Revised Draft Water Resources Management Plan 2024

Technical Appendix X - Investment Model Outputs

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Background and Introduction

X.1 Appendix X provides additional information and summary outputs produced by the WRSE Investment Model (IVM).

IVM Run Dossiers

X.2 Each run dossier contains information from the IVM on:

- Metadata – How the run is configured
- Metrics – Information and breakdowns for all the metrics in the categories Cost, Environmental and Social (including Carbon) and Resilience
- Scheme plots – Bubble charts of options by pathway
- Option type utilisation
- Sankey plots
- Hex plots

X.3 Please note that the Metadata, metric information and Hex plots are provided **at regional-level**. The scheme plots, utilisation plots and Sankey plots are at **company-level.**

X.4 There is a dossier for each of the following model runs cited in Section 10:

- Overall Best Value Plan
- Cost-based
  - Adaptive Least Cost Plan (STPR)
- Wider BVP Metric-based
  - Best Environmental and Society Plan
  - Resilience-focused Plan
  - General BVP Uplift Plan
- Sensitivity analysis
  - Demand Management Policy:
    - Company-led Low basket only
    - Government-led hybrid H only
    - Government-led hybrid G only
  - Option availability/capability:
    - No SESRO
    - No SESRO or STT
    - Only SESRO 150Mm^3 available
    - Only SESRO 125Mm^3 available

- Only SESRO 100Mm^3 available
- Only SESRO 75Mm^3 available
- No Teddington DRA
- Upsize Grand Union Canal transfer to 100 Ml/d
- Beckton recycling 50 in 2033
- Beckton recycling 100 in 2033
- Beckton recycling 150 in 2033

– Drought Resilience policy date changes
  - 1:500 in 2035 (instead of 2040)
  - 1:500 in 2045 (instead of 2040)
  - 1:500 in 2050 (instead of 2040)
  - 1:200 in 2035 (instead of 2030)

– Base Supply Capability
  - Gateway 50 Ml/d
  - Lower Thames Reductions
  - Lower Thames Reductions (mitigated by Tunnel)
  - WBGWS withdrawn in 2040
  - WBGWS withdrawn in 2050
  - ESW Export increased in 2030 (instead of 2035)

– Combinations:
  - Gov-led H + No SESRO
  - Gov-led H + SESRO 125Mm^3
  - Gov-led H + SESRO 100Mm^3
  - Gov-led H + SESRO 75Mm^3
  - Gov-led G + SESRO 150Mm^3
  - Gov-led G + SESRO 125Mm^3
  - Gov-led G + SESRO 100Mm^3
  - Gov-led G + SESRO 75Mm^3
  - Resilience + SESRO 150Mm^3
  - Resilience + SESRO 125Mm^3
  - Resilience + SESRO 100Mm^3
  - Resilience + SESRO 75Mm^3

- E&S + SESRO 150Mm^3
- E&S + SESRO 125Mm^3
- E&S + SESRO 100Mm^3
- E&S + SESRO 75 Mm^3
- General BVP + SESRO 150Mm^3
- General BVP + SESRO 125Mm^3
- General BVP + SESRO 100Mm^3
- General BVP + SESRO 75Mm^3

Interpreting the plots

Option selection plots

X.5 These plots show when an option is first utilised by the model along each of the 9 pathways (shown from 1-9, top to bottom), over the planning period.

X.6 Each dot represents a single scheme, with the dots coloured by type and sized by total capacity (not utilisation, which will vary across the planning period). The focus is on resource development/transfer options. Demand management is not shown.

X.7 An option can only be selected once in each pathway.

X.8 The Severn-Thames transfer is classified as a Direct River Abstraction (red dot), so for example, in the Overall BVP dossier you can see a large red dot in pathways 1 and 4 (representing the unsupported transfer and Netheridge sweetening flow), in 2050 and then further smaller red dots through to the early 2060s as additional support elements are utilised.

Sankey plots

X.9 Sankey plots provide a high-level interpretation of the supply demand balance and the relative volumetric contribution of new options by option type.

X.10 Four time-slices are shown: 2026, 2040, 2050 and 2075.

X.11 The colour-coding is automatic and is not consistent/relevant for this plot type.

X.12 The option types, for clarity, include:

- Loss reduction = Demand management measures
- Change in levels of service = Drought intervention measures (e.g. TUBs and NEUBs)
- Direct River Abstraction includes Teddington DRA and the STT options
- Reclaimed water = Effluent re-use
- Exports includes the Thames to Southern and Thames to Affinity transfers, although it is likely that they would not be an export from 'TW' to either company, but an arrangement based on part-ownership of different assets.

Hex plots

X.13 The hex plots illustrate how water moves into and around the region, and how this will change under the proposals in our draft plan. The hexagons in the plots are either:

- The individual water resource zones (WRZs) in the South East region, and WRZ outside of the region that provide a transfer of water either into or out of the region.
- Zones have been included for investment modelling purposes only, which represent transfer and distribution constraints in the WRSE network.

X.14 Four time-slices are shown: 2026, 2040, 2050 and 2075.

X.15 Each of the plots shows transfers at a particular point in time, under our 1:500 DYAA planning scenario. The thicker the lines between the WRZ, the larger the transfer. The plots demonstrate how increased connectivity within the region, and from other regions, will significantly increase the flow of water that is transferred over time. All of the plots represent the position under our reported pathway – situation 4.

X.16 A key for the abbreviations used in the plots is provided in the table below.

WRZ	Water Company	Zone Name
AZ1	Affinity Water	Misbourne
AZ2		Colne
AZ3		Lee
AZ4		Pinn
AZ5		Stort
AZ6		Wey
AZ7		Dour
PRT	Portsmouth Water	Portsmouth
SES	SES Water	SES
RZ1	South East Water	Tunbridge Wells
RZ2		Haywards Heath
RZ3		Eastbourne
RZ4		Bracknell
RZ5		Farnham
RZ6		Maidstone
RZ7		Cranbrook
RZ8		Ashford
HAZ	Southern Water	Hampshire Andover
HKZ		Hampshire Kingsclere
HRZ		Hampshire Rural
HSE		Hampshire Southampton East
HSW		Hampshire Southampton West
HWZ		Hampshire Winchester
IOW		Isle of Wight
KME		Kent Medway East
KMW		Kent Medway West
KTZ		Kent Thanet
SBZ		Sussex Brighton
SHZ		Sussex Hasting

WRZ	Water Company	Zone Name
SNZ		Sussex North
SWZ		Sussex Worthing
GUI	Thames Water	Guildford
HEN		Henley
KVZ		Kennet Valley
LON		London
SWA		Slough, Wycombe and Aylesbury
SWX		Swindon and Oxfordshire

Zone	Water Company	Zone Name
HON	Modelling purposes only	Honor Oak Junction
HTE		Havant Thicket Exchange
KGV		King George V Junction
OTT		Otterbourne Junction
PWE		Portsmouth Water East
RA4		Raw AZ4 Junction
STR		Strategic Thames Resource
STT		Severn Thames Junction
T2S		Thames to Southern Junction
TWD		Testwood Junction
TWJ		Thames-Weirwood Junction
UTC		Upper Thames Constrained
UTJ		Upper Thames Junction
WLJ		West London Junction
WWD		Weirwood Junction

Table X-1: Hex plot abbreviations

IVM RUN DOSSIER

OVERALL BEST VALUE PLAN

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-only-sesro150-2075-bvp-07_50-v2
Description	BVP run with hybrid-c+2 government interventions including only SESRO 150 Mm3. Constrained to 7.5% improvement in worst BVP metrics from least cost run.
Created at	11/07/2023, 13:12:57
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2-only-sesro150
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets. Exclude all SESRO variants except 150.
Optimised discount rate	STPR

Metrics

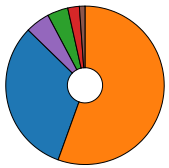
Net present value (Cost)

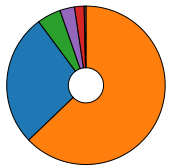
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	20,618	17,917	17,197	19,255	17,772	16,972	18,132	17,264	16,540	(£m)
Cost w/o deficit (STPR)	20,618	17,917	17,197	19,255	17,772	16,972	18,132	17,264	16,540	(£m)
Cost w/ deficit (IGEQ)	31,407	26,288	25,007	28,806	26,042	24,620	26,798	25,165	23,858	(£m)
Cost w/o deficit (IGEQ)	31,407	26,288	25,007	28,806	26,042	24,620	26,798	25,165	23,858	(£m)
Cost w/ deficit (LTDR)	22,708	19,566	18,740	21,121	19,401	18,486	19,832	18,824	17,991	(£m)
Cost w/o deficit (LTDR)	22,708	19,566	18,740	21,121	19,401	18,486	19,832	18,824	17,991	(£m)

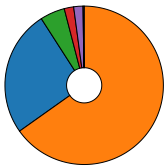
Cost breakdown (STPR)

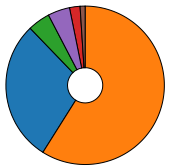
Select Company: Total

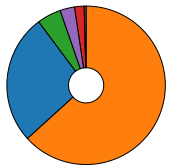
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	6,553	4,835	4,425	5,555	4,717	4,234	4,884	4,431	3,978	(£m)
Fixed opex	11,443	11,261	11,208	11,350	11,242	11,185	11,255	11,202	11,143	(£m)
Fixed operational carbon	878	870	868	877	870	869	872	866	866	(£m)
Embedded carbon	488	357	330	415	351	321	370	332	304	(£m)
Variable opex	1,022	530	325	862	522	314	651	393	232	(£m)
Variable carbon opex	233	65	40	196	69	49	101	40	18	(£m)

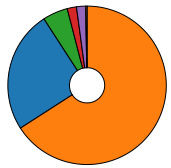
situation1 

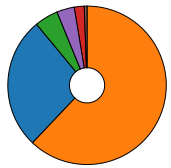
situation2 

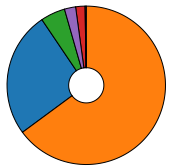
situation3 

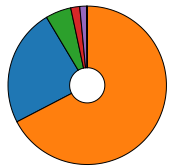
situation4 

situation5 

situation6 

situation7 

situation8 

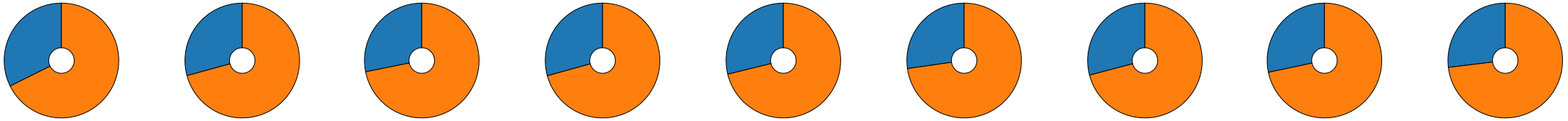
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,123,946	2,185,460	2,011,543	2,591,736	2,151,370	1,947,709	2,287,749	2,022,398	1,834,877	(tonnes)
Operational emissions	6,535,410	5,284,631	5,129,203	6,258,003	5,305,657	5,197,195	5,570,941	5,124,416	4,980,387	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

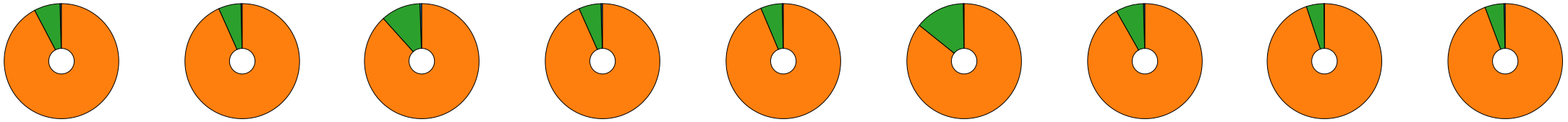


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	103	45	26	94	39	12	61	13	12	(GWh)
Grid	22,444	11,103	4,334	18,832	10,925	3,839	13,137	7,900	2,923	(GWh)
Renewable	1,781	752	547	1,260	707	628	1,121	411	166	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	66,691.00	65,338.00	65,338.00	67,933.00	65,340.00	65,338.00	66,722.00	65,338.00	65,338.00	
SEA environmental disbenefit	104,955.00	77,782.00	72,756.00	97,446.00	78,090.00	71,933.00	83,773.00	70,130.00	61,721.00	
Natural capital	82,030,355.69	81,052,068.42	81,238,835.65	81,015,364.28	81,188,620.53	81,479,508.50	81,609,503.08	81,352,662.92	81,731,503.21	
Bio-diversity net gain	−202,722.00	−144,618.00	−126,255.00	−199,827.00	−150,321.00	−121,902.00	−150,989.00	−127,691.00	−99,097.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	36,704.00	35,098.00	34,819.00	36,555.00	35,130.00	34,696.00	35,269.00	34,496.00	33,967.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	29.53	29.83	32.49	29.24	29.88	32.68	31.20	34.63	38.61	
R1: Uncertainty of option supply/demand benefit	6.04	5.60	6.03	5.83	5.57	6.07	5.94	6.48	7.21	
R3: Risk of service failure due to other physical hazards	7.00	7.40	8.24	7.03	7.42	8.29	7.71	8.76	10.01	
R4: Availability of additional headroom	6.62	6.96	7.16	6.69	6.98	7.19	7.30	7.66	7.90	
R5: Catchment/raw water quality risks (incl. climate change)	4.07	4.19	4.72	3.81	4.21	4.74	4.33	5.00	5.78	
R6: Capacity of catchment services	0.31	0.00	0.01	0.31	0.00	0.01	0.00	0.01	0.01	
R7: Risk of service failure to other exceptional events	5.37	5.67	6.34	5.46	5.70	6.38	5.92	6.73	7.71	
R8: Soil health	0.11	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	

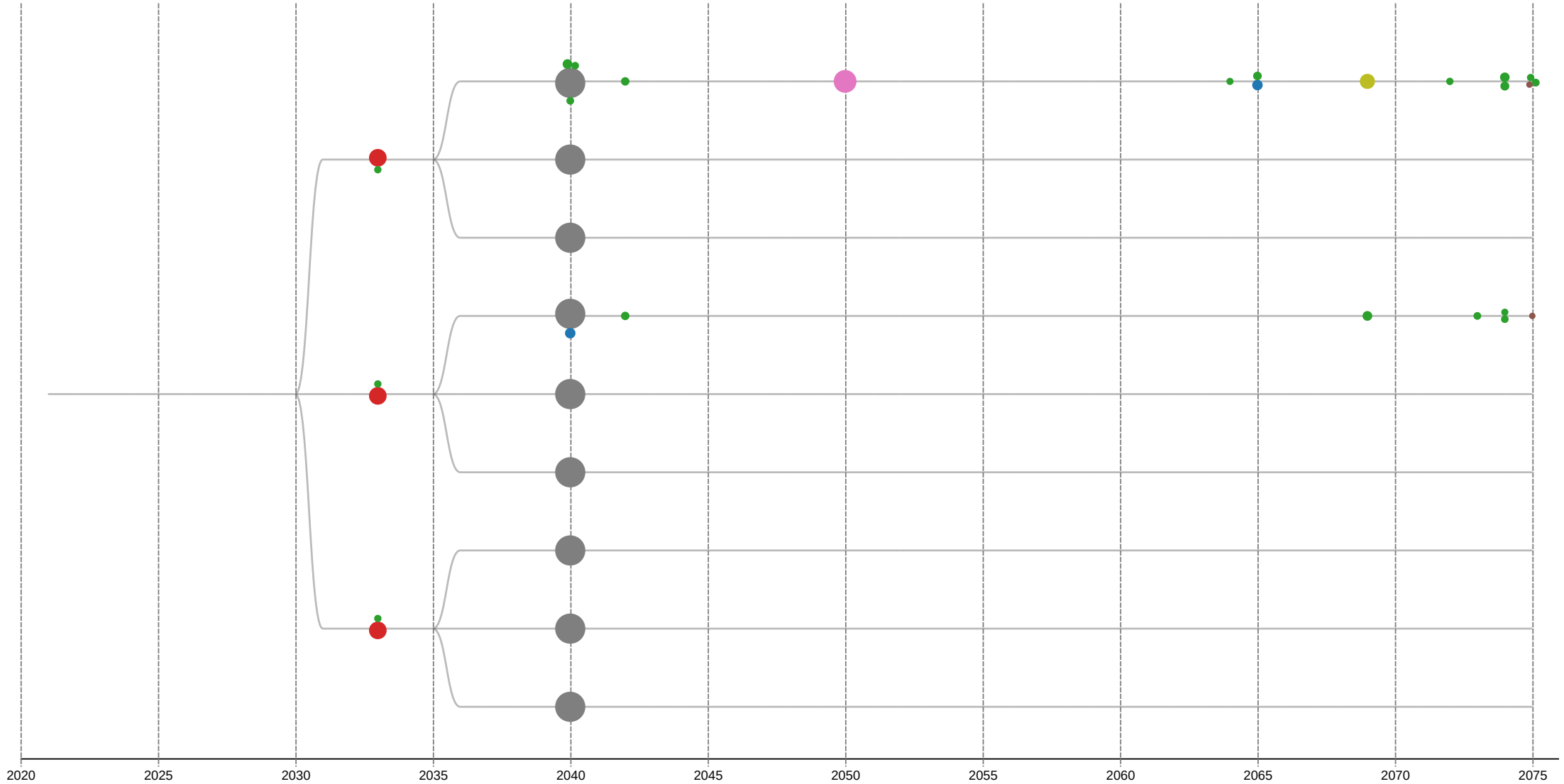
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	14.33	15.72	17.57	14.39	15.72	17.27	16.15	18.40	20.93	
A3: Operational complexity and flexibility	6.53	7.10	7.96	6.69	7.15	8.04	7.39	8.49	9.76	
A4: WRZ connectivity	7.68	8.59	9.59	7.56	8.55	9.20	8.73	9.88	11.14	
A7: Customer relations support engagement with demand management	0.12	0.03	0.03	0.13	0.03	0.03	0.03	0.03	0.03	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.65	20.16	22.13	19.63	20.22	22.24	20.81	23.62	26.79	
E1: Scaleability and modularity of proposed changes	8.77	9.42	10.43	8.78	9.46	10.54	9.72	11.15	12.71	
E2: Intervention lead times	4.22	4.24	4.50	4.18	4.25	4.44	4.34	4.78	5.33	
E3: Reliance on external bodies to deliver changes	6.20	6.49	7.19	6.21	6.51	7.25	6.75	7.68	8.75	
E5: Collaborative land management	0.46	0.01	0.01	0.46	0.00	0.01	0.00	0.01	0.01	

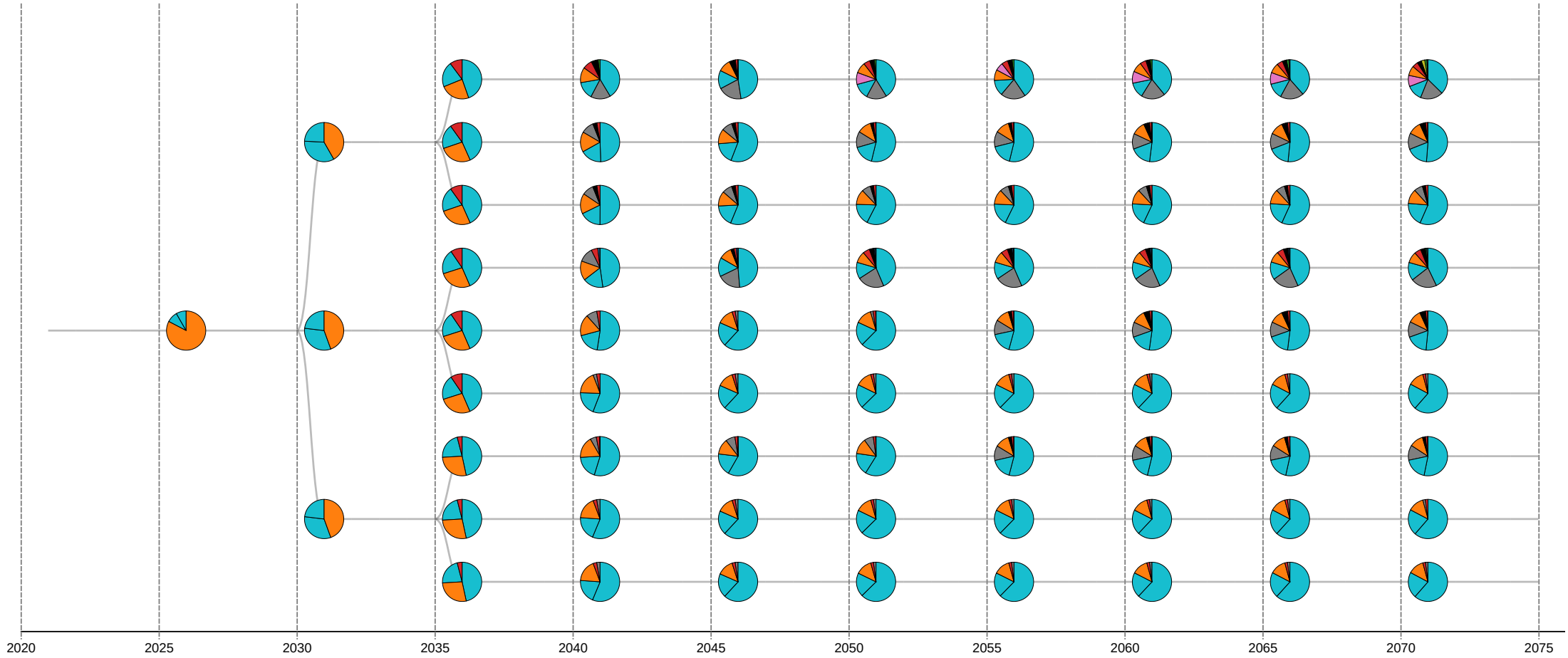
Option Selection (Thames Water)



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

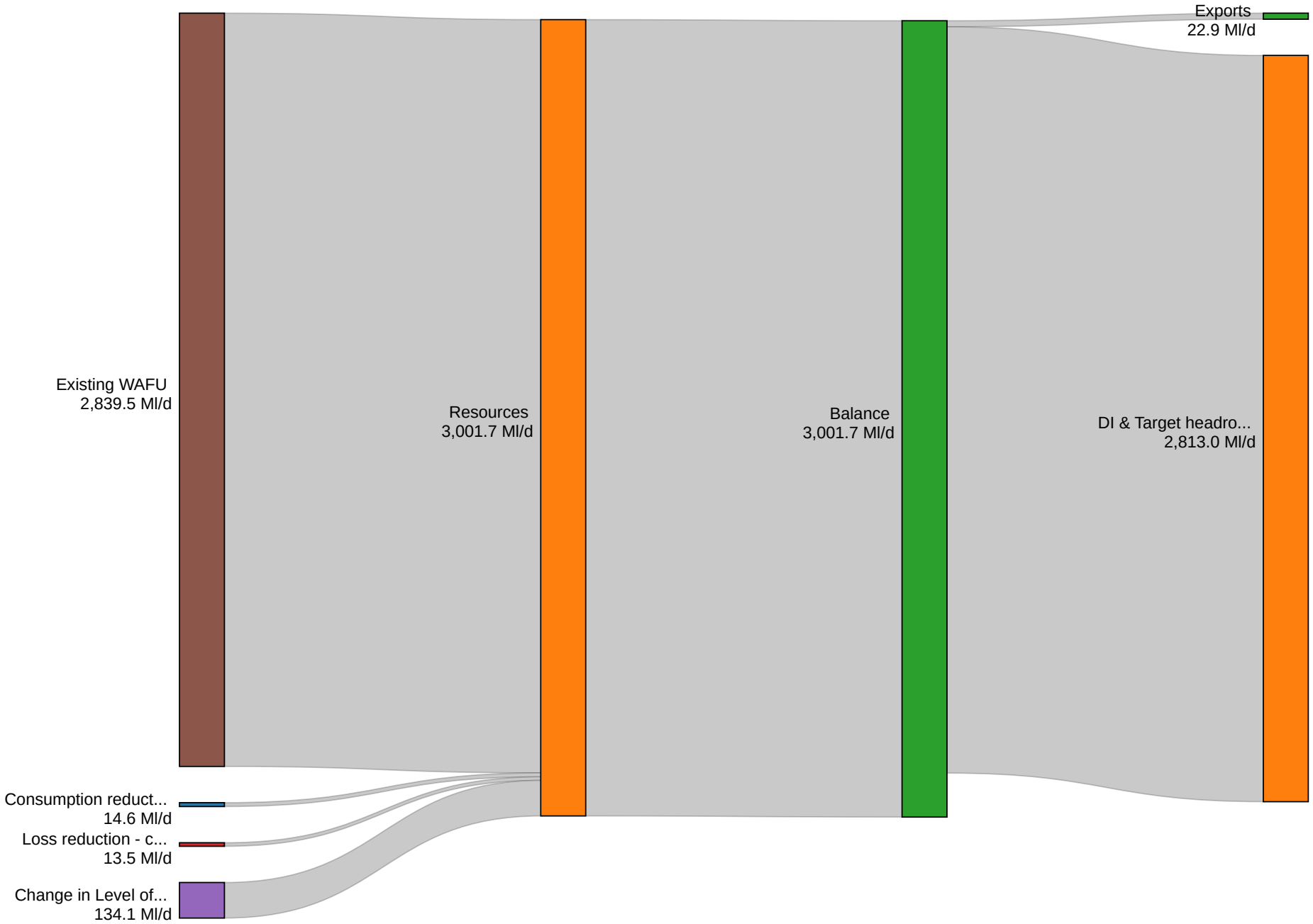
Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.

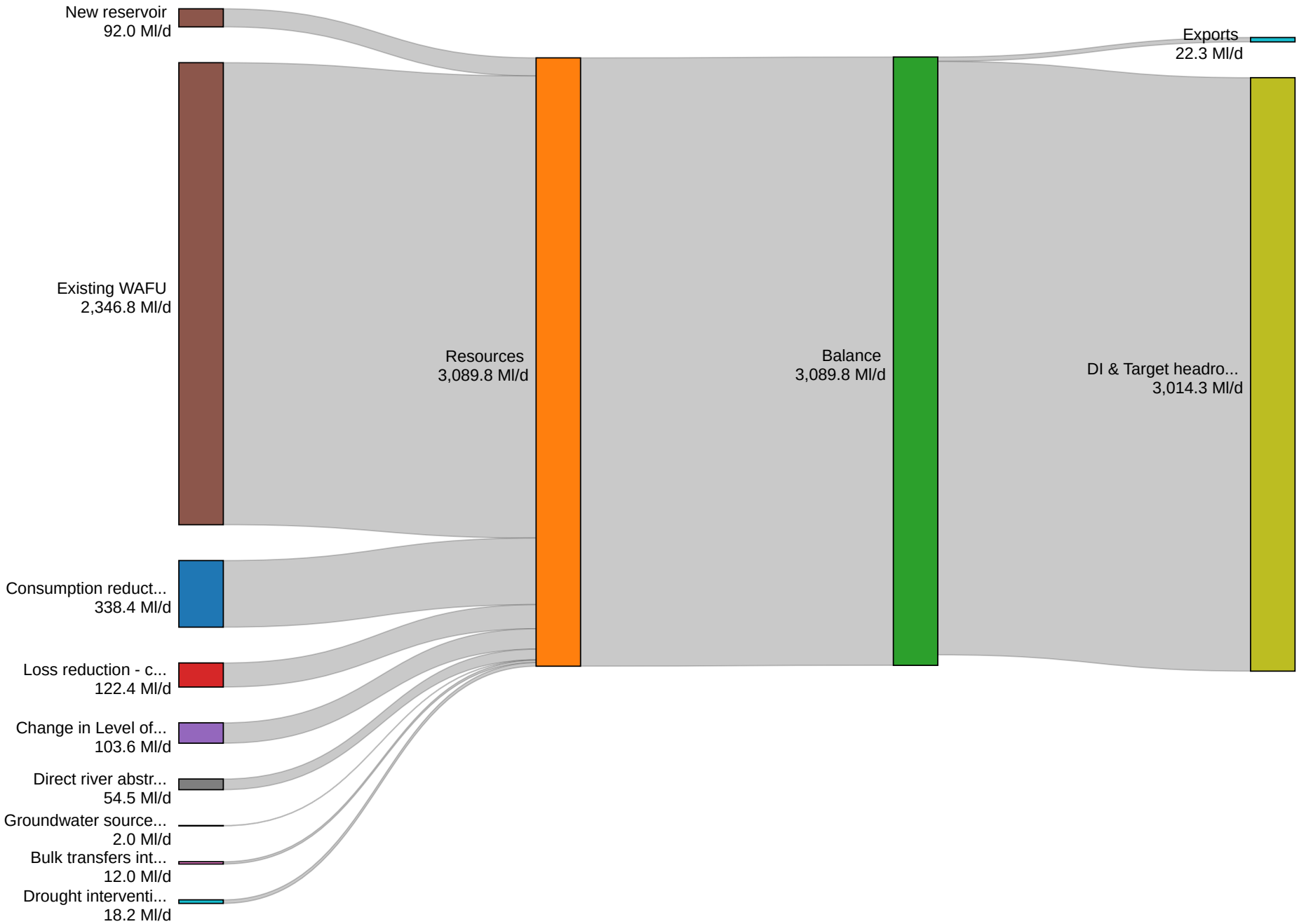


- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

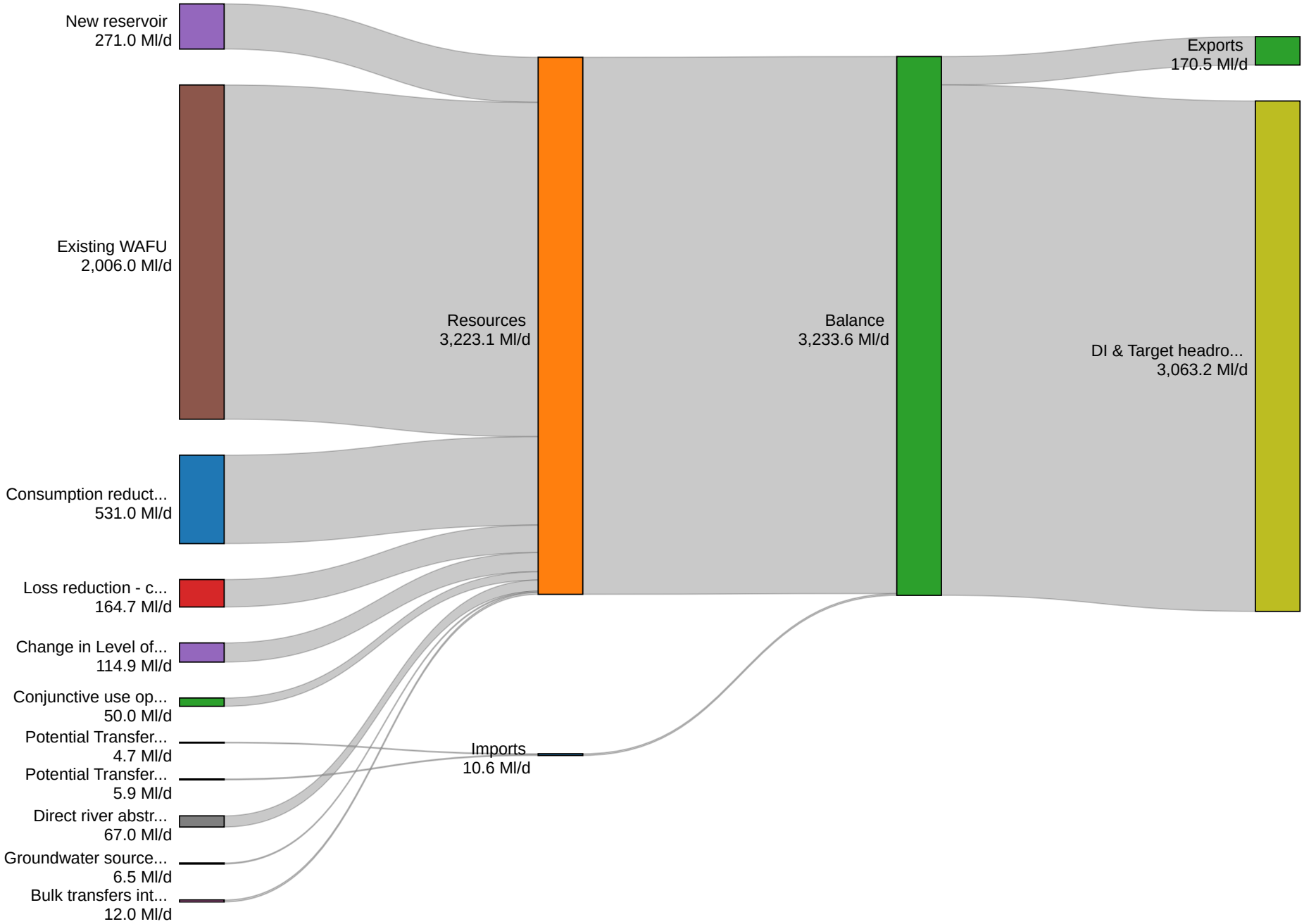
Situation 4 - 2026 (Thames Water)



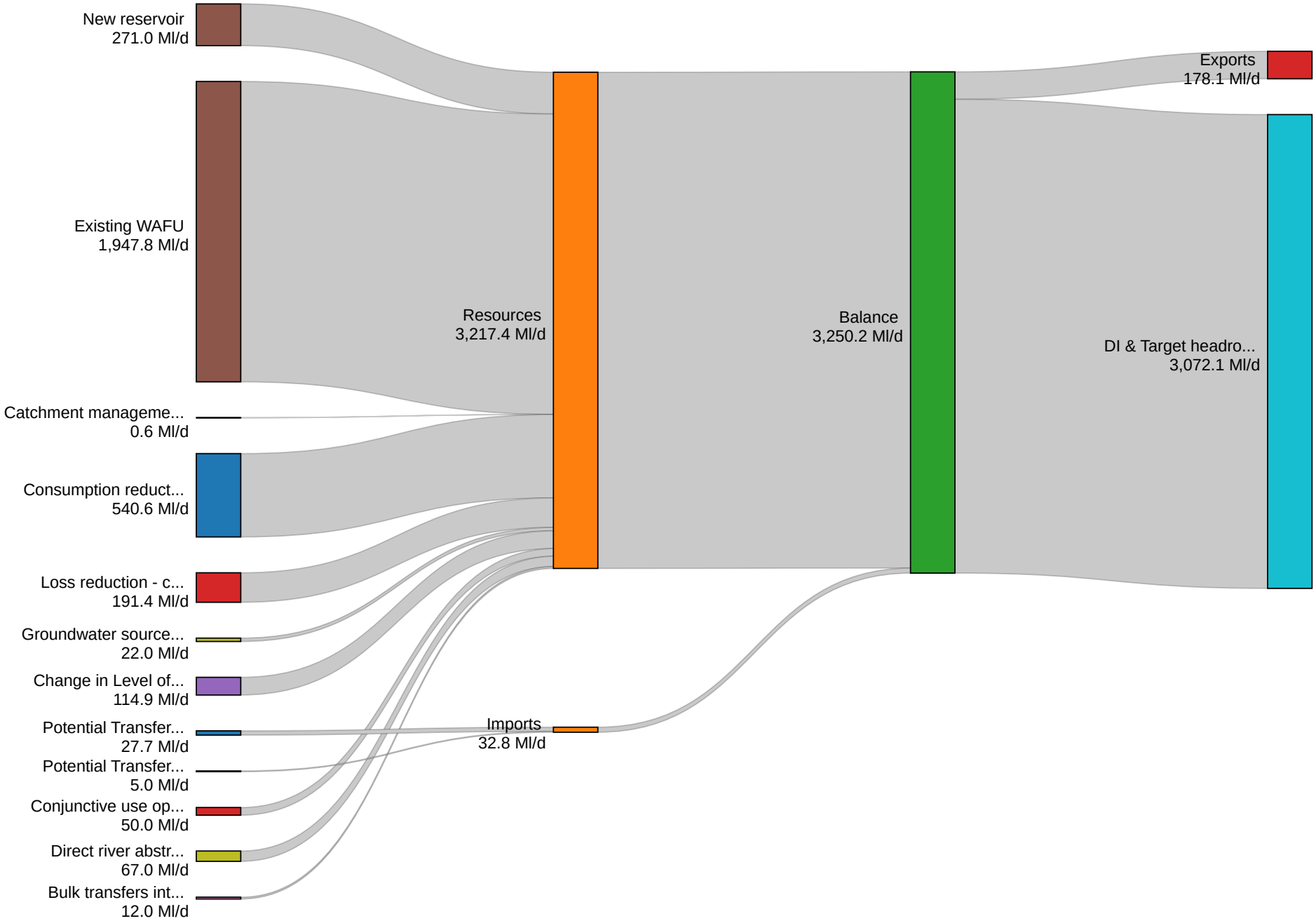
Situation 4 - 2040 (Thames Water)



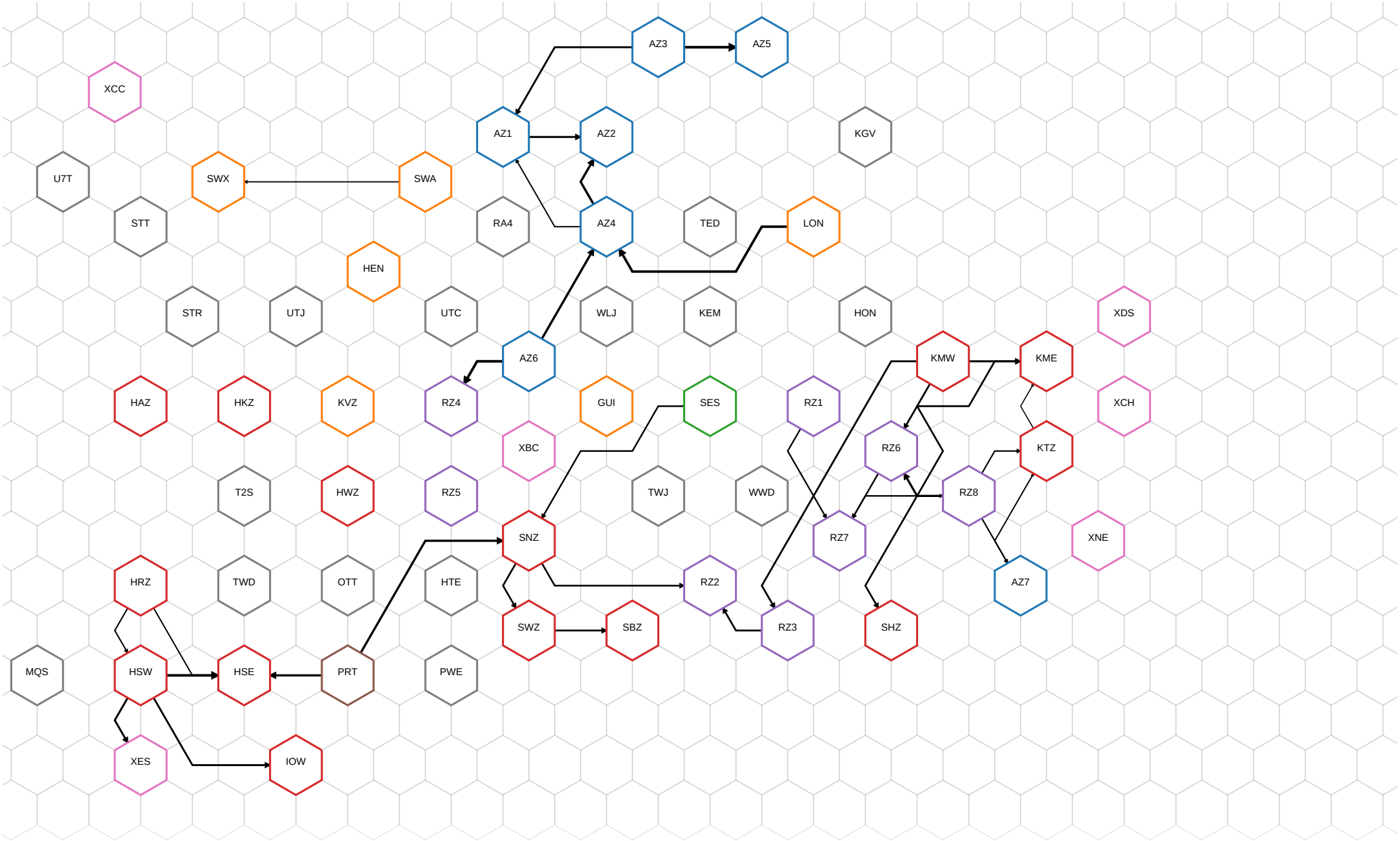
Situation 4 - 2050 (Thames Water)



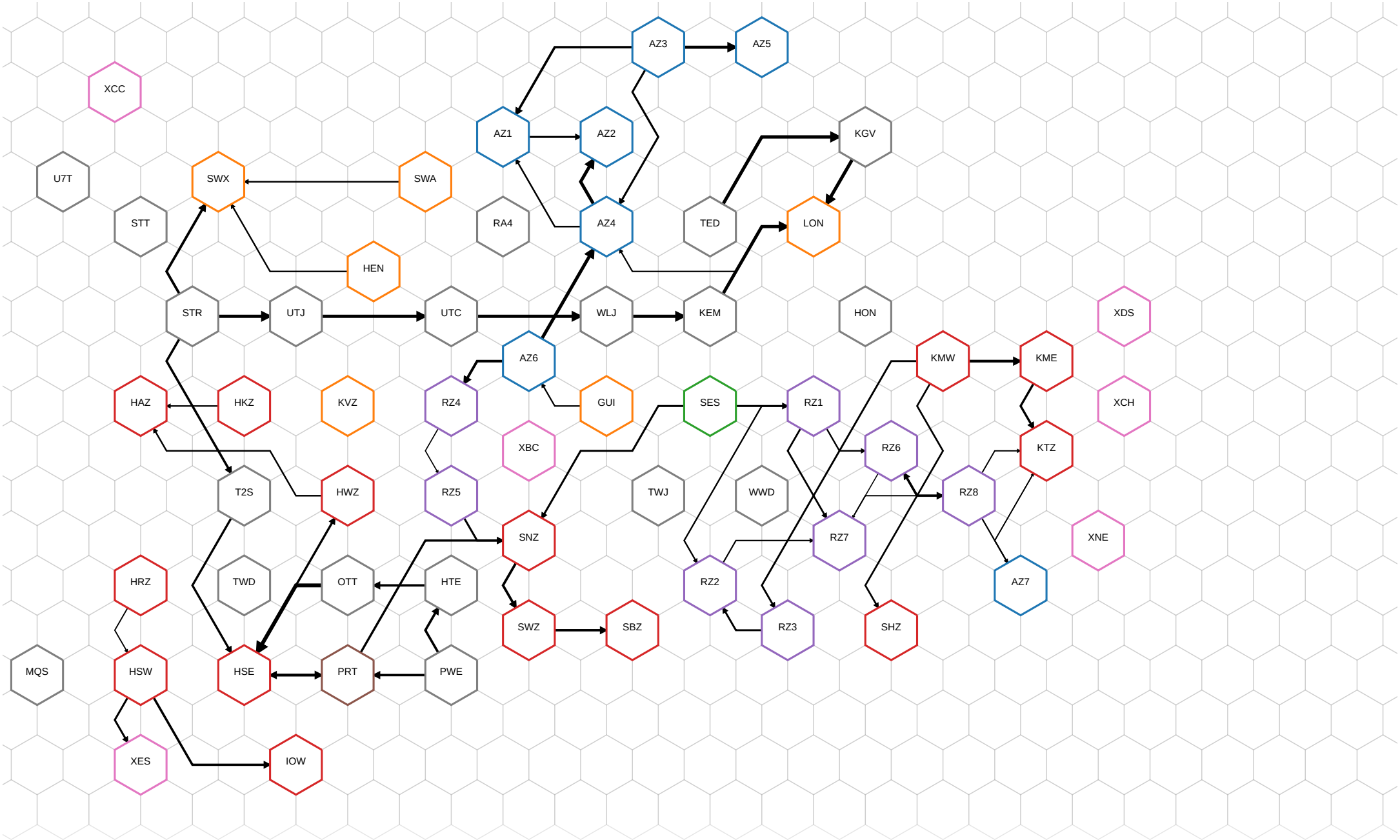
Situation 4 - 2075 (Thames Water)



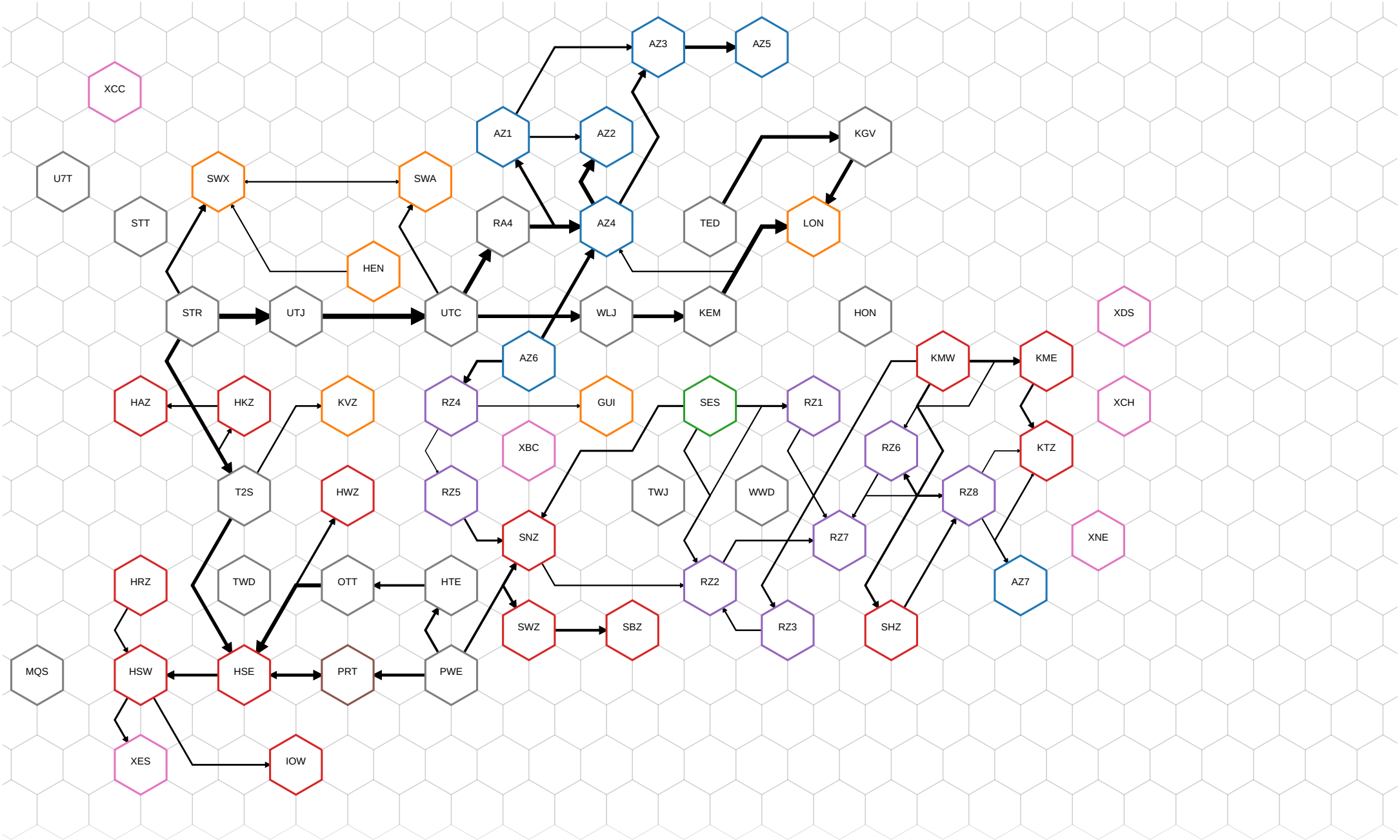
Situation 4 - 2026



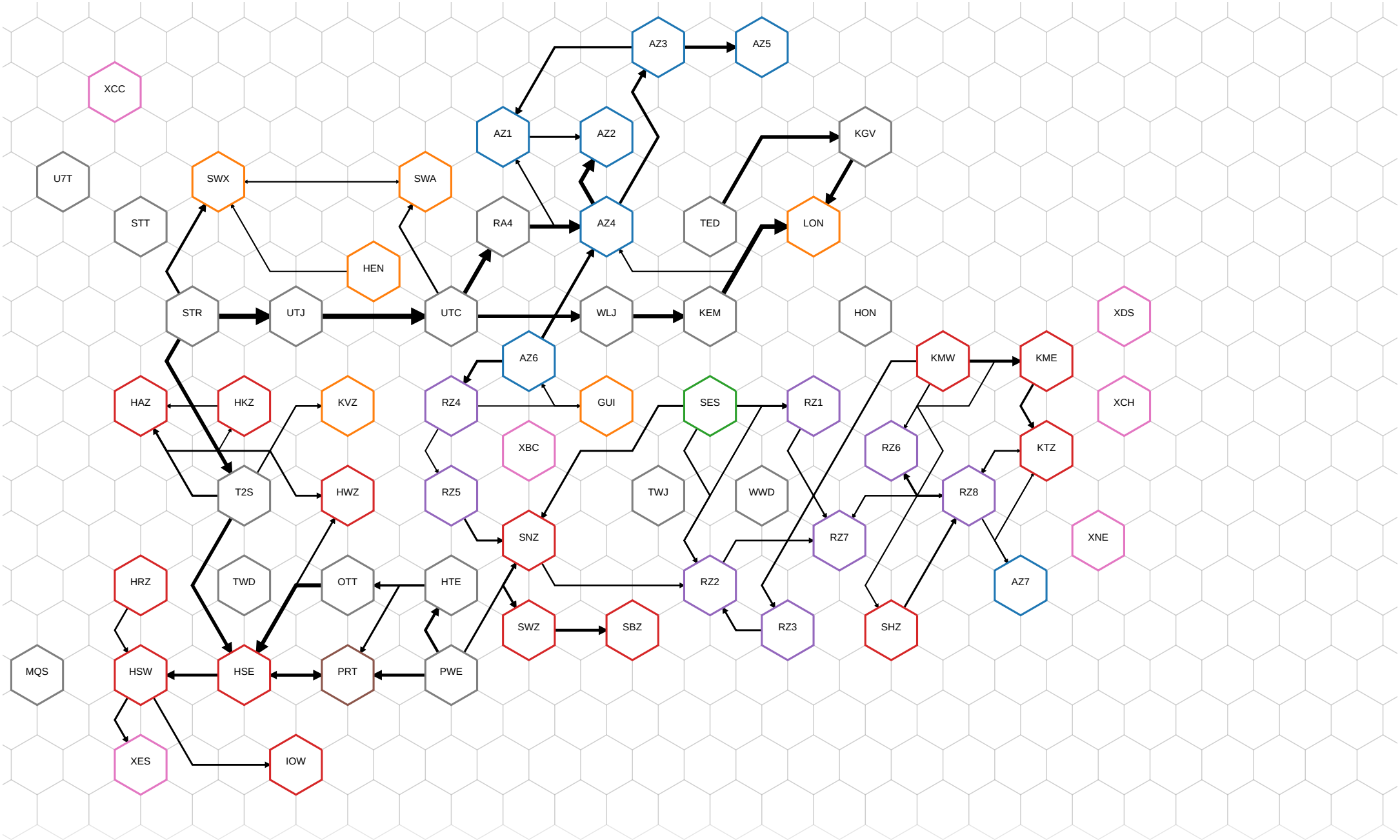
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

ADAPTIVE LEAST COST PLAN (STPR)

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-2075
Description	Least cost run with hybrid-c+2 government interventions.
Created at	23/06/2023, 20:08:51
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets.
Optimised discount rate	STPR

Metrics

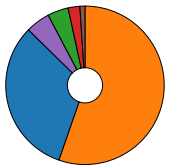
Net present value (Cost)

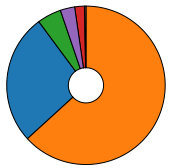
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	20,533	17,663	16,988	19,052	17,550	16,797	17,600	16,753	16,060	(£m)
Cost w/o deficit (STPR)	20,533	17,663	16,988	19,052	17,550	16,797	17,600	16,753	16,060	(£m)
Cost w/ deficit (IGEQ)	31,324	25,882	24,663	28,508	25,690	24,349	25,971	24,375	23,128	(£m)
Cost w/o deficit (IGEQ)	31,324	25,882	24,663	28,508	25,690	24,349	25,971	24,375	23,128	(£m)
Cost w/ deficit (LTDR)	22,622	19,283	18,507	20,898	19,155	18,293	19,244	18,260	17,463	(£m)
Cost w/o deficit (LTDR)	22,622	19,283	18,507	20,898	19,155	18,293	19,244	18,260	17,463	(£m)

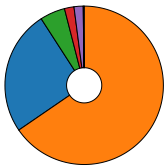
Cost breakdown (STPR)

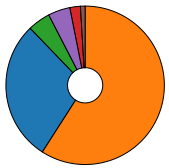
Select Company: Total

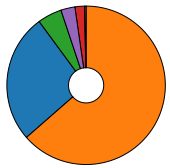
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	6,576	4,705	4,322	5,475	4,624	4,182	4,502	4,054	3,621	(£m)
Fixed opex	11,360	11,167	11,116	11,254	11,155	11,099	11,159	11,108	11,048	(£m)
Fixed operational carbon	880	869	870	877	870	869	871	867	865	(£m)
Embedded carbon	493	352	330	414	346	317	340	303	279	(£m)
Variable opex	1,014	517	317	853	503	300	637	386	230	(£m)
Variable carbon opex	211	53	32	180	53	30	91	36	17	(£m)

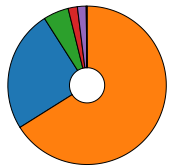
situation1 

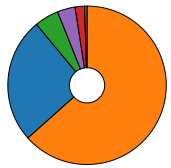
situation2 

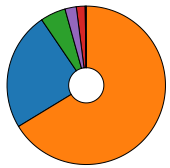
situation3 

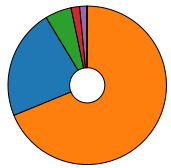
situation4 

situation5 

situation6 

situation7 

situation8 

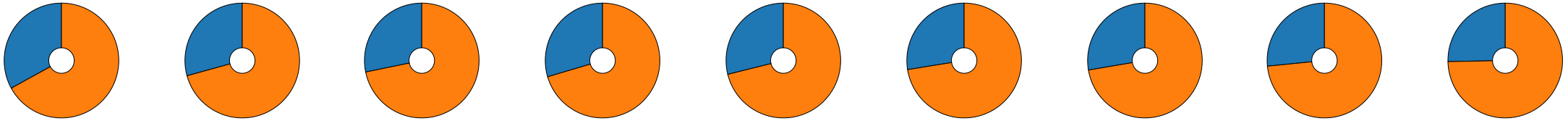
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,162,735	2,156,113	2,004,927	2,589,503	2,118,820	1,929,021	2,107,615	1,846,769	1,685,150	(tonnes)
Operational emissions	6,416,312	5,204,888	5,097,158	6,164,492	5,216,347	5,074,343	5,508,962	5,100,931	4,973,614	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

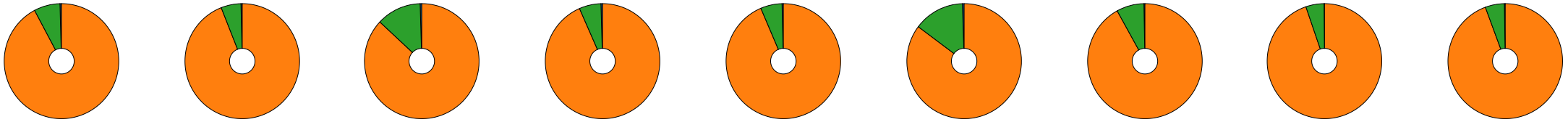


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	104	44	23	95	44	22	41	9	8	(GWh)
Grid	22,677	11,394	4,242	19,228	11,022	3,899	13,217	7,974	2,892	(GWh)
Renewable	1,807	681	615	1,262	713	654	1,115	433	165	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	69,276.00	63,943.00	63,099.00	67,149.00	63,619.00	62,710.00	63,882.00	61,608.00	60,552.00	
SEA environmental disbenefit	113,350.00	81,960.00	75,599.00	99,769.00	79,604.00	73,499.00	83,904.00	70,527.00	61,680.00	
Natural capital	81,558,380.08	77,108,627.79	79,953,048.65	75,242,446.88	77,050,015.70	79,699,194.70	80,870,398.70	81,648,863.21	84,520,785.56	
Bio-diversity net gain	−218,825.00	−154,246.00	−127,650.00	−204,324.00	−154,023.00	−128,380.00	−124,133.00	−96,975.00	−67,921.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	33,935.00	31,847.00	31,498.00	33,042.00	31,693.00	31,300.00	31,706.00	30,797.00	30,307.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	28.91	29.31	32.12	28.30	29.44	32.25	28.45	31.41	34.89	
R1: Uncertainty of option supply/demand benefit	5.96	5.34	5.83	5.57	5.36	5.85	5.26	5.68	6.27	
R3: Risk of service failure due to other physical hazards	6.96	7.29	8.17	6.91	7.34	8.21	7.00	7.92	9.03	
R4: Availability of additional headroom	6.58	6.92	7.14	6.64	6.94	7.15	7.08	7.44	7.68	
R5: Catchment/raw water quality risks (incl. climate change)	4.12	4.23	4.77	3.86	4.24	4.79	3.94	4.53	5.24	
R6: Capacity of catchment services	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	
R7: Risk of service failure to other exceptional events	5.29	5.54	6.21	5.31	5.56	6.24	5.17	5.83	6.67	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

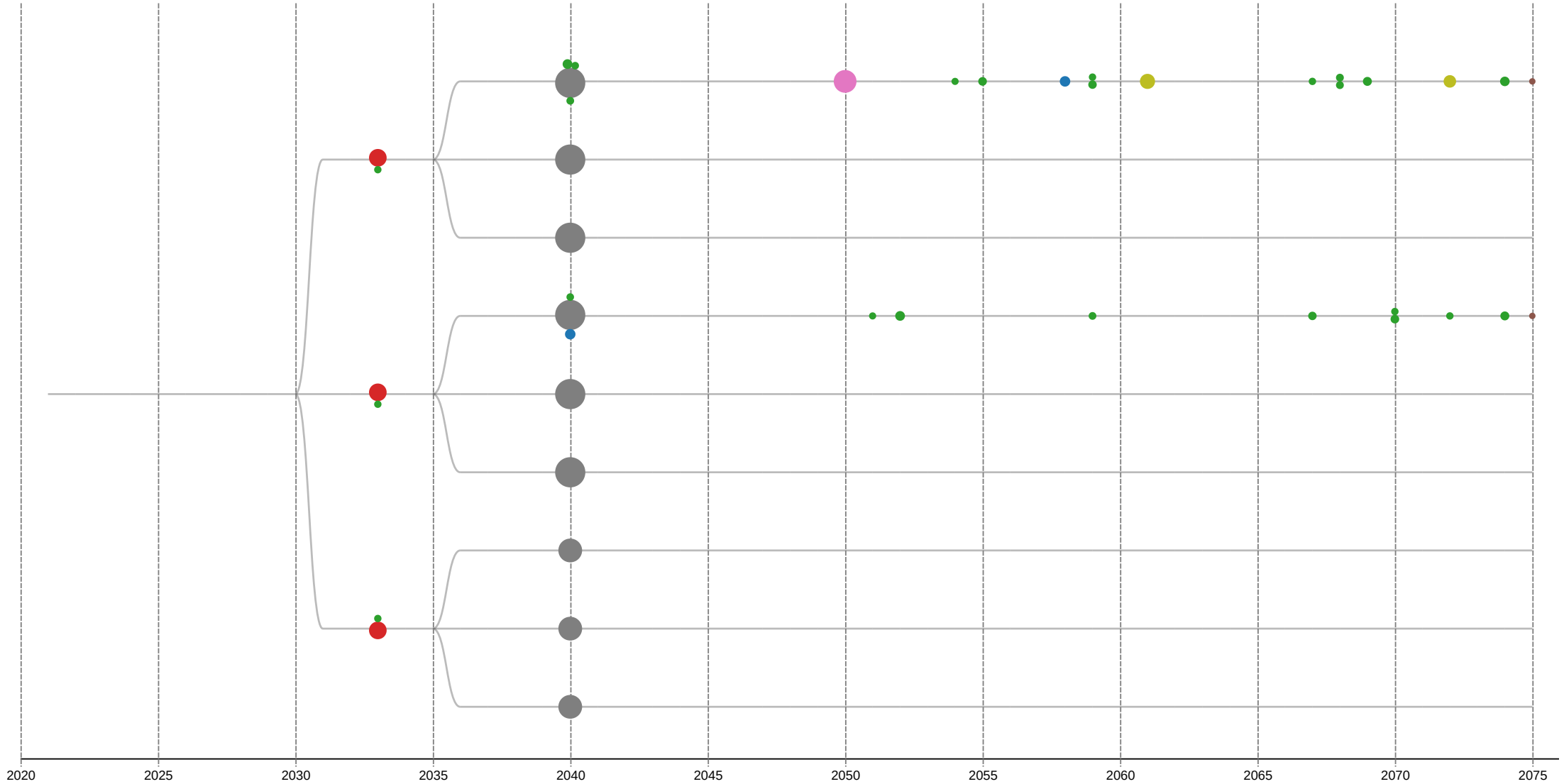
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	14.03	15.61	17.50	14.20	15.66	17.38	15.40	17.51	19.96	
A3: Operational complexity and flexibility	6.49	7.00	7.87	6.59	7.06	7.94	6.68	7.65	8.78	
A4: WRZ connectivity	7.50	8.58	9.60	7.58	8.58	9.41	8.68	9.83	11.15	
A7: Customer relations support engagement with demand management	0.04	0.03	0.03	0.04	0.03	0.03	0.03	0.03	0.03	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.15	19.84	22.05	18.73	19.94	21.99	20.20	22.90	25.93	
E1: Scaleability and modularity of proposed changes	8.78	9.32	10.39	8.67	9.39	10.48	9.67	11.10	12.64	
E2: Intervention lead times	4.20	4.14	4.55	3.97	4.12	4.34	4.04	4.41	4.89	
E3: Reliance on external bodies to deliver changes	6.17	6.38	7.12	6.08	6.43	7.17	6.50	7.38	8.40	
E5: Collaborative land management	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	

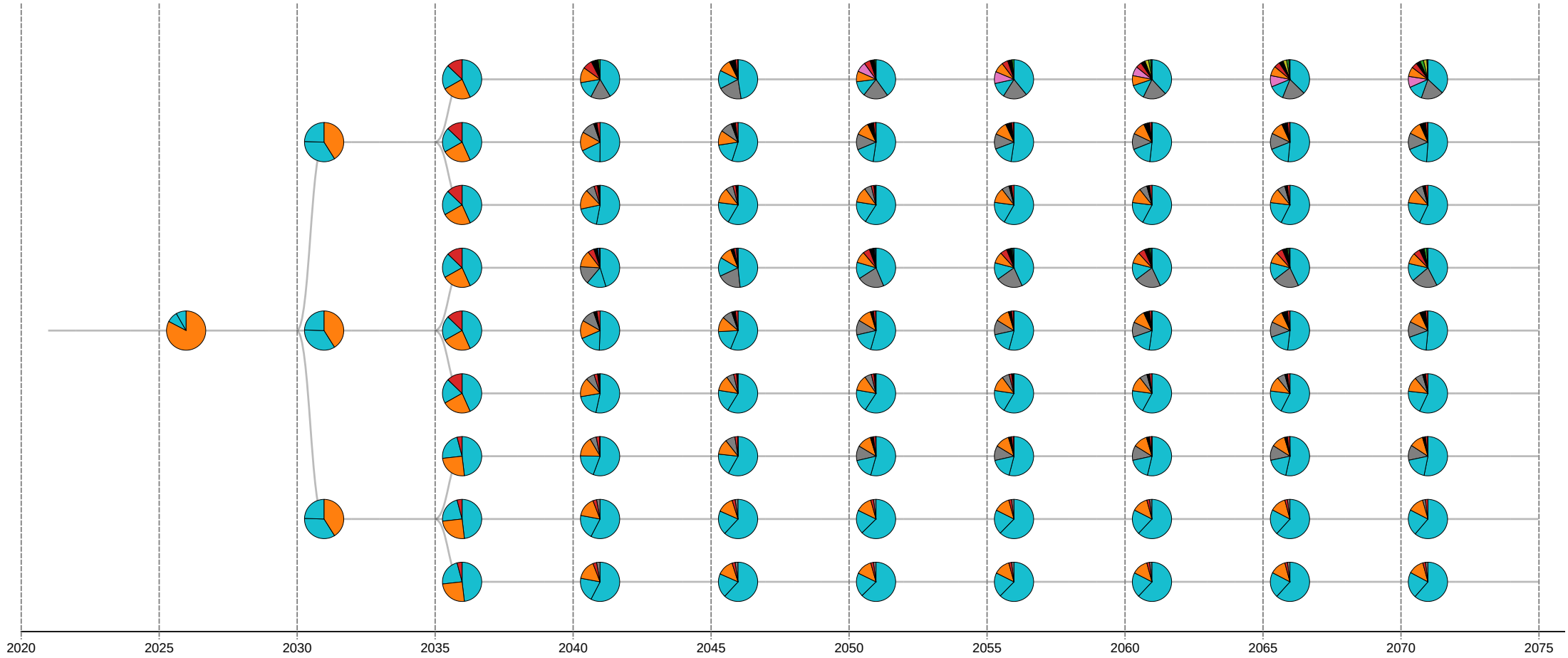
Option Selection (Thames Water)



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

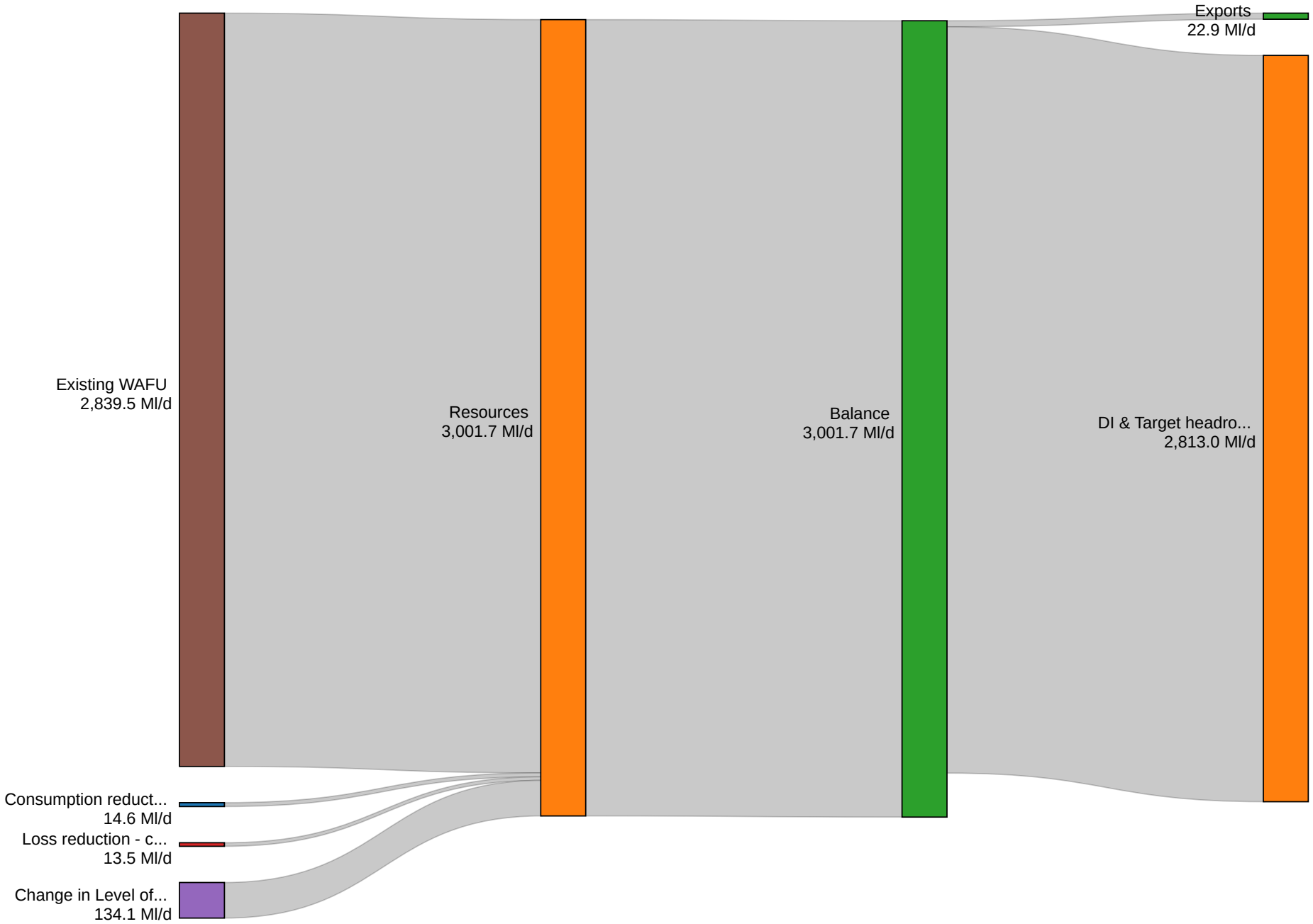
Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.

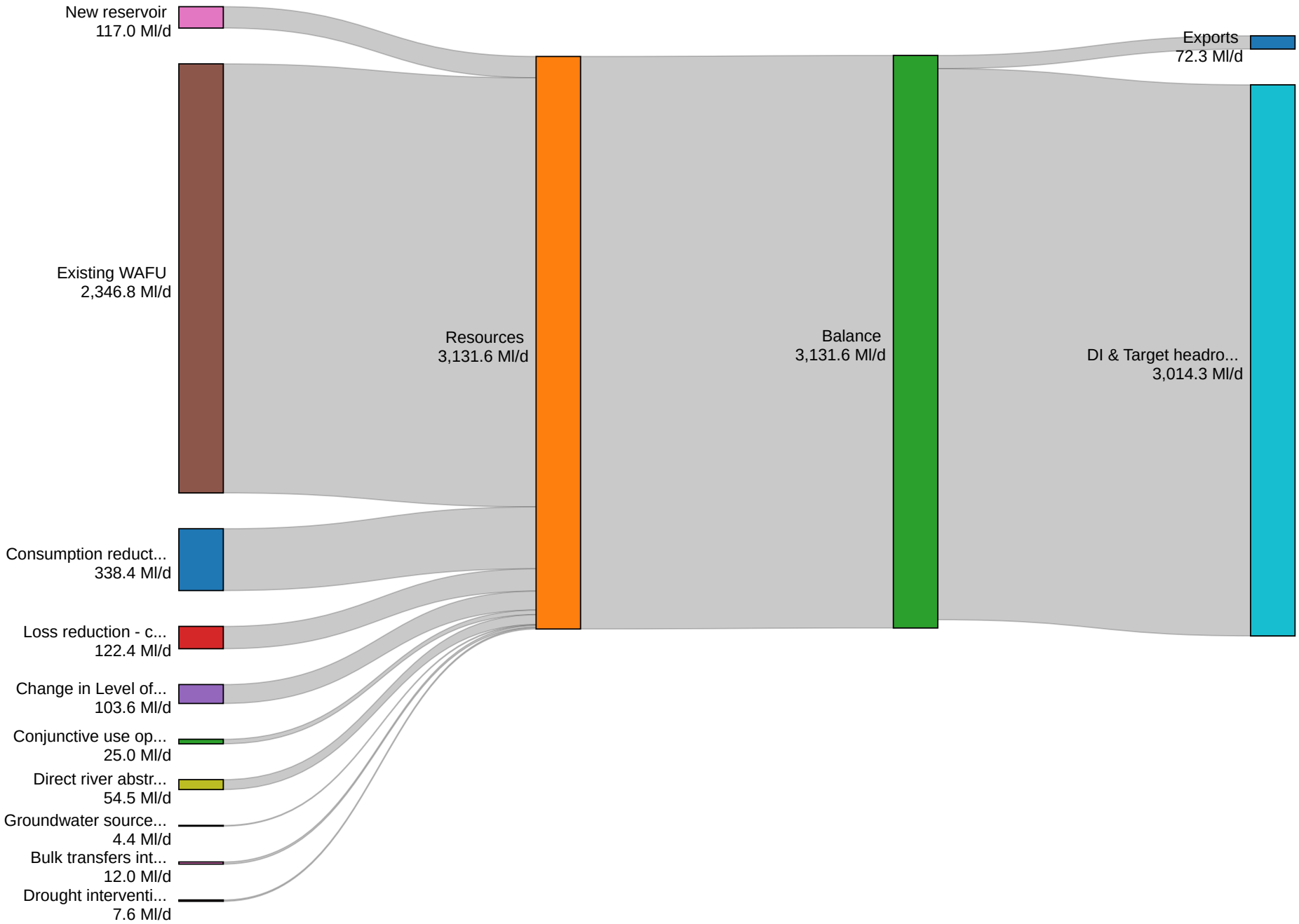


- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

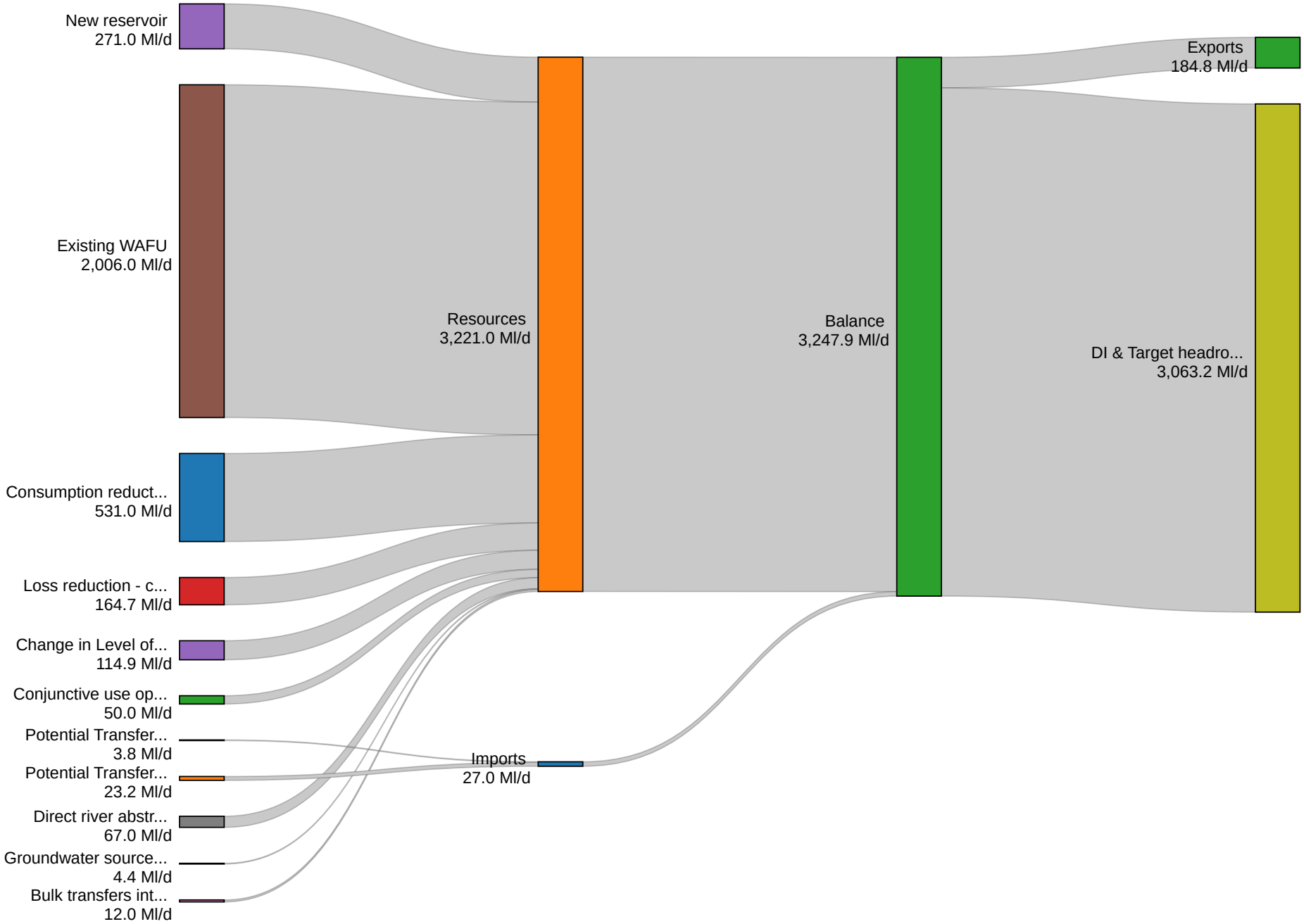
Situation 4 - 2026 (Thames Water)



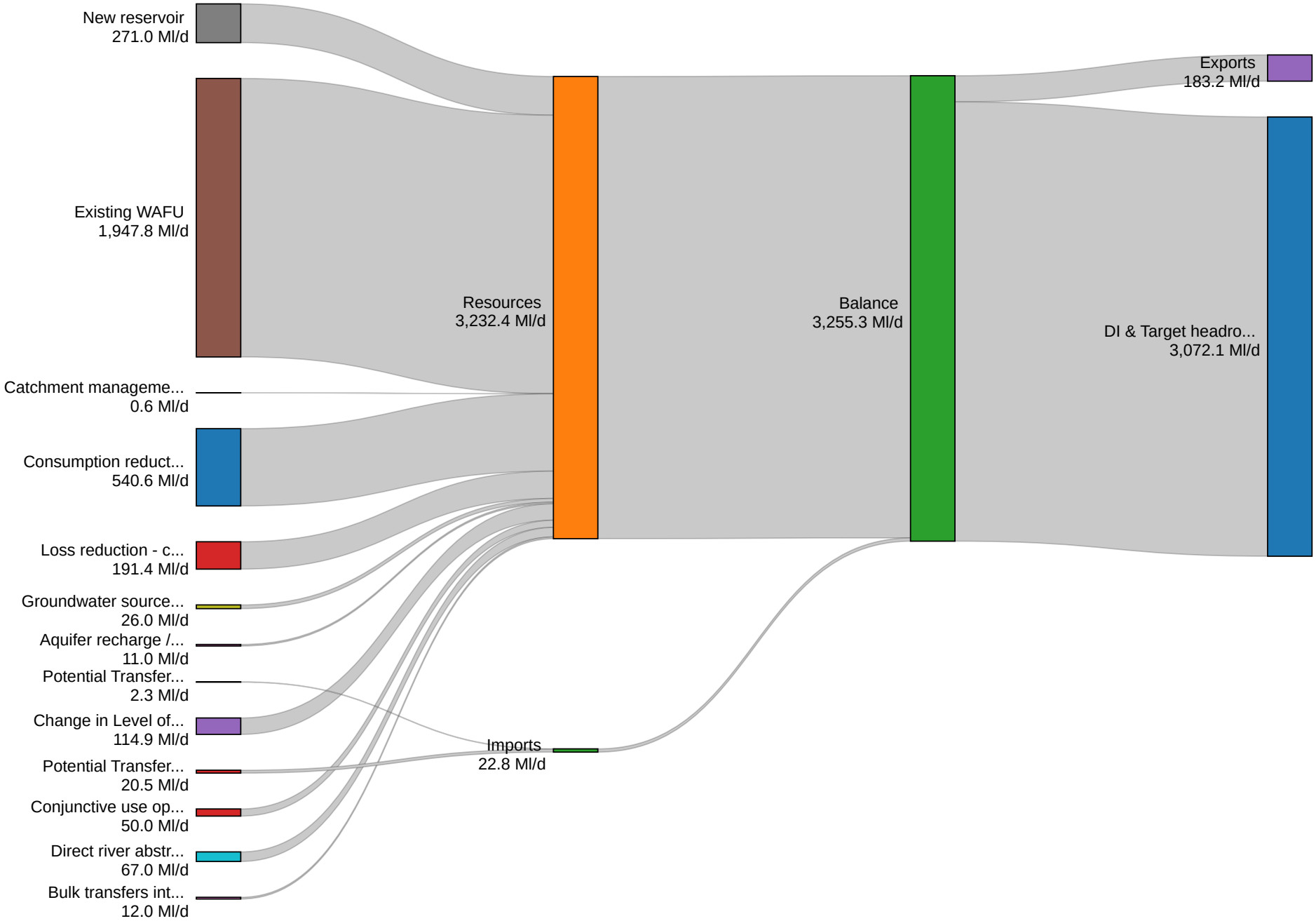
Situation 4 - 2040 (Thames Water)



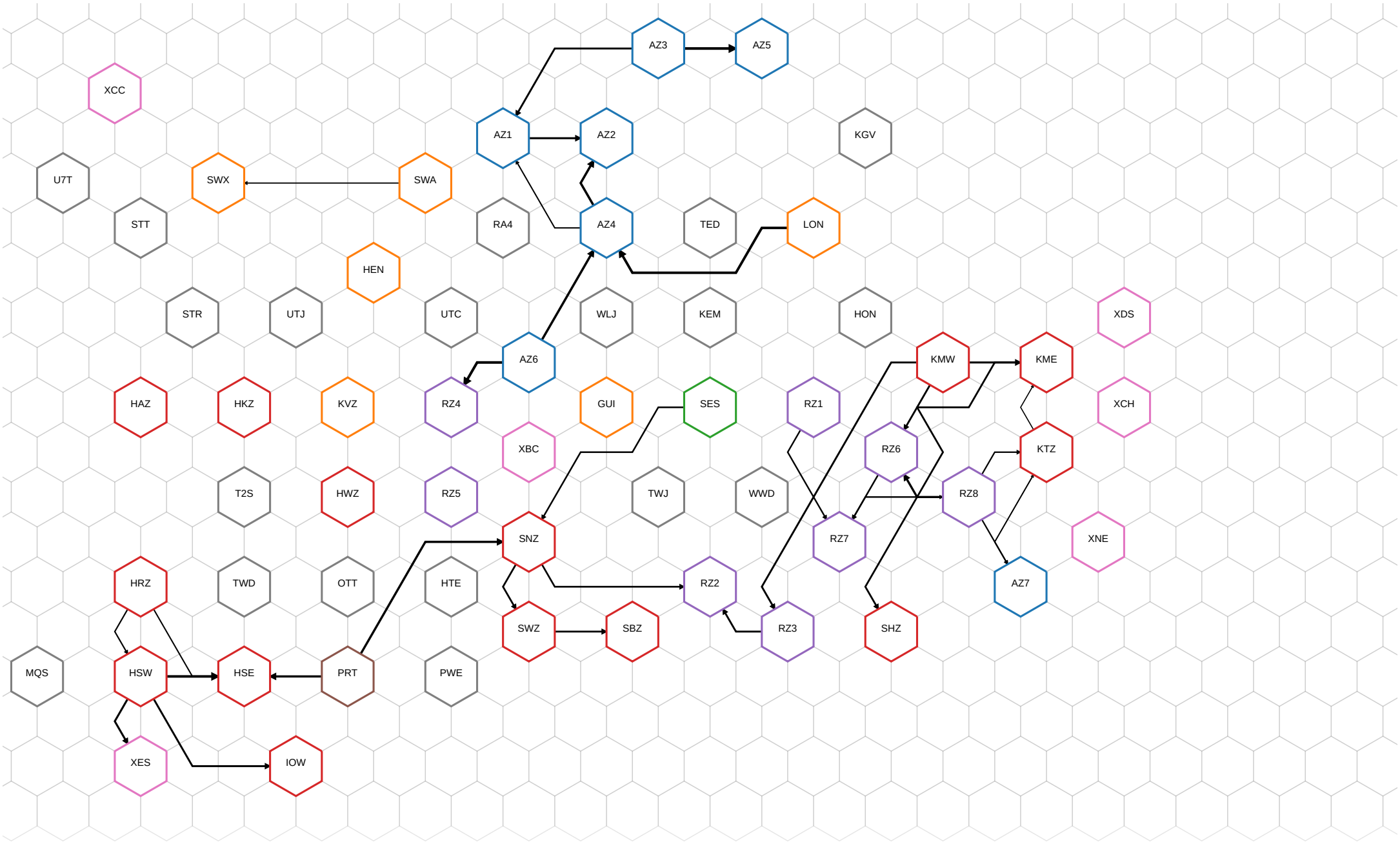
Situation 4 - 2050 (Thames Water)



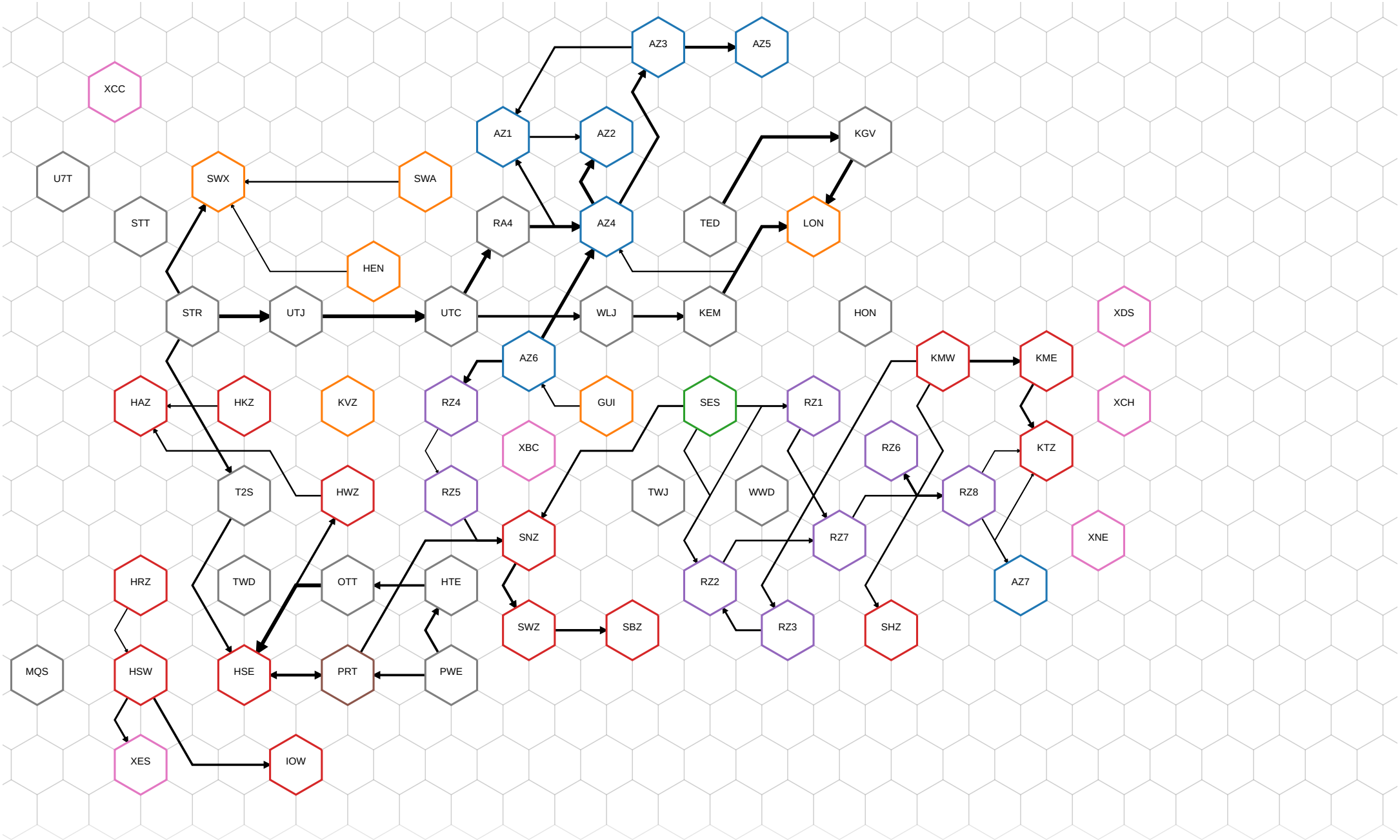
Situation 4 - 2075 (Thames Water)



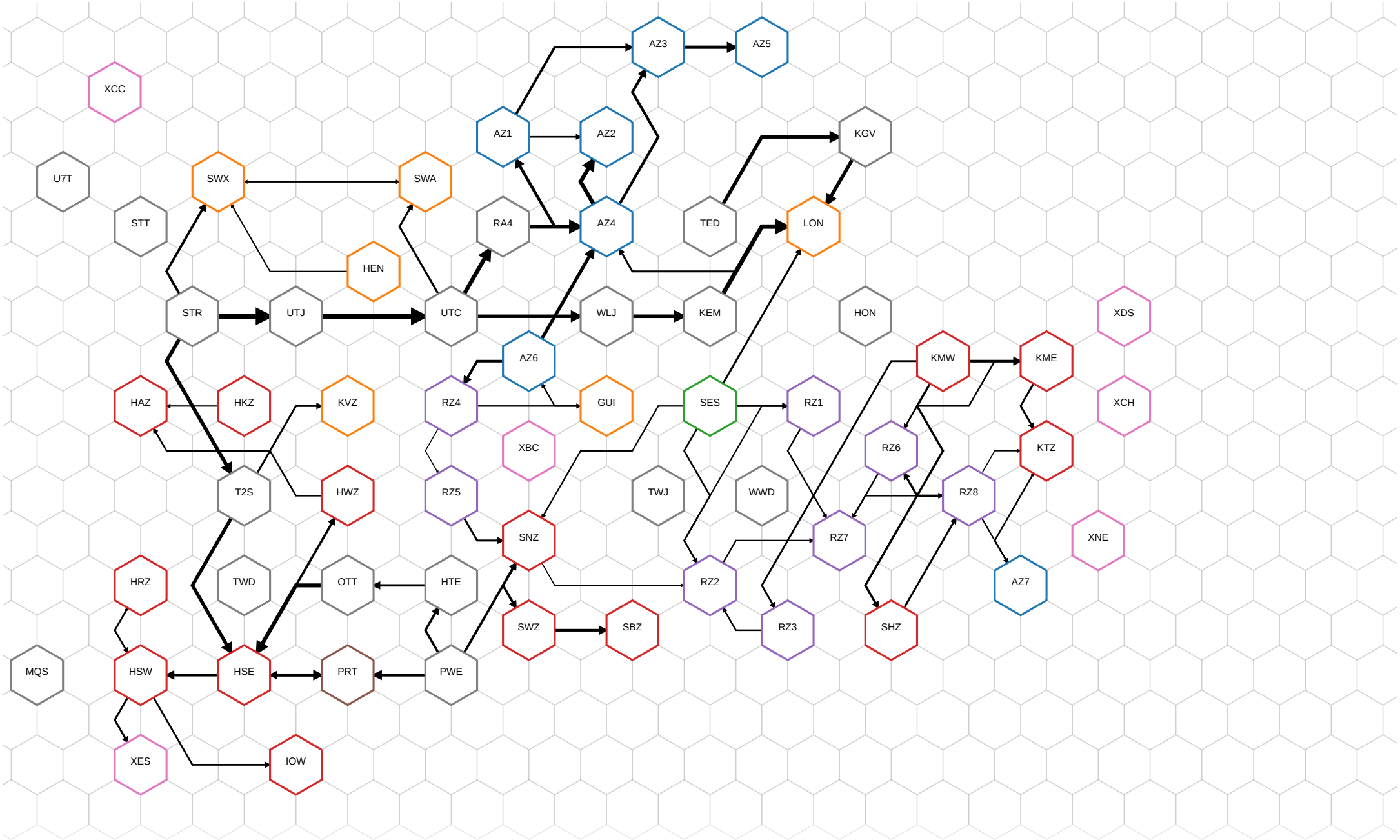
Situation 4 - 2026



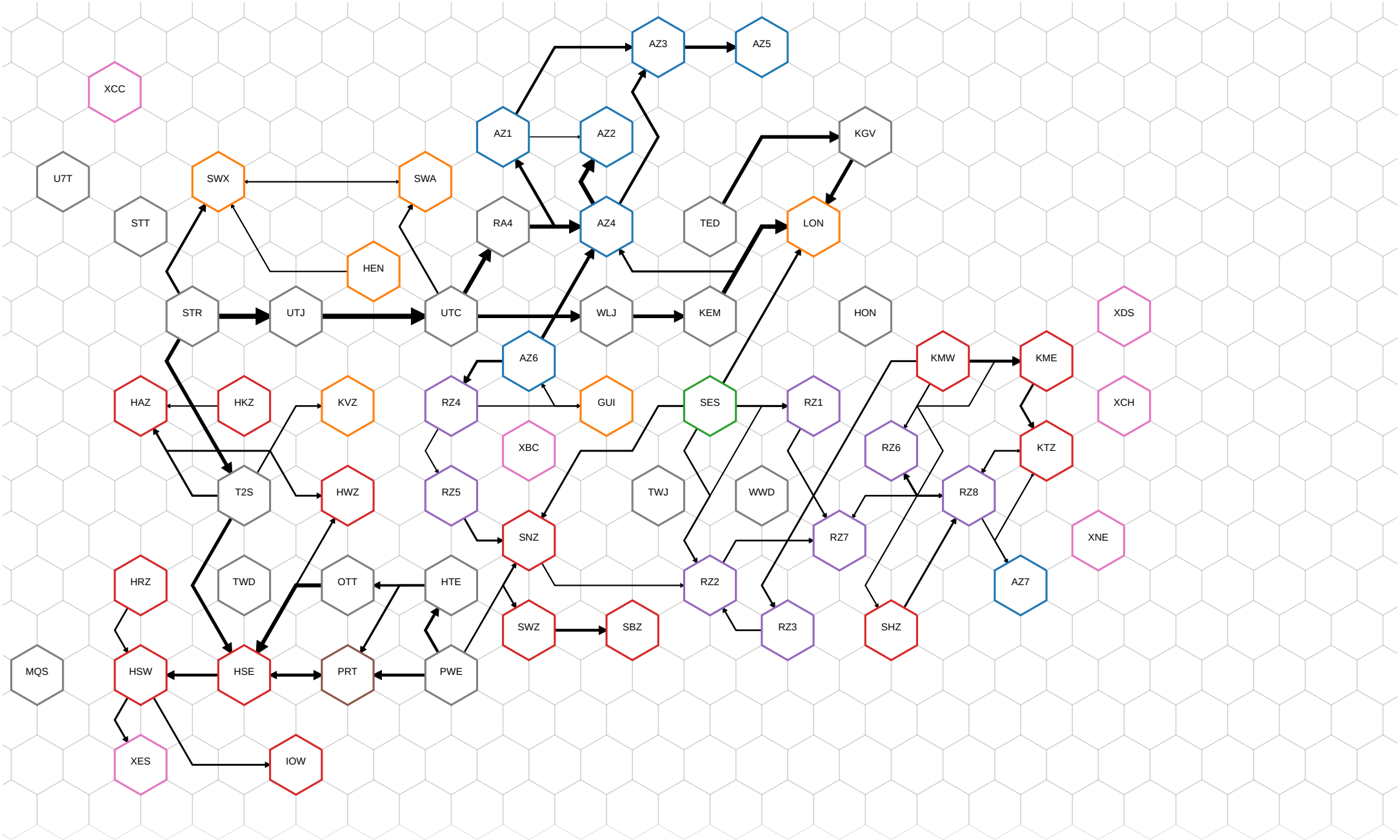
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

BEST ENVIRONMENTAL & SOCIETY PLAN

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-2075-envsoc-07_50-v2
Description	Environmental-social run with hybrid-c+2 government interventions including only GUC 100 Ml/d and SESRO 150 Mm3. Constrained to 7.5% improvement in worst BVP metrics from least cost run.
Created at	06/07/2023, 13:29:45
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets.
Optimised discount rate	STPR

Metrics

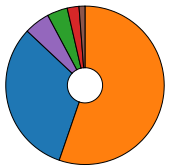
Net present value (Cost)

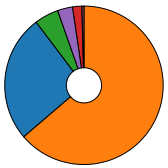
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	20,931	17,664	16,929	19,383	17,457	16,635	17,787	16,924	16,207	(£m)
Cost w/o deficit (STPR)	20,931	17,664	16,929	19,383	17,457	16,635	17,787	16,924	16,207	(£m)
Cost w/ deficit (IGEQ)	32,084	25,908	24,580	29,165	25,574	24,110	26,266	24,637	23,345	(£m)
Cost w/o deficit (IGEQ)	32,084	25,908	24,580	29,165	25,574	24,110	26,266	24,637	23,345	(£m)
Cost w/ deficit (LTDR)	23,088	19,288	18,443	21,290	19,056	18,115	19,452	18,448	17,624	(£m)
Cost w/o deficit (LTDR)	23,088	19,288	18,443	21,290	19,056	18,115	19,452	18,448	17,624	(£m)

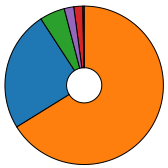
Cost breakdown (STPR)

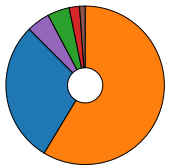
Select Company: Total

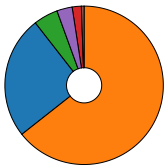
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	6,642	4,587	4,170	5,600	4,378	3,927	4,526	4,116	3,672	(£m)
Fixed opex	11,567	11,257	11,204	11,367	11,239	11,182	11,250	11,201	11,139	(£m)
Fixed operational carbon	878	869	870	873	870	868	871	867	865	(£m)
Embedded carbon	502	338	314	411	327	297	344	308	280	(£m)
Variable opex	1,090	540	327	915	546	314	669	391	232	(£m)
Variable carbon opex	253	73	44	218	96	48	127	41	18	(£m)

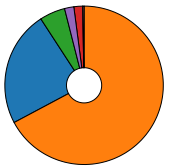
situation1 

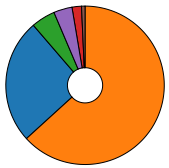
situation2 

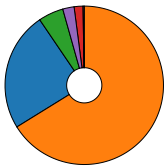
situation3 

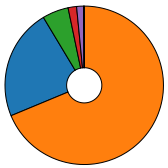
situation4 

situation5 

situation6 

situation7 

situation8 

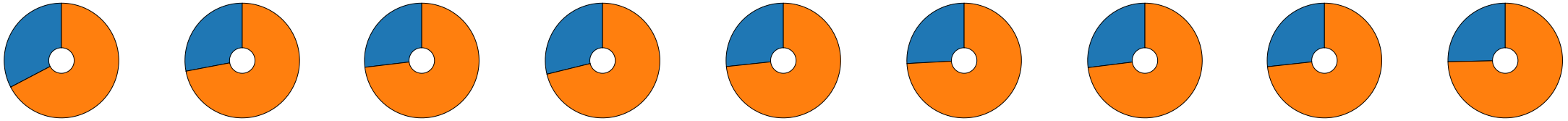
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,234,832	2,067,443	1,901,268	2,582,014	2,001,685	1,804,294	2,126,132	1,872,899	1,690,091	(tonnes)
Operational emissions	6,667,042	5,320,434	5,169,441	6,373,484	5,498,469	5,177,025	5,755,982	5,134,766	4,980,353	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

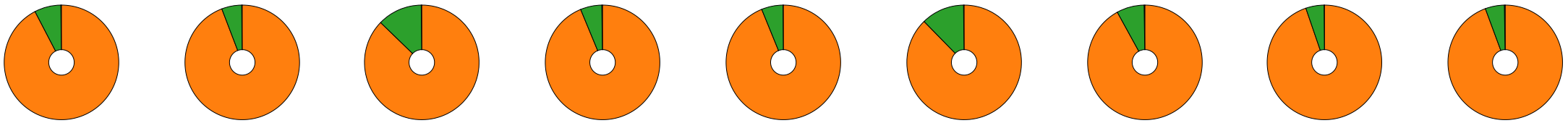


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	46	21	8	46	12	8	34	9	8	(GWh)
Grid	22,915	11,376	4,194	19,534	10,944	3,875	13,203	7,956	2,894	(GWh)
Renewable	1,849	680	606	1,255	706	538	1,115	433	165	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	66,230.00	65,108.00	65,094.00	68,530.00	65,274.00	65,094.00	66,237.00	65,094.00	65,094.00	
SEA environmental disbenefit	104,837.00	81,825.00	75,682.00	102,686.00	79,988.00	74,025.00	82,773.00	70,102.00	62,511.00	
Natural capital	85,108,021.79	81,330,184.55	84,296,486.84	82,655,298.86	81,692,047.83	84,214,245.56	81,123,884.58	81,730,236.21	84,622,240.17	
Bio-diversity net gain	−166,079.00	−120,333.00	−91,865.00	−172,101.00	−117,321.00	−99,790.00	−116,524.00	−92,322.00	−67,332.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	36,750.00	35,377.00	35,066.00	36,736.00	35,210.00	34,964.00	35,248.00	34,597.00	34,112.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	27.79	27.61	30.08	26.77	27.63	30.04	28.84	31.98	35.54	
R1: Uncertainty of option supply/demand benefit	5.79	5.09	5.51	5.28	5.10	5.49	5.45	5.94	6.57	
R3: Risk of service failure due to other physical hazards	6.63	6.80	7.58	6.41	6.81	7.57	7.07	8.04	9.16	
R4: Availability of additional headroom	6.47	6.80	7.01	6.57	6.82	7.03	7.13	7.49	7.73	
R5: Catchment/raw water quality risks (incl. climate change)	3.90	3.82	4.29	3.71	3.80	4.28	3.89	4.50	5.20	
R6: Capacity of catchment services	0.00	0.00	0.01	0.01	0.00	0.01	0.00	0.01	0.01	
R7: Risk of service failure to other exceptional events	5.00	5.10	5.69	4.79	5.09	5.67	5.29	6.00	6.87	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

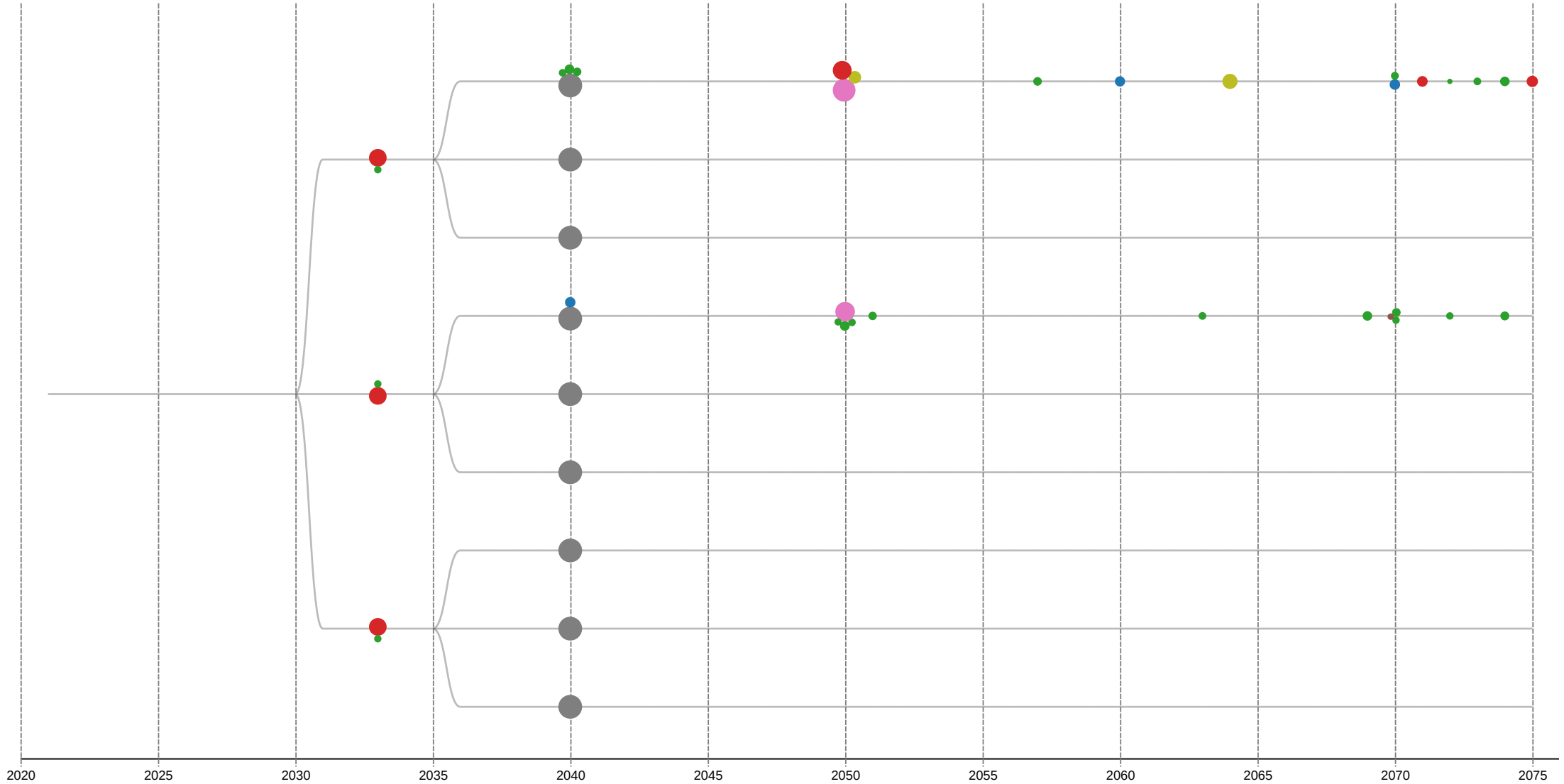
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	13.54	15.14	16.83	13.64	14.99	16.59	15.45	17.68	20.11	
A3: Operational complexity and flexibility	6.10	6.53	7.32	6.03	6.56	7.33	6.77	7.76	8.91	
A4: WRZ connectivity	7.42	8.59	9.49	7.57	8.41	9.23	8.66	9.89	11.17	
A7: Customer relations support engagement with demand management	0.02	0.03	0.03	0.04	0.03	0.03	0.03	0.03	0.03	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.28	19.80	21.80	18.72	19.77	21.83	20.43	23.29	26.39	
E1: Scaleability and modularity of proposed changes	8.88	9.43	10.49	8.77	9.48	10.52	9.72	11.18	12.74	
E2: Intervention lead times	4.21	4.03	4.27	3.97	3.93	4.26	4.13	4.60	5.11	
E3: Reliance on external bodies to deliver changes	6.19	6.33	7.03	5.97	6.35	7.04	6.57	7.50	8.53	
E5: Collaborative land management	0.00	0.01	0.01	0.01	0.00	0.01	0.00	0.01	0.01	

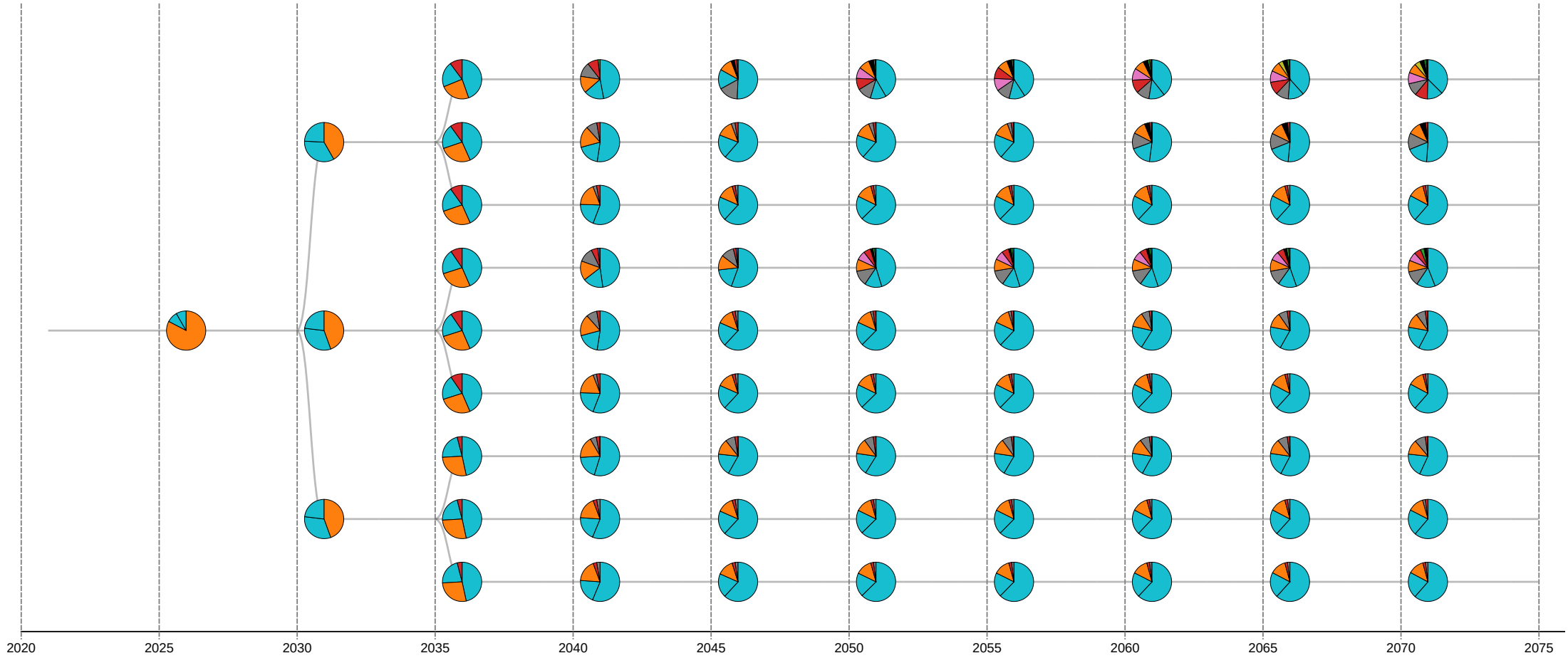
Option Selection (Thames Water)



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
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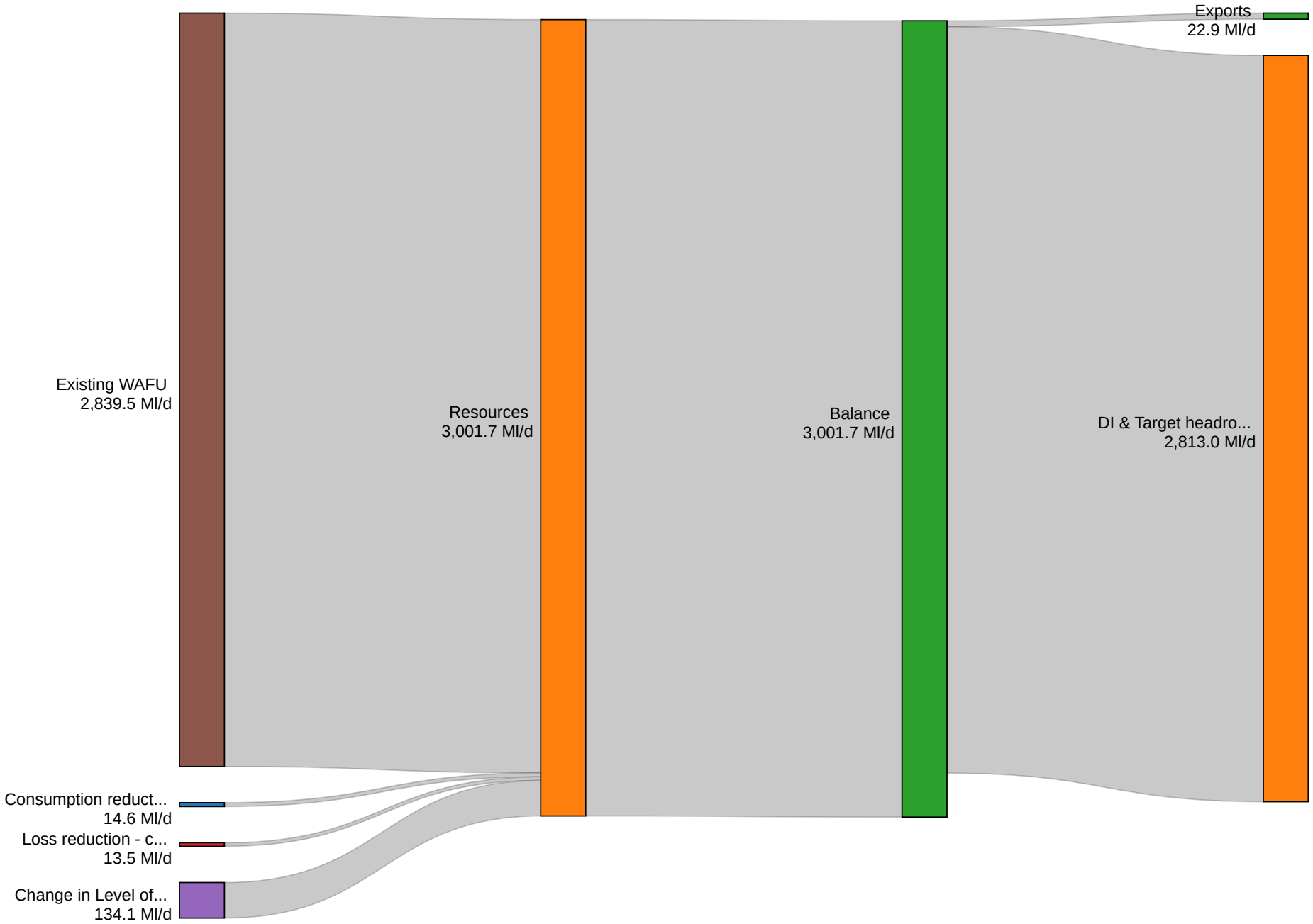
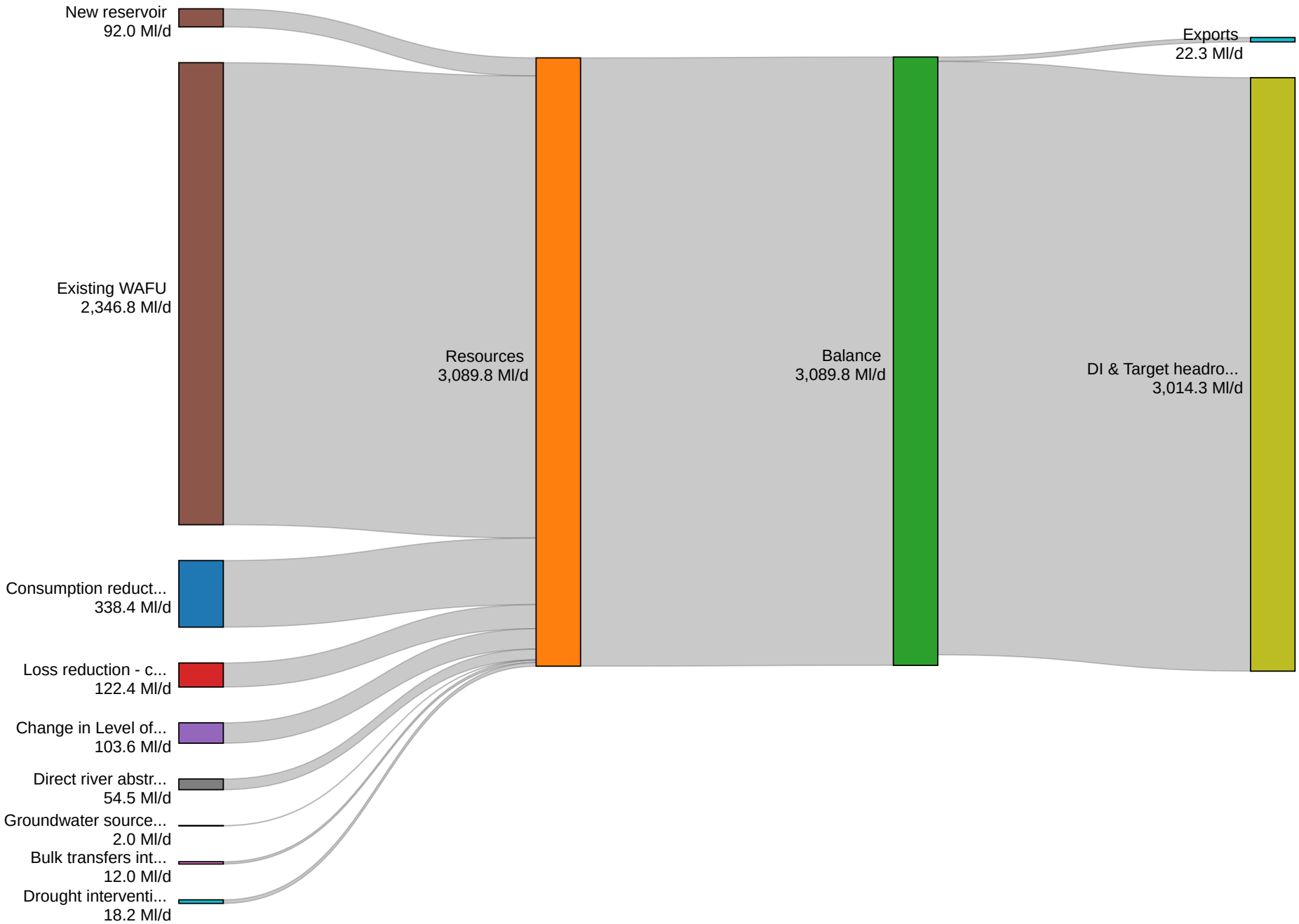
- Other

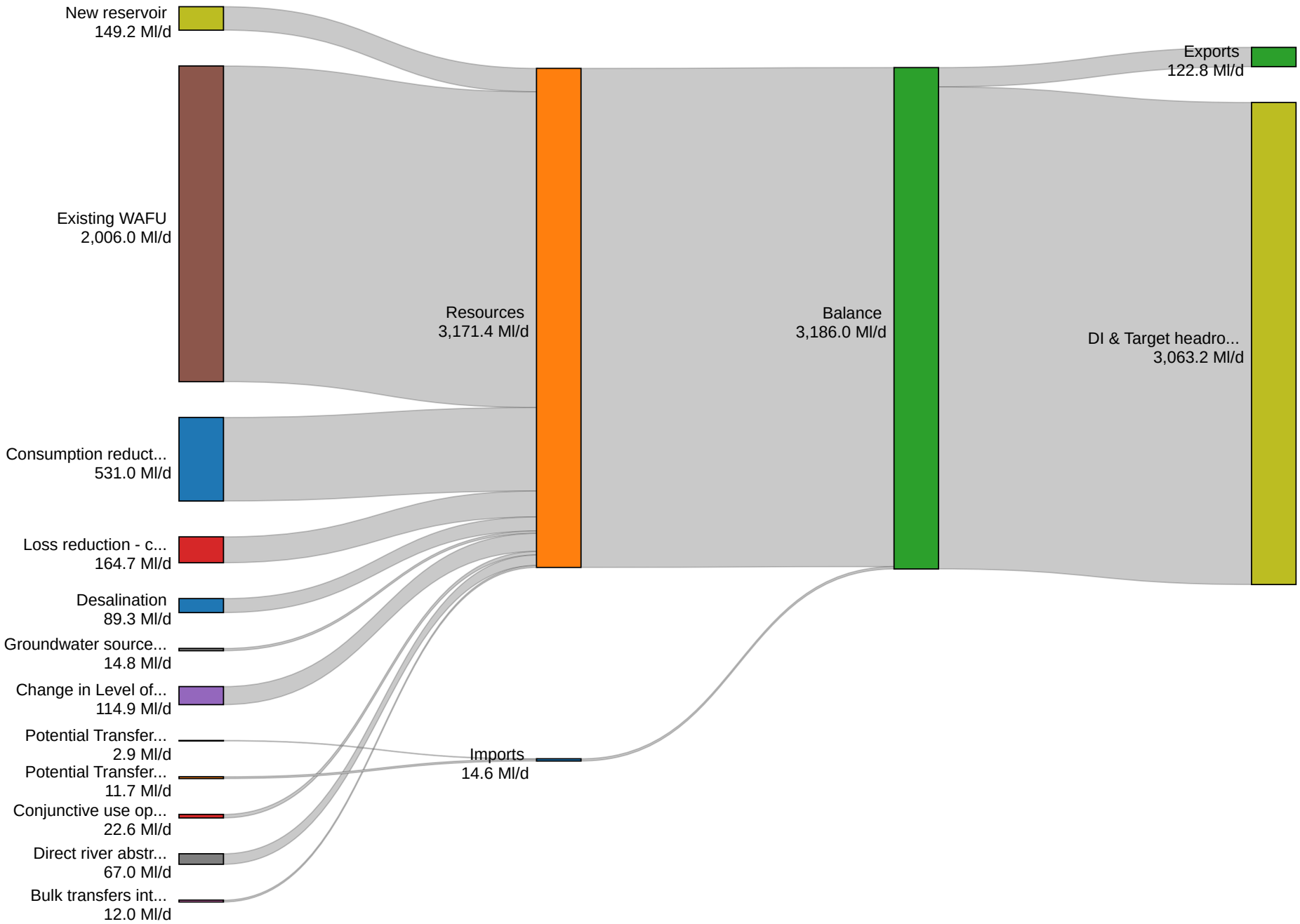
Situation 4 - 2026 (Thames Water)



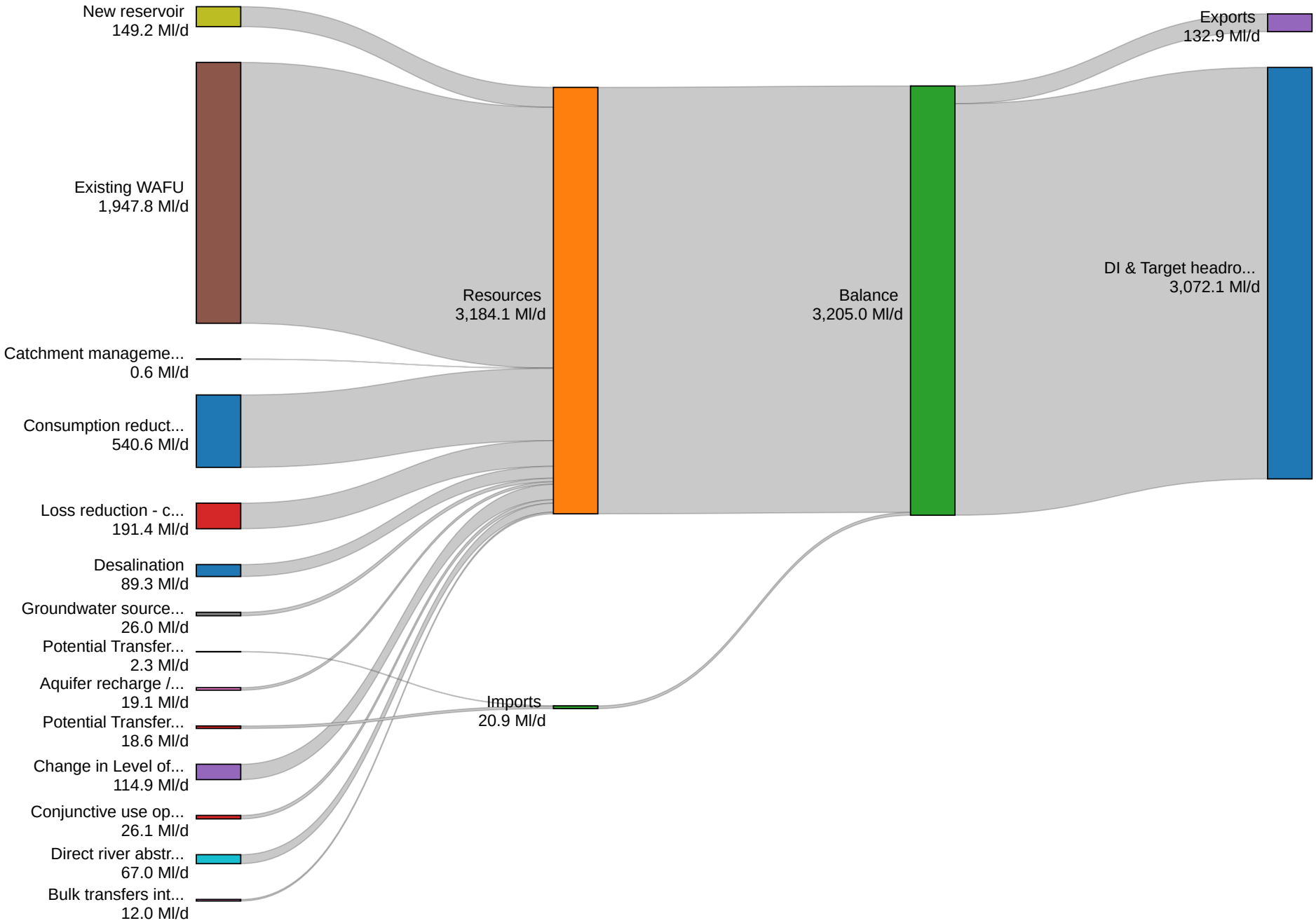
Situation 4 - 2040 (Thames Water)



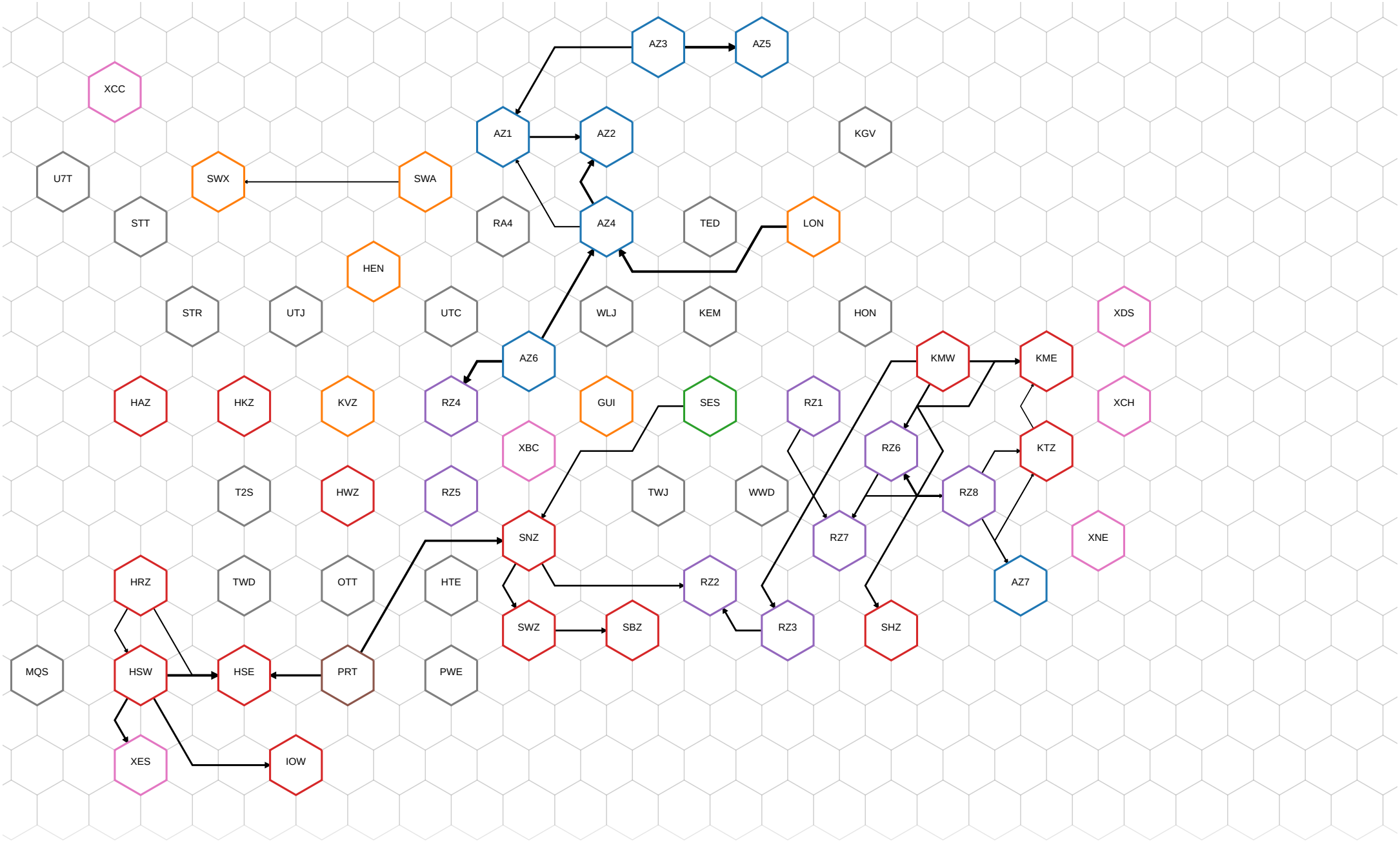
Situation 4 - 2050 (Thames Water)



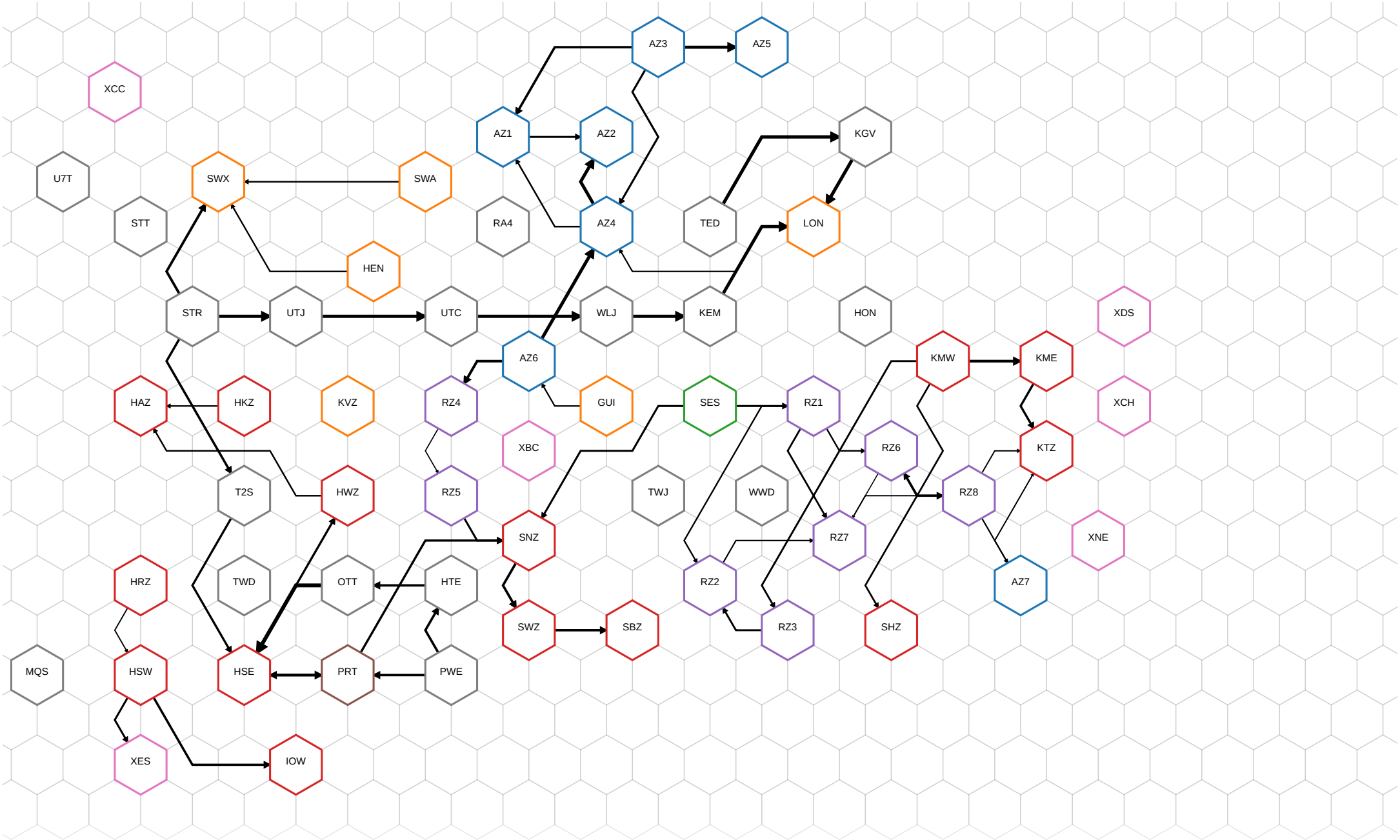
Situation 4 - 2075 (Thames Water)



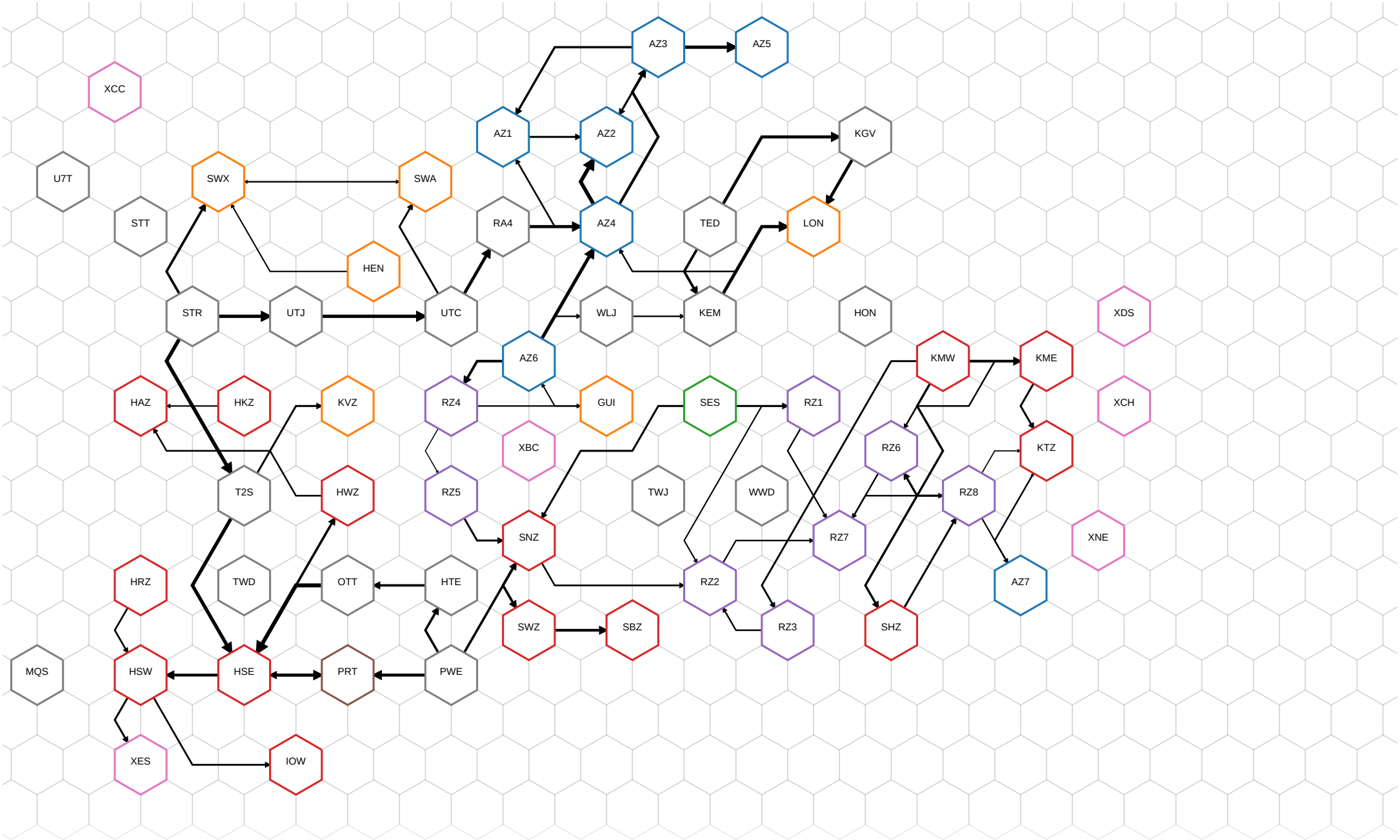
Situation 4 - 2026



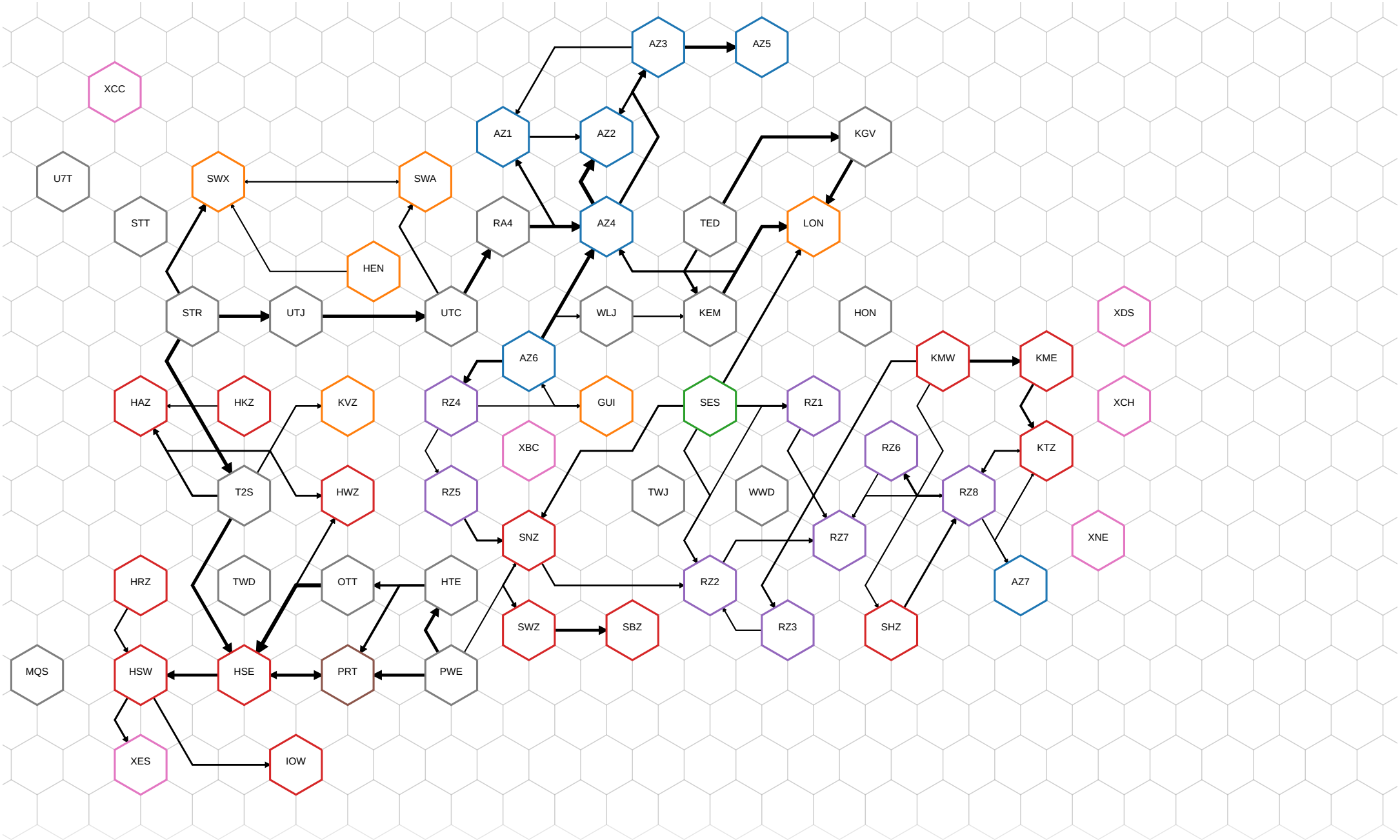
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

RESILIENCE-FOCUSED PLAN

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-2075-resilience-07_50-v2
Description	Resilience run with hybrid-c+2 government interventions. Constrained to 7.5% improvement in worst BVP metrics from least cost run.
Created at	06/07/2023, 13:30:31
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets.
Optimised discount rate	STPR

Metrics

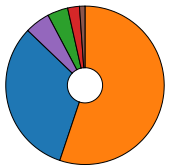
Net present value (Cost)

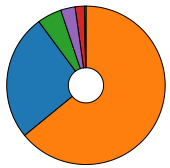
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	20,852	17,428	16,732	19,377	17,317	16,537	17,621	16,772	16,078	(£m)
Cost w/o deficit (STPR)	20,852	17,428	16,732	19,377	17,317	16,537	17,621	16,772	16,078	(£m)
Cost w/ deficit (IGEQ)	32,008	25,534	24,274	29,240	25,345	23,954	26,001	24,403	23,155	(£m)
Cost w/o deficit (IGEQ)	32,008	25,534	24,274	29,240	25,345	23,954	26,001	24,403	23,155	(£m)
Cost w/ deficit (LTDR)	23,008	19,025	18,225	21,296	18,900	18,006	19,267	18,280	17,484	(£m)
Cost w/o deficit (LTDR)	23,008	19,025	18,225	21,296	18,900	18,006	19,267	18,280	17,484	(£m)

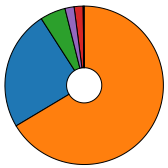
Cost breakdown (STPR)

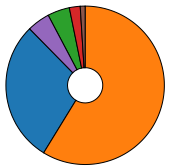
Select Company: Total

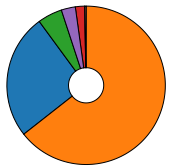
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	6,676	4,494	4,095	5,595	4,420	3,945	4,519	4,070	3,638	(£m)
Fixed opex	11,499	11,169	11,115	11,387	11,153	11,097	11,161	11,109	11,049	(£m)
Fixed operational carbon	880	869	870	877	869	869	872	867	866	(£m)
Embedded carbon	503	331	307	429	325	295	341	304	280	(£m)
Variable opex	1,064	511	310	897	496	300	635	385	230	(£m)
Variable carbon opex	231	54	34	192	53	31	93	37	17	(£m)

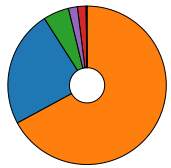
situation1 

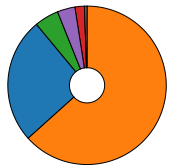
situation2 

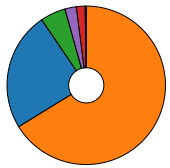
situation3 

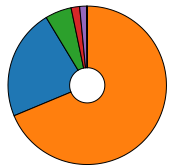
situation4 

situation5 

situation6 

situation7 

situation8 

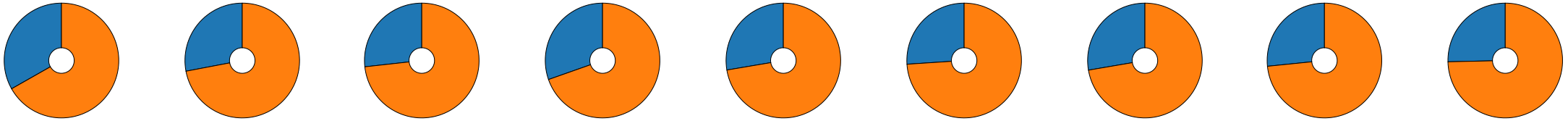
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,257,701	2,027,538	1,867,360	2,725,956	1,993,344	1,790,065	2,114,763	1,851,409	1,689,790	(tonnes)
Operational emissions	6,554,797	5,216,397	5,112,448	6,247,388	5,213,619	5,086,087	5,522,304	5,107,105	4,973,837	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

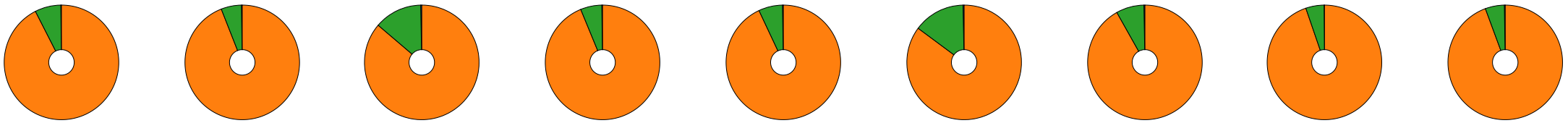


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	48	29	14	46	29	14	41	9	8	(GWh)
Grid	22,849	11,192	3,937	19,619	10,560	3,834	13,092	7,948	2,894	(GWh)
Renewable	1,807	681	615	1,255	765	654	1,122	433	165	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	71,169.00	65,623.00	64,006.00	69,397.00	65,016.00	63,789.00	65,723.00	63,528.00	62,472.00	
SEA environmental disbenefit	115,704.00	85,635.00	76,078.00	104,493.00	80,318.00	74,831.00	85,424.00	72,421.00	63,574.00	
Natural capital	84,358,114.63	81,291,105.95	84,135,850.90	77,815,049.33	81,338,201.55	83,885,992.37	80,965,870.71	81,728,690.87	84,600,613.22	
Bio-diversity net gain	−189,408.00	−121,220.00	−94,886.00	−170,954.00	−114,312.00	−92,664.00	−121,041.00	−93,500.00	−64,446.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	34,393.00	32,419.00	31,823.00	33,788.00	32,070.00	31,600.00	32,067.00	31,152.00	30,662.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	28.23	28.13	29.96	28.21	28.12	29.96	28.65	31.63	35.14	
R1: Uncertainty of option supply/demand benefit	5.78	5.11	5.42	5.64	5.06	5.39	5.31	5.73	6.33	
R3: Risk of service failure due to other physical hazards	6.67	6.86	7.58	6.77	6.90	7.59	7.06	7.98	9.10	
R4: Availability of additional headroom	6.46	6.79	7.00	6.52	6.81	7.02	7.10	7.46	7.70	
R5: Catchment/raw water quality risks (incl. climate change)	3.97	3.87	4.36	3.72	3.88	4.37	3.98	4.58	5.29	
R6: Capacity of catchment services	0.27	0.31	0.00	0.31	0.31	0.00	0.00	0.00	0.00	
R7: Risk of service failure to other exceptional events	4.99	5.08	5.60	5.14	5.05	5.59	5.20	5.87	6.72	
R8: Soil health	0.10	0.11	0.00	0.11	0.11	0.00	0.00	0.00	0.00	

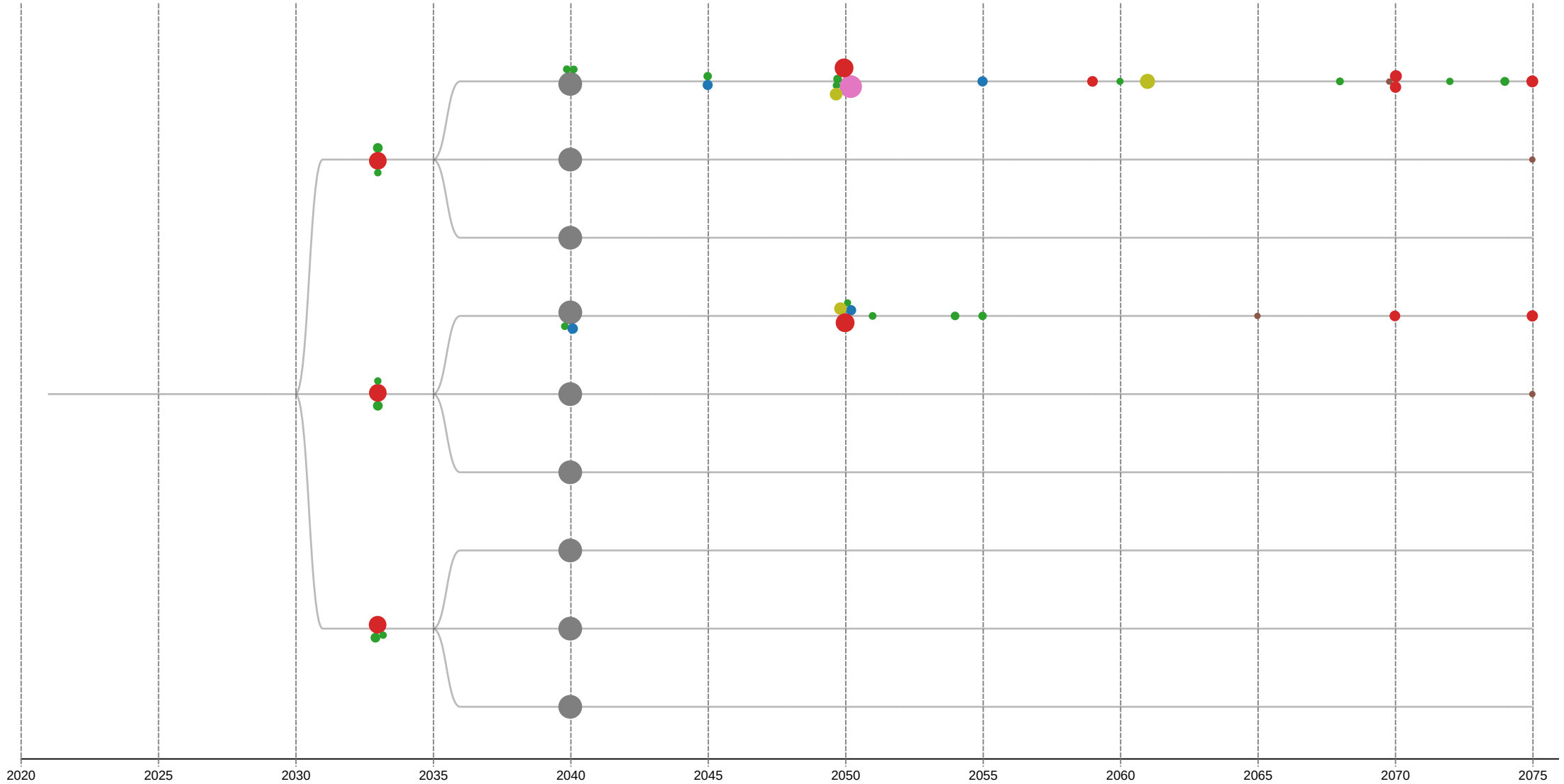
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	14.14	15.36	16.90	14.08	15.29	16.82	15.52	17.66	20.13	
A3: Operational complexity and flexibility	6.13	6.56	7.29	6.35	6.56	7.32	6.74	7.71	8.85	
A4: WRZ connectivity	7.92	8.67	9.58	7.61	8.61	9.48	8.75	9.92	11.25	
A7: Customer relations support engagement with demand management	0.09	0.13	0.03	0.12	0.13	0.03	0.03	0.03	0.03	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.78	20.49	21.93	20.05	20.39	21.77	20.29	22.99	26.05	
E1: Scaleability and modularity of proposed changes	8.91	9.47	10.47	8.99	9.51	10.53	9.69	11.12	12.66	
E2: Intervention lead times	4.29	4.18	4.45	4.30	4.05	4.21	4.07	4.45	4.94	
E3: Reliance on external bodies to deliver changes	6.22	6.38	7.02	6.30	6.38	7.03	6.53	7.42	8.45	
E5: Collaborative land management	0.35	0.46	0.00	0.46	0.46	0.00	0.00	0.00	0.00	

Option Selection (Thames Water)



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
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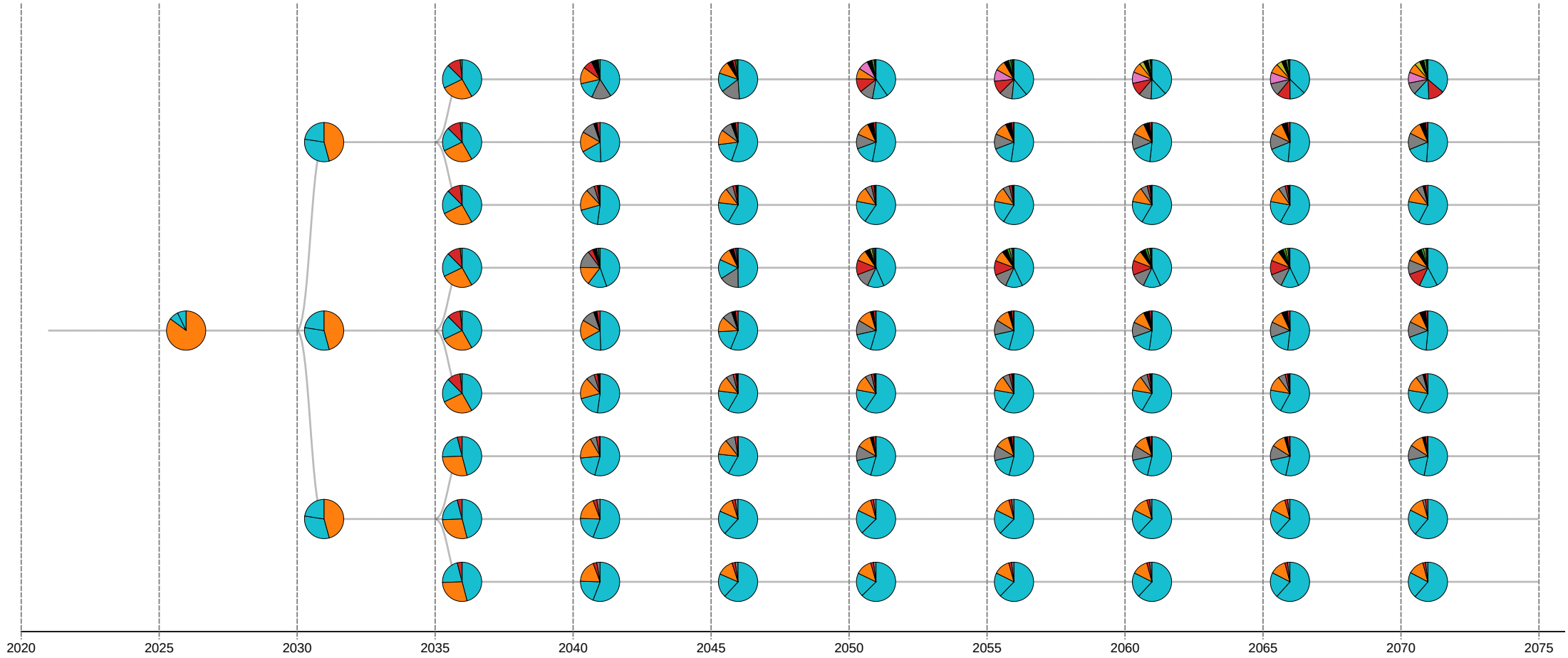
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

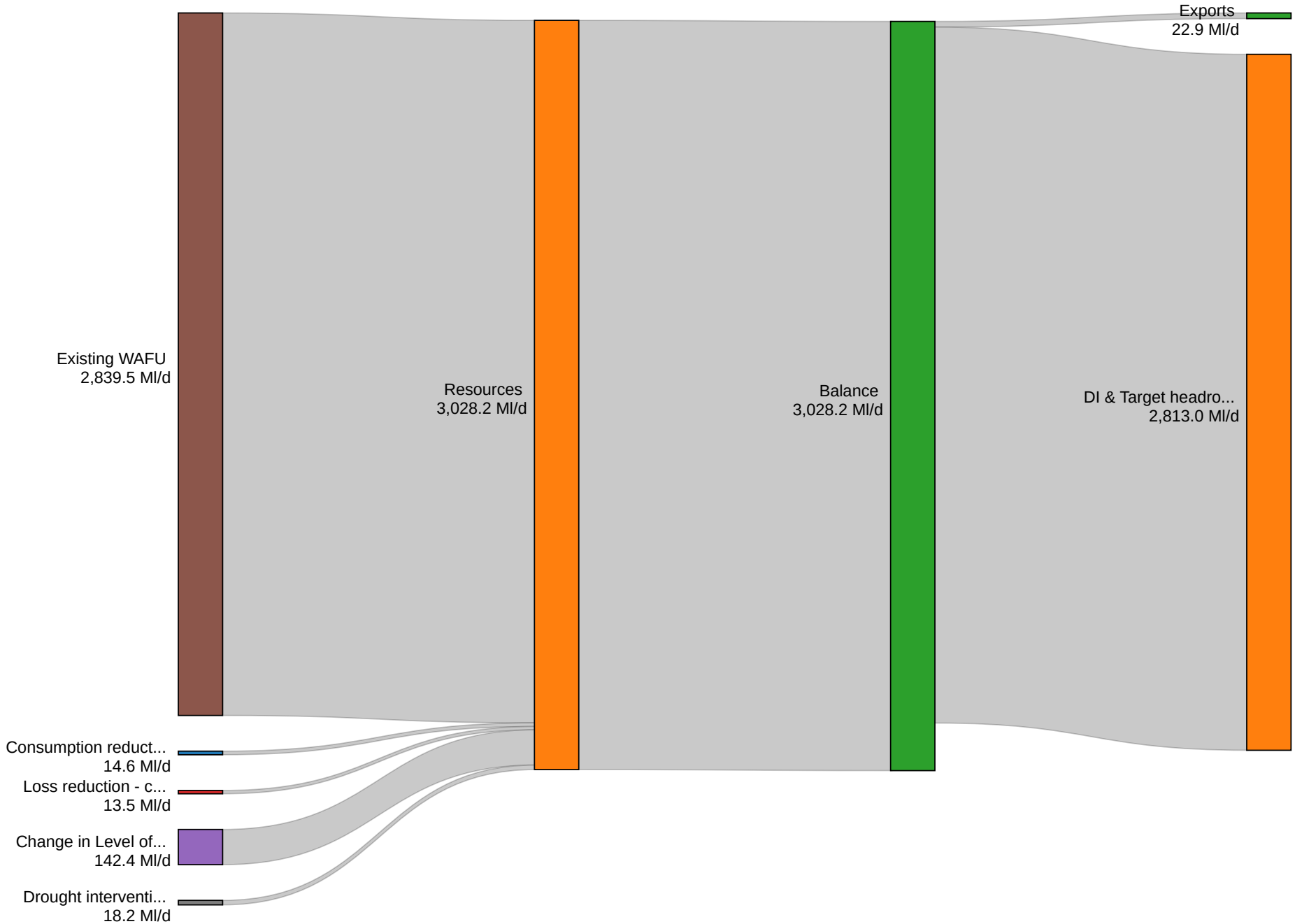
Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.

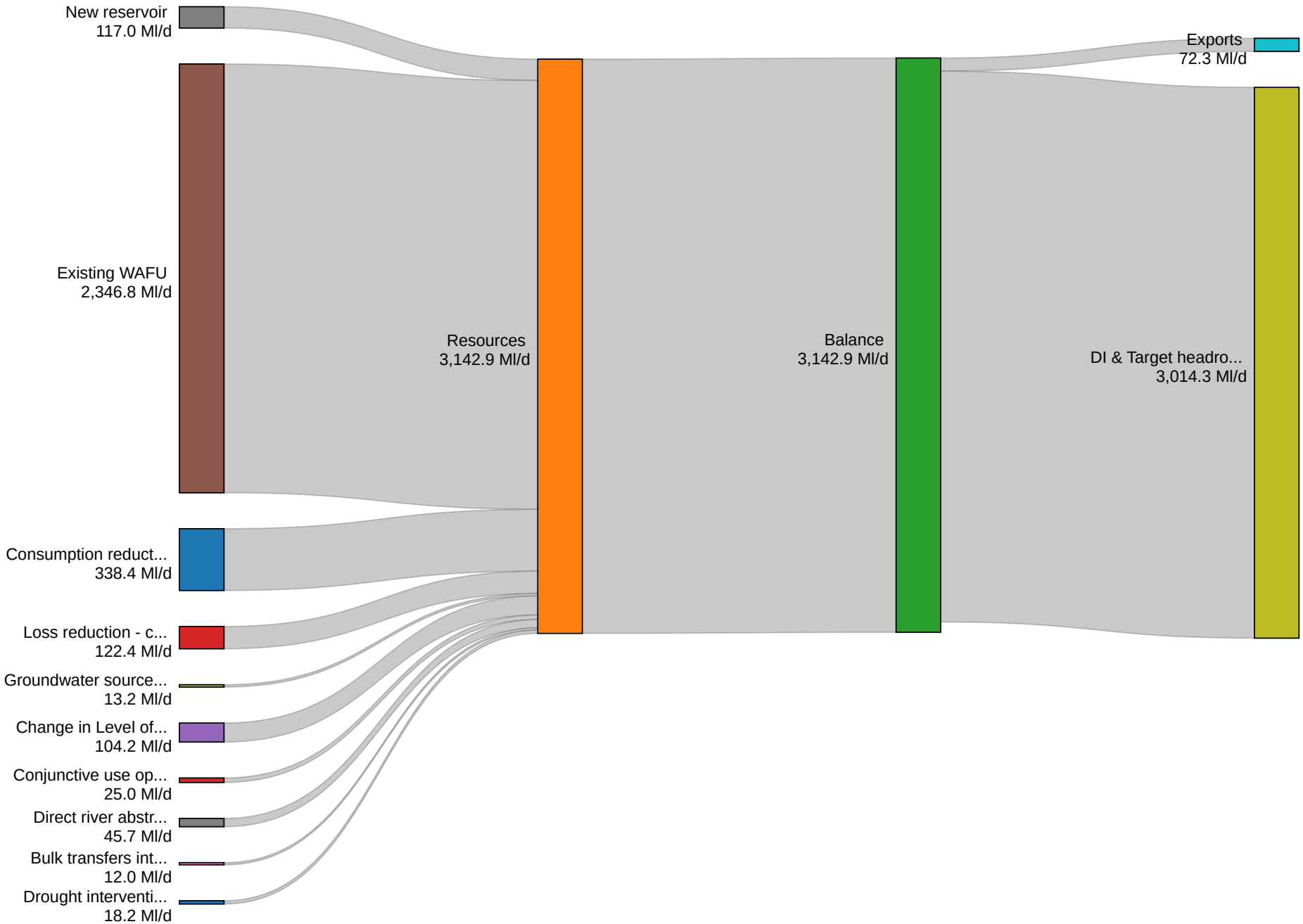


- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

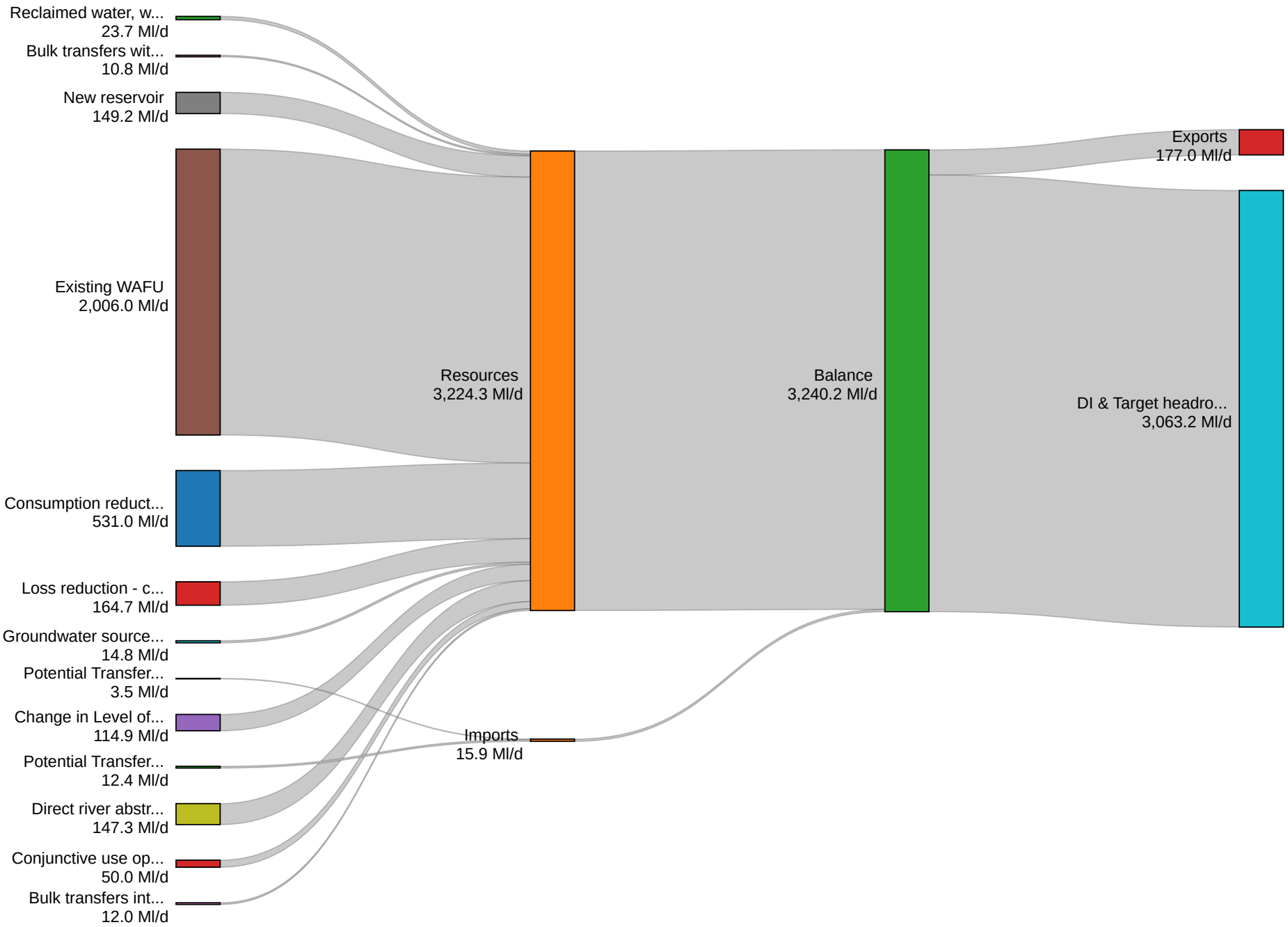
Situation 4 - 2026 (Thames Water)



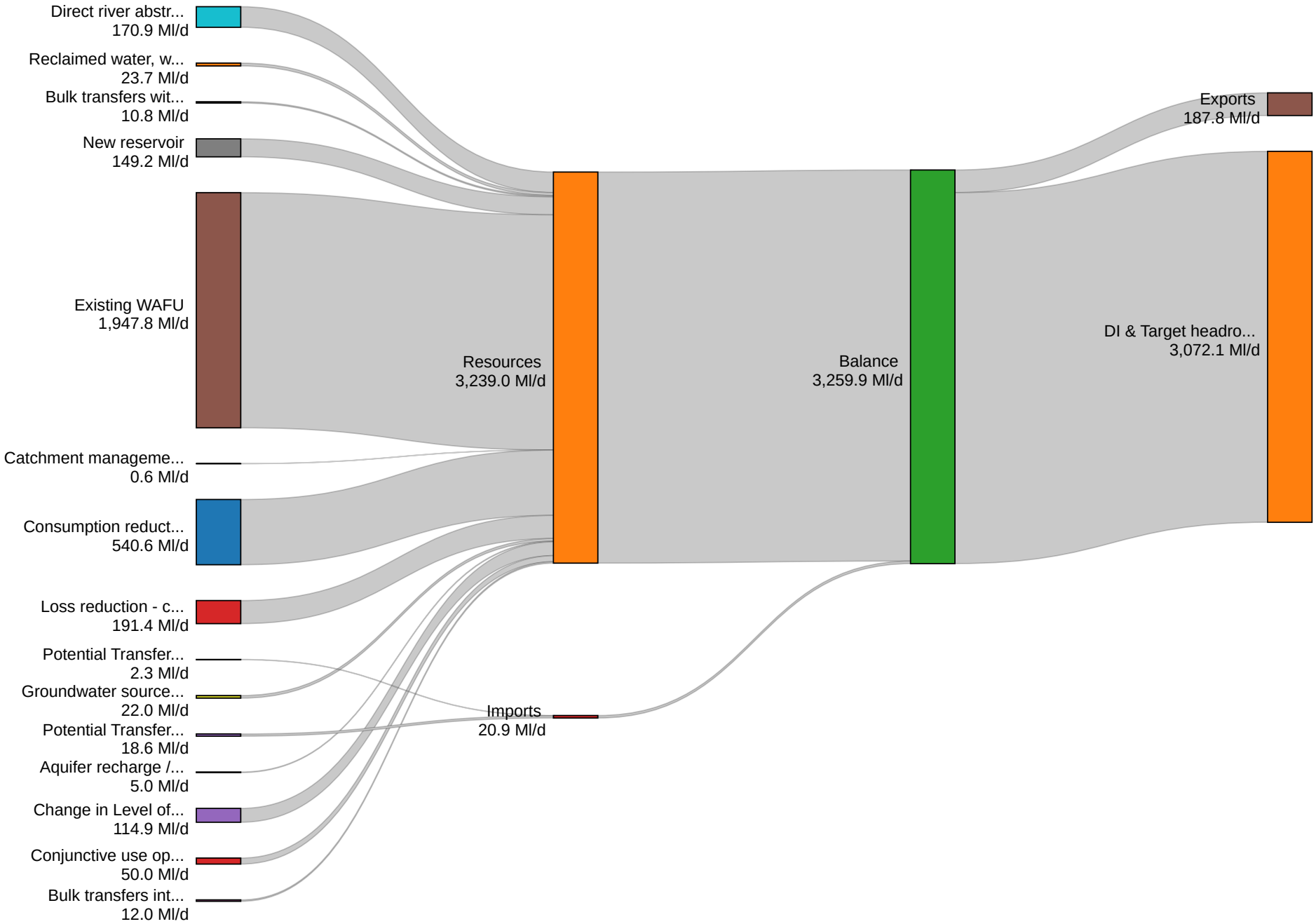
Situation 4 - 2040 (Thames Water)



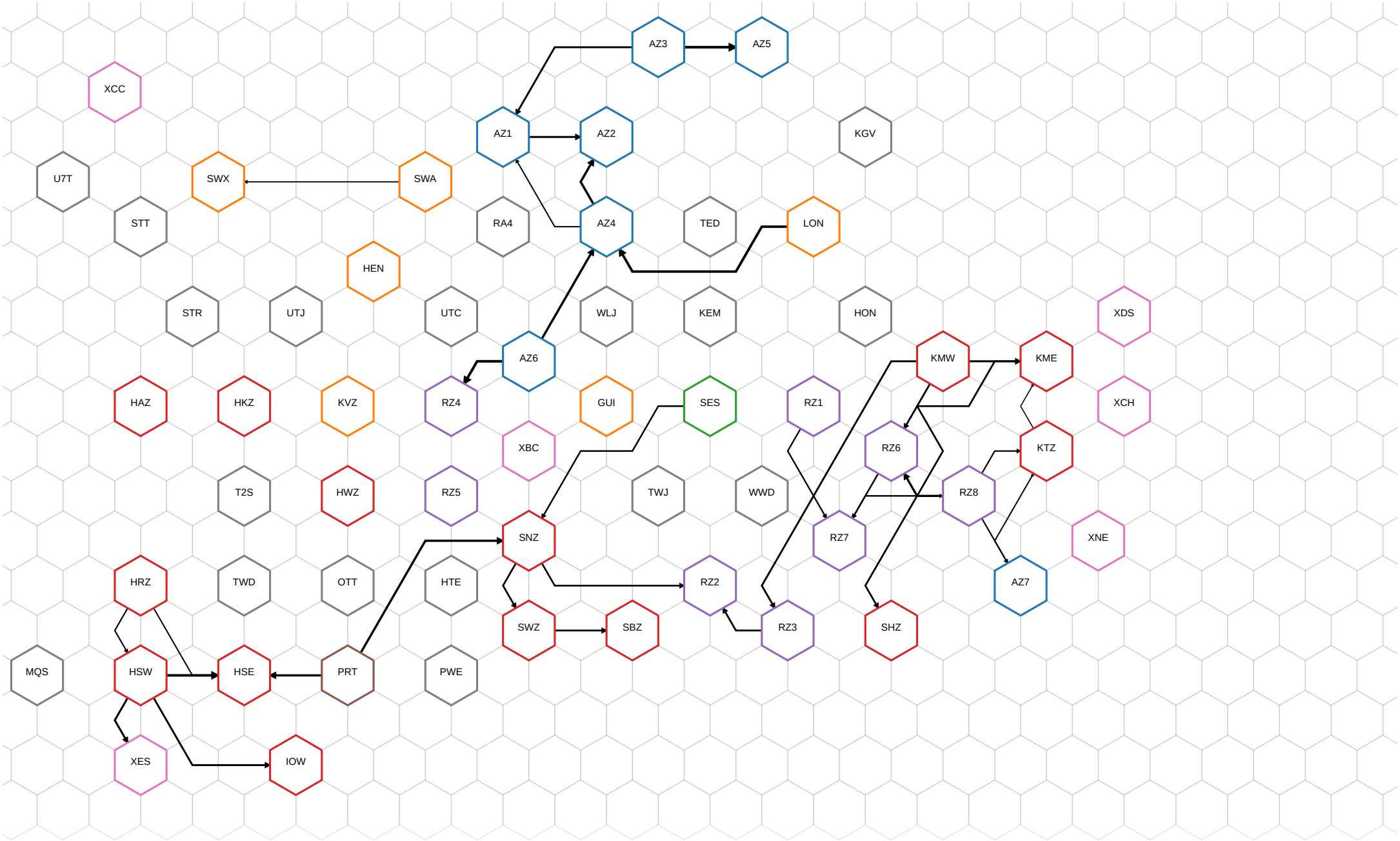
Situation 4 - 2050 (Thames Water)



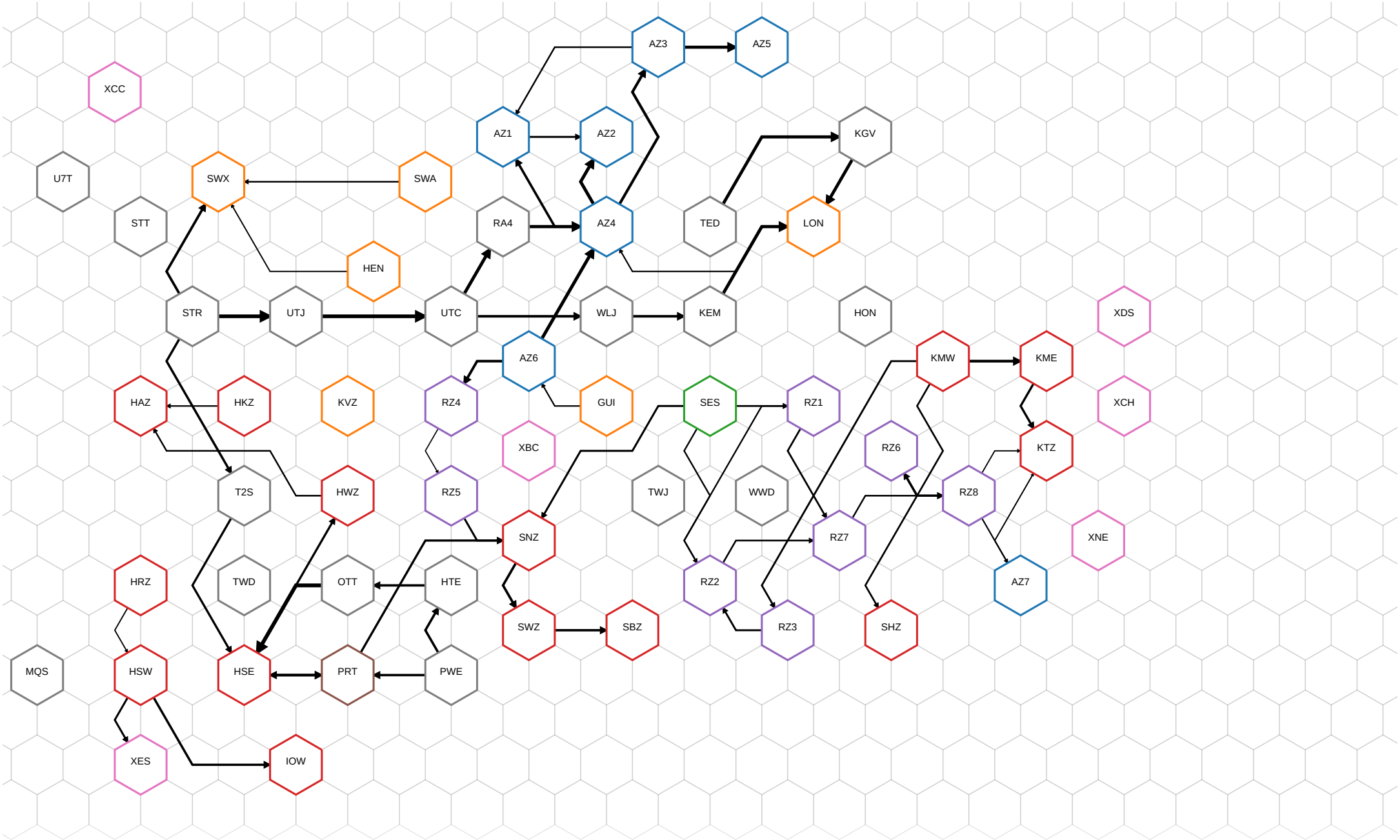
Situation 4 - 2075 (Thames Water)



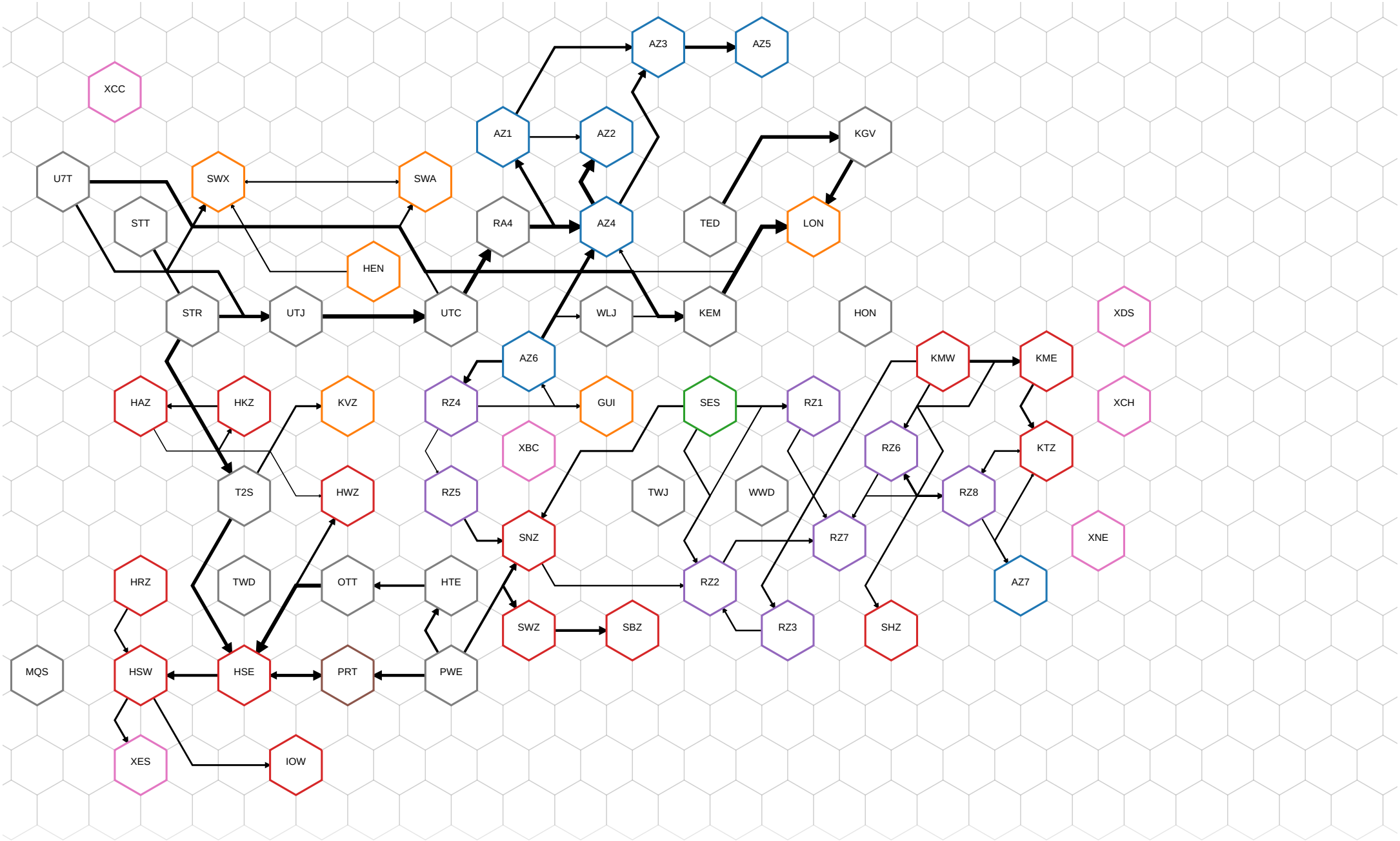
Situation 4 - 2026



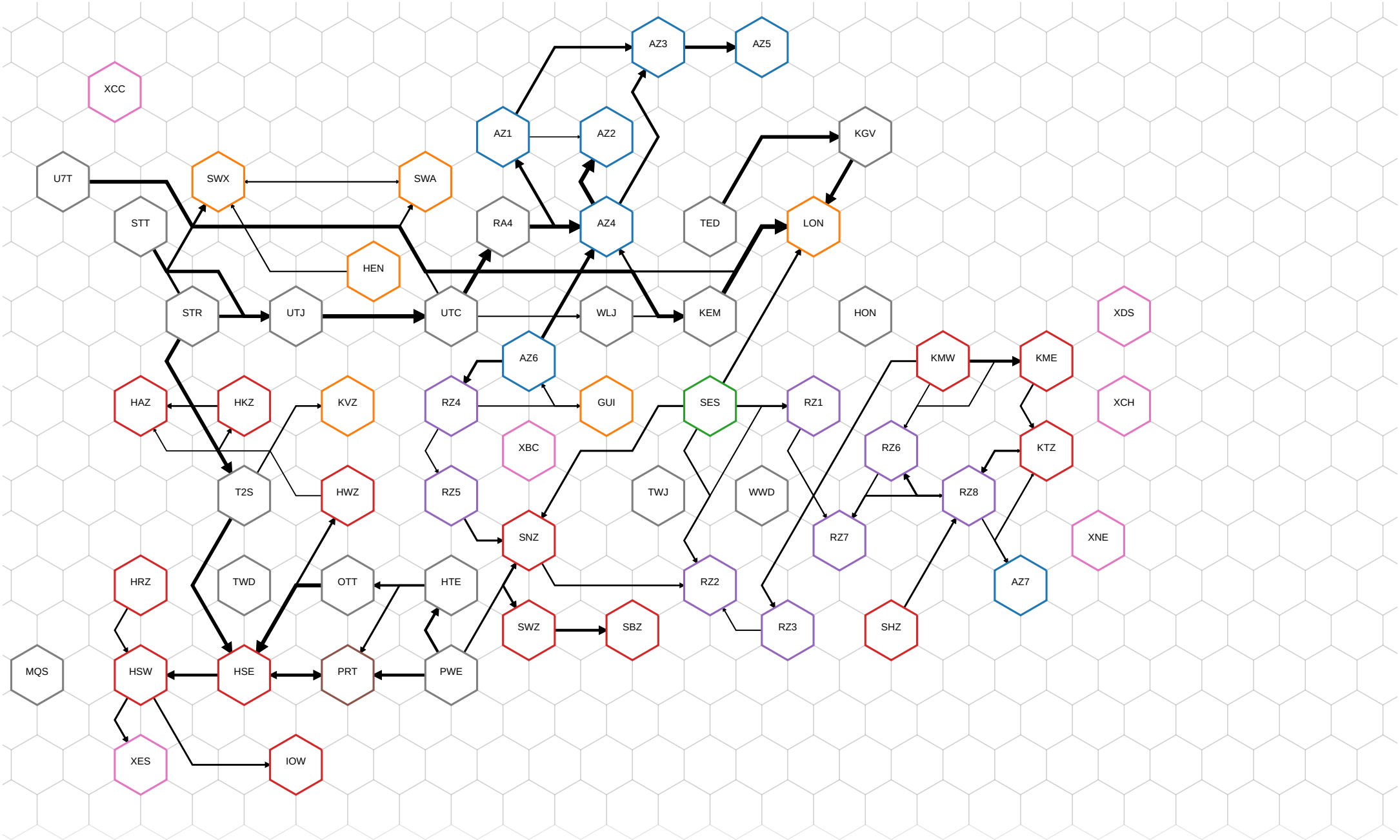
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

GENERAL BVP UPLIFT PLAN

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-2075-bvp-07_50-v2
Description	BVP run with hybrid-c+2 government interventions. Constrained to 7.5% improvement in worst BVP metrics from least cost run.
Created at	06/07/2023, 13:25:31
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets.
Optimised discount rate	STPR

Metrics

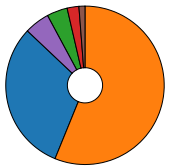
Net present value (Cost)

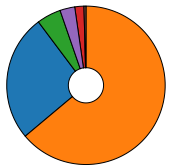
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	20,874	17,617	16,892	19,491	17,542	16,753	17,858	16,999	16,283	(£m)
Cost w/o deficit (STPR)	20,874	17,617	16,892	19,491	17,542	16,753	17,858	16,999	16,283	(£m)
Cost w/ deficit (IGEQ)	32,013	25,824	24,509	29,386	25,687	24,282	26,364	24,752	23,461	(£m)
Cost w/o deficit (IGEQ)	32,013	25,824	24,509	29,386	25,687	24,282	26,364	24,752	23,461	(£m)
Cost w/ deficit (LTDR)	23,026	19,234	18,400	21,416	19,147	18,244	19,528	18,531	17,708	(£m)
Cost w/o deficit (LTDR)	23,026	19,234	18,400	21,416	19,147	18,244	19,528	18,531	17,708	(£m)

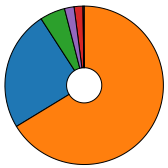
Cost breakdown (STPR)

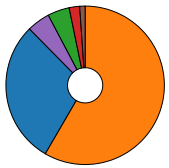
Select Company: Total

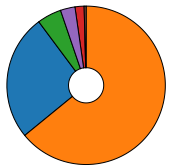
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	6,447	4,558	4,148	5,697	4,512	4,049	4,634	4,185	3,741	(£m)
Fixed opex	11,724	11,256	11,201	11,378	11,243	11,187	11,253	11,201	11,139	(£m)
Fixed operational carbon	882	871	870	873	870	869	871	867	865	(£m)
Embedded carbon	500	330	305	418	326	296	347	309	281	(£m)
Variable opex	1,065	532	328	912	521	313	651	397	237	(£m)
Variable carbon opex	256	71	41	214	70	39	102	41	18	(£m)

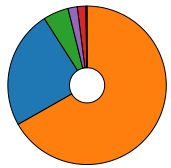
situation1 

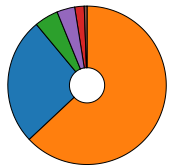
situation2 

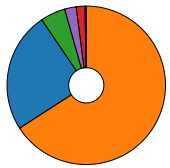
situation3 

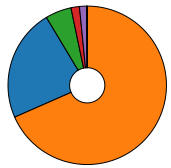
situation4 

situation5 

situation6 

situation7 

situation8 

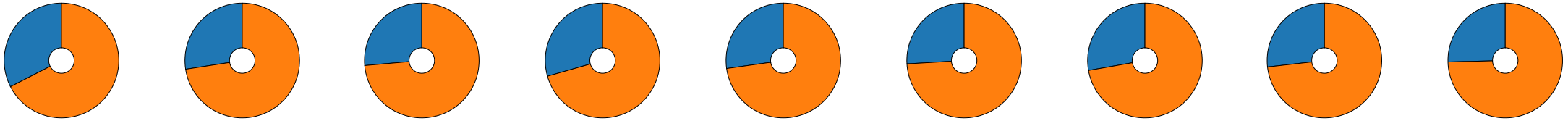
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,239,638	2,017,994	1,848,276	2,646,446	1,992,857	1,796,644	2,144,193	1,879,150	1,696,342	(tonnes)
Operational emissions	6,717,295	5,337,844	5,154,516	6,352,404	5,326,776	5,130,871	5,575,455	5,134,824	4,980,410	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

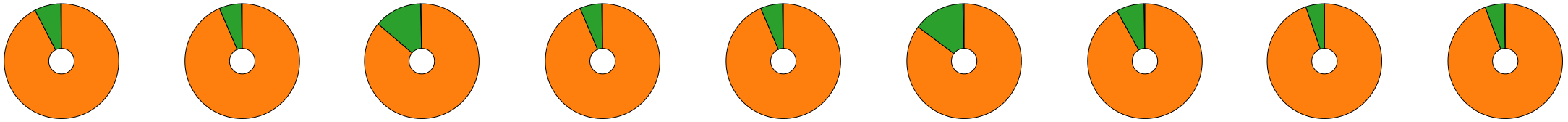


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	48	31	17	49	29	17	40	9	8	(GWh)
Grid	22,384	11,091	4,192	19,285	10,807	3,861	13,145	7,960	2,898	(GWh)
Renewable	1,805	740	654	1,271	714	655	1,115	434	167	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	66,405.00	65,094.00	65,094.00	68,077.00	65,116.00	65,094.00	66,292.00	65,094.00	65,094.00	
SEA environmental disbenefit	104,845.00	78,718.00	71,382.00	103,159.00	76,153.00	71,264.00	82,317.00	69,386.00	61,837.00	
Natural capital	84,043,162.24	81,480,828.86	84,182,526.14	80,890,313.36	81,374,431.43	83,918,866.15	80,975,953.25	81,730,201.86	84,622,205.82	
Bio-diversity net gain	−164,856.00	−110,190.00	−86,765.00	−164,462.00	−112,308.00	−91,042.00	−119,182.00	−92,300.00	−67,310.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	36,861.00	35,405.00	34,878.00	37,103.00	35,341.00	34,976.00	35,382.00	34,641.00	34,201.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	28.30	28.16	29.98	28.23	28.15	30.21	28.84	31.90	35.45	
R1: Uncertainty of option supply/demand benefit	5.99	5.21	5.55	5.68	5.14	5.58	5.47	5.93	6.56	
R3: Risk of service failure due to other physical hazards	6.81	6.84	7.55	6.70	6.87	7.62	7.07	8.01	9.13	
R4: Availability of additional headroom	6.41	6.80	7.01	6.57	6.83	7.04	7.13	7.49	7.73	
R5: Catchment/raw water quality risks (incl. climate change)	3.79	3.77	4.23	3.78	3.79	4.28	3.89	4.48	5.18	
R6: Capacity of catchment services	0.00	0.31	0.01	0.31	0.30	0.01	0.00	0.01	0.01	
R7: Risk of service failure to other exceptional events	5.31	5.11	5.64	5.08	5.10	5.69	5.29	5.98	6.84	
R8: Soil health	0.00	0.11	0.00	0.11	0.11	0.00	0.00	0.00	0.00	

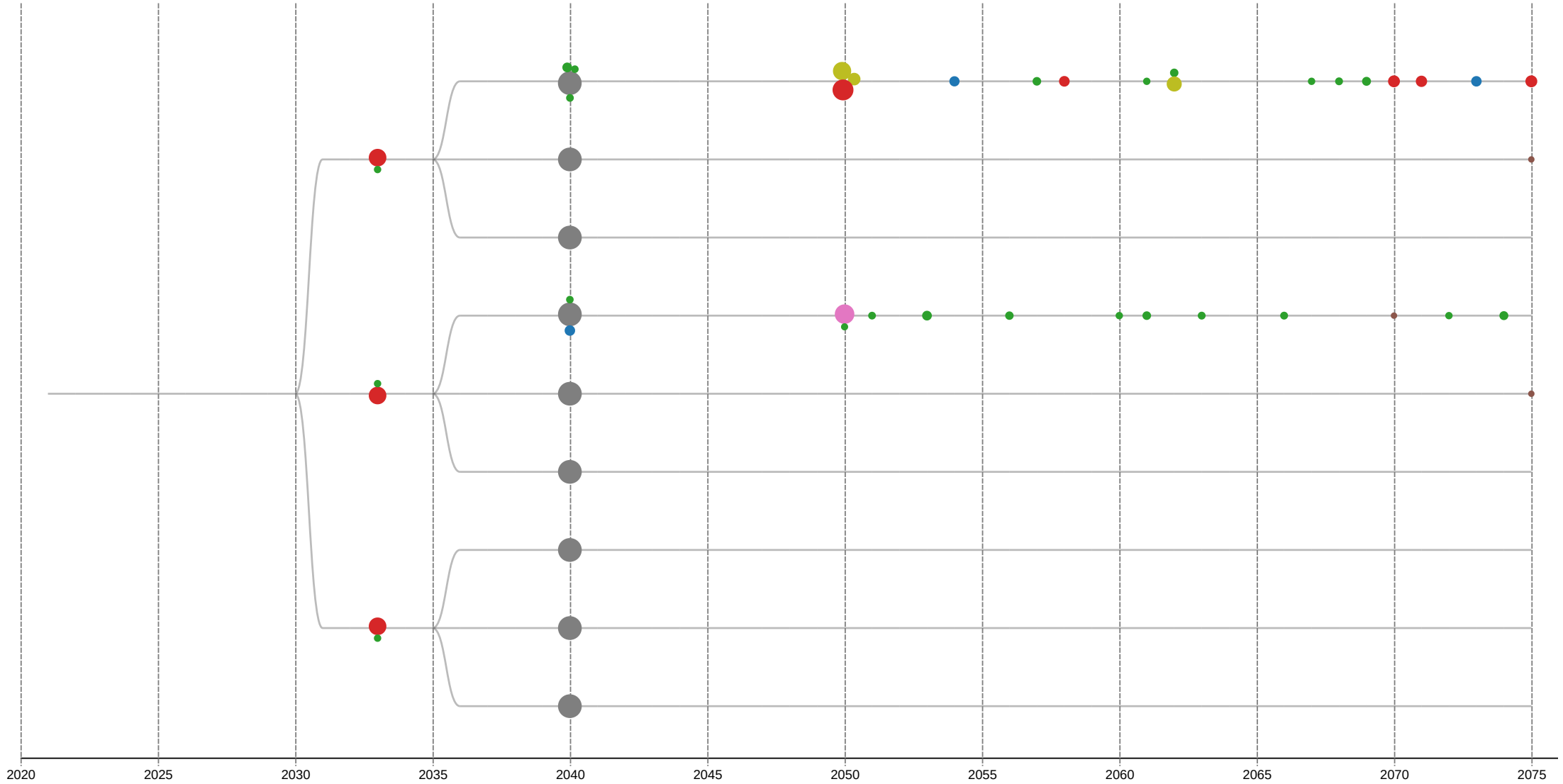
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	14.86	15.26	16.89	14.12	15.26	16.84	15.56	17.71	20.15	
A3: Operational complexity and flexibility	6.31	6.53	7.26	6.30	6.54	7.34	6.76	7.74	8.88	
A4: WRZ connectivity	8.52	8.59	9.60	7.70	8.59	9.46	8.77	9.94	11.23	
A7: Customer relations support engagement with demand management	0.02	0.13	0.03	0.12	0.13	0.03	0.03	0.03	0.03	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.80	20.50	21.79	19.83	20.42	22.00	20.46	23.23	26.32	
E1: Scaleability and modularity of proposed changes	9.07	9.47	10.47	9.00	9.49	10.57	9.72	11.16	12.71	
E2: Intervention lead times	4.36	4.20	4.30	4.18	4.12	4.34	4.17	4.59	5.10	
E3: Reliance on external bodies to deliver changes	6.38	6.38	7.02	6.20	6.37	7.08	6.57	7.47	8.51	
E5: Collaborative land management	0.00	0.46	0.01	0.46	0.44	0.01	0.00	0.01	0.01	

Option Selection (Thames Water)



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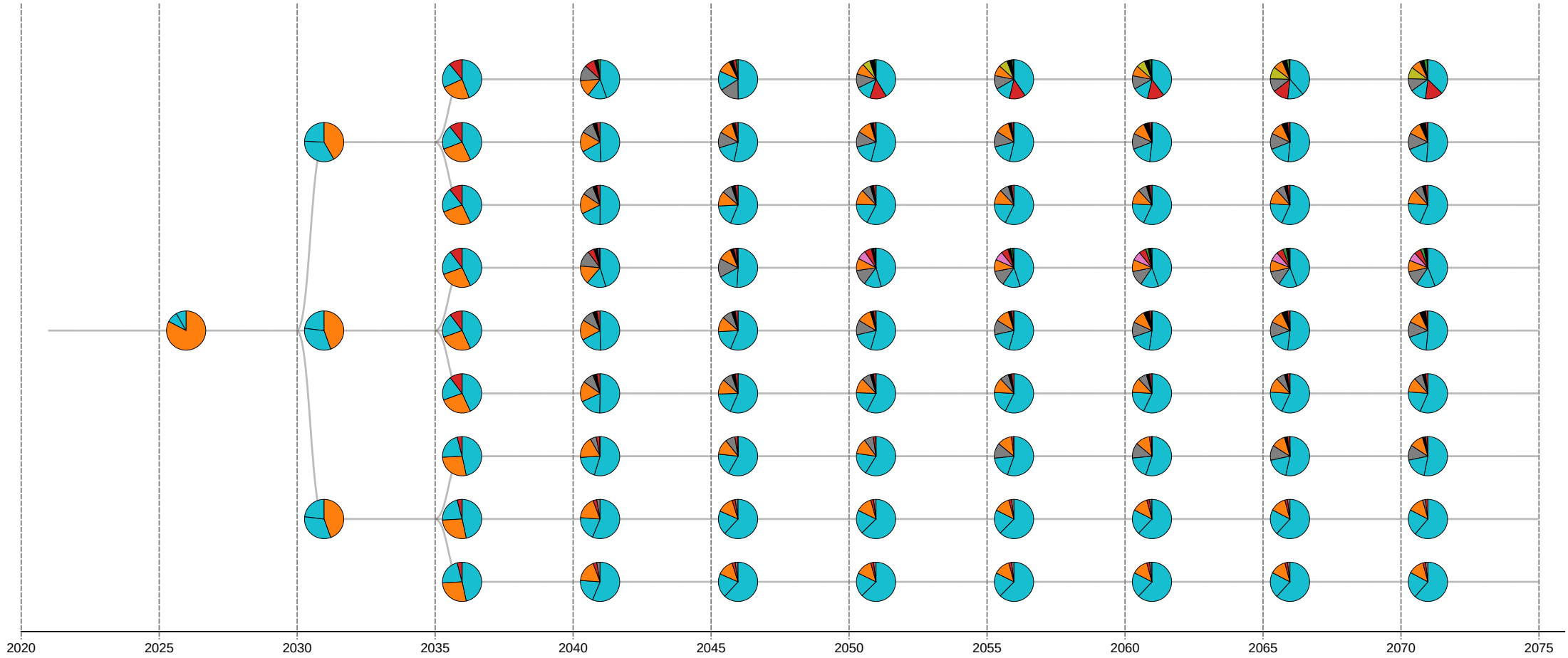
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.



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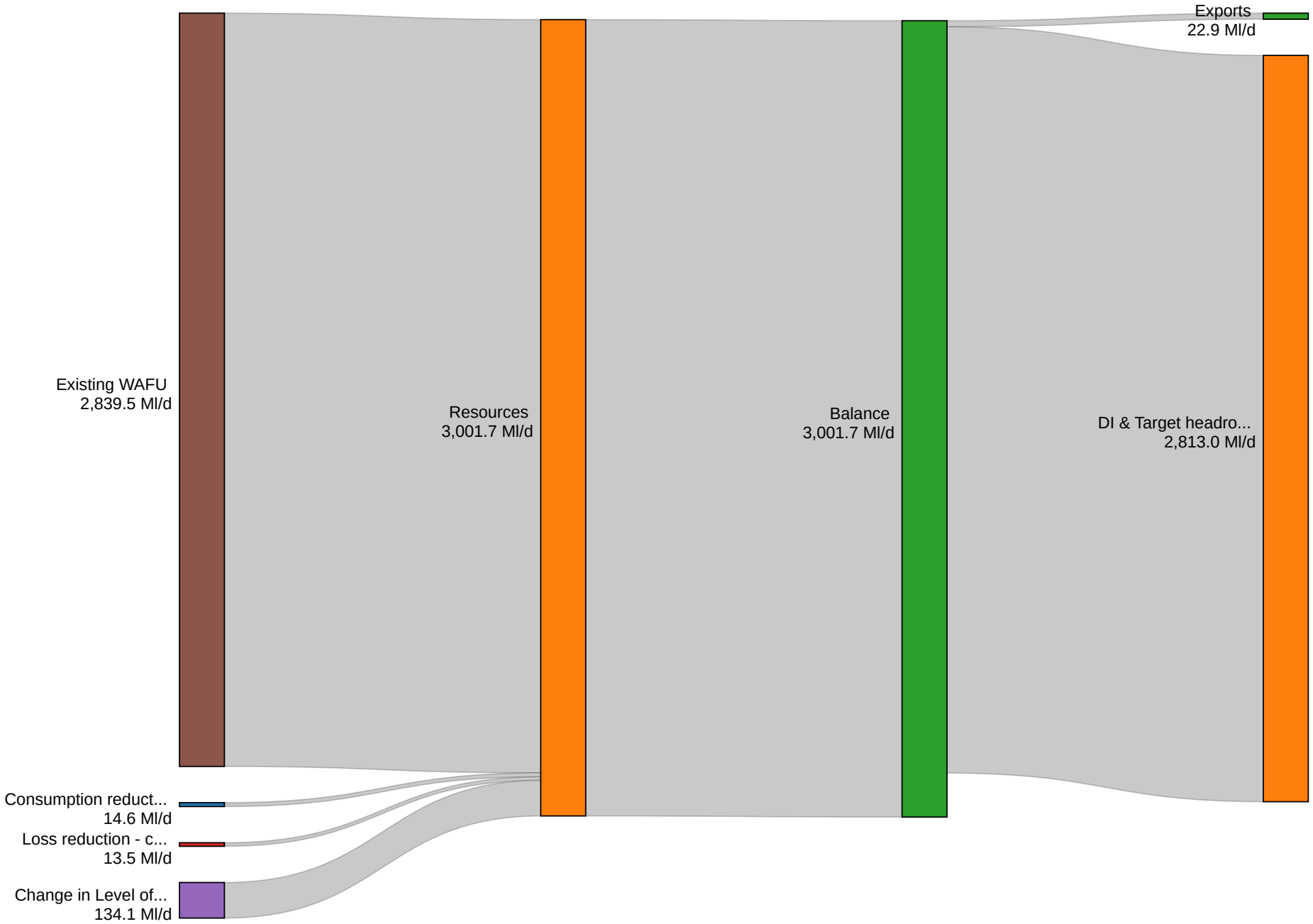
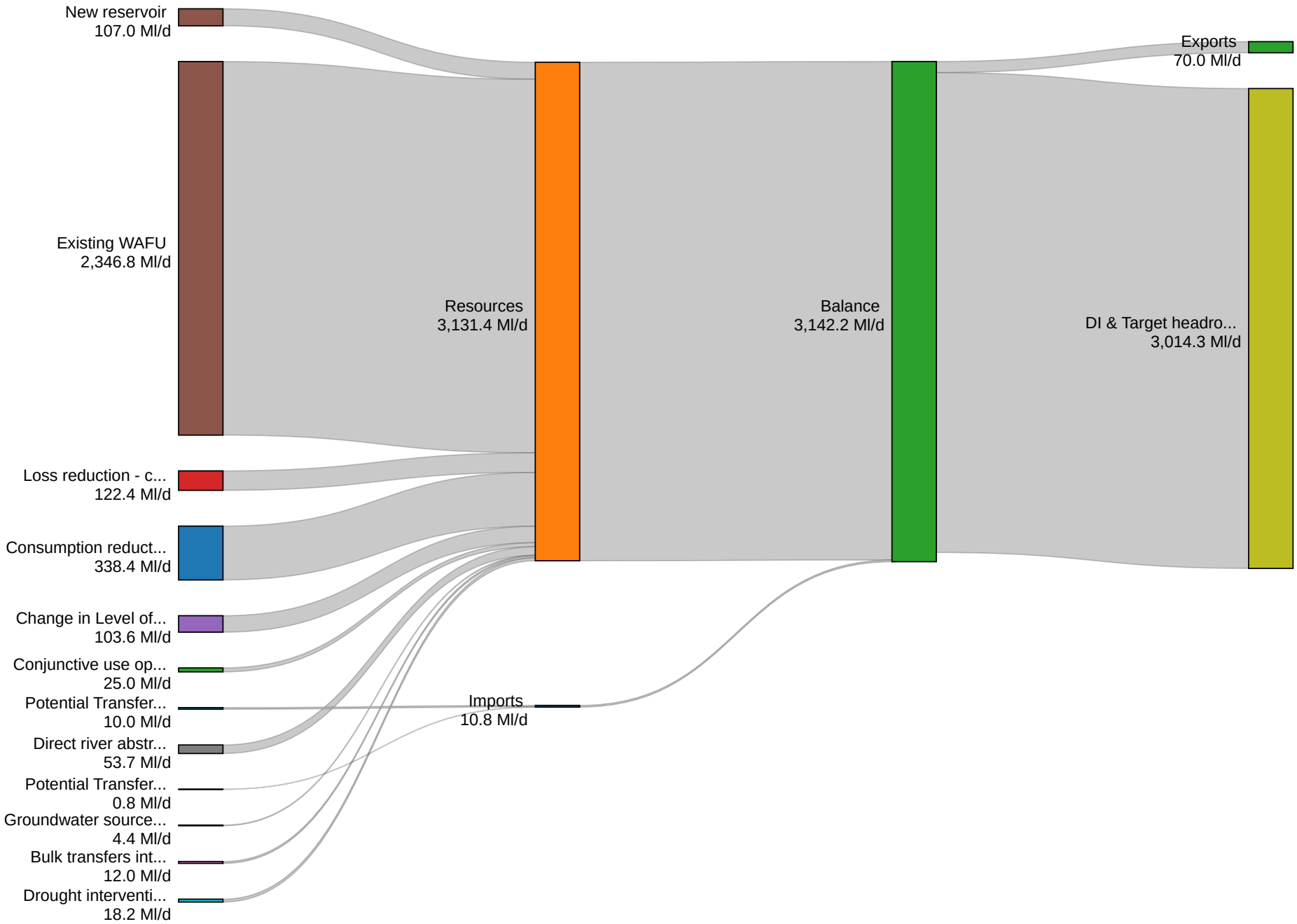
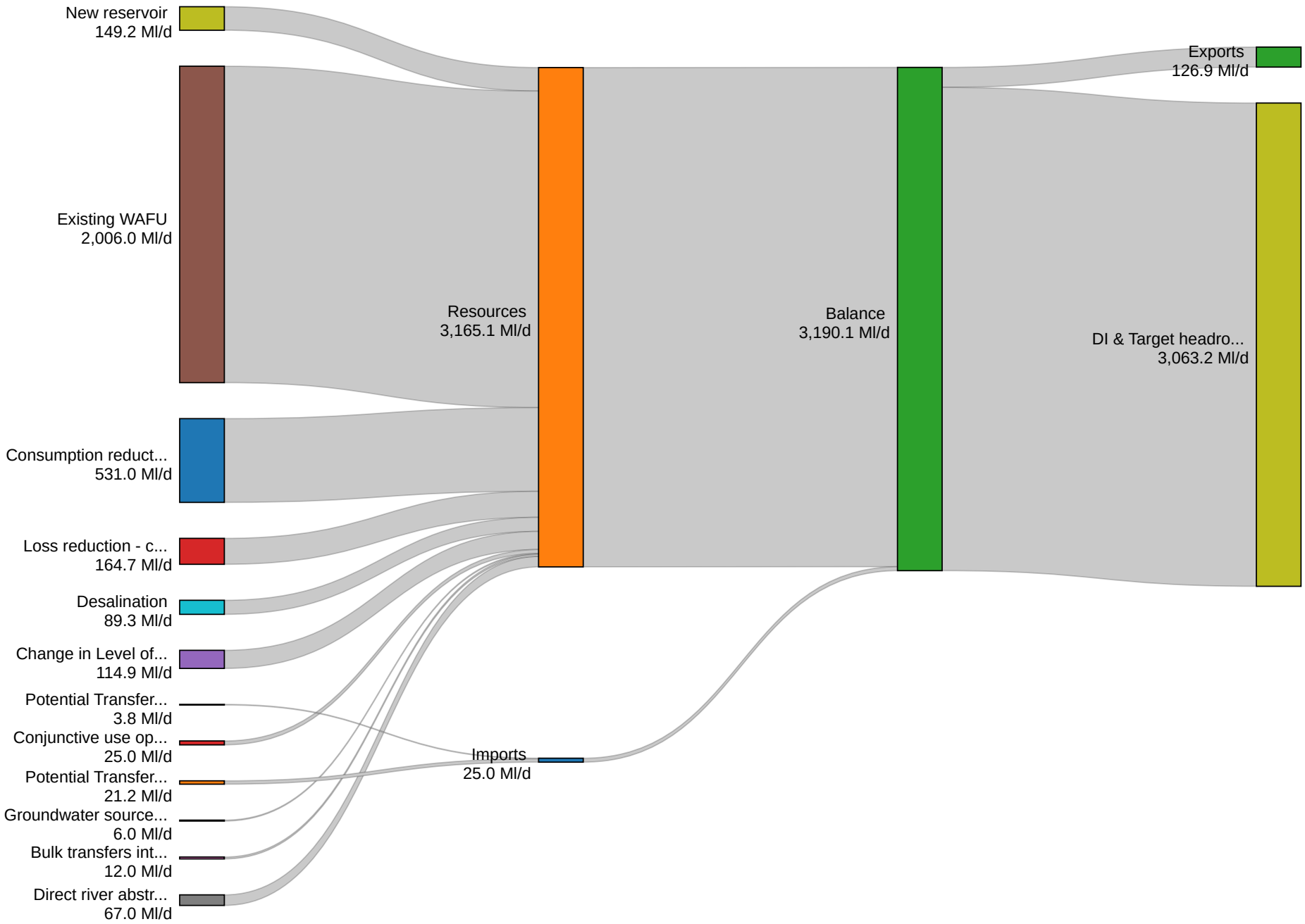
Situation 4 - 2026 (Thames Water)



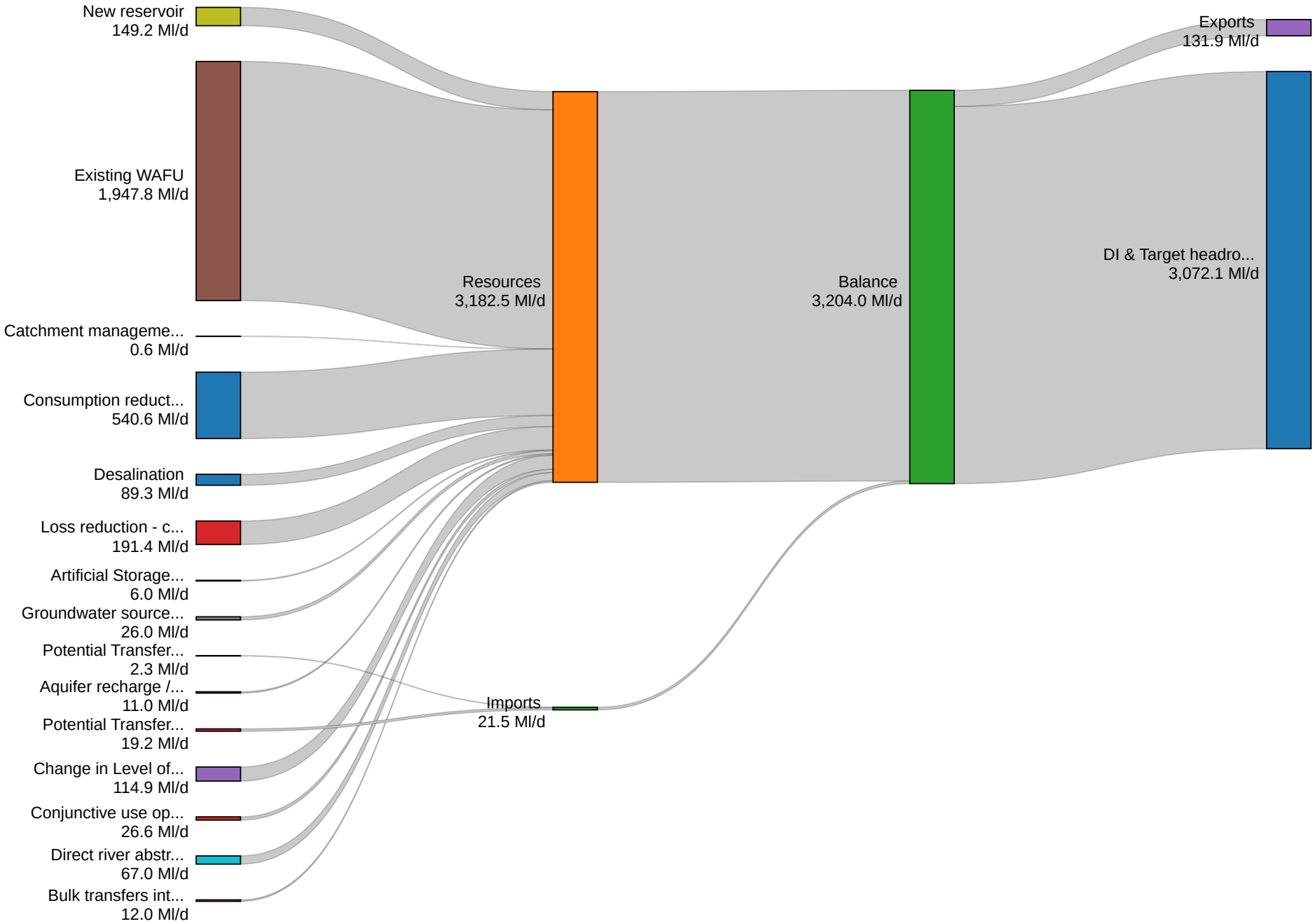
Situation 4 - 2040 (Thames Water)



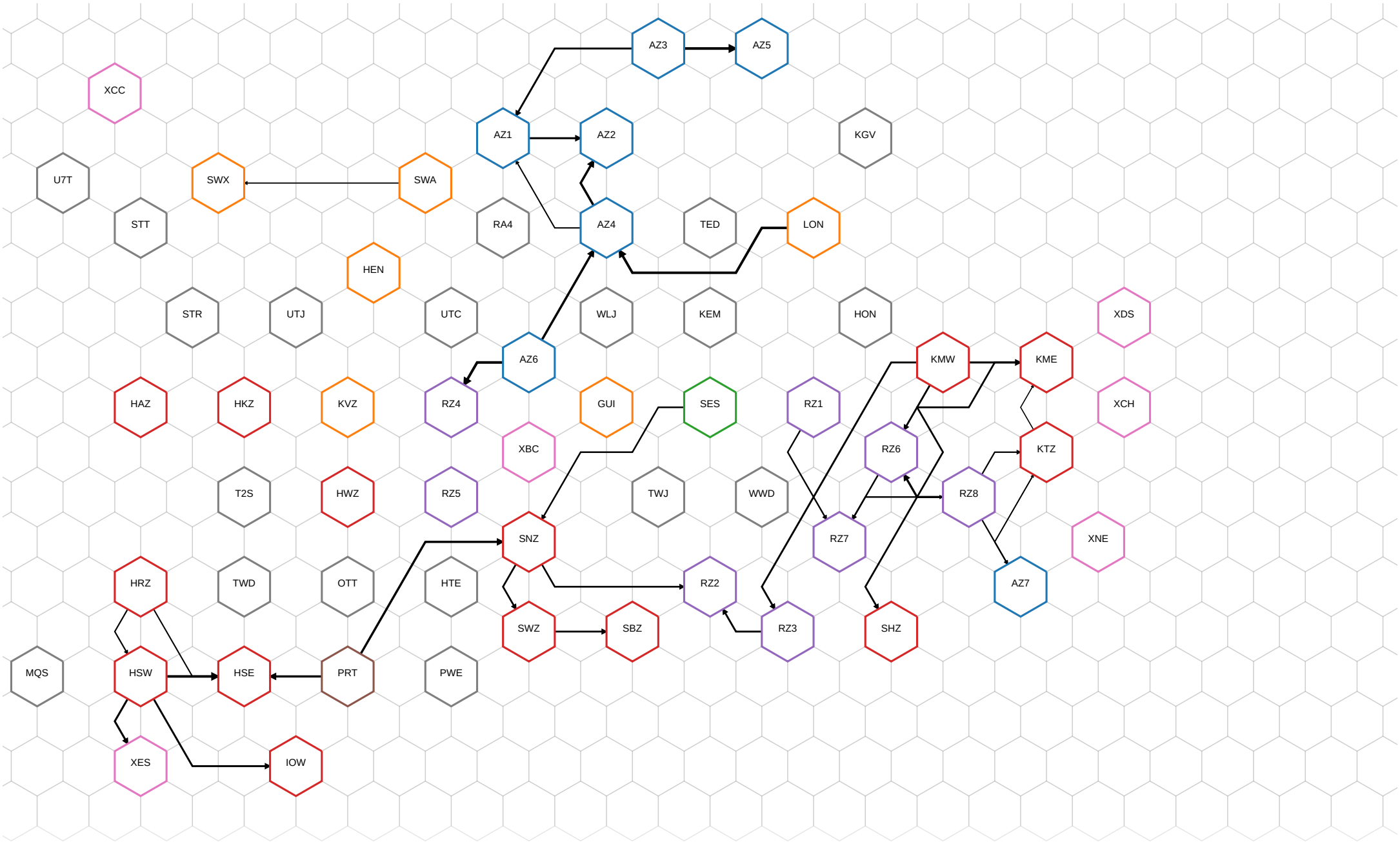
Situation 4 - 2050 (Thames Water)



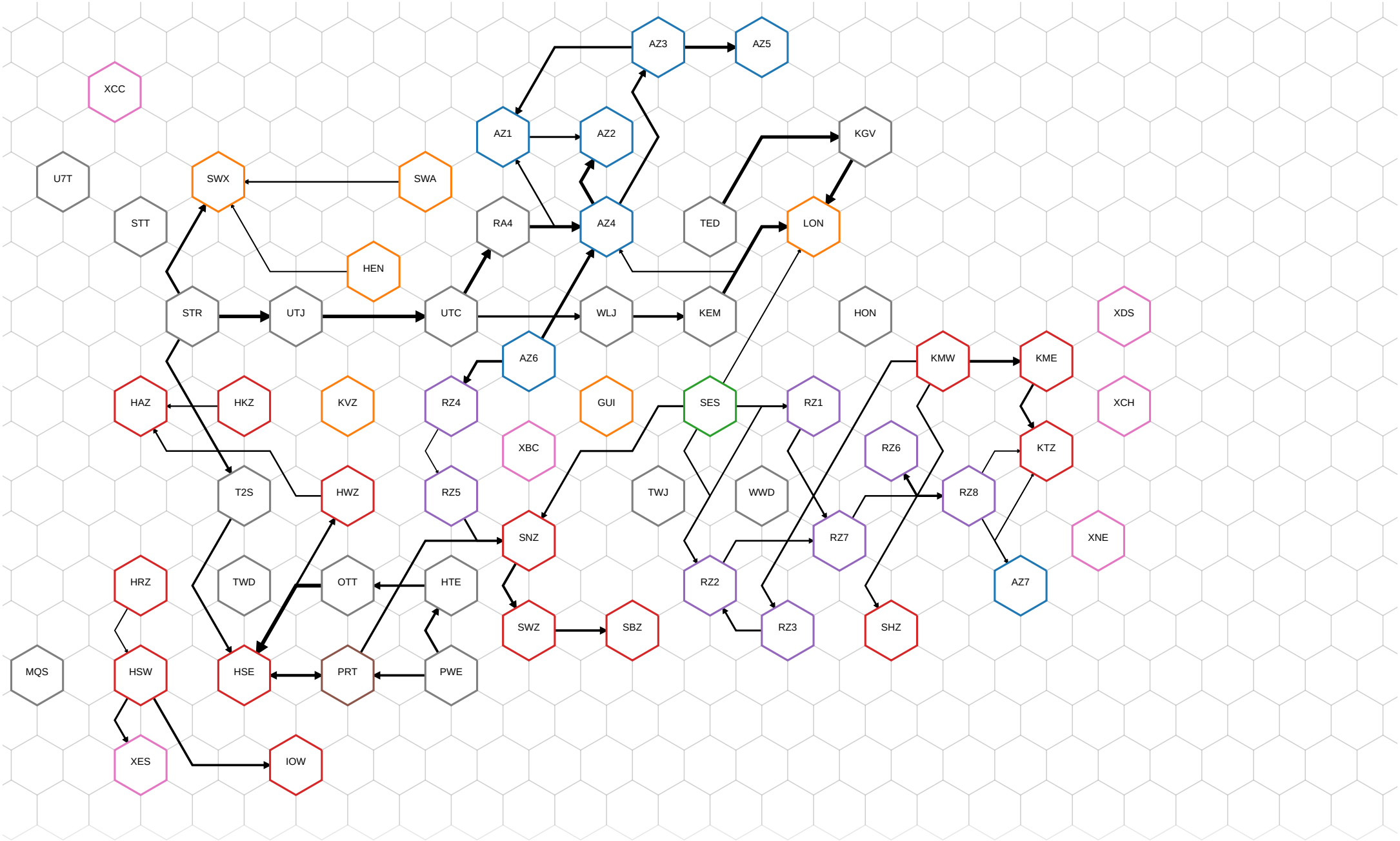
Situation 4 - 2075 (Thames Water)



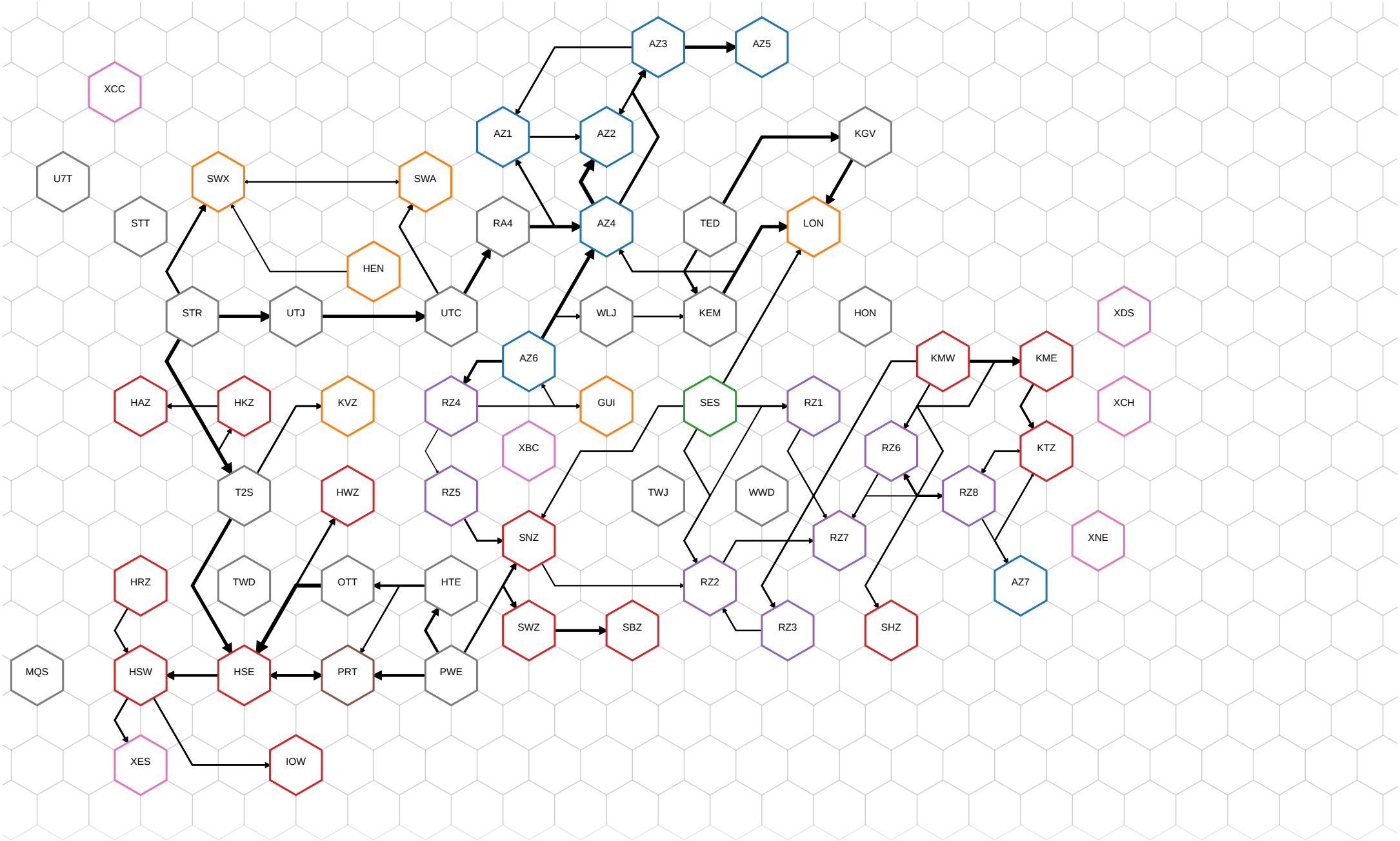
Situation 4 - 2026



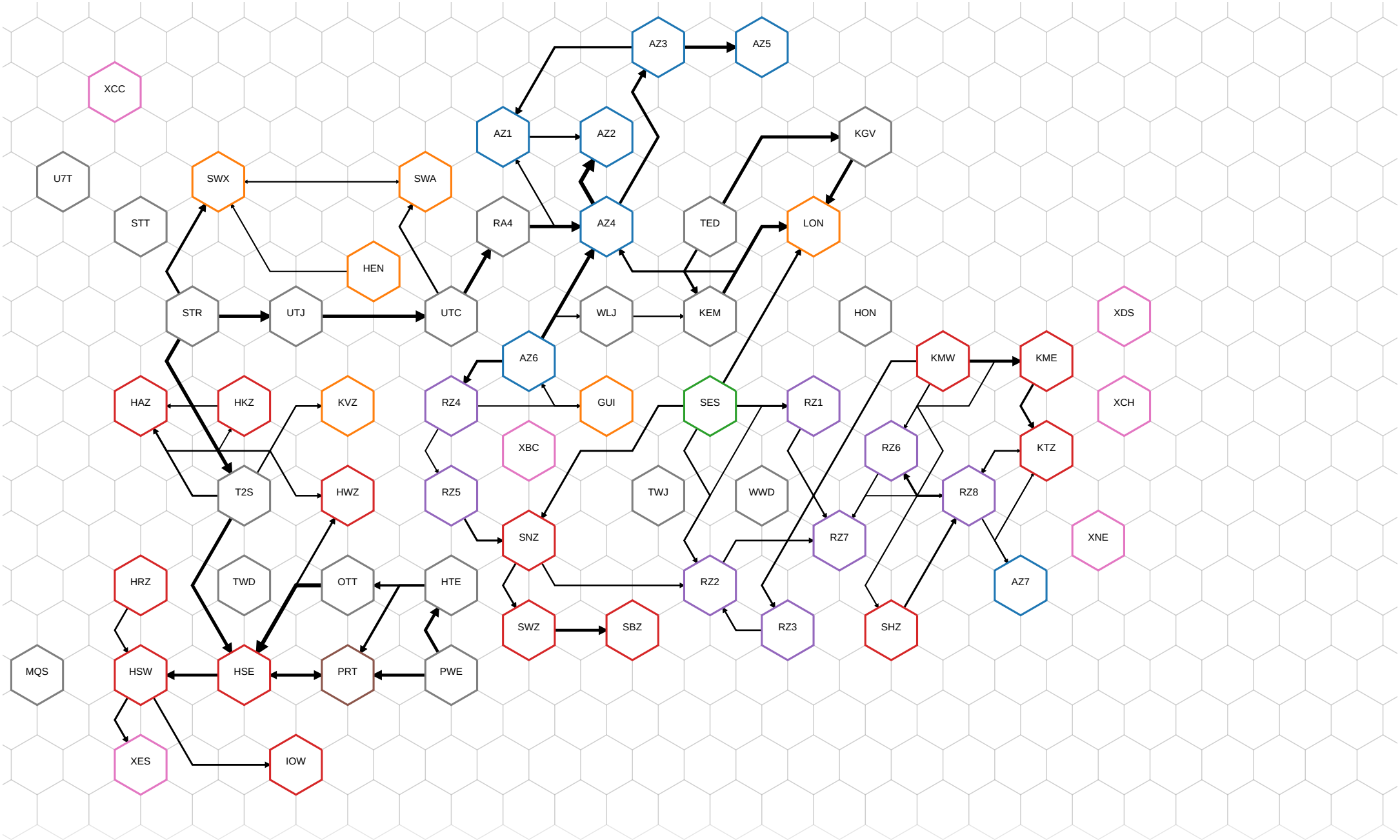
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

COMPANY-LED DEMAND MANAGEMENT – LOW SCENARIO

IVM Summary: Thames Water

! This run contained total deficits of 86.5 Ml/d in the **"100a-dyaa-hplan-fthr"** planning scenario.

! This run contained total deficits of 484.9 Ml/d in the **"hybrida-dyaa-hplan-fthr"** planning scenario.

! This run contained total deficits of 45.3 Ml/d in the **"normal-hplan-fthr"** planning scenario.

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-low-dmp-sew-med-gov-led-2075
Description	Least cost run with hybrid-c+2 government interventions including only low demand management options (except PRT which uses medium) but medium government led C+2 for SEW.
Created at	17/07/2023, 10:04:09
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2-low-dmp-sew-med-gov-led
Setting description	No emergency options. Low consumption and leakage baskets. Low DMP options but using SEW medium gov-led as per request.
Optimised discount rate	STPR

Metrics

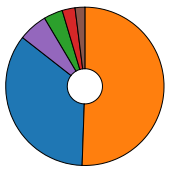
Net present value (Cost)

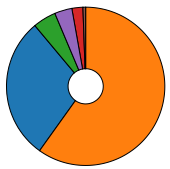
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	12,901,442	109,909	109,152	6,205,917	109,398	108,578	294,598	108,584	107,792	(£m)
Cost w/o deficit (STPR)	21,883	17,900	17,142	20,299	17,388	16,569	18,579	16,574	15,782	(£m)
Cost w/ deficit (IGEQ)	12,913,578	118,537	117,173	6,216,731	117,702	116,247	304,044	116,320	114,890	(£m)
Cost w/o deficit (IGEQ)	34,019	26,528	25,163	31,113	25,693	24,237	28,025	24,310	22,880	(£m)
Cost w/ deficit (LTDR)	12,903,780	111,604	110,733	6,208,012	111,030	110,091	296,439	110,108	109,198	(£m)
Cost w/o deficit (LTDR)	24,221	19,594	18,723	22,395	19,020	18,082	20,420	18,099	17,188	(£m)

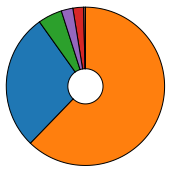
Cost breakdown (STPR)

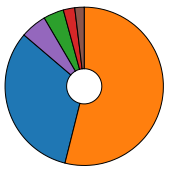
Select Company: Total

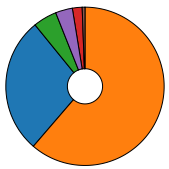
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	7,661	5,198	4,786	6,564	4,839	4,390	5,419	4,317	3,848	(£m)
Fixed opex	11,063	10,719	10,666	10,942	10,661	10,609	10,827	10,599	10,535	(£m)
Fixed operational carbon	855	846	846	850	842	839	843	839	837	(£m)
Embedded carbon	575	403	374	474	347	319	396	308	279	(£m)
Variable opex	1,292	636	405	1,081	601	353	810	452	256	(£m)
Variable carbon opex	436	99	64	389	98	59	284	59	27	(£m)

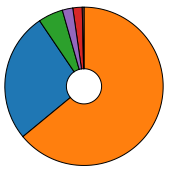
situation1 

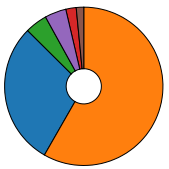
situation2 

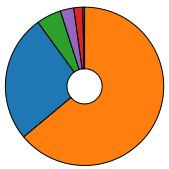
situation3 

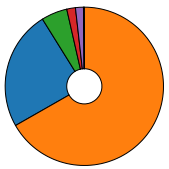
situation4 

situation5 

situation6 

situation7 

situation8 

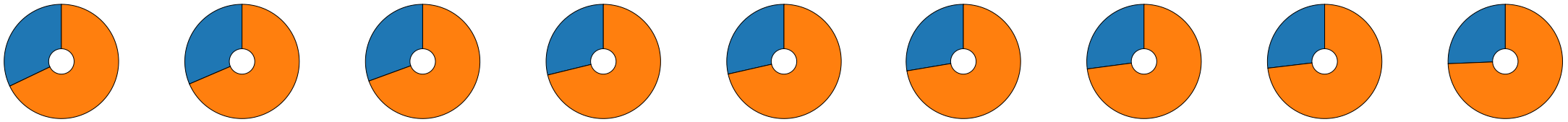
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,688,820	2,463,346	2,272,735	3,015,084	2,128,810	1,939,200	2,485,747	1,871,911	1,679,152	(tonnes)
Operational emissions	7,799,280	5,368,816	5,159,548	7,446,106	5,326,203	5,072,659	6,686,318	5,090,979	4,873,281	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

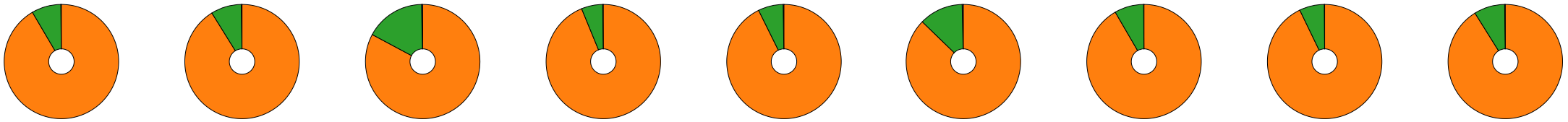


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	50	34	21	48	32	18	22	11	6	(GWh)
Grid	25,732	13,032	5,250	22,332	11,908	4,592	15,685	8,615	2,943	(GWh)
Renewable	2,324	1,229	1,067	1,426	907	652	1,412	653	281	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	58,360.00	52,200.00	51,724.00	55,867.00	51,274.00	50,068.00	52,032.00	49,426.00	48,257.00	
SEA environmental disbenefit	128,584.00	92,128.00	85,963.00	118,171.00	93,161.00	84,975.00	98,455.00	80,485.00	71,355.00	
Natural capital	85,950,503.28	89,309,194.29	89,439,920.30	81,779,467.18	81,349,645.43	84,050,047.42	62,416,446.60	64,972,398.66	67,865,932.09	
Bio-diversity net gain	−214,883.00	−141,043.00	−132,545.00	−186,652.00	−132,425.00	−111,427.00	−149,723.00	−113,080.00	−82,373.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	35,302.00	32,867.00	32,554.00	34,661.00	32,880.00	32,397.00	32,967.00	31,954.00	31,446.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	28.54	28.34	30.96	27.53	26.98	29.32	27.76	29.13	32.14	
R1: Uncertainty of option supply/demand benefit	6.57	6.08	6.64	6.07	5.48	5.92	5.86	5.95	6.51	
R3: Risk of service failure due to other physical hazards	6.59	6.76	7.55	6.43	6.42	7.13	6.51	7.00	7.92	
R4: Availability of additional headroom	6.41	6.70	6.91	6.47	6.69	6.89	6.92	7.23	7.47	
R5: Catchment/raw water quality risks (incl. climate change)	3.69	3.34	3.76	3.40	3.25	3.67	3.33	3.46	3.99	
R6: Capacity of catchment services	0.01	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	
R7: Risk of service failure to other exceptional events	5.27	5.47	6.12	5.16	5.13	5.71	5.14	5.49	6.25	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

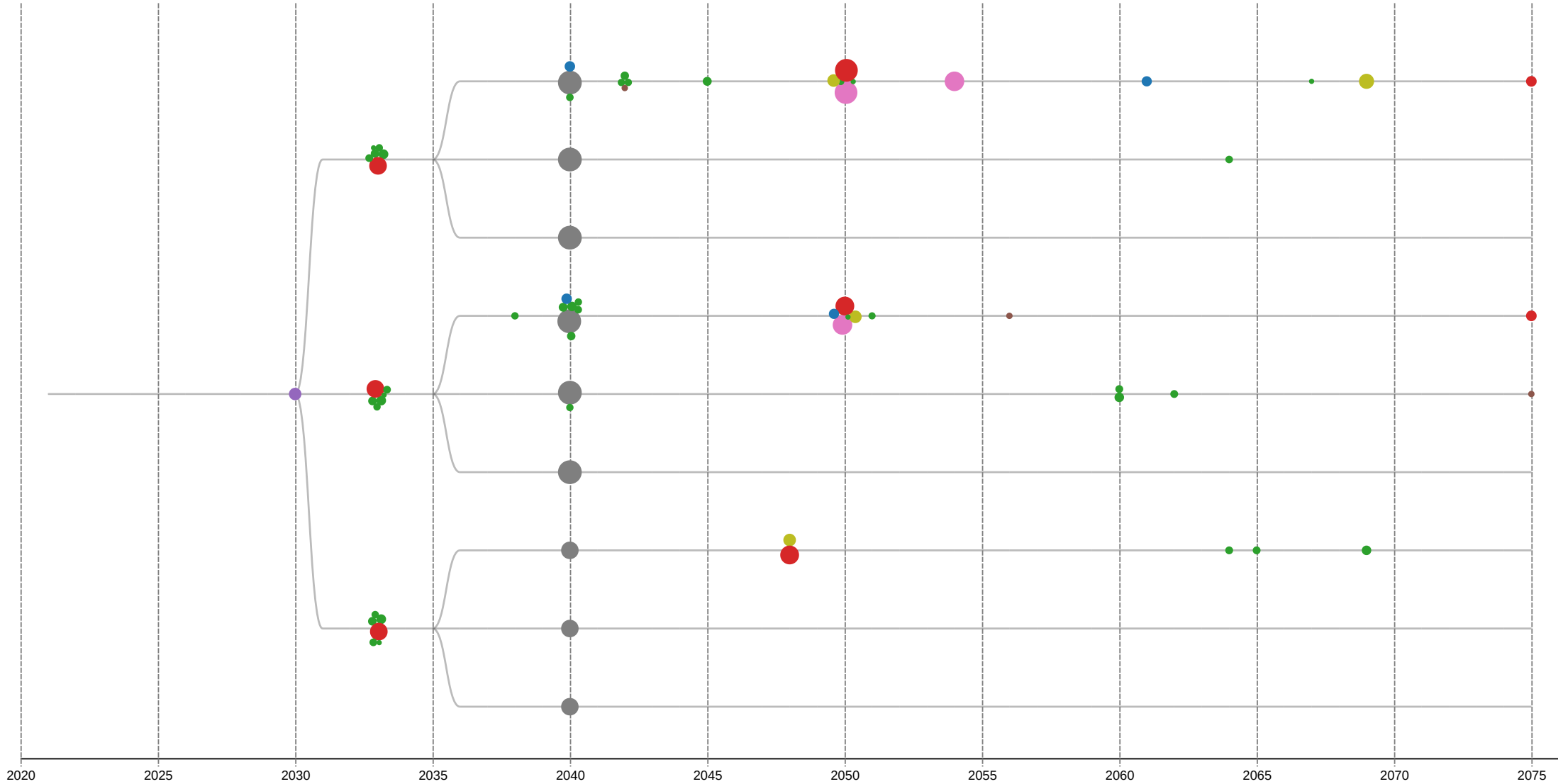
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	13.41	15.00	16.88	13.58	14.91	16.45	14.69	16.70	18.94	
A3: Operational complexity and flexibility	5.97	6.42	7.20	5.97	6.14	6.86	6.10	6.73	7.69	
A4: WRZ connectivity	7.41	8.55	9.65	7.57	8.74	9.57	8.56	9.94	11.22	
A7: Customer relations support engagement with demand management	0.03	0.03	0.03	0.04	0.04	0.03	0.03	0.03	0.03	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.31	19.39	21.53	18.60	18.68	20.47	19.63	21.08	23.72	
E1: Scaleability and modularity of proposed changes	8.73	8.99	9.99	8.41	8.71	9.63	8.97	9.94	11.24	
E2: Intervention lead times	4.38	4.07	4.50	4.17	3.97	4.21	4.31	4.28	4.73	
E3: Reliance on external bodies to deliver changes	6.19	6.33	7.03	6.01	6.00	6.63	6.35	6.86	7.76	
E5: Collaborative land management	0.01	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00	

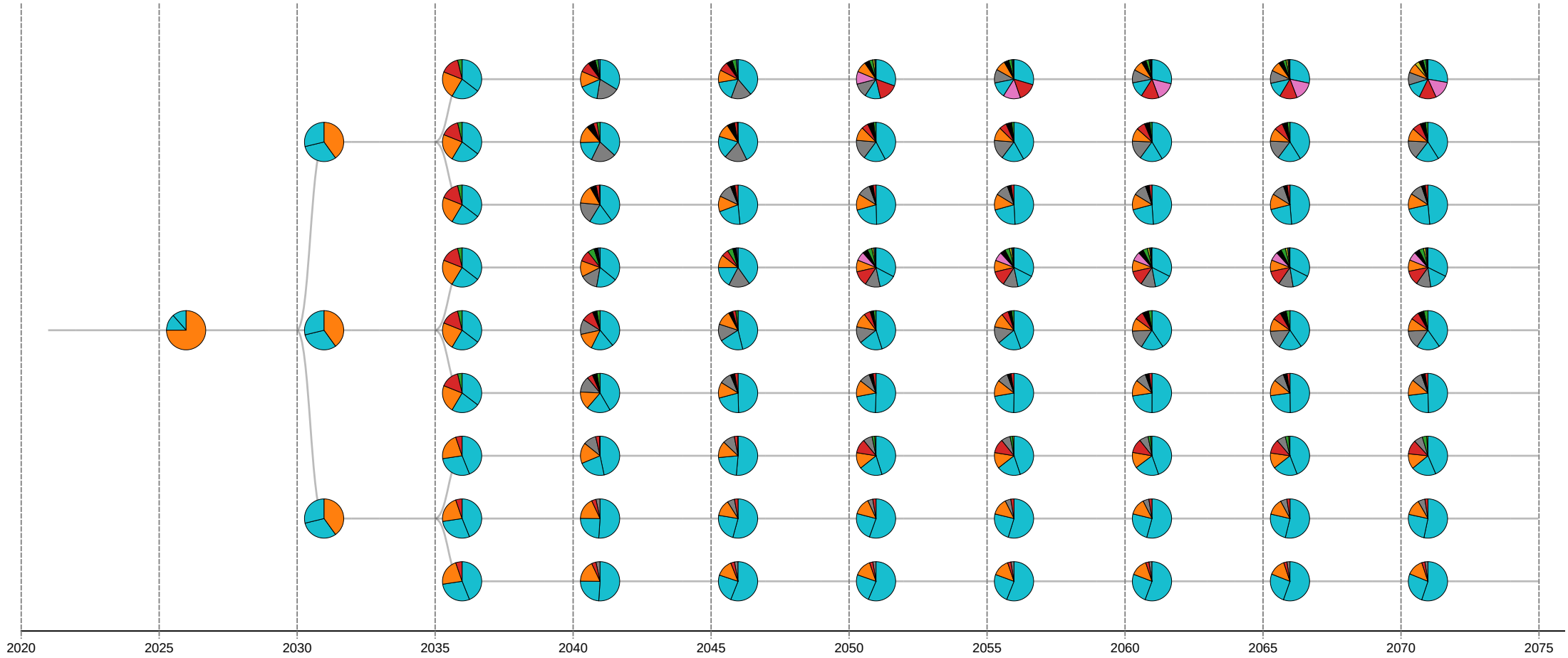
Option Selection (Thames Water)



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
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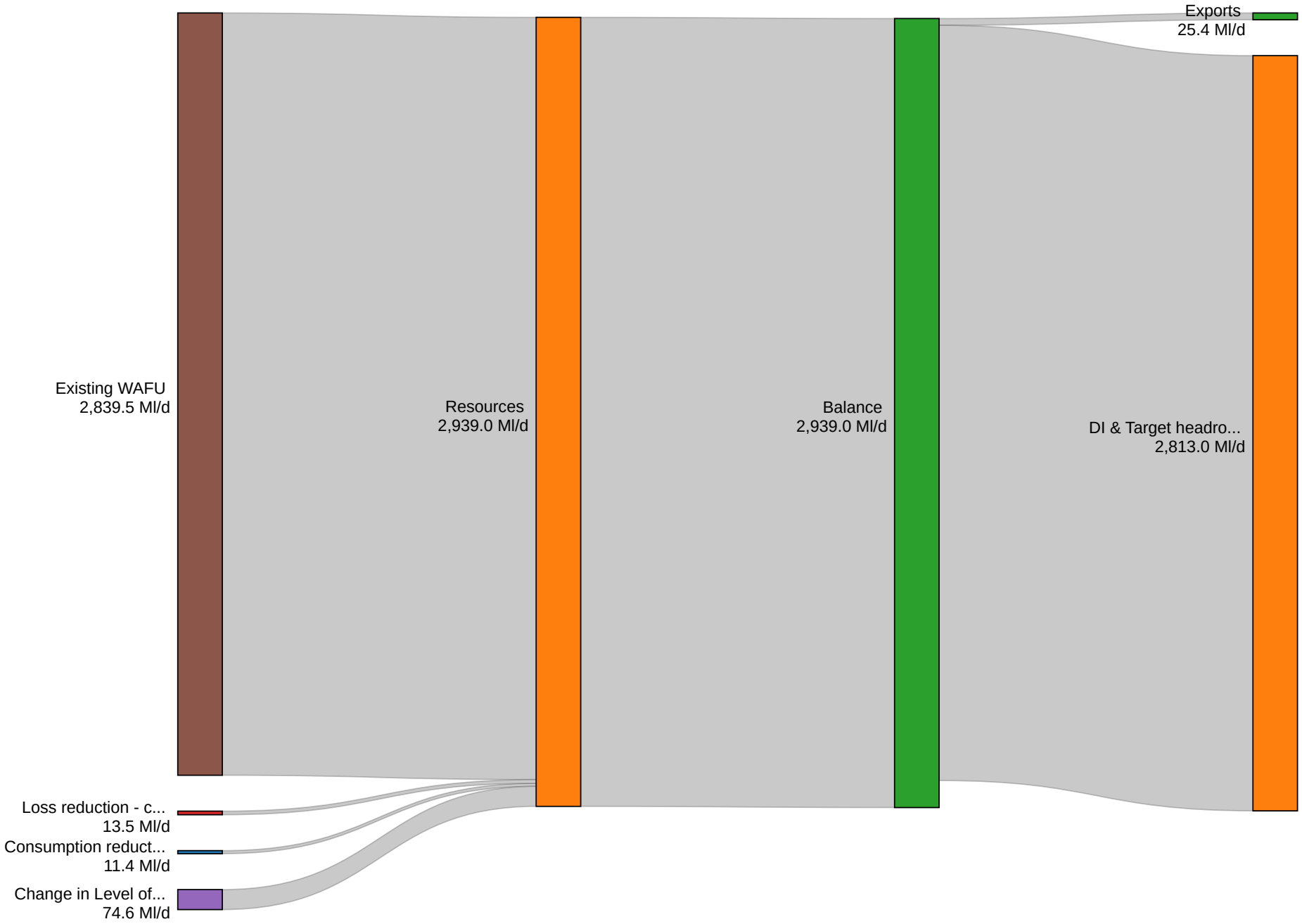
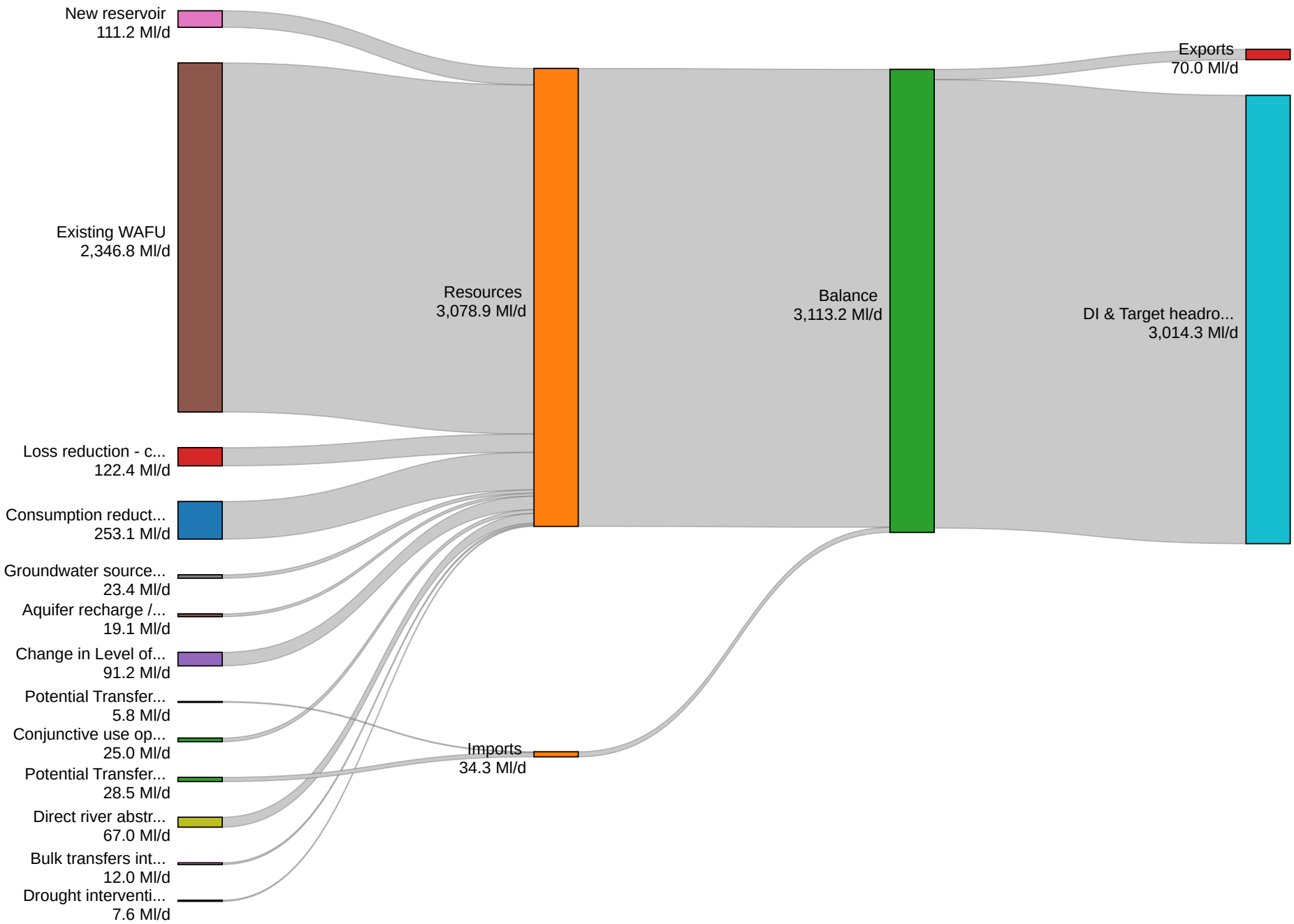
- Leakage reduction
- Other

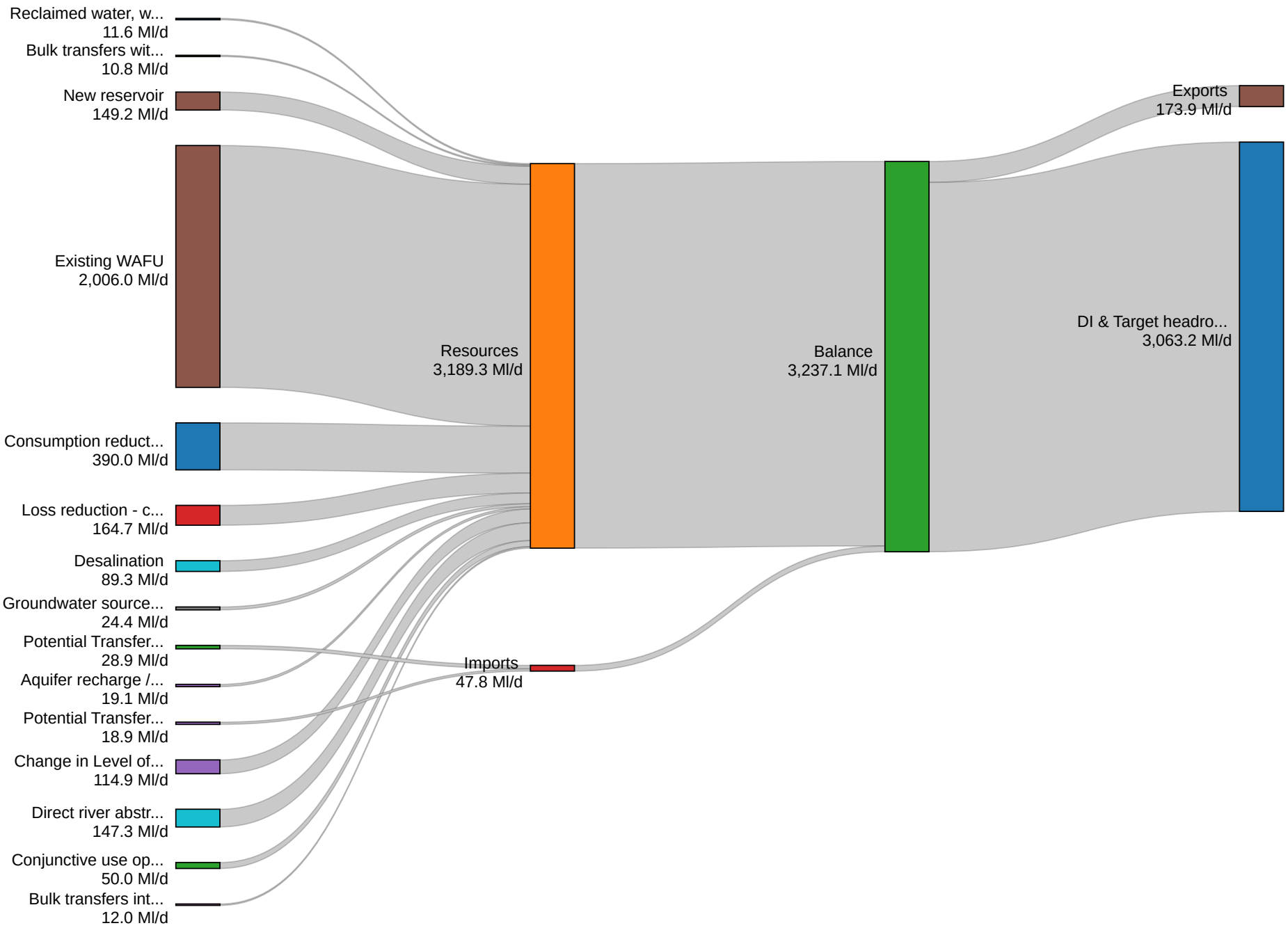
Situation 4 - 2026 (Thames Water)



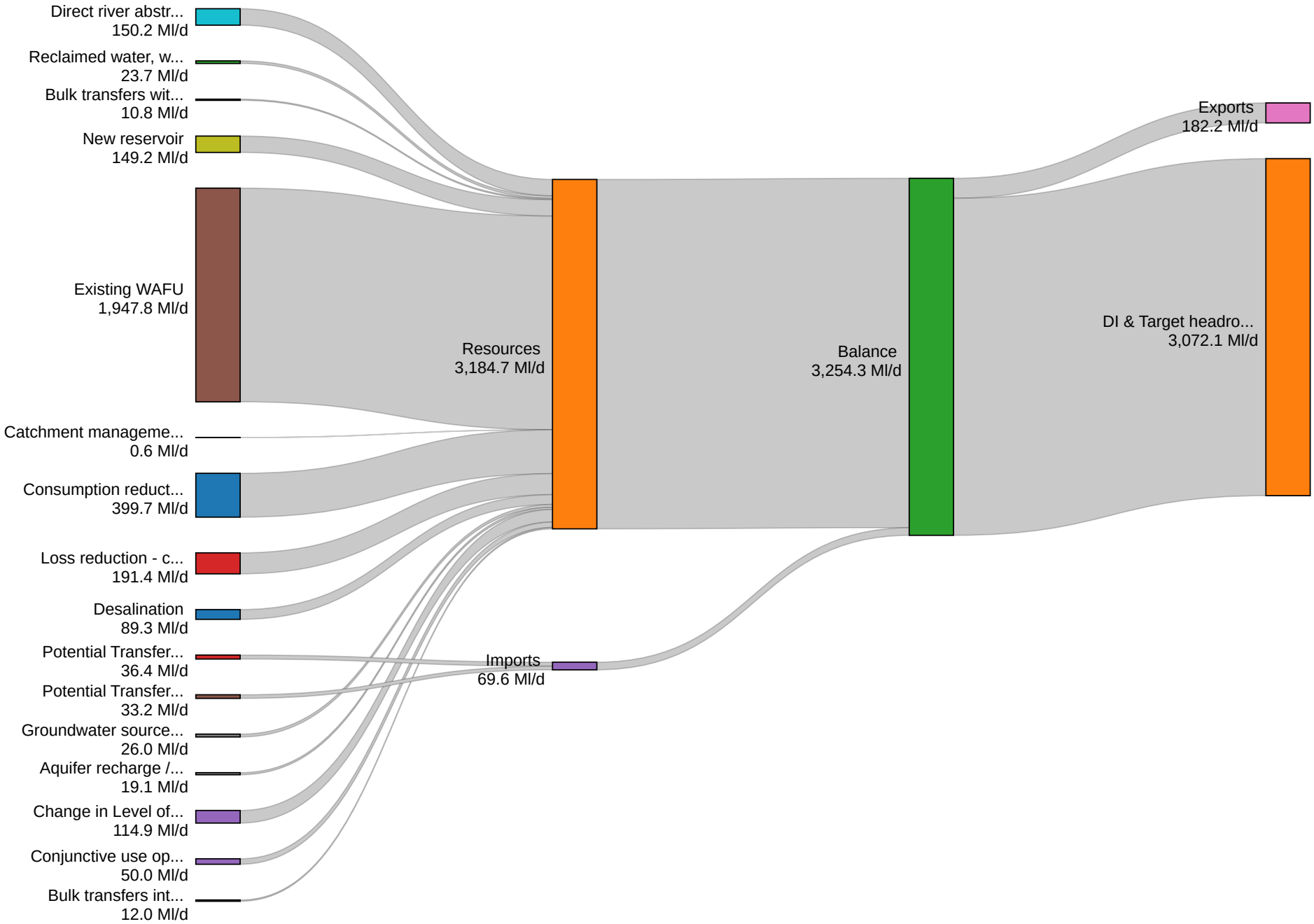
Situation 4 - 2040 (Thames Water)



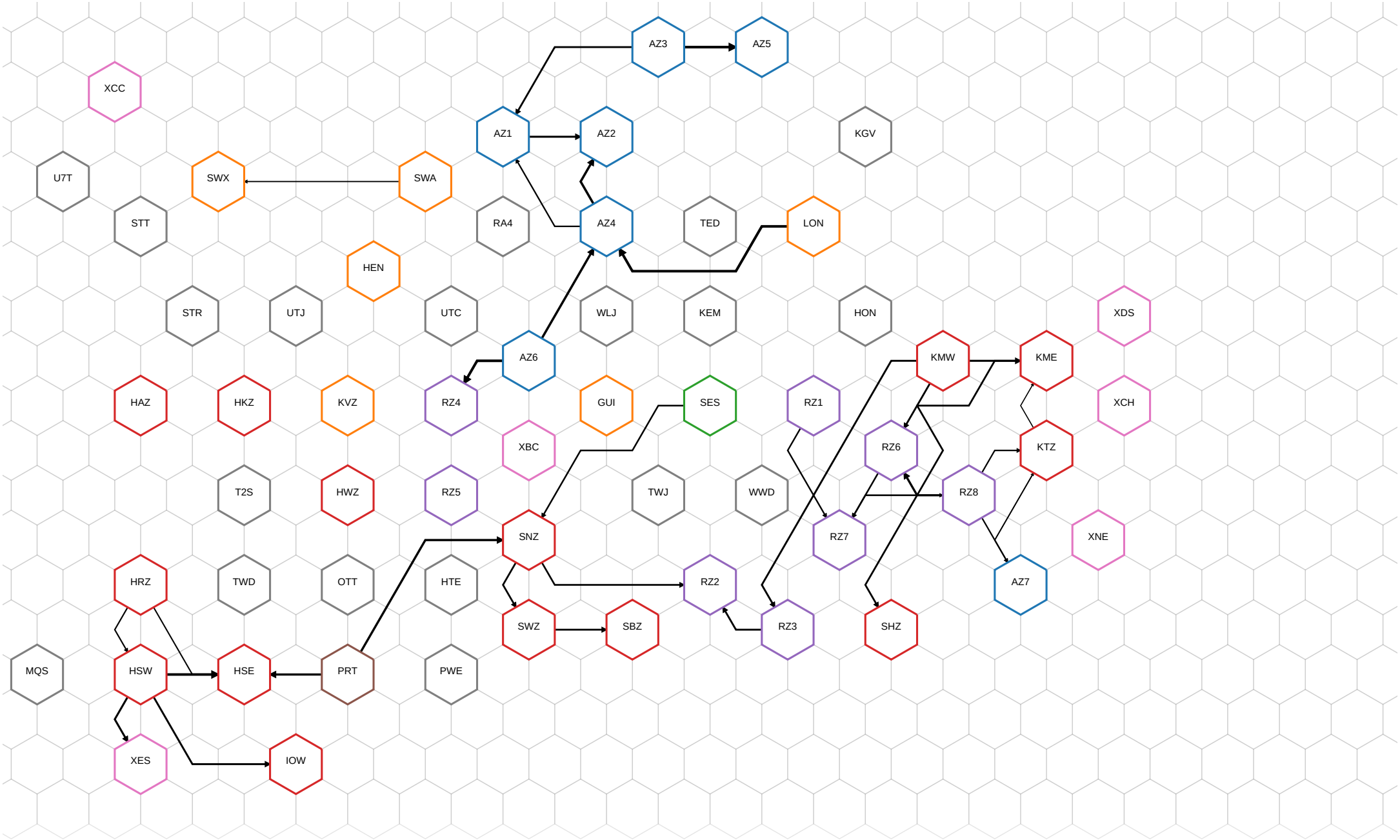
Situation 4 - 2050 (Thames Water)



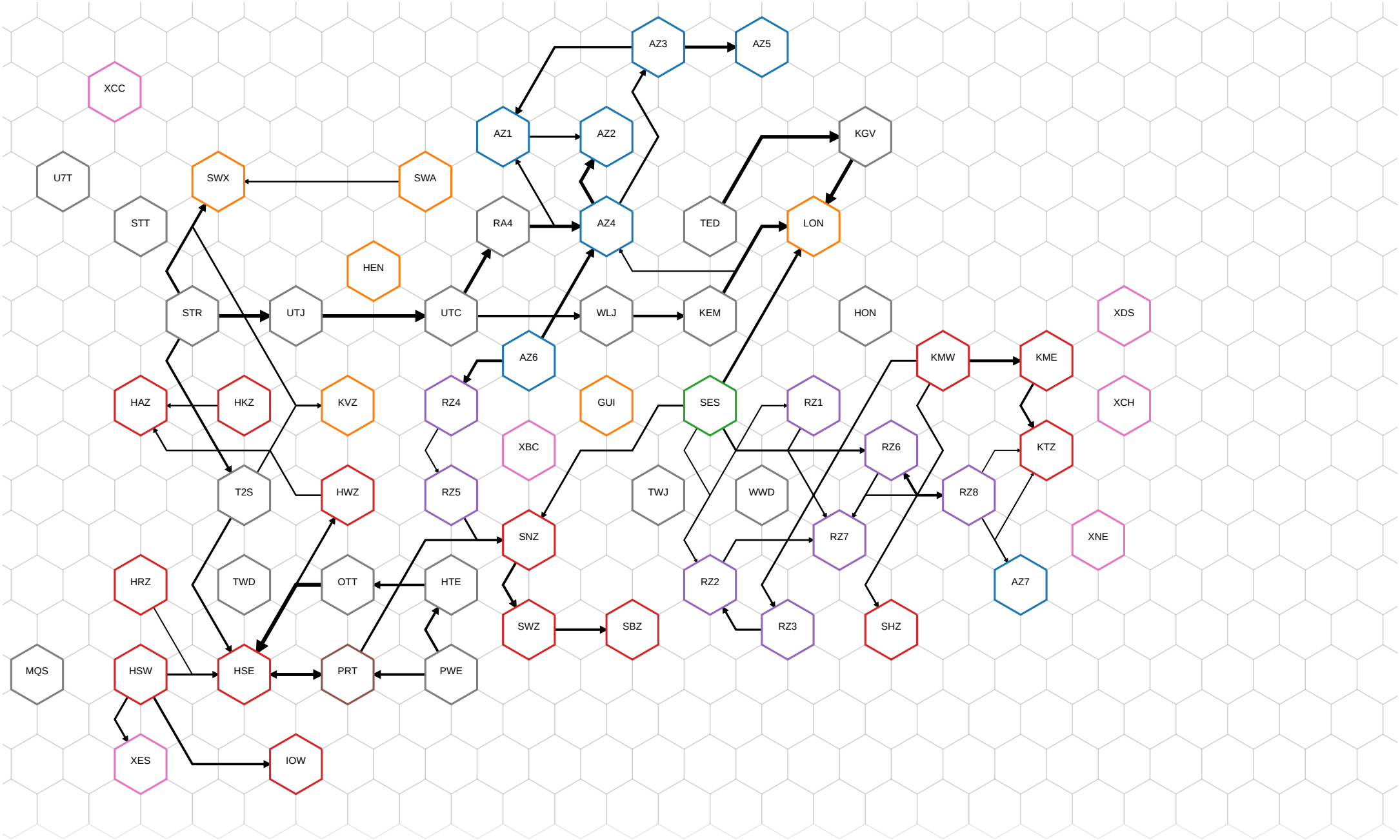
Situation 4 - 2075 (Thames Water)



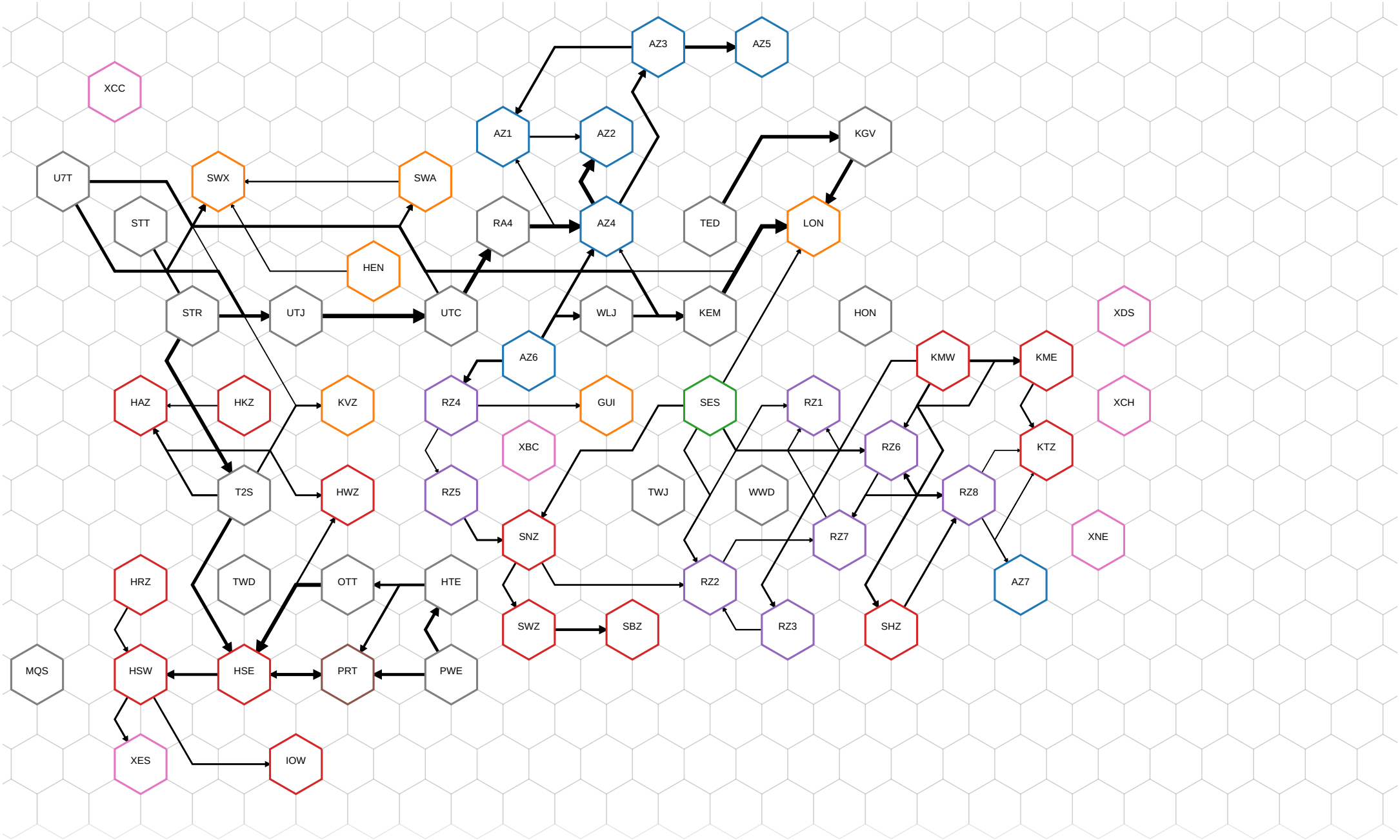
Situation 4 - 2026



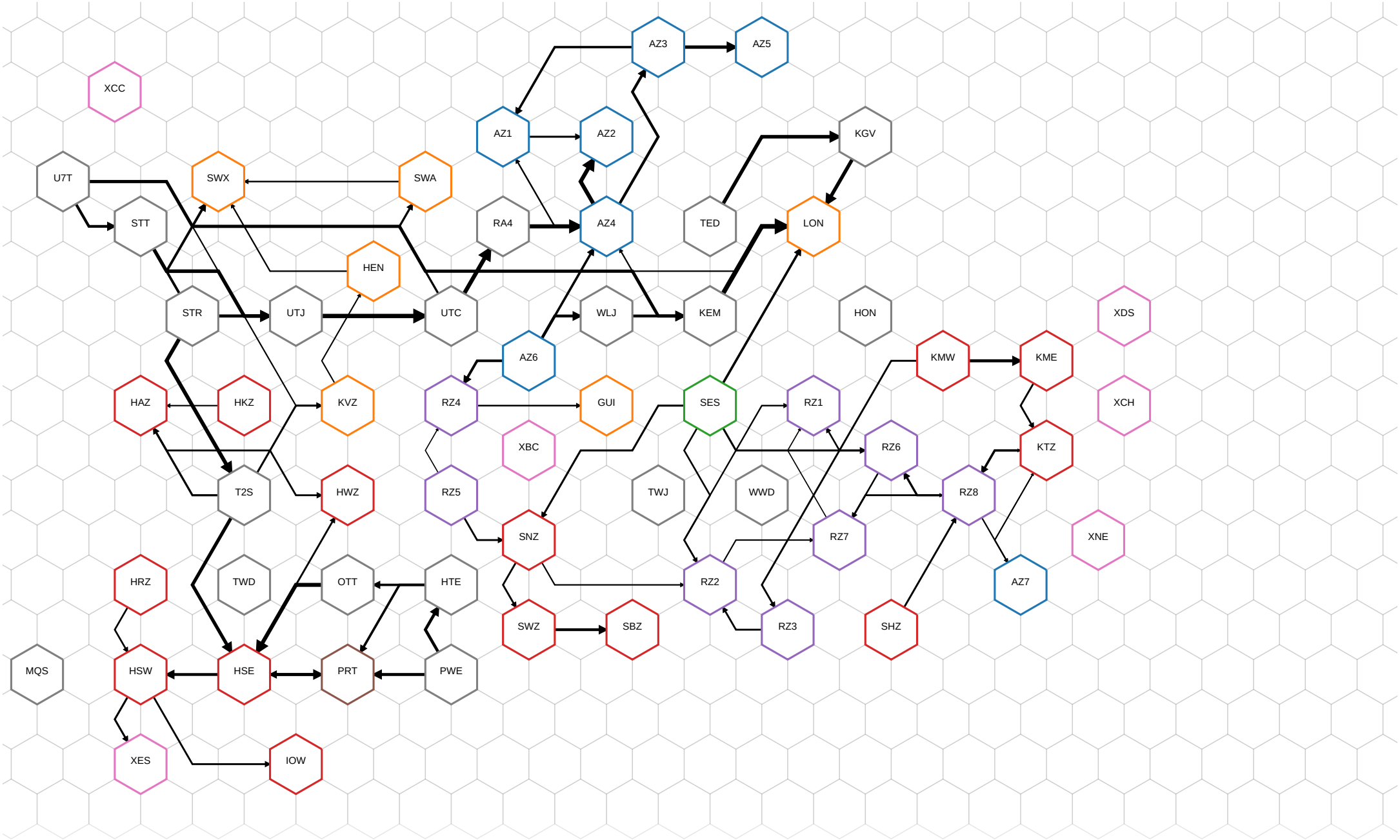
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

GOVERNMENT-LED SCENARIO G

IVM Summary: Thames Water

! This run contained total deficits of 29.9 Ml/d in the **"100a-dyaa-hplan-fthr"** planning scenario.

! This run contained total deficits of 4.9 Ml/d in the **"hybrida-dyaa-hplan-fthr"** planning scenario.

! This run contained total deficits of 23.9 Ml/d in the **"normal-hplan-fthr"** planning scenario.

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridg-2075
Description	Least cost run with hybrid-g government interventions.
Created at	07/07/2023, 09:29:30
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridg
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets.
Optimised discount rate	STPR

Metrics

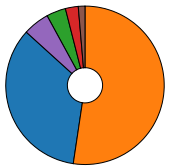
Net present value (Cost)

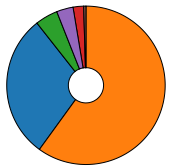
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	4,702,986	1,920,014	1,919,193	921,530	919,520	918,769	518,919	517,974	517,371	(£m)
Cost w/o deficit (STPR)	22,299	18,941	18,120	20,706	18,696	17,945	18,781	17,836	17,234	(£m)
Cost w/ deficit (IGEQ)	4,714,859	1,928,885	1,927,431	931,975	928,248	926,934	527,887	526,127	525,036	(£m)
Cost w/o deficit (IGEQ)	34,172	27,811	26,357	31,151	27,424	26,110	27,749	25,990	24,898	(£m)
Cost w/ deficit (LTDR)	4,705,283	1,921,761	1,920,822	923,566	921,239	920,382	520,679	519,584	518,891	(£m)
Cost w/o deficit (LTDR)	24,595	20,688	19,748	22,742	20,415	19,558	20,541	19,447	18,753	(£m)

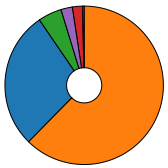
Cost breakdown (STPR)

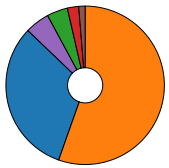
Select Company: Total

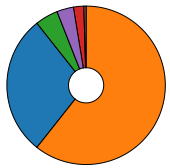
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	7,661	5,568	5,090	6,572	5,363	4,934	5,292	4,793	4,485	(£m)
Fixed opex	11,677	11,362	11,301	11,474	11,341	11,283	11,335	11,278	11,237	(£m)
Fixed operational carbon	884	874	874	883	875	874	872	866	866	(£m)
Embedded carbon	584	408	380	479	395	366	393	358	340	(£m)
Variable opex	1,190	640	418	1,029	636	424	747	481	280	(£m)
Variable carbon opex	303	88	57	269	86	64	143	61	26	(£m)

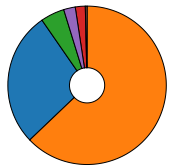
situation1 

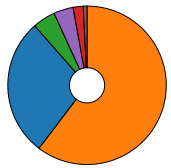
situation2 

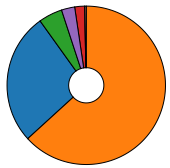
situation3 

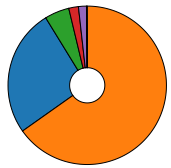
situation4 

situation5 

situation6 

situation7 

situation8 

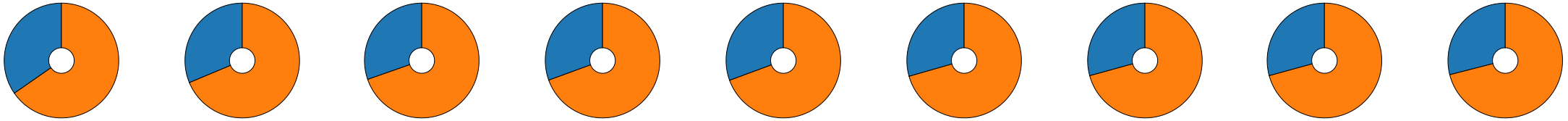
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,729,876	2,483,960	2,294,562	2,986,131	2,404,359	2,216,908	2,413,404	2,165,377	2,047,379	(tonnes)
Operational emissions	7,034,940	5,452,185	5,268,074	6,783,003	5,449,252	5,312,116	5,831,841	5,234,579	5,015,952	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

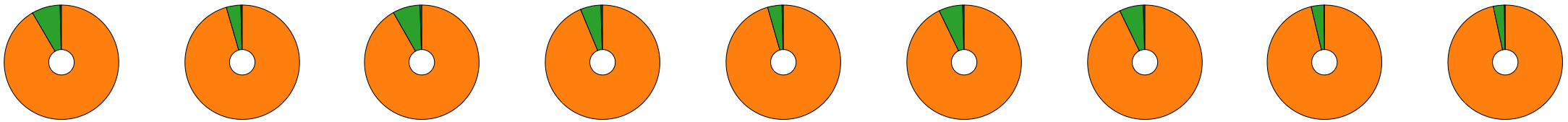


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	111	59	36	112	58	29	80	16	12	(GWh)
Grid	24,492	13,561	6,403	21,638	13,770	6,085	15,150	9,705	4,029	(GWh)
Renewable	2,144	578	539	1,334	580	441	1,095	360	129	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	71,632.00	66,413.00	65,729.00	69,250.00	66,031.00	65,168.00	65,809.00	63,750.00	62,803.00	
SEA environmental disbenefit	125,580.00	92,928.00	87,896.00	112,198.00	89,300.00	82,920.00	91,258.00	77,368.00	72,066.00	
Natural capital	82,571,623.46	79,182,778.22	79,424,982.44	78,752,046.82	80,316,532.94	82,970,725.56	79,695,301.39	80,682,776.84	83,448,016.90	
Bio-diversity net gain	−260,257.00	−181,781.00	−160,123.00	−223,135.00	−165,531.00	−146,562.00	−166,736.00	−128,337.00	−105,627.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	34,970.00	32,943.00	32,666.00	34,147.00	32,721.00	32,300.00	32,756.00	31,706.00	31,297.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	31.52	32.31	35.34	30.99	32.42	35.51	32.55	36.05	40.45	
R1: Uncertainty of option supply/demand benefit	6.54	6.11	6.64	6.25	6.12	6.68	5.97	6.42	7.24	
R3: Risk of service failure due to other physical hazards	7.34	7.73	8.57	7.26	7.77	8.67	7.72	8.73	9.97	
R4: Availability of additional headroom	6.51	6.84	7.04	6.60	6.84	7.04	7.15	7.50	7.75	
R5: Catchment/raw water quality risks (incl. climate change)	5.27	5.45	6.16	5.11	5.48	6.17	5.62	6.50	7.53	
R6: Capacity of catchment services	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	
R7: Risk of service failure to other exceptional events	5.86	6.18	6.92	5.77	6.21	6.95	6.09	6.90	7.95	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

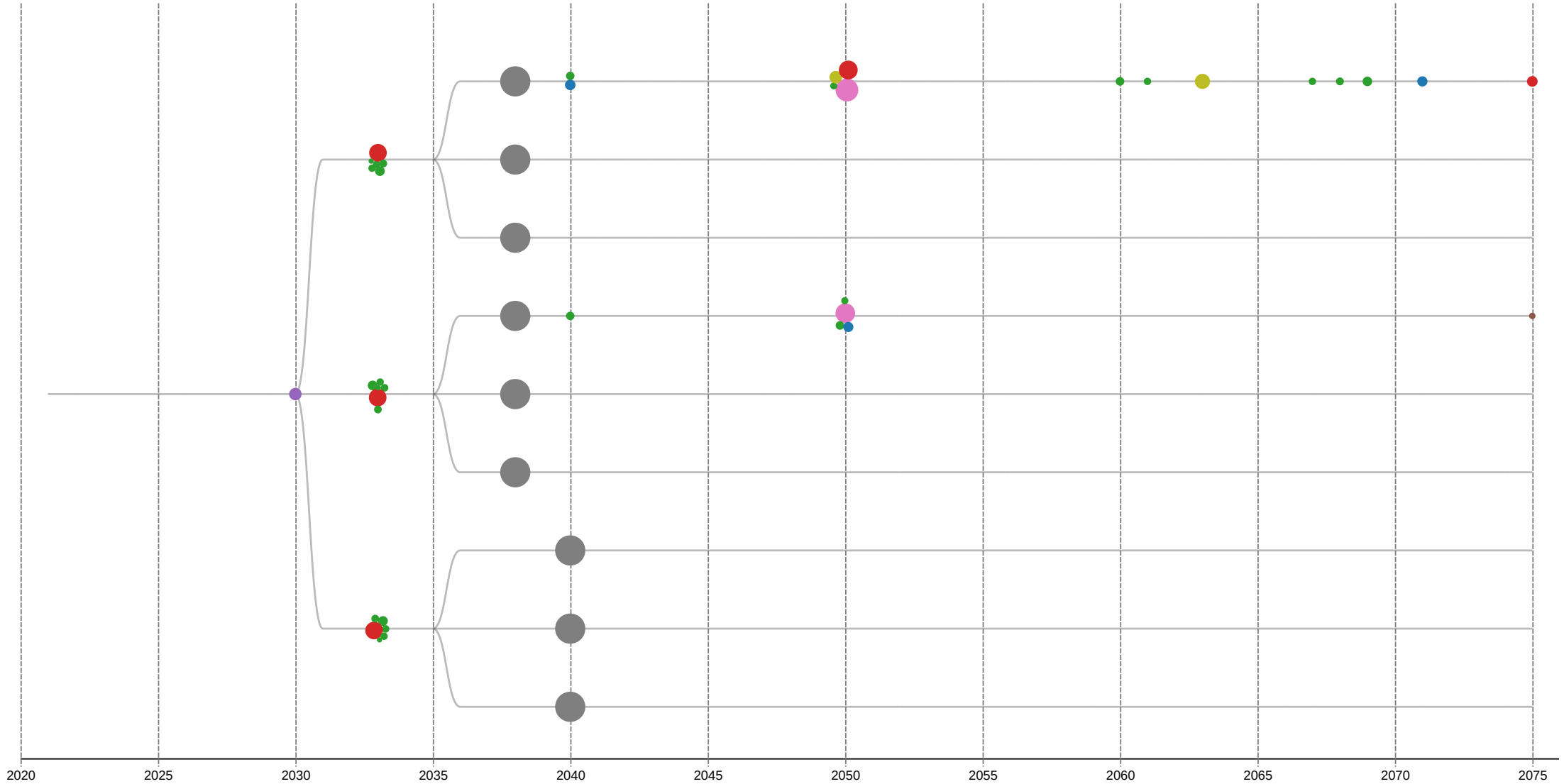
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	14.50	15.87	17.85	14.34	15.86	17.77	15.89	18.08	20.71	
A3: Operational complexity and flexibility	6.48	7.04	7.89	6.52	7.08	7.95	7.00	7.98	9.21	
A4: WRZ connectivity	7.98	8.79	9.91	7.76	8.73	9.77	8.85	10.05	11.45	
A7: Customer relations support engagement with demand management	0.04	0.04	0.05	0.05	0.04	0.05	0.05	0.05	0.06	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.36	19.90	22.03	18.94	19.99	22.01	20.00	22.35	25.46	
E1: Scaleability and modularity of proposed changes	8.17	8.61	9.55	8.13	8.66	9.62	8.61	9.79	11.21	
E2: Intervention lead times	5.58	5.63	6.22	5.35	5.65	6.08	5.79	6.30	7.09	
E3: Reliance on external bodies to deliver changes	5.60	5.66	6.27	5.45	5.69	6.30	5.60	6.26	7.15	
E5: Collaborative land management	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	

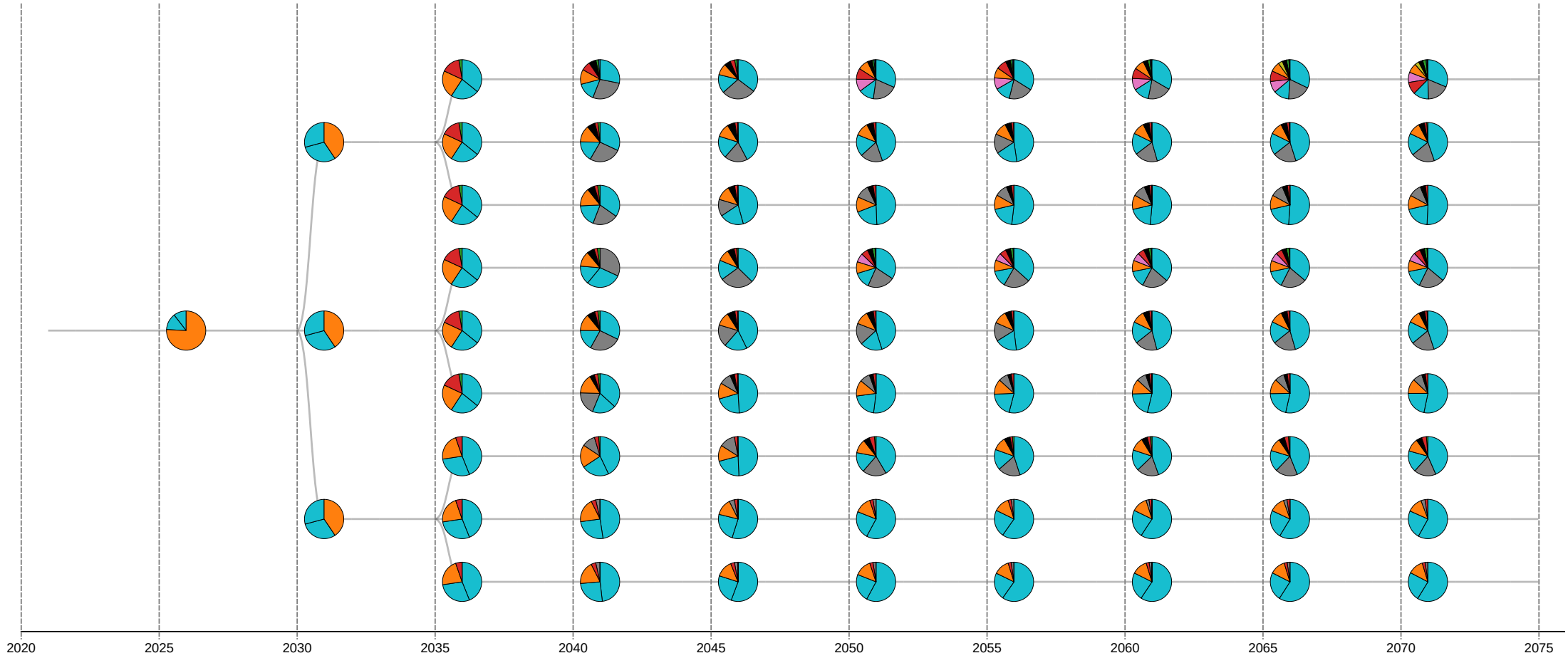
Option Selection (Thames Water)



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.



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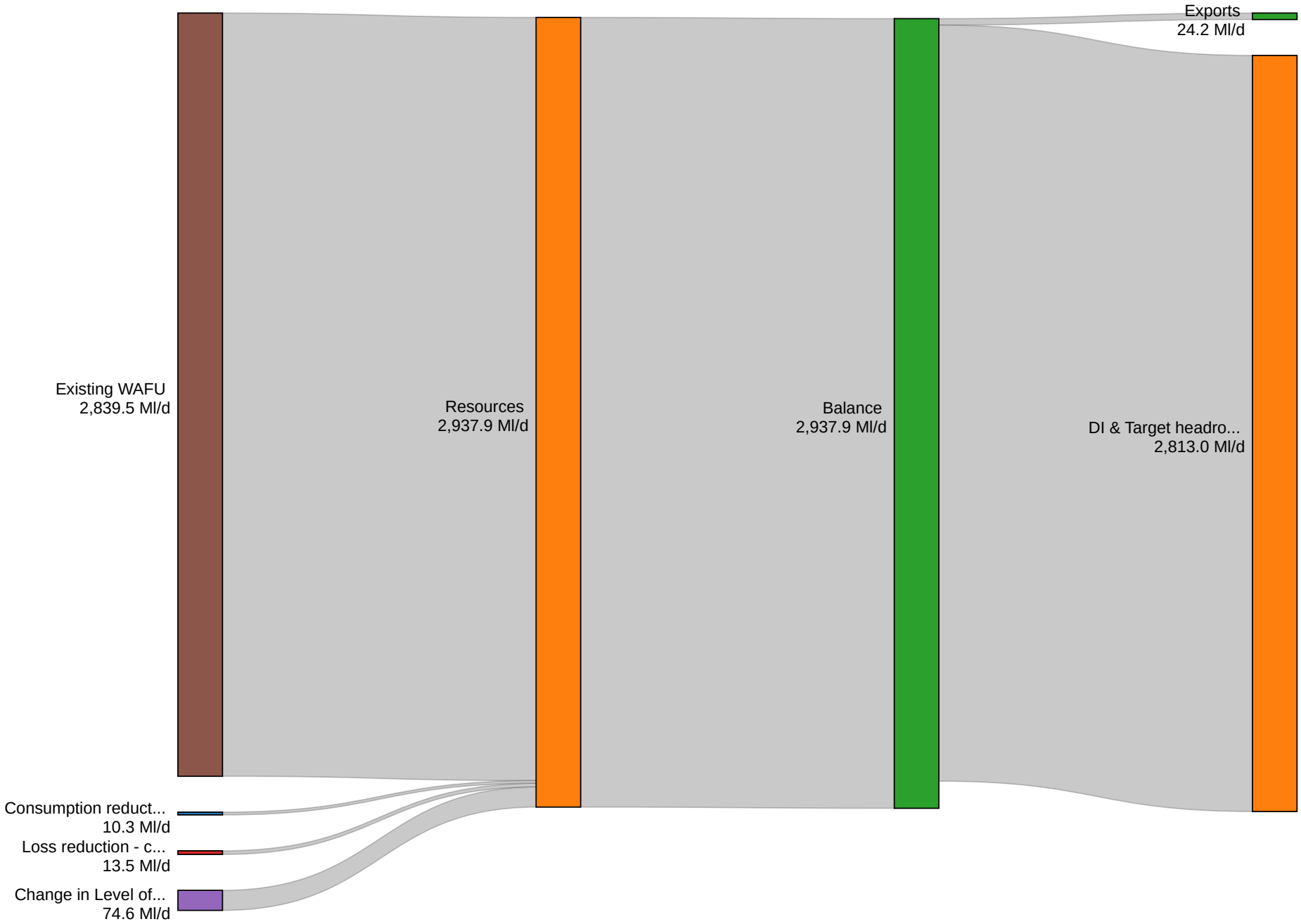
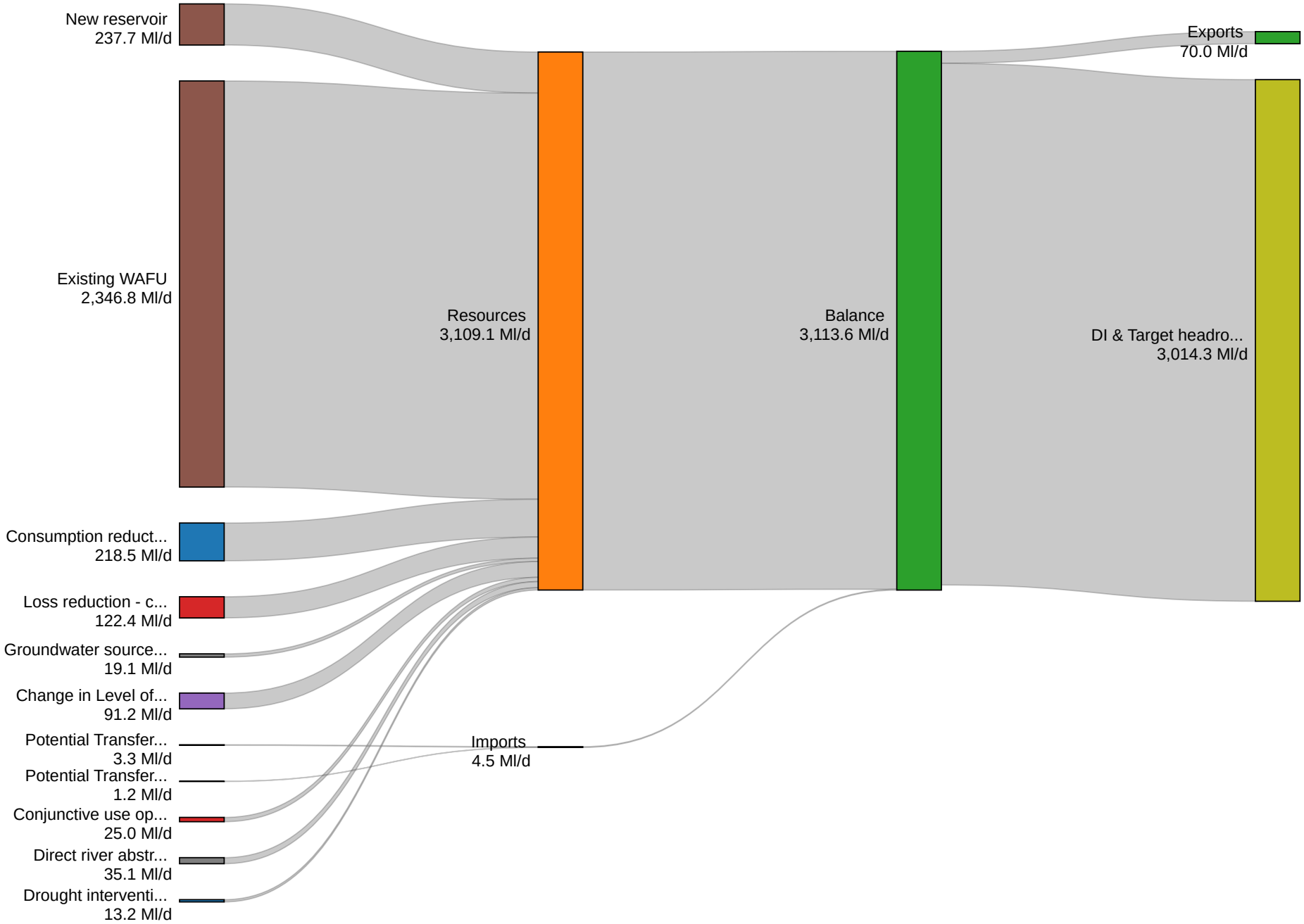
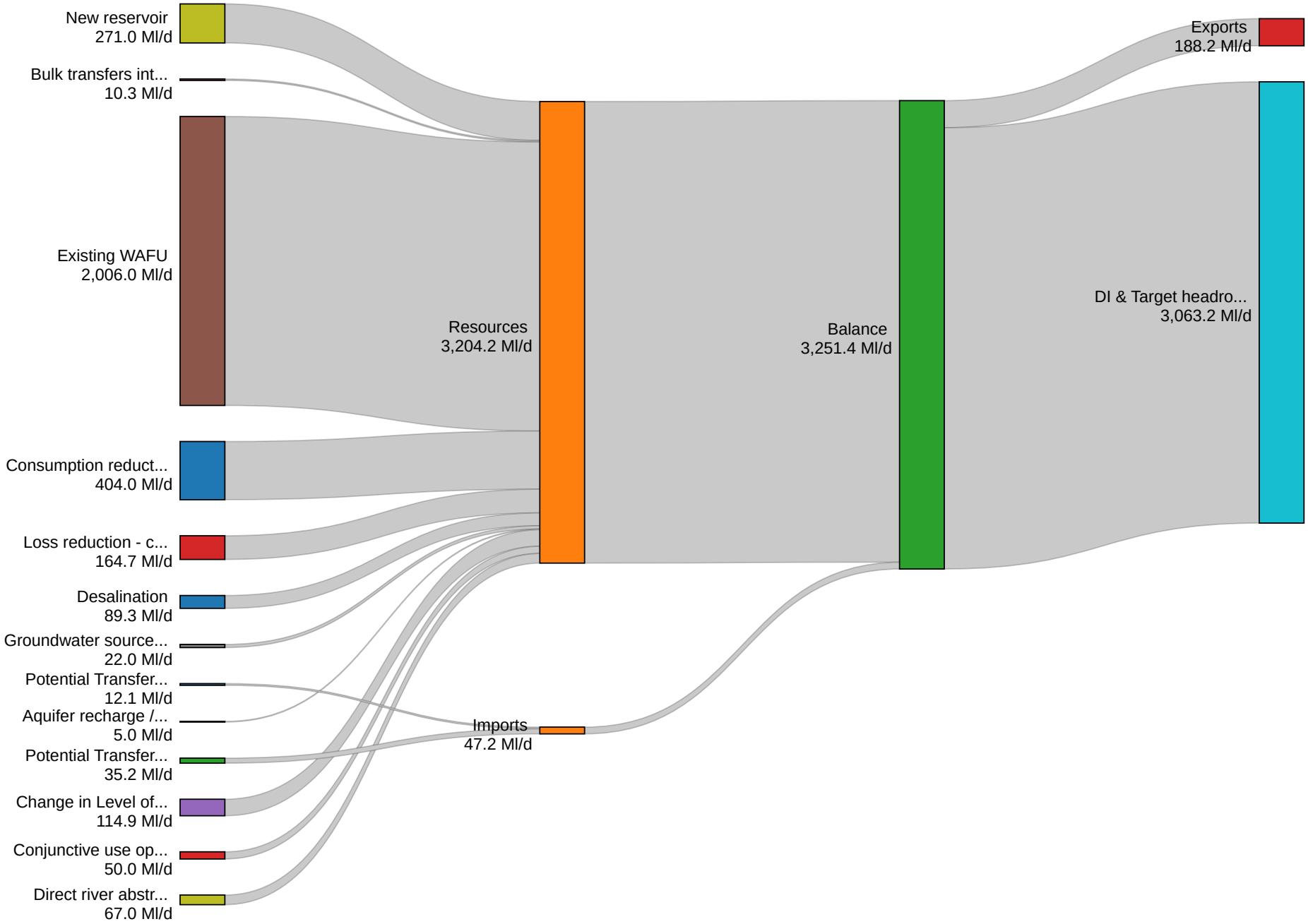
Situation 4 - 2026 (Thames Water)



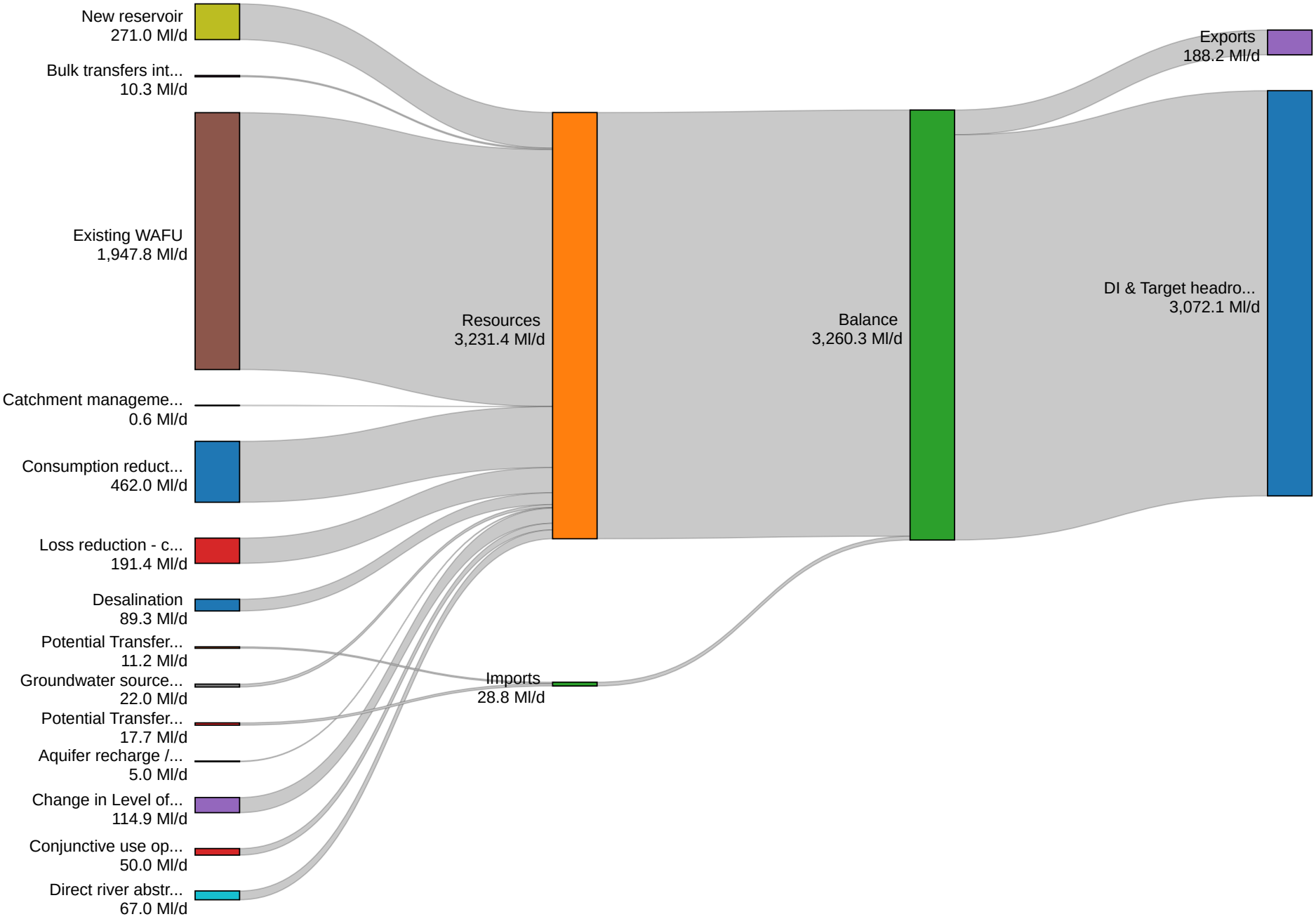
Situation 4 - 2040 (Thames Water)



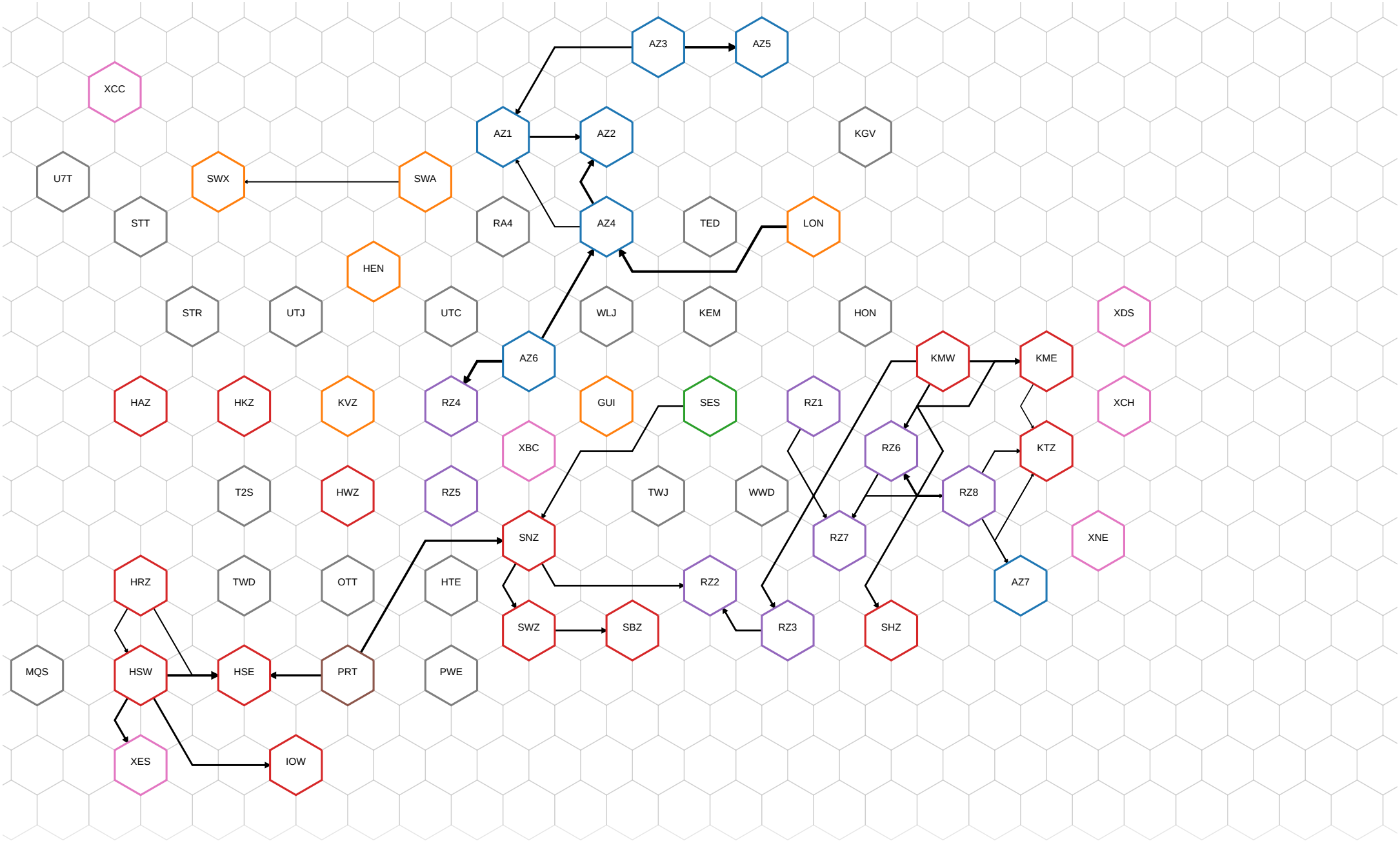
Situation 4 - 2050 (Thames Water)



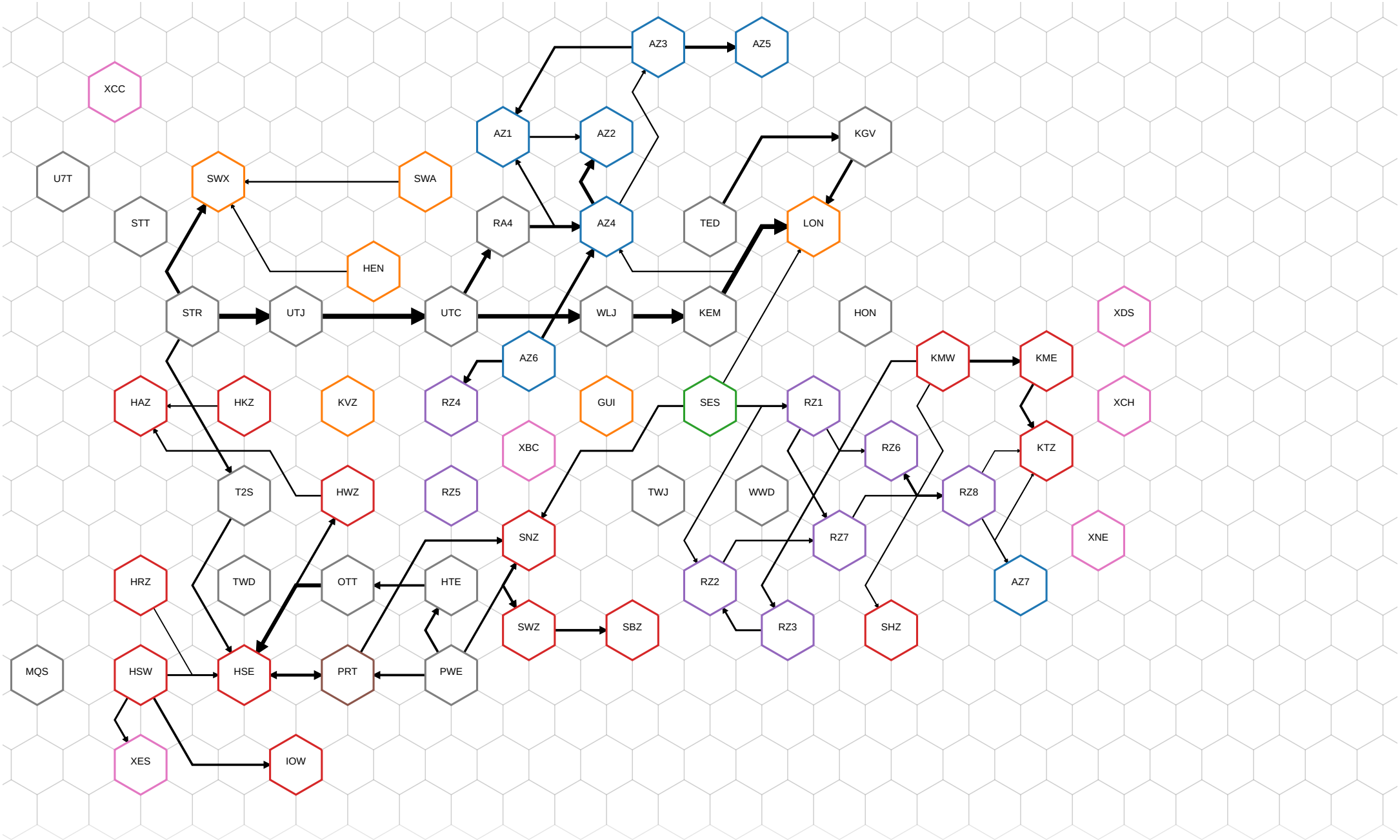
Situation 4 - 2075 (Thames Water)



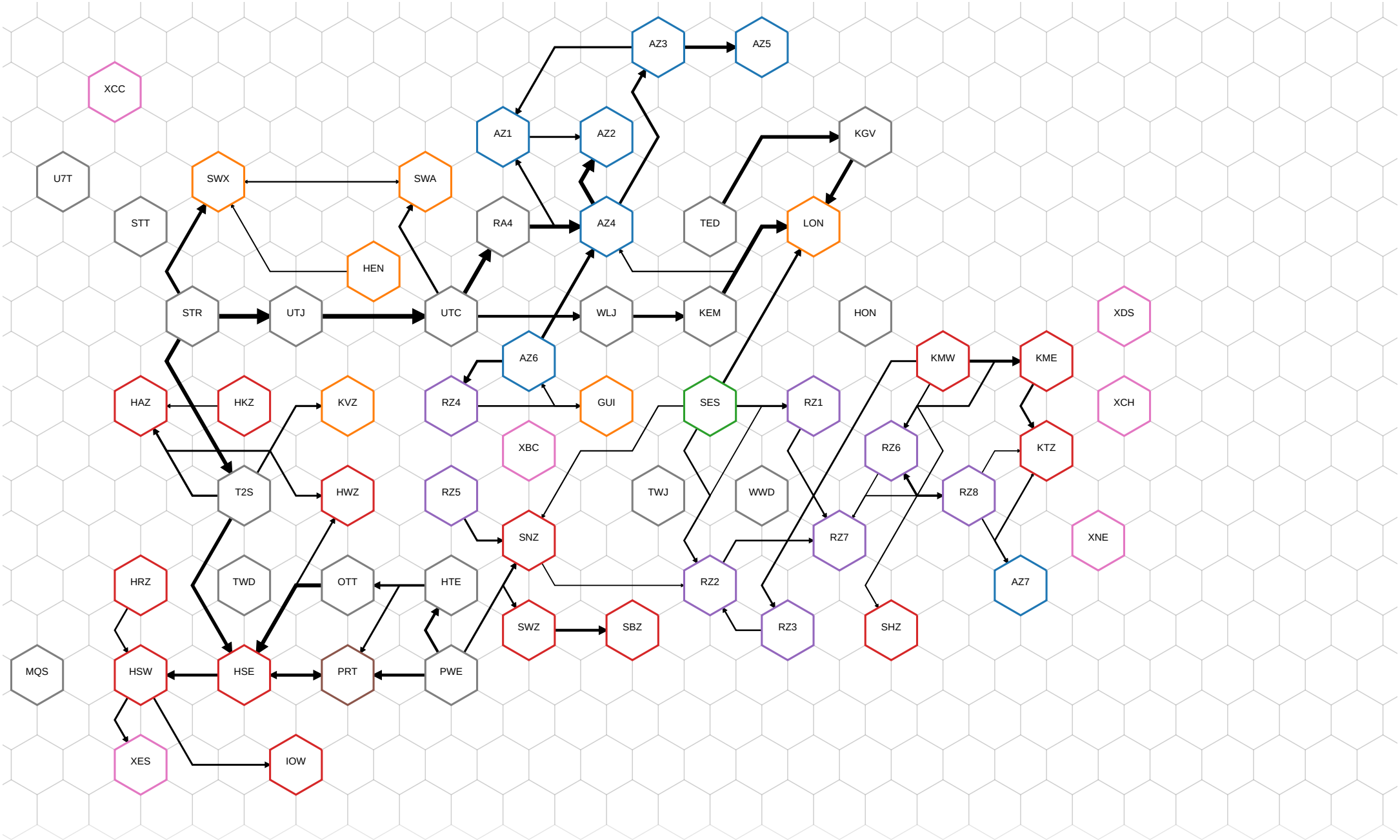
Situation 4 - 2026



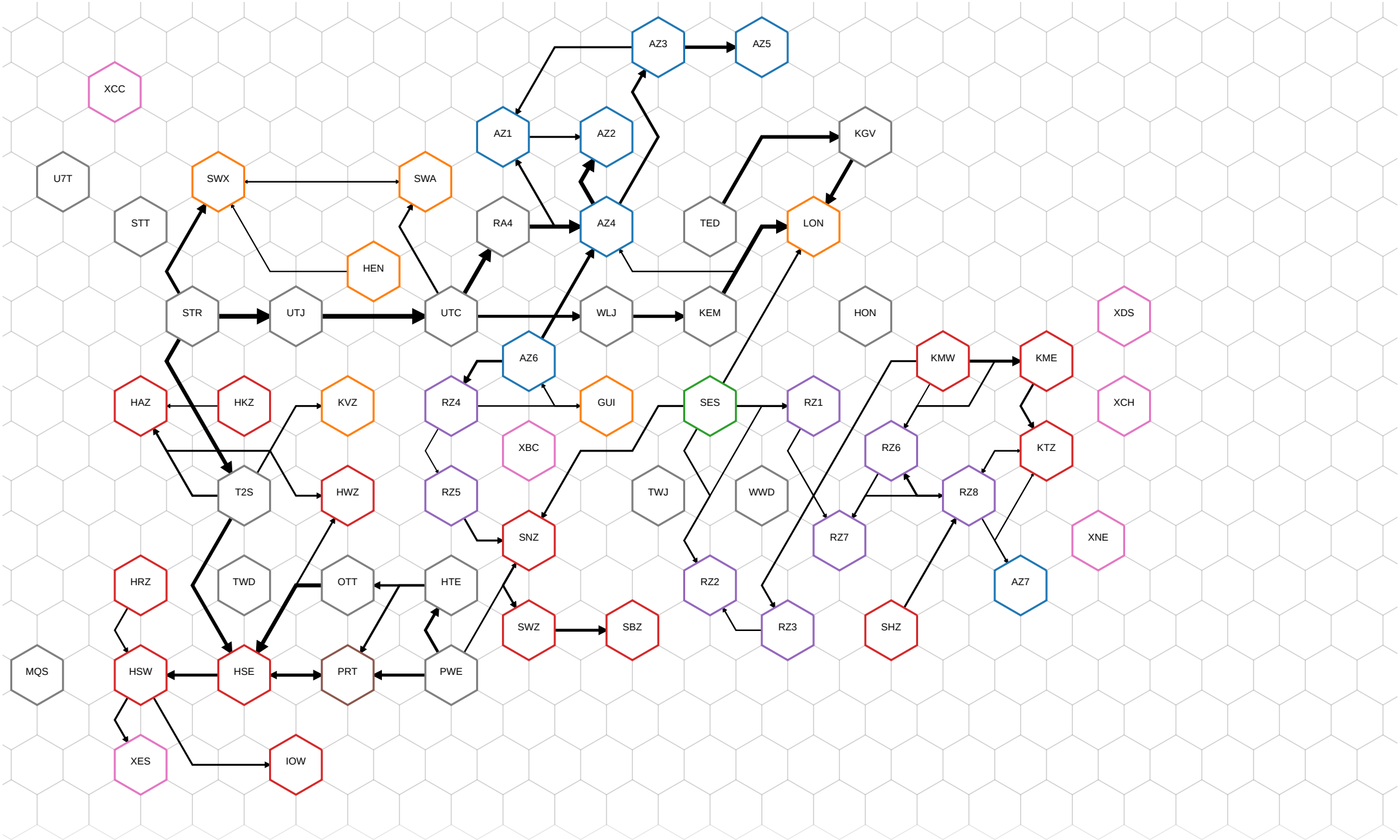
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

GOVERNMENT-LED SCENARIO H

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridh-large-sws-prt-transfer-v4-2075
Description	Least cost run with hybrid-h government interventions with increased capacity of T2S transfer to 200 Ml/d and increased Otterbourne - Gaters Mill transfer to 95 Ml/d. No cost changes to account for the increased capacities have been included. Includes a 6 Ml/d emergency deficit in RZ6 in 2049. Extend Testwood and Candover drought permits to 2040.
Created at	22/08/2023, 14:35:55
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridh-large-sws-prt-transfer-v4
Setting description	Emergency options in RZ6 (2049). Excluding SES low, medium and high DMP baskets. Increase capacity of T2S transfer to 200 Ml/d and expand Otterbourne - Gaters Mill transfer to 95 Ml/d. Extend Testwood and Candover drought permits to 2040.
Optimised discount rate	STPR

Metrics

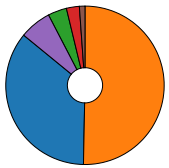
Net present value (Cost)

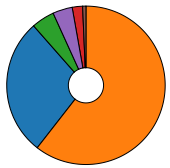
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	23,295	18,655	17,686	21,687	18,558	17,572	18,780	17,526	16,705	(£m)
Cost w/o deficit (STPR)	23,295	18,655	17,686	21,687	18,558	17,572	18,780	17,526	16,705	(£m)
Cost w/ deficit (IGEQ)	36,458	27,669	25,913	33,362	27,505	25,726	28,065	25,716	24,222	(£m)
Cost w/o deficit (IGEQ)	36,458	27,669	25,913	33,362	27,505	25,726	28,065	25,716	24,222	(£m)
Cost w/ deficit (LTDR)	25,823	20,423	19,308	23,946	20,313	19,181	20,595	19,140	18,194	(£m)
Cost w/o deficit (LTDR)	25,823	20,423	19,308	23,946	20,313	19,181	20,595	19,140	18,194	(£m)

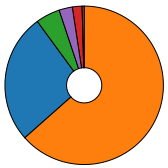
Cost breakdown (STPR)

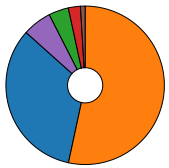
Select Company: Total

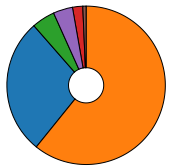
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	8,294	5,219	4,681	7,209	5,149	4,592	5,192	4,504	4,042	(£m)
Fixed opex	11,719	11,293	11,225	11,576	11,285	11,213	11,296	11,209	11,149	(£m)
Fixed operational carbon	897	876	875	887	876	874	877	869	866	(£m)
Embedded carbon	615	395	352	536	389	344	398	339	307	(£m)
Variable opex	1,506	746	479	1,275	735	477	878	537	301	(£m)
Variable carbon opex	264	126	74	204	124	72	140	68	41	(£m)

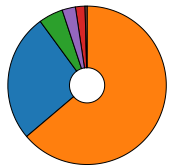
situation1 

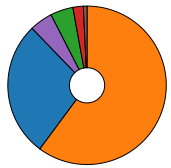
situation2 

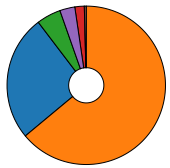
situation3 

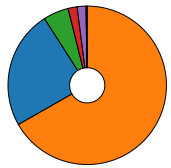
situation4 

situation5 

situation6 

situation7 

situation8 

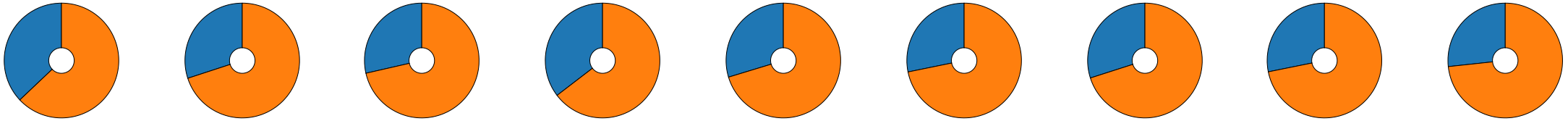
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	4,033,690	2,460,270	2,160,923	3,471,362	2,419,455	2,113,425	2,495,148	2,082,681	1,866,692	(tonnes)
Operational emissions	6,852,519	5,737,395	5,403,814	6,336,301	5,731,350	5,380,993	5,842,509	5,312,516	5,125,923	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

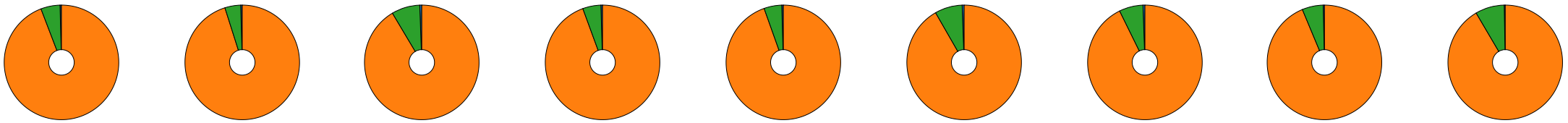


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	137	76	48	136	74	47	109	42	12	(GWh)
Grid	31,637	16,228	7,687	27,172	15,641	7,599	18,334	11,168	3,917	(GWh)
Renewable	1,817	760	671	1,475	828	642	1,331	708	351	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	72,317.00	66,144.00	65,053.00	69,343.00	65,788.00	64,287.00	66,170.00	63,049.00	61,955.00	
SEA environmental disbenefit	124,375.00	89,822.00	79,137.00	109,737.00	86,659.00	75,267.00	91,365.00	72,804.00	66,332.00	
Natural capital	78,703,022.15	75,690,518.52	76,159,139.61	73,791,385.49	76,756,068.36	79,926,976.66	76,388,420.37	77,564,953.53	80,249,660.59	
Bio-diversity net gain	−246,610.00	−181,436.00	−165,678.00	−216,079.00	−167,940.00	−144,360.00	−179,130.00	−132,668.00	−116,340.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	35,227.00	32,992.00	32,399.00	34,322.00	32,865.00	32,227.00	32,949.00	31,708.00	31,315.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	31.55	30.94	33.46	30.80	31.10	33.54	31.87	34.13	37.71	
R1: Uncertainty of option supply/demand benefit	7.21	6.37	6.85	6.76	6.42	6.85	6.55	6.72	7.32	
R3: Risk of service failure due to other physical hazards	7.10	7.17	7.90	6.98	7.22	7.93	7.35	8.00	9.02	
R4: Availability of additional headroom	6.53	6.78	6.97	6.57	6.79	6.98	7.09	7.43	7.66	
R5: Catchment/raw water quality risks (incl. climate change)	5.06	4.81	5.35	4.88	4.83	5.37	4.96	5.60	6.45	
R6: Capacity of catchment services	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	
R7: Risk of service failure to other exceptional events	5.65	5.80	6.38	5.62	5.82	6.40	5.92	6.39	7.26	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

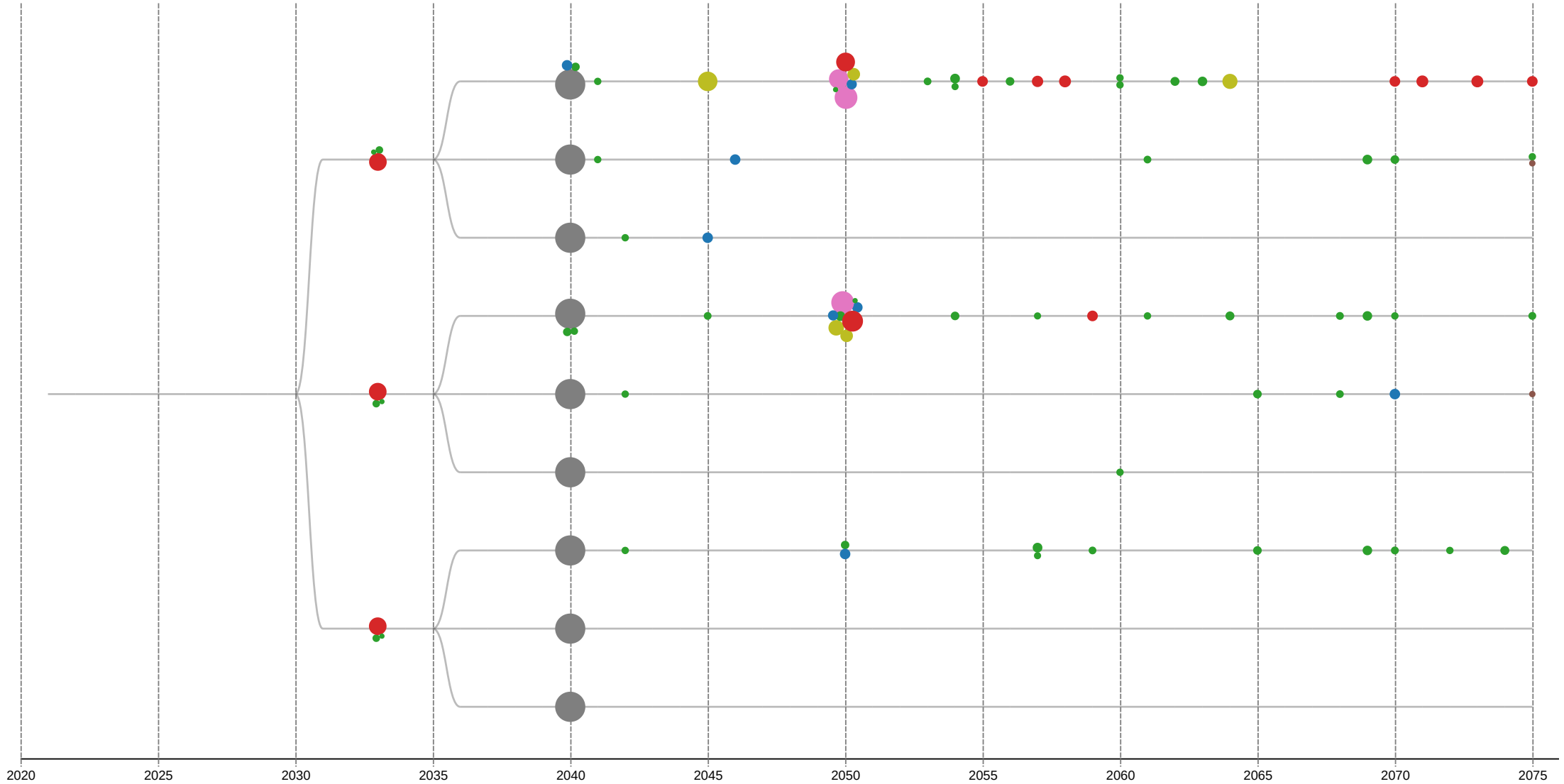
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	15.40	15.84	17.57	14.50	15.95	17.64	16.06	18.19	20.46	
A3: Operational complexity and flexibility	6.31	6.68	7.37	6.29	6.72	7.41	6.82	7.46	8.52	
A4: WRZ connectivity	9.05	9.10	10.15	8.16	9.17	10.18	9.19	10.68	11.89	
A7: Customer relations support engagement with demand management	0.04	0.06	0.05	0.04	0.06	0.05	0.05	0.05	0.06	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.30	18.83	20.62	19.04	18.98	20.67	19.38	21.04	23.37	
E1: Scaleability and modularity of proposed changes	8.09	8.05	8.82	7.98	8.13	8.87	8.29	9.08	10.17	
E2: Intervention lead times	5.32	5.05	5.53	5.31	5.07	5.52	5.21	5.67	6.15	
E3: Reliance on external bodies to deliver changes	5.90	5.73	6.26	5.75	5.77	6.28	5.88	6.30	7.05	
E5: Collaborative land management	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	

Option Selection (Thames Water)



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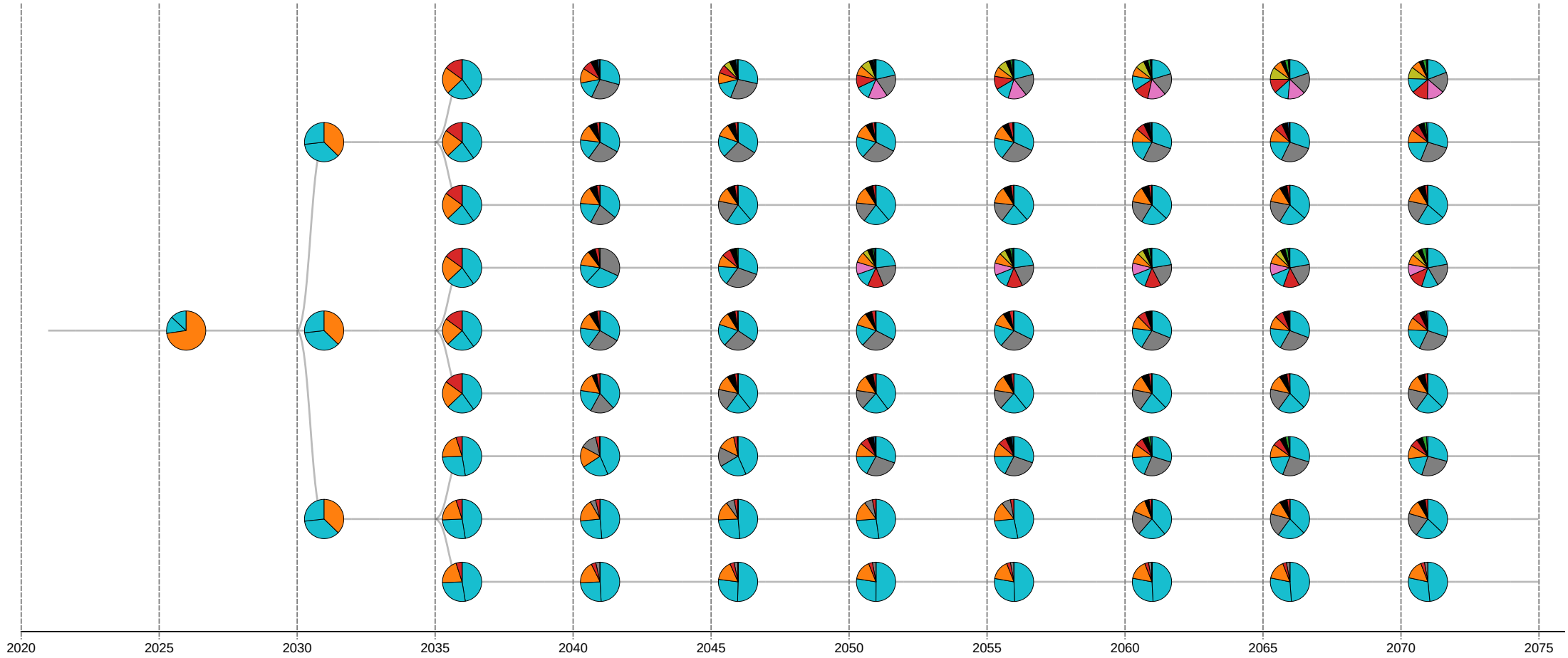
Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.



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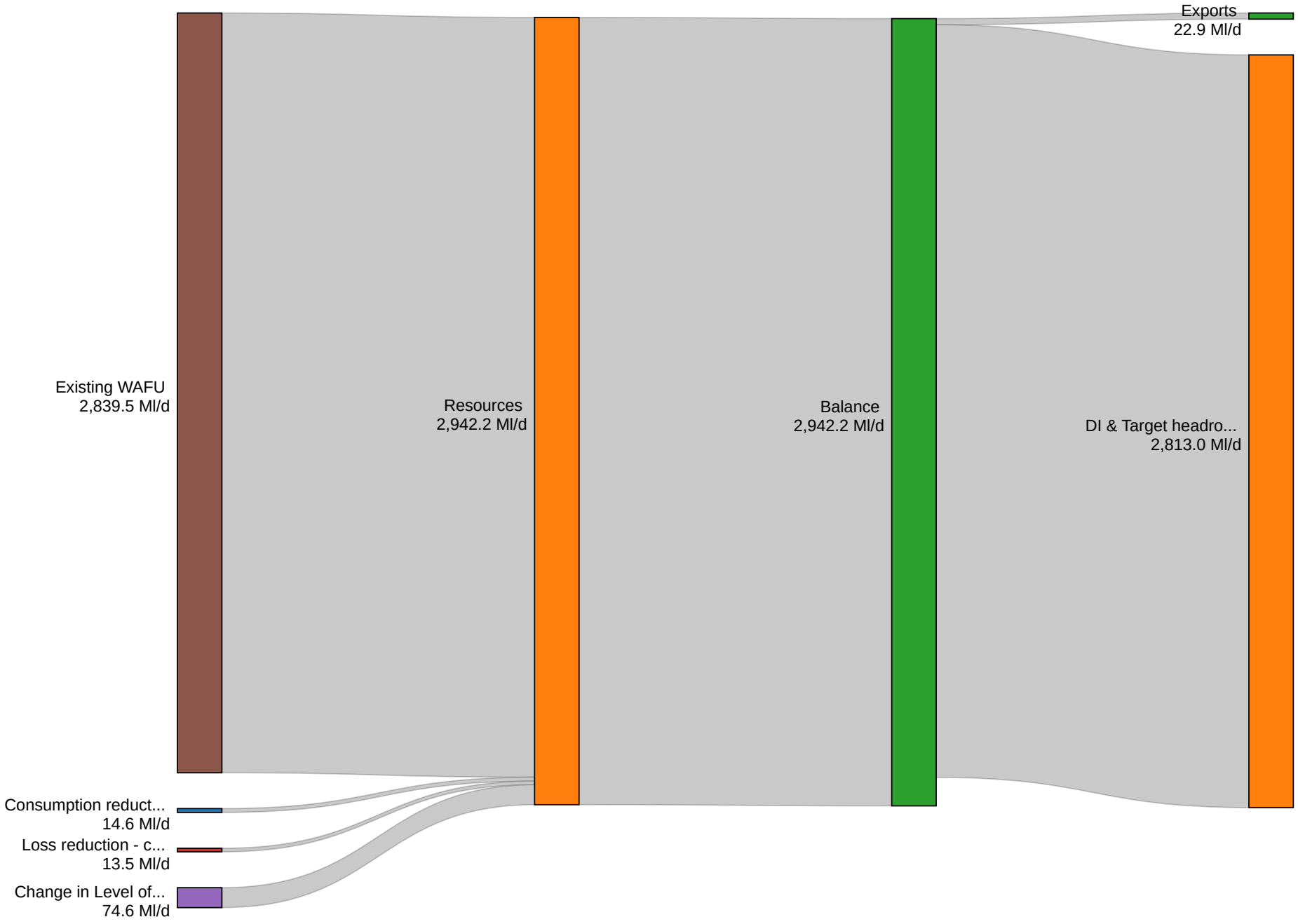
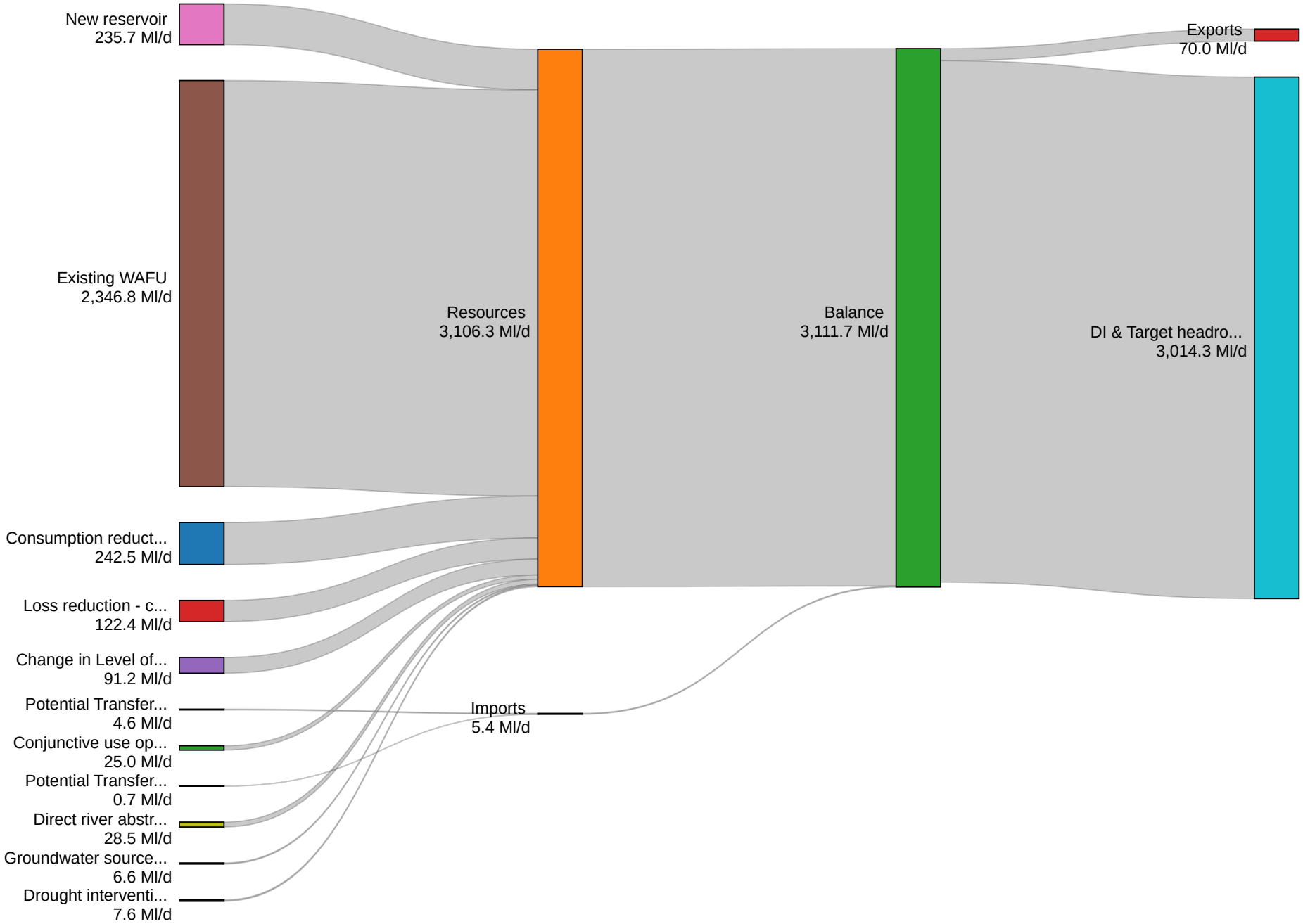
- Other

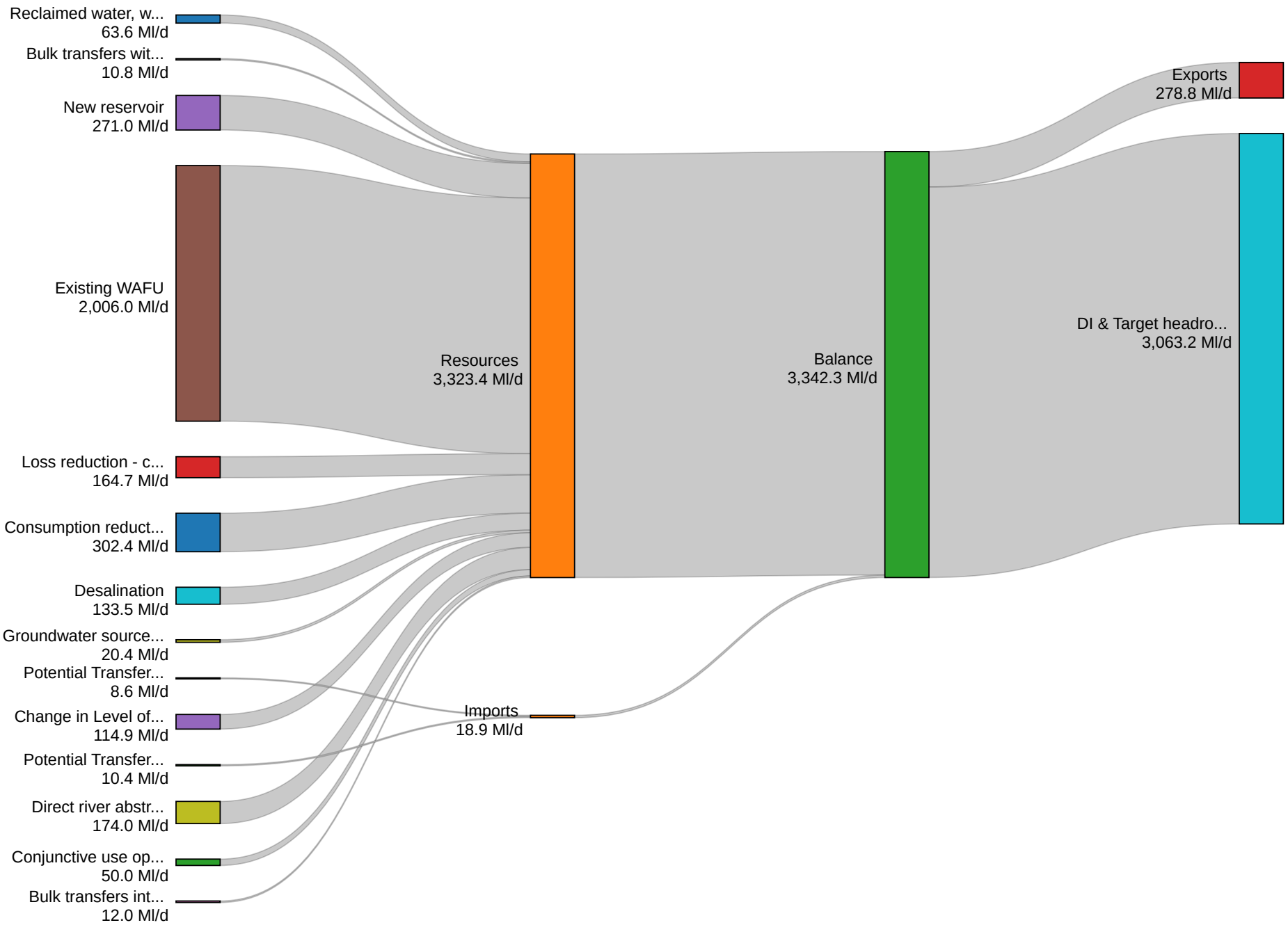
Situation 4 - 2026 (Thames Water)



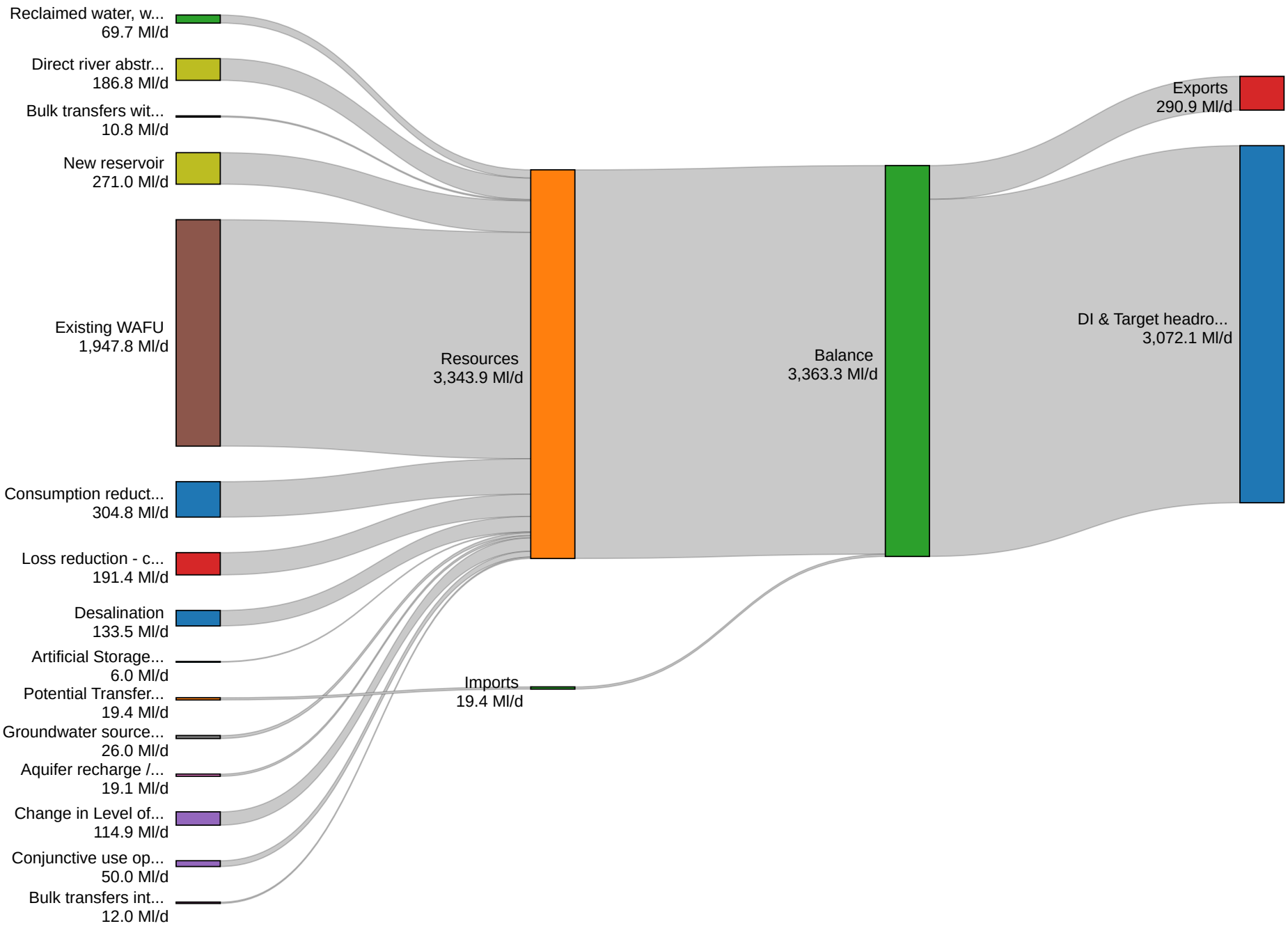
Situation 4 - 2040 (Thames Water)



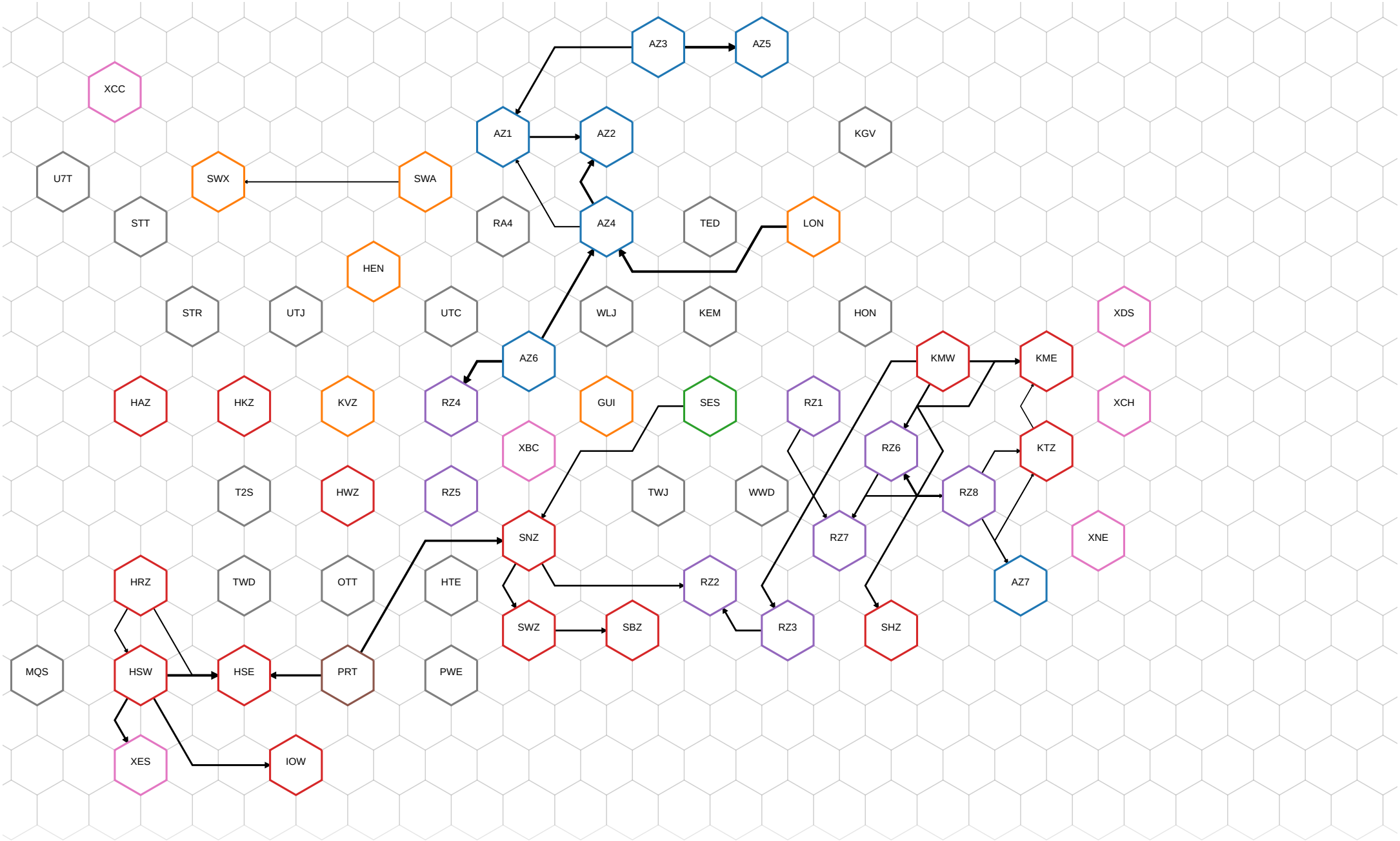
Situation 4 - 2050 (Thames Water)



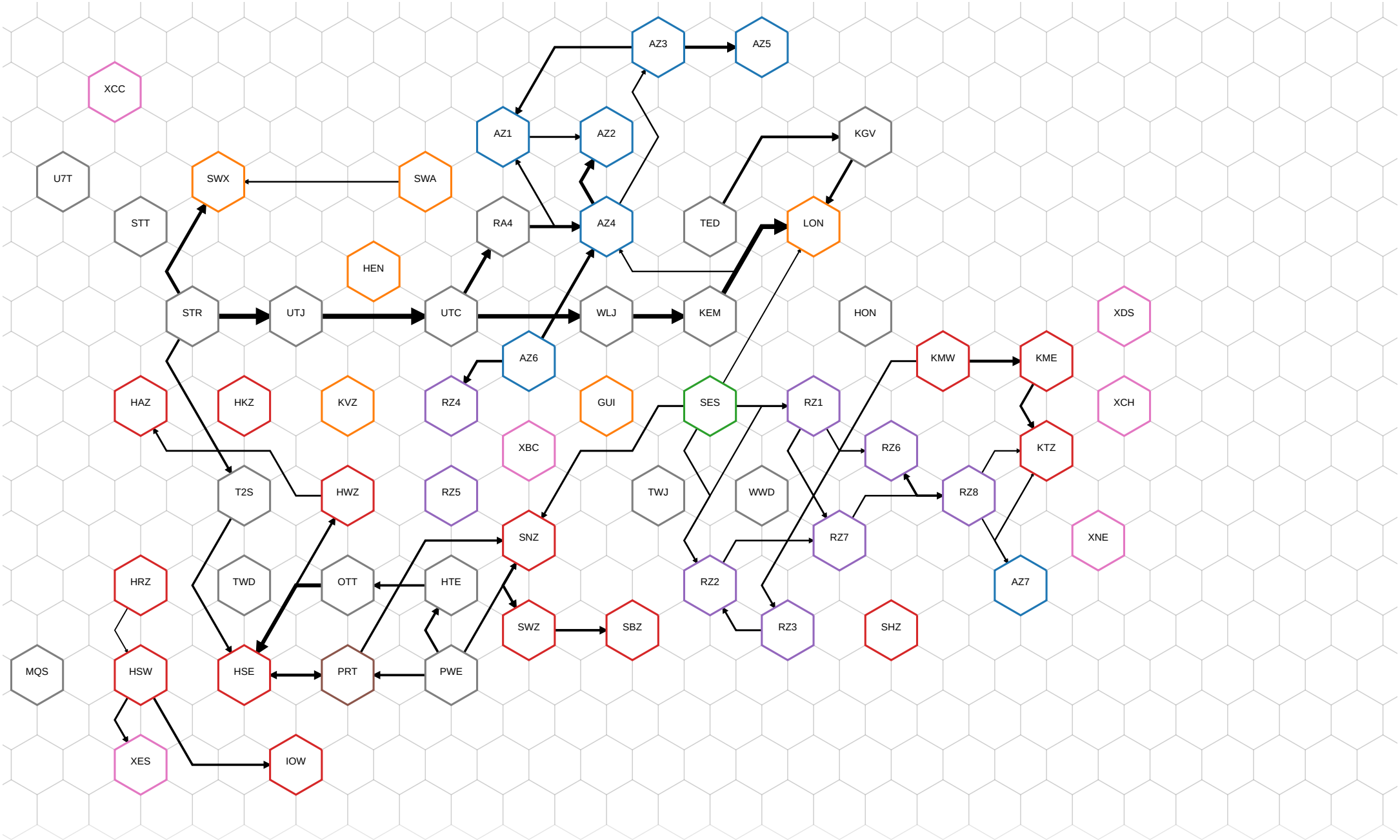
Situation 4 - 2075 (Thames Water)



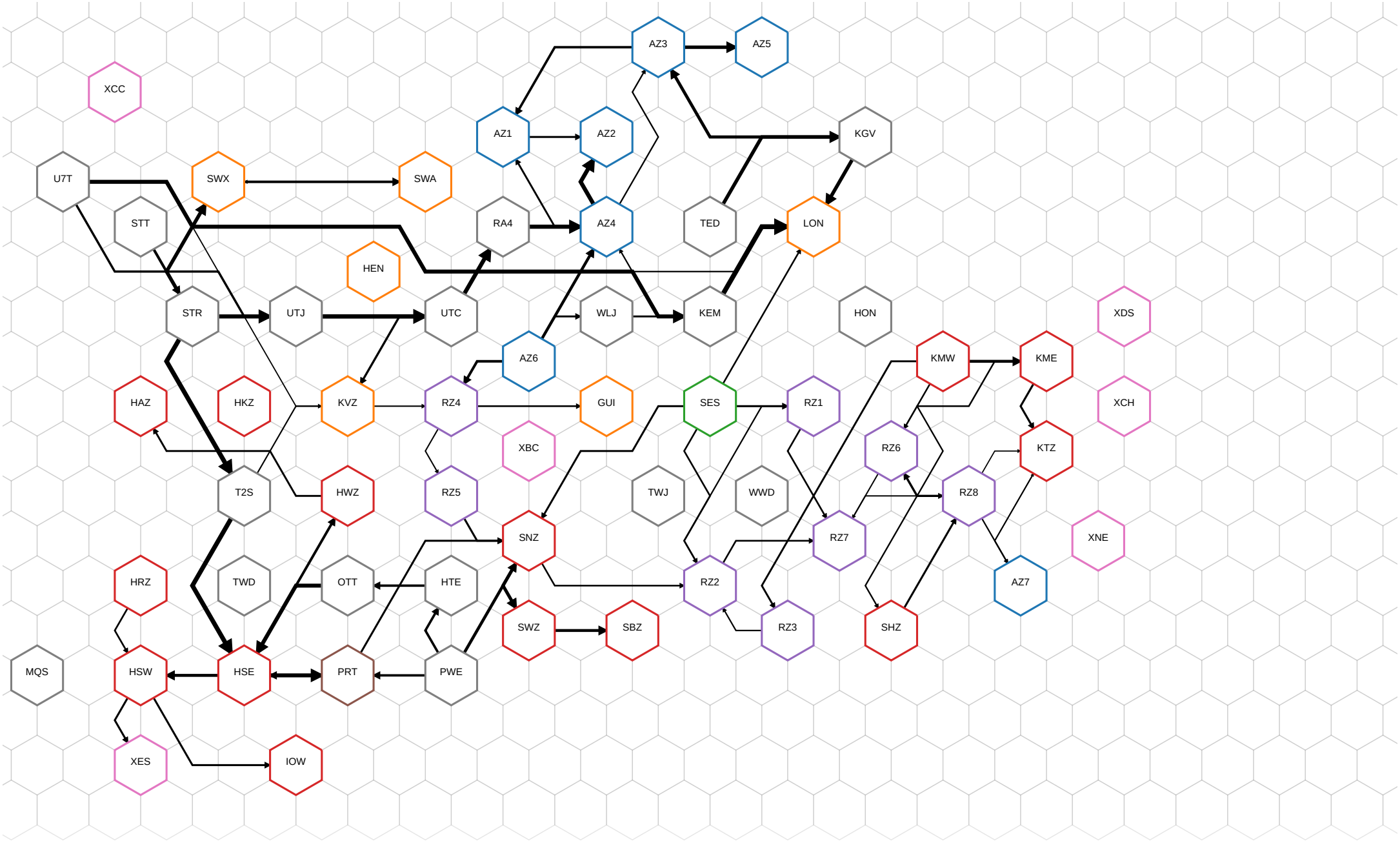
Situation 4 - 2026



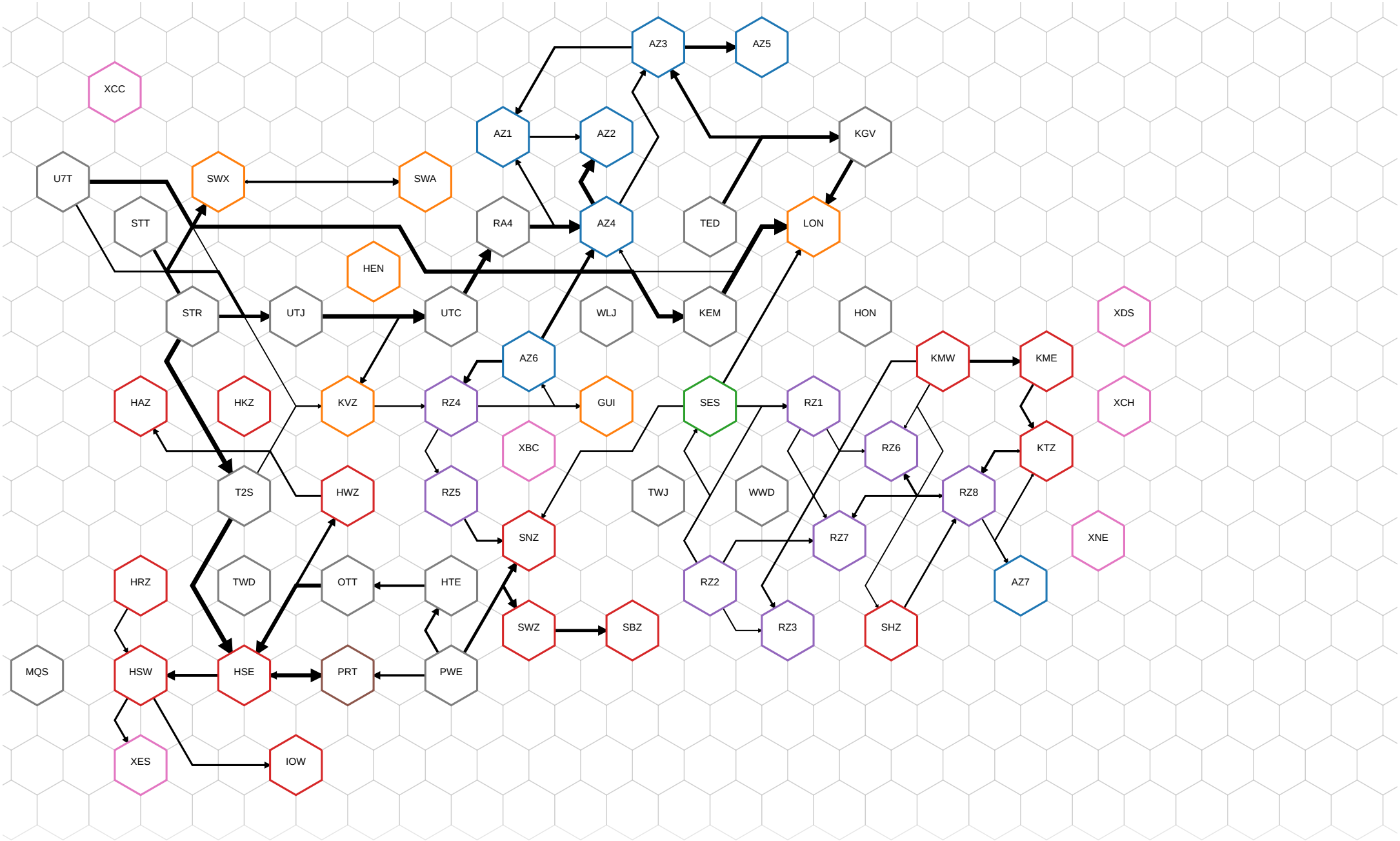
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

NO SESRO

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-excl-sesro-2075
Description	Least cost run with hybrid-c+2 government interventions excluding SESRO.
Created at	29/06/2023, 05:49:29
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2-excl-sesro
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets. Exclude all SESRO variants.
Optimised discount rate	STPR

Metrics

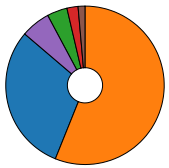
Net present value (Cost)

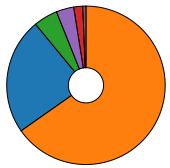
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	21,239	17,669	16,815	19,682	17,366	16,455	18,165	16,643	15,907	(£m)
Cost w/o deficit (STPR)	21,239	17,669	16,815	19,682	17,366	16,455	18,165	16,643	15,907	(£m)
Cost w/ deficit (IGEQ)	32,652	26,035	24,467	29,783	25,545	23,889	27,043	24,257	22,928	(£m)
Cost w/o deficit (IGEQ)	32,652	26,035	24,467	29,783	25,545	23,889	27,043	24,257	22,928	(£m)
Cost w/ deficit (LTDR)	23,445	19,314	18,329	21,647	18,975	17,926	19,903	18,147	17,301	(£m)
Cost w/o deficit (LTDR)	23,445	19,314	18,329	21,647	18,975	17,926	19,903	18,147	17,301	(£m)

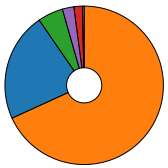
Cost breakdown (STPR)

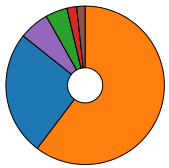
Select Company: Total

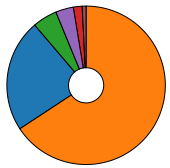
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	6,402	4,202	3,735	5,003	3,997	3,510	4,219	3,655	3,201	(£m)
Fixed opex	11,914	11,528	11,465	11,871	11,417	11,328	11,695	11,345	11,282	(£m)
Fixed operational carbon	880	869	870	880	870	869	872	867	865	(£m)
Embedded carbon	481	328	294	392	314	277	329	284	257	(£m)
Variable opex	1,265	630	390	1,199	630	393	855	437	273	(£m)
Variable carbon opex	297	113	61	336	137	78	196	55	30	(£m)

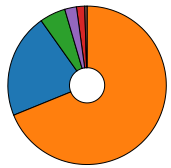
situation1 

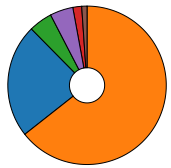
situation2 

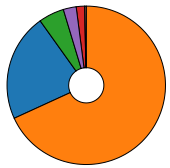
situation3 

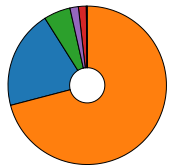
situation4 

situation5 

situation6 

situation7 

situation8 

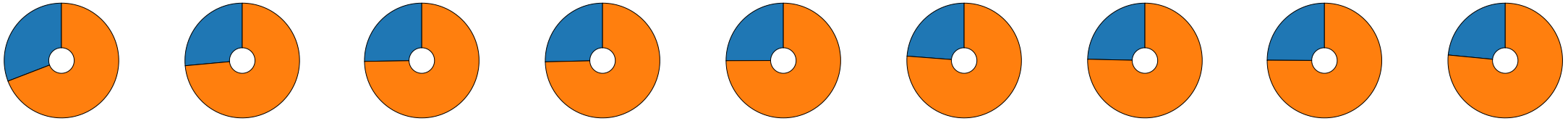
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,103,230	2,014,829	1,784,394	2,466,448	1,932,557	1,681,759	2,039,907	1,735,307	1,549,877	(tonnes)
Operational emissions	6,957,514	5,602,906	5,283,454	7,256,606	5,782,146	5,389,715	6,238,352	5,230,419	5,055,040	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

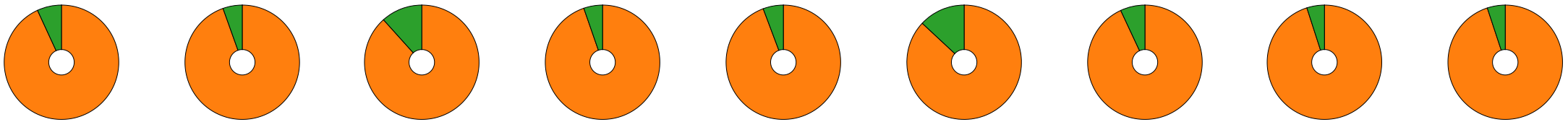


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	0	0	0	0	0	0	0	0	0	(GWh)
Grid	24,631	11,831	4,698	22,376	11,784	4,355	15,017	8,310	3,098	(GWh)
Renewable	1,816	683	619	1,256	715	654	1,121	434	165	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
SEA environmental benefit	67,599.00	61,266.00	60,104.00	65,210.00	61,645.00	60,570.00	62,188.00	60,146.00	58,923.00	
SEA environmental disbenefit	113,674.00	80,037.00	71,273.00	97,836.00	77,496.00	69,442.00	82,145.00	68,131.00	57,817.00	
Natural capital	8,316,350.81	6,879,800.90	10,270,350.28	3,433,465.83	6,107,750.54	8,864,015.37	4,989,241.70	6,440,097.44	9,341,913.57	
Bio-diversity net gain	−240,480.00	−195,618.00	−164,133.00	−242,921.00	−193,343.00	−165,668.00	−198,173.00	−170,197.00	−140,647.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	34,227.00	31,839.00	31,395.00	33,225.00	31,730.00	31,180.00	31,948.00	30,853.00	30,279.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	27.50	26.08	28.17	26.58	26.38	28.57	28.09	29.83	32.95	
R1: Uncertainty of option supply/demand benefit	5.79	4.83	5.17	5.43	4.93	5.29	5.33	5.43	5.95	
R3: Risk of service failure due to other physical hazards	6.49	6.31	6.96	6.31	6.42	7.12	6.73	7.39	8.38	
R4: Availability of additional headroom	6.45	6.69	6.89	6.49	6.71	6.92	7.09	7.38	7.62	
R5: Catchment/raw water quality risks (incl. climate change)	3.87	3.58	3.98	3.54	3.61	4.03	3.94	4.27	4.91	
R6: Capacity of catchment services	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
R7: Risk of service failure to other exceptional events	4.91	4.67	5.16	4.81	4.71	5.20	5.00	5.36	6.09	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

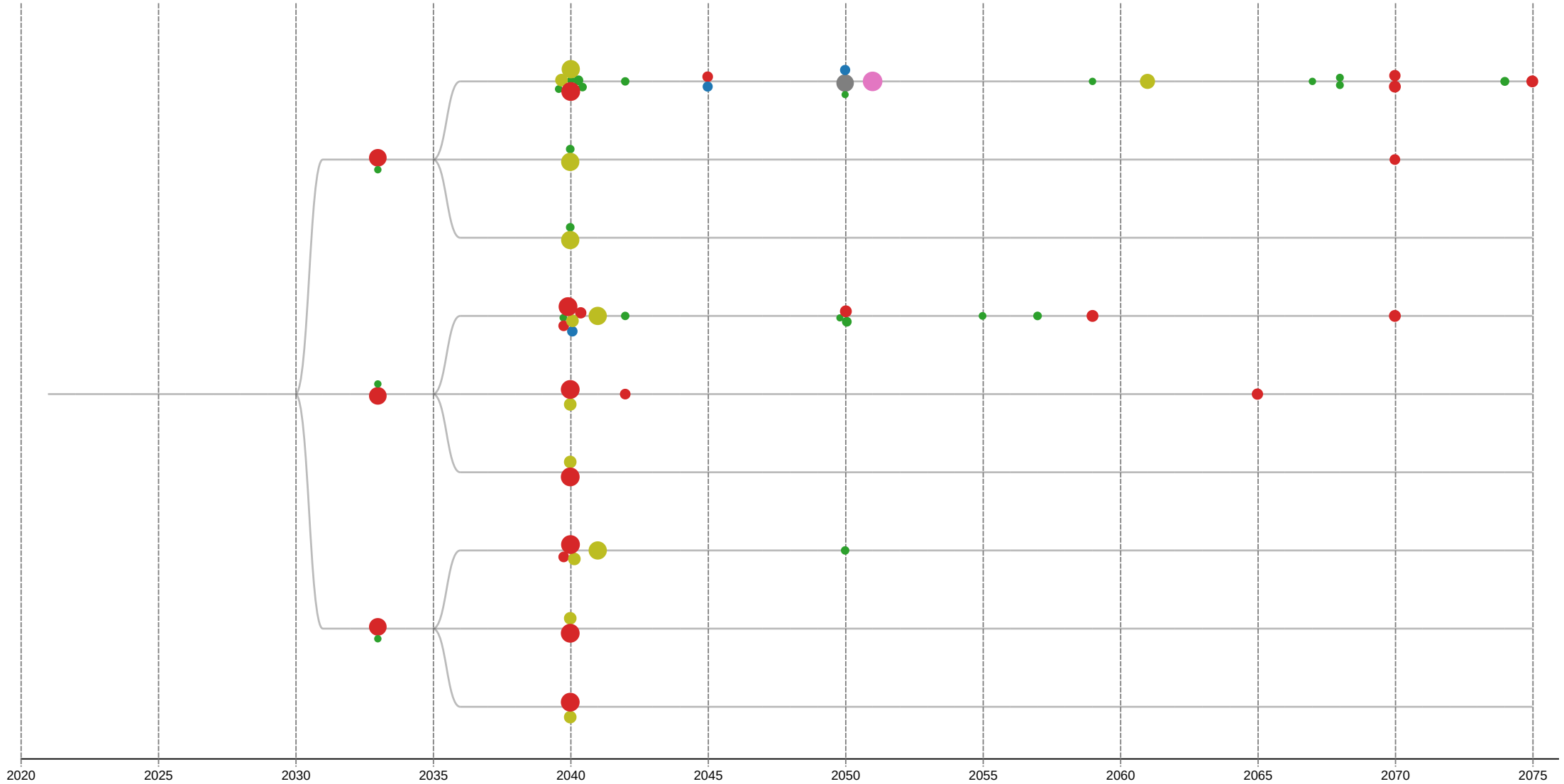
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	13.12	14.20	15.76	13.27	14.45	15.87	14.68	16.58	18.79	
A3: Operational complexity and flexibility	5.92	5.98	6.63	5.83	6.06	6.75	6.23	6.99	7.99	
A4: WRZ connectivity	7.18	8.19	9.10	7.42	8.36	9.09	8.41	9.55	10.77	
A7: Customer relations support engagement with demand management	0.02	0.03	0.03	0.02	0.03	0.03	0.03	0.03	0.03	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.64	19.45	21.46	19.37	20.04	22.10	20.89	23.21	26.19	
E1: Scaleability and modularity of proposed changes	8.88	9.27	10.28	8.82	9.36	10.39	9.67	10.88	12.34	
E2: Intervention lead times	4.37	3.84	4.16	4.23	4.18	4.52	4.47	4.85	5.36	
E3: Reliance on external bodies to deliver changes	6.39	6.34	7.01	6.32	6.49	7.19	6.75	7.48	8.49	
E5: Collaborative land management	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

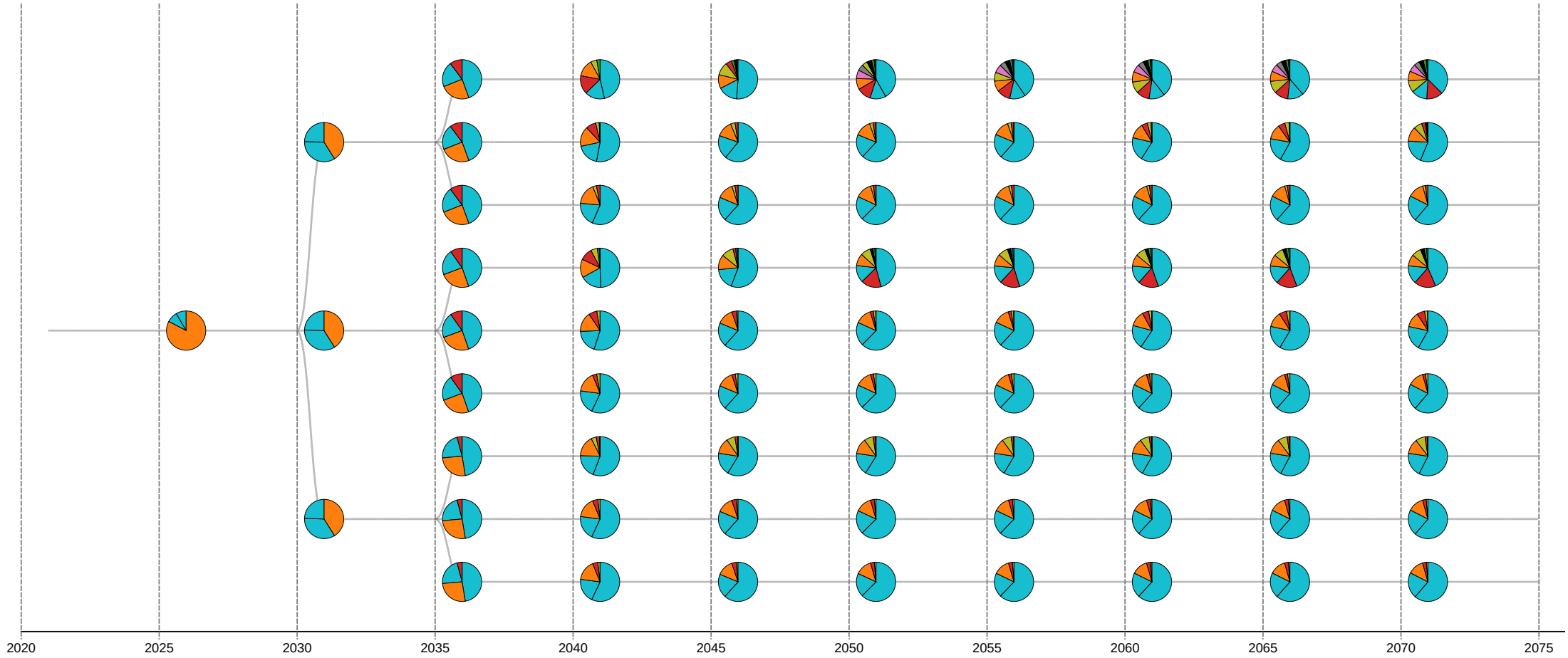
Option Selection (Thames Water)



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

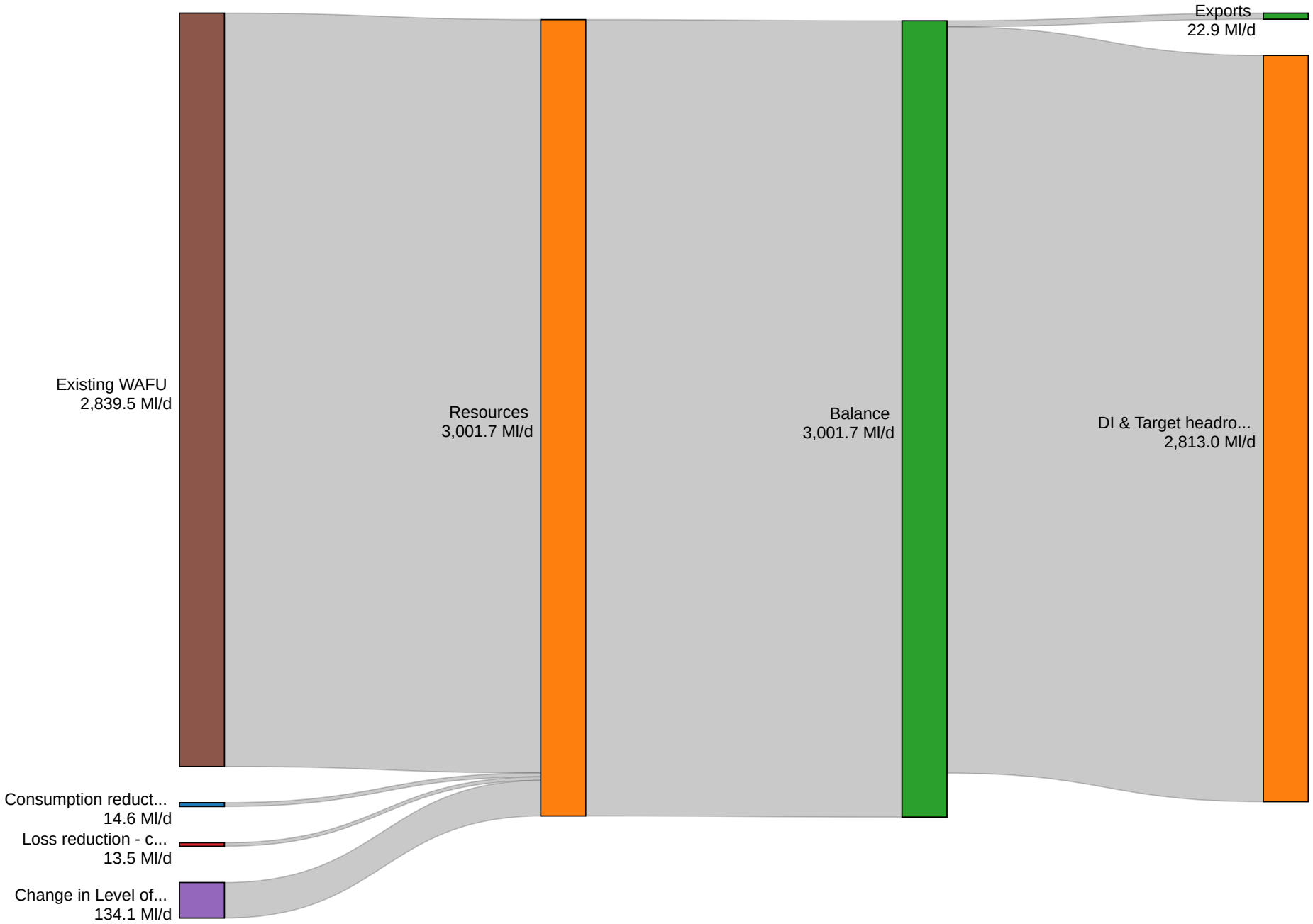
Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.

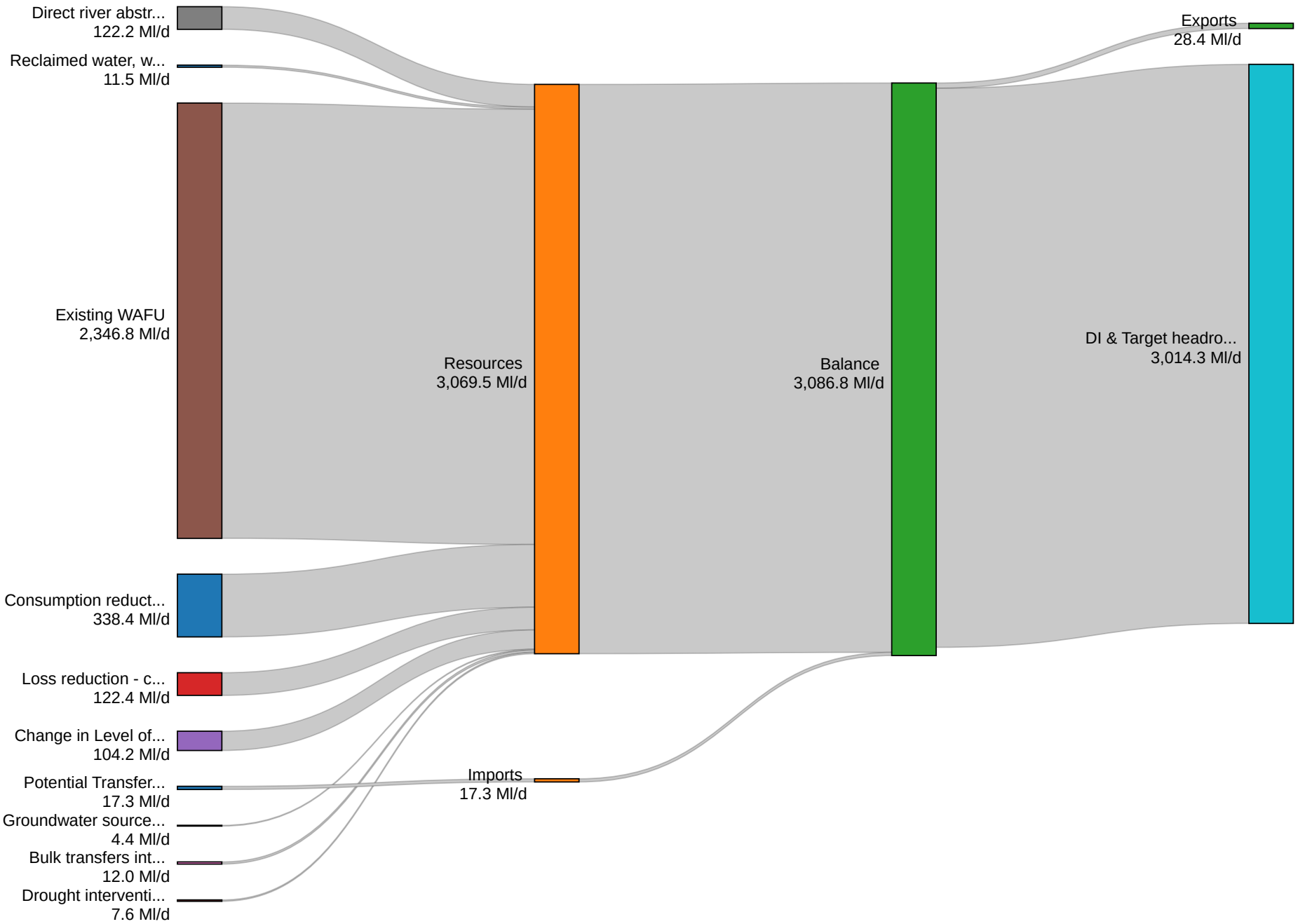


- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

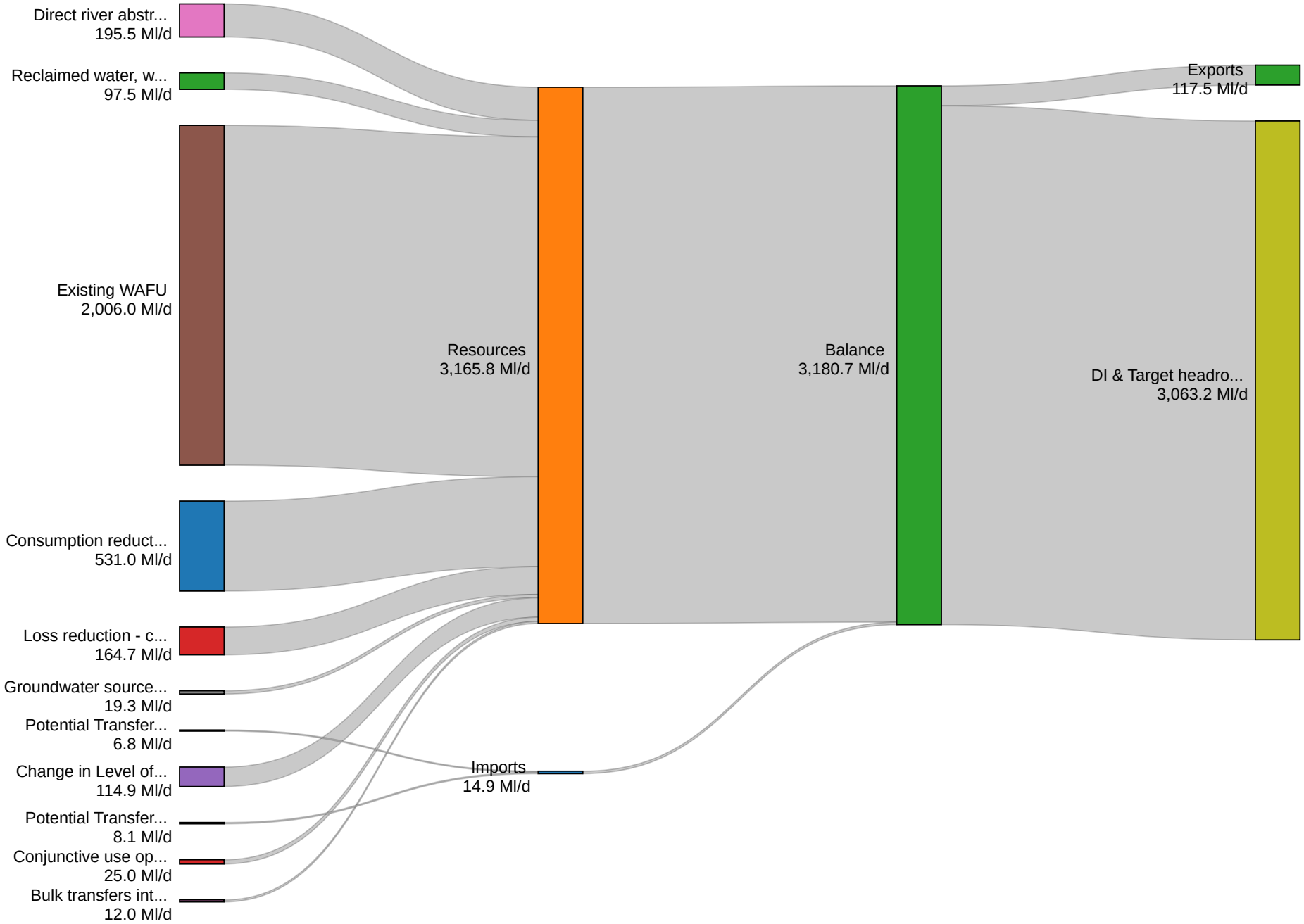
Situation 4 - 2026 (Thames Water)



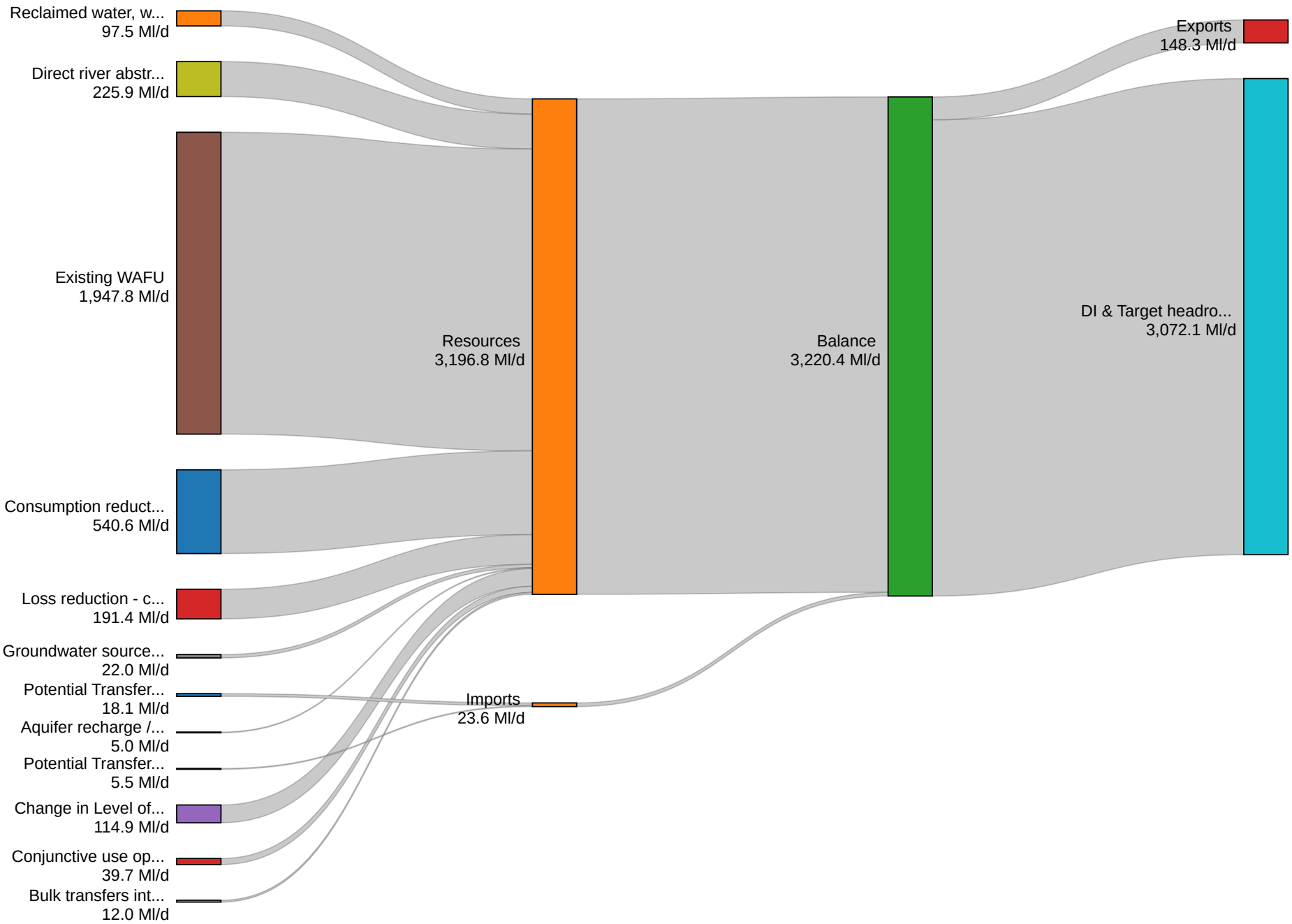
Situation 4 - 2040 (Thames Water)



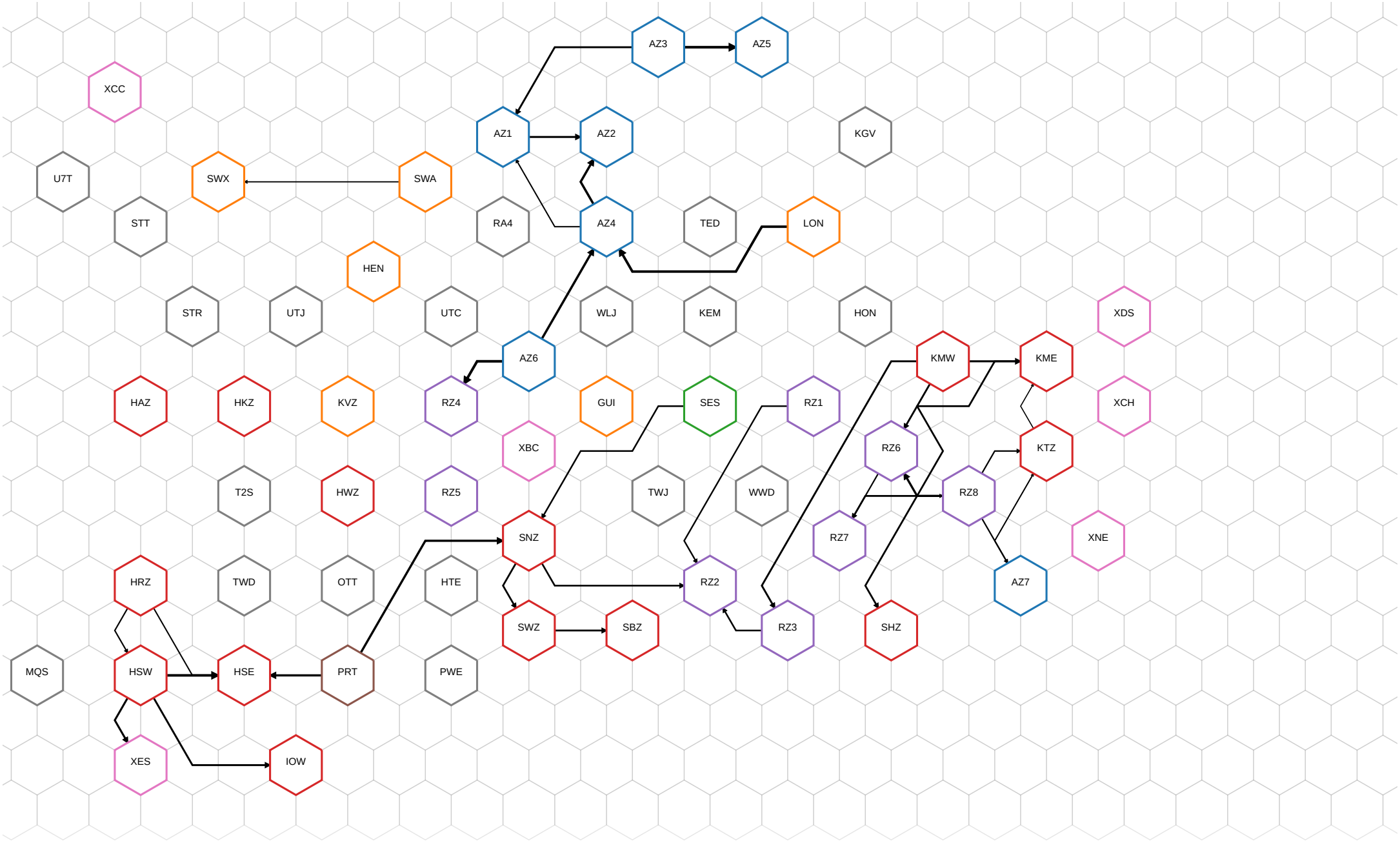
Situation 4 - 2050 (Thames Water)



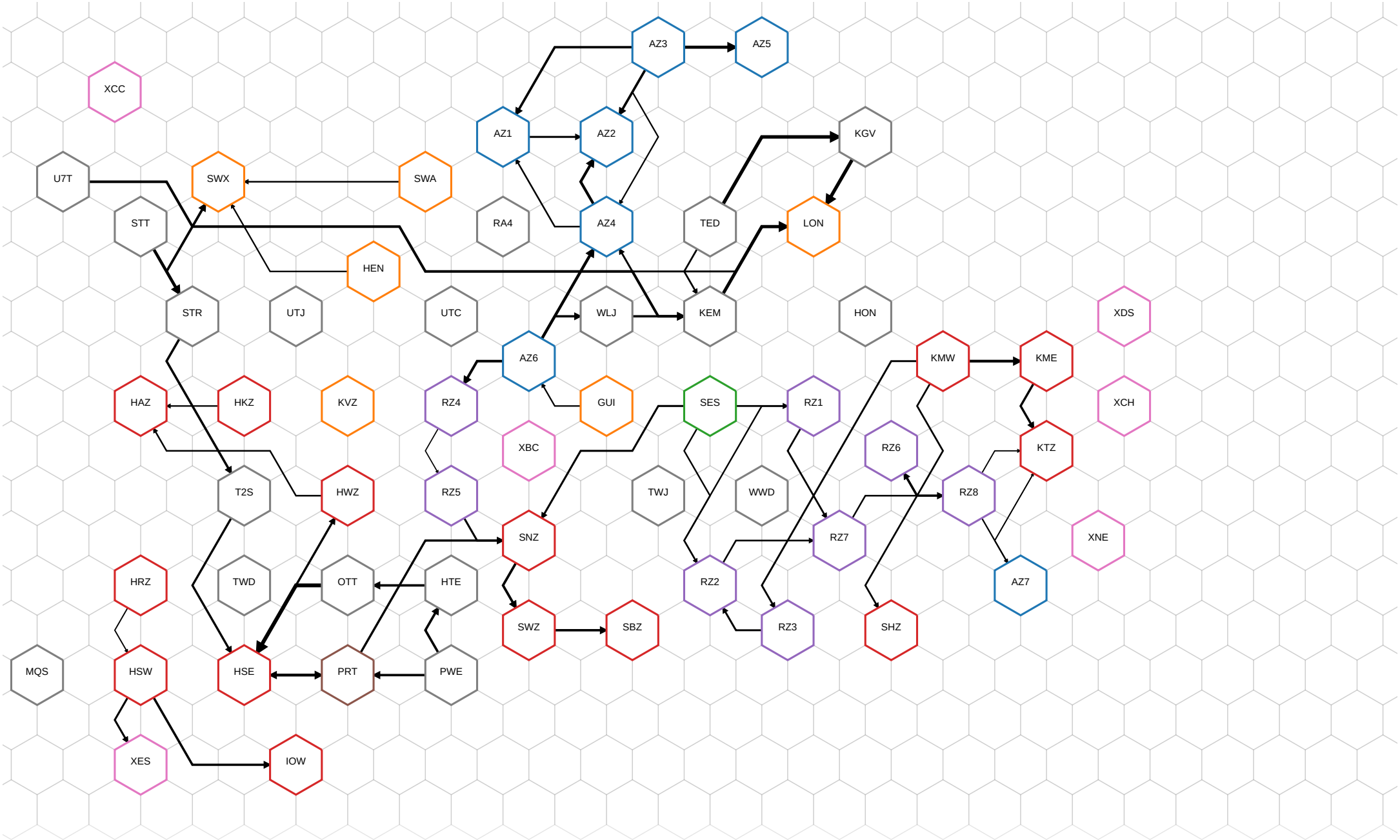
Situation 4 - 2075 (Thames Water)



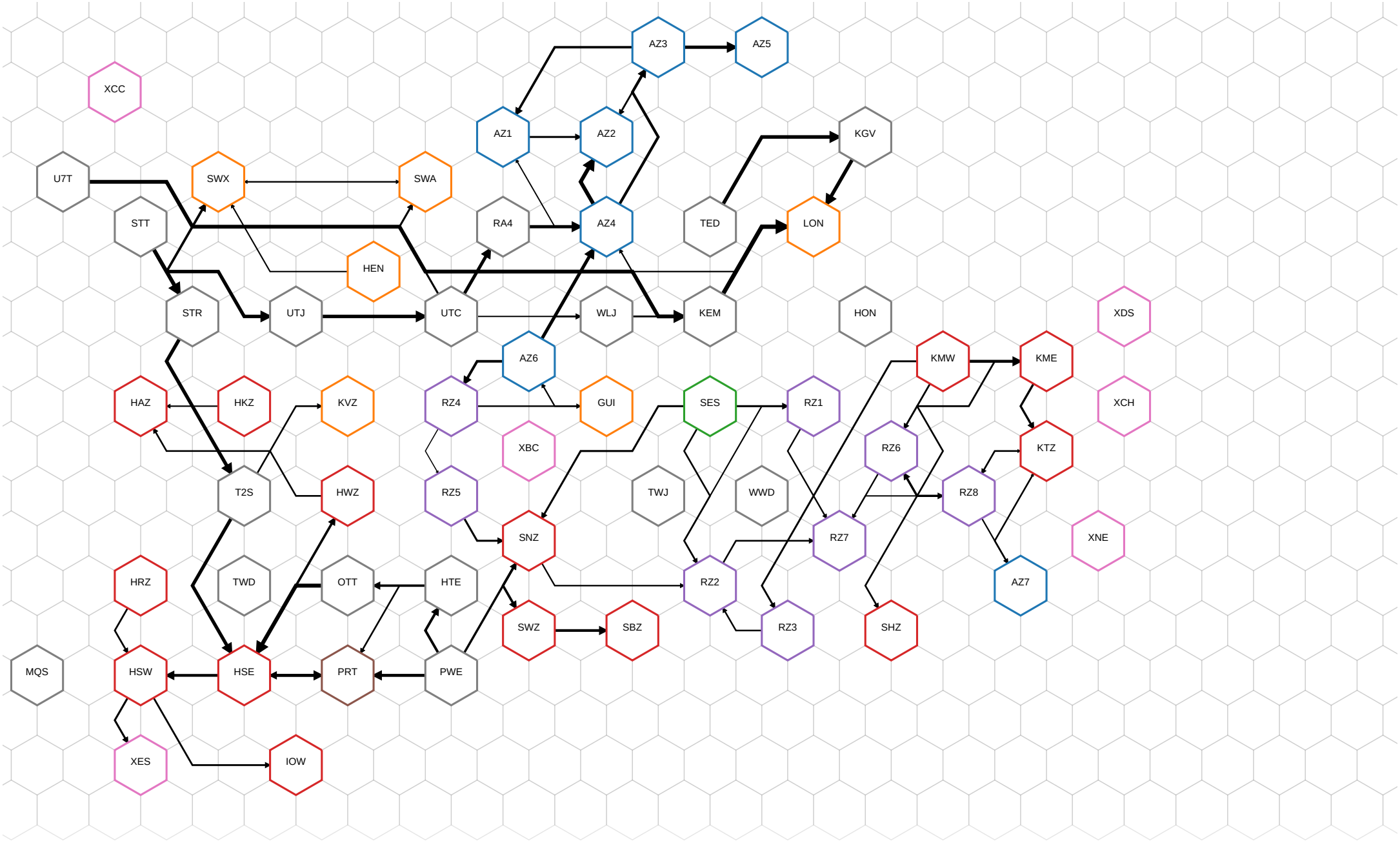
Situation 4 - 2026



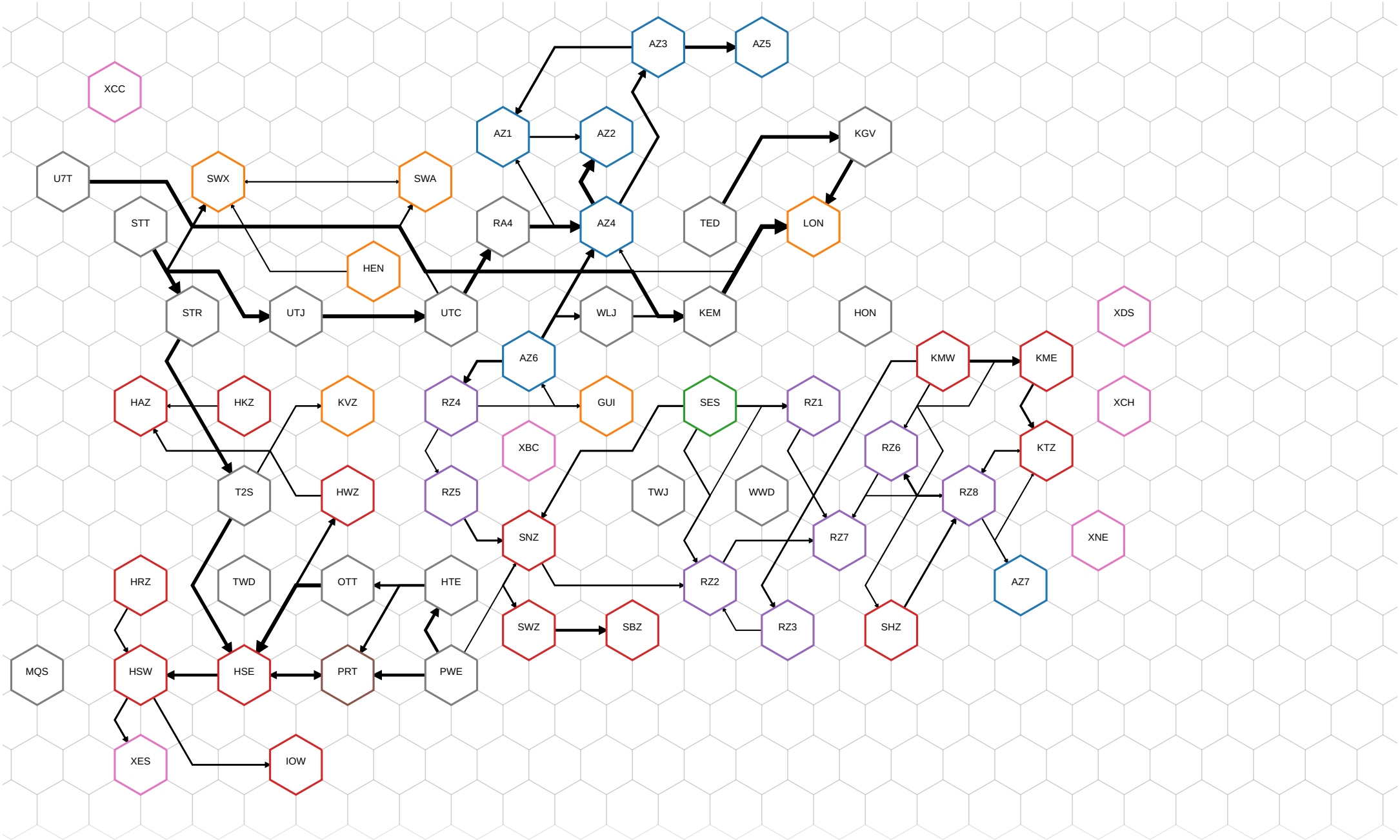
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

NO SESRO NO STT

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-excl-sesro-excl-stt-2075
Description	Least cost run with hybrid-c+2 government interventions excluding SESRO and STT.
Created at	22/08/2023, 12:07:07
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2-excl-sesro-excl-stt
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets. Exclude all SESRO variants. Exclude all STT components.
Optimised discount rate	STPR

Metrics

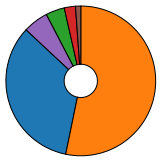
Net present value (Cost)

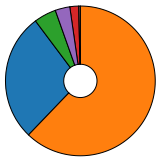
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	21,613	18,137	17,394	20,002	18,021	17,169	18,007	16,812	16,078	(£m)
Cost w/o deficit (STPR)	21,613	18,137	17,394	20,002	18,021	17,169	18,007	16,812	16,078	(£m)
Cost w/ deficit (IGEQ)	33,304	26,671	25,327	30,199	26,488	24,960	26,678	24,459	23,132	(£m)
Cost w/o deficit (IGEQ)	33,304	26,671	25,327	30,199	26,488	24,960	26,678	24,459	23,132	(£m)
Cost w/ deficit (LTDR)	23,868	19,817	18,962	21,987	19,688	18,710	19,707	18,323	17,479	(£m)
Cost w/o deficit (LTDR)	23,868	19,817	18,962	21,987	19,688	18,710	19,707	18,323	17,479	(£m)

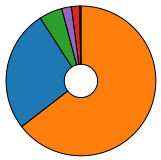
Cost breakdown (STPR)

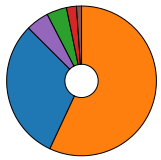
Select Company: Total

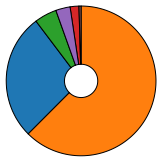
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	7,290	5,006	4,584	6,108	4,907	4,408	4,676	4,033	3,581	(£m)
Fixed opex	11,505	11,276	11,221	11,390	11,260	11,200	11,264	11,191	11,128	(£m)
Fixed operational carbon	883	870	870	873	869	870	870	868	866	(£m)
Embedded carbon	522	345	317	430	343	310	336	285	257	(£m)
Variable opex	1,170	574	359	985	559	331	692	395	230	(£m)
Variable carbon opex	244	65	42	216	83	50	168	42	17	(£m)

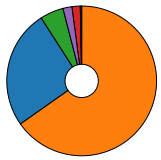
situation1 

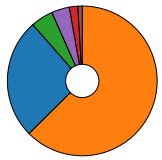
situation2 

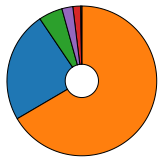
situation3 

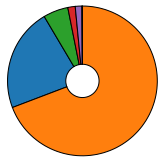
situation4 

situation5 

situation6 

situation7 

situation8 

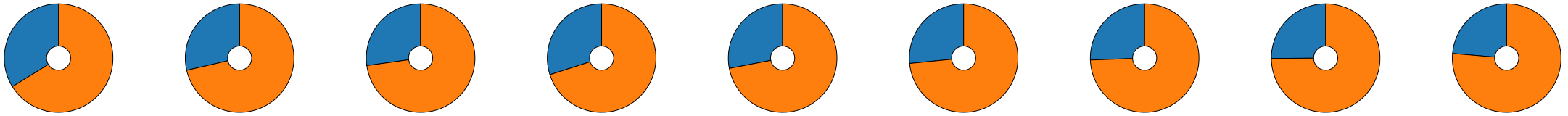
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,391,532	2,118,417	1,928,145	2,719,989	2,103,608	1,885,192	2,078,283	1,726,098	1,540,404	(tonnes)
Operational emissions	6,637,311	5,286,097	5,154,437	6,360,031	5,397,920	5,208,477	6,049,645	5,145,708	4,974,002	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

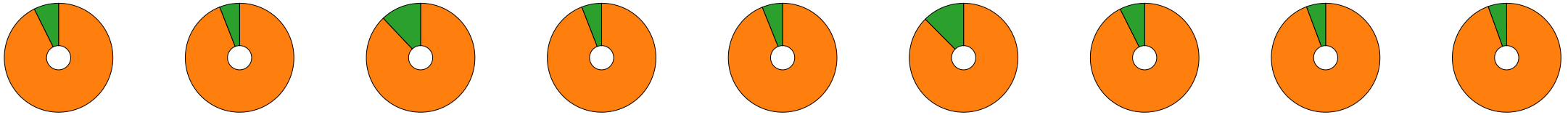


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	0	0	0	0	0	0	0	0	0	(GWh)
Grid	24,234	11,857	4,767	19,770	11,362	4,194	14,220	7,894	2,837	(GWh)
Renewable	1,931	753	655	1,250	738	598	1,142	479	165	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
SEA environmental benefit	67,703.00	62,127.00	61,332.00	65,499.00	61,972.00	60,582.00	61,904.00	59,941.00	58,852.00	
SEA environmental disbenefit	112,534.00	76,347.00	69,864.00	99,052.00	75,328.00	69,258.00	79,920.00	66,246.00	56,923.00	
Natural capital	6,414,204.43	5,469,155.41	8,199,490.85	3,595,855.84	5,371,525.46	8,187,504.91	5,976,816.71	6,648,518.69	9,550,353.63	
Bio-diversity net gain	−122,180.00	−62,597.00	−38,806.00	−117,433.00	−67,077.00	−39,535.00	−178,529.00	−137,776.00	−108,215.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	34,094.00	31,730.00	31,331.00	33,183.00	31,645.00	31,241.00	31,771.00	30,786.00	30,261.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	27.94	27.52	29.99	26.78	27.60	30.00	27.08	29.68	32.83	
R1: Uncertainty of option supply/demand benefit	5.86	5.14	5.55	5.31	5.14	5.51	5.00	5.35	5.85	
R3: Risk of service failure due to other physical hazards	6.64	6.79	7.57	6.43	6.83	7.58	6.58	7.42	8.43	
R4: Availability of additional headroom	6.49	6.80	7.01	6.56	6.82	7.02	7.05	7.38	7.62	
R5: Catchment/raw water quality risks (incl. climate change)	4.12	3.89	4.39	3.83	3.90	4.41	3.75	4.24	4.90	
R6: Capacity of catchment services	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
R7: Risk of service failure to other exceptional events	4.82	4.90	5.46	4.64	4.91	5.48	4.70	5.29	6.03	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

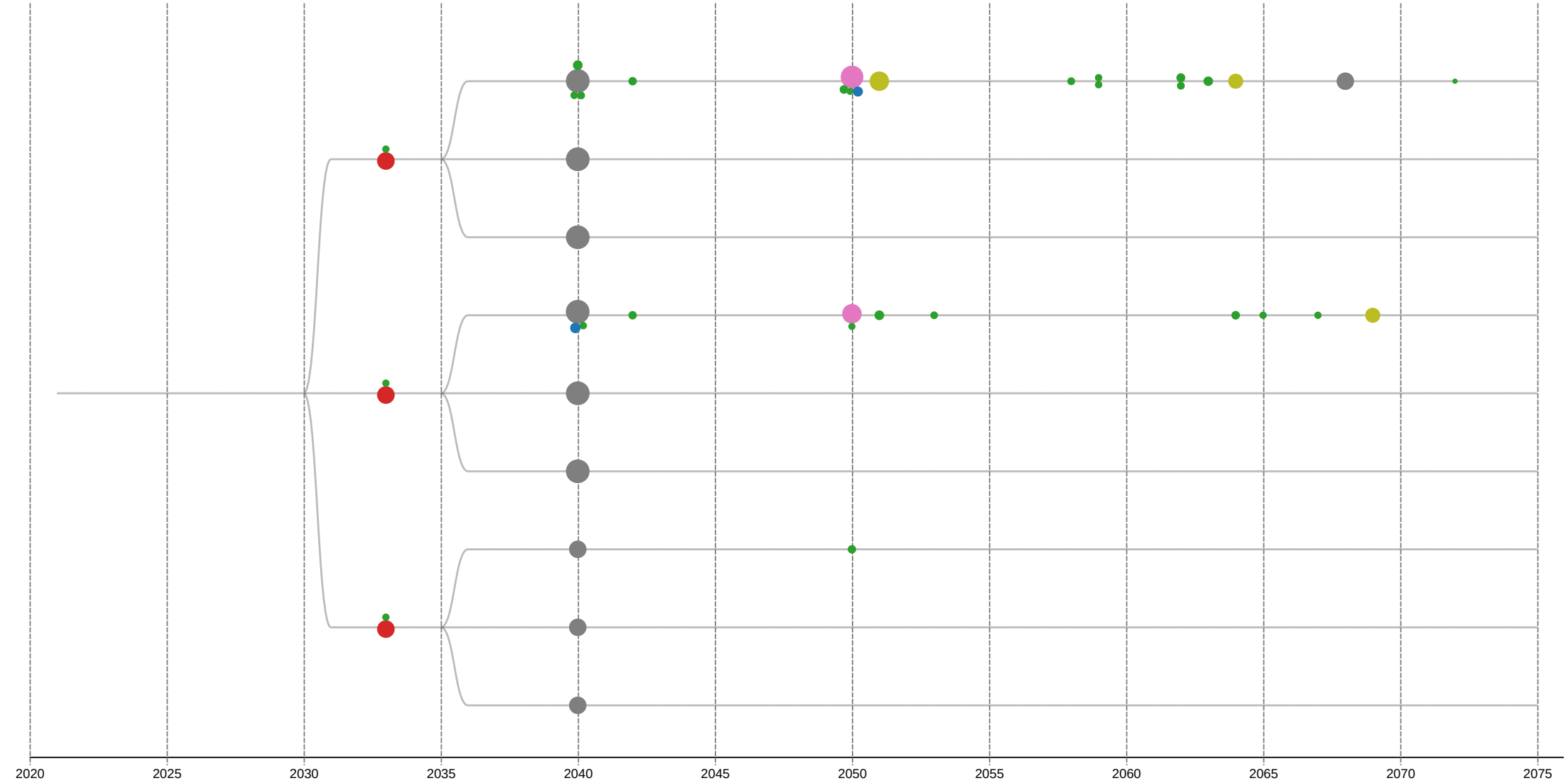
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	13.67	15.07	16.81	14.22	14.96	16.48	14.76	16.74	19.01	
A3: Operational complexity and flexibility	6.14	6.49	7.28	6.03	6.54	7.33	6.25	7.13	8.17	
A4: WRZ connectivity	7.50	8.54	9.50	8.16	8.39	9.12	8.48	9.58	10.80	
A7: Customer relations support engagement with demand management	0.02	0.03	0.03	0.02	0.03	0.03	0.03	0.03	0.03	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.61	20.01	22.03	18.85	20.01	22.04	19.95	22.56	25.50	
E1: Scaleability and modularity of proposed changes	8.98	9.43	10.49	8.78	9.50	10.53	9.45	10.81	12.28	
E2: Intervention lead times	4.30	4.07	4.31	3.94	3.96	4.26	4.05	4.43	4.90	
E3: Reliance on external bodies to deliver changes	6.33	6.51	7.23	6.13	6.54	7.25	6.45	7.32	8.32	
E5: Collaborative land management	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

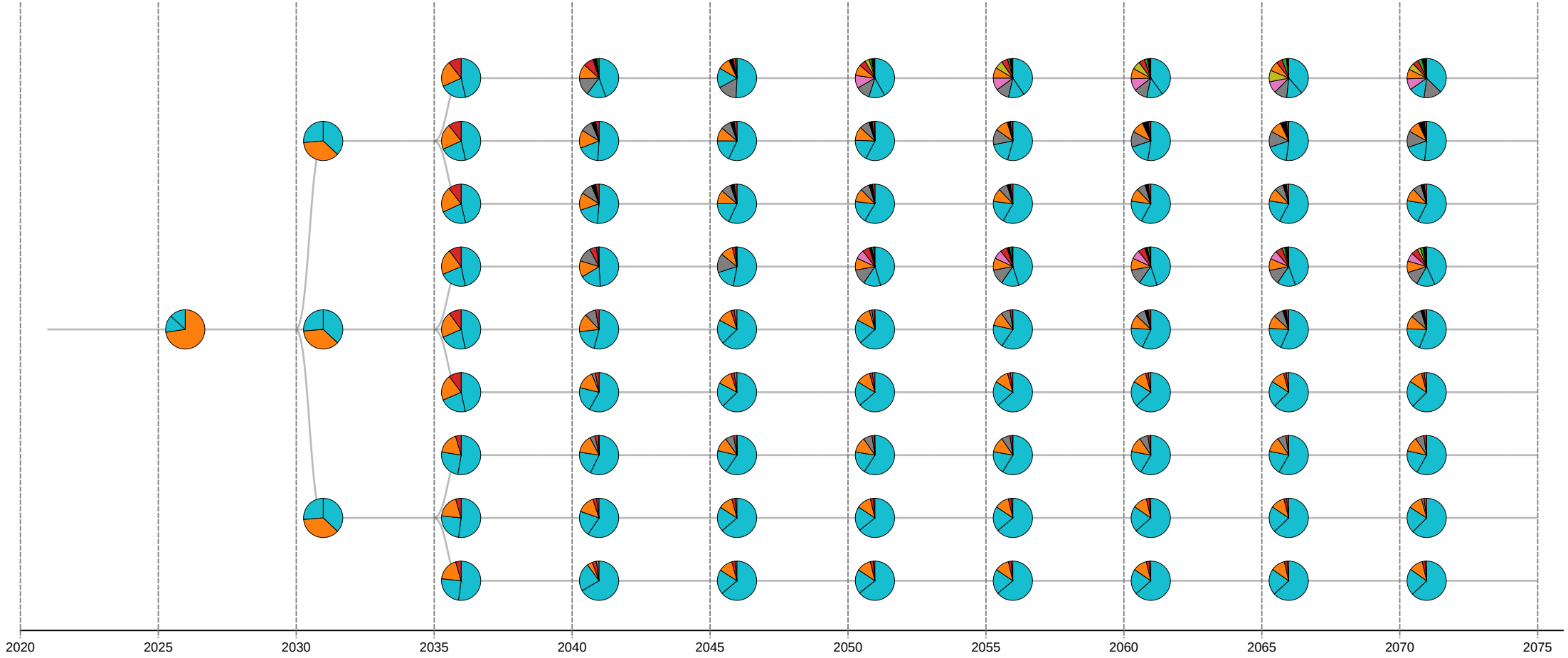
Option Selection (Thames Water)



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

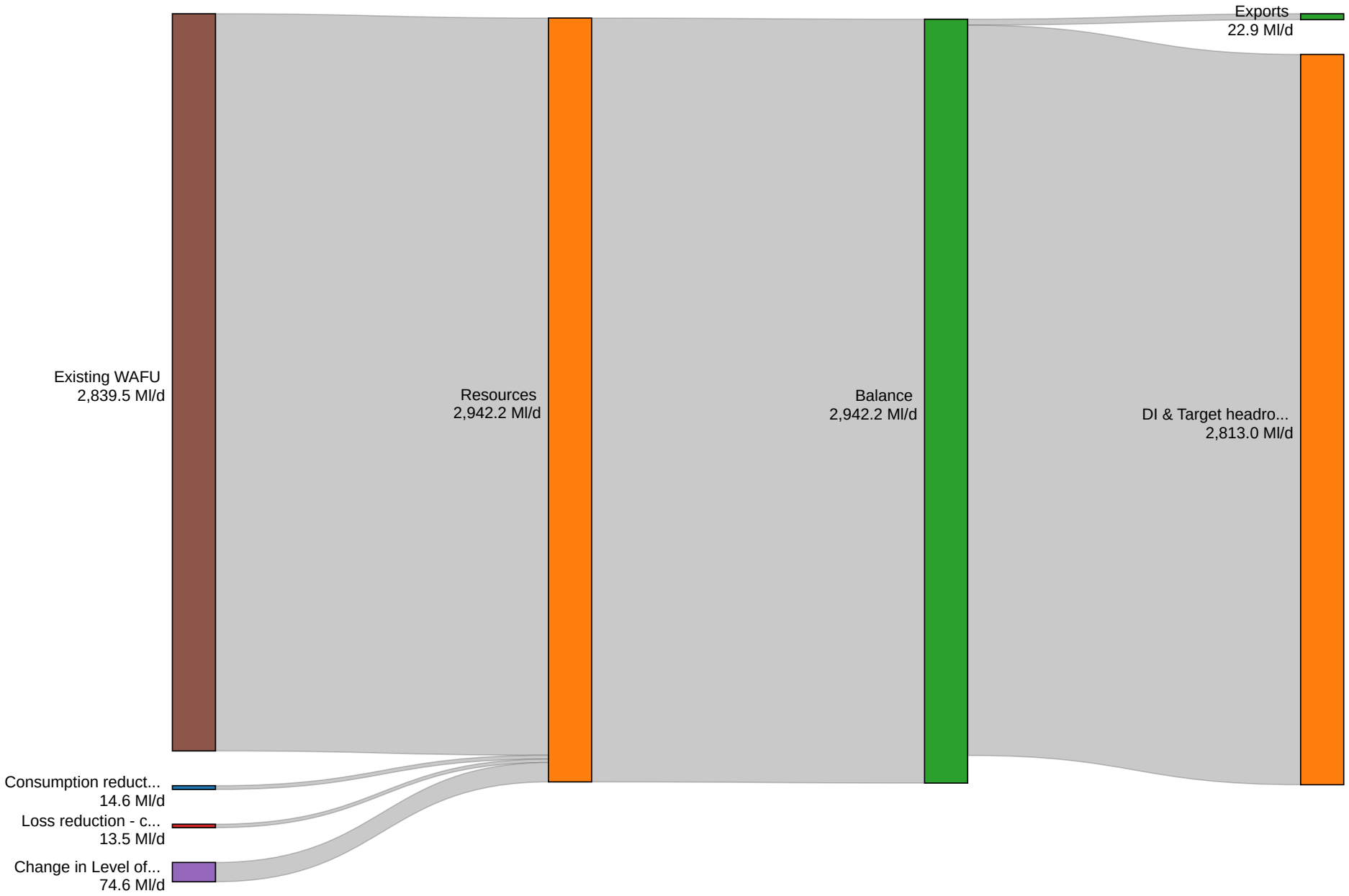
Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.

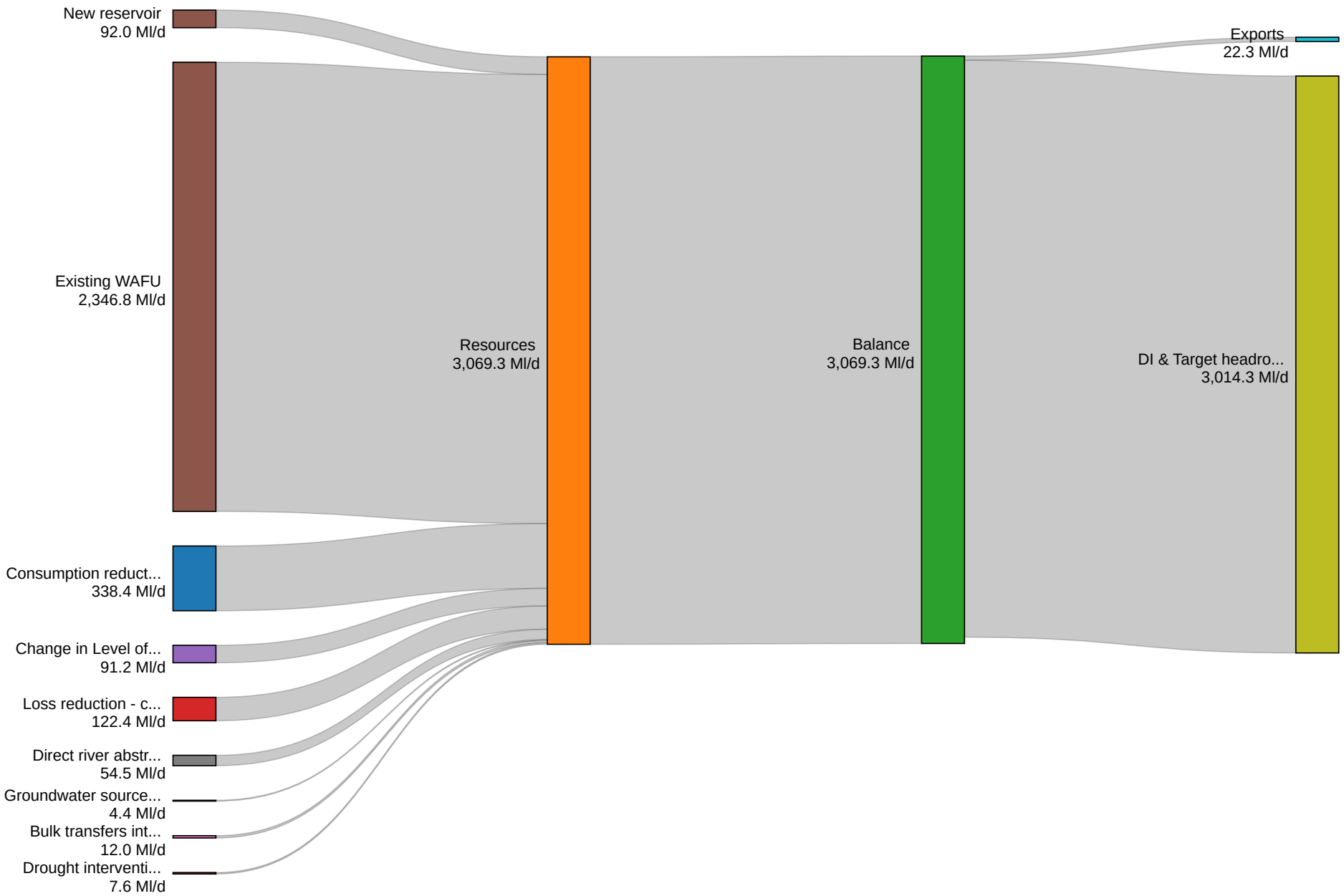


- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

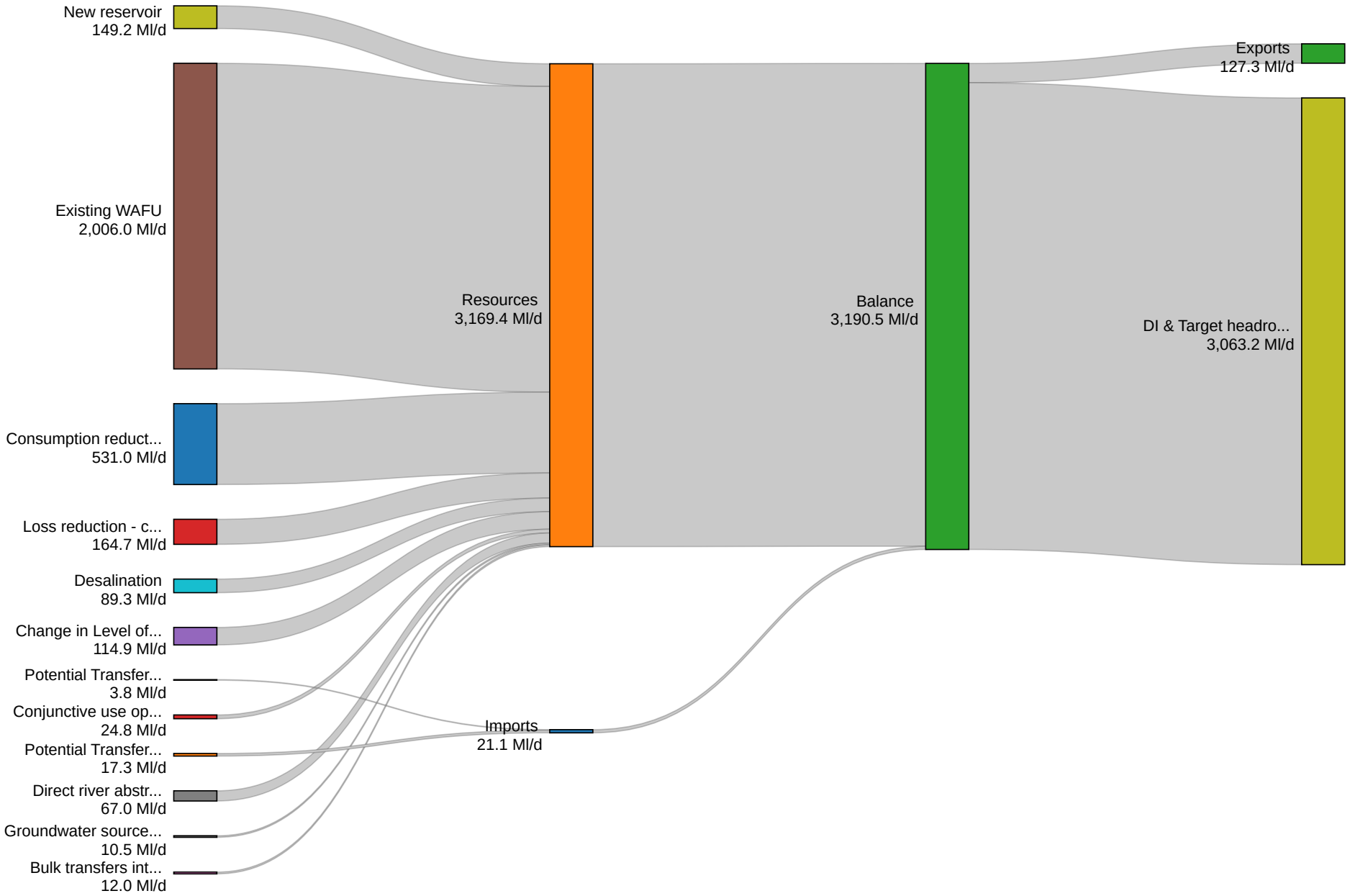
Situation 4 - 2026 (Thames Water)



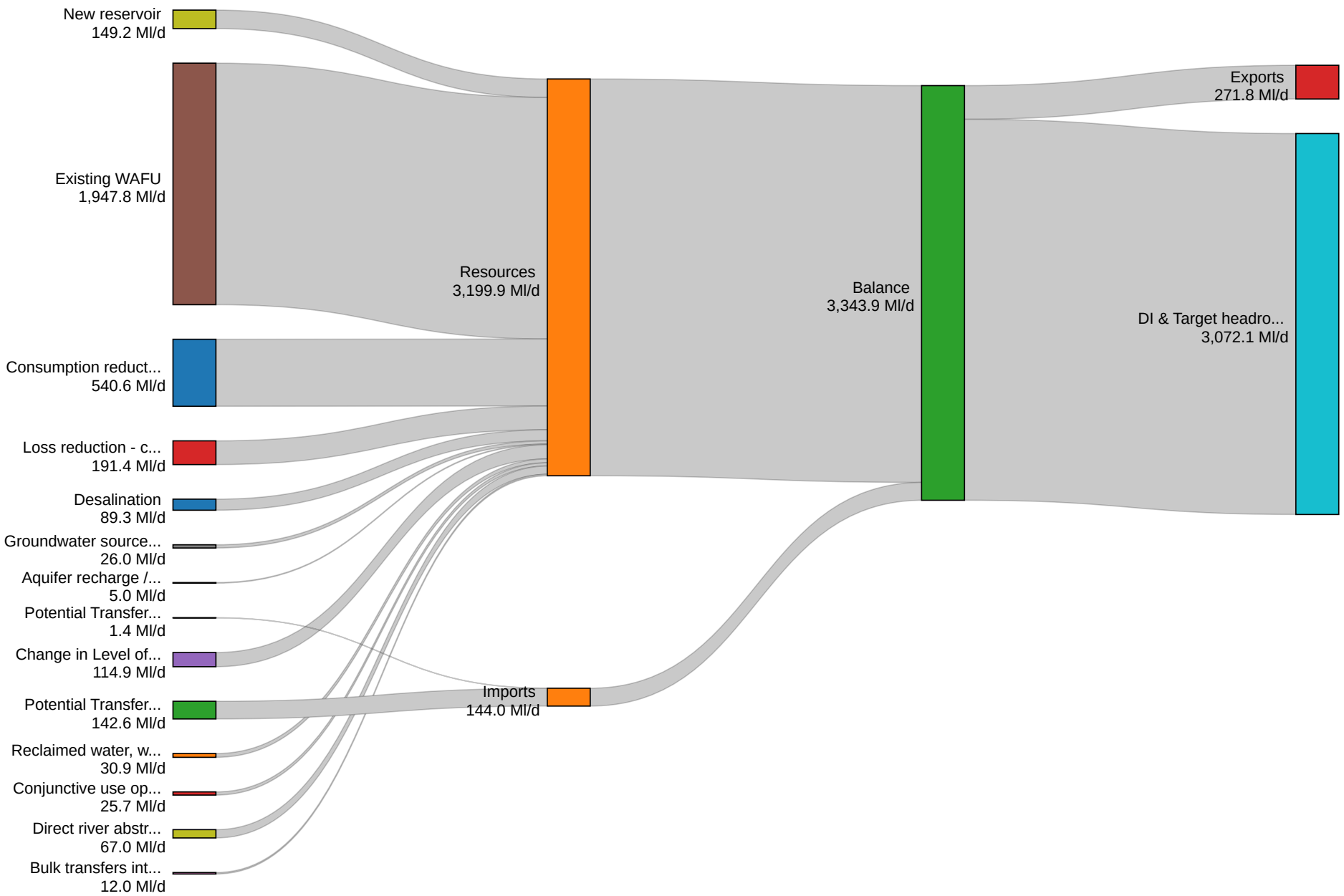
Situation 4 - 2040 (Thames Water)



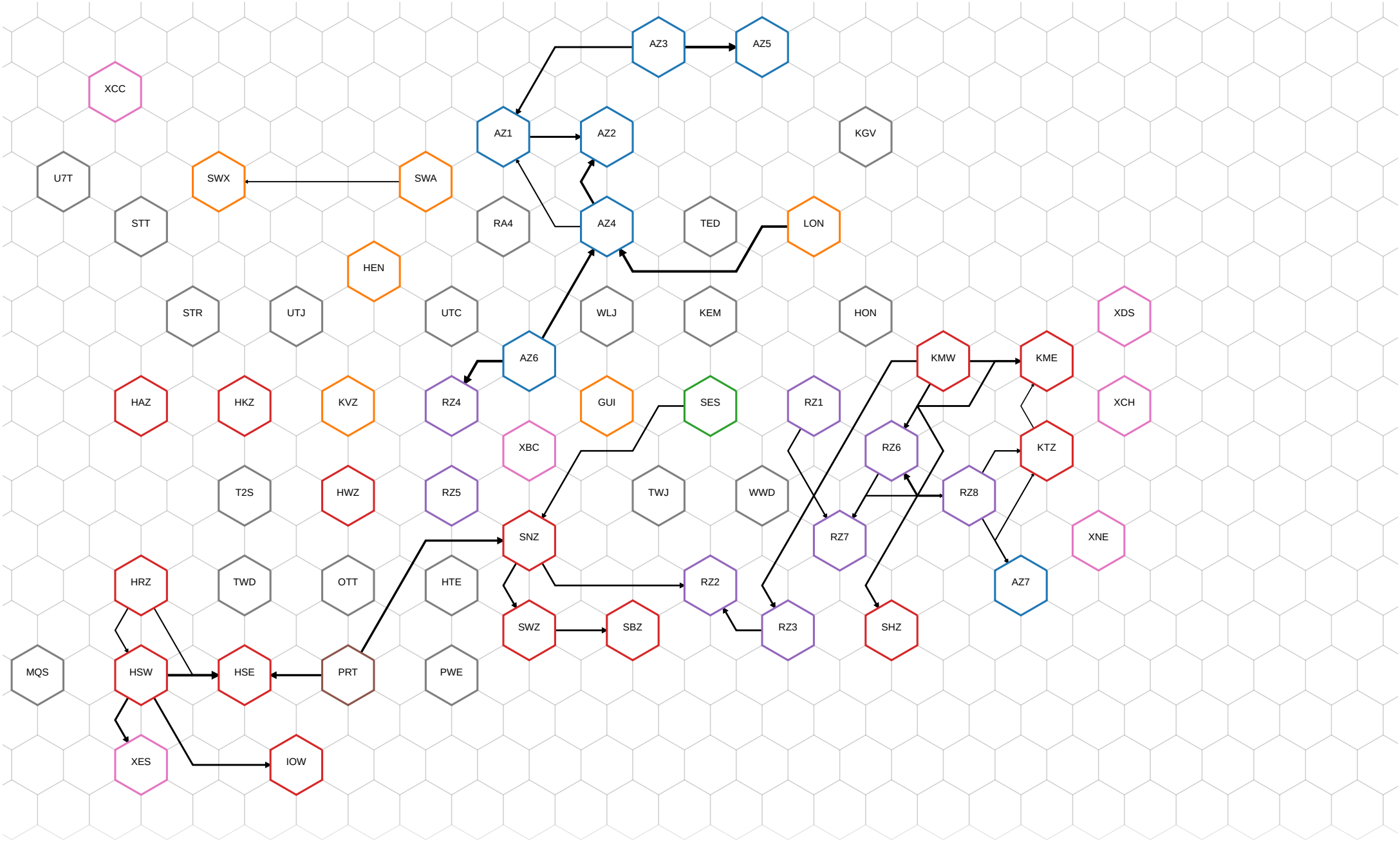
Situation 4 - 2050 (Thames Water)



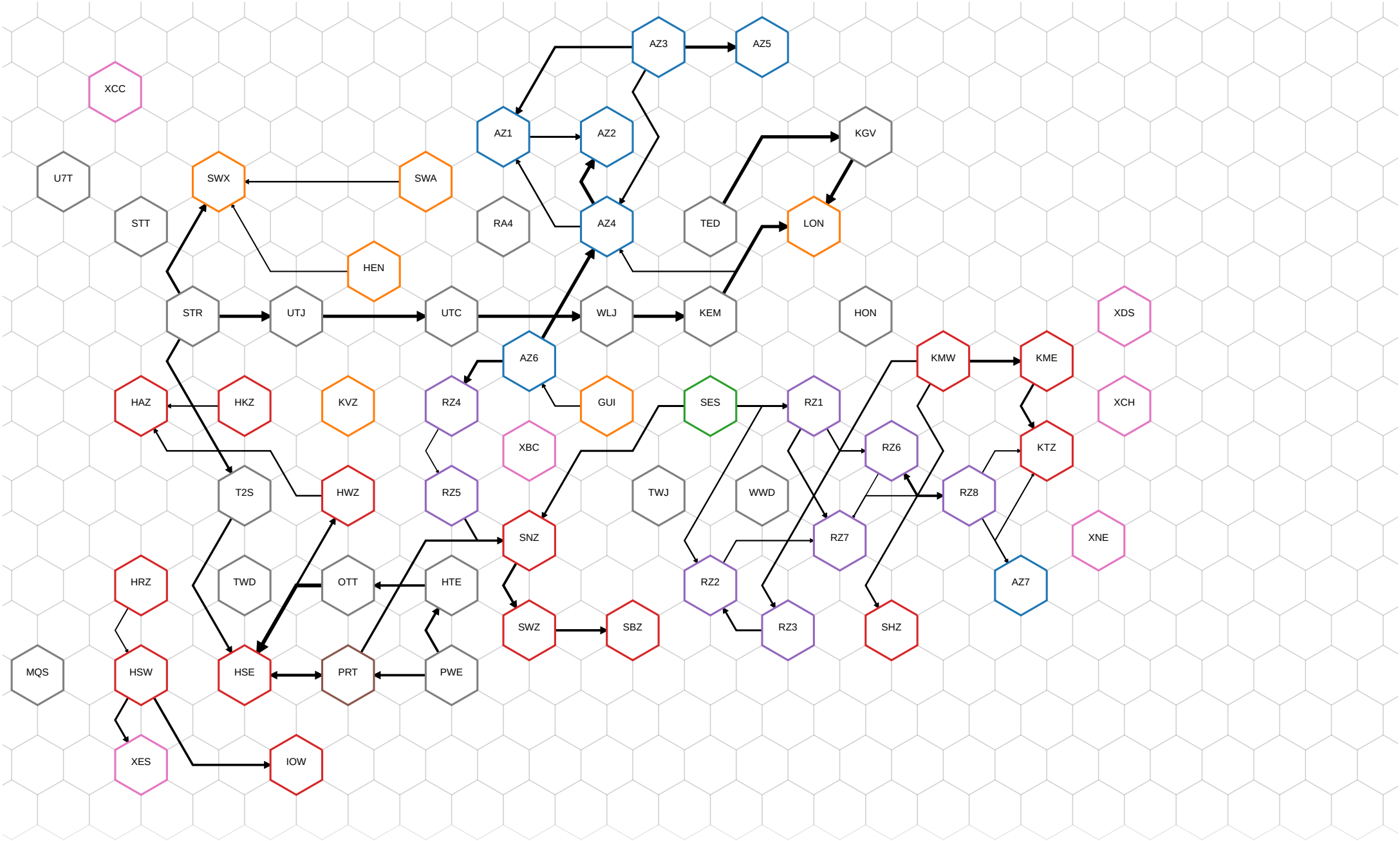
Situation 4 - 2075 (Thames Water)



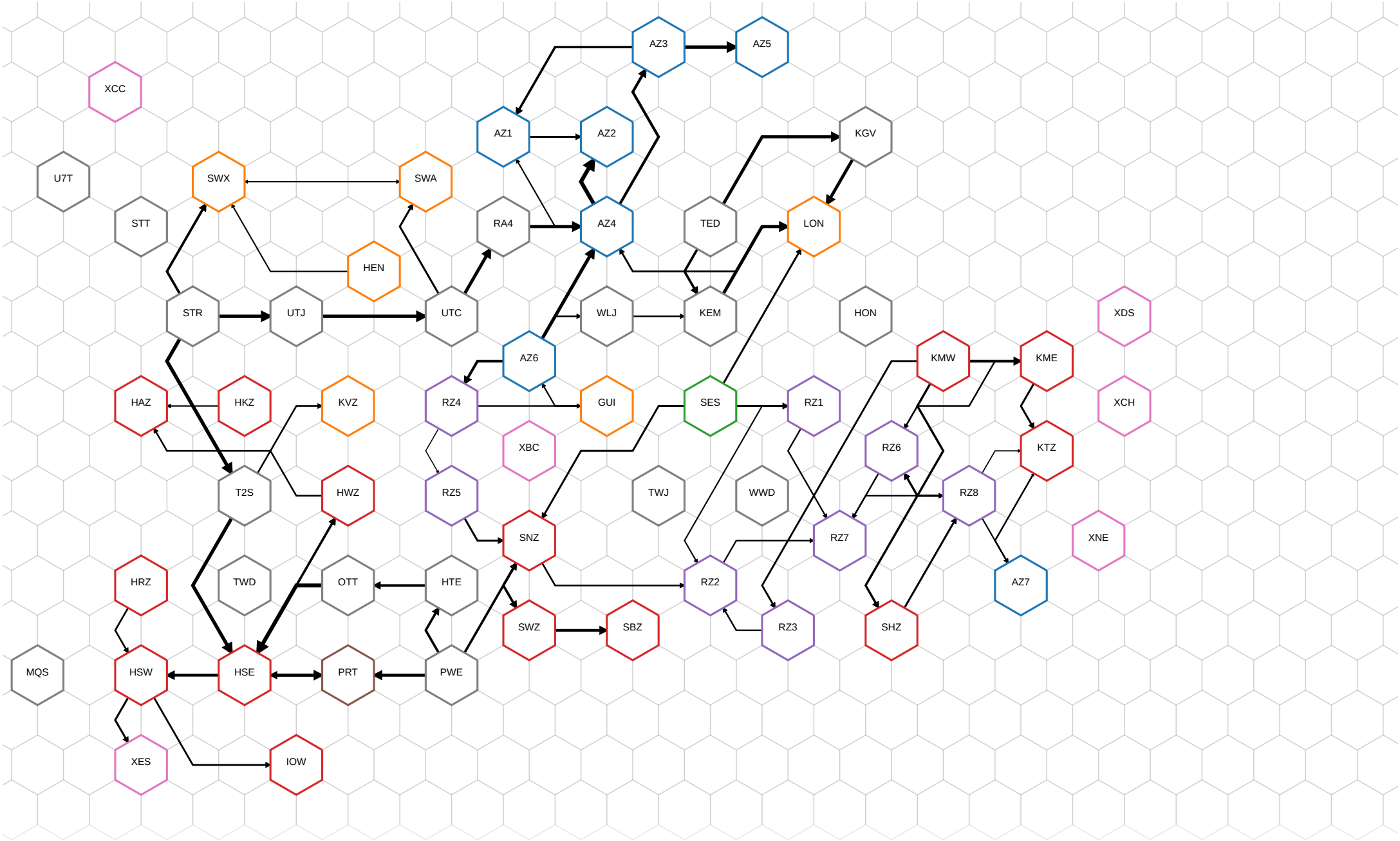
Situation 4 - 2026



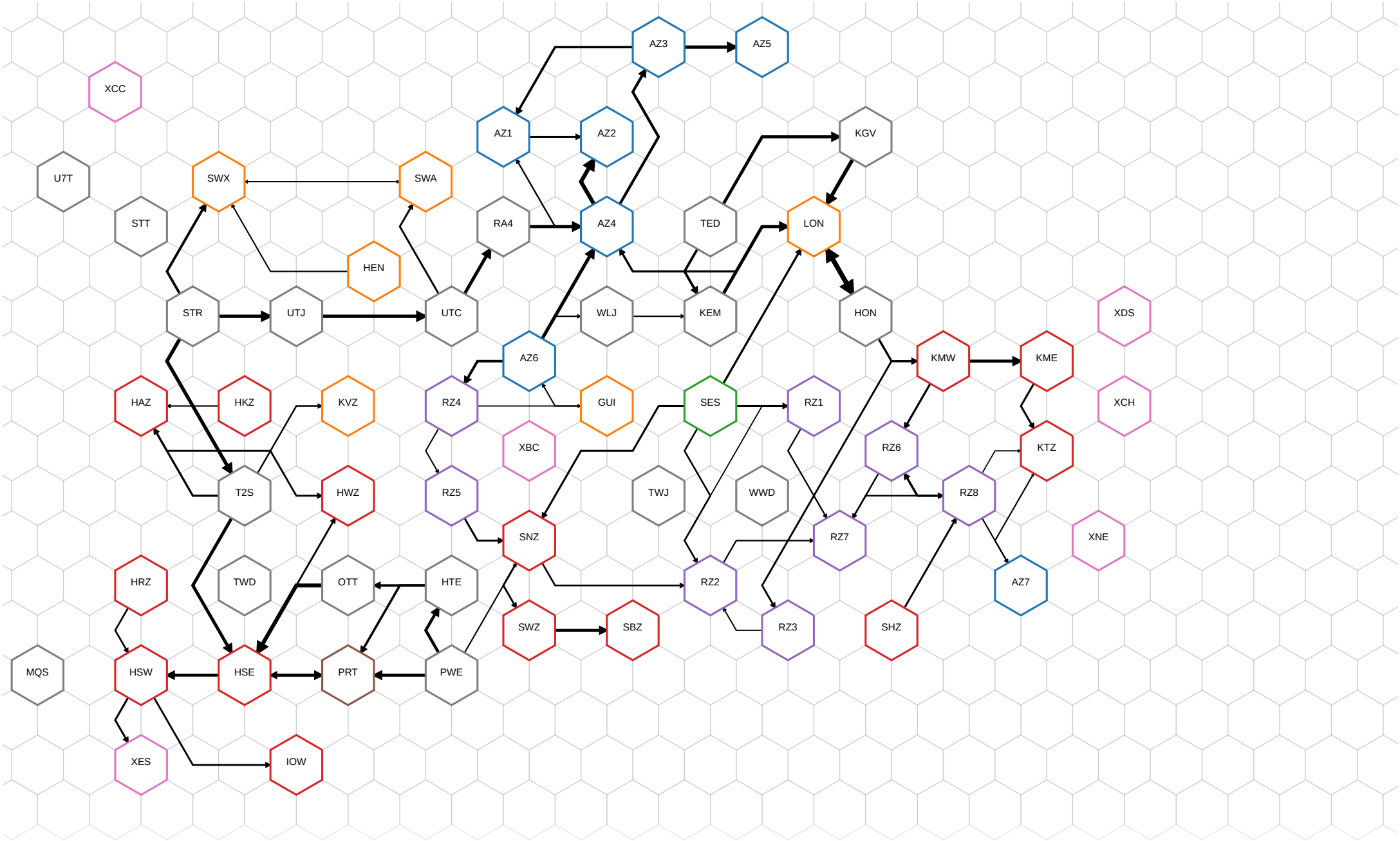
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

ONLY SESRO 150Mm^3 AVAILABLE

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-only-sesro150-2075
Description	Least cost run with hybrid-c+2 government interventions including only SESRO 150 Mm3.
Created at	09/07/2023, 19:49:22
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2-only-sesro150
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets. Exclude all SESRO variants except 150.
Optimised discount rate	STPR

Metrics

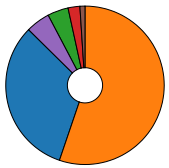
Net present value (Cost)

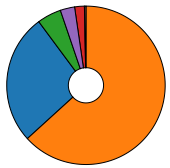
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	20,572	17,652	17,004	19,052	17,540	16,788	17,868	17,029	16,325	(£m)
Cost w/o deficit (STPR)	20,572	17,652	17,004	19,052	17,540	16,788	17,868	17,029	16,325	(£m)
Cost w/ deficit (IGEQ)	31,418	25,865	24,692	28,513	25,673	24,335	26,377	24,799	23,530	(£m)
Cost w/o deficit (IGEQ)	31,418	25,865	24,692	28,513	25,673	24,335	26,377	24,799	23,530	(£m)
Cost w/ deficit (LTDR)	22,671	19,271	18,526	20,900	19,143	18,282	19,539	18,564	17,755	(£m)
Cost w/o deficit (LTDR)	22,671	19,271	18,526	20,900	19,143	18,282	19,539	18,564	17,755	(£m)

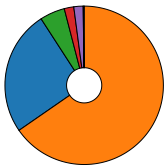
Cost breakdown (STPR)

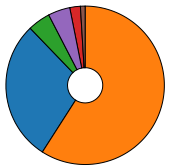
Select Company: Total

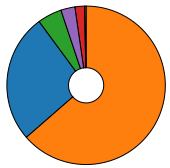
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	6,619	4,697	4,334	5,475	4,616	4,173	4,743	4,303	3,863	(£m)
Fixed opex	11,359	11,164	11,115	11,253	11,153	11,097	11,161	11,110	11,049	(£m)
Fixed operational carbon	880	869	868	877	870	869	872	868	866	(£m)
Embedded carbon	495	351	330	414	345	316	363	326	301	(£m)
Variable opex	1,007	517	323	852	502	300	637	384	230	(£m)
Variable carbon opex	211	55	34	181	54	31	93	37	17	(£m)

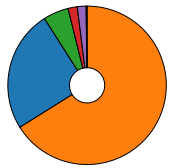
situation1 

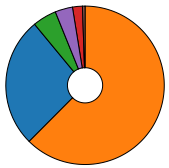
situation2 

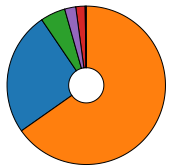
situation3 

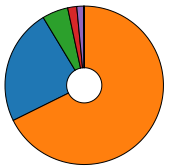
situation4 

situation5 

situation6 

situation7 

situation8 

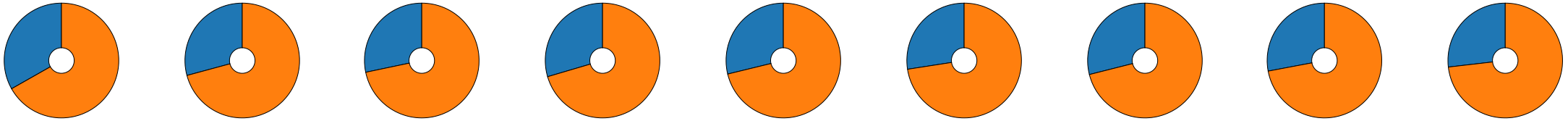
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,187,911	2,150,978	2,008,340	2,589,400	2,113,452	1,923,654	2,248,170	1,987,884	1,823,379	(tonnes)
Operational emissions	6,416,906	5,216,603	5,089,961	6,172,653	5,225,643	5,086,117	5,522,031	5,121,260	4,973,821	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

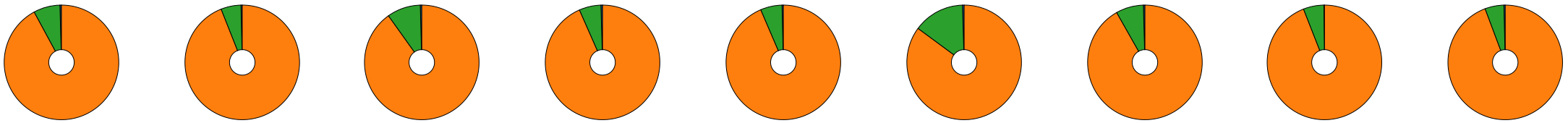


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	104	44	22	95	44	22	63	13	12	(GWh)
Grid	22,143	11,340	4,613	19,157	10,975	3,861	13,171	7,777	2,917	(GWh)
Renewable	1,795	681	484	1,260	713	654	1,115	479	165	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	69,638.00	63,945.00	63,059.00	67,206.00	63,620.00	62,711.00	64,084.00	61,837.00	60,779.00	
SEA environmental disbenefit	113,516.00	81,897.00	74,590.00	99,970.00	79,528.00	73,423.00	83,452.00	70,545.00	61,656.00	
Natural capital	81,687,049.97	77,190,026.04	79,998,022.50	75,268,233.60	77,131,521.83	79,780,700.84	76,860,677.10	77,623,380.55	80,495,321.70	
Bio-diversity net gain	−220,521.00	−150,043.00	−121,966.00	−202,738.00	−149,655.00	−124,012.00	−152,370.00	−124,859.00	−95,794.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	33,991.00	31,817.00	31,470.00	33,102.00	31,688.00	31,293.00	31,703.00	30,805.00	30,314.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	28.97	29.35	32.18	28.34	29.49	32.29	30.73	34.13	37.98	
R1: Uncertainty of option supply/demand benefit	5.97	5.35	5.85	5.58	5.38	5.87	5.74	6.27	6.92	
R3: Risk of service failure due to other physical hazards	6.98	7.31	8.20	6.92	7.36	8.23	7.62	8.68	9.89	
R4: Availability of additional headroom	6.58	6.92	7.14	6.65	6.94	7.15	7.25	7.61	7.85	
R5: Catchment/raw water quality risks (incl. climate change)	4.14	4.23	4.78	3.87	4.24	4.79	4.35	5.03	5.81	
R6: Capacity of catchment services	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	
R7: Risk of service failure to other exceptional events	5.30	5.54	6.21	5.31	5.56	6.24	5.77	6.56	7.51	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

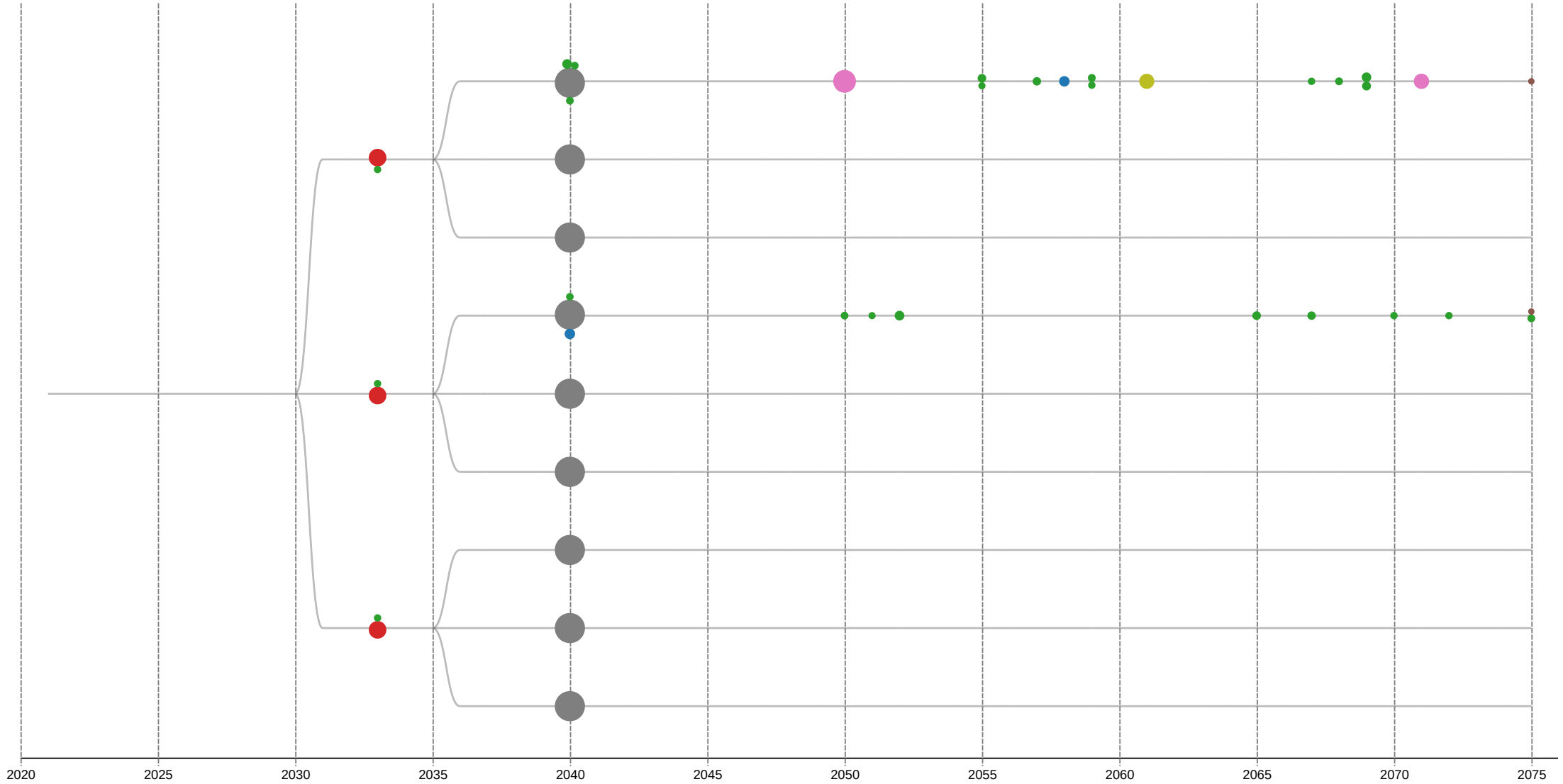
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	14.43	15.63	17.51	14.21	15.68	17.40	16.02	18.26	20.82	
A3: Operational complexity and flexibility	6.50	7.02	7.89	6.60	7.07	7.96	7.31	8.39	9.64	
A4: WRZ connectivity	7.89	8.58	9.58	7.58	8.58	9.41	8.68	9.83	11.15	
A7: Customer relations support engagement with demand management	0.04	0.03	0.03	0.04	0.03	0.03	0.03	0.03	0.03	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.16	19.81	22.02	18.75	19.92	21.95	20.45	23.23	26.27	
E1: Scaleability and modularity of proposed changes	8.78	9.29	10.37	8.68	9.38	10.46	9.63	11.06	12.58	
E2: Intervention lead times	4.19	4.13	4.54	3.97	4.11	4.33	4.17	4.59	5.09	
E3: Reliance on external bodies to deliver changes	6.18	6.38	7.12	6.09	6.43	7.16	6.65	7.57	8.61	
E5: Collaborative land management	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	

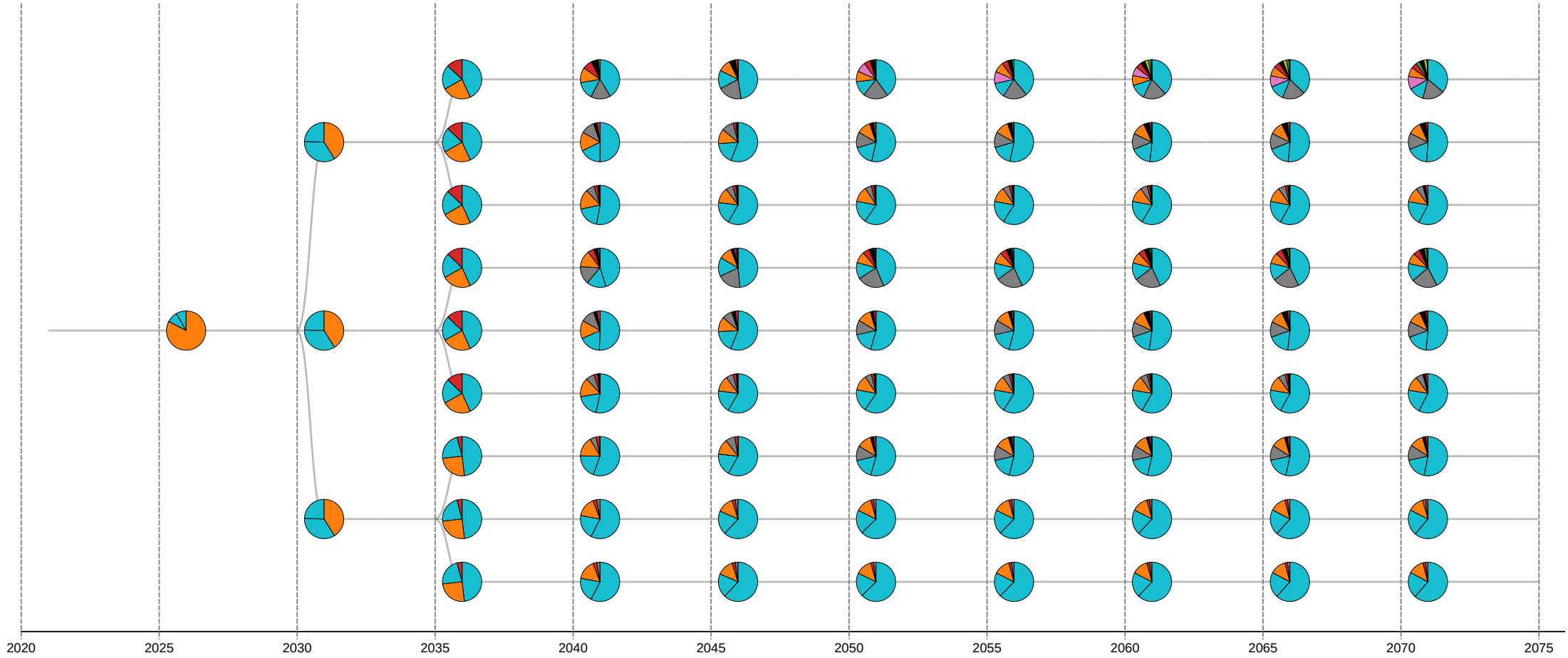
Option Selection (Thames Water)



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.



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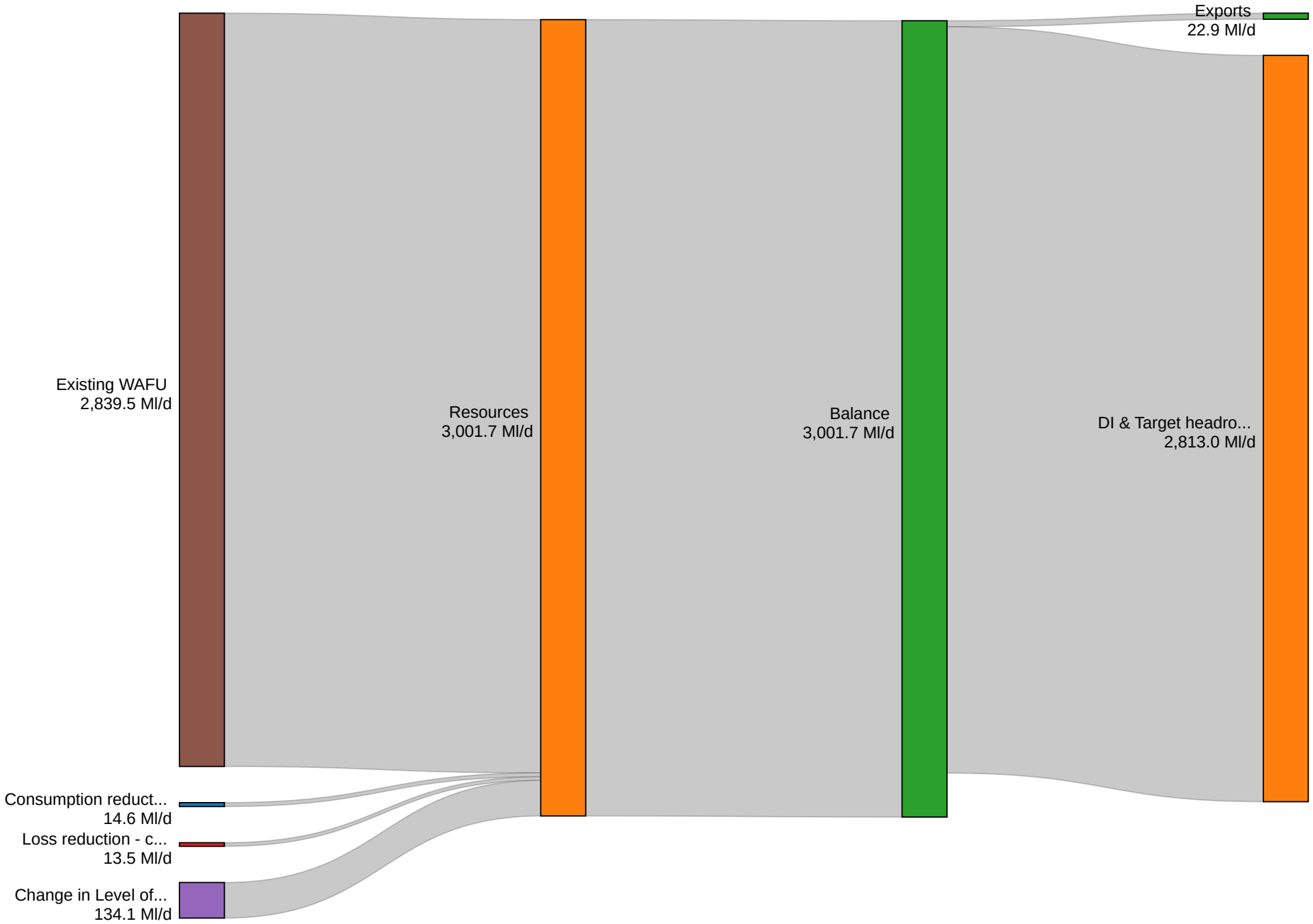
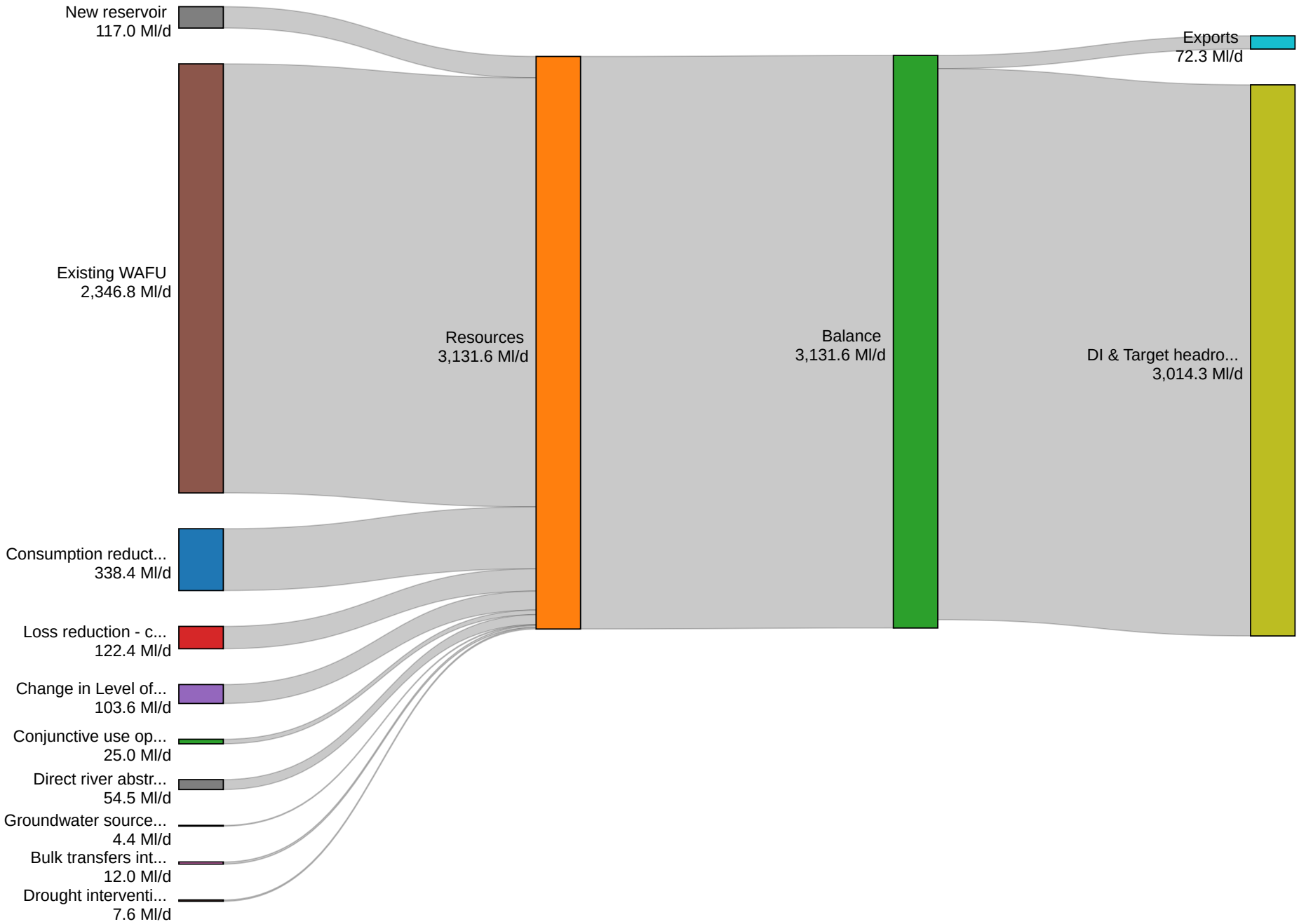
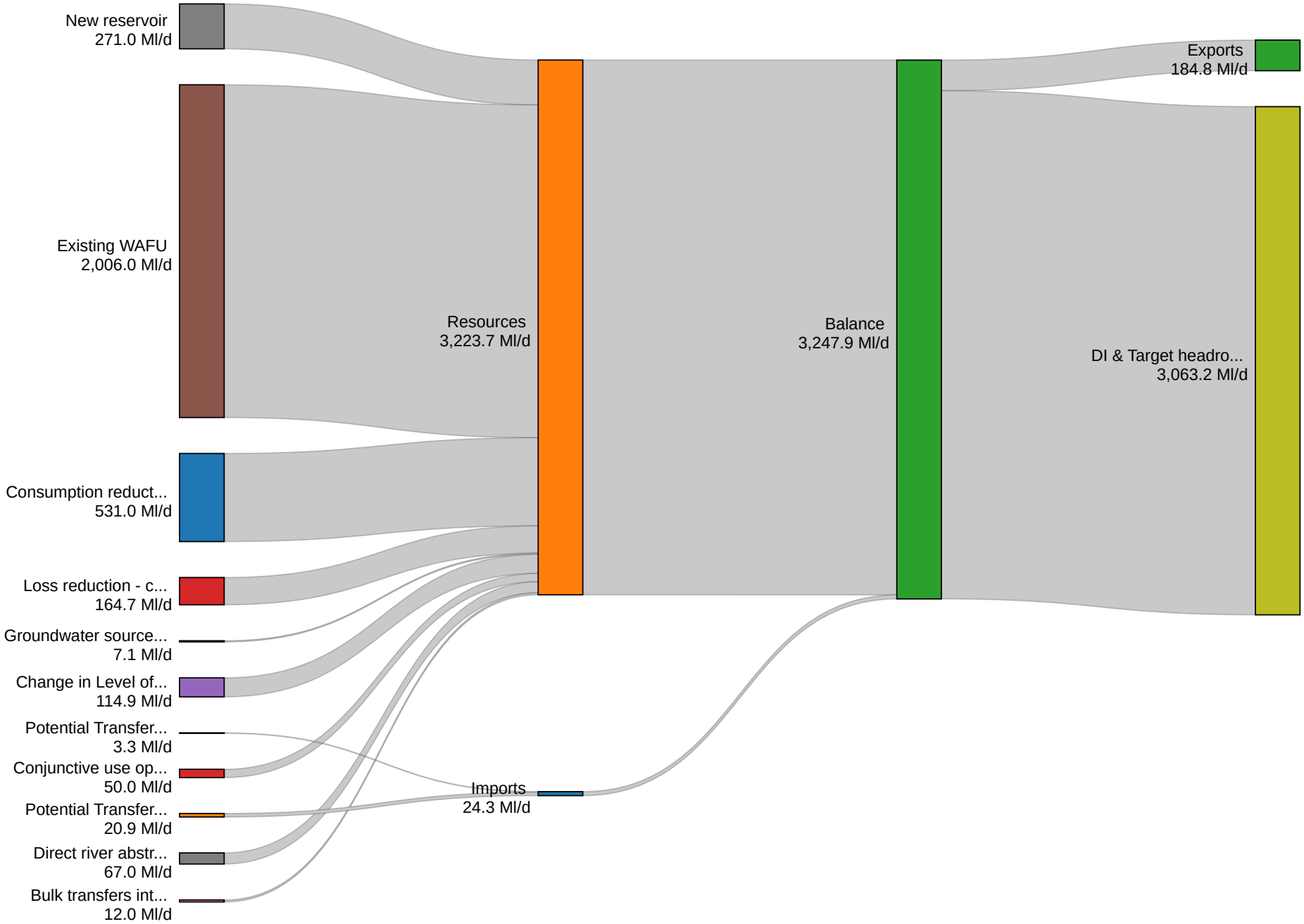
Situation 4 - 2026 (Thames Water)



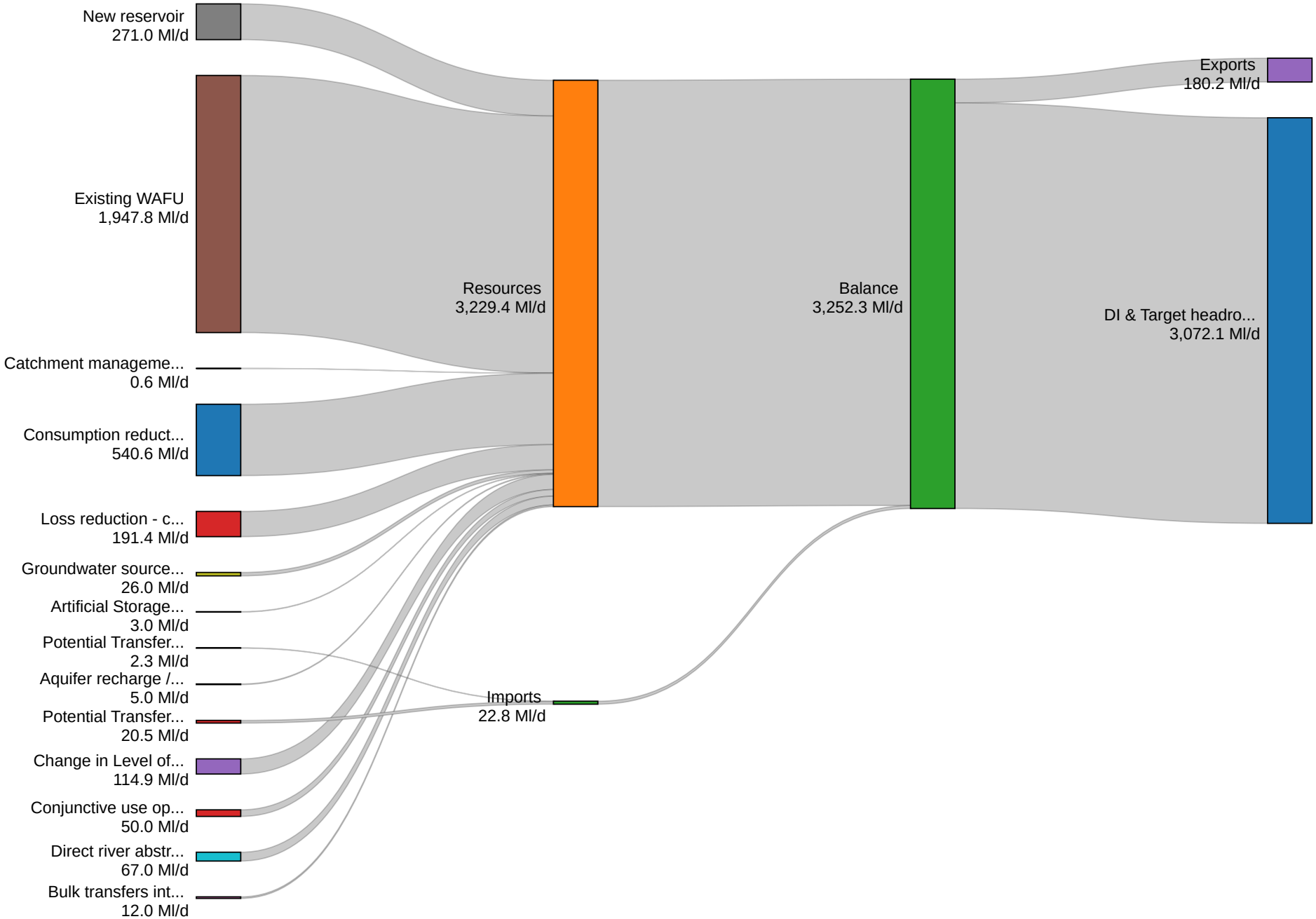
Situation 4 - 2040 (Thames Water)



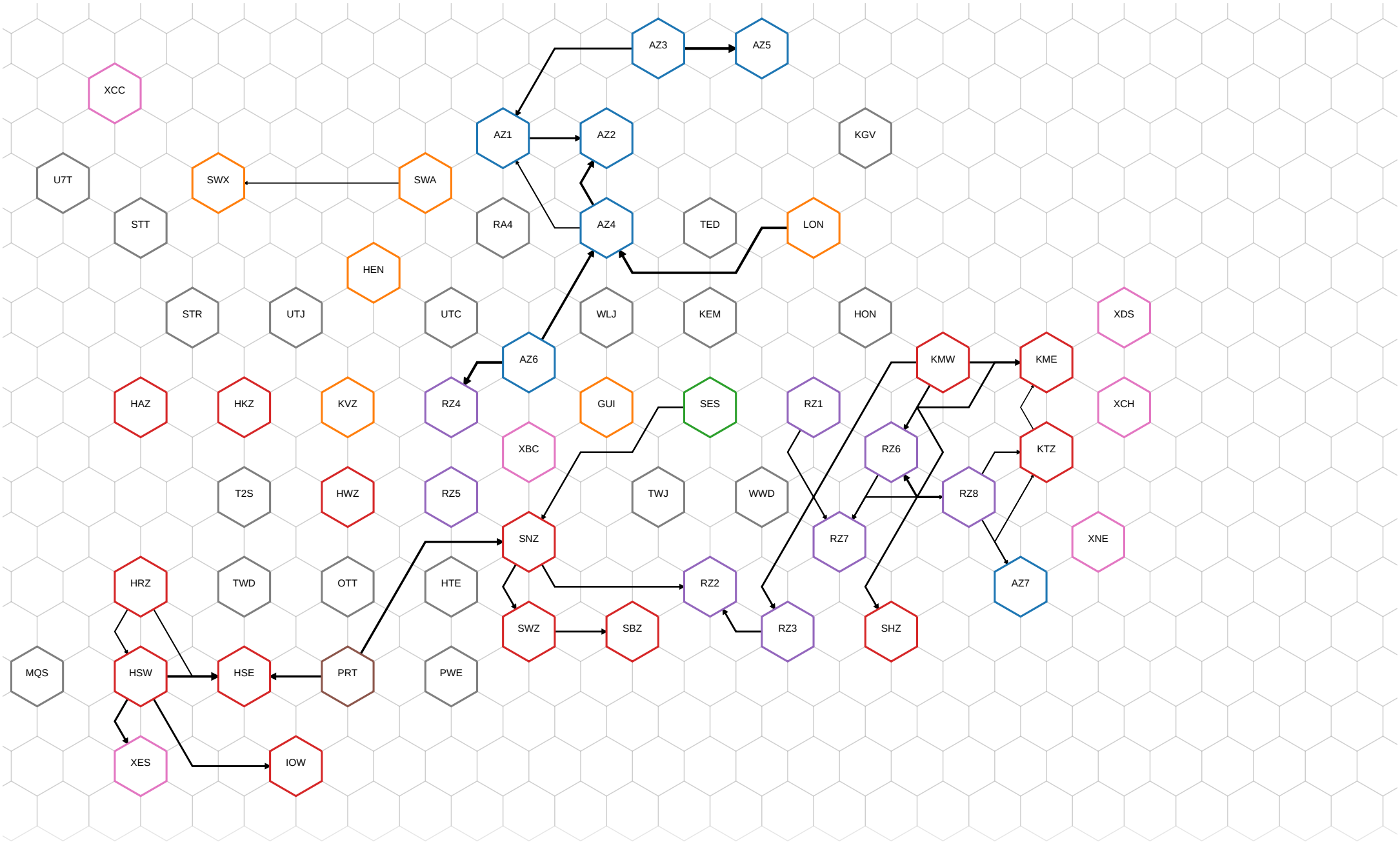
Situation 4 - 2050 (Thames Water)



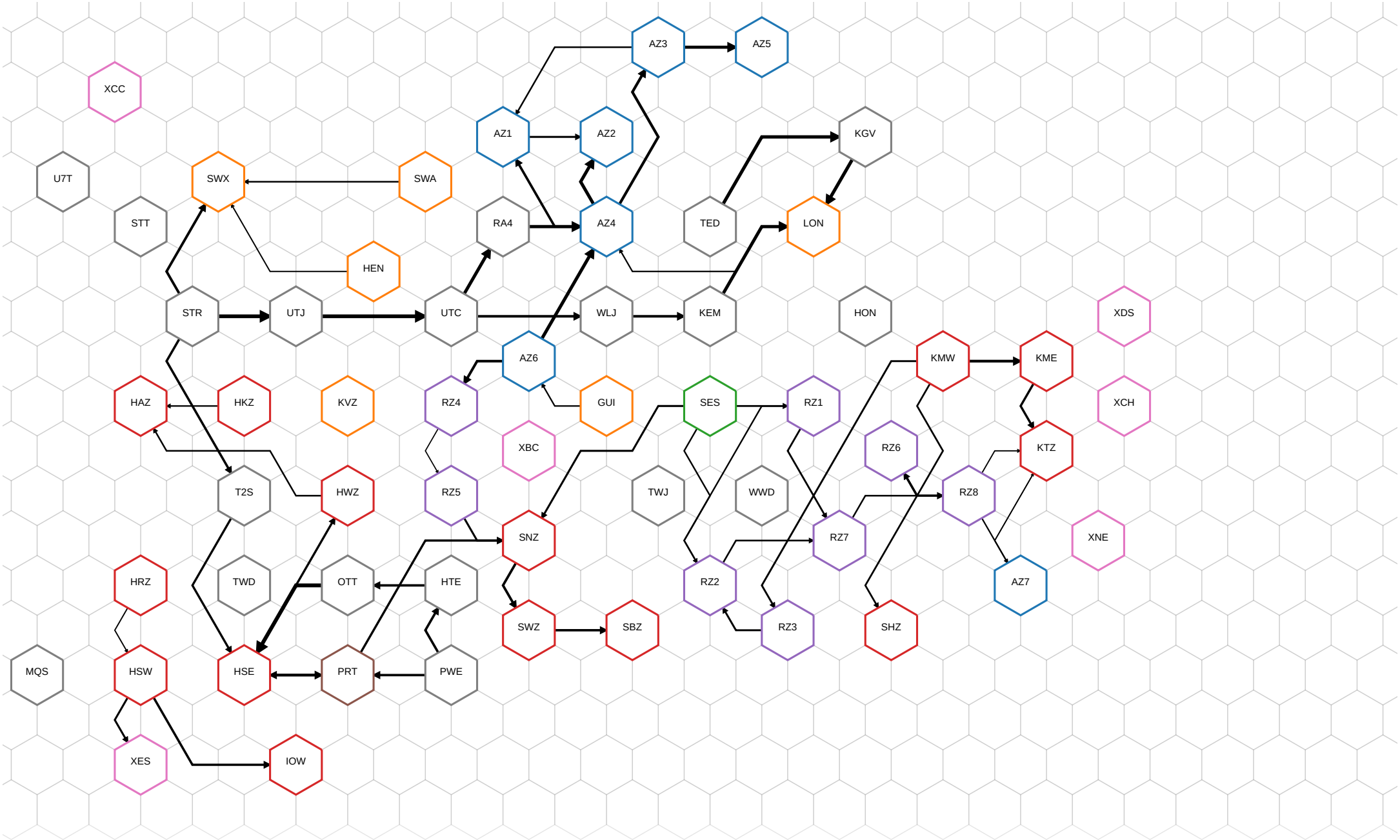
Situation 4 - 2075 (Thames Water)



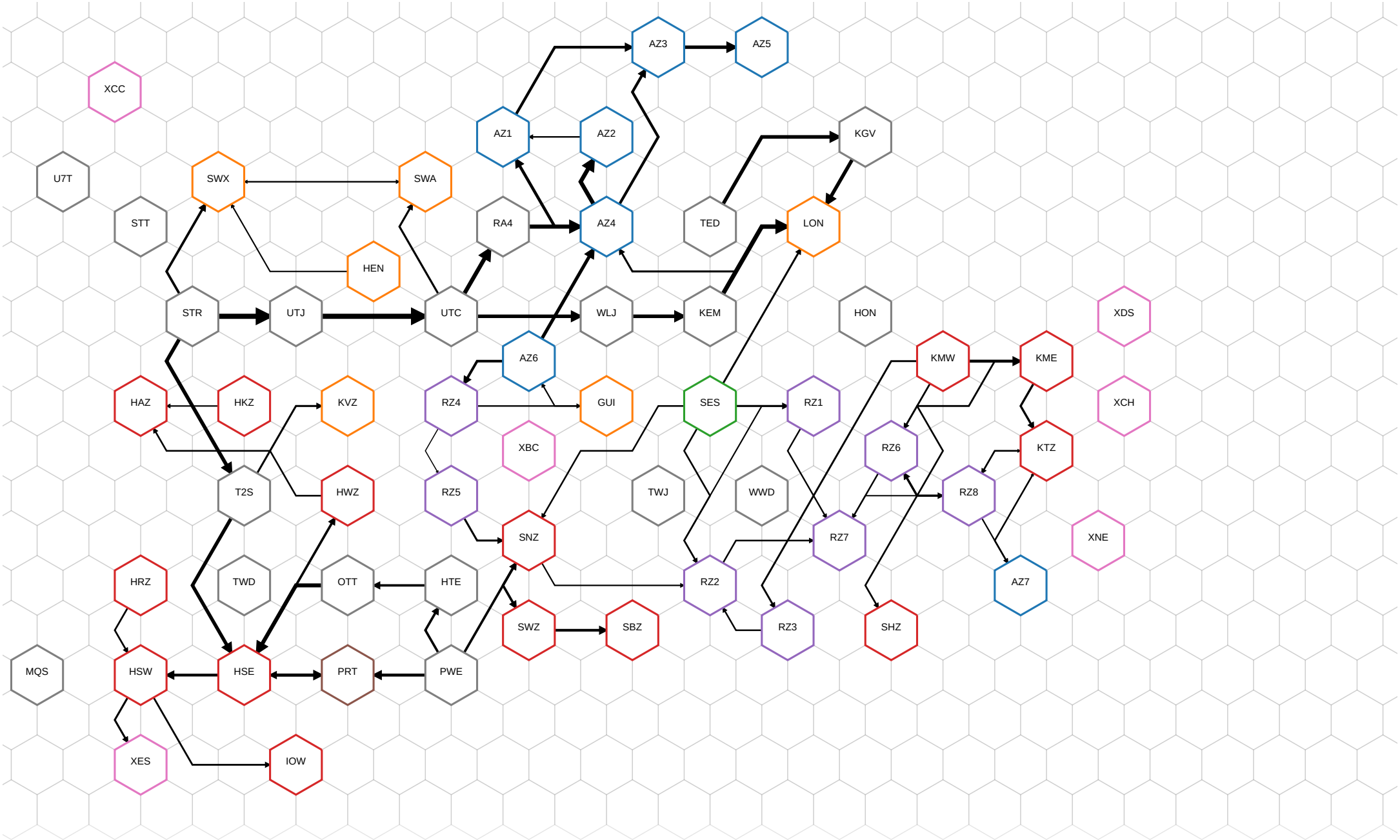
Situation 4 - 2026



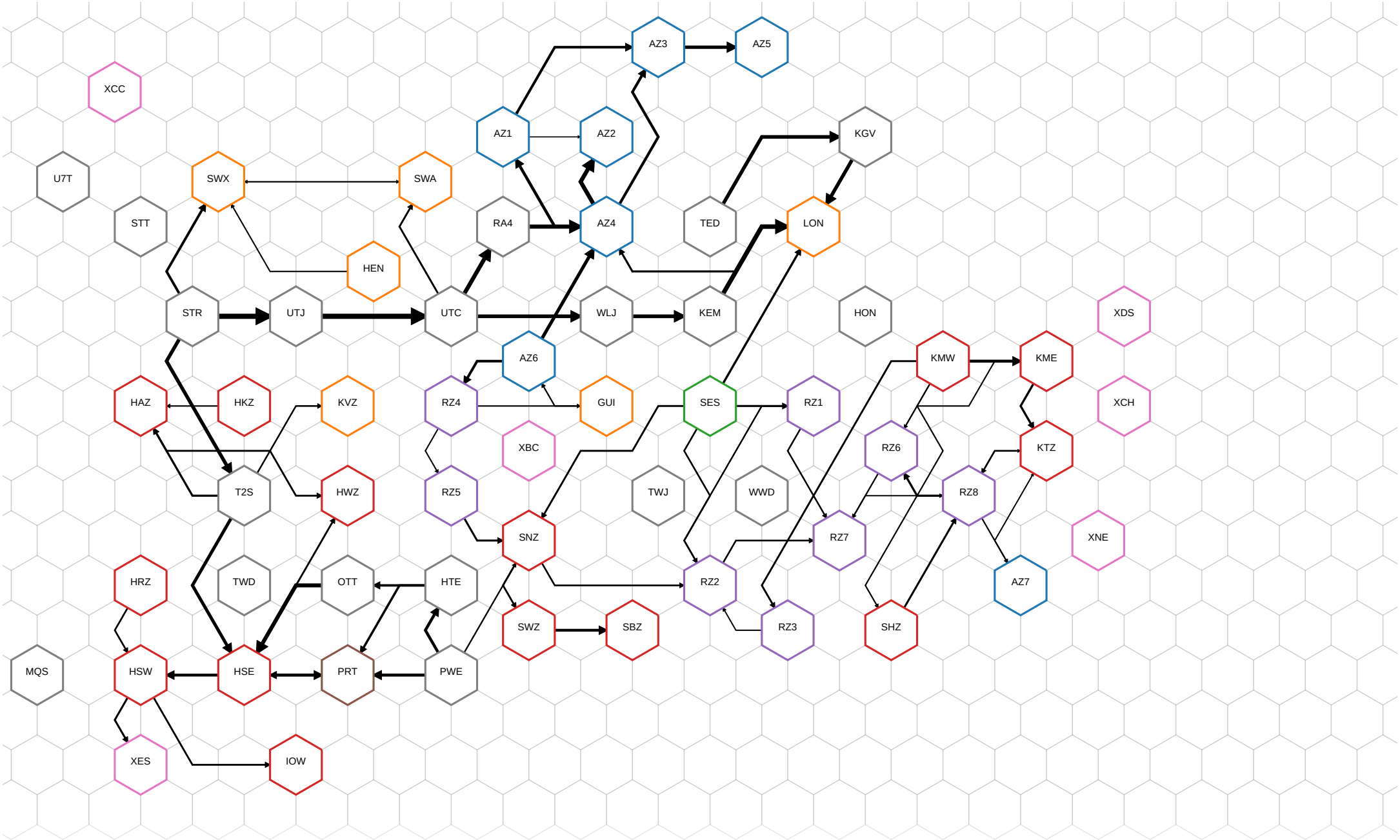
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

ONLY SESRO 125Mm^3 AVAILABLE

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-only-sesro125-2075
Description	Least cost run with hybrid-c+2 government interventions including only SESRO 125 Mm3.
Created at	09/07/2023, 19:49:15
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2-only-sesro125
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets. Exclude all SESRO variants except 125.
Optimised discount rate	STPR

Metrics

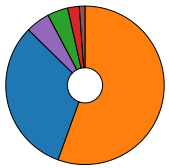
Net present value (Cost)

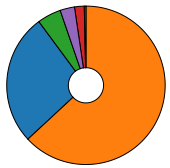
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	20,624	17,853	17,161	19,198	17,696	16,900	18,044	17,187	16,468	(£m)
Cost w/o deficit (STPR)	20,624	17,853	17,161	19,198	17,696	16,900	18,044	17,187	16,468	(£m)
Cost w/ deficit (IGEQ)	31,461	26,175	24,916	28,724	25,914	24,498	26,641	25,034	23,737	(£m)
Cost w/o deficit (IGEQ)	31,461	26,175	24,916	28,724	25,914	24,498	26,641	25,034	23,737	(£m)
Cost w/ deficit (LTDR)	22,722	19,493	18,696	21,058	19,316	18,404	19,732	18,737	17,910	(£m)
Cost w/o deficit (LTDR)	22,722	19,493	18,696	21,058	19,316	18,404	19,732	18,737	17,910	(£m)

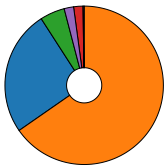
Cost breakdown (STPR)

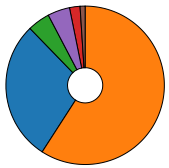
Select Company: Total

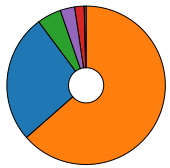
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	6,571	4,781	4,386	5,496	4,649	4,167	4,809	4,359	3,912	(£m)
Fixed opex	11,447	11,264	11,212	11,349	11,244	11,185	11,256	11,203	11,142	(£m)
Fixed operational carbon	875	868	866	877	870	869	872	867	866	(£m)
Embedded carbon	488	355	328	413	346	315	361	326	298	(£m)
Variable opex	1,008	525	330	866	518	314	648	391	232	(£m)
Variable carbon opex	235	60	39	196	69	49	99	41	18	(£m)

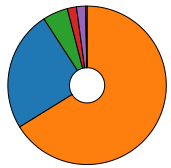
situation1 

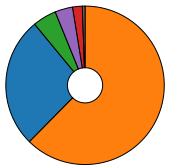
situation2 

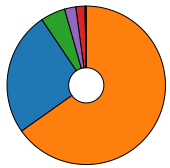
situation3 

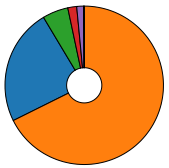
situation4 

situation5 

situation6 

situation7 

situation8 

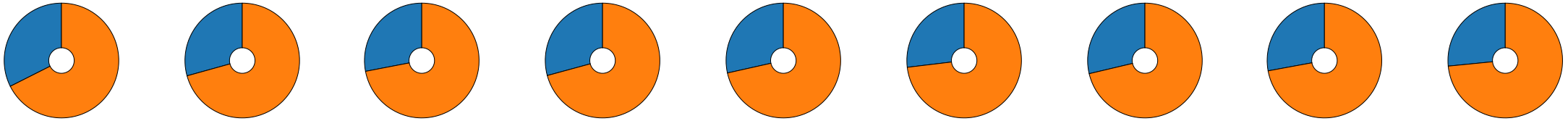
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,131,295	2,172,799	1,991,544	2,583,986	2,113,843	1,912,149	2,233,552	1,985,497	1,801,569	(tonnes)
Operational emissions	6,527,799	5,241,296	5,114,192	6,259,241	5,304,648	5,197,459	5,551,126	5,133,439	4,980,353	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

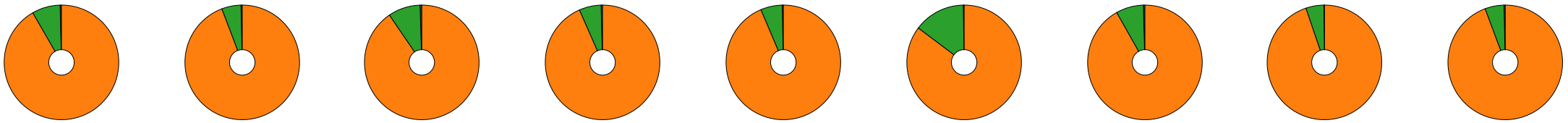


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	91	43	25	85	36	11	66	12	11	(GWh)
Grid	21,563	11,307	4,600	19,093	10,970	3,840	13,247	7,971	2,912	(GWh)
Renewable	1,870	650	461	1,263	713	654	1,115	428	165	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	68,272.00	63,350.00	62,389.00	66,521.00	63,028.00	61,858.00	63,584.00	61,352.00	60,254.00	
SEA environmental disbenefit	109,736.00	78,540.00	70,094.00	97,286.00	77,250.00	70,594.00	81,256.00	68,555.00	59,032.00	
Natural capital	83,882,201.84	79,261,170.26	81,987,116.26	77,437,184.90	79,104,427.30	81,922,734.05	78,787,393.36	79,532,508.62	82,437,780.22	
Bio-diversity net gain	−196,329.00	−138,039.00	−113,045.00	−187,850.00	−139,375.00	−110,832.00	−142,270.00	−116,862.00	−86,058.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	33,743.00	31,728.00	31,220.00	32,995.00	31,562.00	31,076.00	31,684.00	30,751.00	30,219.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	28.14	29.09	31.75	28.00	29.14	31.80	30.51	33.72	37.55	
R1: Uncertainty of option supply/demand benefit	5.72	5.43	5.89	5.59	5.42	5.89	5.81	6.30	6.99	
R3: Risk of service failure due to other physical hazards	6.72	7.19	8.03	6.80	7.22	8.06	7.52	8.51	9.72	
R4: Availability of additional headroom	6.58	6.92	7.13	6.63	6.92	7.13	7.24	7.60	7.84	
R5: Catchment/raw water quality risks (incl. climate change)	4.04	4.08	4.59	3.72	4.07	4.58	4.20	4.83	5.58	
R6: Capacity of catchment services	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
R7: Risk of service failure to other exceptional events	5.07	5.47	6.11	5.25	5.50	6.14	5.73	6.48	7.43	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

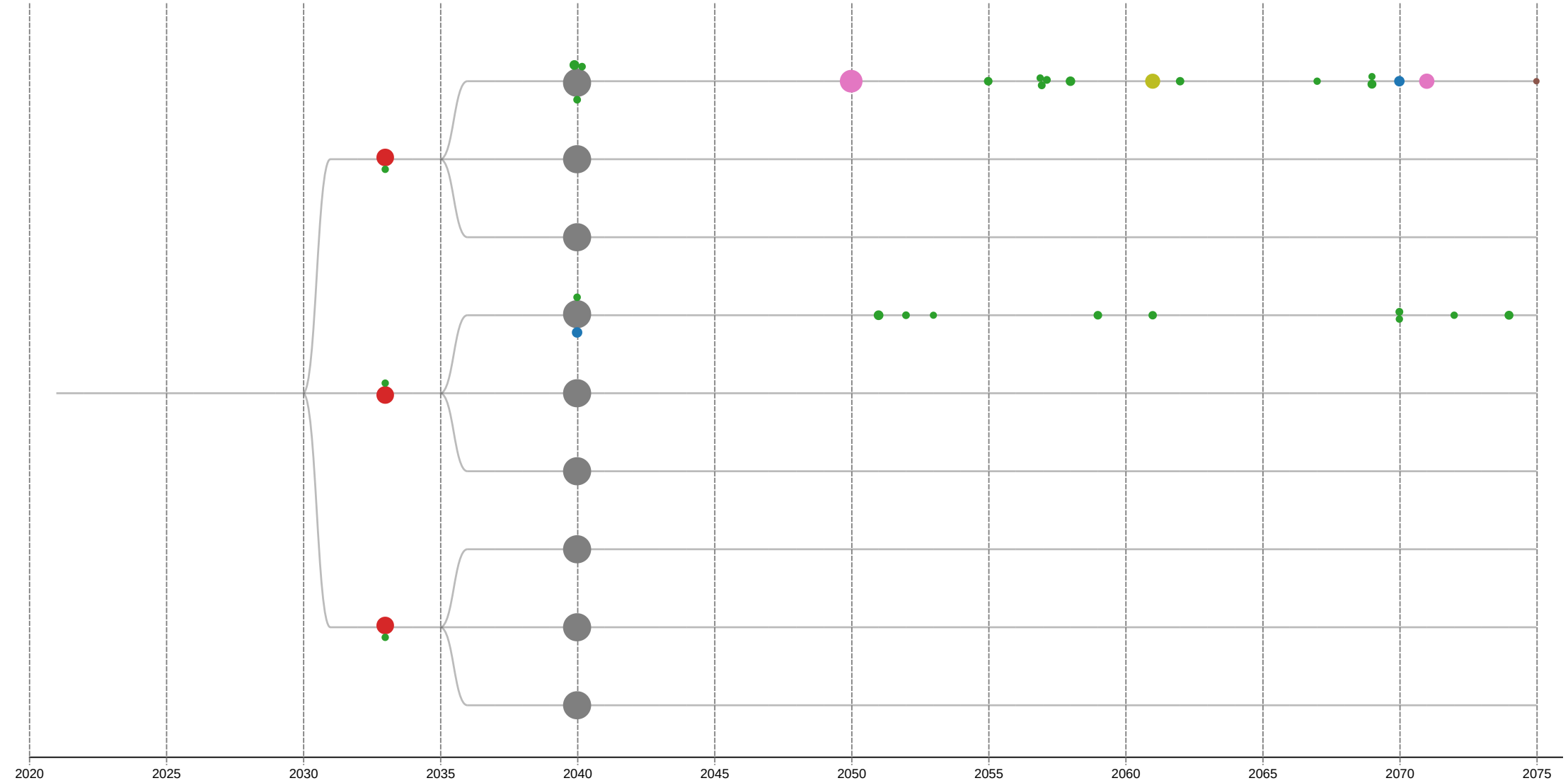
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	14.06	15.50	17.30	14.01	15.47	16.97	15.94	18.09	20.58	
A3: Operational complexity and flexibility	6.23	6.90	7.73	6.48	6.95	7.80	7.19	8.24	9.47	
A4: WRZ connectivity	7.80	8.57	9.54	7.50	8.50	9.14	8.72	9.82	11.08	
A7: Customer relations support engagement with demand management	0.04	0.03	0.03	0.02	0.03	0.03	0.03	0.03	0.03	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	18.79	20.01	21.99	18.83	20.07	22.03	20.82	23.42	26.54	
E1: Scaleability and modularity of proposed changes	8.65	9.35	10.40	8.69	9.41	10.48	9.68	11.09	12.63	
E2: Intervention lead times	4.09	4.22	4.45	4.03	4.19	4.37	4.43	4.71	5.24	
E3: Reliance on external bodies to deliver changes	6.04	6.43	7.14	6.11	6.46	7.19	6.71	7.62	8.67	
E5: Collaborative land management	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

Option Selection (Thames Water)



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- Groundwater
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- Reservoir
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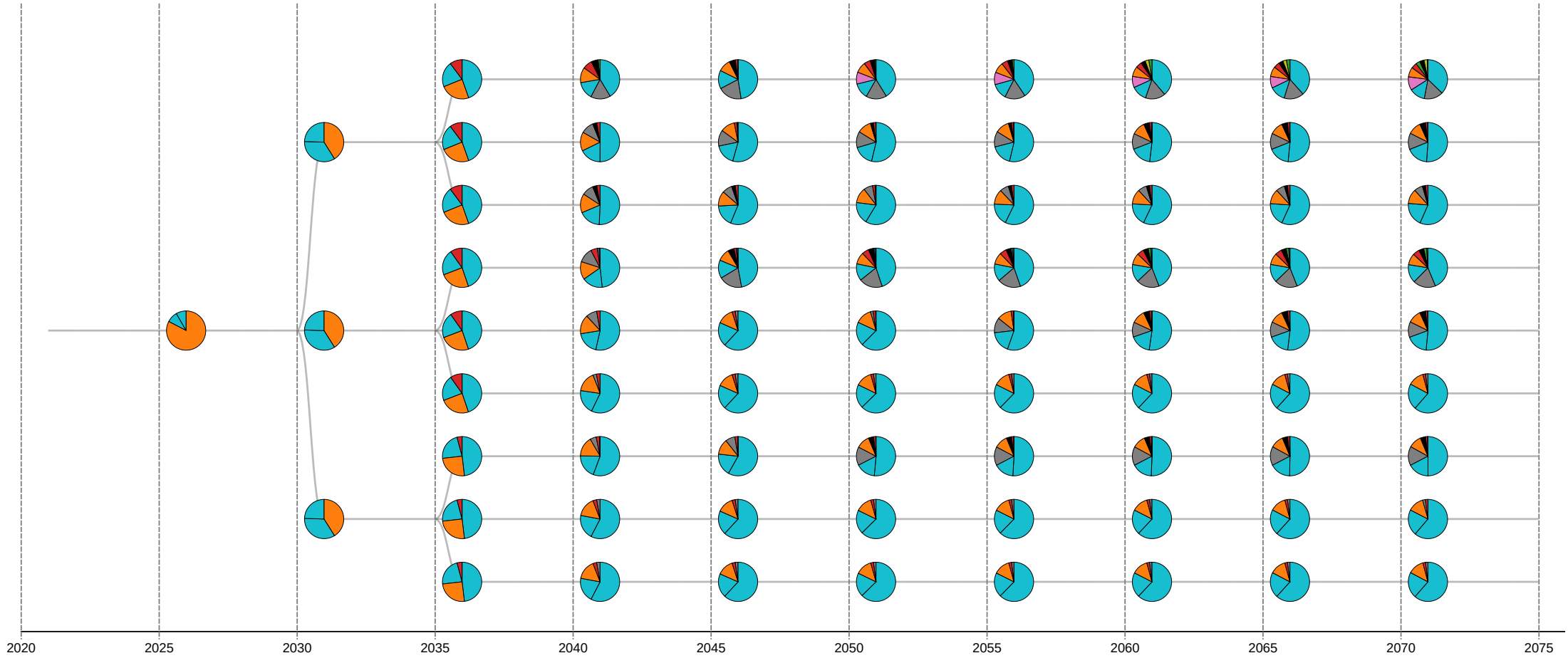
Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.



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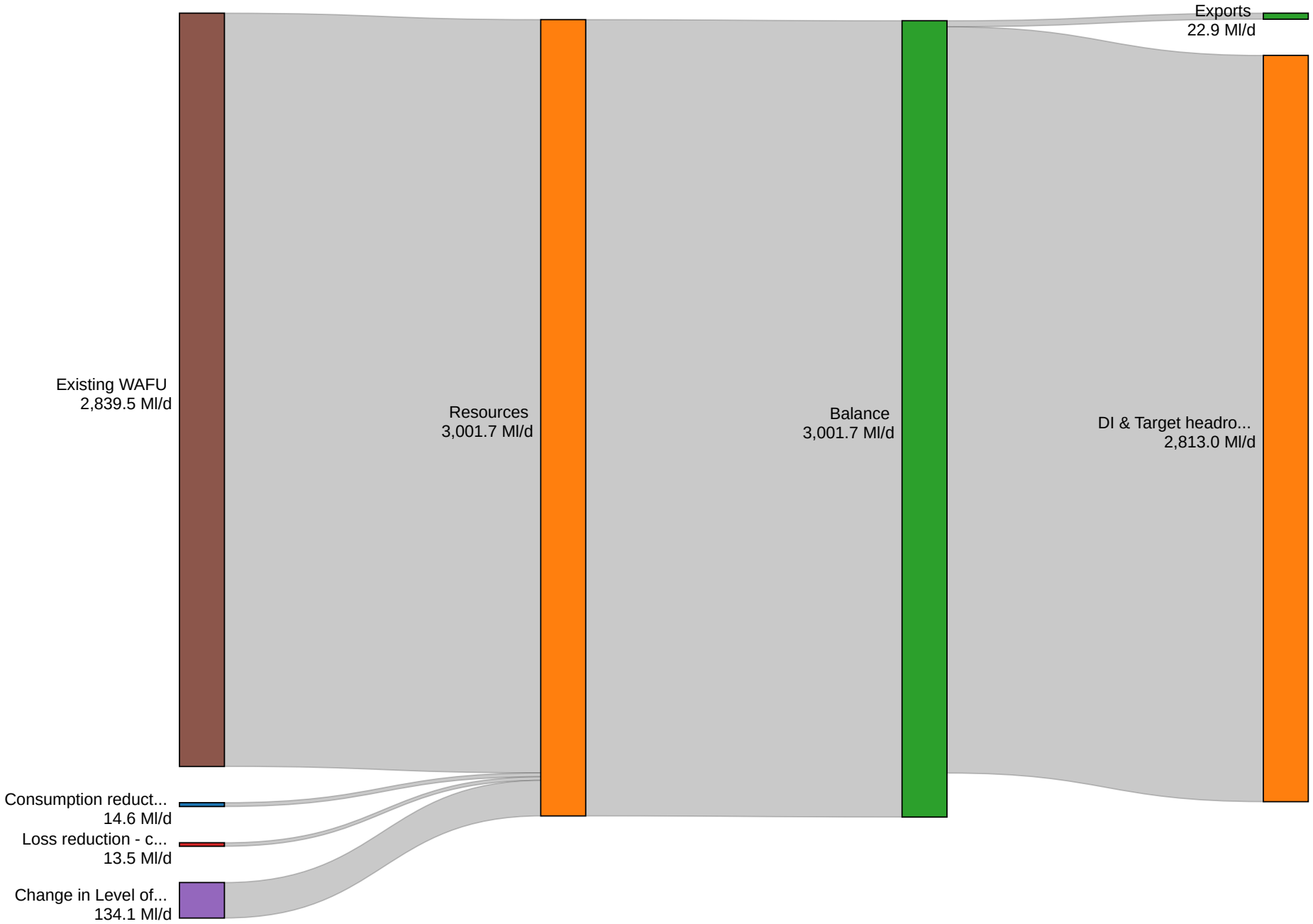
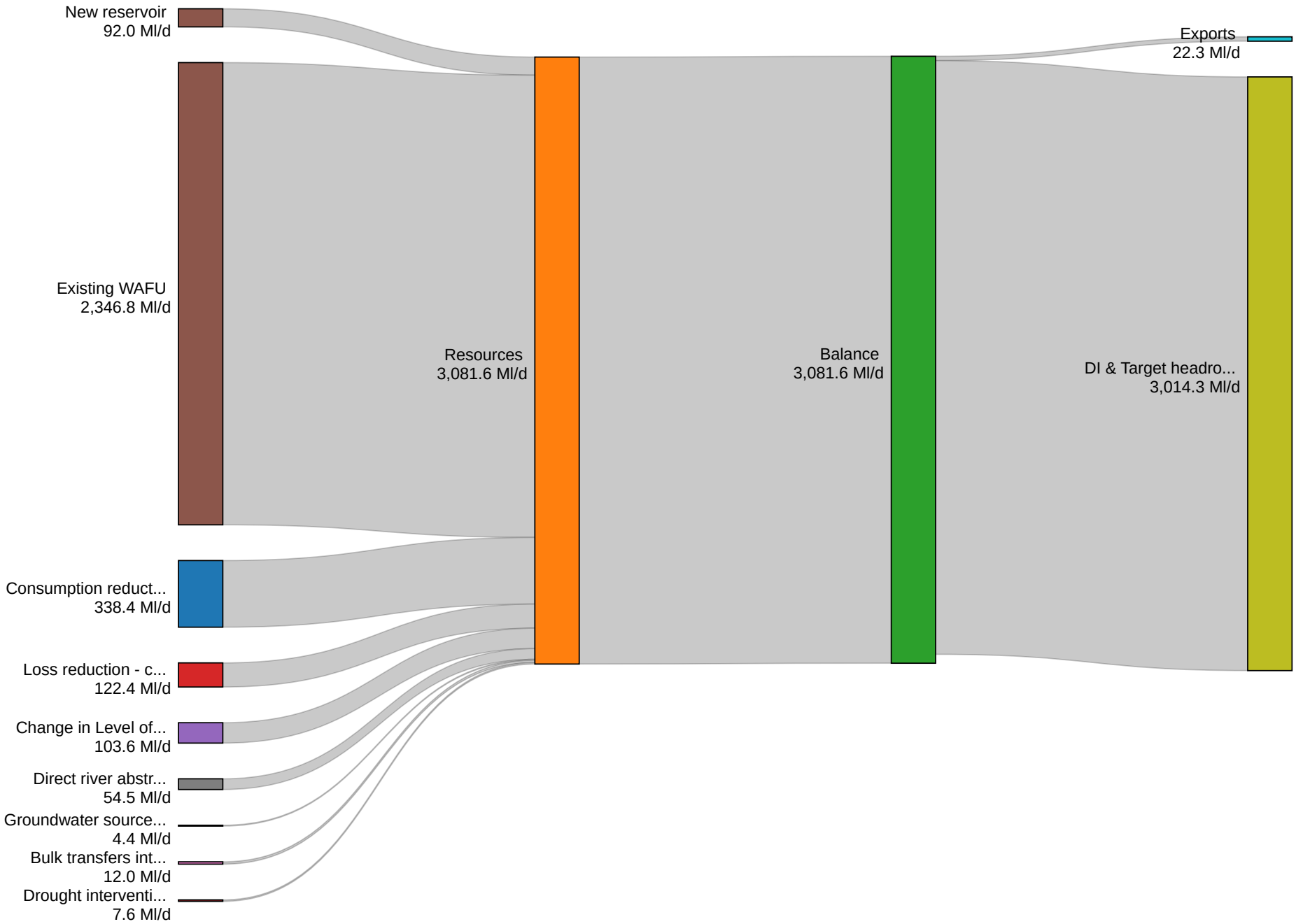
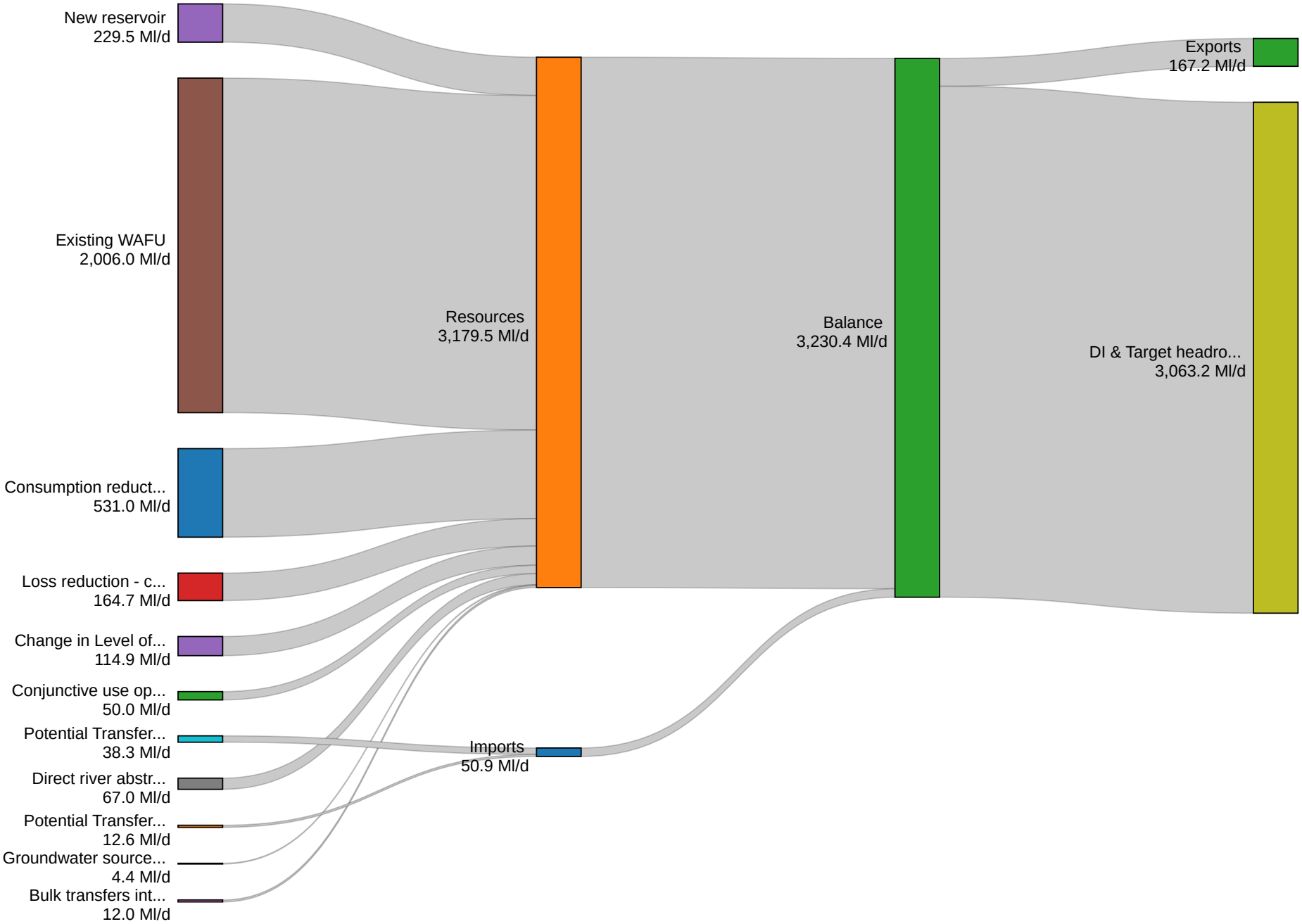
Situation 4 - 2026 (Thames Water)



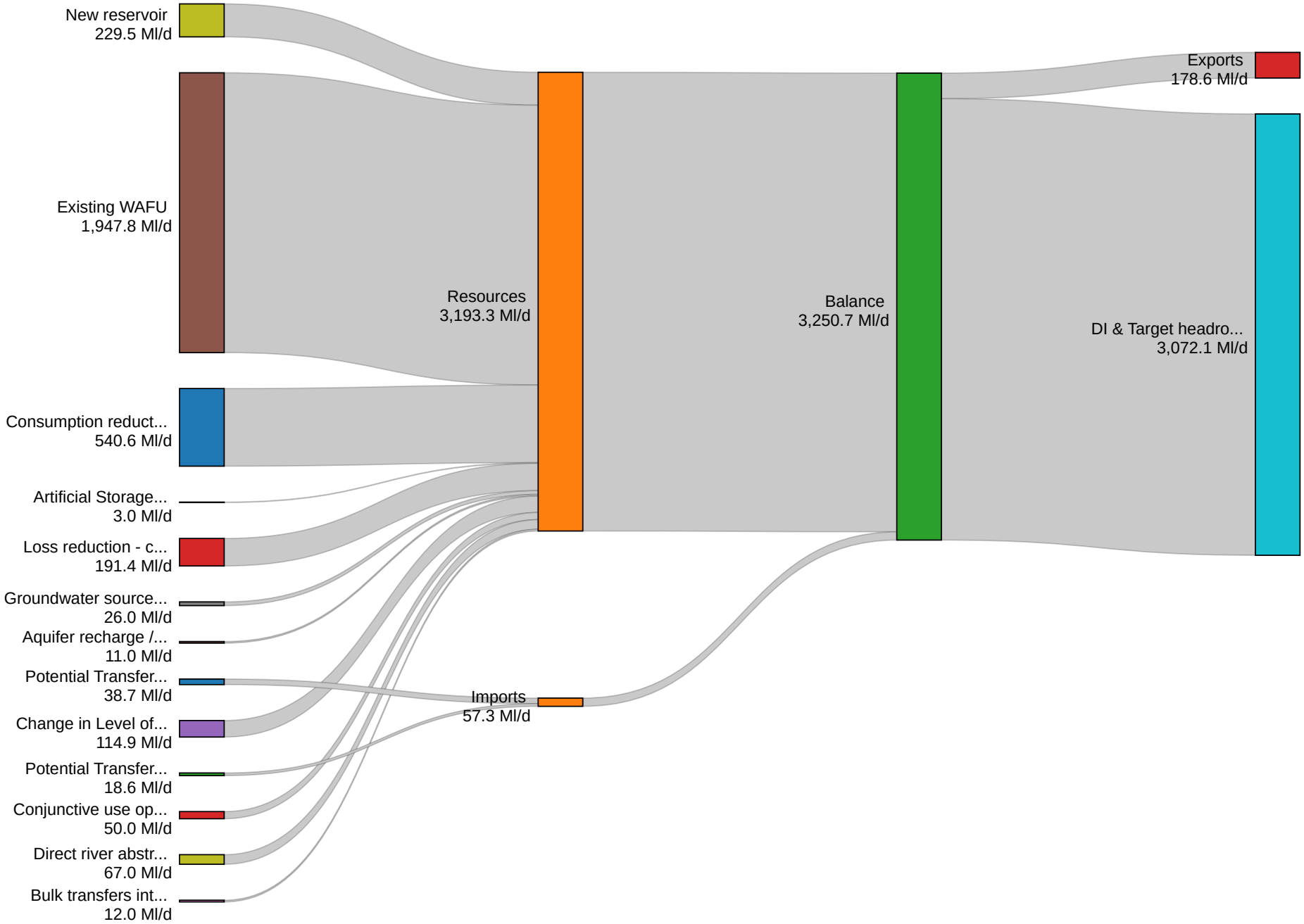
Situation 4 - 2040 (Thames Water)



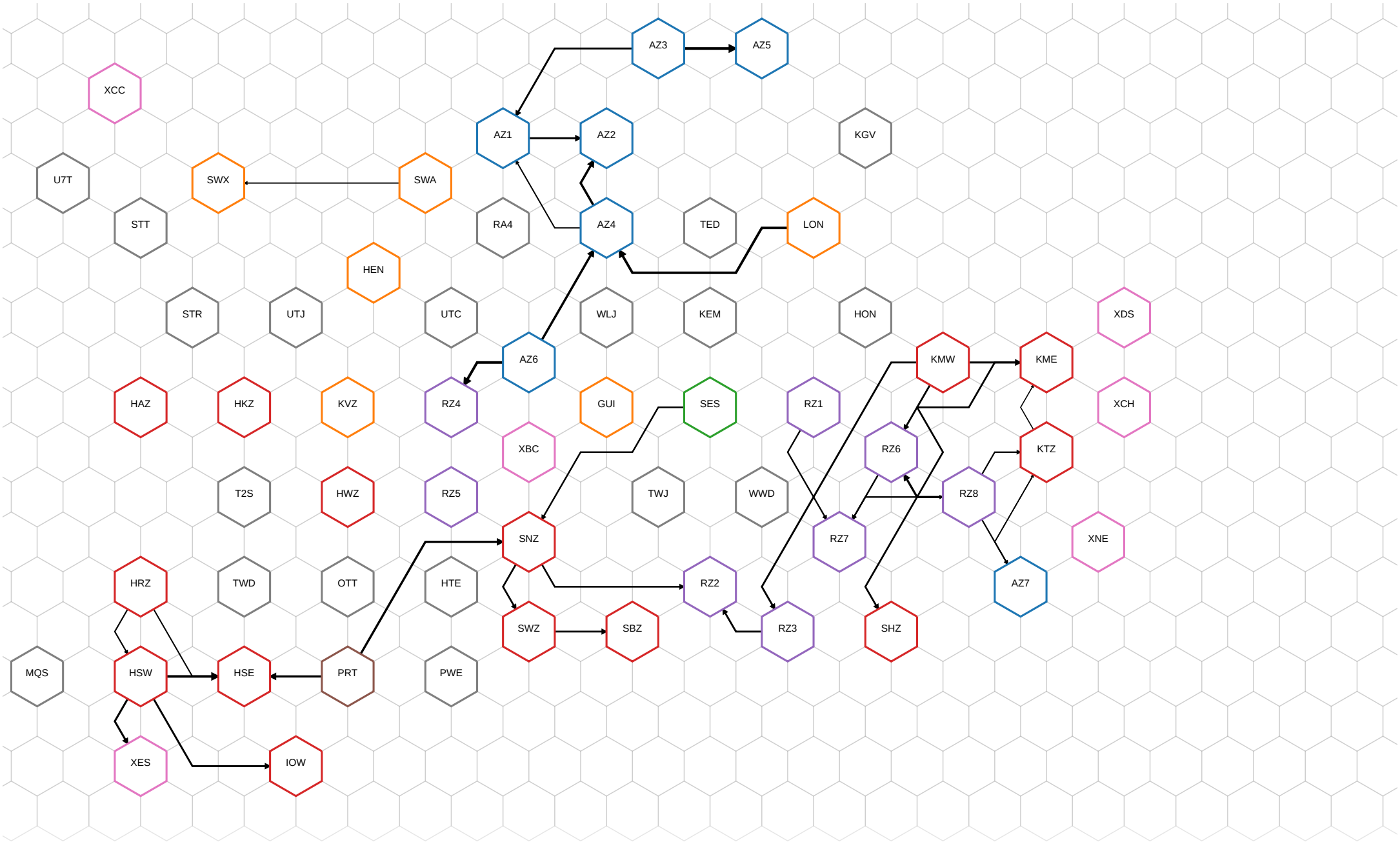
Situation 4 - 2050 (Thames Water)



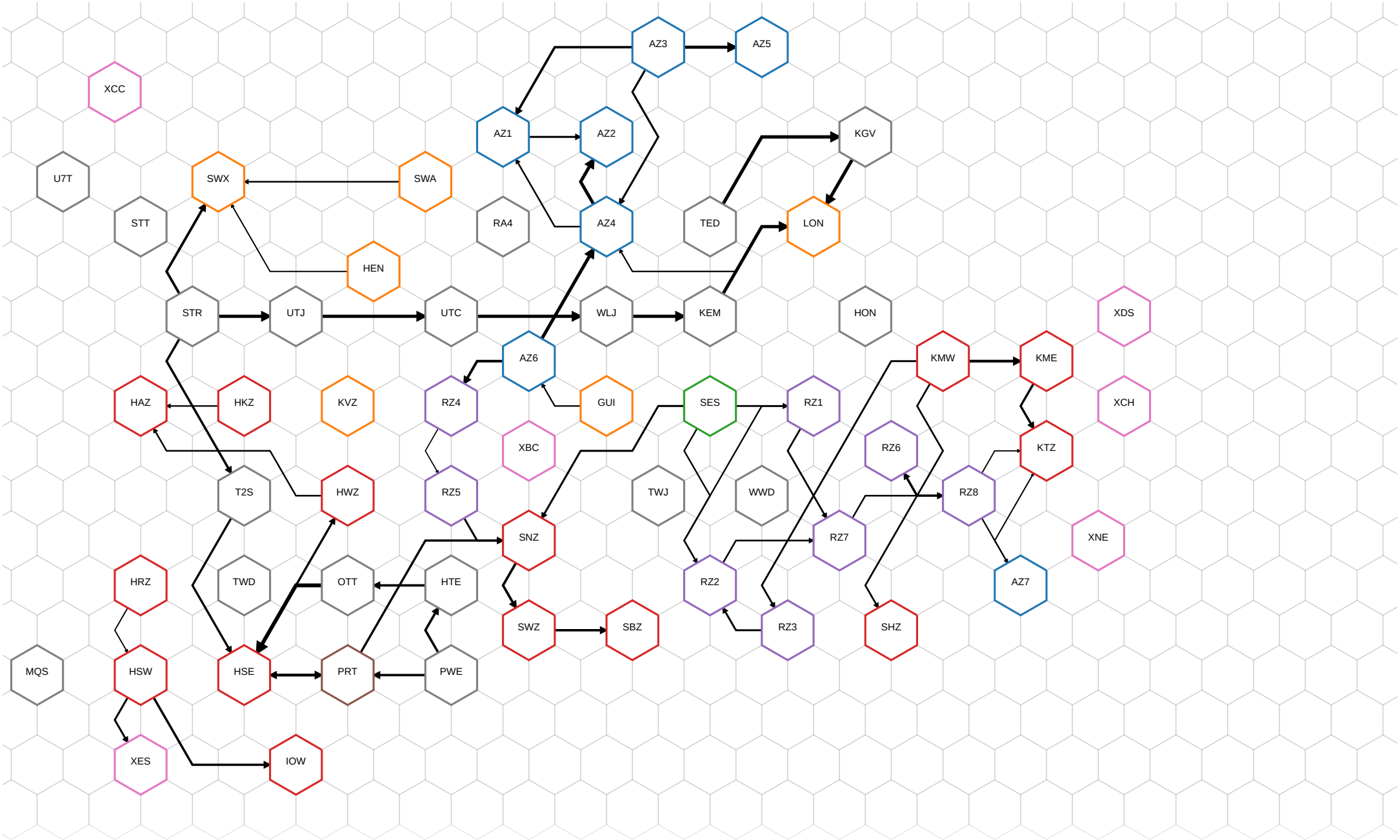
Situation 4 - 2075 (Thames Water)



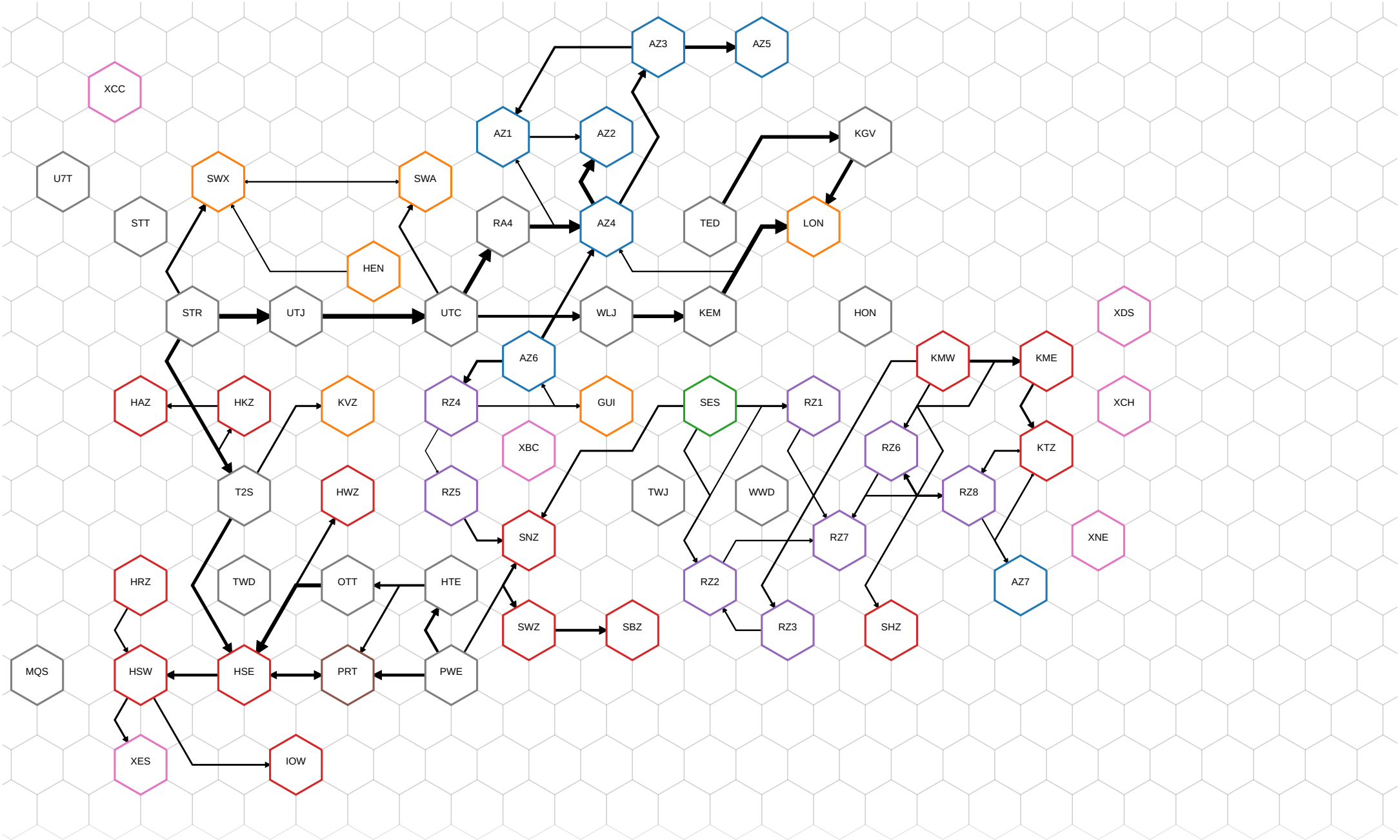
Situation 4 - 2026



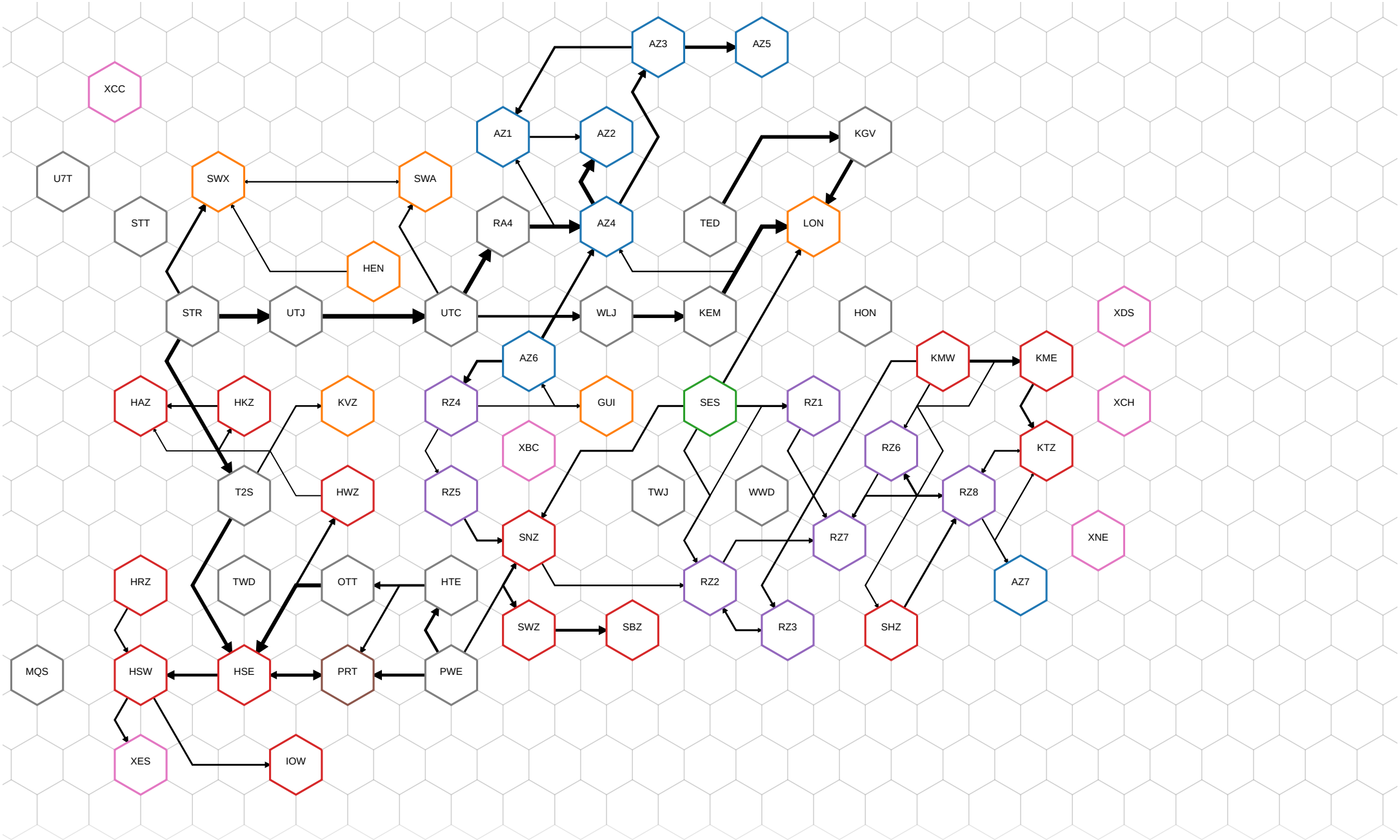
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

ONLY SESRO 100Mm^3 AVAILABLE

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-only-sesro100-2075
Description	Least cost run with hybrid-c+2 government interventions including only SESRO 100 Mm3.
Created at	09/07/2023, 19:49:07
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2-only-sesro100
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets. Exclude all SESRO variants except 100.
Optimised discount rate	STPR

Metrics

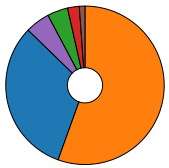
Net present value (Cost)

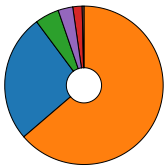
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	20,730	17,663	16,957	19,274	17,568	16,756	17,906	17,046	16,330	(£m)
Cost w/o deficit (STPR)	20,730	17,663	16,957	19,274	17,568	16,756	17,906	17,046	16,330	(£m)
Cost w/ deficit (IGEQ)	31,757	25,895	24,619	28,944	25,735	24,292	26,448	24,832	23,540	(£m)
Cost w/o deficit (IGEQ)	31,757	25,895	24,619	28,944	25,735	24,292	26,448	24,832	23,540	(£m)
Cost w/ deficit (LTDR)	22,861	19,285	18,473	21,160	19,178	18,248	19,583	18,585	17,761	(£m)
Cost w/o deficit (LTDR)	22,861	19,285	18,473	21,160	19,178	18,248	19,583	18,585	17,761	(£m)

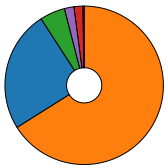
Cost breakdown (STPR)

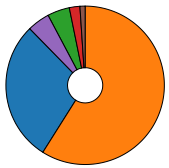
Select Company: Total

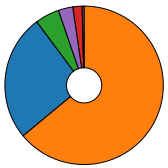
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	6,584	4,609	4,206	5,536	4,539	4,037	4,667	4,231	3,787	(£m)
Fixed opex	11,506	11,255	11,203	11,364	11,240	11,183	11,253	11,202	11,141	(£m)
Fixed operational carbon	876	869	870	877	870	869	871	867	866	(£m)
Embedded carbon	496	338	312	415	335	304	352	314	287	(£m)
Variable opex	1,031	528	326	880	516	314	653	391	232	(£m)
Variable carbon opex	237	64	41	203	69	49	108	41	18	(£m)

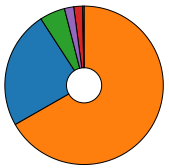
situation1 

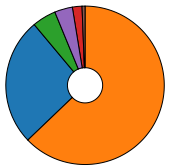
situation2 

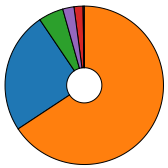
situation3 

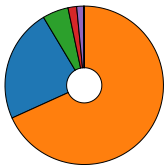
situation4 

situation5 

situation6 

situation7 

situation8 

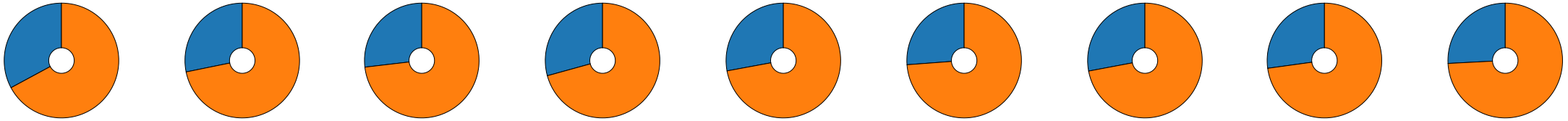
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,205,350	2,069,804	1,892,252	2,612,381	2,054,095	1,843,238	2,179,047	1,916,045	1,733,237	(tonnes)
Operational emissions	6,547,721	5,270,610	5,154,408	6,309,238	5,307,129	5,197,277	5,616,616	5,134,766	4,980,353	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

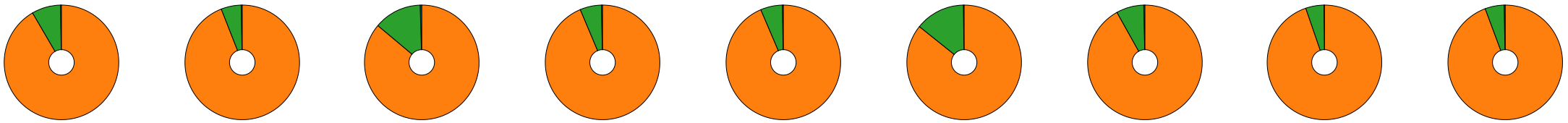


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	72	39	23	69	33	10	50	11	10	(GWh)
Grid	22,109	11,341	4,194	19,532	10,757	3,831	13,192	7,966	2,904	(GWh)
Renewable	1,958	681	655	1,255	706	628	1,115	433	165	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	68,667.00	63,427.00	62,622.00	67,014.00	63,033.00	61,925.00	63,567.00	61,365.00	60,278.00	
SEA environmental disbenefit	112,359.00	78,944.00	71,657.00	100,581.00	76,097.00	71,111.00	81,641.00	68,309.00	59,028.00	
Natural capital	83,722,726.61	79,901,621.61	82,782,712.60	78,170,977.13	80,067,436.91	82,784,283.31	79,597,338.65	80,331,994.08	83,233,810.22	
Bio-diversity net gain	−199,305.00	−128,481.00	−97,944.00	−182,146.00	−122,820.00	−98,439.00	−129,901.00	−103,499.00	−73,949.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	33,965.00	31,711.00	31,285.00	33,159.00	31,631.00	31,134.00	31,634.00	30,755.00	30,234.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	27.91	28.06	30.72	27.73	28.32	30.82	29.49	32.68	36.35	
R1: Uncertainty of option supply/demand benefit	5.74	5.20	5.69	5.61	5.25	5.69	5.59	6.09	6.74	
R3: Risk of service failure due to other physical hazards	6.66	6.93	7.76	6.72	7.04	7.79	7.25	8.23	9.39	
R4: Availability of additional headroom	6.51	6.83	7.05	6.58	6.86	7.07	7.17	7.53	7.77	
R5: Catchment/raw water quality risks (incl. climate change)	3.97	3.88	4.37	3.69	3.91	4.39	4.01	4.63	5.36	
R6: Capacity of catchment services	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
R7: Risk of service failure to other exceptional events	5.04	5.22	5.85	5.13	5.26	5.88	5.47	6.20	7.10	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

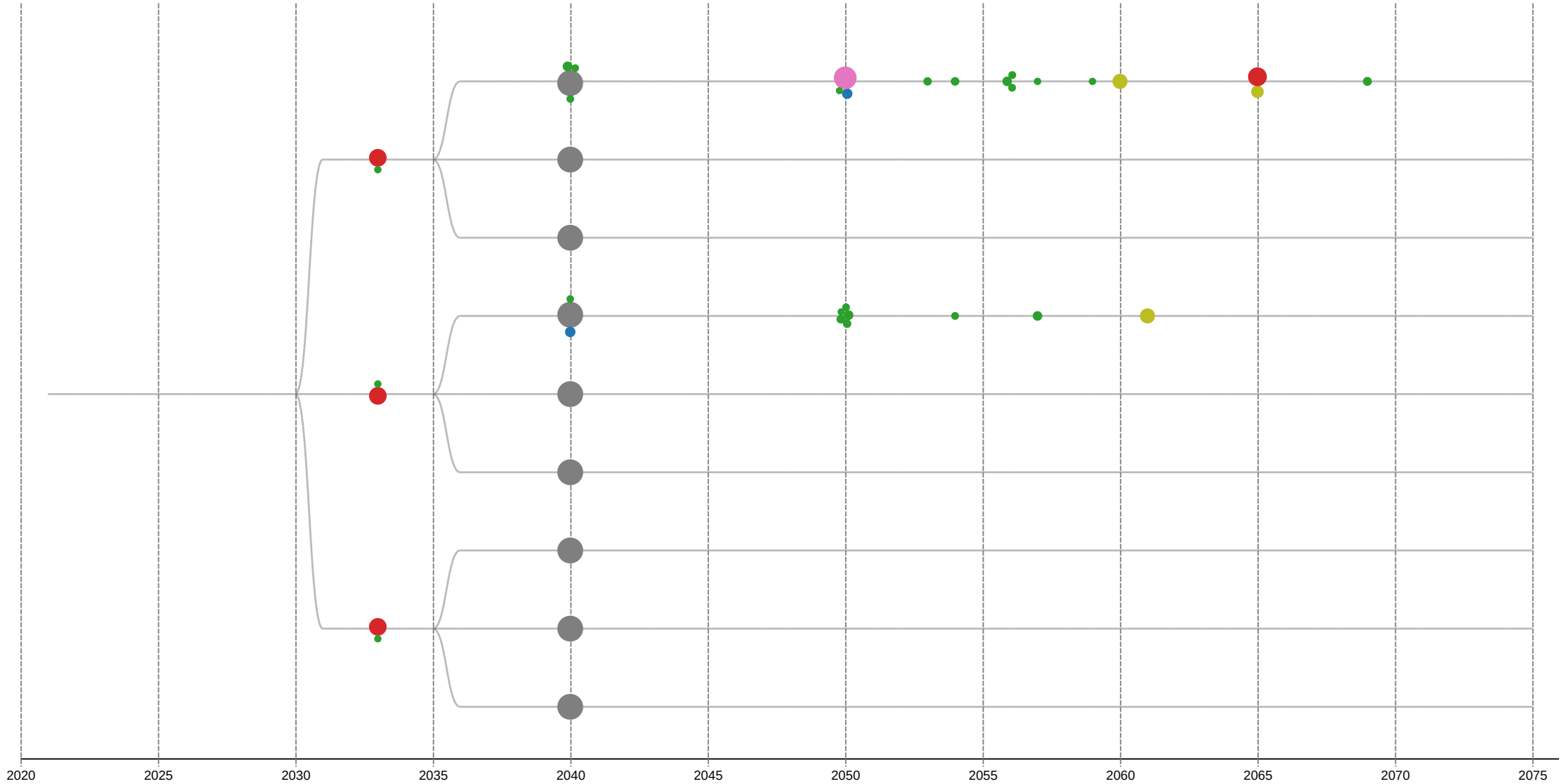
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	13.66	15.23	17.03	13.91	15.20	16.70	15.62	17.80	20.26	
A3: Operational complexity and flexibility	6.16	6.65	7.47	6.37	6.71	7.53	6.94	7.96	9.14	
A4: WRZ connectivity	7.47	8.56	9.53	7.51	8.46	9.14	8.65	9.82	11.08	
A7: Customer relations support engagement with demand management	0.02	0.03	0.03	0.02	0.03	0.03	0.03	0.03	0.03	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.29	19.93	22.02	19.24	20.09	22.07	20.64	23.47	26.60	
E1: Scaleability and modularity of proposed changes	8.88	9.47	10.58	8.97	9.57	10.65	9.82	11.28	12.85	
E2: Intervention lead times	4.28	4.12	4.36	4.10	4.12	4.30	4.21	4.64	5.16	
E3: Reliance on external bodies to deliver changes	6.13	6.35	7.08	6.17	6.41	7.12	6.62	7.54	8.59	
E5: Collaborative land management	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

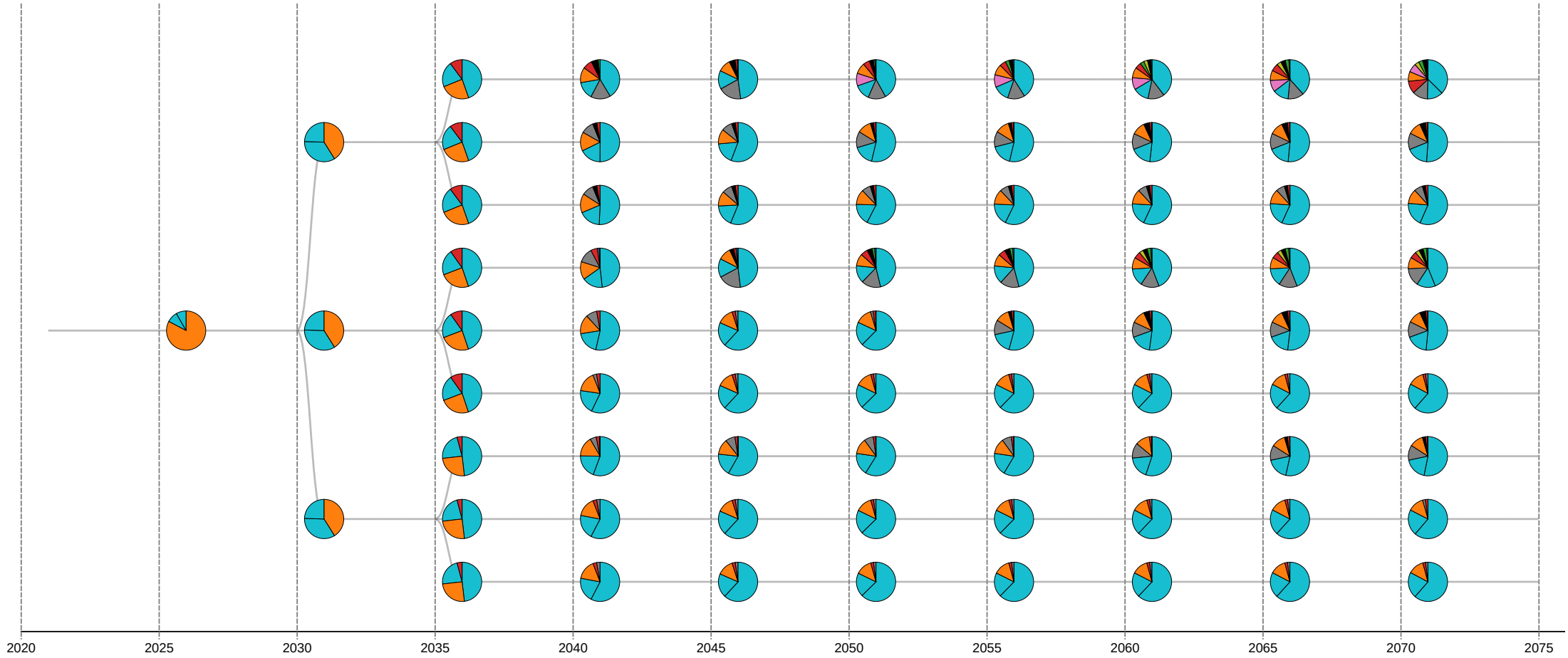
Option Selection (Thames Water)



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

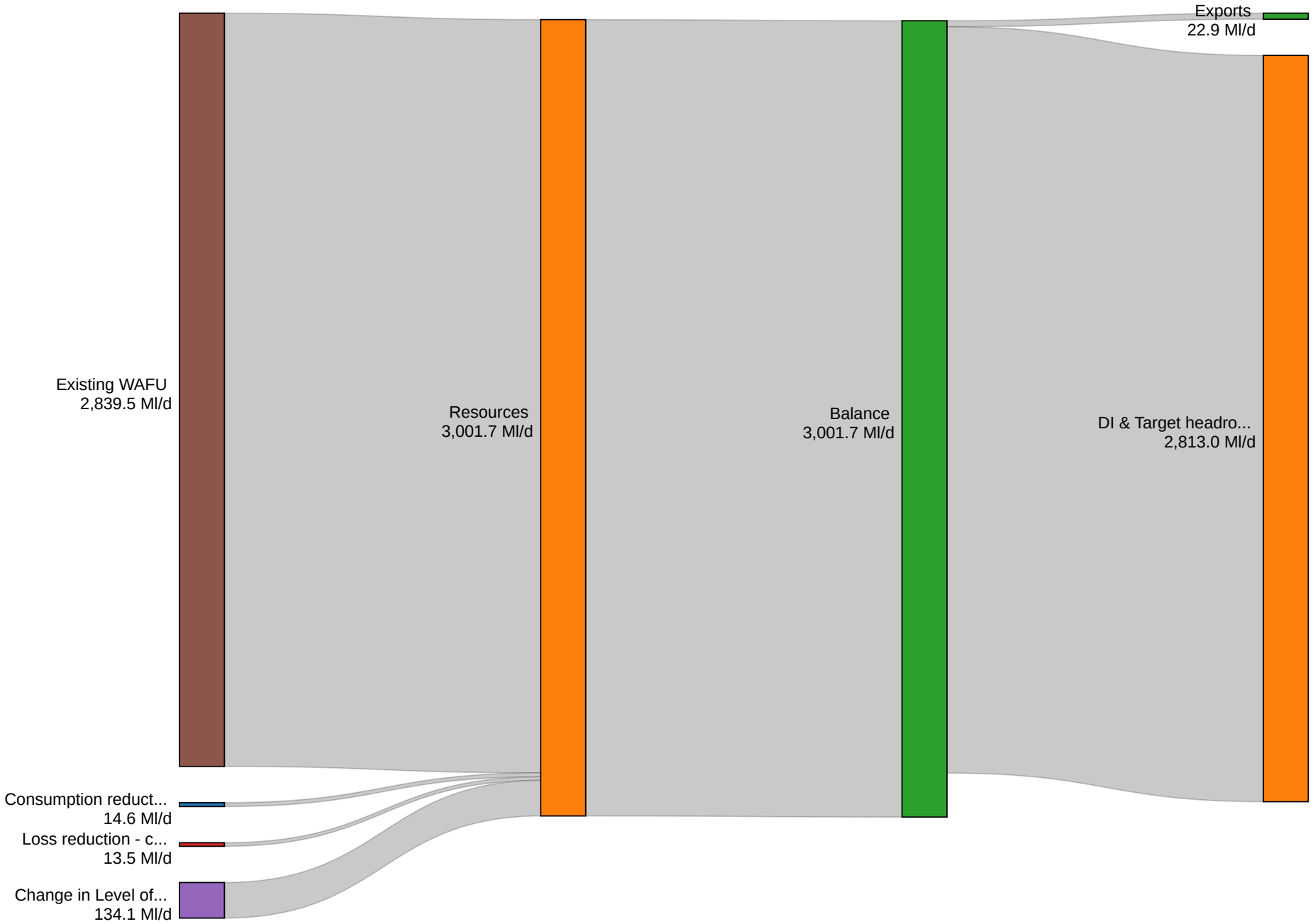
Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.

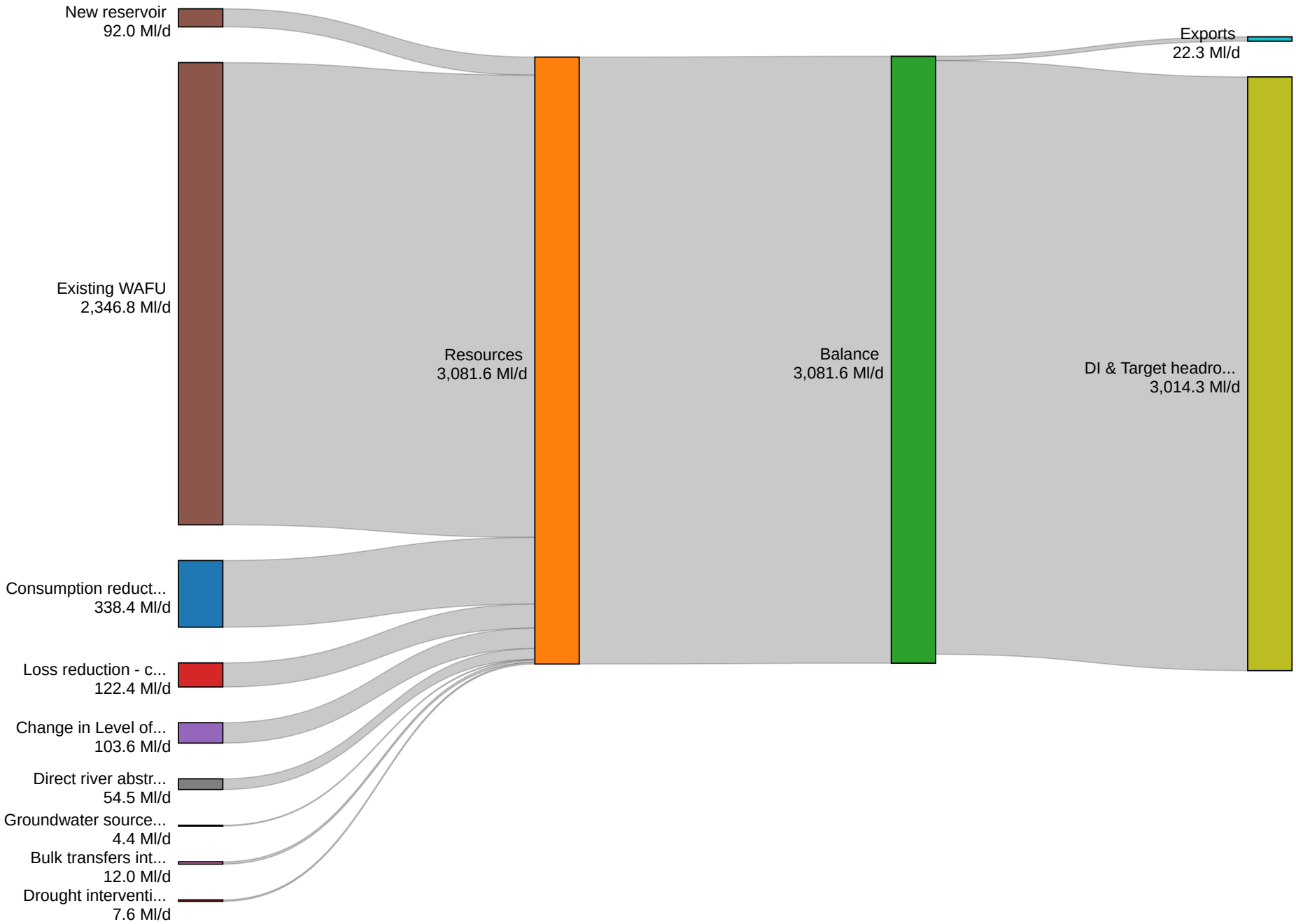


- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

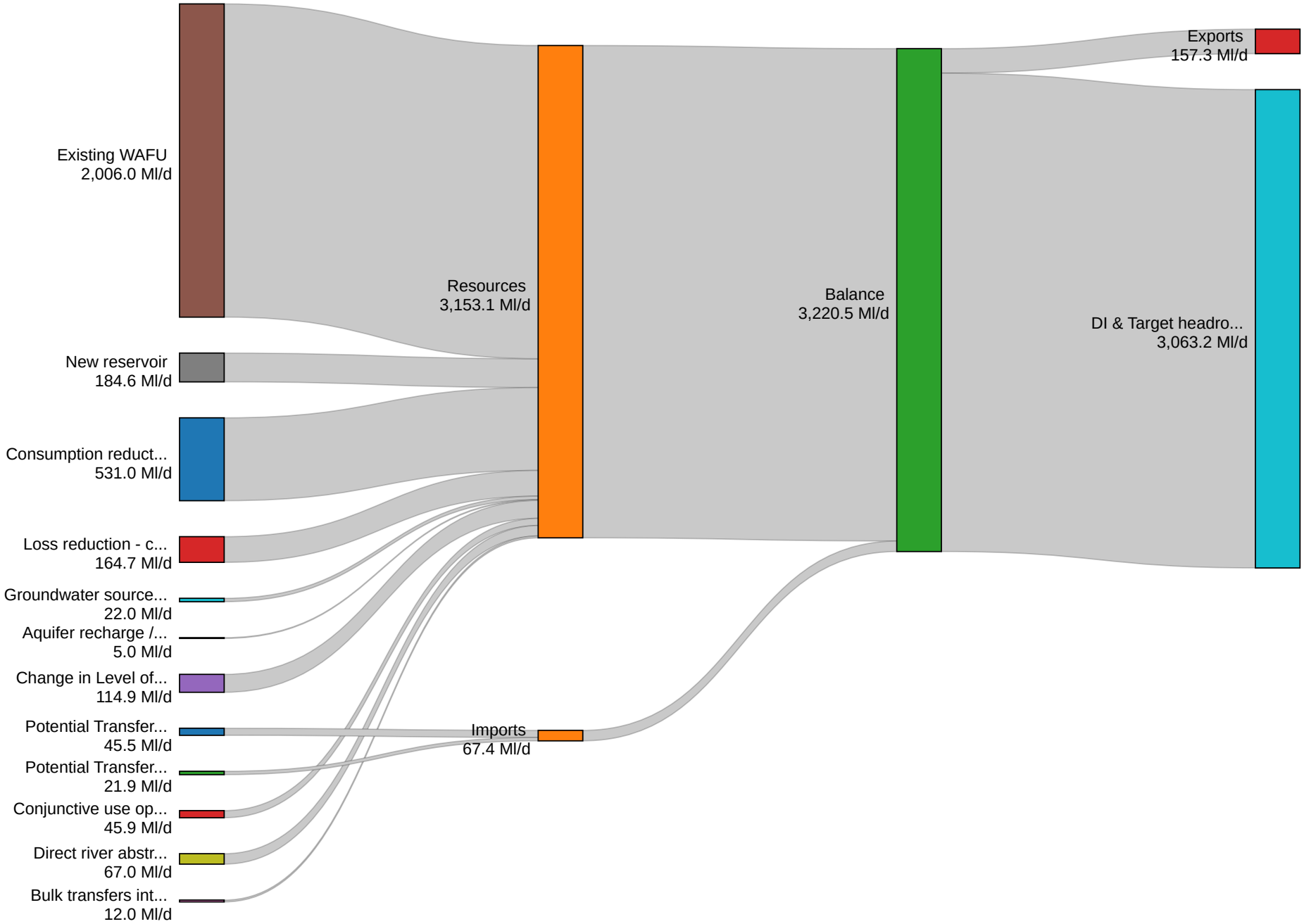
Situation 4 - 2026 (Thames Water)



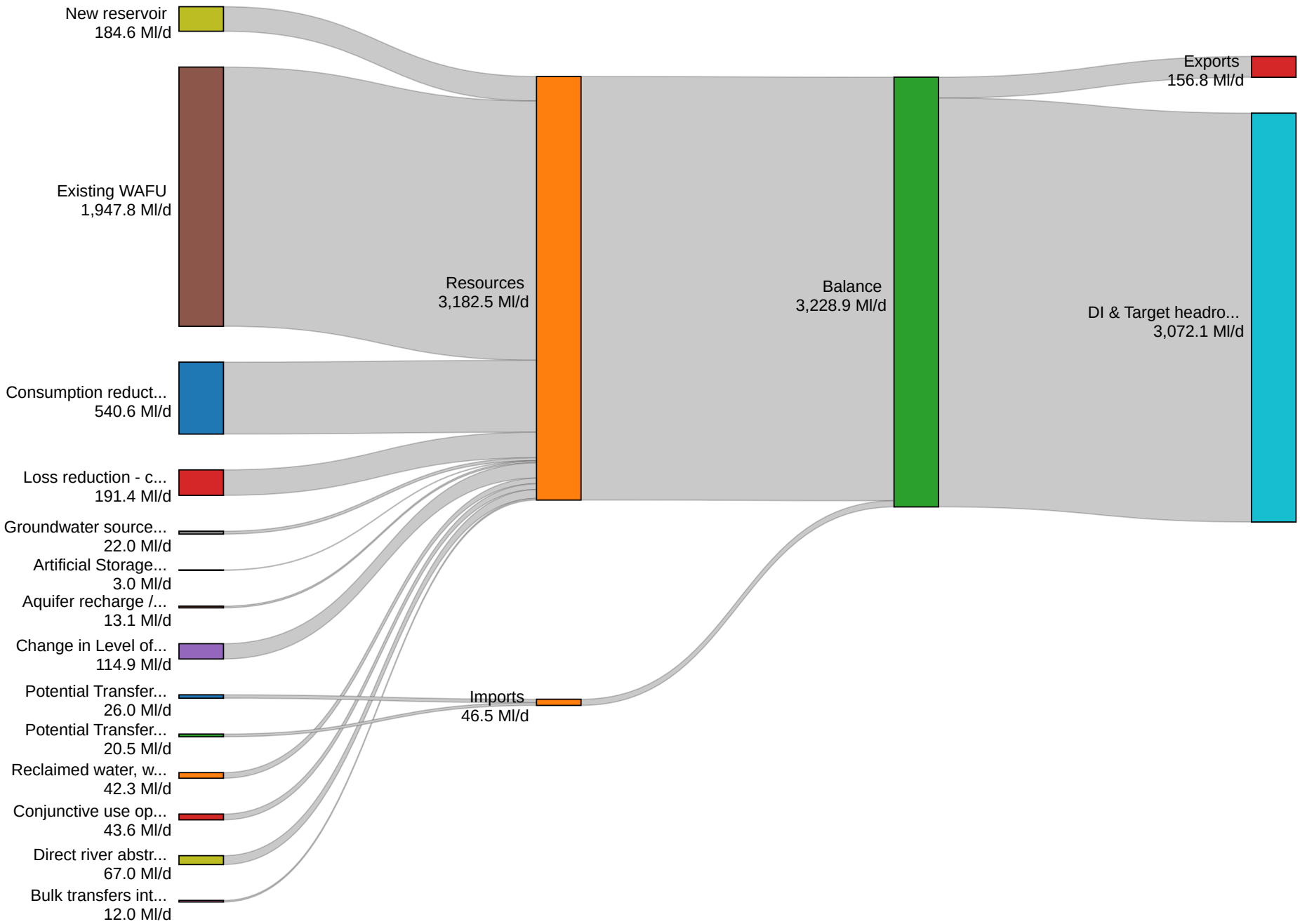
Situation 4 - 2040 (Thames Water)



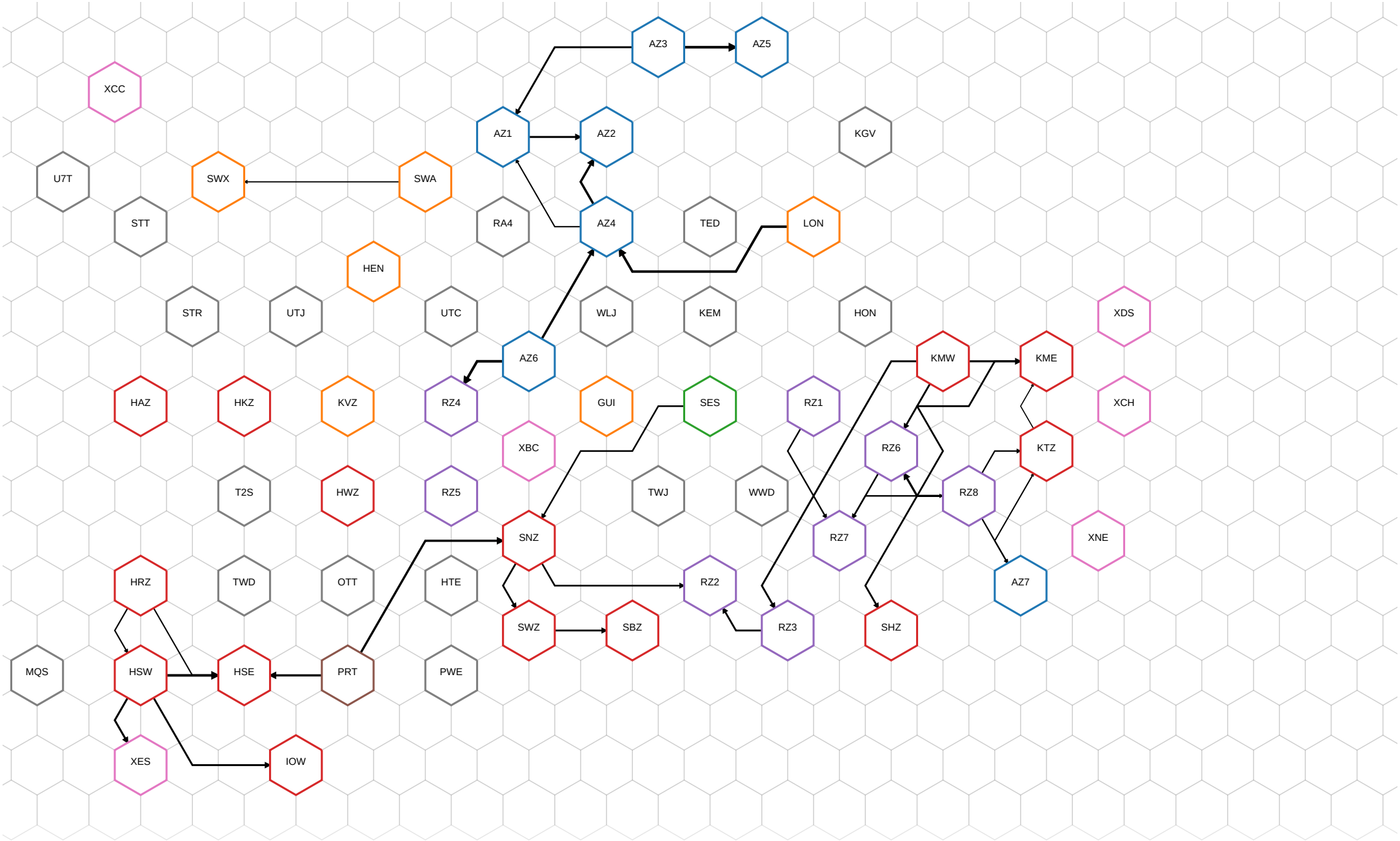
Situation 4 - 2050 (Thames Water)



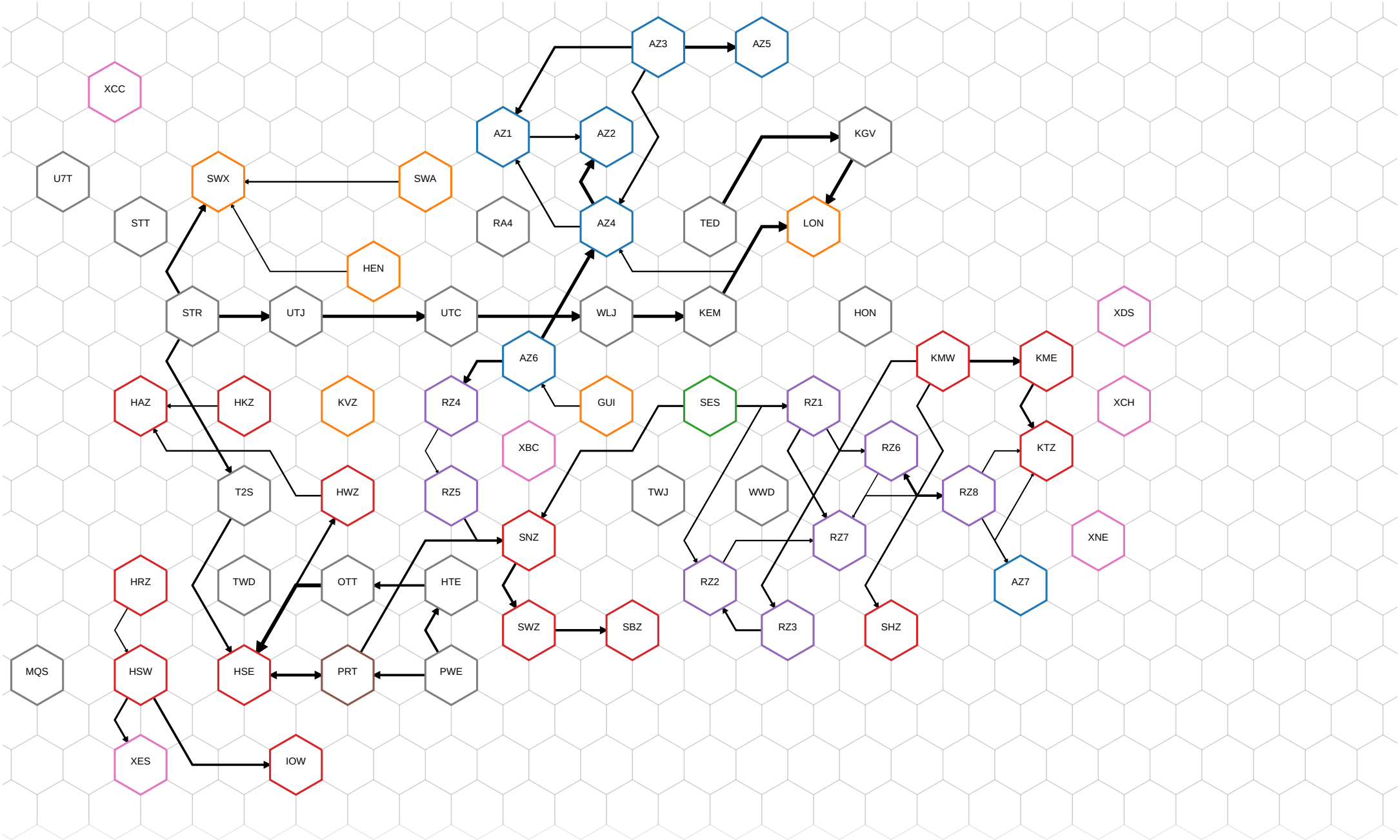
Situation 4 - 2075 (Thames Water)



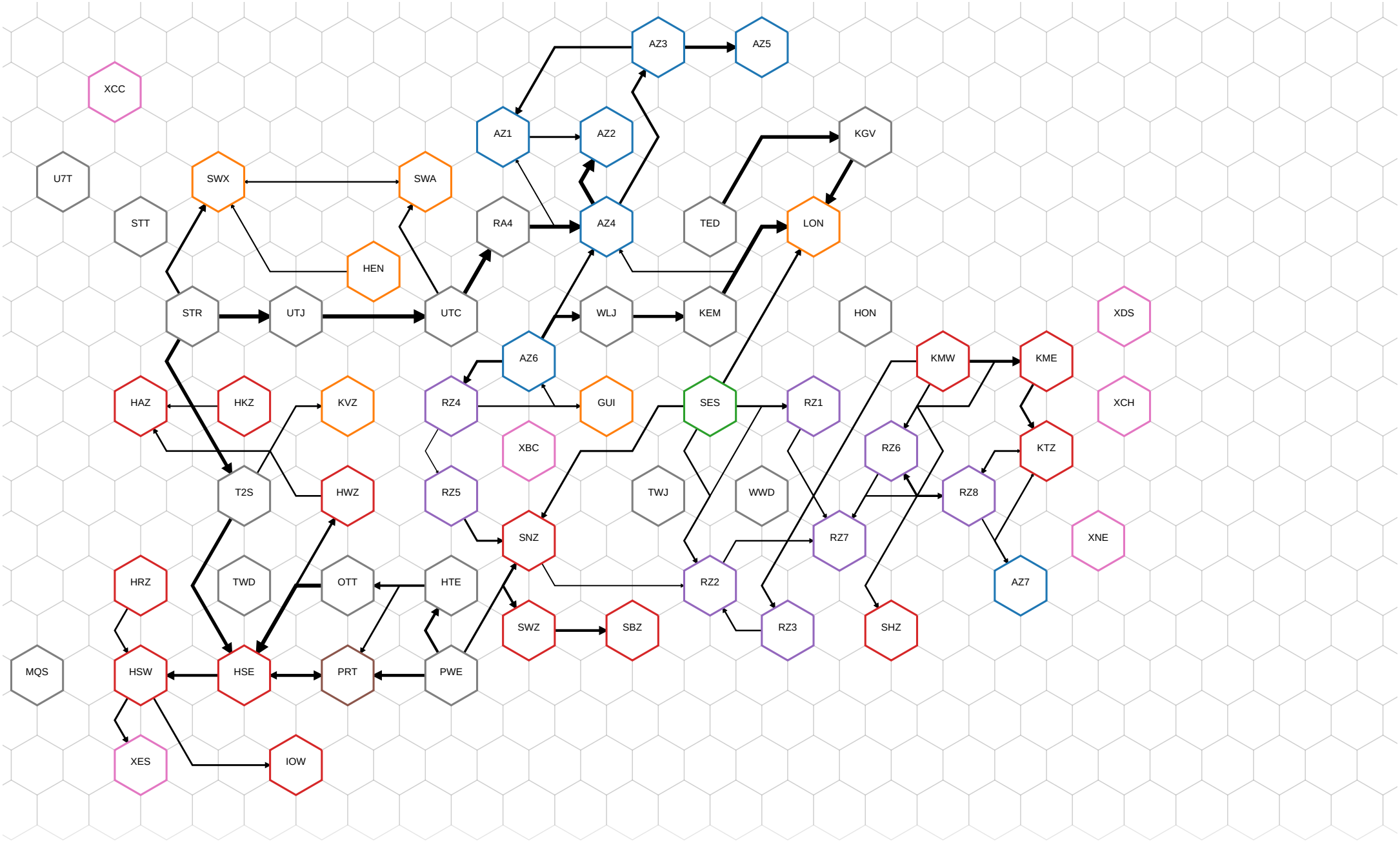
Situation 4 - 2026



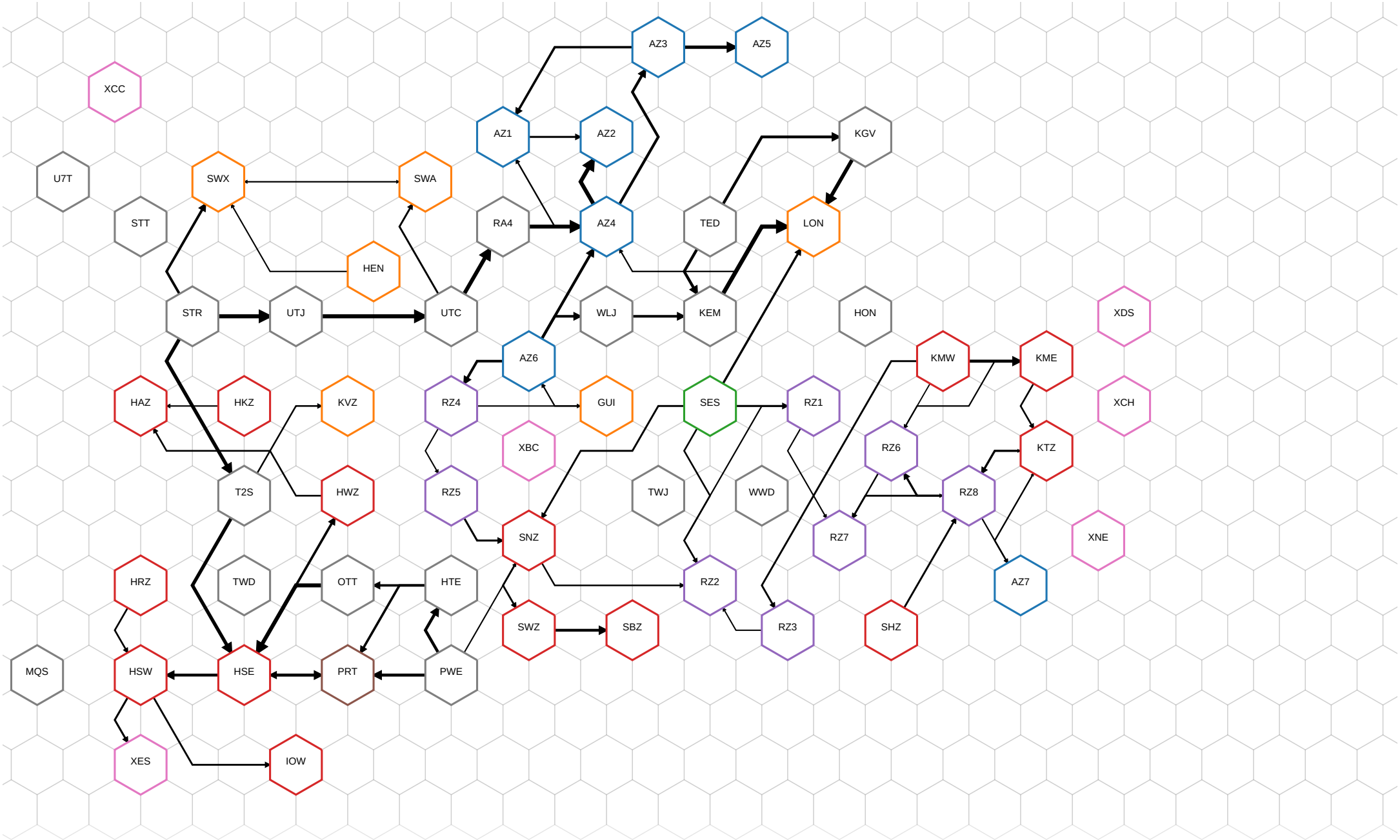
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

ONLY SESRO 75Mm^3 AVAILABLE

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-only-sesro75-2075
Description	Least cost run with hybrid-c+2 government interventions including only SESRO 75 Mm3.
Created at	09/07/2023, 19:49:00
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2-only-sesro75
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets. Exclude all SESRO variants except 75.
Optimised discount rate	STPR

Metrics

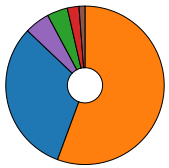
Net present value (Cost)

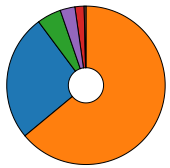
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	20,809	17,587	16,909	19,365	17,482	16,690	17,829	16,971	16,254	(£m)
Cost w/o deficit (STPR)	20,809	17,587	16,909	19,365	17,482	16,690	17,829	16,971	16,254	(£m)
Cost w/ deficit (IGEQ)	31,896	25,773	24,548	29,122	25,597	24,195	26,323	24,711	23,419	(£m)
Cost w/o deficit (IGEQ)	31,896	25,773	24,548	29,122	25,597	24,195	26,323	24,711	23,419	(£m)
Cost w/ deficit (LTDR)	22,953	19,200	18,421	21,267	19,082	18,175	19,497	18,500	17,676	(£m)
Cost w/o deficit (LTDR)	22,953	19,200	18,421	21,267	19,082	18,175	19,497	18,500	17,676	(£m)

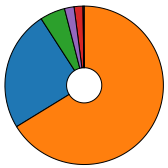
Cost breakdown (STPR)

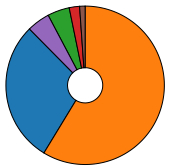
Select Company: Total

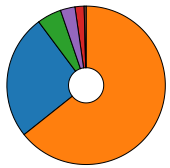
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	6,547	4,541	4,163	5,595	4,457	3,981	4,611	4,164	3,719	(£m)
Fixed opex	11,575	11,253	11,203	11,368	11,242	11,182	11,253	11,201	11,139	(£m)
Fixed operational carbon	879	869	868	873	870	868	871	867	865	(£m)
Embedded carbon	494	331	306	409	327	297	346	308	280	(£m)
Variable opex	1,062	528	328	904	518	314	646	391	232	(£m)
Variable carbon opex	252	64	40	216	69	48	102	41	18	(£m)

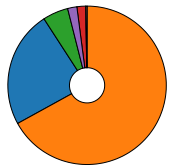
situation1 

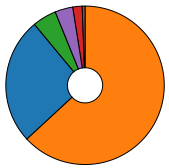
situation2 

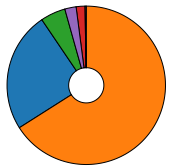
situation3 

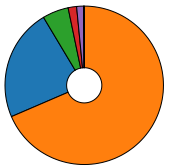
situation4 

situation5 

situation6 

situation7 

situation8 

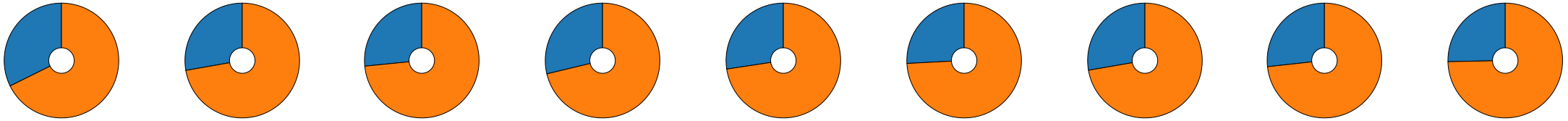
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,190,544	2,026,124	1,859,011	2,568,093	2,001,816	1,801,492	2,138,040	1,872,374	1,689,566	(tonnes)
Operational emissions	6,681,499	5,271,294	5,136,573	6,366,776	5,305,461	5,176,512	5,573,796	5,134,766	4,980,353	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

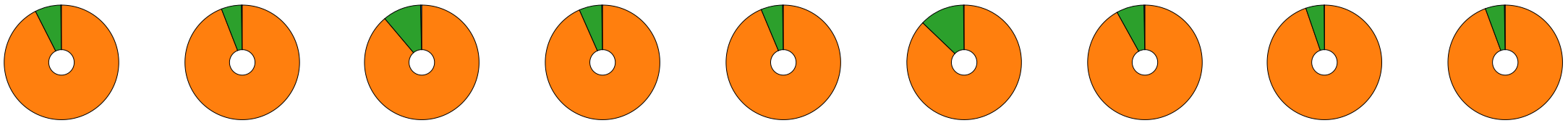


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	47	30	17	47	26	8	40	9	8	(GWh)
Grid	22,629	11,325	4,390	19,209	10,943	3,857	13,163	7,956	2,894	(GWh)
Renewable	1,784	681	534	1,314	712	562	1,115	433	165	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	69,298.00	63,425.00	62,504.00	66,373.00	63,107.00	62,165.00	63,621.00	61,365.00	60,278.00	
SEA environmental disbenefit	112,799.00	78,935.00	71,409.00	99,156.00	77,341.00	73,355.00	81,755.00	68,309.00	59,028.00	
Natural capital	84,168,449.41	81,314,461.61	84,188,960.78	79,672,257.68	81,313,116.56	84,026,494.87	80,975,186.71	81,744,834.08	84,646,650.22	
Bio-diversity net gain	−187,050.00	−117,349.00	−89,129.00	−161,377.00	−116,214.00	−98,132.00	−119,369.00	−92,367.00	−62,817.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	34,005.00	31,704.00	31,271.00	33,008.00	31,617.00	31,190.00	31,661.00	30,755.00	30,234.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	27.77	27.45	30.01	26.74	27.63	30.00	28.90	31.95	35.51	
R1: Uncertainty of option supply/demand benefit	5.78	5.07	5.53	5.29	5.12	5.48	5.48	5.94	6.57	
R3: Risk of service failure due to other physical hazards	6.64	6.76	7.57	6.41	6.82	7.56	7.09	8.03	9.16	
R4: Availability of additional headroom	6.45	6.79	7.01	6.56	6.81	7.02	7.13	7.48	7.72	
R5: Catchment/raw water quality risks (incl. climate change)	3.83	3.77	4.24	3.70	3.79	4.27	3.91	4.50	5.20	
R6: Capacity of catchment services	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
R7: Risk of service failure to other exceptional events	5.07	5.06	5.65	4.78	5.09	5.67	5.30	6.00	6.87	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

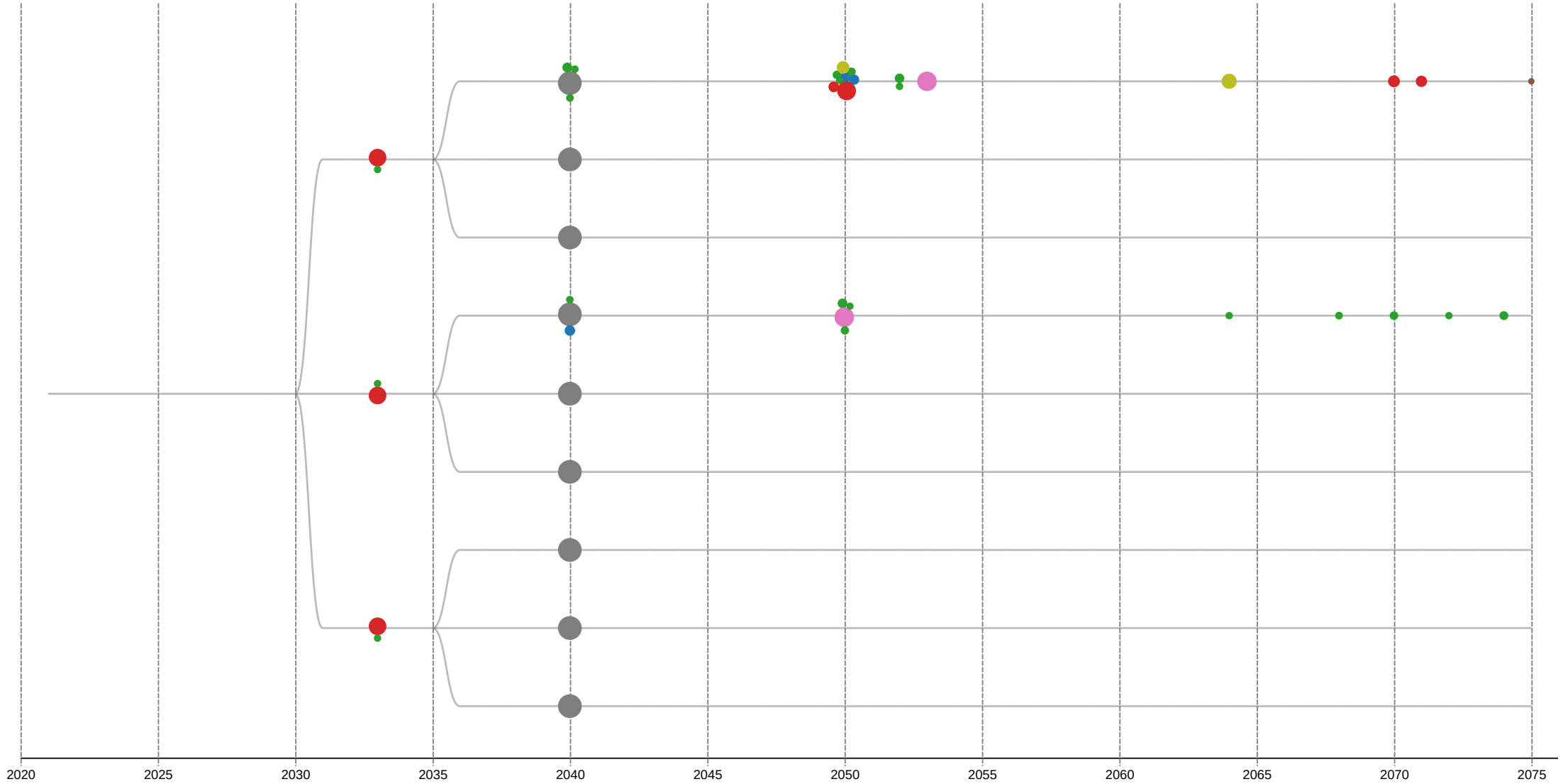
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	13.59	15.07	16.85	13.59	15.07	16.53	15.47	17.60	20.02	
A3: Operational complexity and flexibility	6.17	6.48	7.28	6.02	6.54	7.33	6.78	7.76	8.91	
A4: WRZ connectivity	7.39	8.56	9.54	7.54	8.50	9.17	8.67	9.82	11.08	
A7: Customer relations support engagement with demand management	0.04	0.03	0.03	0.02	0.03	0.03	0.03	0.03	0.03	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.39	19.76	21.82	18.65	19.93	21.79	20.50	23.27	26.36	
E1: Scaleability and modularity of proposed changes	8.87	9.38	10.47	8.77	9.48	10.51	9.74	11.18	12.74	
E2: Intervention lead times	4.29	4.08	4.33	3.92	4.09	4.24	4.18	4.59	5.10	
E3: Reliance on external bodies to deliver changes	6.23	6.30	7.02	5.97	6.36	7.04	6.59	7.49	8.53	
E5: Collaborative land management	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

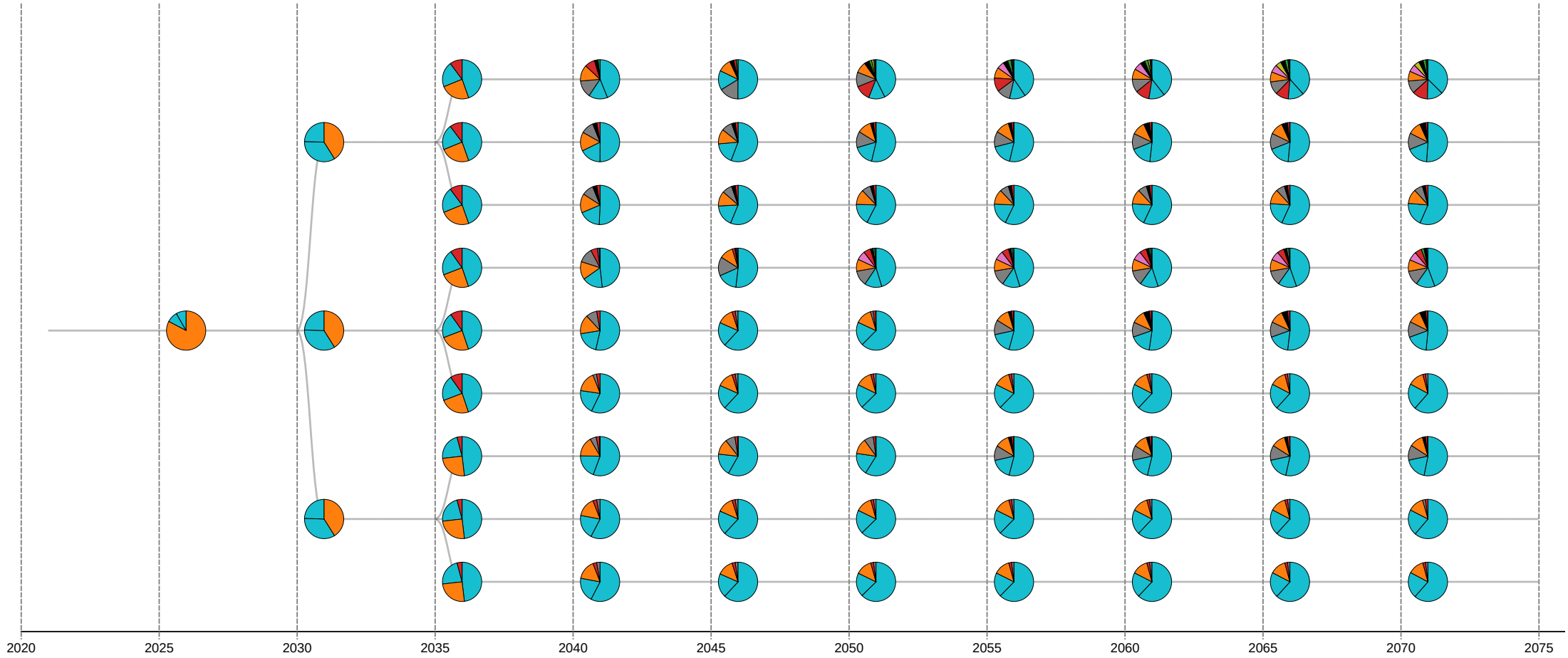
Option Selection (Thames Water)



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

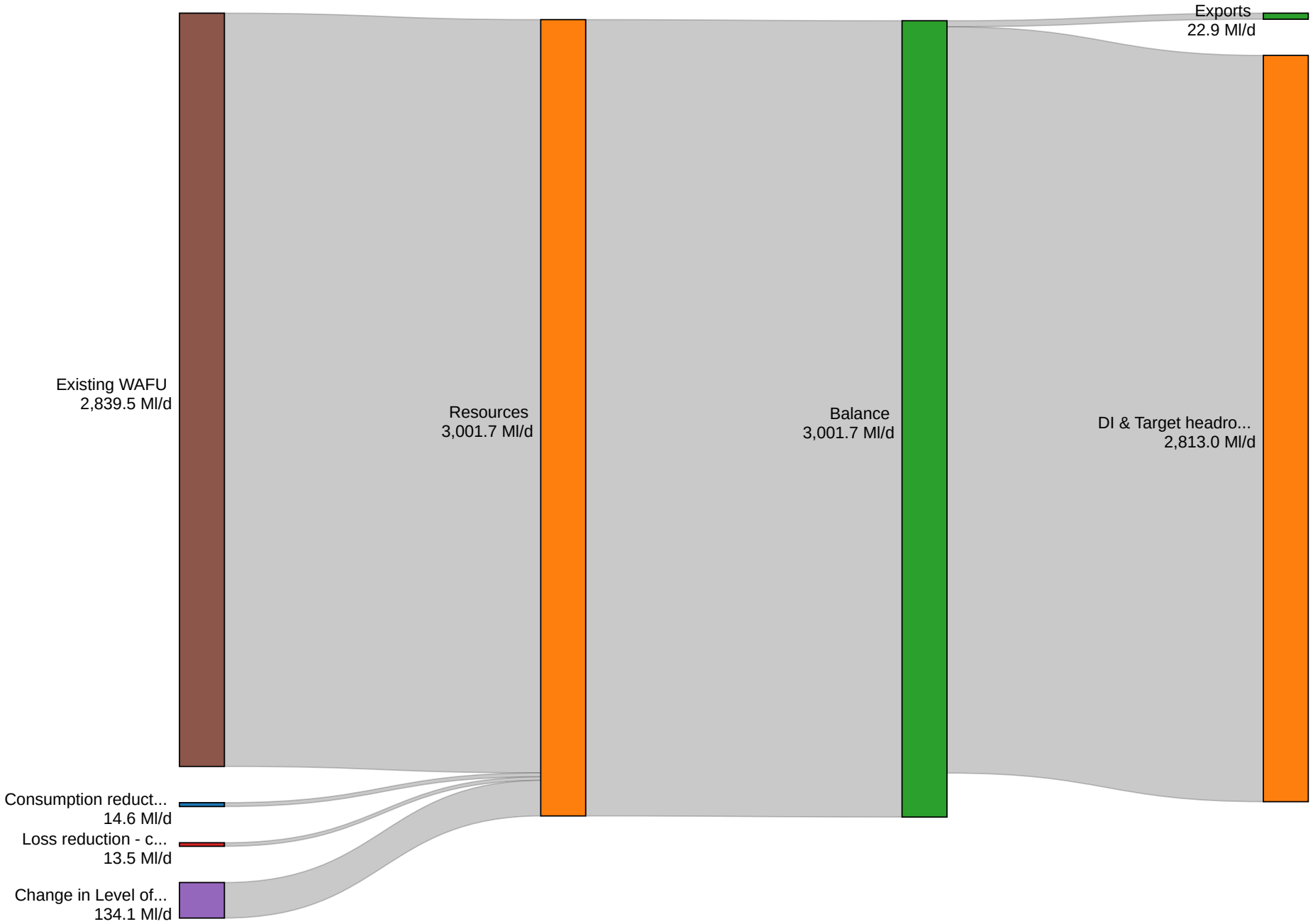
Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.

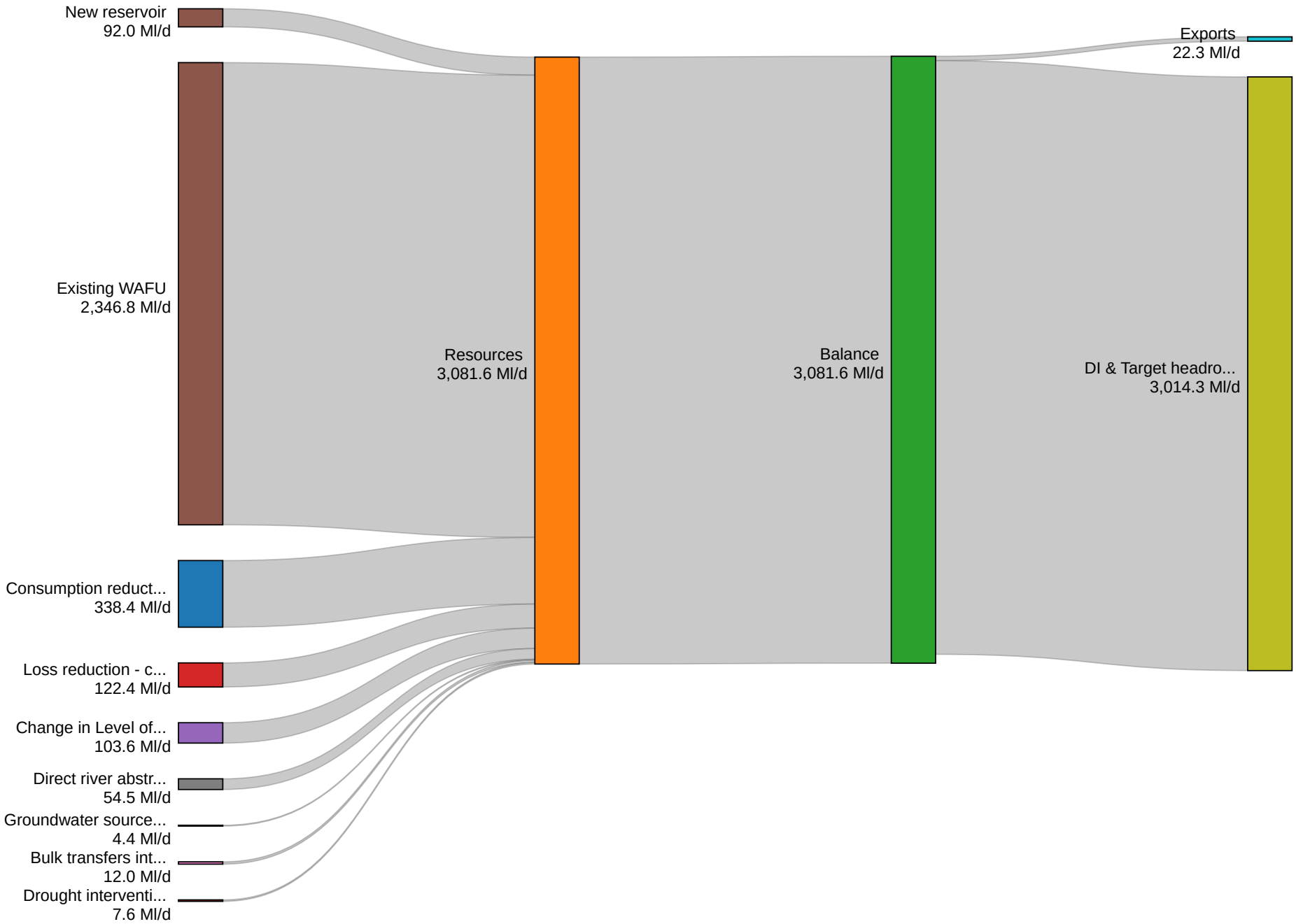


- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

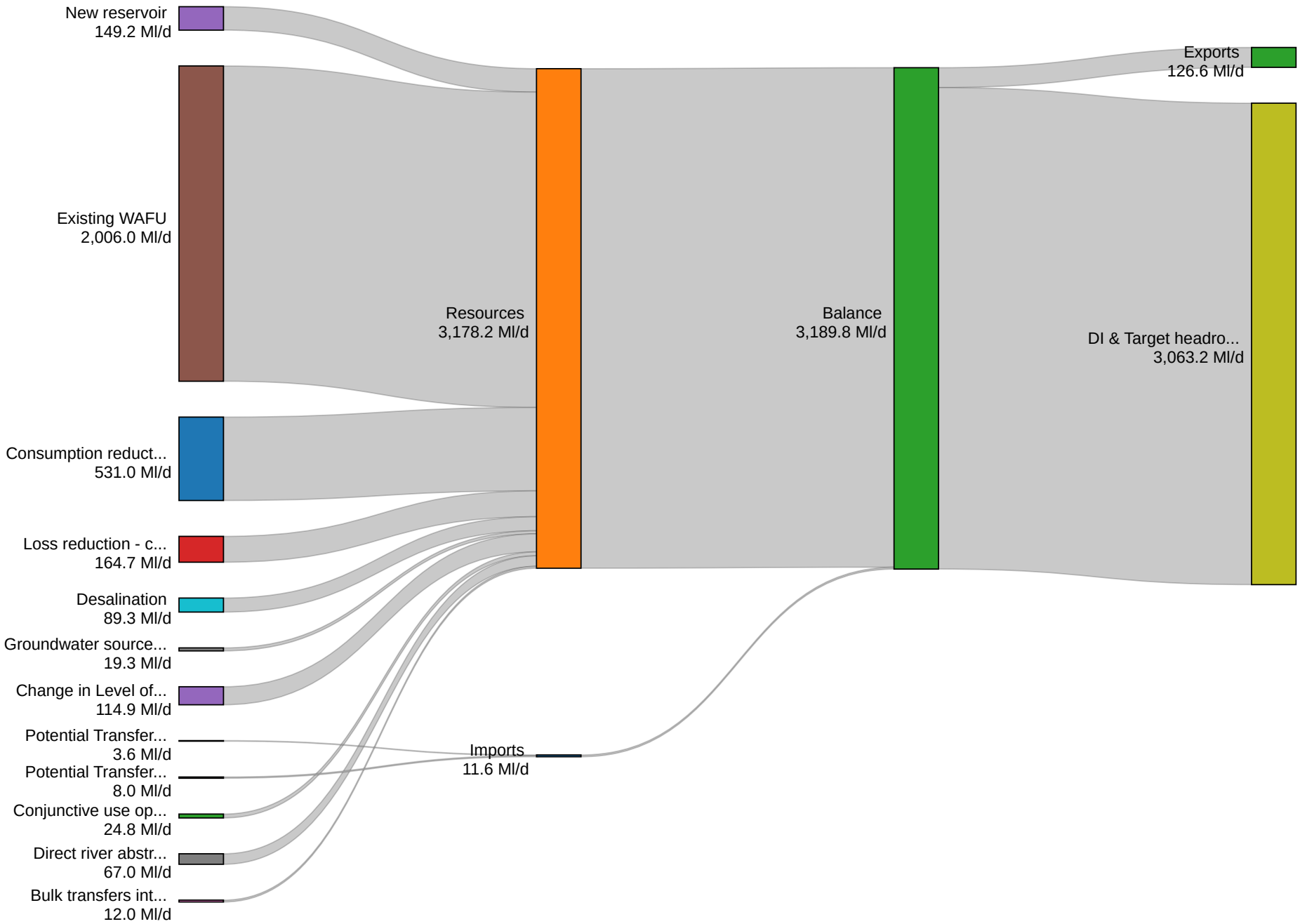
Situation 4 - 2026 (Thames Water)



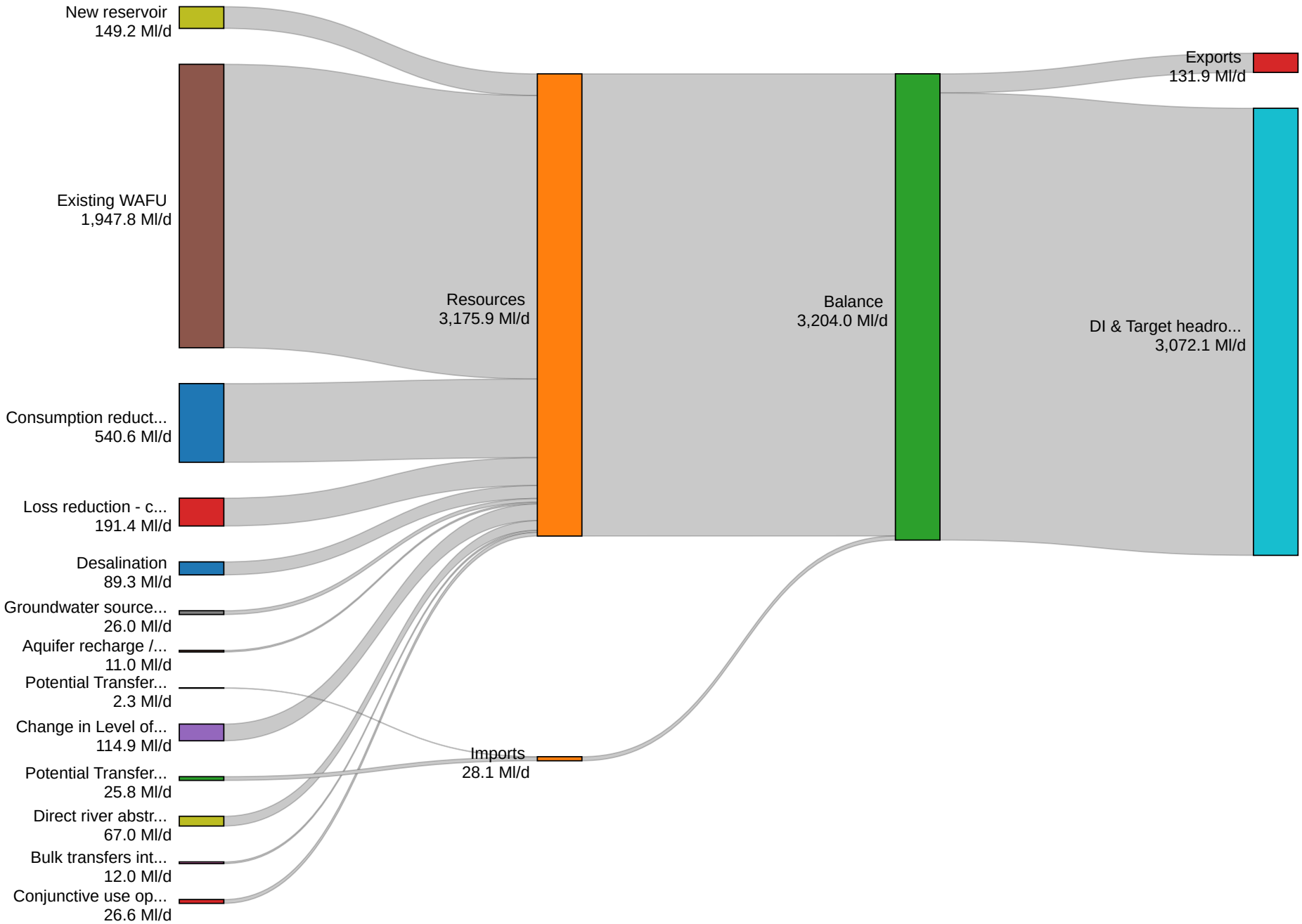
Situation 4 - 2040 (Thames Water)



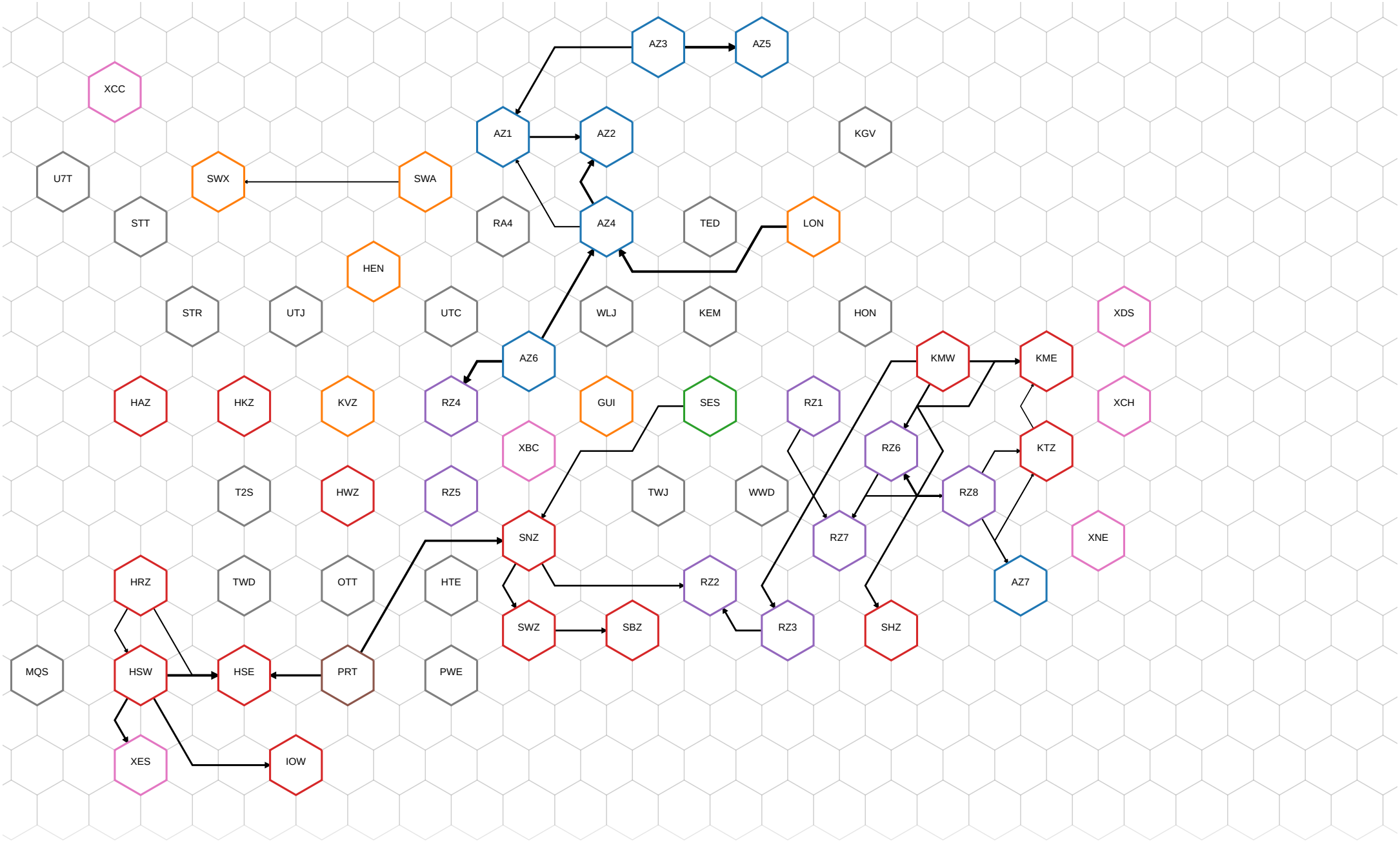
Situation 4 - 2050 (Thames Water)



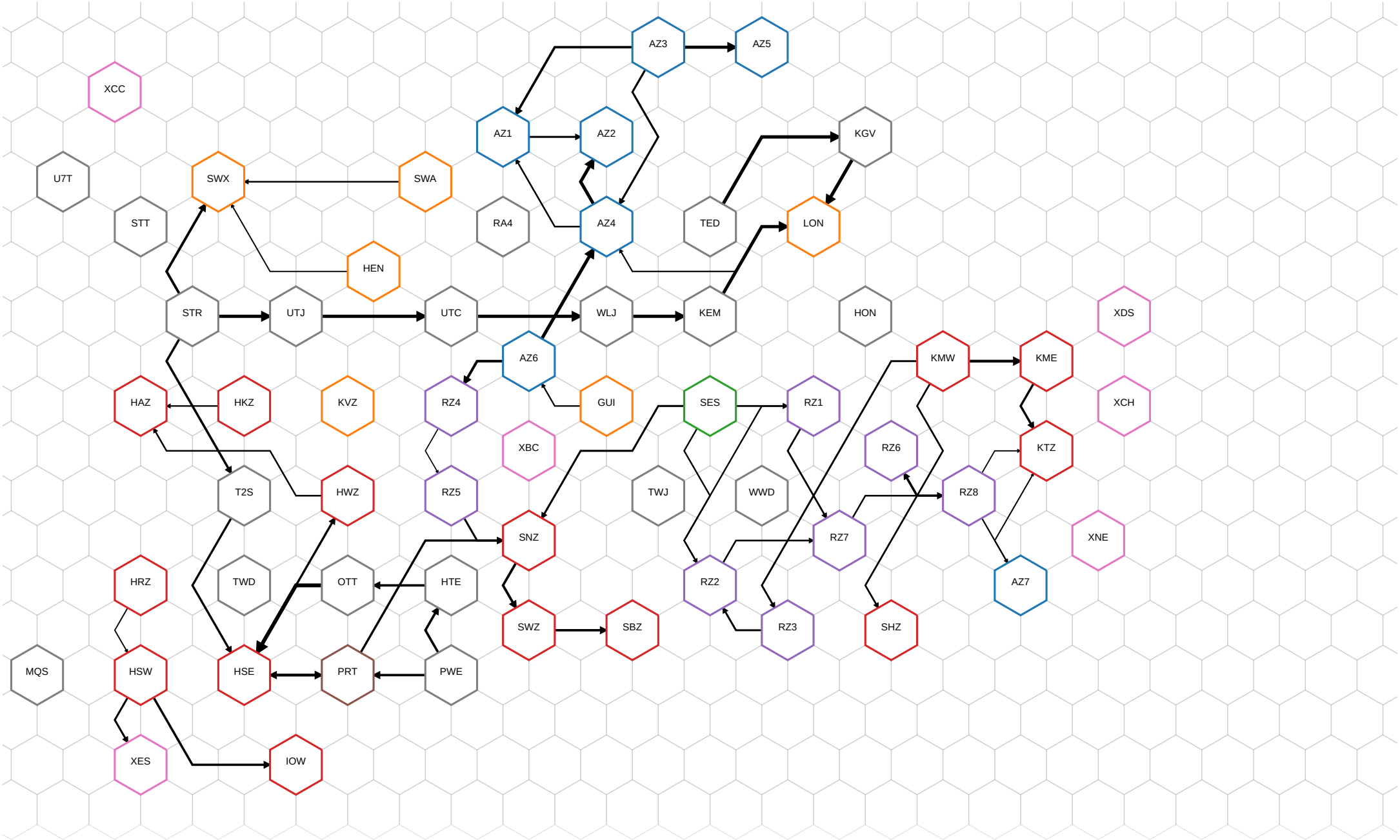
Situation 4 - 2075 (Thames Water)



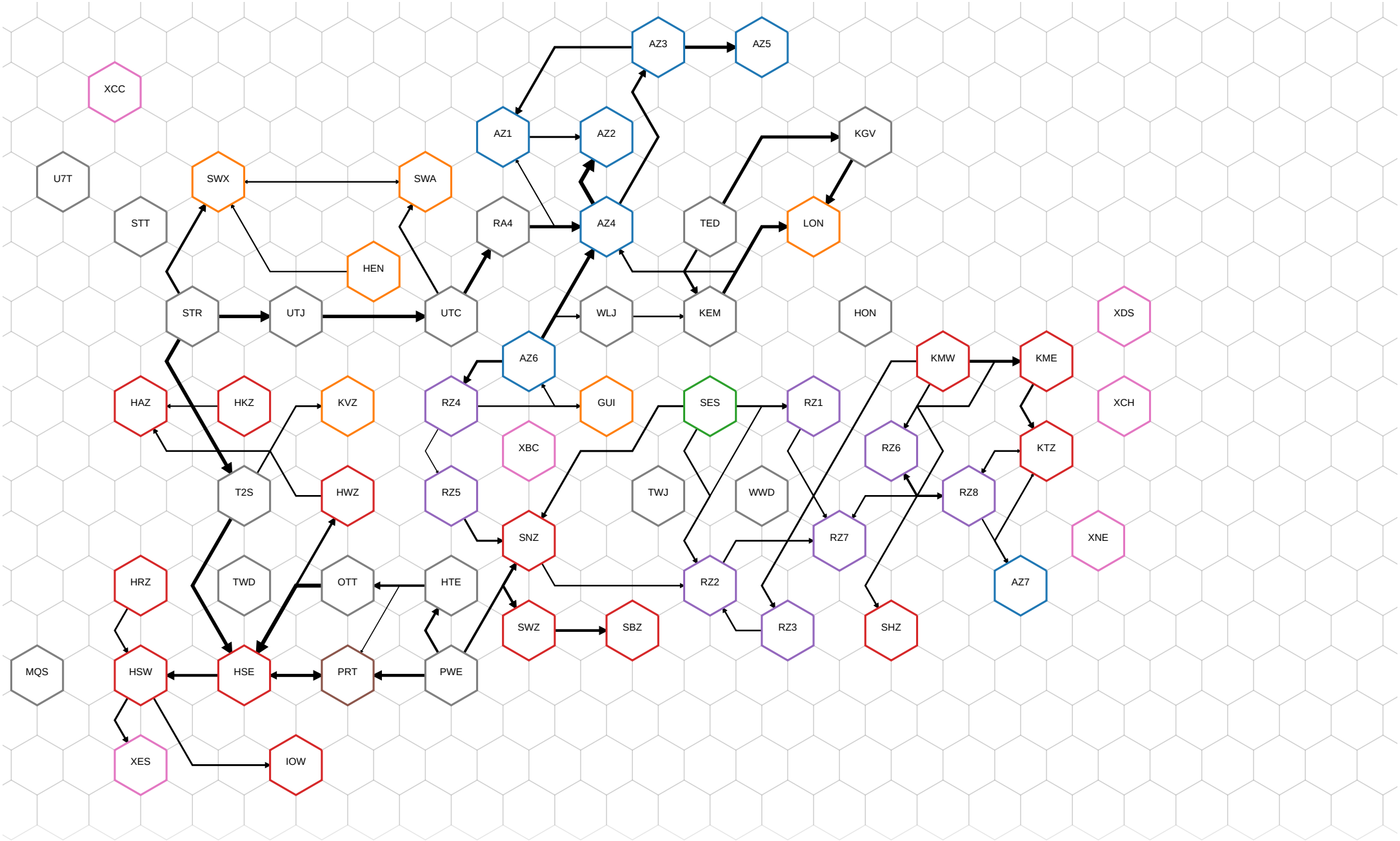
Situation 4 - 2026



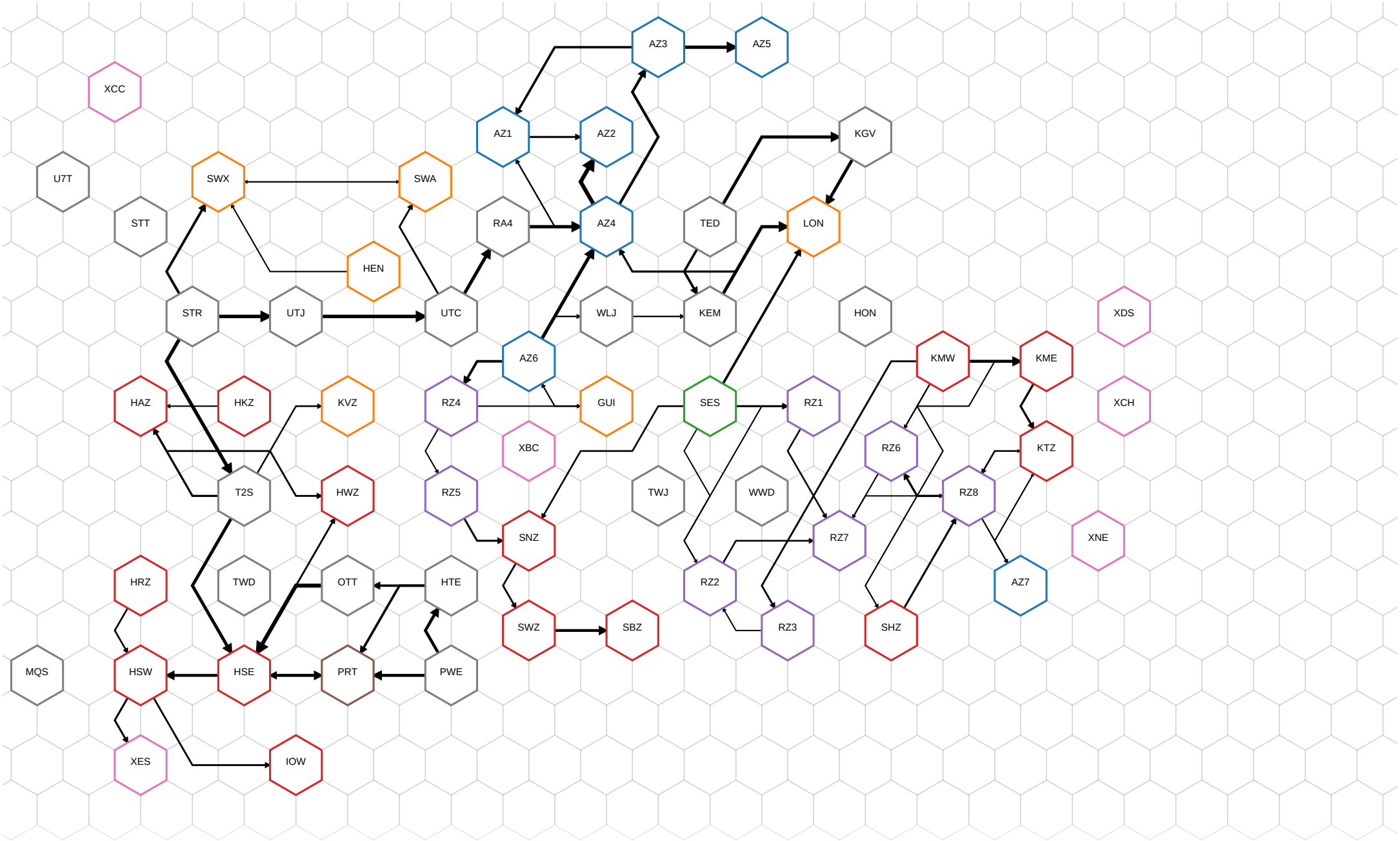
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

NO TEDDINGTON DRA

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-excl-ted-dra-2075
Description	Least cost run with hybrid-c+2 government interventions excluding Teddington DRA.
Created at	28/06/2023, 10:45:04
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2-excl-ted-dra
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets. Excludes Teddington DRA.
Optimised discount rate	STPR

Metrics

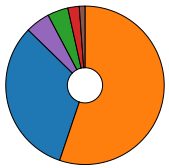
Net present value (Cost)

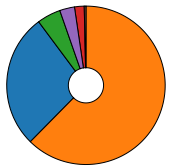
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	20,768	18,078	17,394	19,264	17,772	16,971	18,003	16,865	16,157	(£m)
Cost w/o deficit (STPR)	20,768	18,078	17,394	19,264	17,772	16,971	18,003	16,865	16,157	(£m)
Cost w/ deficit (IGEQ)	31,677	26,548	25,306	28,825	26,030	24,609	26,669	24,532	23,257	(£m)
Cost w/o deficit (IGEQ)	31,677	26,548	25,306	28,825	26,030	24,609	26,669	24,532	23,257	(£m)
Cost w/ deficit (LTDR)	22,880	19,746	18,958	21,131	19,399	18,483	19,701	18,380	17,567	(£m)
Cost w/o deficit (LTDR)	22,880	19,746	18,958	21,131	19,399	18,483	19,701	18,380	17,567	(£m)

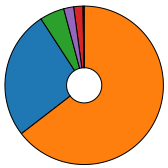
Cost breakdown (STPR)

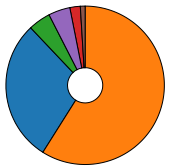
Select Company: Total

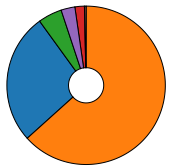
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	6,671	4,960	4,573	5,583	4,743	4,257	4,721	4,104	3,660	(£m)
Fixed opex	11,459	11,277	11,226	11,357	11,256	11,196	11,277	11,203	11,142	(£m)
Fixed operational carbon	880	874	873	875	867	867	868	864	863	(£m)
Embedded carbon	484	357	332	412	345	314	334	287	260	(£m)
Variable opex	1,035	547	350	851	502	298	645	374	219	(£m)
Variable carbon opex	239	63	39	187	60	39	159	32	14	(£m)

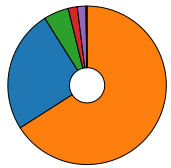
situation1 

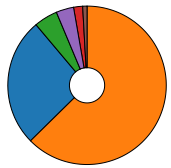
situation2 

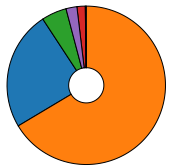
situation3 

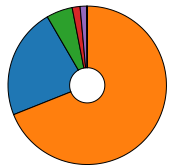
situation4 

situation5 

situation6 

situation7 

situation8 

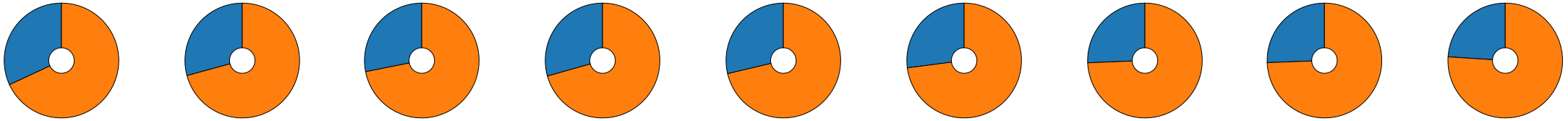
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,095,916	2,189,714	2,020,464	2,574,372	2,105,662	1,901,568	2,061,817	1,740,872	1,558,064	(tonnes)
Operational emissions	6,600,323	5,300,070	5,161,368	6,191,120	5,233,821	5,126,677	5,977,867	5,061,164	4,939,818	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

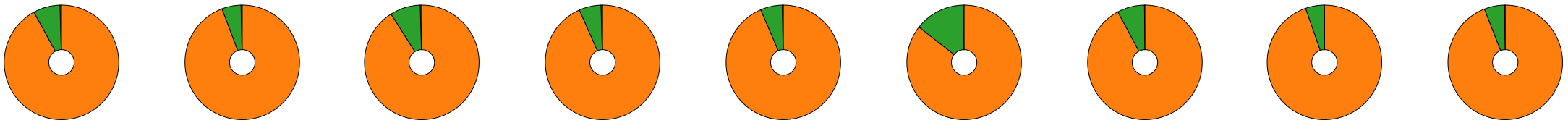


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	103	45	26	93	38	11	21	7	6	(GWh)
Grid	22,566	11,894	5,157	19,127	10,869	3,772	13,651	7,817	2,729	(GWh)
Renewable	1,853	681	485	1,264	713	625	1,138	433	165	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	69,088.00	64,778.00	63,687.00	66,834.00	63,374.00	62,209.00	63,960.00	61,921.00	60,834.00	
SEA environmental disbenefit	113,519.00	85,486.00	77,573.00	100,680.00	82,385.00	76,366.00	88,786.00	73,800.00	64,519.00	
Natural capital	81,687,538.58	77,158,745.67	80,037,206.56	75,553,167.81	77,193,202.56	79,997,733.25	64,472,650.83	65,083,317.35	67,985,133.49	
Bio-diversity net gain	−220,014.00	−160,660.00	−130,014.00	−197,779.00	−153,202.00	−127,036.00	−141,336.00	−101,914.00	−72,364.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	33,813.00	32,015.00	31,531.00	33,109.00	31,820.00	31,373.00	31,994.00	31,044.00	30,523.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	29.03	30.46	33.34	28.19	29.43	32.09	27.10	29.74	32.96	
R1: Uncertainty of option supply/demand benefit	6.17	5.98	6.54	5.66	5.48	5.92	5.13	5.48	6.04	
R3: Risk of service failure due to other physical hazards	6.96	7.56	8.47	6.84	7.29	8.12	6.57	7.41	8.43	
R4: Availability of additional headroom	6.57	6.92	7.13	6.65	6.94	7.14	7.01	7.35	7.59	
R5: Catchment/raw water quality risks (incl. climate change)	4.00	4.11	4.62	3.75	4.13	4.65	3.60	4.09	4.72	
R6: Capacity of catchment services	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
R7: Risk of service failure to other exceptional events	5.33	5.89	6.59	5.29	5.60	6.25	4.79	5.41	6.18	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

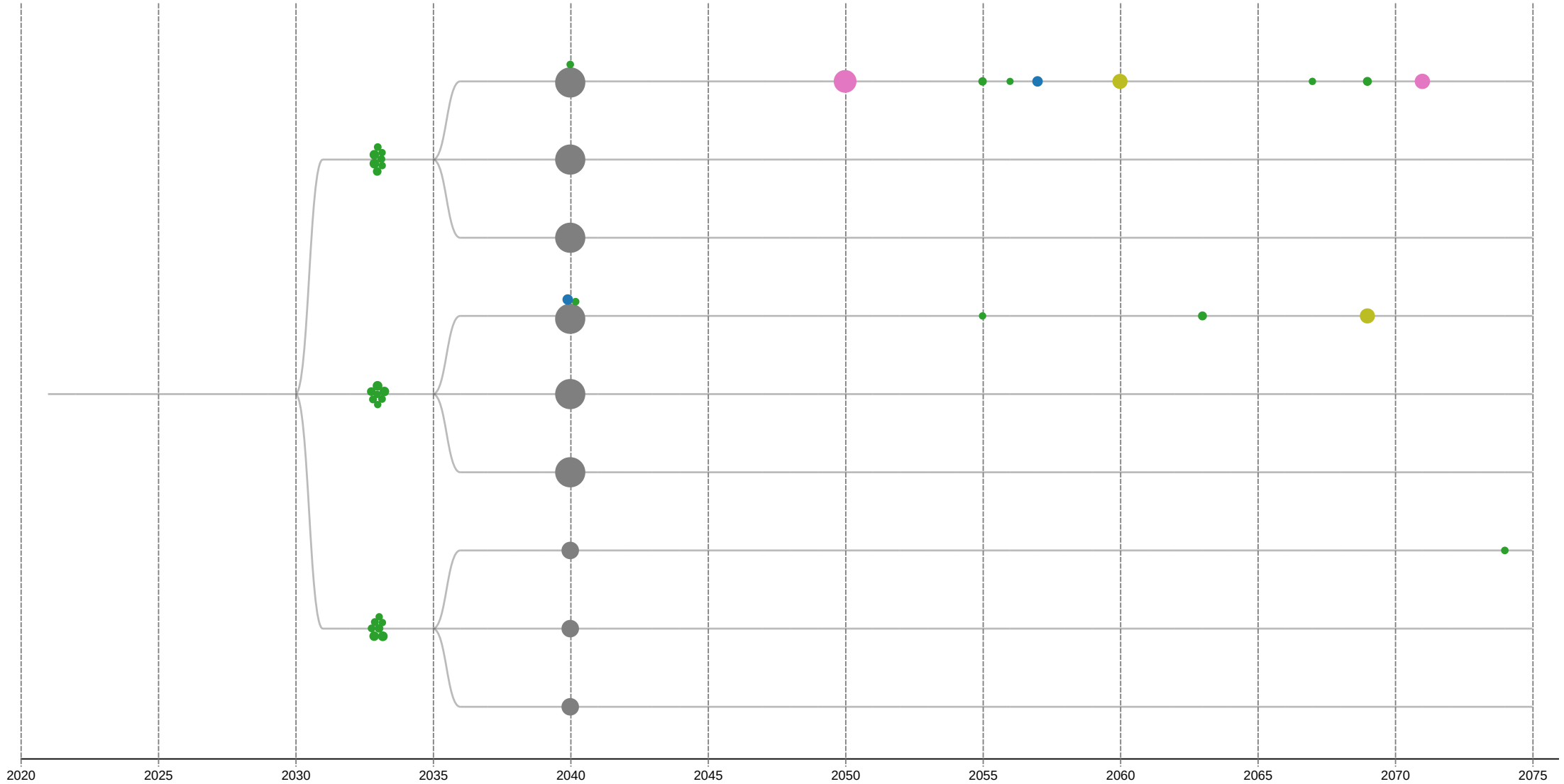
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	13.67	15.58	17.41	13.82	15.28	16.77	14.61	16.67	18.94	
A3: Operational complexity and flexibility	6.56	7.38	8.29	6.58	7.11	7.99	6.34	7.25	8.32	
A4: WRZ connectivity	7.09	8.17	9.09	7.21	8.14	8.75	8.24	9.39	10.59	
A7: Customer relations support engagement with demand management	0.02	0.03	0.03	0.02	0.03	0.03	0.03	0.03	0.03	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.29	20.77	22.91	18.86	20.15	22.10	20.09	22.74	25.75	
E1: Scaleability and modularity of proposed changes	8.81	9.62	10.72	8.65	9.39	10.43	9.51	10.87	12.37	
E2: Intervention lead times	4.17	4.30	4.57	4.03	4.20	4.39	4.04	4.43	4.91	
E3: Reliance on external bodies to deliver changes	6.31	6.84	7.61	6.18	6.56	7.29	6.55	7.44	8.47	
E5: Collaborative land management	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

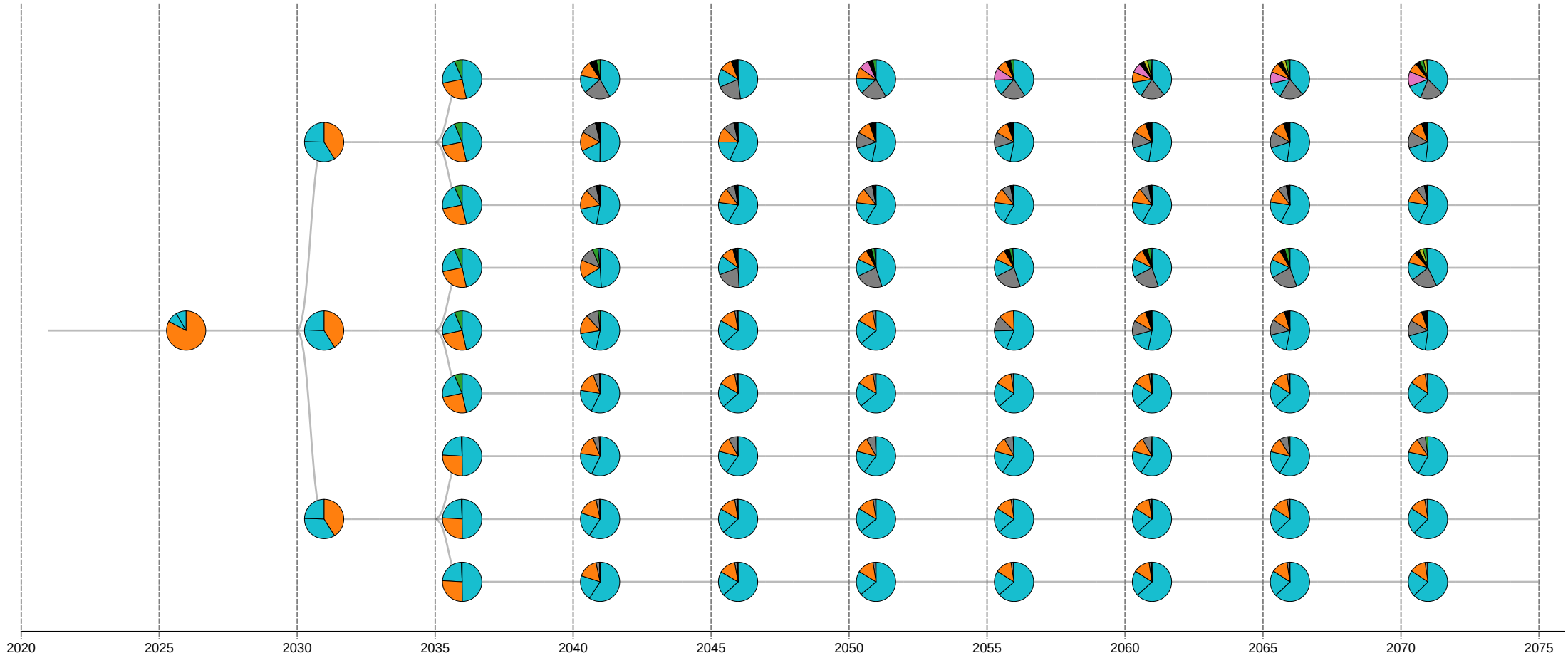
Option Selection (Thames Water)



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.



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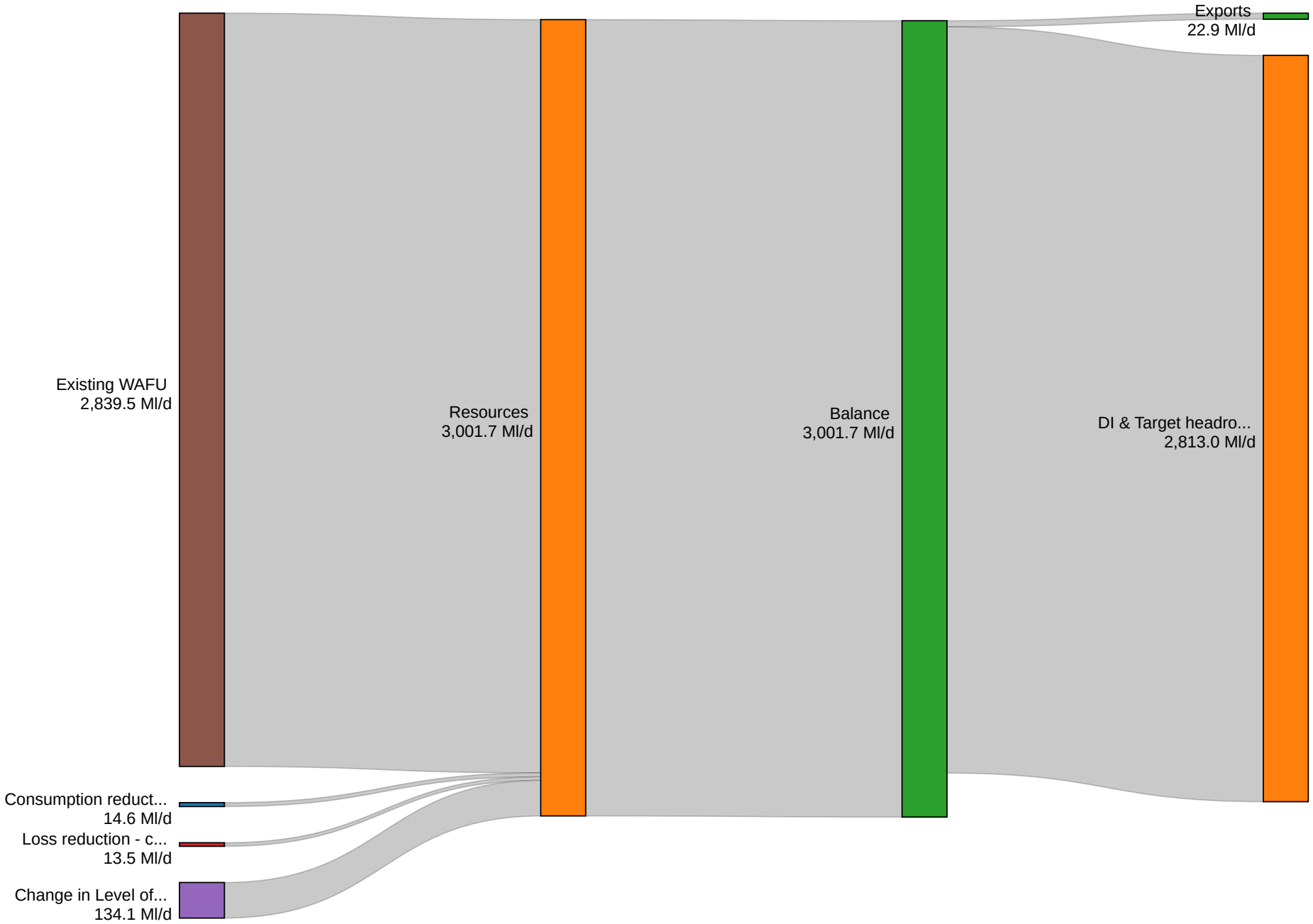
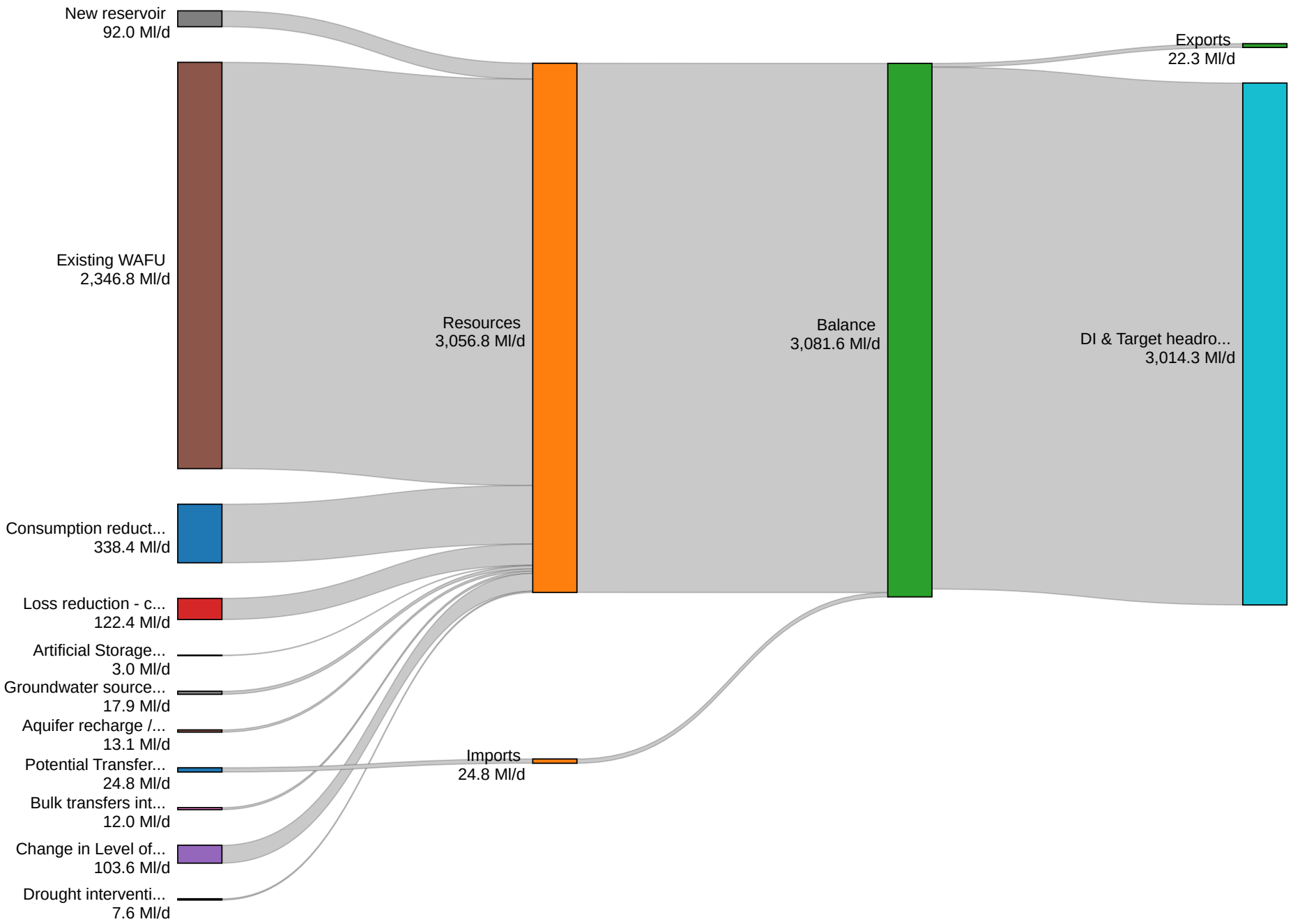
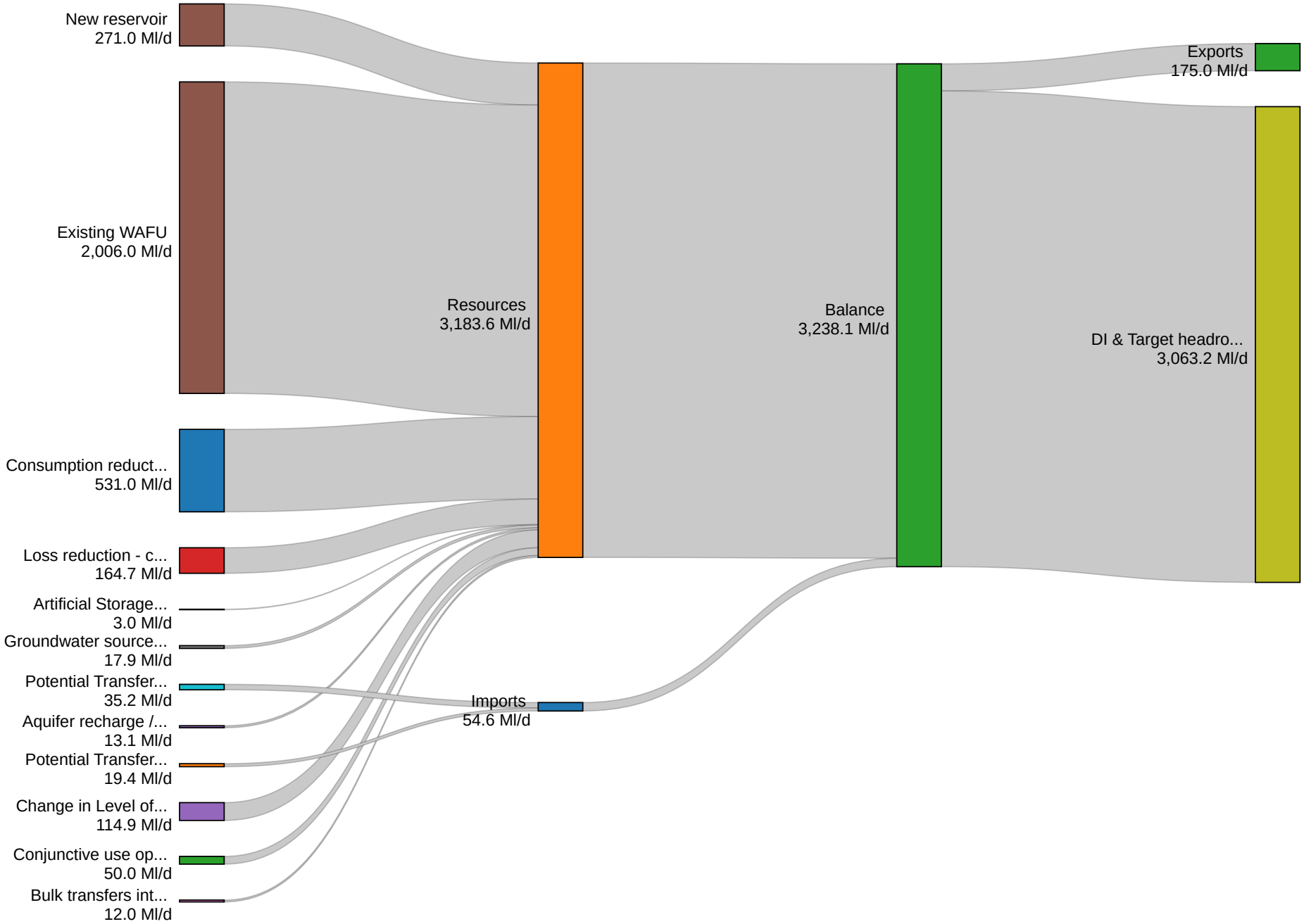
Situation 4 - 2026 (Thames Water)



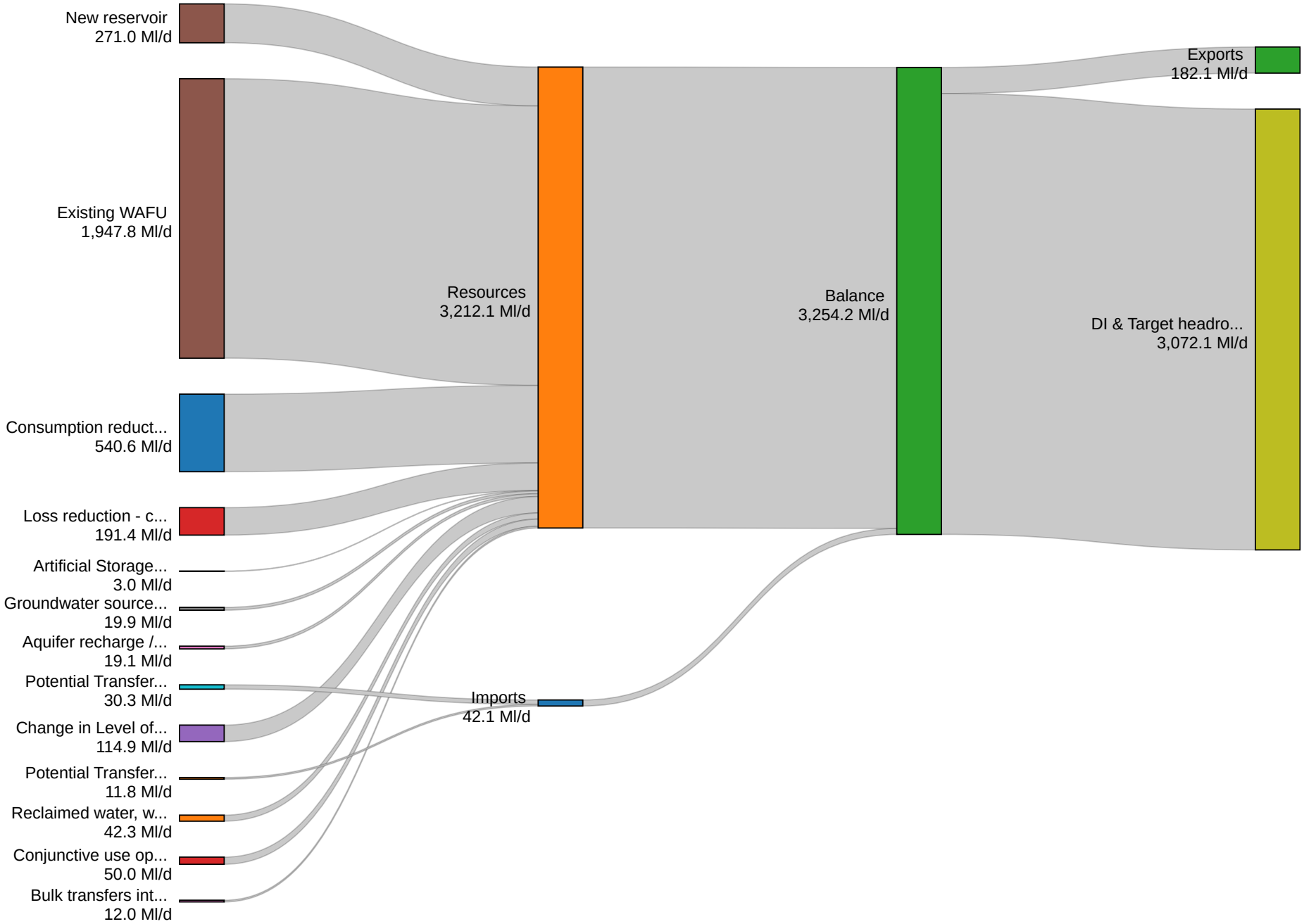
Situation 4 - 2040 (Thames Water)



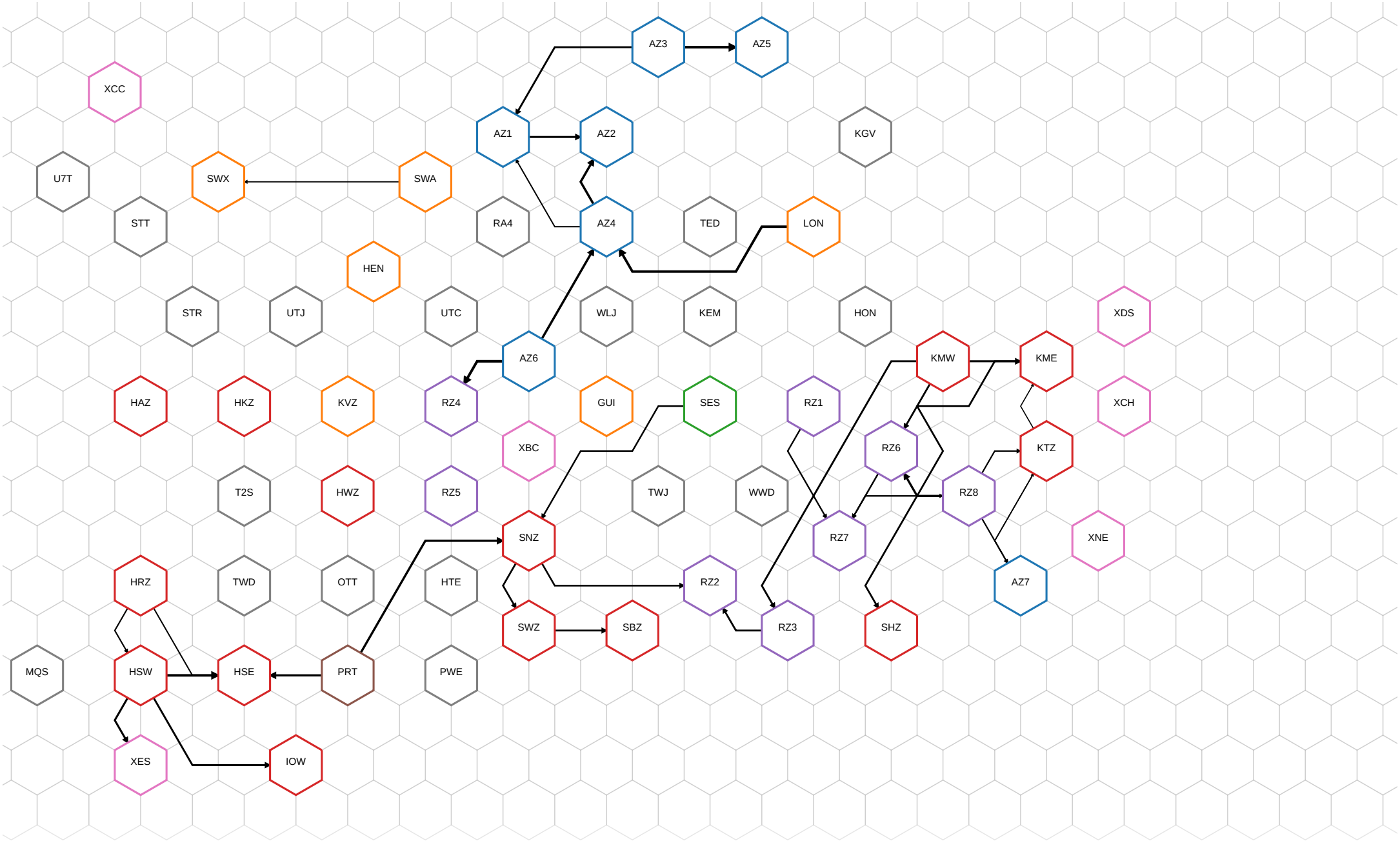
Situation 4 - 2050 (Thames Water)



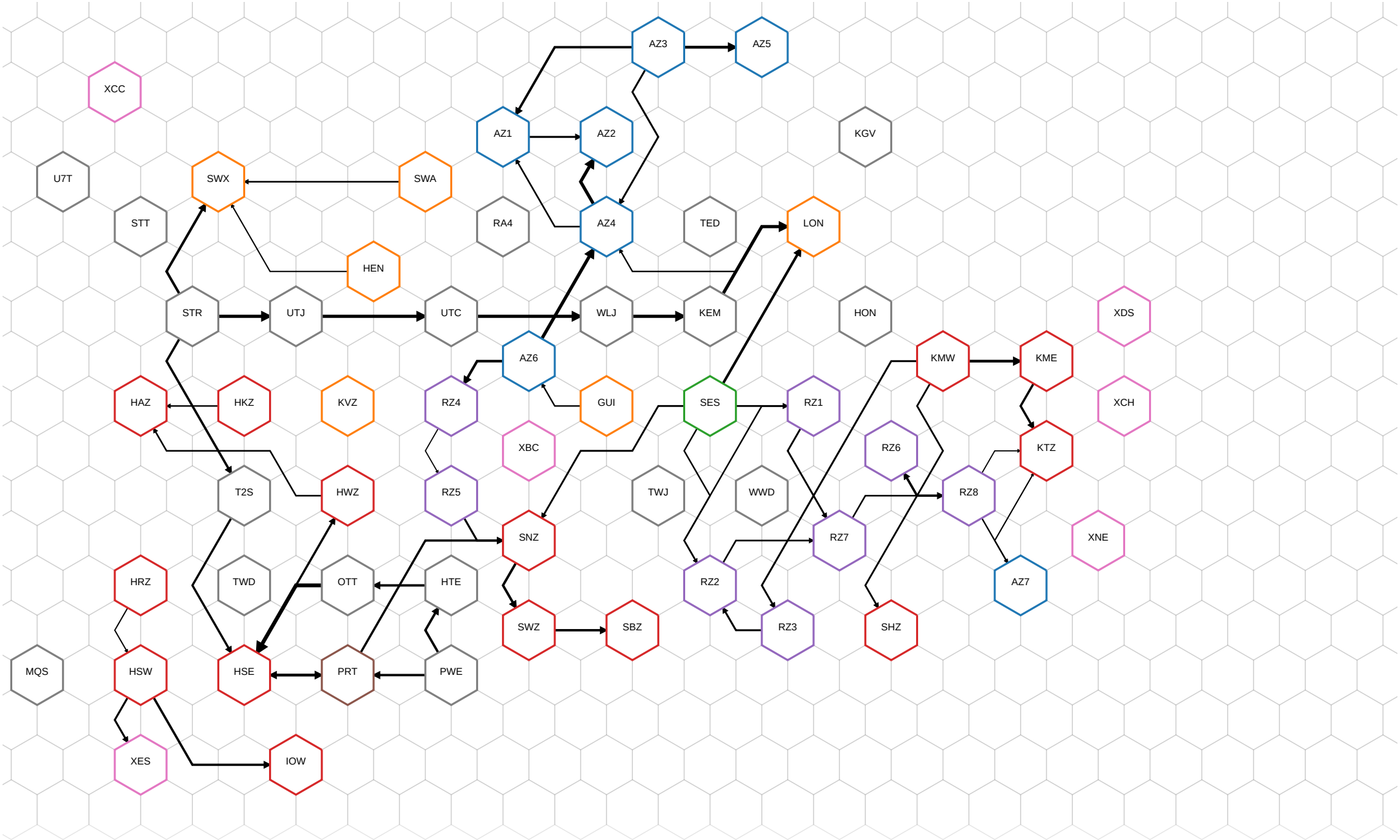
Situation 4 - 2075 (Thames Water)



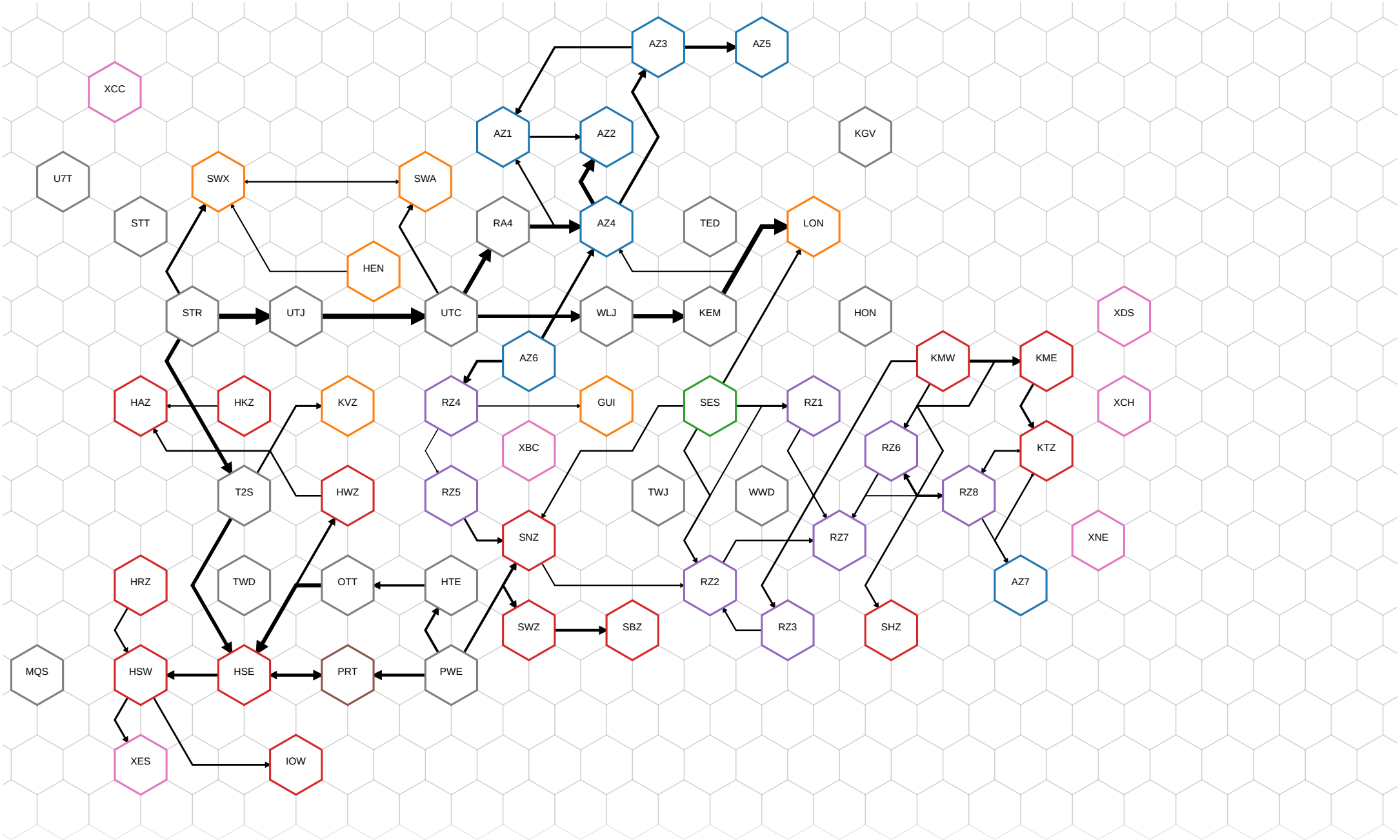
Situation 4 - 2026



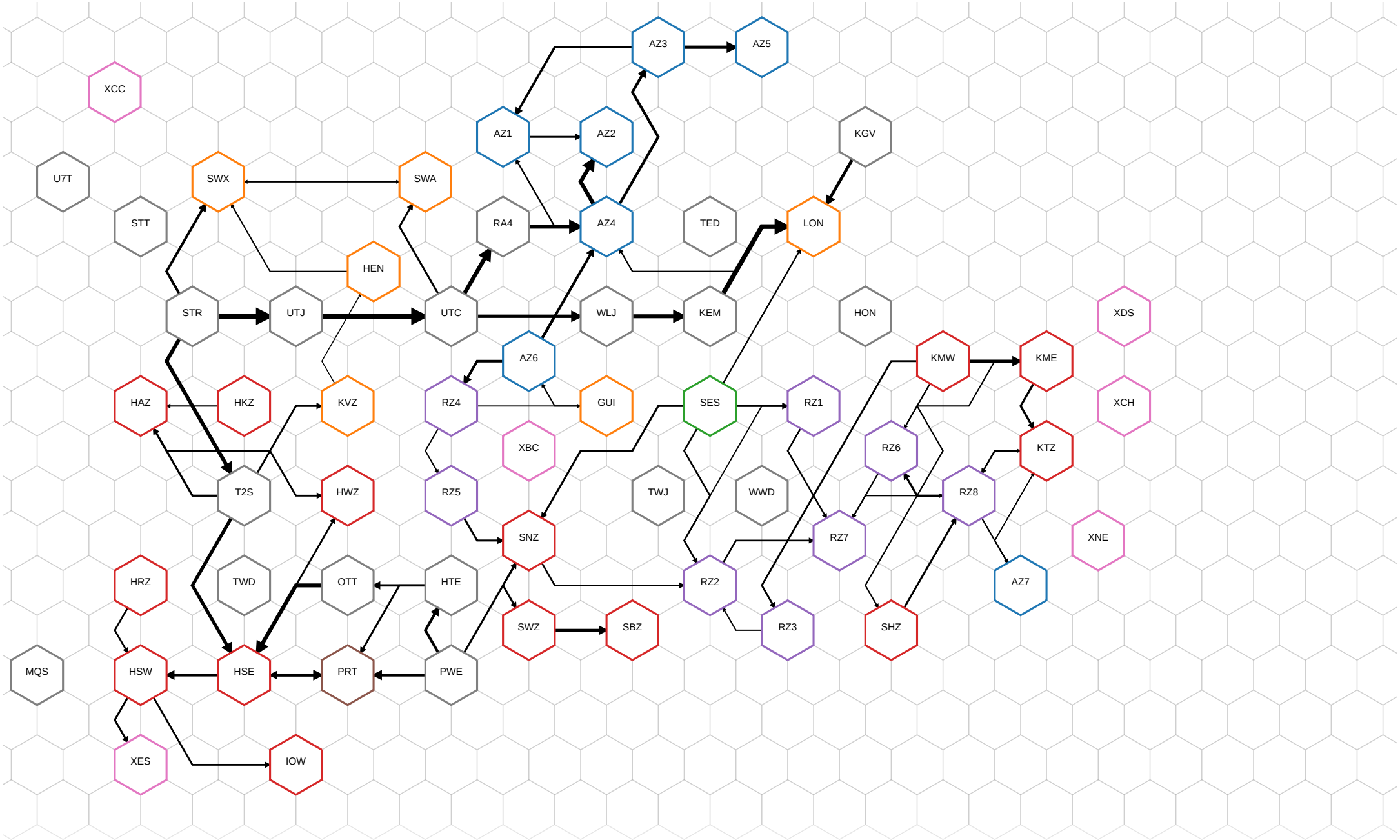
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

UPSIZE GRAND UNION CANAL TO 100Ml/d

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-only-guc100-2075
Description	Least cost run with hybrid-c+2 government interventions including only GUC 100 Ml/d.
Created at	22/06/2023, 20:42:01
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2-only-guc100
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets. Exclude all GUC variants except 100.
Optimised discount rate	STPR

Metrics

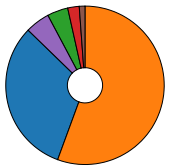
Net present value (Cost)

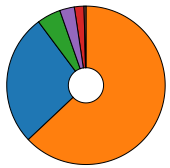
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	20,566	17,875	17,161	19,206	17,702	16,903	18,006	16,860	16,146	(£m)
Cost w/o deficit (STPR)	20,566	17,875	17,161	19,206	17,702	16,903	18,006	16,860	16,146	(£m)
Cost w/ deficit (IGEQ)	31,304	26,210	24,920	28,734	25,925	24,506	26,680	24,529	23,242	(£m)
Cost w/o deficit (IGEQ)	31,304	26,210	24,920	28,734	25,925	24,506	26,680	24,529	23,242	(£m)
Cost w/ deficit (LTDR)	22,648	19,517	18,696	21,067	19,323	18,408	19,706	18,376	17,555	(£m)
Cost w/o deficit (LTDR)	22,648	19,517	18,696	21,067	19,323	18,408	19,706	18,376	17,555	(£m)

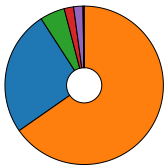
Cost breakdown (STPR)

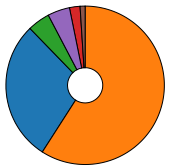
Select Company: Total

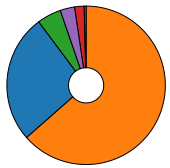
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	6,510	4,794	4,390	5,506	4,653	4,168	4,694	4,077	3,633	(£m)
Fixed opex	11,436	11,256	11,205	11,347	11,245	11,185	11,267	11,193	11,132	(£m)
Fixed operational carbon	878	869	870	877	870	870	870	867	865	(£m)
Embedded carbon	483	353	328	415	346	316	340	294	267	(£m)
Variable opex	1,021	533	326	866	519	315	663	389	231	(£m)
Variable carbon opex	238	70	41	196	70	50	171	40	18	(£m)

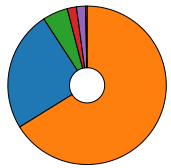
situation1 

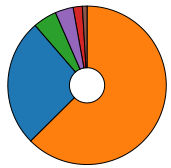
situation2 

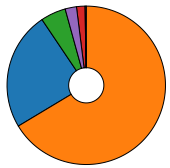
situation3 

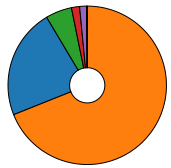
situation4 

situation5 

situation6 

situation7 

situation8 

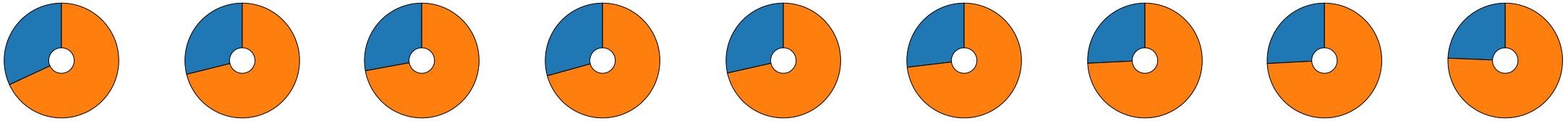
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,081,568	2,156,063	1,992,715	2,594,157	2,118,042	1,913,948	2,106,313	1,785,368	1,602,560	(tonnes)
Operational emissions	6,571,907	5,314,553	5,157,957	6,260,436	5,310,233	5,205,454	6,071,355	5,125,486	4,979,014	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

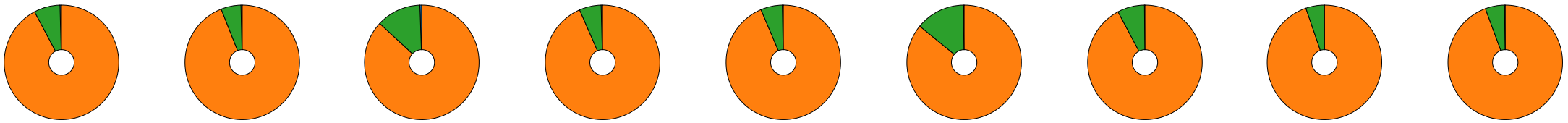


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	103	45	26	85	35	11	21	7	6	(GWh)
Grid	22,337	11,396	4,277	19,155	10,962	3,870	13,741	7,939	2,878	(GWh)
Renewable	1,781	681	619	1,261	713	625	1,138	433	165	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	68,515.00	63,551.00	62,688.00	66,539.00	63,015.00	61,850.00	63,330.00	61,291.00	60,204.00	
SEA environmental disbenefit	109,015.00	78,542.00	71,683.00	97,200.00	77,217.00	71,198.00	83,233.00	68,247.00	58,966.00	
Natural capital	81,887,549.10	77,234,492.45	80,088,601.40	77,452,821.35	79,110,259.29	81,914,789.99	64,491,607.56	65,102,274.08	68,004,090.22	
Bio-diversity net gain	−207,955.00	−149,142.00	−119,042.00	−185,990.00	−139,275.00	−113,109.00	−136,409.00	−96,987.00	−67,437.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	33,692.00	31,651.00	31,253.00	32,962.00	31,570.00	31,113.00	31,676.00	30,730.00	30,209.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	28.91	29.62	32.43	28.05	29.12	31.71	27.51	30.22	33.51	
R1: Uncertainty of option supply/demand benefit	5.97	5.52	6.03	5.62	5.43	5.86	5.22	5.60	6.17	
R3: Risk of service failure due to other physical hazards	6.95	7.35	8.22	6.81	7.22	8.03	6.69	7.55	8.60	
R4: Availability of additional headroom	6.62	6.95	7.16	6.63	6.92	7.12	7.04	7.38	7.62	
R5: Catchment/raw water quality risks (incl. climate change)	4.06	4.16	4.69	3.72	4.06	4.57	3.67	4.17	4.82	
R6: Capacity of catchment services	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
R7: Risk of service failure to other exceptional events	5.33	5.64	6.32	5.25	5.49	6.13	4.88	5.52	6.31	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

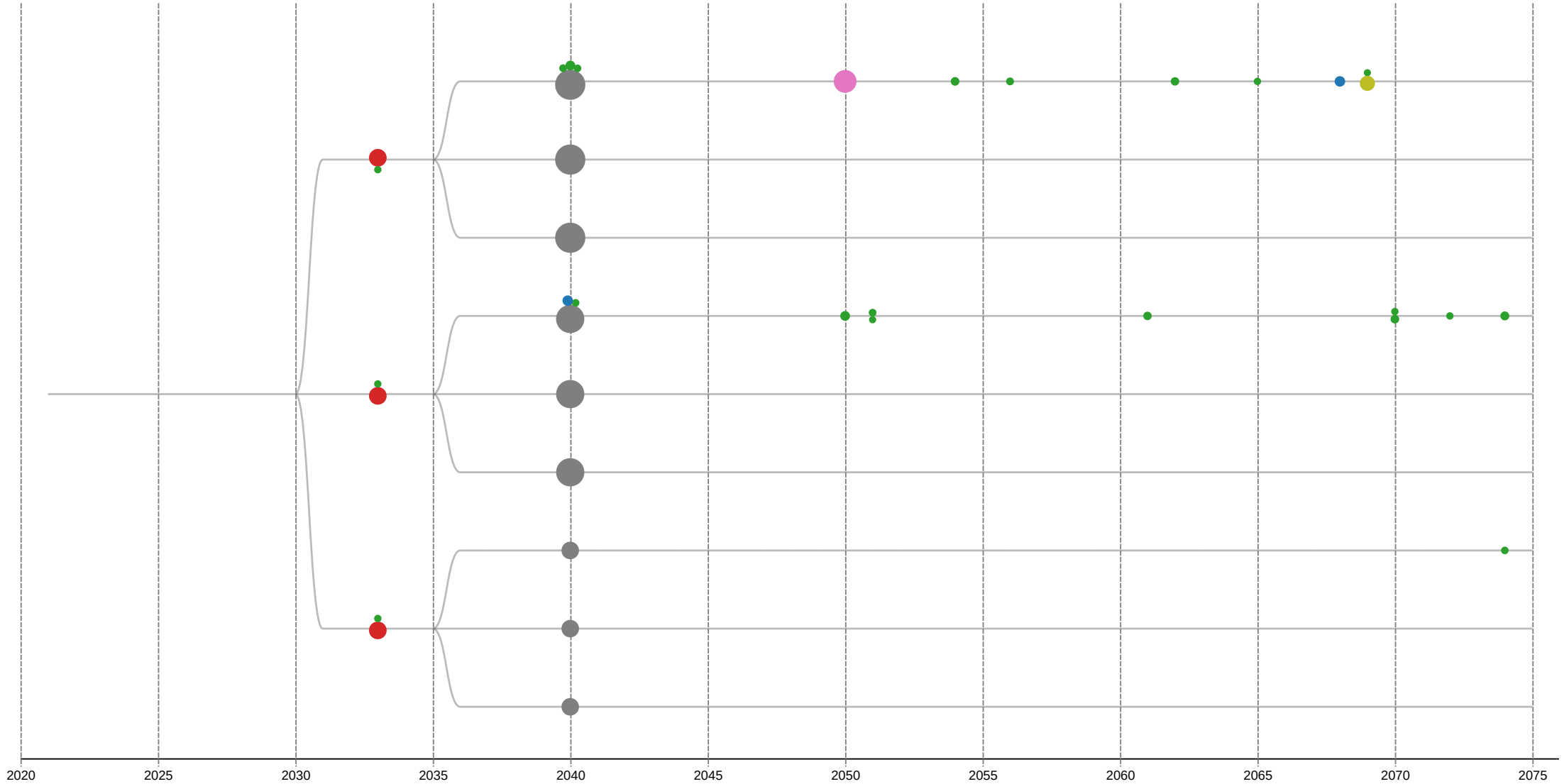
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	13.90	15.63	17.50	14.05	15.46	16.97	14.98	17.12	19.46	
A3: Operational complexity and flexibility	6.49	7.07	7.94	6.49	6.94	7.78	6.36	7.28	8.35	
A4: WRZ connectivity	7.39	8.53	9.53	7.54	8.49	9.15	8.59	9.82	11.08	
A7: Customer relations support engagement with demand management	0.02	0.03	0.03	0.02	0.03	0.03	0.03	0.03	0.03	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.05	20.02	22.09	18.87	20.05	21.97	20.13	22.78	25.80	
E1: Scaleability and modularity of proposed changes	8.73	9.35	10.42	8.70	9.40	10.44	9.57	10.94	12.45	
E2: Intervention lead times	4.17	4.22	4.49	4.05	4.19	4.38	4.08	4.48	4.96	
E3: Reliance on external bodies to deliver changes	6.15	6.44	7.18	6.12	6.46	7.16	6.49	7.37	8.38	
E5: Collaborative land management	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

Option Selection (Thames Water)



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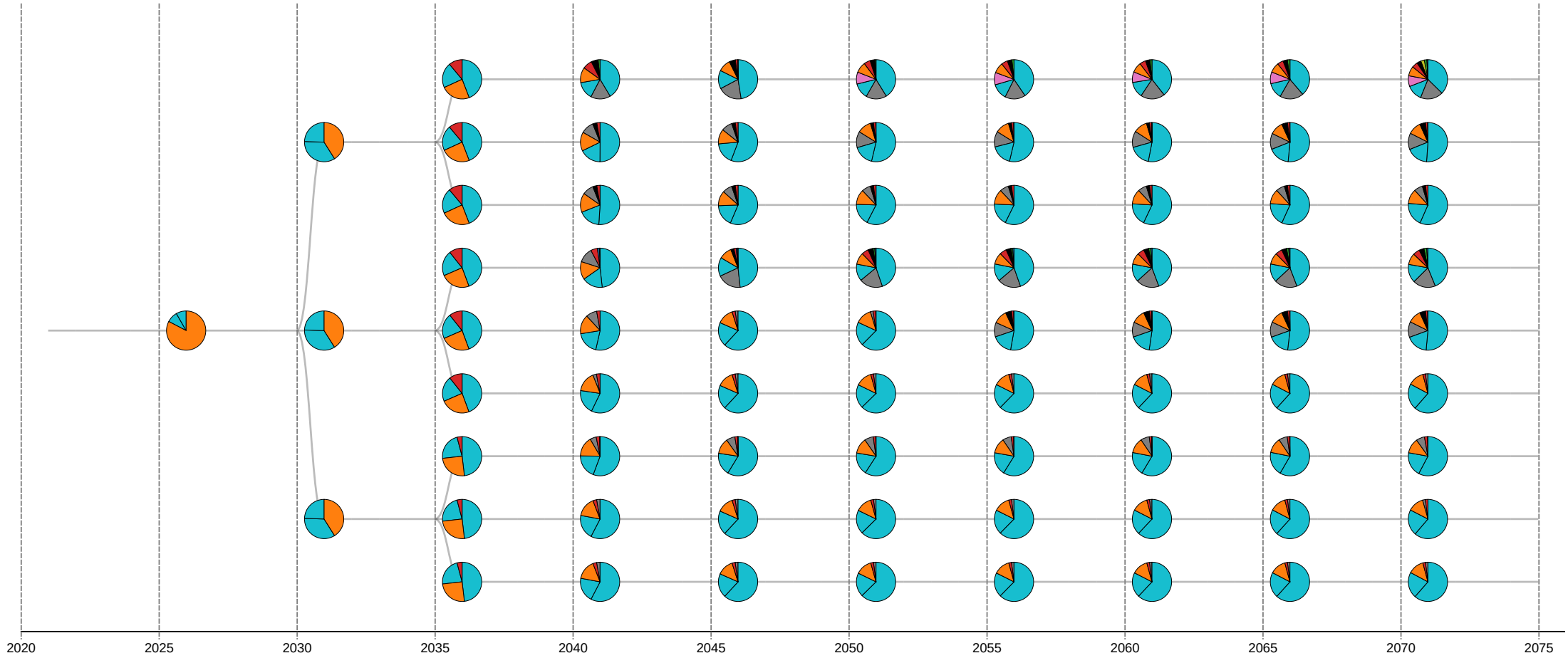
Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.



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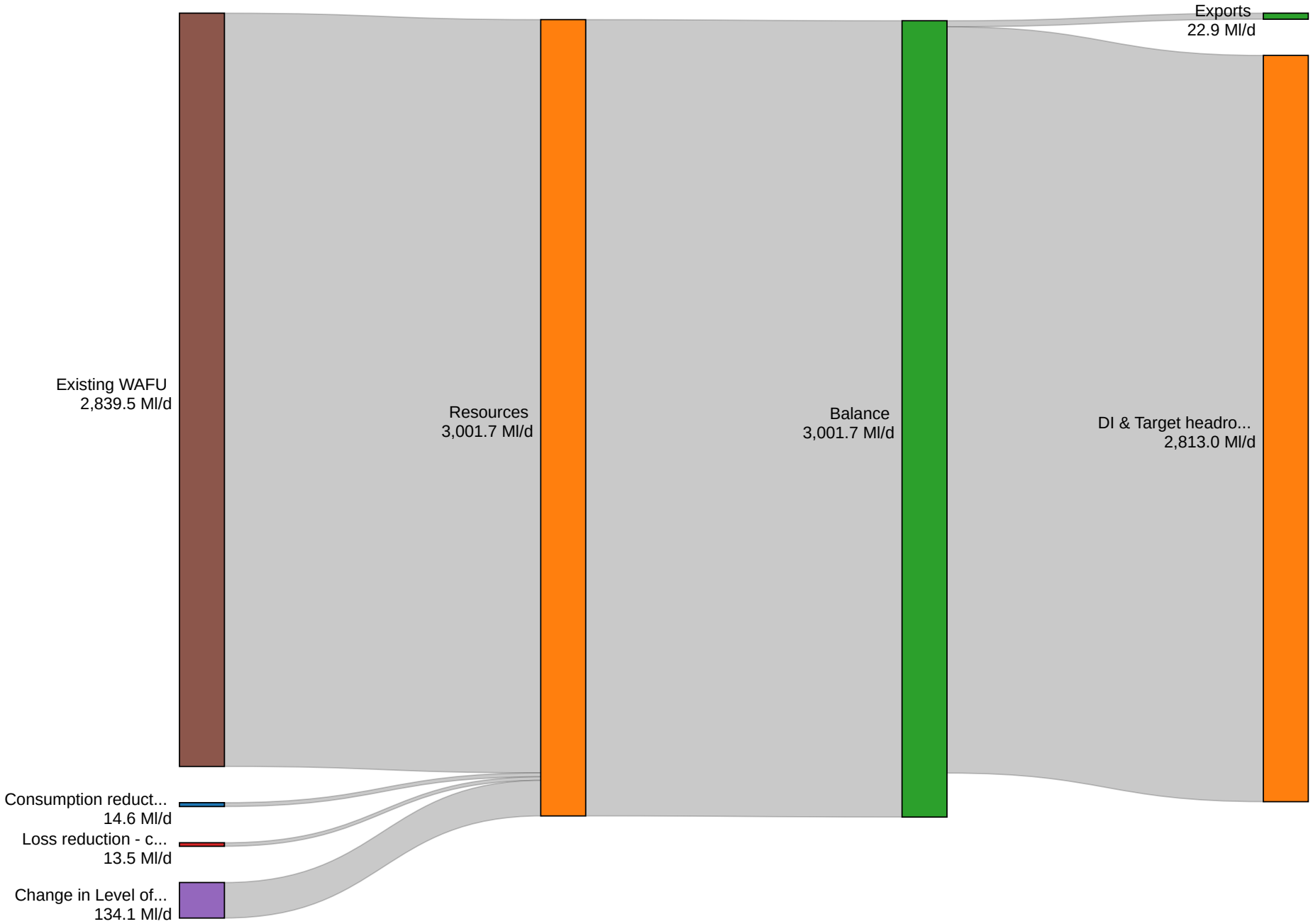
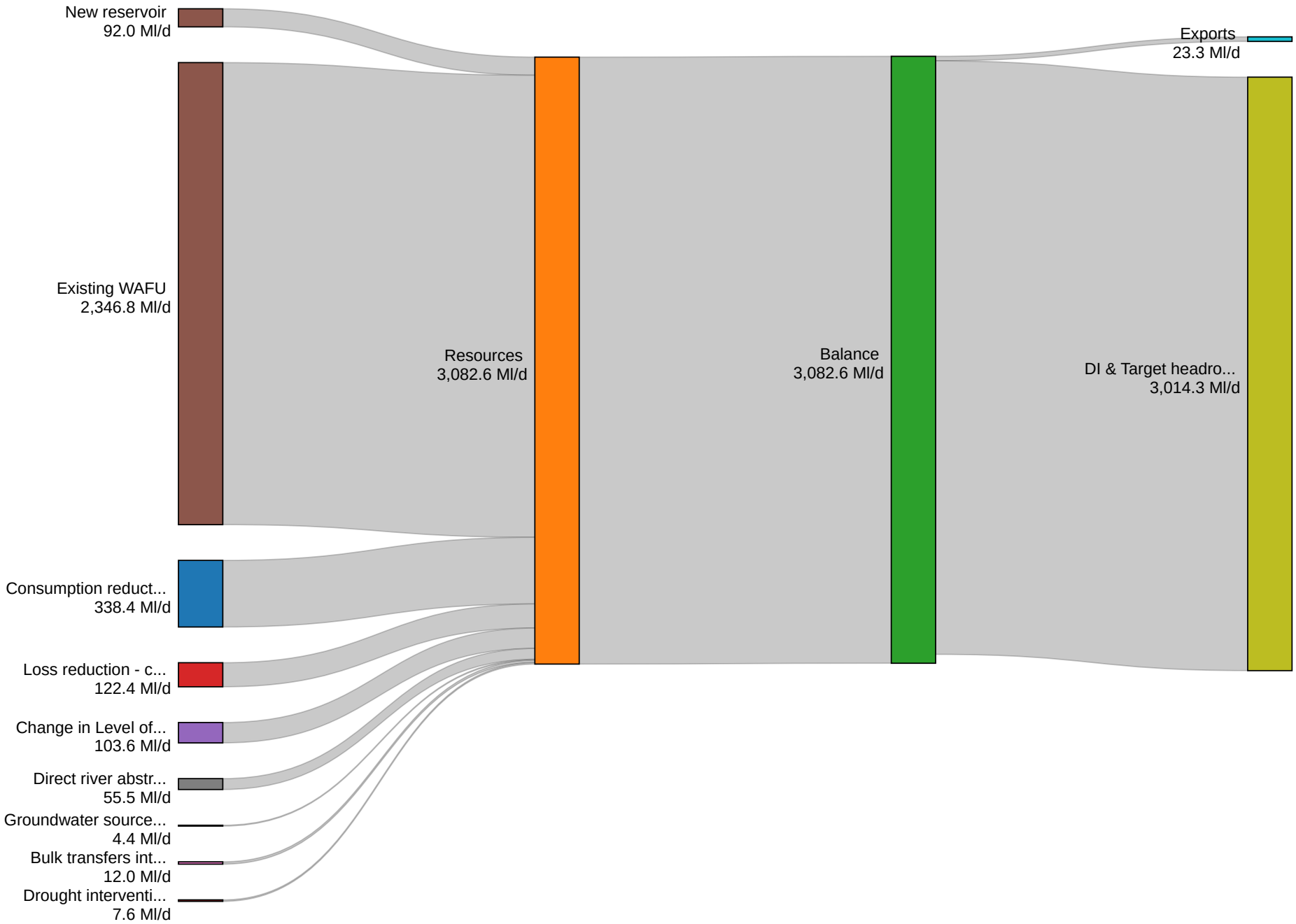
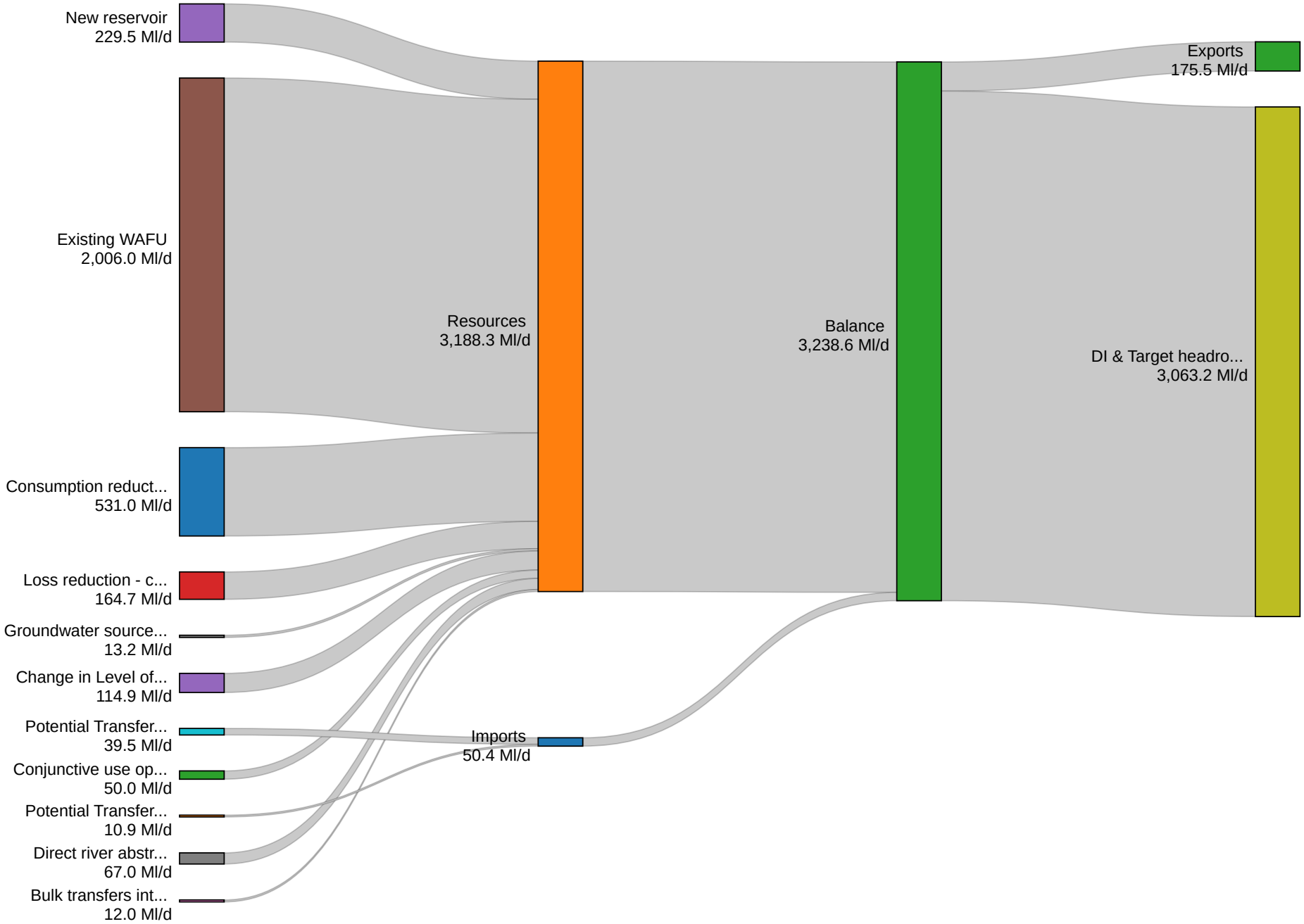
Situation 4 - 2026 (Thames Water)



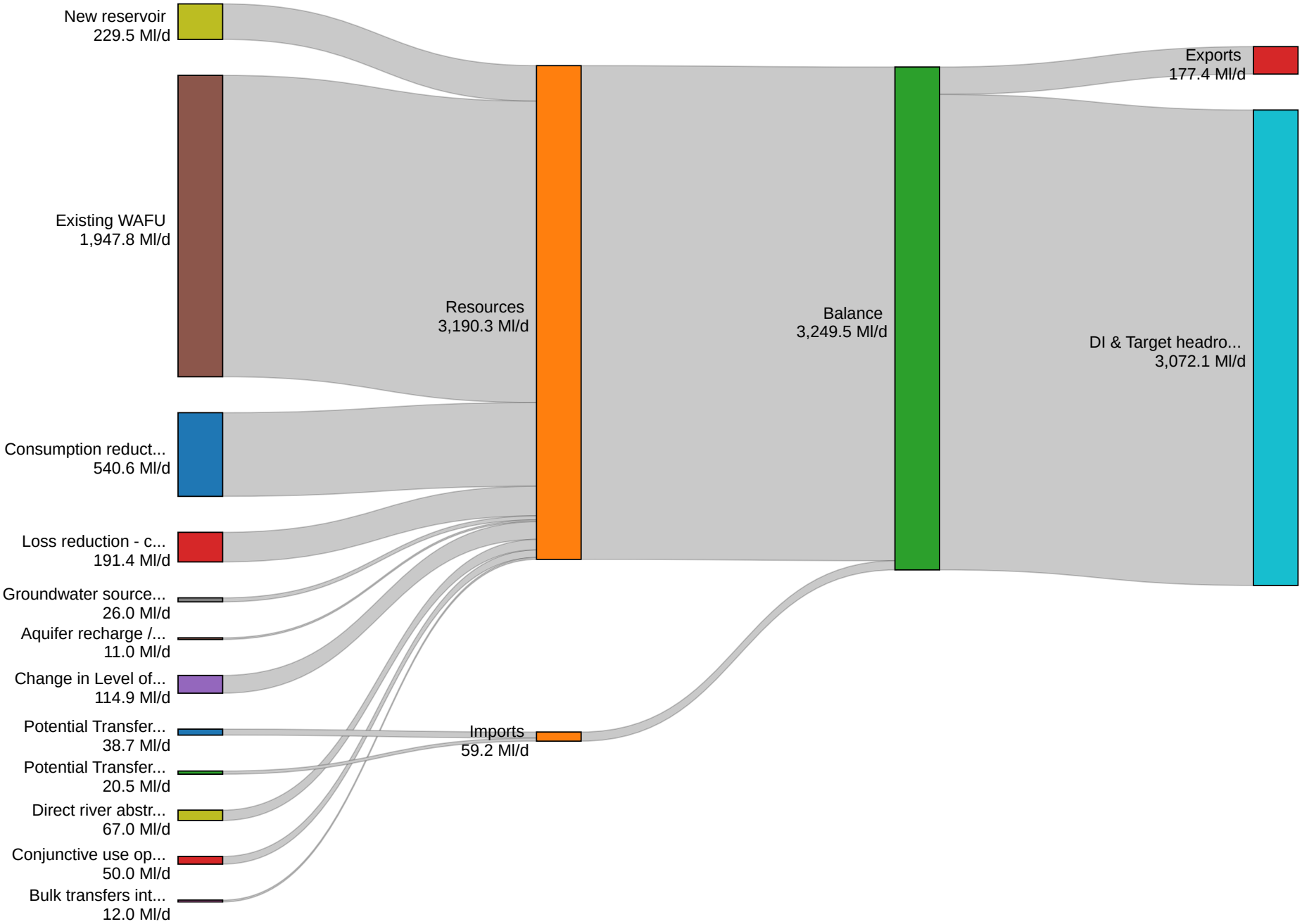
Situation 4 - 2040 (Thames Water)



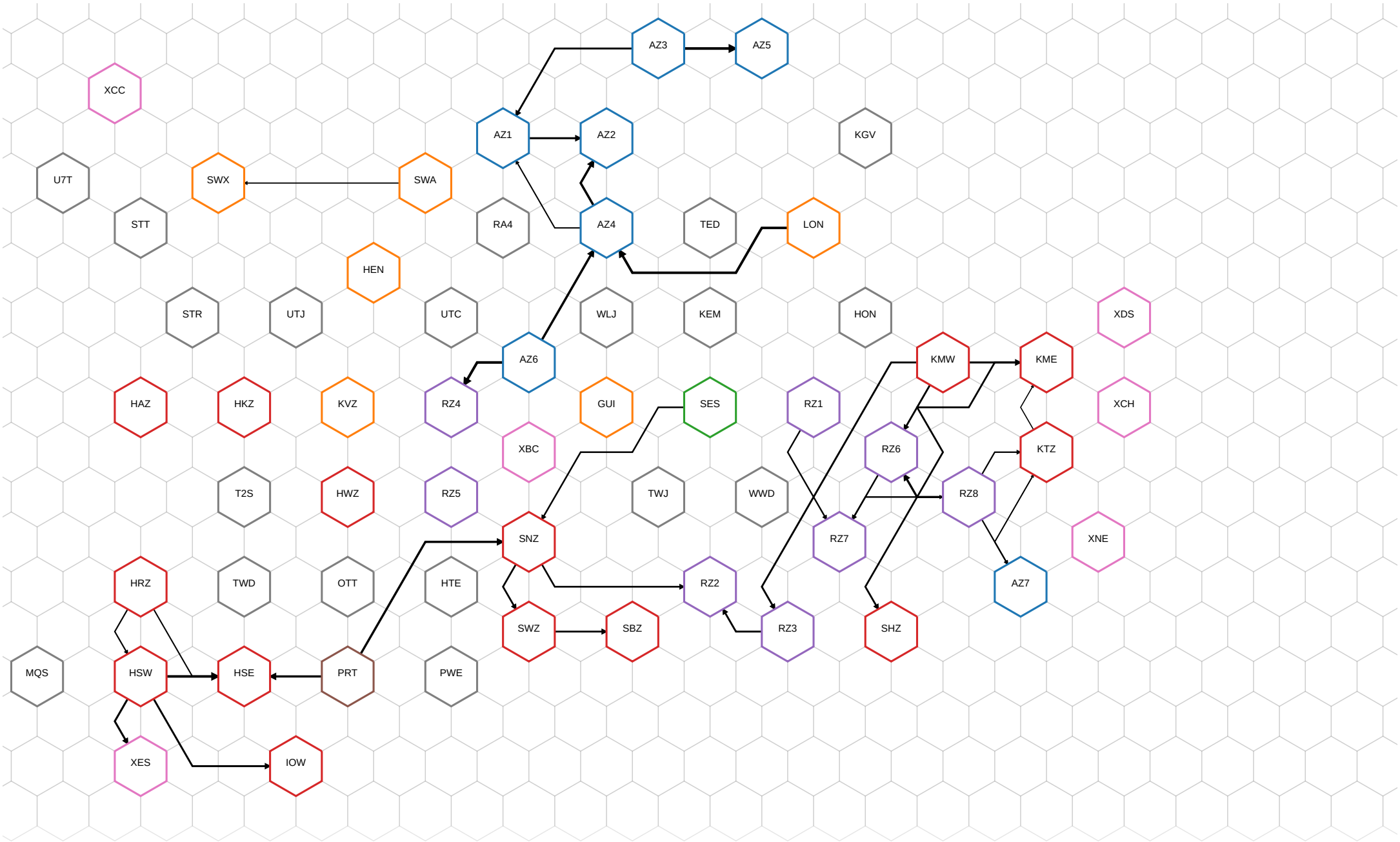
Situation 4 - 2050 (Thames Water)



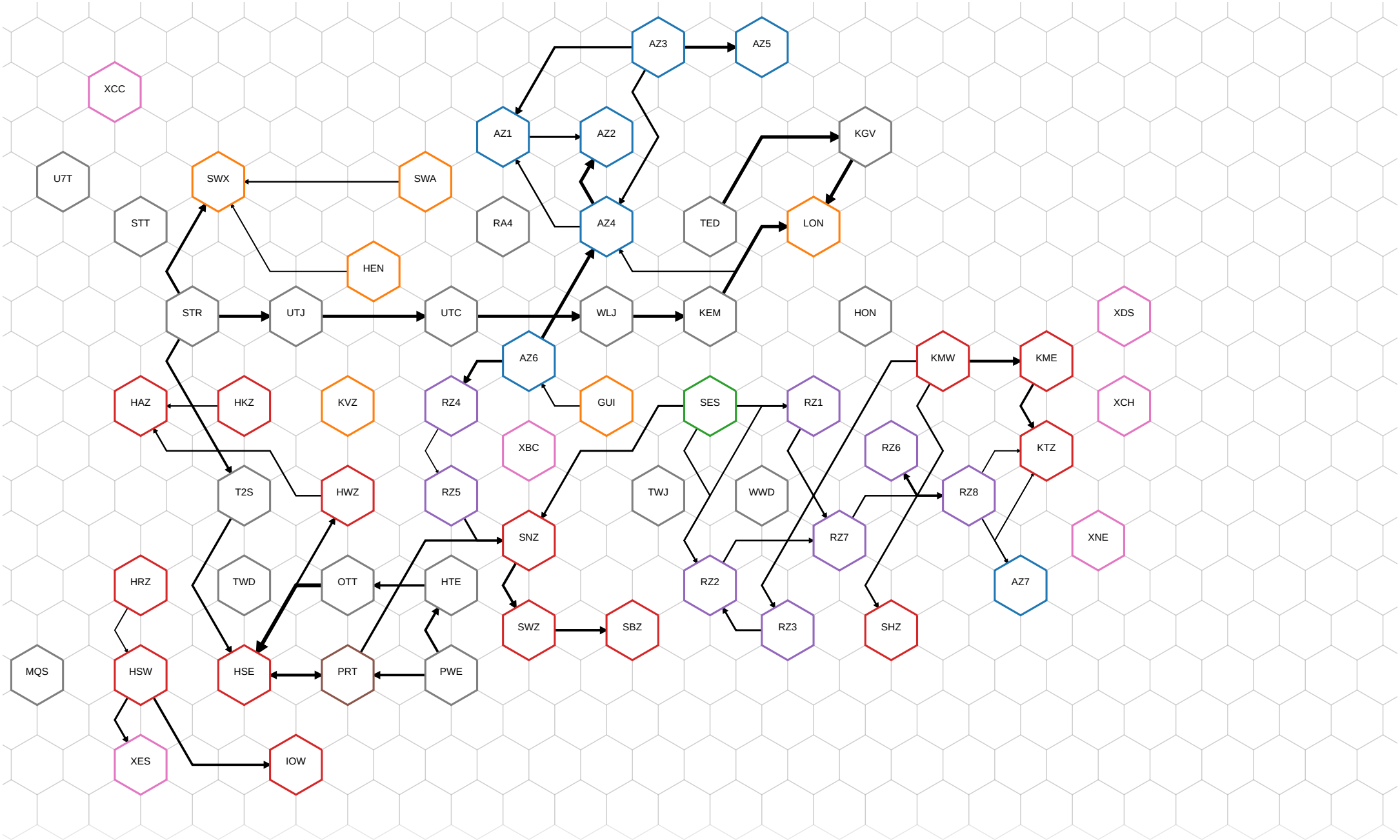
Situation 4 - 2075 (Thames Water)



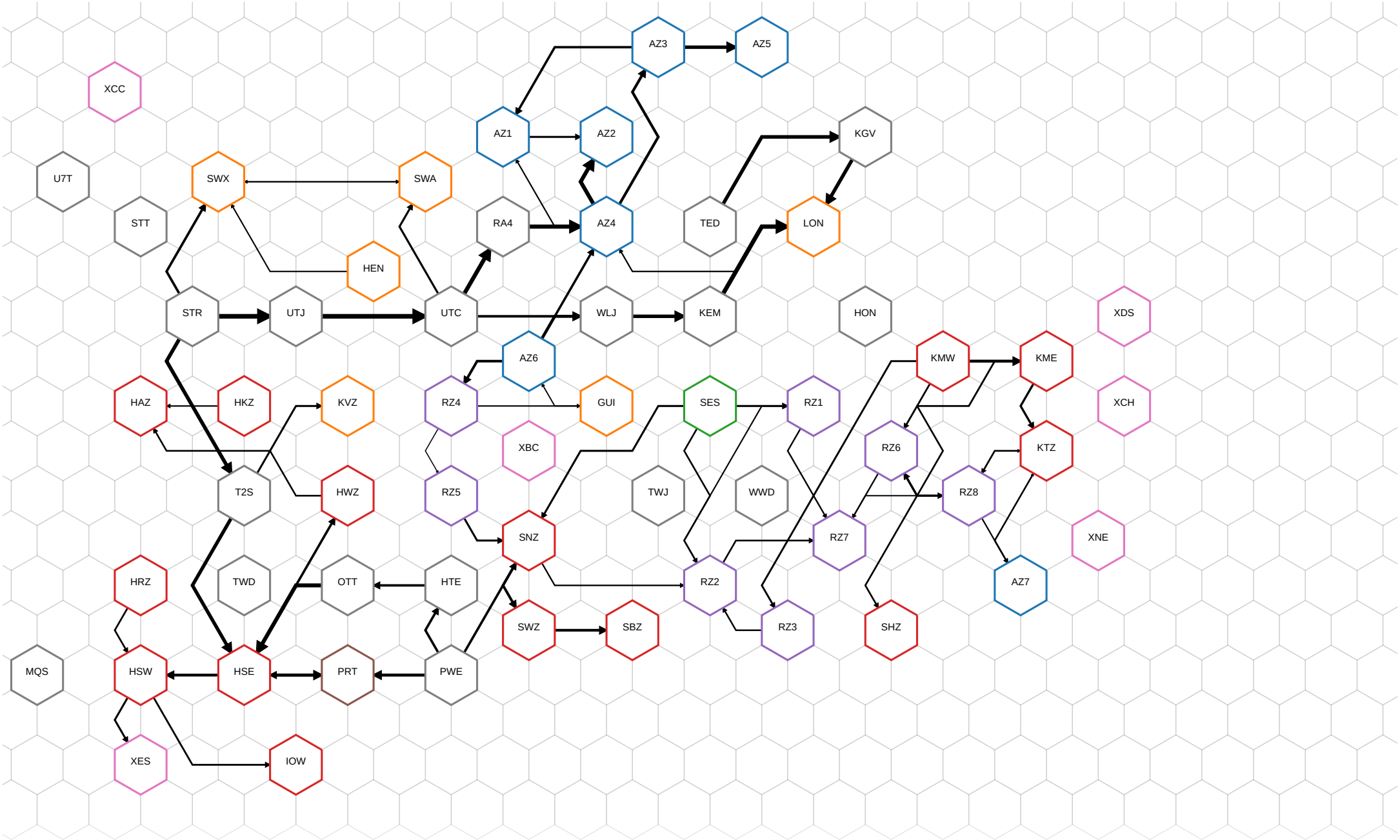
Situation 4 - 2026



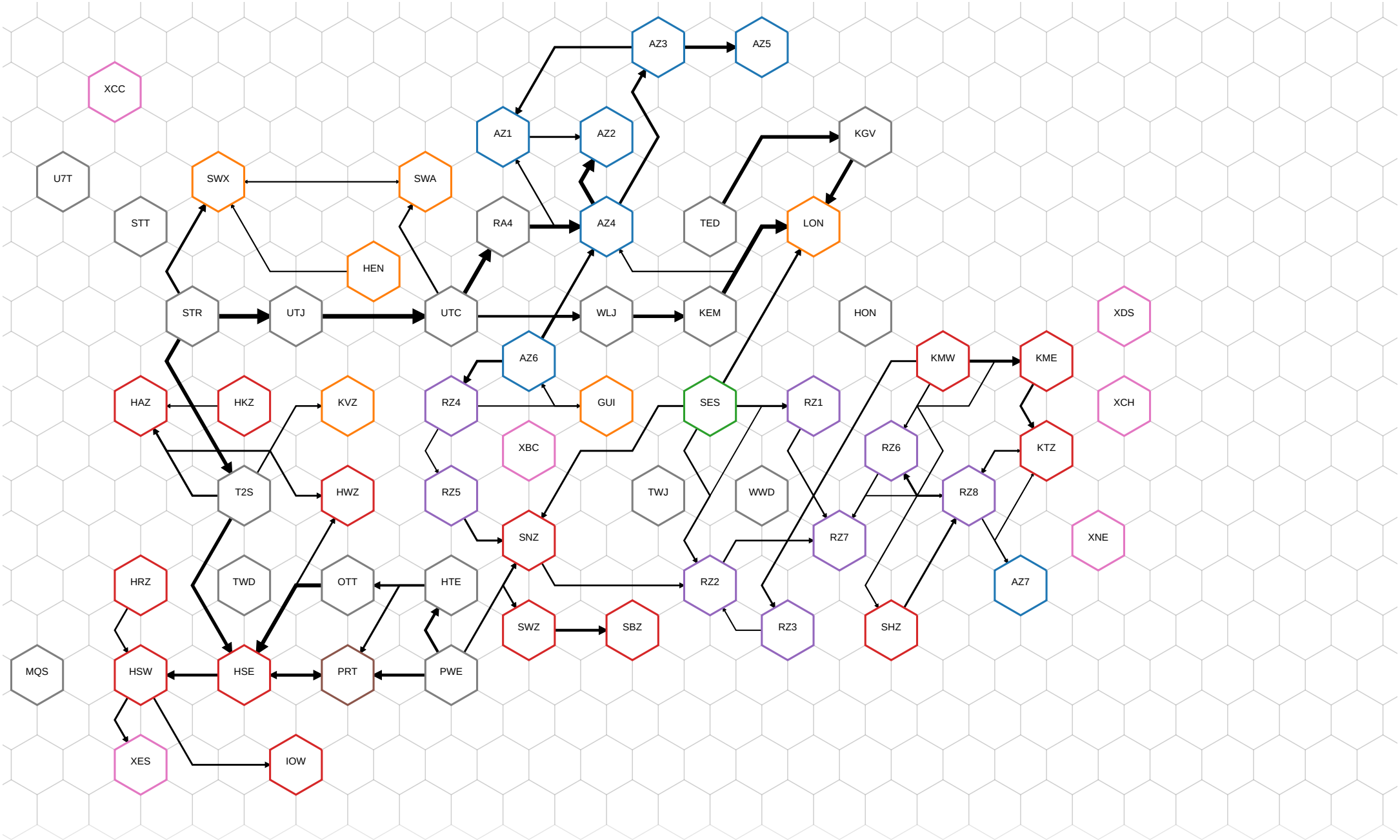
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

BECKTON RECYCLING 50 IN 2033

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-force-beckton-reuse50-2033-2075
Description	Least cost run with hybrid-c+2 government interventions forcing the selection of Beckton Reuse 50 Ml/d to be operational in 2033.
Created at	03/07/2023, 12:03:16
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2-force-beckton-reuse50-2033
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets. Force Beckton Reuse 50 Ml/d to be operational in 2033 (selected 2029).
Optimised discount rate	STPR

Metrics

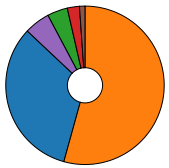
Net present value (Cost)

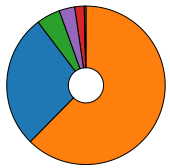
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	21,283	17,979	17,306	19,704	18,087	17,332	18,428	17,240	16,548	(£m)
Cost w/o deficit (STPR)	21,283	17,979	17,306	19,704	18,087	17,332	18,428	17,240	16,548	(£m)
Cost w/ deficit (IGEQ)	32,637	26,359	25,145	29,536	26,498	25,156	27,330	25,101	23,857	(£m)
Cost w/o deficit (IGEQ)	32,637	26,359	25,145	29,536	26,498	25,156	27,330	25,101	23,857	(£m)
Cost w/ deficit (LTDR)	23,477	19,630	18,857	21,623	19,745	18,880	20,173	18,793	17,999	(£m)
Cost w/o deficit (LTDR)	23,477	19,630	18,857	21,623	19,745	18,880	20,173	18,793	17,999	(£m)

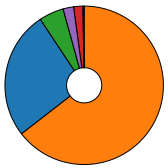
Cost breakdown (STPR)

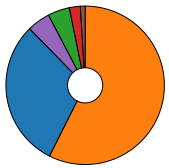
Select Company: Total

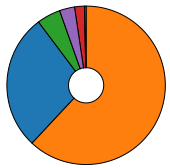
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	6,964	4,911	4,528	5,958	5,028	4,579	5,114	4,425	3,992	(£m)
Fixed opex	11,556	11,214	11,163	11,312	11,205	11,149	11,229	11,152	11,092	(£m)
Fixed operational carbon	888	873	874	882	874	874	874	871	870	(£m)
Embedded carbon	528	352	329	442	364	335	361	312	288	(£m)
Variable opex	1,110	569	370	921	556	356	698	438	284	(£m)
Variable carbon opex	236	61	41	189	60	39	152	42	23	(£m)

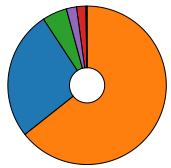
situation1 

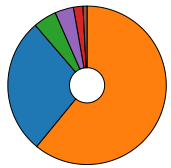
situation2 

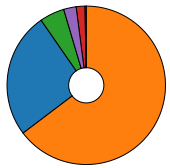
situation3 

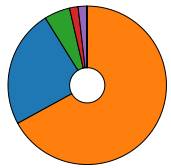
situation4 

situation5 

situation6 

situation7 

situation8 

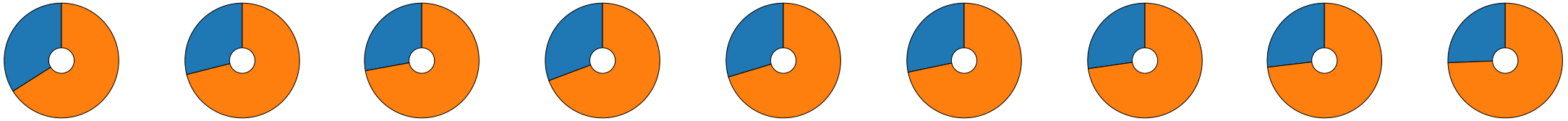
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,412,696	2,151,035	1,999,849	2,772,458	2,227,575	2,034,305	2,236,246	1,896,228	1,734,609	(tonnes)
Operational emissions	6,633,204	5,279,696	5,177,930	6,255,402	5,285,733	5,158,876	5,961,677	5,162,189	5,035,625	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

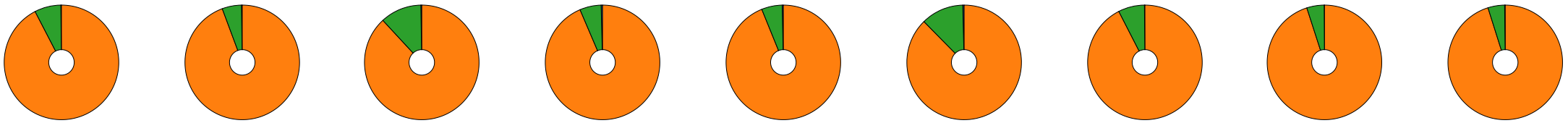


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	48	29	14	87	40	20	21	7	6	(GWh)
Grid	23,350	11,787	4,657	19,728	11,404	4,368	14,208	8,403	3,350	(GWh)
Renewable	1,877	681	614	1,270	706	598	1,138	433	165	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	69,869.00	63,885.00	63,041.00	67,308.00	63,603.00	62,636.00	63,979.00	61,697.00	60,641.00	
SEA environmental disbenefit	117,832.00	84,611.00	78,250.00	102,921.00	82,773.00	77,111.00	88,979.00	73,319.00	64,472.00	
Natural capital	84,182,092.18	81,348,116.51	84,192,537.37	77,189,984.98	79,147,510.69	81,793,230.24	64,321,450.42	65,140,406.87	68,012,329.22	
Bio-diversity net gain	−198,223.00	−118,589.00	−91,993.00	−196,564.00	−141,085.00	−116,694.00	−142,401.00	−97,851.00	−68,797.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	34,358.00	31,942.00	31,616.00	33,326.00	31,861.00	31,531.00	31,960.00	30,953.00	30,463.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	27.64	26.92	29.42	27.84	28.50	31.12	26.86	29.45	32.63	
R1: Uncertainty of option supply/demand benefit	5.74	4.98	5.43	5.57	5.32	5.76	5.10	5.45	6.00	
R3: Risk of service failure due to other physical hazards	6.62	6.61	7.40	6.76	7.05	7.87	6.52	7.34	8.36	
R4: Availability of additional headroom	6.40	6.75	6.96	6.60	6.87	7.08	6.98	7.32	7.56	
R5: Catchment/raw water quality risks (incl. climate change)	3.91	3.78	4.27	3.81	4.06	4.59	3.66	4.16	4.81	
R6: Capacity of catchment services	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
R7: Risk of service failure to other exceptional events	4.96	4.79	5.36	5.10	5.20	5.82	4.59	5.17	5.90	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

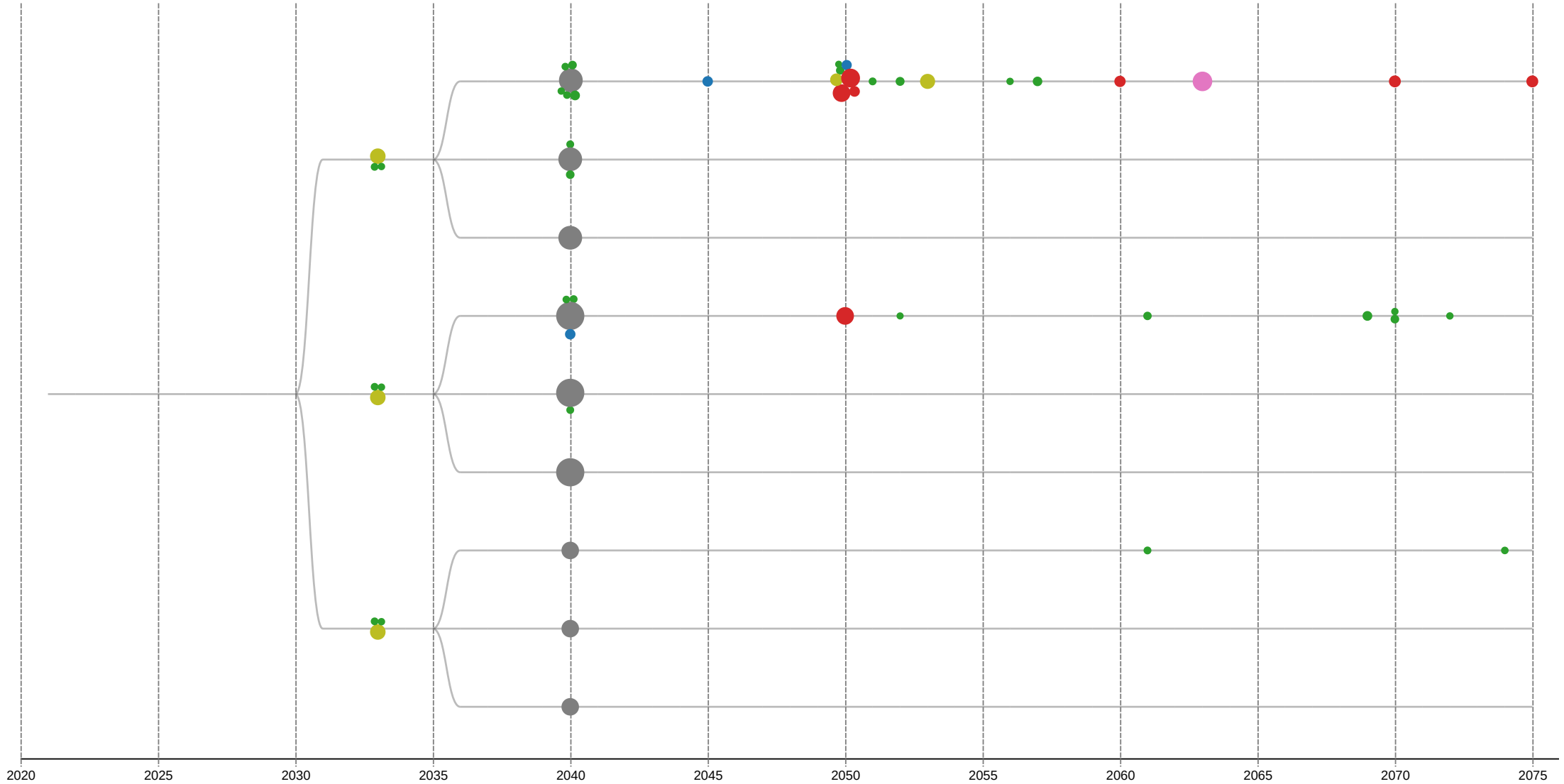
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	13.57	14.58	16.33	13.90	15.04	16.68	14.57	16.54	18.83	
A3: Operational complexity and flexibility	6.12	6.35	7.13	6.41	6.79	7.63	6.21	7.10	8.14	
A4: WRZ connectivity	7.43	8.20	9.17	7.46	8.22	9.01	8.33	9.41	10.66	
A7: Customer relations support engagement with demand management	0.02	0.03	0.03	0.02	0.03	0.03	0.03	0.03	0.03	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.52	19.56	21.73	18.75	19.76	21.74	19.84	22.38	25.34	
E1: Scaleability and modularity of proposed changes	8.89	9.29	10.36	8.69	9.28	10.33	9.44	10.79	12.28	
E2: Intervention lead times	4.39	3.97	4.35	3.96	4.04	4.26	3.94	4.26	4.71	
E3: Reliance on external bodies to deliver changes	6.24	6.30	7.02	6.10	6.43	7.16	6.46	7.34	8.34	
E5: Collaborative land management	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

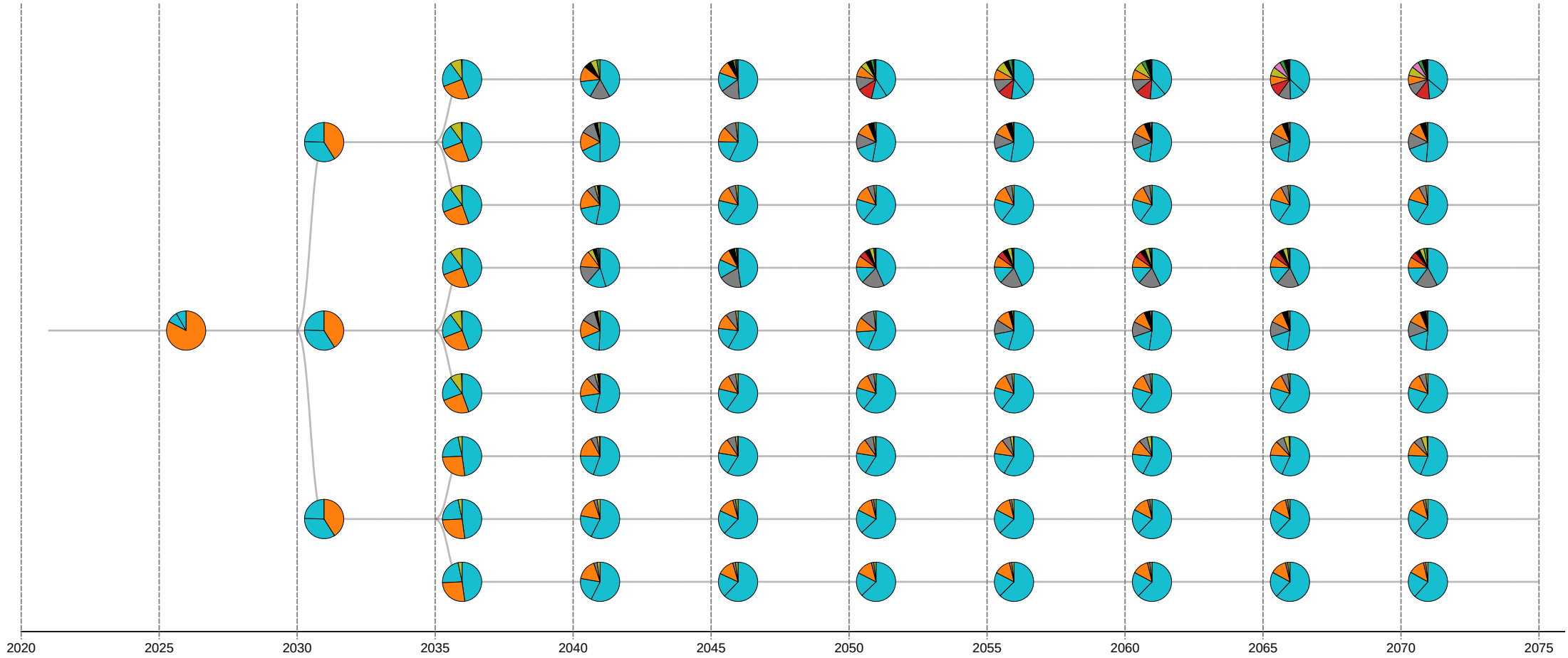
Option Selection (Thames Water)



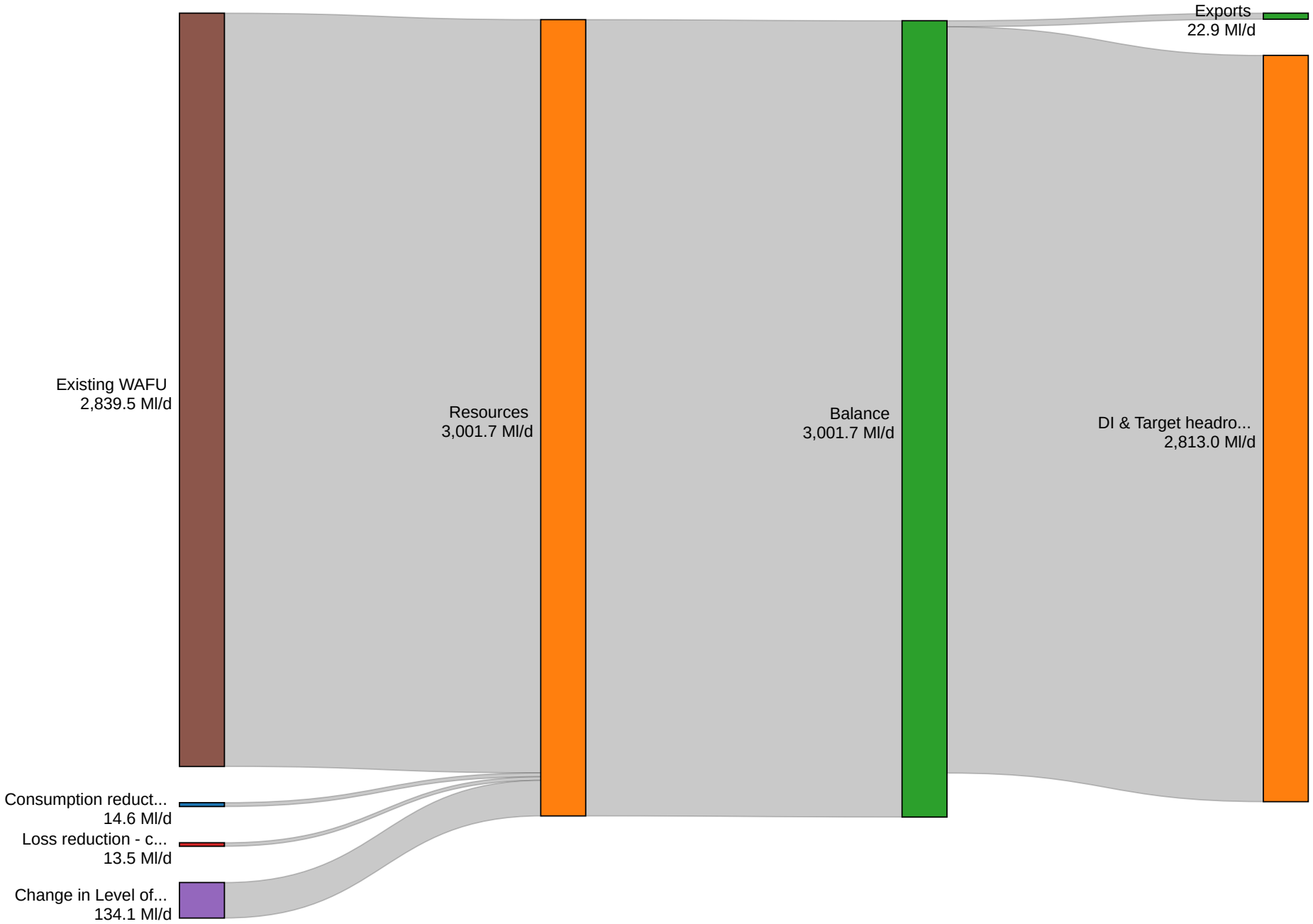
- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

Utilisation (Thames Water)

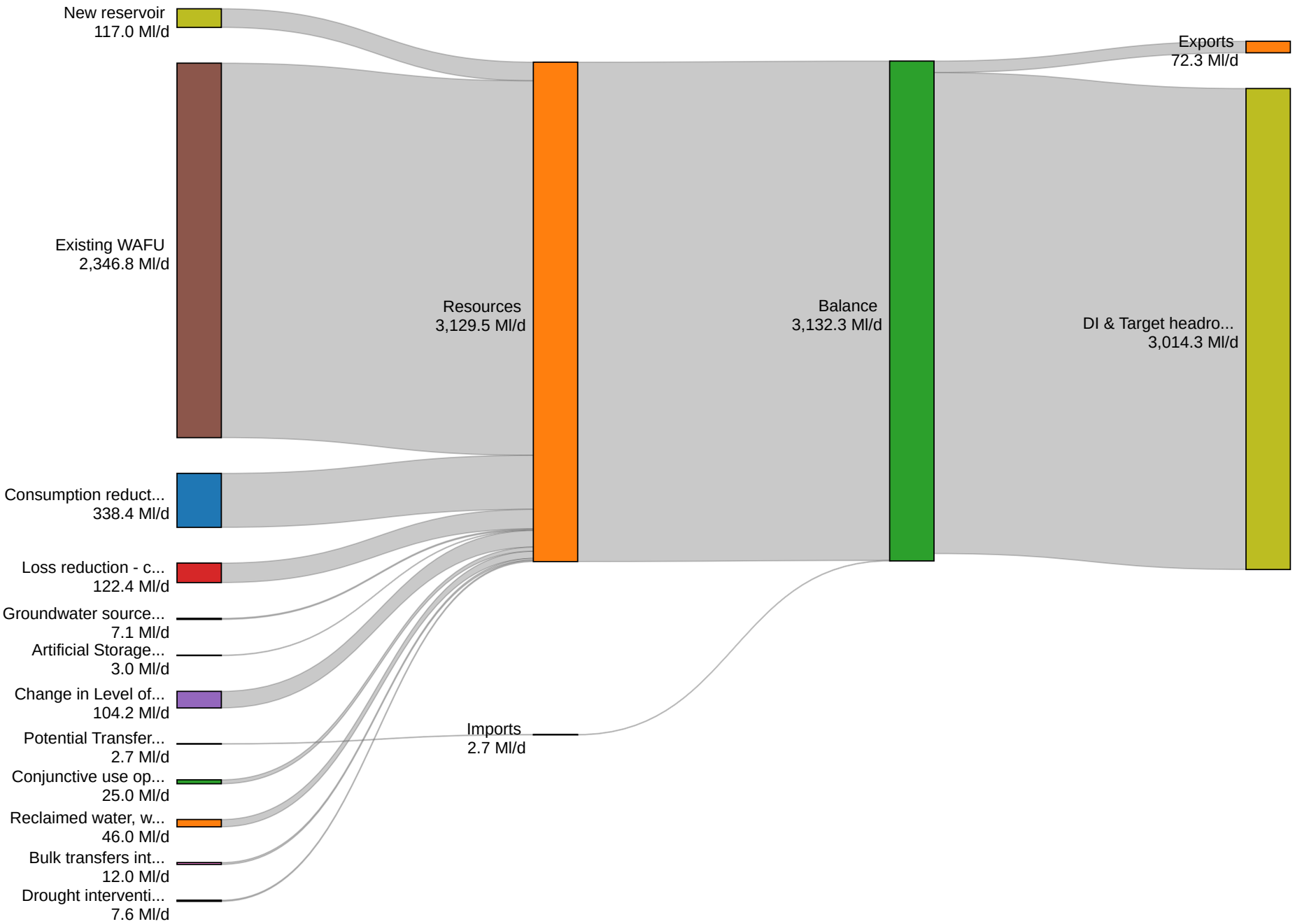
Pie charts show the breakdown of option utilisation by option category.



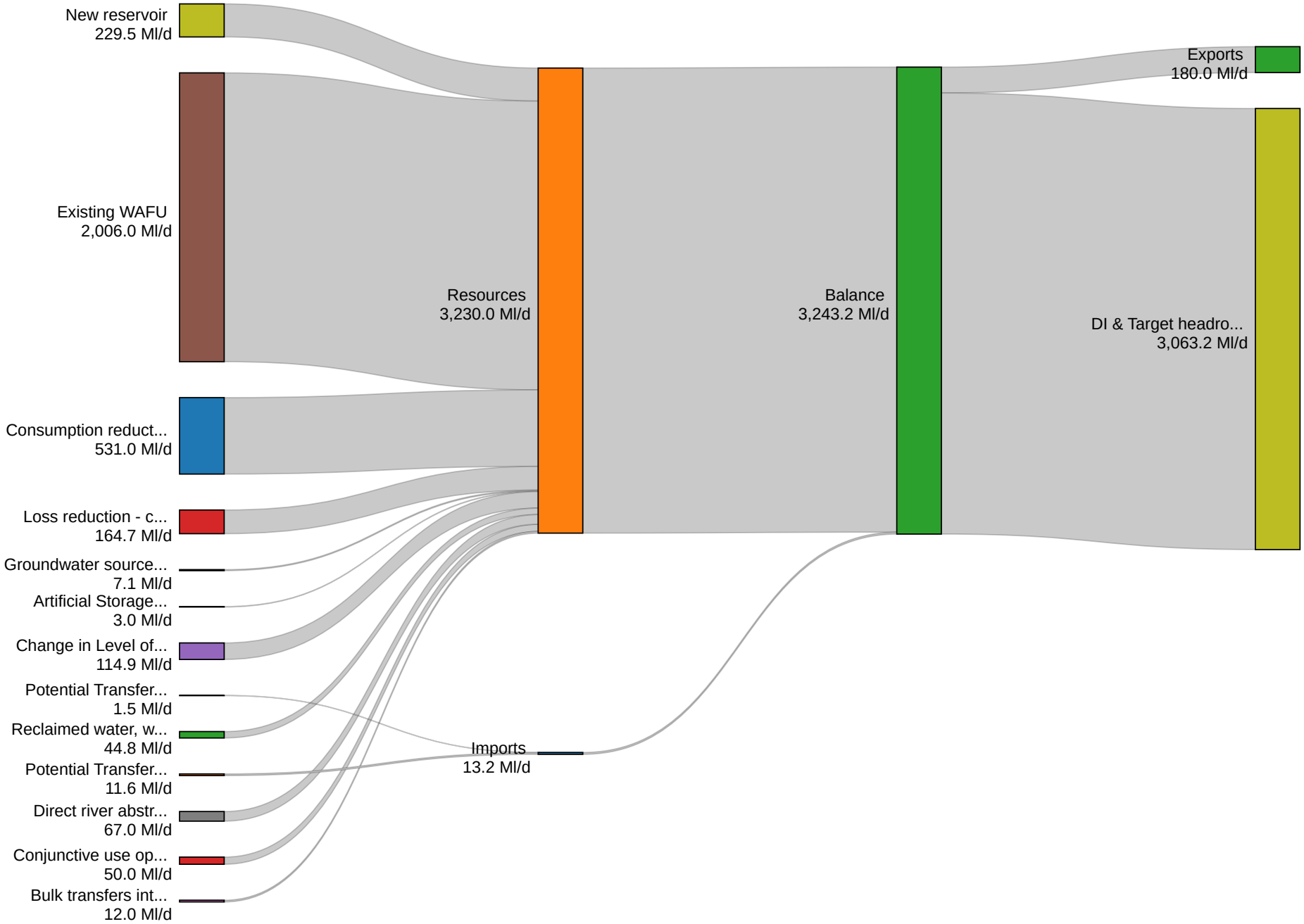
Situation 4 - 2026 (Thames Water)



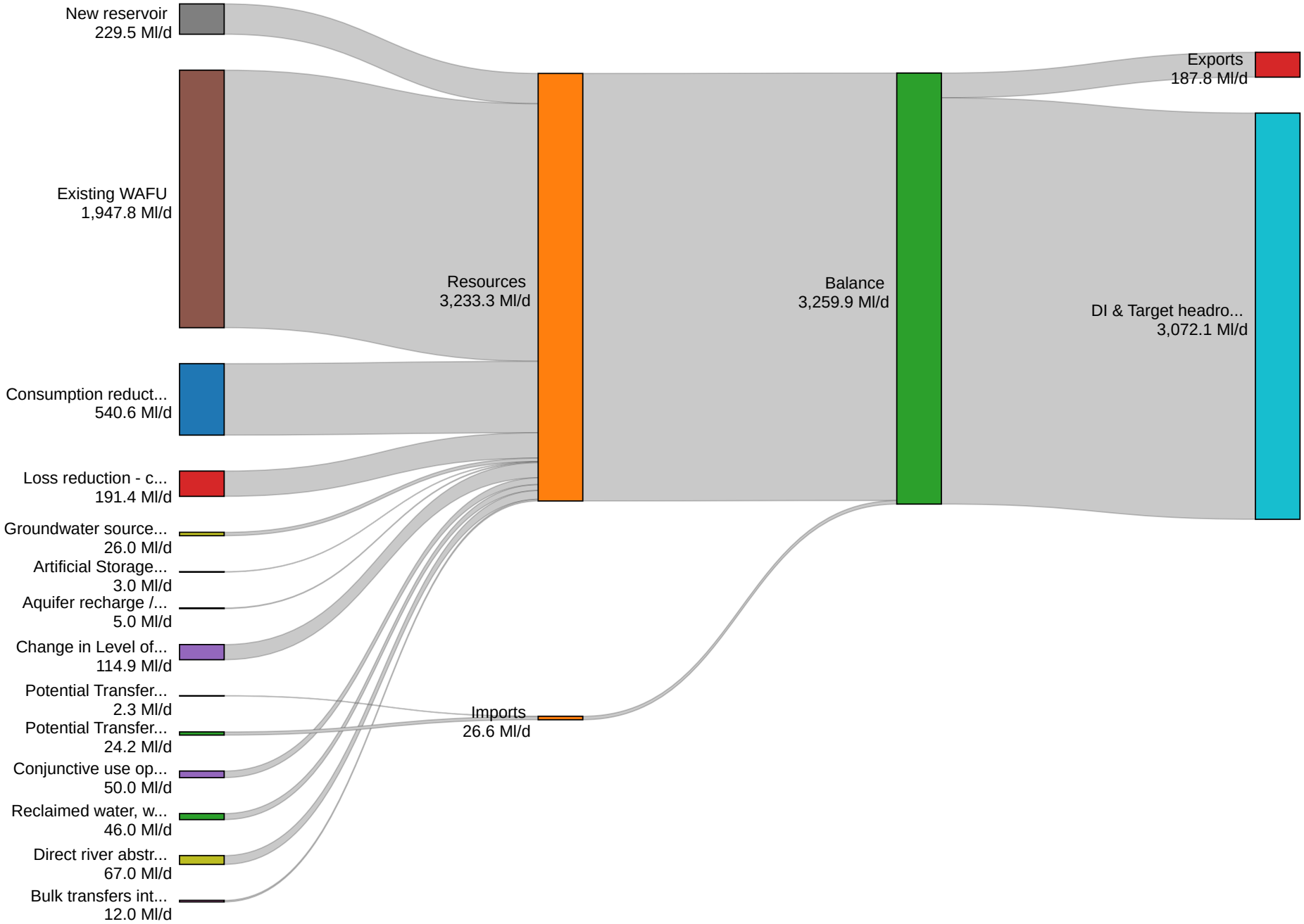
Situation 4 - 2040 (Thames Water)



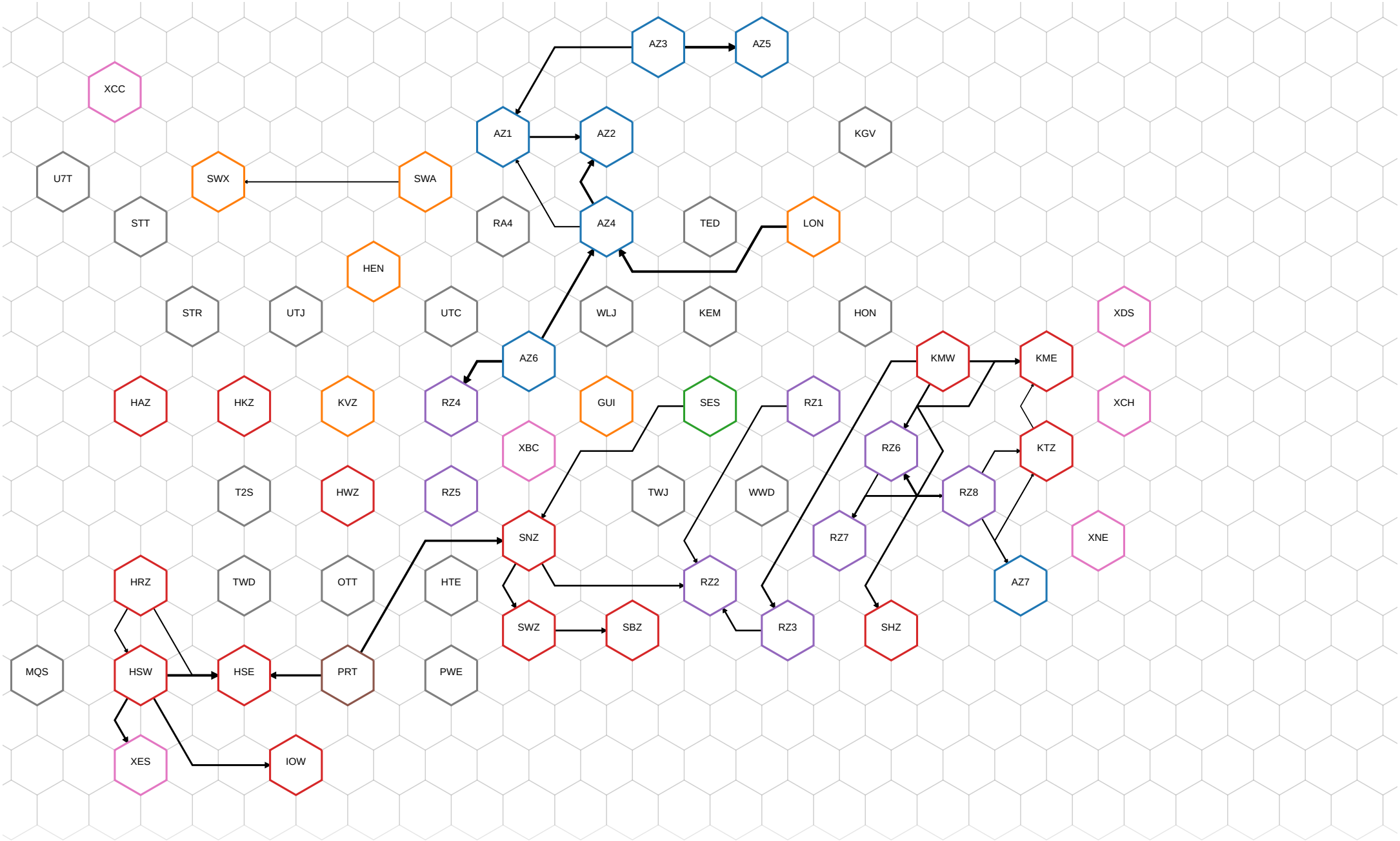
Situation 4 - 2050 (Thames Water)



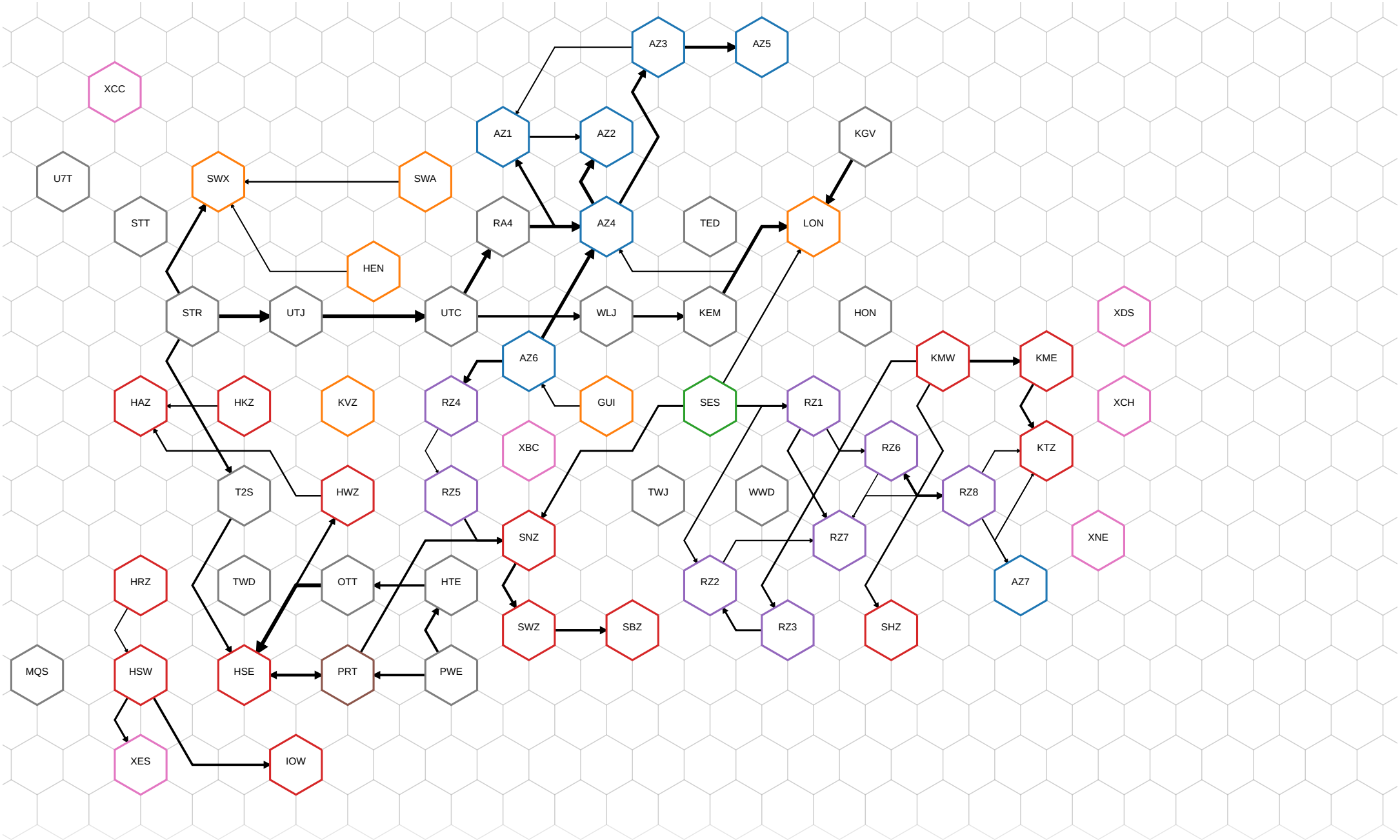
Situation 4 - 2075 (Thames Water)



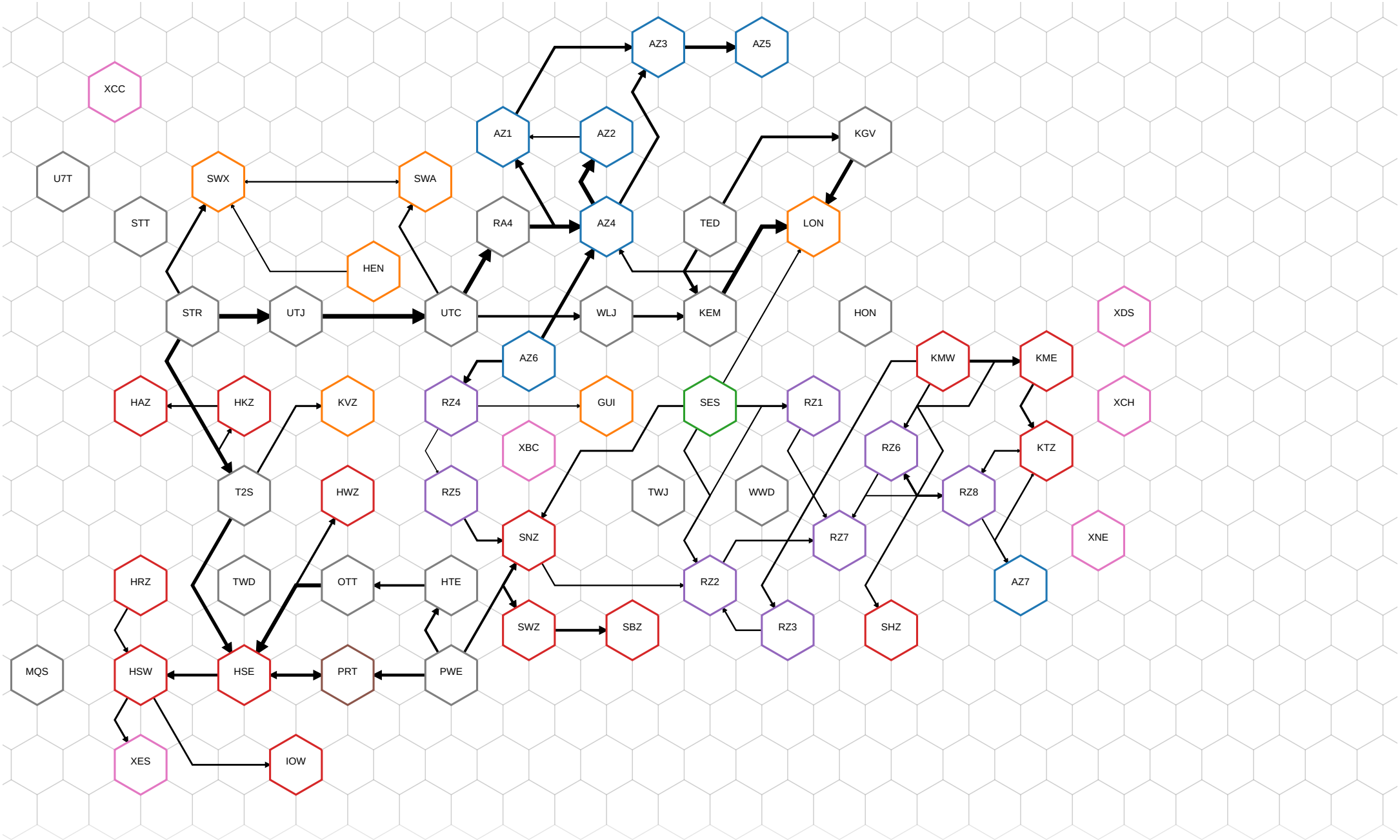
Situation 4 - 2026



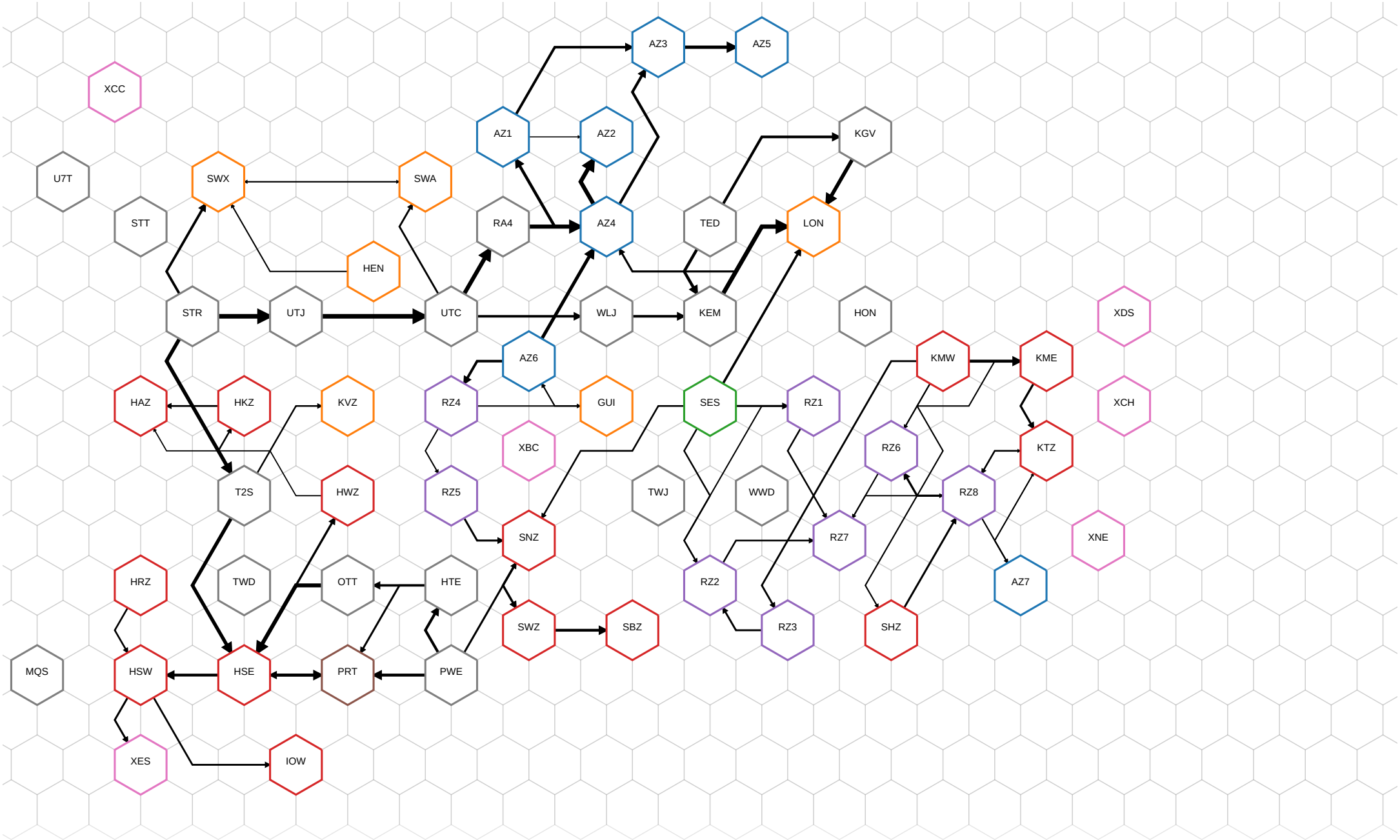
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

BECKTON RECYCLING 100 IN 2033

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-force-beckton-reuse100-2033-2075
Description	Least cost run with hybrid-c+2 government interventions forcing the selection of Beckton Reuse 100 Ml/d to be operational in 2033.
Created at	08/07/2023, 01:40:01
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2-force-beckton-reuse100-2033
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets. Force Beckton Reuse 100 Ml/d to be operational in 2033 (selected 2029).
Optimised discount rate	STPR

Metrics

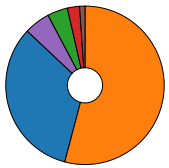
Net present value (Cost)

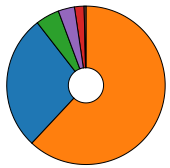
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	21,308	18,119	17,452	19,942	18,011	17,254	18,545	17,363	16,670	(£m)
Cost w/o deficit (STPR)	21,308	18,119	17,452	19,942	18,011	17,254	18,545	17,363	16,670	(£m)
Cost w/ deficit (IGEQ)	32,628	26,581	25,376	30,014	26,397	25,050	27,511	25,296	24,048	(£m)
Cost w/o deficit (IGEQ)	32,628	26,581	25,376	30,014	26,397	25,050	27,511	25,296	24,048	(£m)
Cost w/ deficit (LTDR)	23,497	19,786	19,019	21,905	19,664	18,796	20,301	18,930	18,133	(£m)
Cost w/o deficit (LTDR)	23,497	19,786	19,019	21,905	19,664	18,796	20,301	18,930	18,133	(£m)

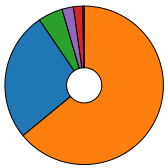
Cost breakdown (STPR)

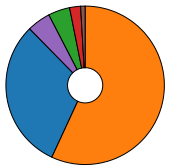
Select Company: Total

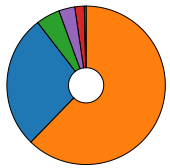
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	7,007	4,989	4,611	6,132	4,917	4,466	5,179	4,490	4,057	(£m)
Fixed opex	11,530	11,225	11,175	11,346	11,214	11,158	11,238	11,162	11,102	(£m)
Fixed operational carbon	891	879	881	885	880	880	881	877	876	(£m)
Embedded carbon	529	356	334	447	351	321	365	316	292	(£m)
Variable opex	1,119	601	403	951	584	384	723	469	313	(£m)
Variable carbon opex	232	68	48	182	66	44	158	49	30	(£m)

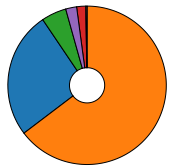
situation1 

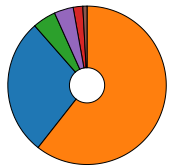
situation2 

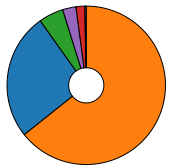
situation3 

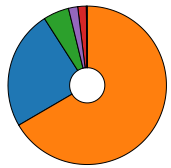
situation4 

situation5 

situation6 

situation7 

situation8 

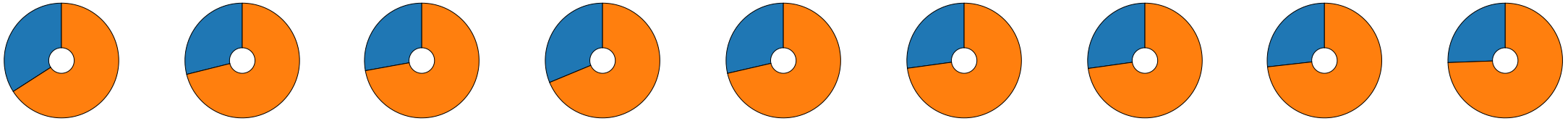
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,417,667	2,178,747	2,030,218	2,821,687	2,146,048	1,951,655	2,260,539	1,920,521	1,758,902	(tonnes)
Operational emissions	6,613,454	5,363,609	5,261,584	6,209,386	5,359,520	5,232,298	6,045,433	5,252,721	5,119,453	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

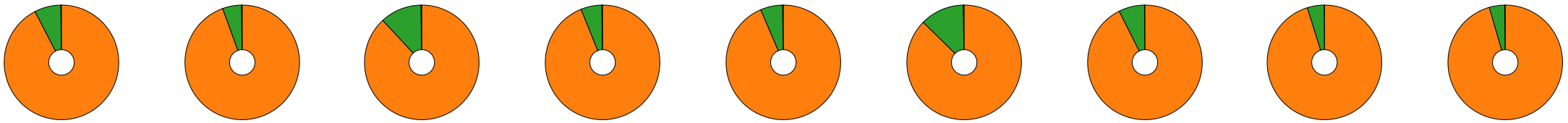


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	48	29	14	49	29	14	21	7	6	(GWh)
Grid	23,276	12,090	4,947	20,200	11,526	4,612	14,501	8,705	3,652	(GWh)
Renewable	1,876	681	655	1,269	765	654	1,138	433	165	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	69,870.00	63,716.00	62,939.00	67,336.00	63,466.00	62,483.00	63,889.00	61,607.00	60,551.00	
SEA environmental disbenefit	116,605.00	82,554.00	75,659.00	104,185.00	80,006.00	74,093.00	86,833.00	71,173.00	62,326.00	
Natural capital	84,265,694.27	81,366,522.93	84,220,613.07	79,426,286.55	81,307,892.03	83,957,089.84	64,338,271.90	65,157,228.35	68,029,150.70	
Bio-diversity net gain	−196,693.00	−116,881.00	−86,792.00	−172,354.00	−116,669.00	−91,015.00	−141,021.00	−96,471.00	−67,417.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	34,132.00	31,709.00	31,371.00	33,248.00	31,547.00	31,189.00	31,704.00	30,697.00	30,207.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	27.85	27.34	29.98	26.65	27.52	30.00	27.29	29.96	33.22	
R1: Uncertainty of option supply/demand benefit	5.83	5.18	5.69	5.29	5.24	5.67	5.29	5.68	6.26	
R3: Risk of service failure due to other physical hazards	6.65	6.69	7.50	6.36	6.74	7.52	6.60	7.44	8.46	
R4: Availability of additional headroom	6.43	6.79	7.01	6.56	6.81	7.02	7.03	7.37	7.61	
R5: Catchment/raw water quality risks (incl. climate change)	3.96	3.88	4.38	3.79	3.89	4.39	3.77	4.29	4.95	
R6: Capacity of catchment services	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
R7: Risk of service failure to other exceptional events	4.98	4.80	5.39	4.64	4.83	5.40	4.61	5.20	5.93	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

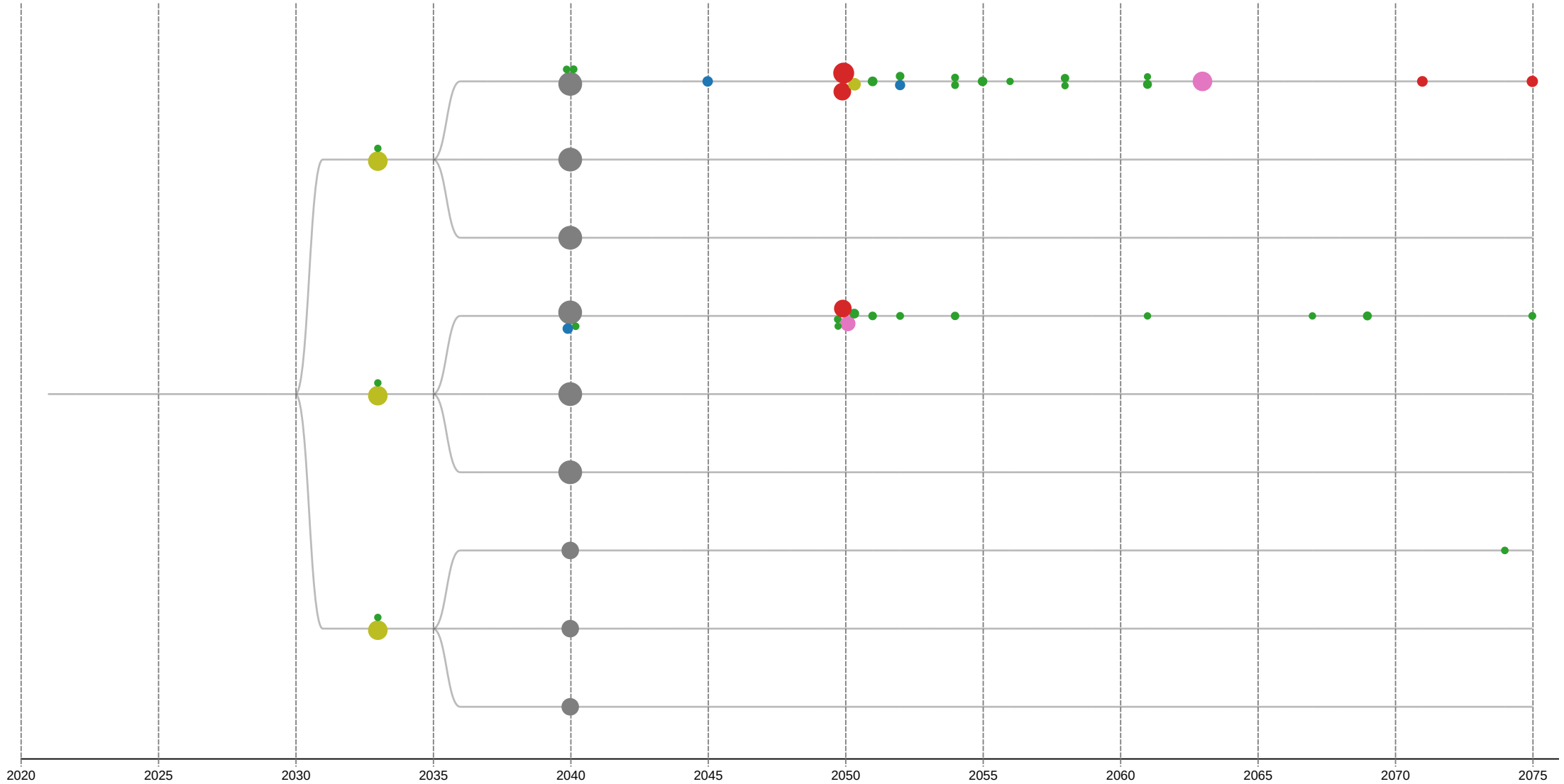
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	13.57	14.56	16.31	13.56	14.61	16.18	14.53	16.49	18.78	
A3: Operational complexity and flexibility	6.13	6.37	7.17	5.95	6.42	7.21	6.24	7.13	8.18	
A4: WRZ connectivity	7.42	8.17	9.11	7.58	8.16	8.94	8.27	9.33	10.57	
A7: Customer relations support engagement with demand management	0.02	0.03	0.03	0.02	0.03	0.03	0.03	0.03	0.03	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.72	19.81	22.06	18.74	19.94	21.95	20.11	22.71	25.72	
E1: Scaleability and modularity of proposed changes	9.01	9.40	10.52	8.81	9.51	10.58	9.57	10.94	12.45	
E2: Intervention lead times	4.43	4.04	4.42	3.96	4.01	4.22	4.01	4.35	4.81	
E3: Reliance on external bodies to deliver changes	6.28	6.37	7.12	5.98	6.43	7.15	6.54	7.43	8.45	
E5: Collaborative land management	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

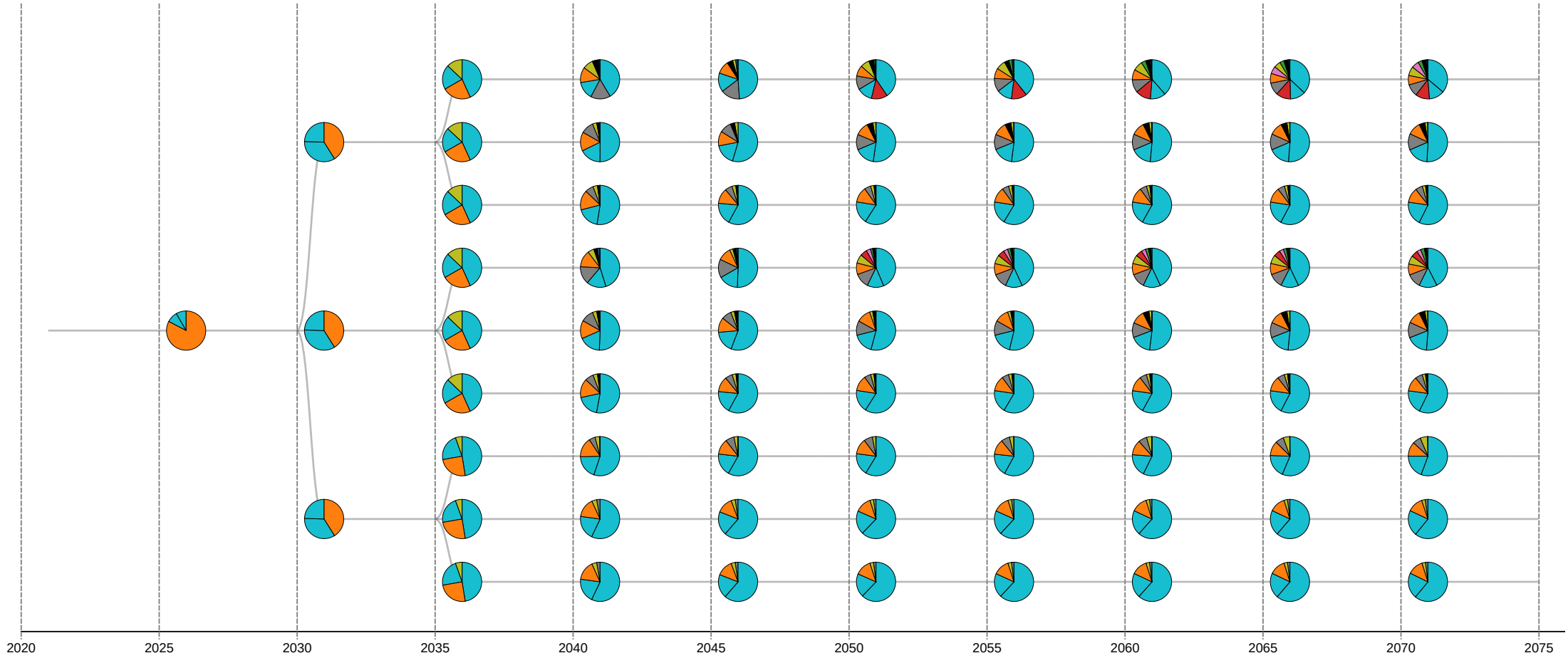
Option Selection (Thames Water)



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

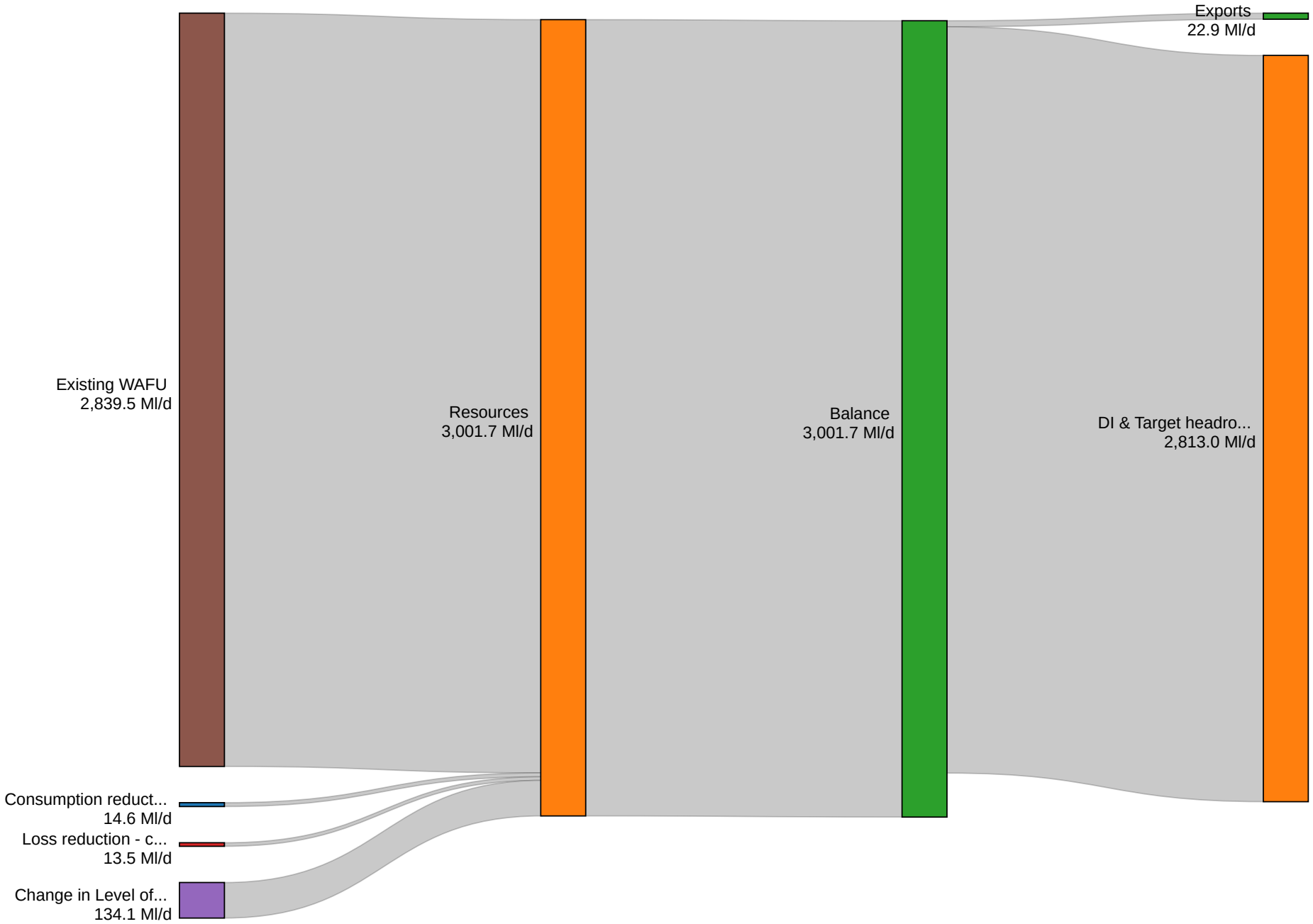
Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.

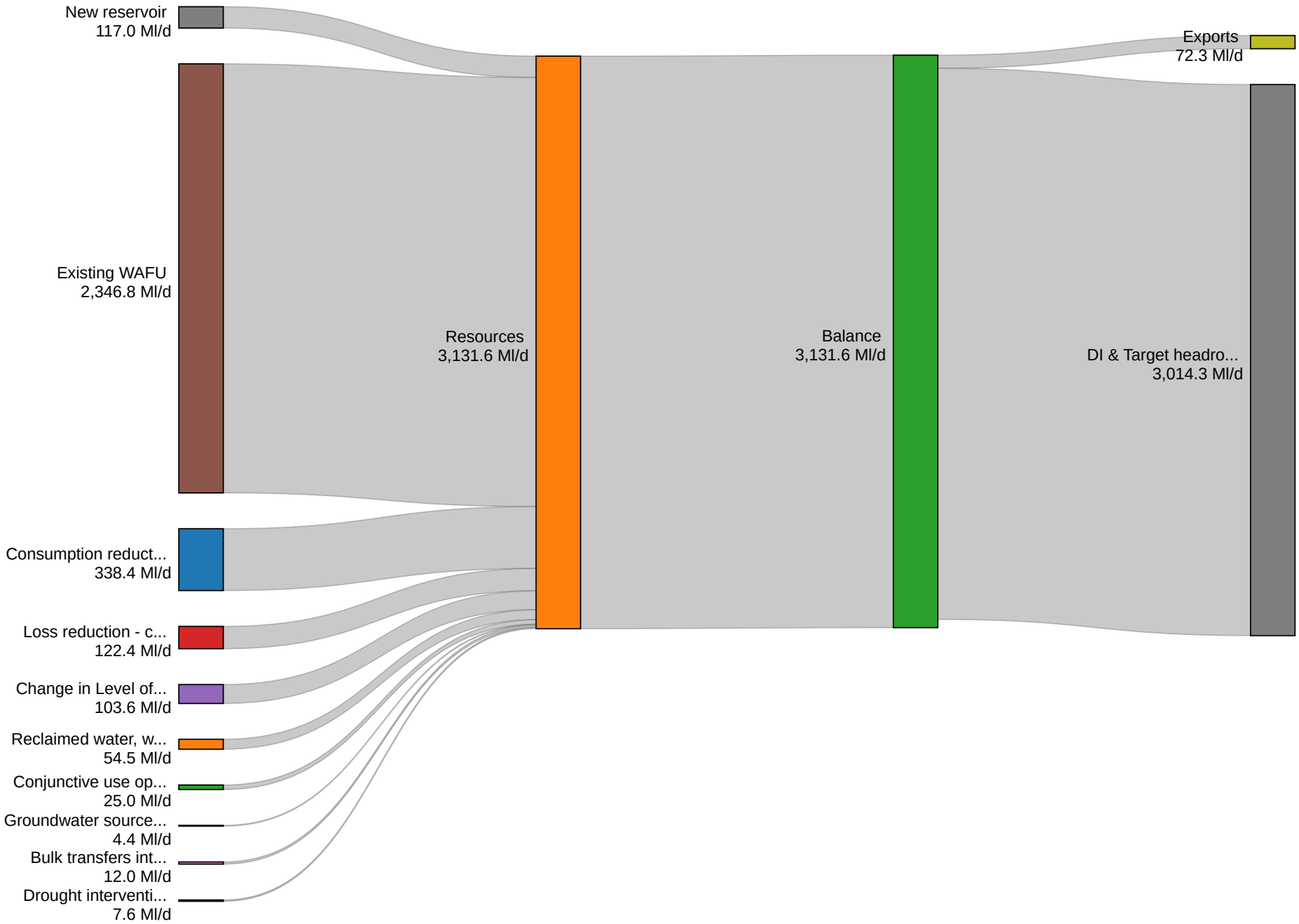


- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

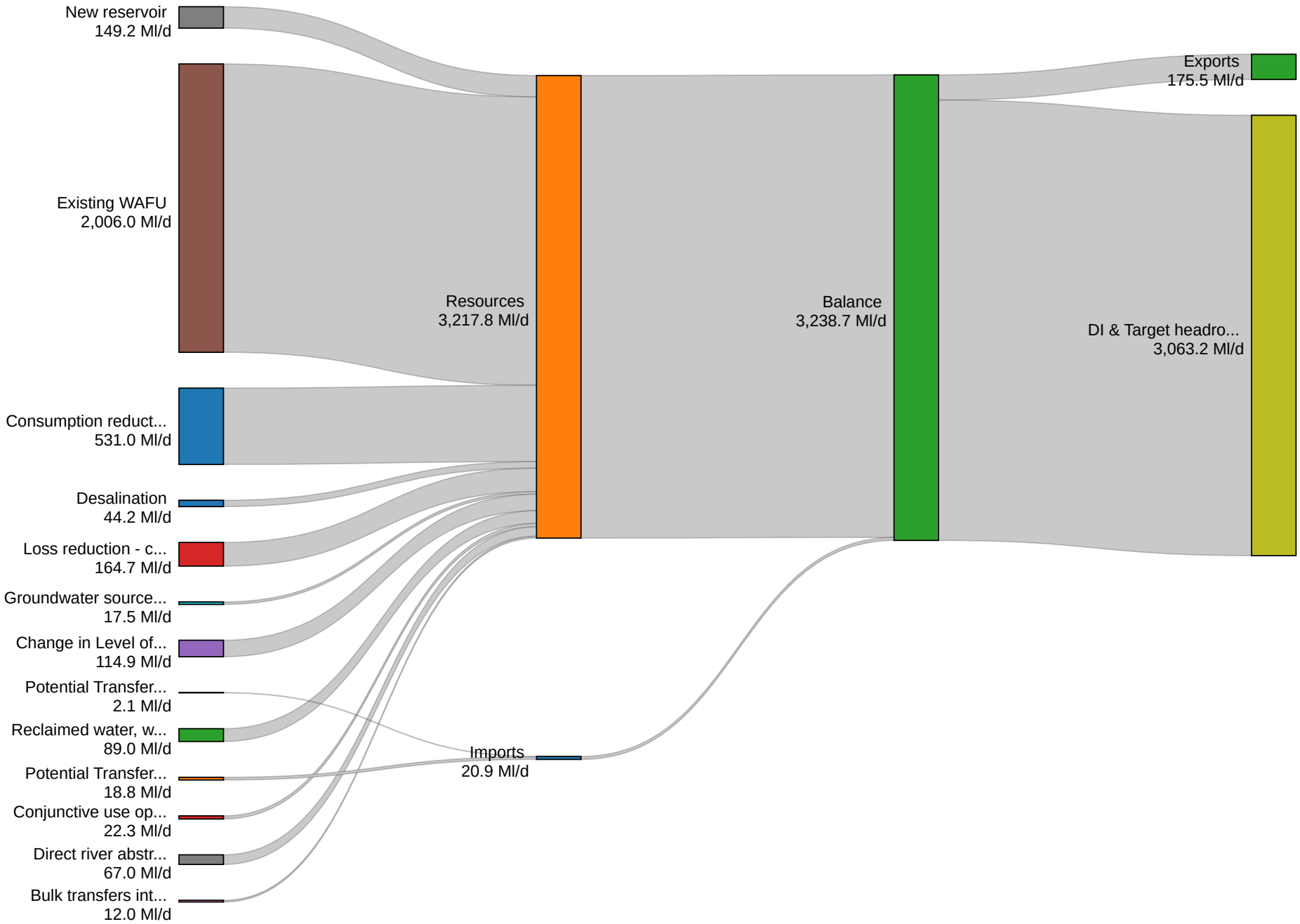
Situation 4 - 2026 (Thames Water)



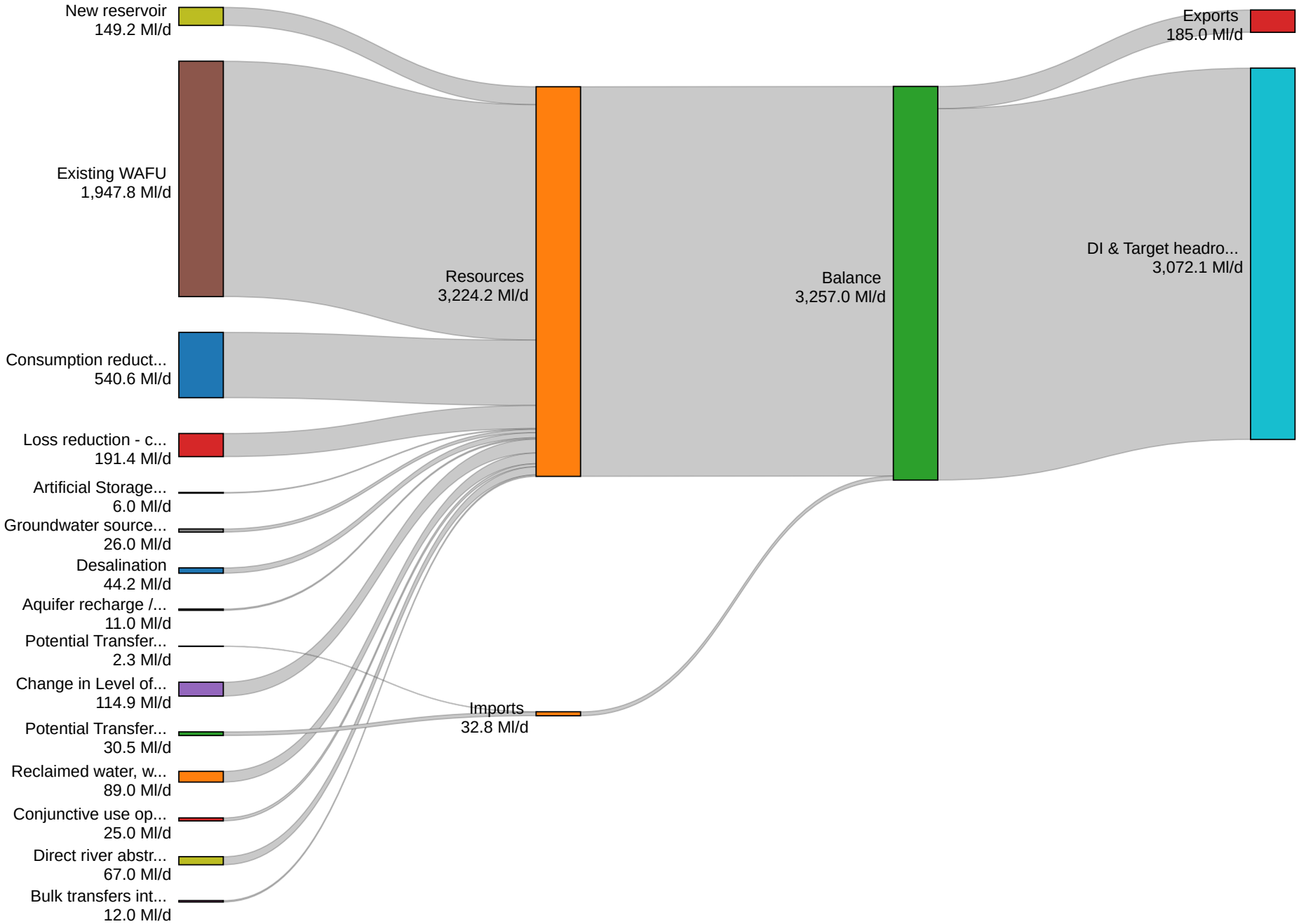
Situation 4 - 2040 (Thames Water)



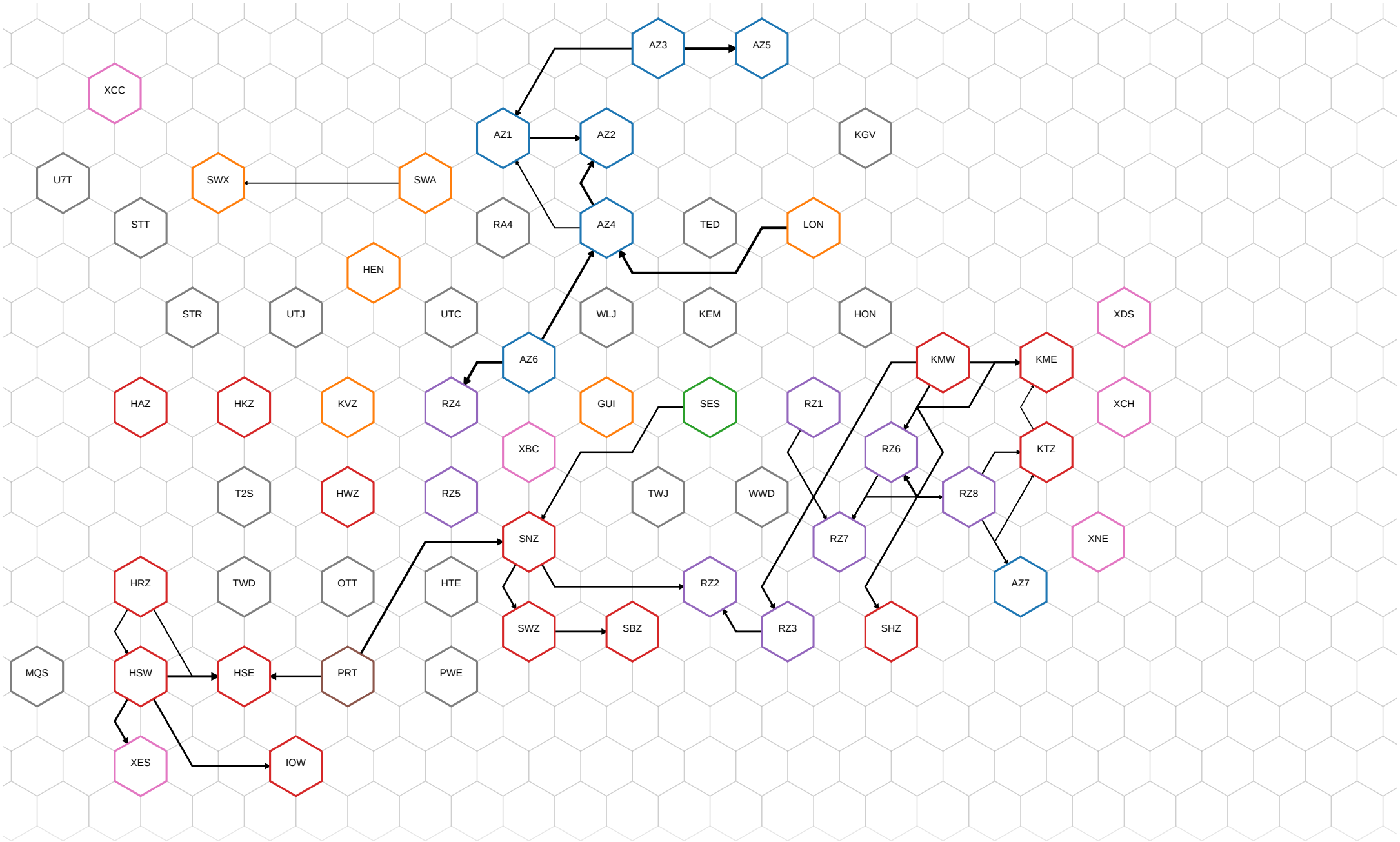
Situation 4 - 2050 (Thames Water)



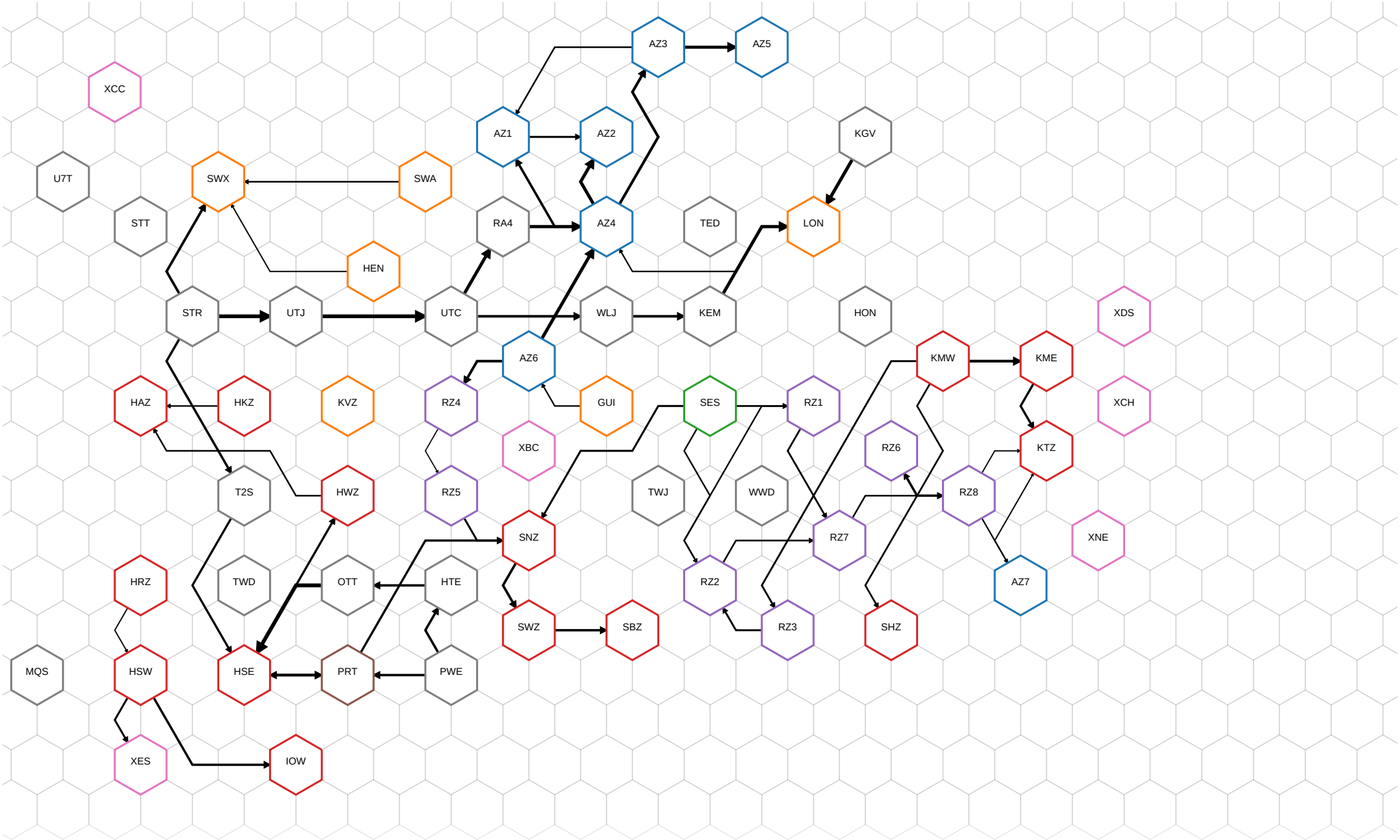
Situation 4 - 2075 (Thames Water)



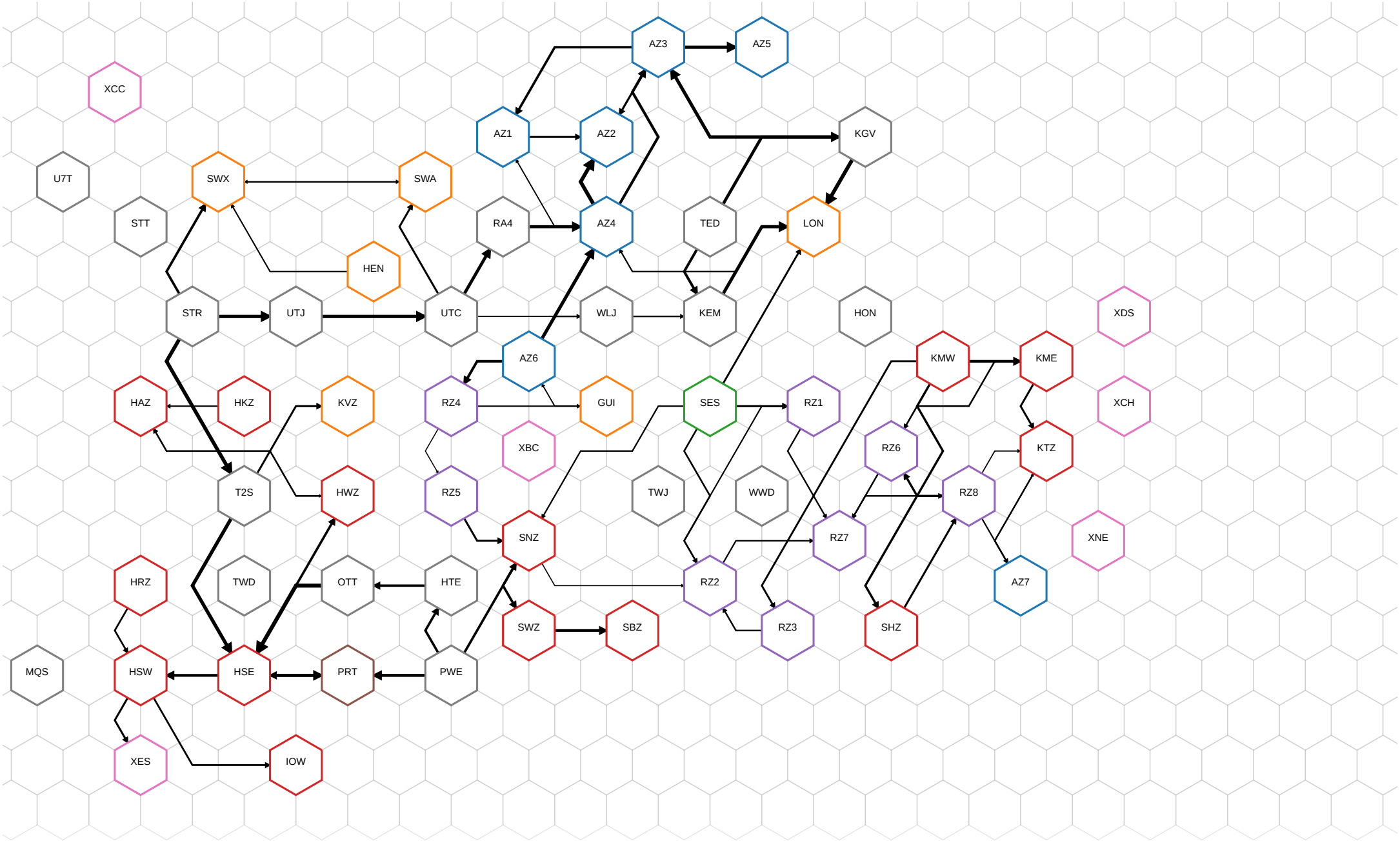
Situation 4 - 2026



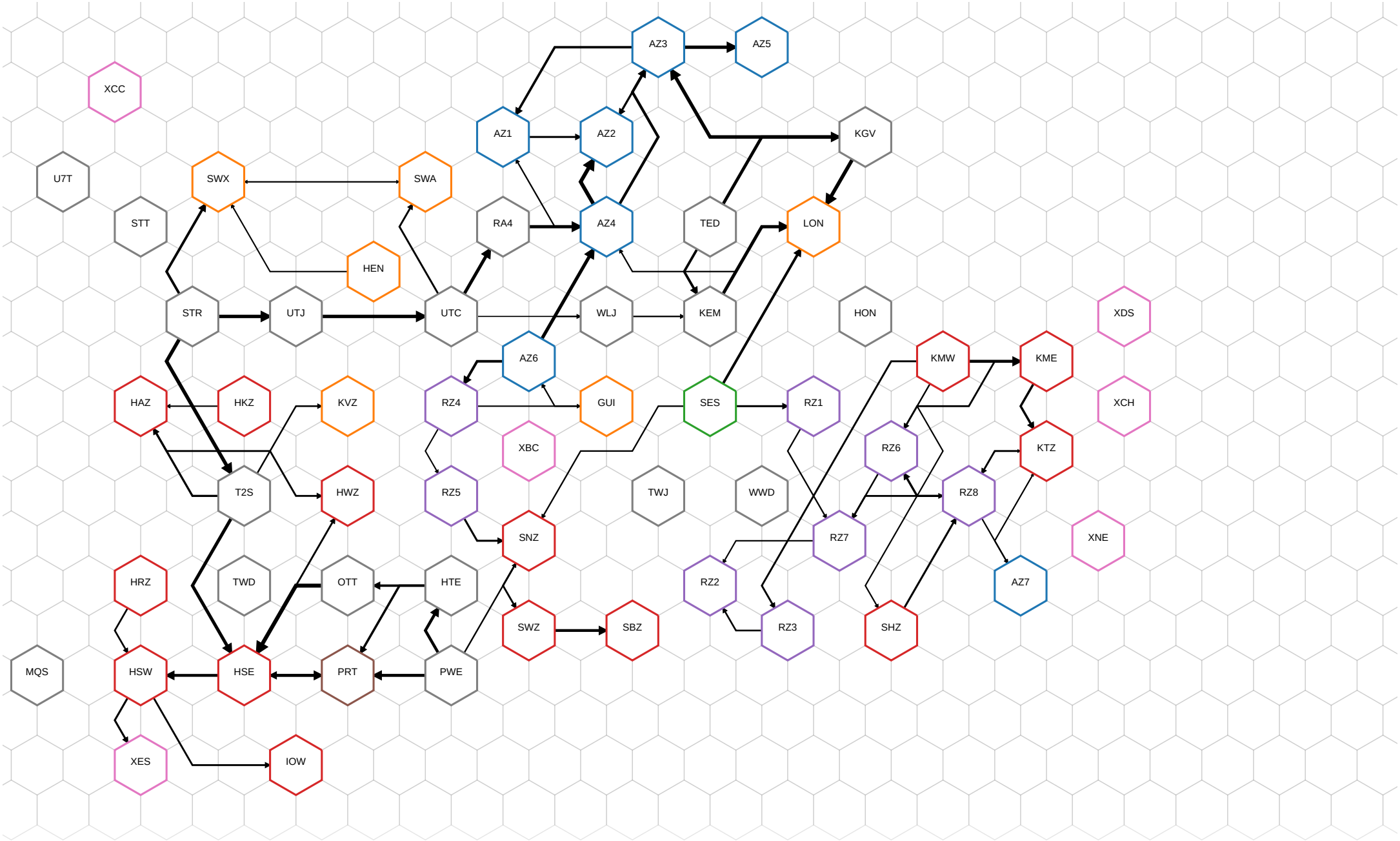
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

BECKTON RECYCLING 150 IN 2033

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-force-beckton-reuse150-2033-2075
Description	Least cost run with hybrid-c+2 government interventions forcing the selection of Beckton Reuse 150 Ml/d to be operational in 2033.
Created at	18/07/2023, 12:17:01
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2-force-beckton-reuse150-2033
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets. Force Beckton Reuse 150 Ml/d to be operational in 2033 (selected 2028).
Optimised discount rate	STPR

Metrics

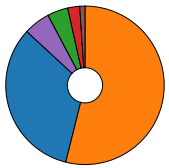
Net present value (Cost)

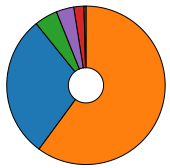
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	21,169	18,730	18,048	20,022	18,383	17,659	18,843	17,661	16,966	(£m)
Cost w/o deficit (STPR)	21,169	18,730	18,048	20,022	18,383	17,659	18,843	17,661	16,966	(£m)
Cost w/ deficit (IGEQ)	32,160	27,510	26,284	30,042	26,971	25,684	27,957	25,755	24,502	(£m)
Cost w/o deficit (IGEQ)	32,160	27,510	26,284	30,042	26,971	25,684	27,957	25,755	24,502	(£m)
Cost w/ deficit (LTDR)	23,300	20,459	19,675	21,977	20,074	19,245	20,629	19,259	18,460	(£m)
Cost w/o deficit (LTDR)	23,300	20,459	19,675	21,977	20,074	19,245	20,629	19,259	18,460	(£m)

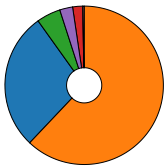
Cost breakdown (STPR)

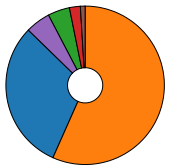
Select Company: Total

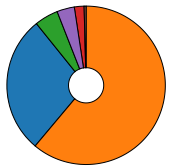
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	6,980	5,454	5,063	6,130	5,166	4,741	5,362	4,674	4,238	(£m)
Fixed opex	11,411	11,254	11,202	11,345	11,234	11,181	11,259	11,180	11,121	(£m)
Fixed operational carbon	899	886	886	898	889	888	891	885	885	(£m)
Embedded carbon	518	392	368	445	365	337	376	324	299	(£m)
Variable opex	1,136	671	475	1,012	655	459	796	541	385	(£m)
Variable carbon opex	224	74	54	193	74	53	160	58	38	(£m)

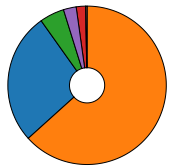
situation1 

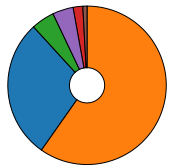
situation2 

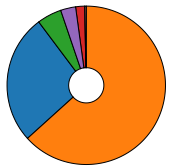
situation3 

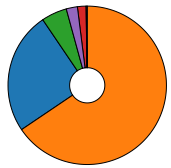
situation4 

situation5 

situation6 

situation7 

situation8 

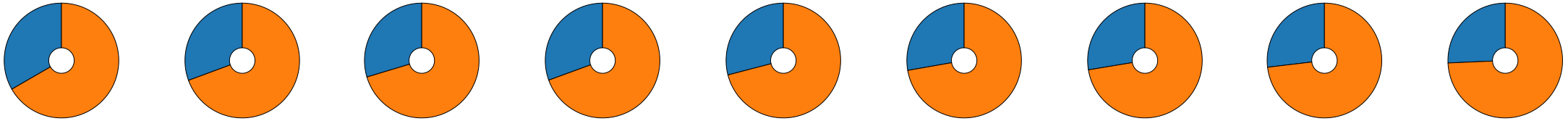
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,299,421	2,395,746	2,240,486	2,797,411	2,233,553	2,046,708	2,326,331	1,963,142	1,802,712	(tonnes)
Operational emissions	6,600,125	5,426,803	5,316,105	6,355,494	5,453,062	5,324,451	6,098,723	5,341,025	5,213,981	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

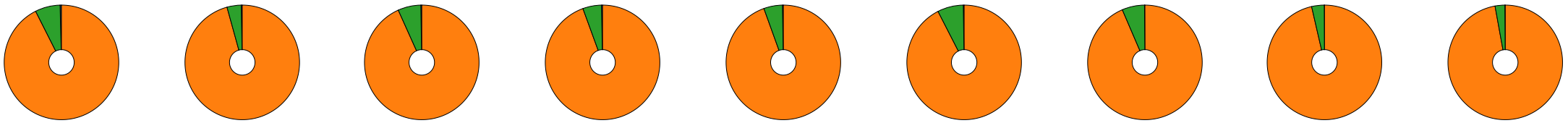


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	106	44	21	72	37	18	21	7	6	(GWh)
Grid	25,014	14,366	7,306	22,285	13,718	7,048	16,782	10,979	5,830	(GWh)
Renewable	1,907	600	506	1,243	764	556	1,138	404	165	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	69,404.00	63,821.00	63,160.00	67,227.00	63,527.00	62,378.00	64,076.00	61,639.00	60,562.00	
SEA environmental disbenefit	113,219.00	81,248.00	75,983.00	99,219.00	80,129.00	73,676.00	87,664.00	71,358.00	62,359.00	
Natural capital	81,881,150.75	77,259,202.28	80,021,856.06	77,986,481.10	79,894,824.10	82,544,522.44	64,281,802.72	65,025,704.43	68,029,150.70	
Bio-diversity net gain	−209,378.00	−155,255.00	−131,132.00	−181,876.00	−127,893.00	−100,902.00	−145,191.00	−103,012.00	−67,419.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	33,931.00	31,707.00	31,419.00	33,029.00	31,569.00	31,181.00	31,659.00	30,711.00	30,211.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	29.20	30.14	33.02	27.89	28.65	31.29	28.14	30.58	33.94	
R1: Uncertainty of option supply/demand benefit	6.11	5.84	6.38	5.74	5.56	6.04	5.62	5.91	6.54	
R3: Risk of service failure due to other physical hazards	7.00	7.39	8.27	6.71	7.00	7.83	6.77	7.55	8.60	
R4: Availability of additional headroom	6.63	7.01	7.22	6.62	6.91	7.11	7.09	7.42	7.66	
R5: Catchment/raw water quality risks (incl. climate change)	4.18	4.45	5.03	3.86	4.13	4.67	3.93	4.44	5.13	
R6: Capacity of catchment services	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
R7: Risk of service failure to other exceptional events	5.28	5.45	6.11	4.96	5.04	5.64	4.74	5.25	6.00	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

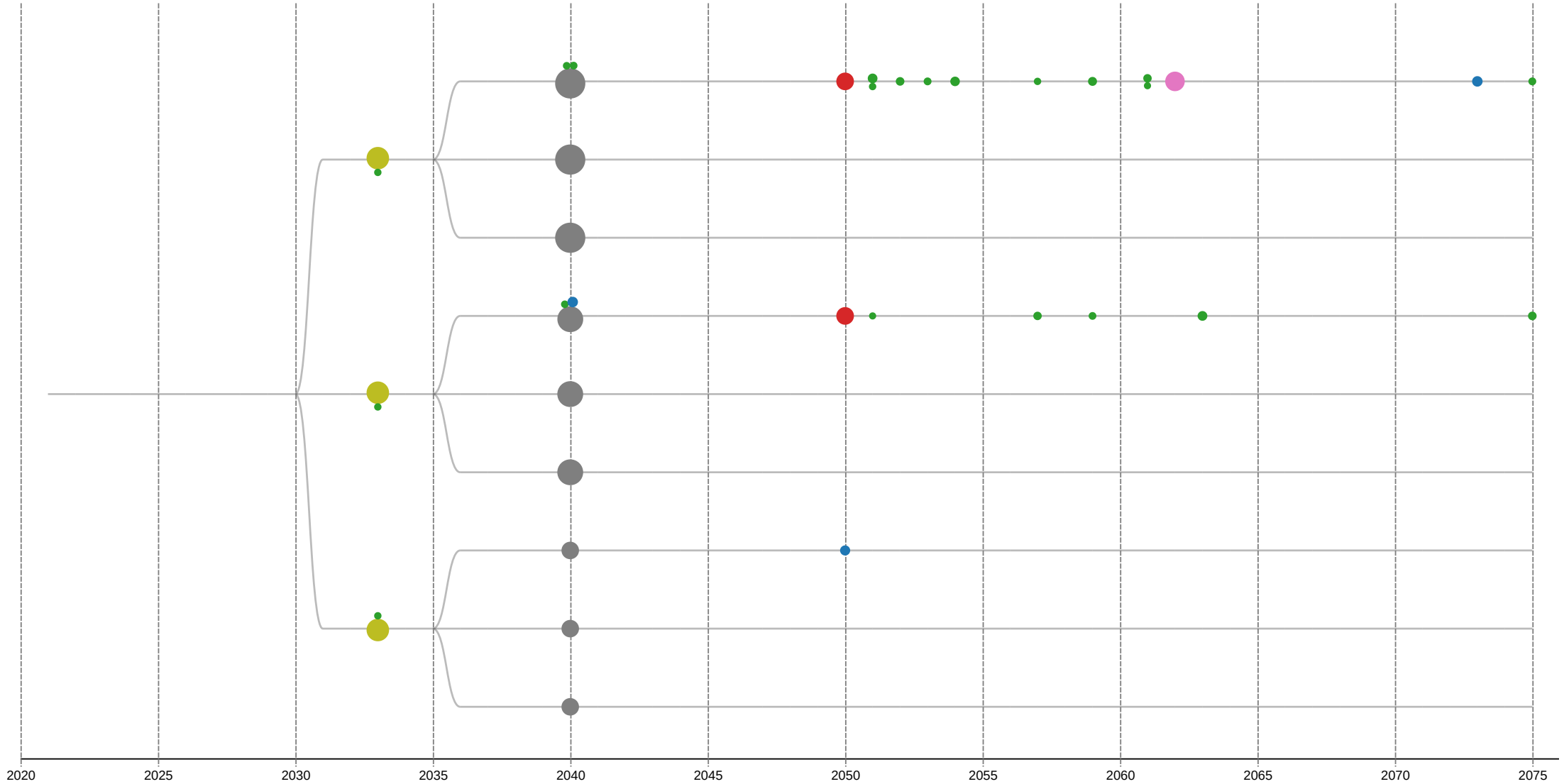
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	13.96	15.23	17.06	13.86	14.83	16.42	14.67	16.55	18.85	
A3: Operational complexity and flexibility	6.50	7.02	7.89	6.27	6.64	7.46	6.36	7.19	8.25	
A4: WRZ connectivity	7.43	8.18	9.14	7.57	8.16	8.93	8.28	9.33	10.57	
A7: Customer relations support engagement with demand management	0.02	0.03	0.03	0.02	0.03	0.03	0.03	0.03	0.03	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.30	20.30	22.54	19.20	20.30	22.37	20.55	22.93	25.99	
E1: Scaleability and modularity of proposed changes	8.86	9.54	10.63	9.05	9.74	10.84	9.80	11.11	12.66	
E2: Intervention lead times	4.19	4.13	4.53	3.96	3.99	4.23	4.03	4.27	4.73	
E3: Reliance on external bodies to deliver changes	6.25	6.63	7.38	6.20	6.57	7.31	6.72	7.55	8.59	
E5: Collaborative land management	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

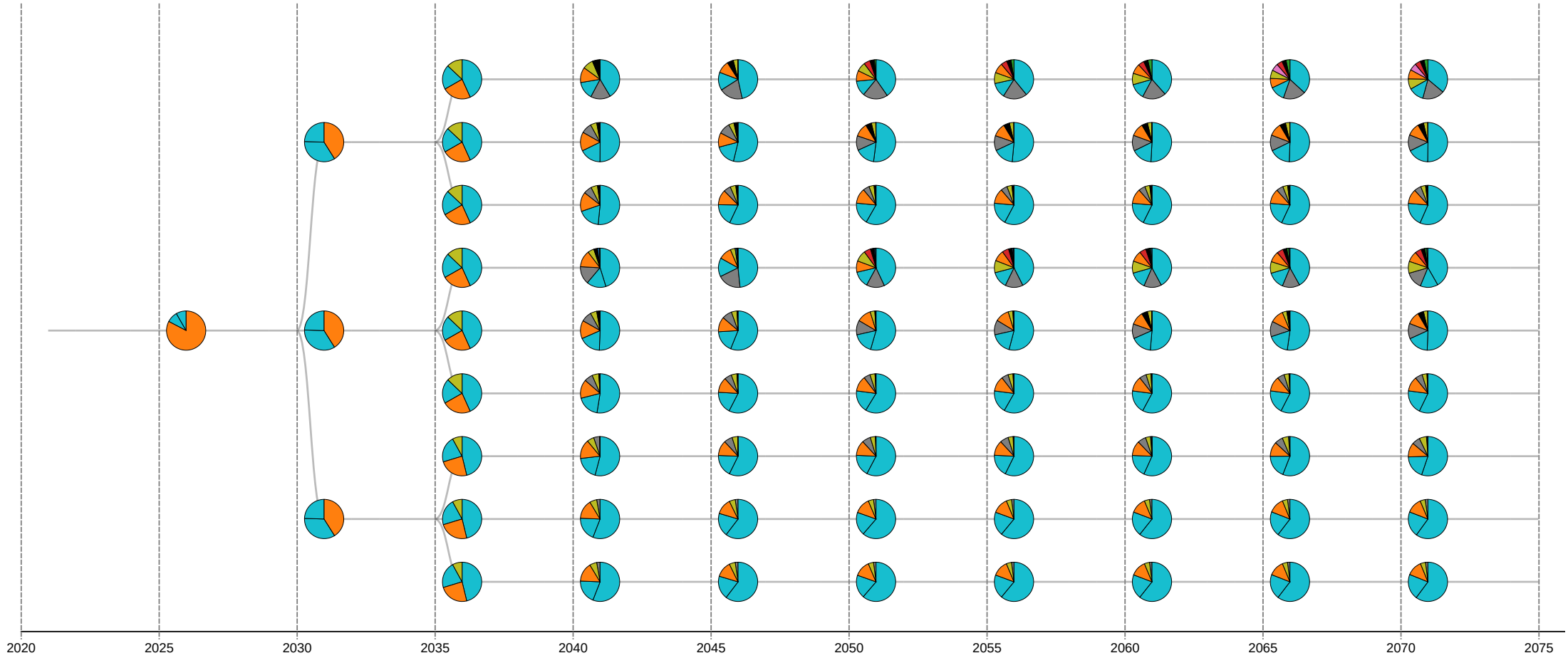
Option Selection (Thames Water)



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.



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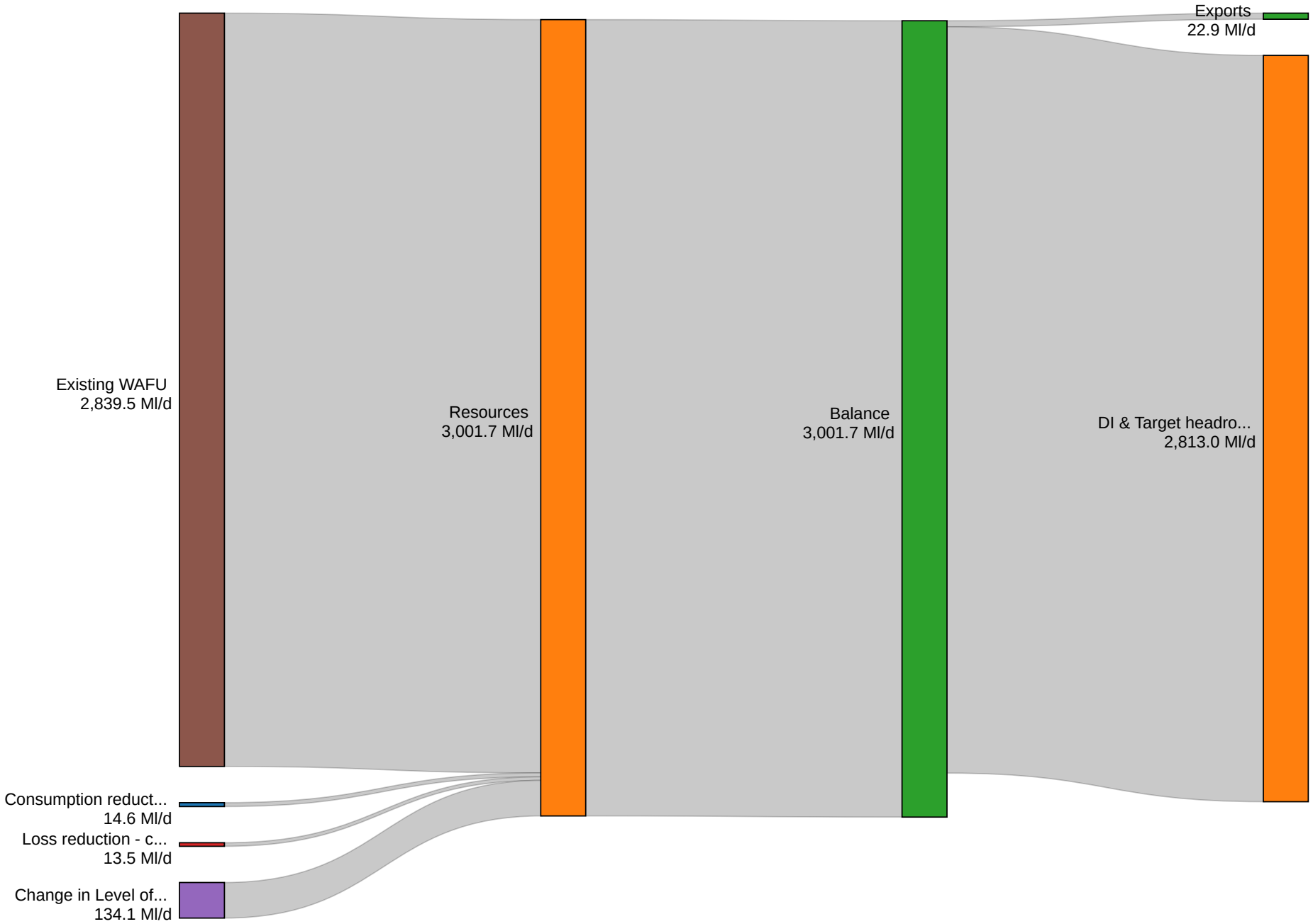
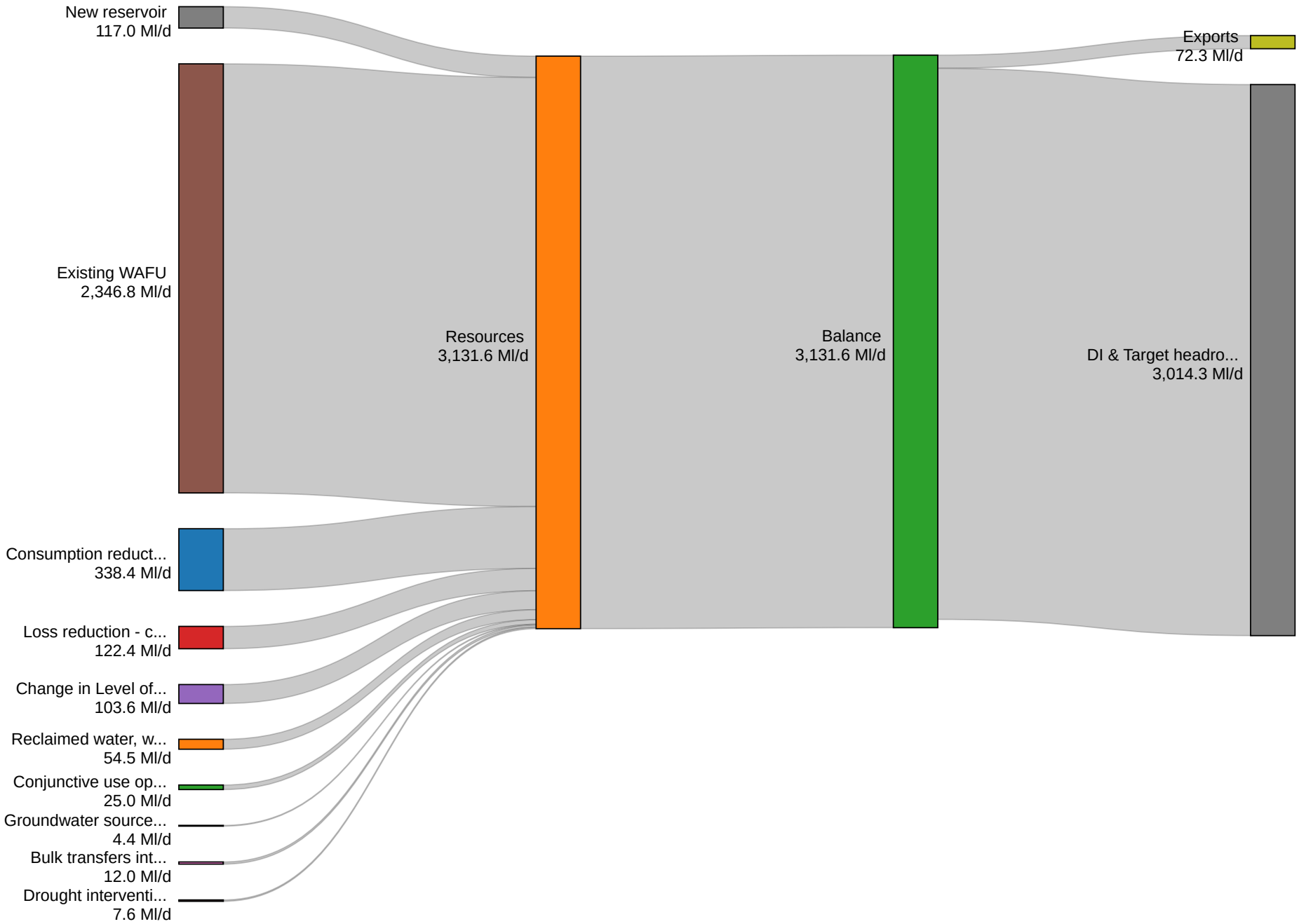
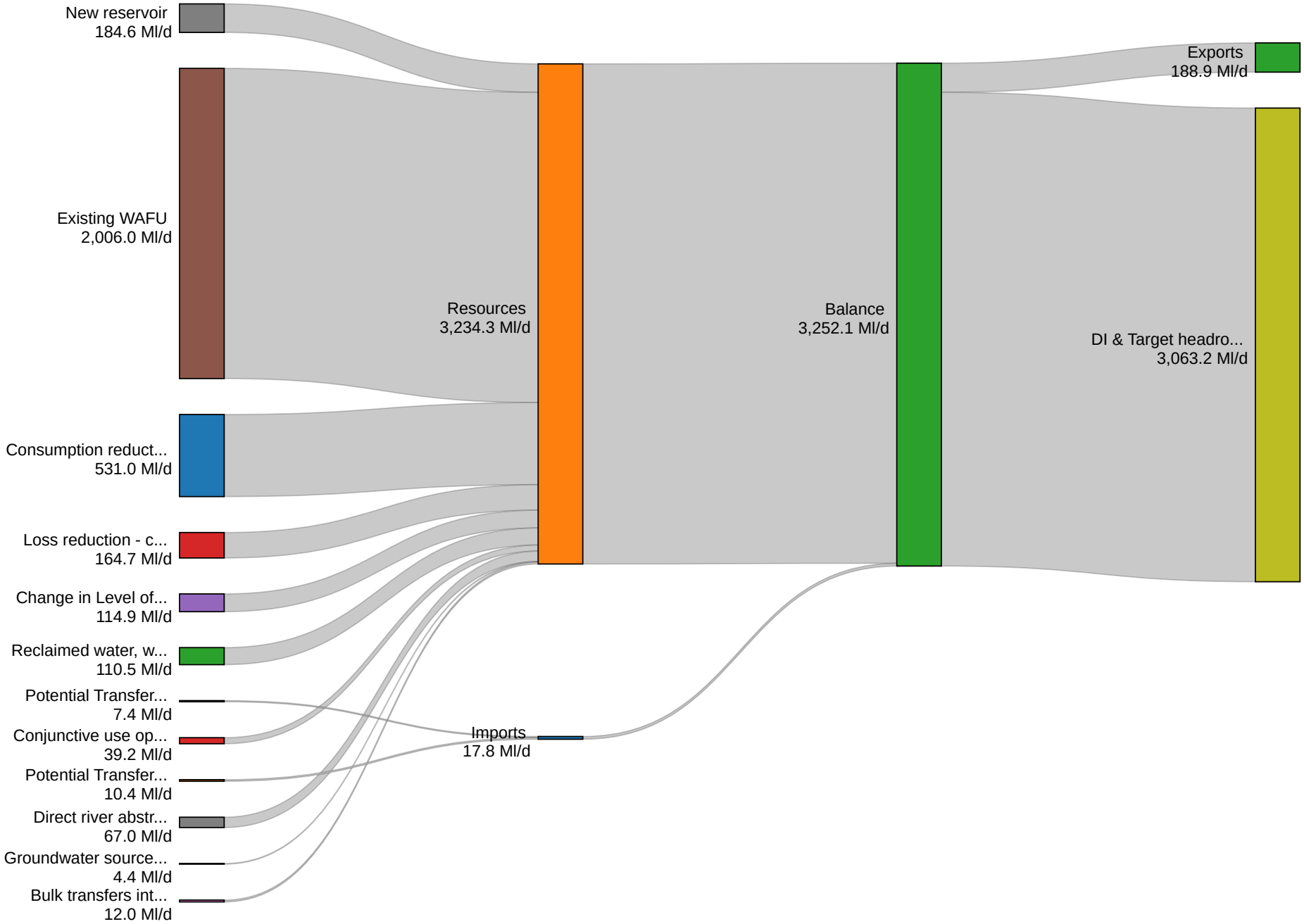
Situation 4 - 2026 (Thames Water)



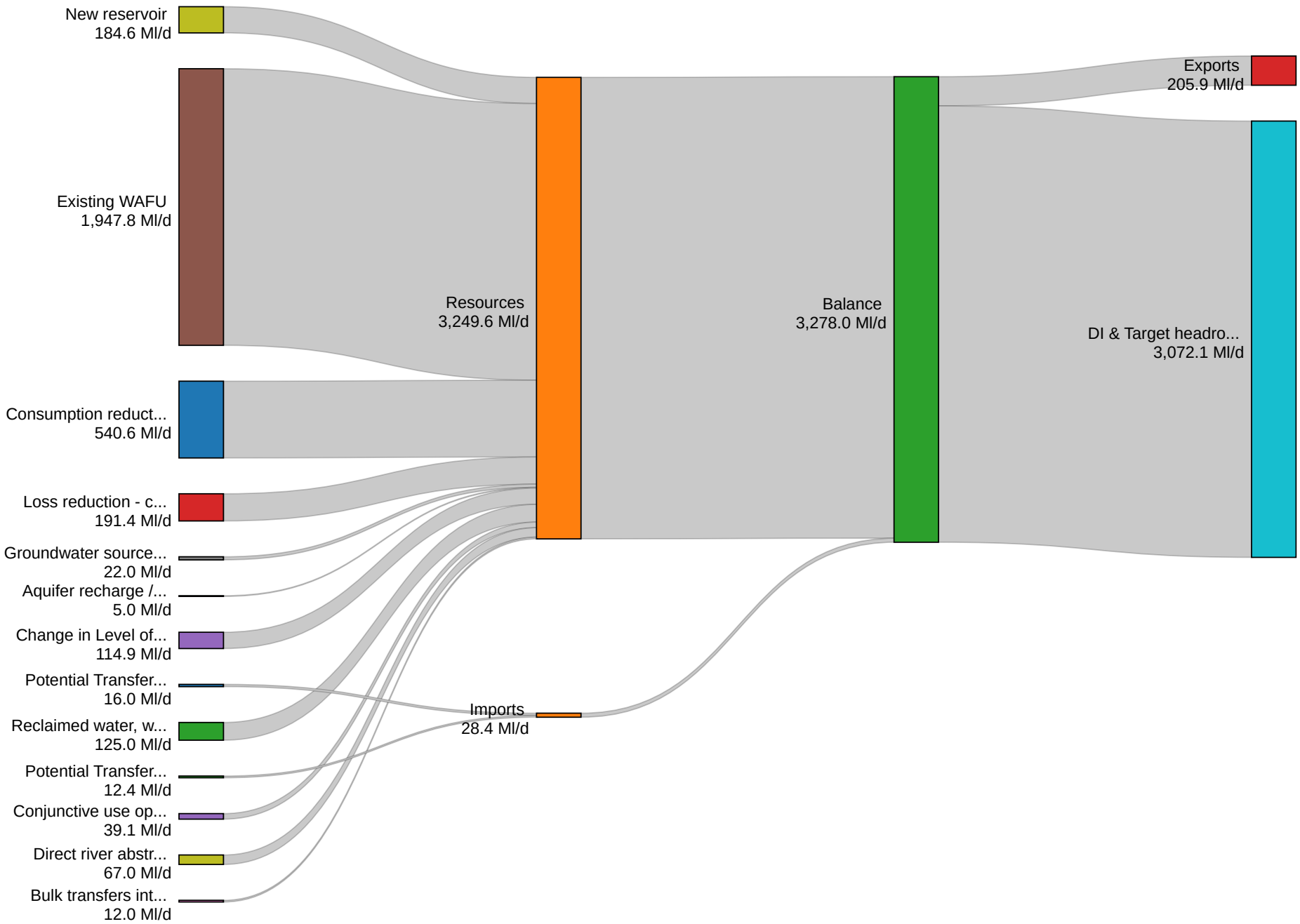
Situation 4 - 2040 (Thames Water)



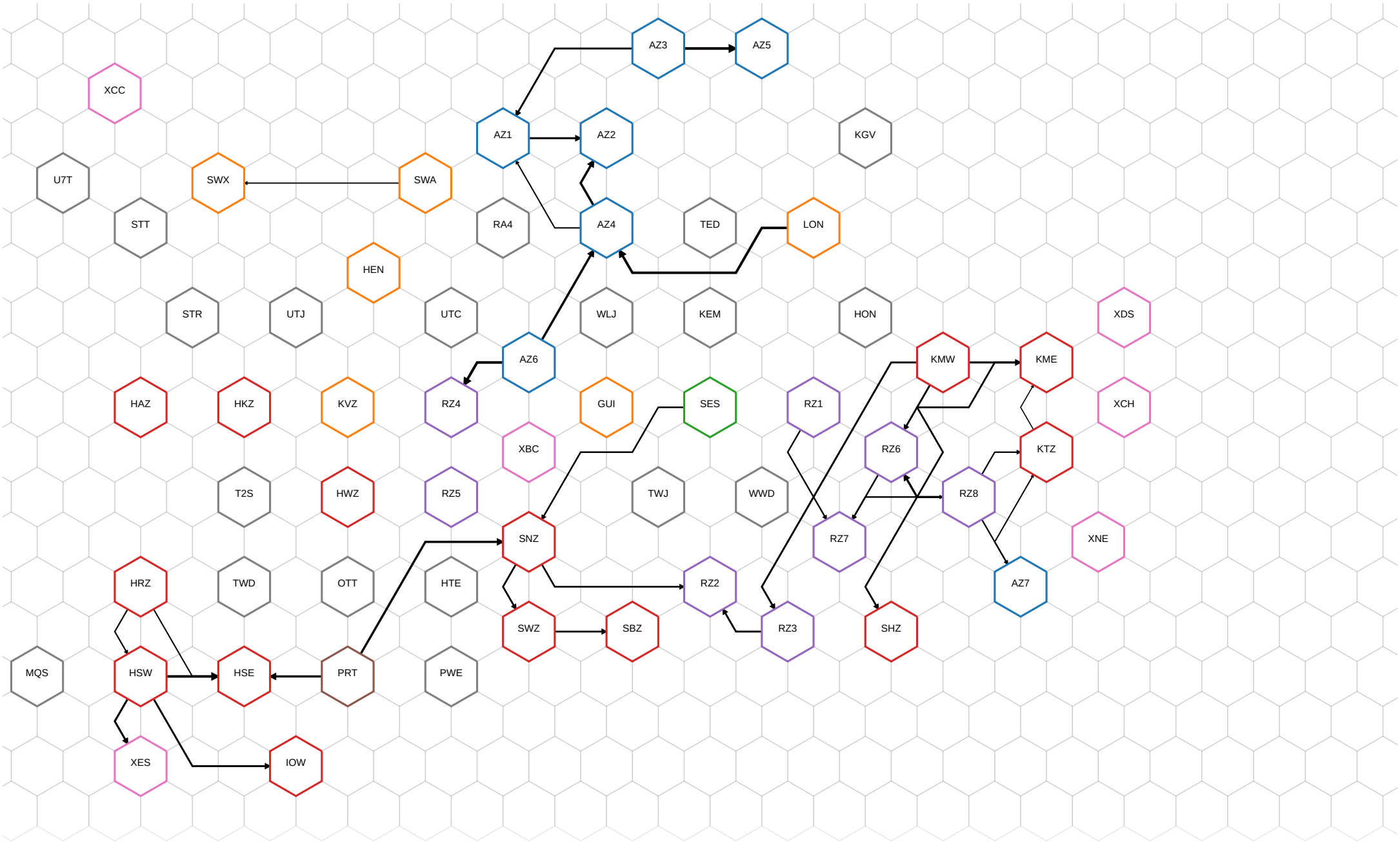
Situation 4 - 2050 (Thames Water)



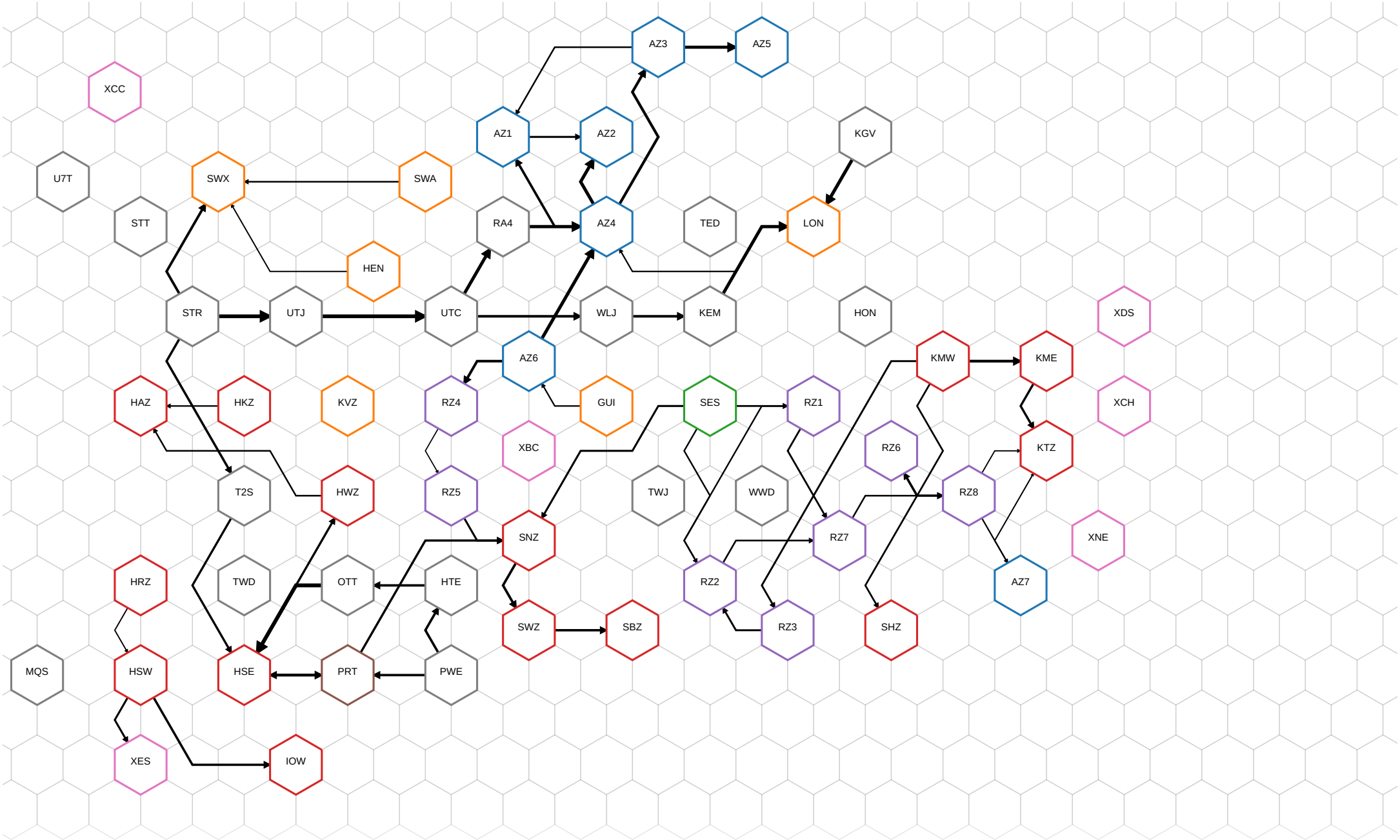
Situation 4 - 2075 (Thames Water)



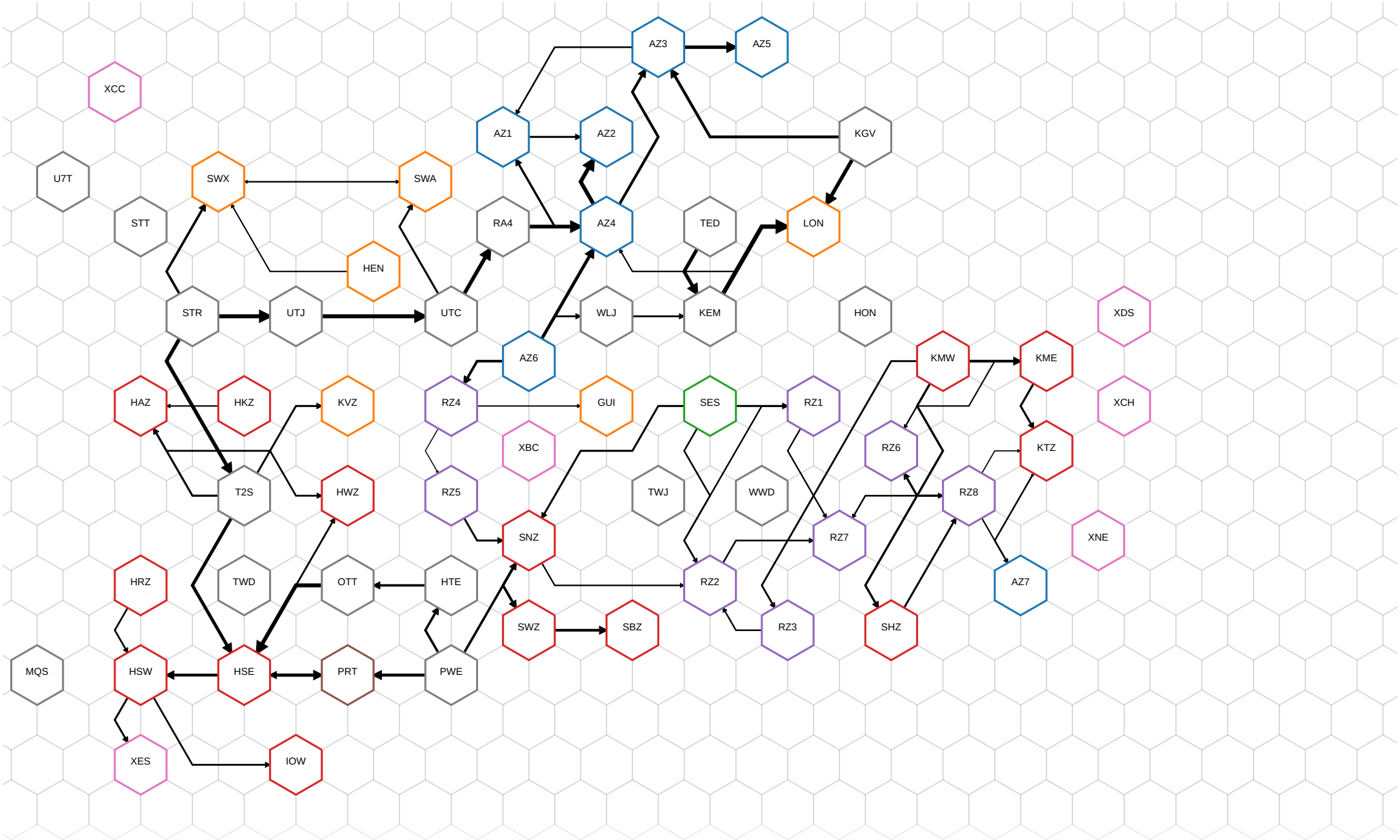
Situation 4 - 2026



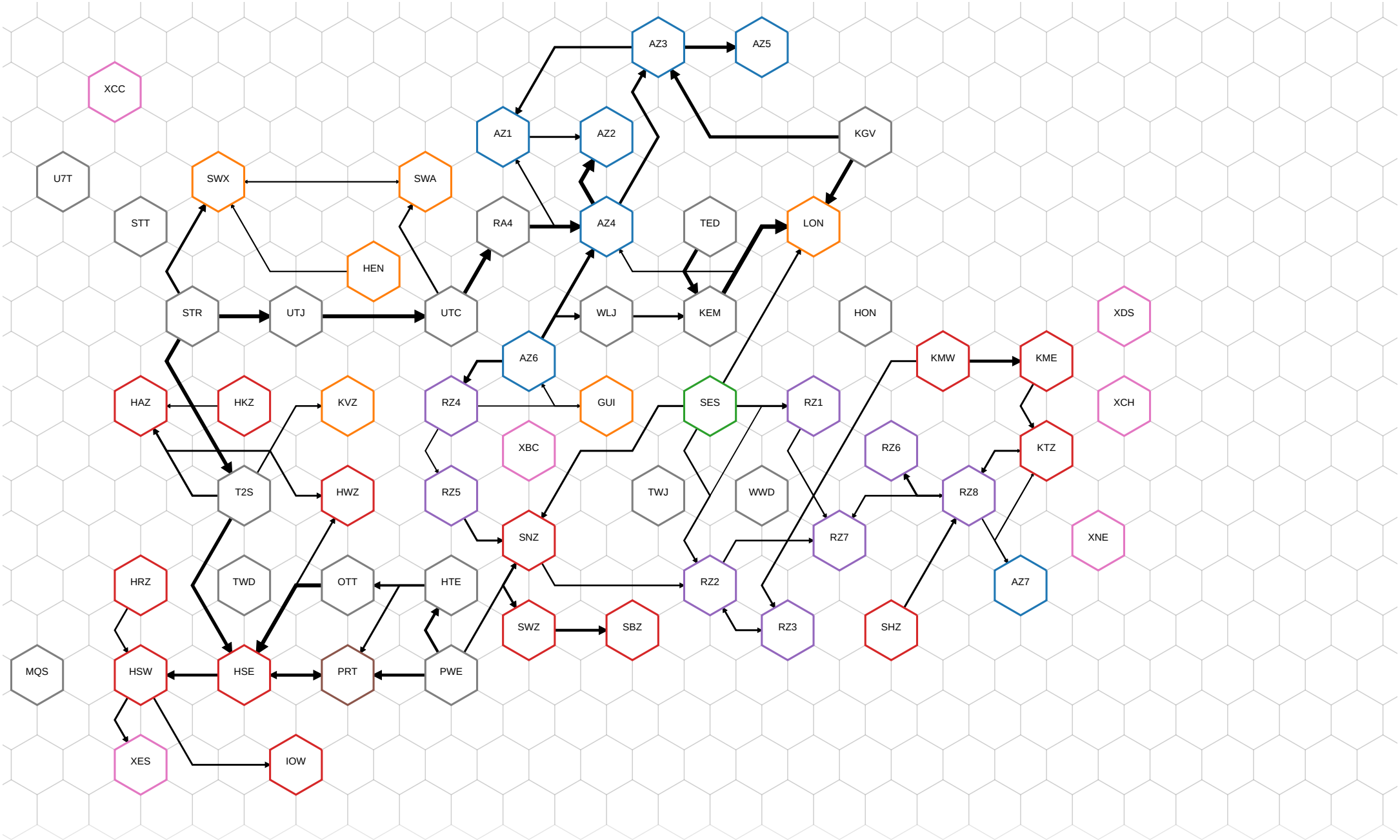
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

1:500 DROUGHT RESILIENCE IN 2035

IVM Summary: Thames Water

! This run contained total deficits of 6.5 Ml/d in the **"100a-dyaa-hplan-fthr"** planning scenario.

Metadata

General Settings

Name	st-hybrid2035-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-drpo-v4-2075
Description	Least cost run with hybrid-c+2 government interventions with 1in500 achieved in 2035 and extending drought options to 2036 (i.e. use "v4" of the drought options).
Created at	22/08/2023, 11:10:58
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2-drpo-v4
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets. Use v4 of drought permits and orders (end in 2036).
Optimised discount rate	STPR

Metrics

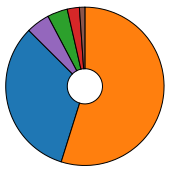
Net present value (Cost)

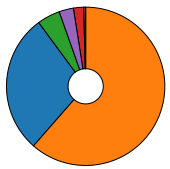
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	421,371	418,801	418,039	419,988	418,528	417,755	18,569	17,722	17,035	(£m)
Cost w/o deficit (STPR)	21,170	18,600	17,838	19,871	18,411	17,638	18,569	17,722	17,035	(£m)
Cost w/ deficit (IGEQ)	432,350	427,443	426,061	429,755	427,051	425,673	27,366	25,767	24,528	(£m)
Cost w/o deficit (IGEQ)	32,150	27,242	25,860	29,638	26,934	25,556	27,366	25,767	24,528	(£m)
Cost w/ deficit (LTDR)	423,498	420,503	419,626	421,897	420,207	419,321	20,295	19,311	18,521	(£m)
Cost w/o deficit (LTDR)	23,298	20,302	19,425	21,780	20,090	19,204	20,295	19,311	18,521	(£m)

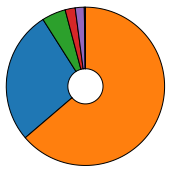
Cost breakdown (STPR)

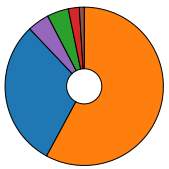
Select Company: Total

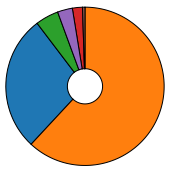
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	6,910	5,295	4,863	5,972	5,110	4,683	5,111	4,696	4,273	(£m)
Fixed opex	11,607	11,427	11,370	11,499	11,398	11,339	11,410	11,357	11,298	(£m)
Fixed operational carbon	879	869	870	877	870	869	872	867	866	(£m)
Embedded carbon	524	392	366	444	379	351	390	357	330	(£m)
Variable opex	1,016	545	328	880	561	343	671	411	249	(£m)
Variable carbon opex	234	72	41	198	93	52	115	35	18	(£m)

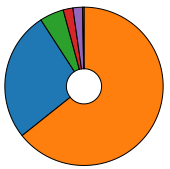
situation1 

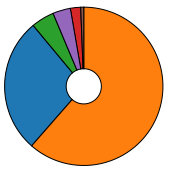
situation2 

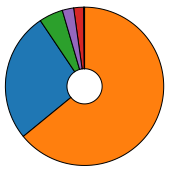
situation3 

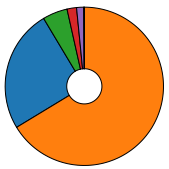
situation4 

situation5 

situation6 

situation7 

situation8 

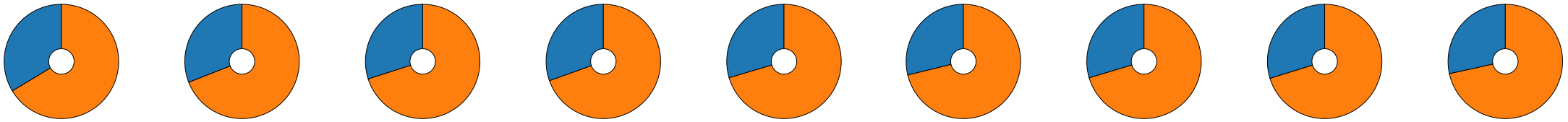
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,316,425	2,379,259	2,203,777	2,746,205	2,301,267	2,112,741	2,391,106	2,159,838	1,980,883	(tonnes)
Operational emissions	6,543,240	5,308,522	5,150,566	6,262,510	5,468,517	5,213,532	5,675,788	5,090,368	4,980,596	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

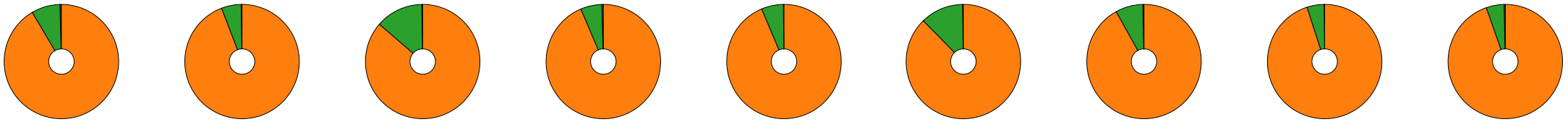


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	101	33	12	89	19	12	51	13	12	(GWh)
Grid	21,949	11,517	4,101	19,379	11,175	4,318	13,398	8,379	3,181	(GWh)
Renewable	1,931	676	636	1,239	741	596	1,125	426	170	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
SEA environmental benefit	70,263.00	65,428.00	64,601.00	67,330.00	64,444.00	63,743.00	65,144.00	63,230.00	62,223.00	
SEA environmental disbenefit	118,874.00	88,815.00	82,378.00	102,534.00	86,376.00	80,164.00	87,693.00	73,427.00	65,640.00	
Natural capital	84,727,041.95	80,185,049.02	82,993,407.50	78,409,978.72	80,065,720.11	82,795,299.77	79,789,732.58	81,621,977.58	83,253,896.87	
Bio-diversity net gain	−225,570.00	−149,431.00	−133,383.00	−208,101.00	−165,104.00	−142,270.00	−154,148.00	−126,974.00	−100,445.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	34,611.00	32,637.00	32,257.00	33,453.00	32,287.00	31,960.00	32,314.00	31,361.00	31,038.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	29.31	30.57	33.41	29.07	30.60	33.47	31.50	35.05	39.15	
R1: Uncertainty of option supply/demand benefit	6.05	5.70	6.20	5.78	5.68	6.17	5.98	6.54	7.29	
R3: Risk of service failure due to other physical hazards	7.06	7.57	8.47	7.08	7.60	8.49	7.79	8.87	10.15	
R4: Availability of additional headroom	6.62	7.01	7.22	6.74	7.04	7.24	7.32	7.68	7.93	
R5: Catchment/raw water quality risks (incl. climate change)	4.06	4.38	4.92	3.94	4.38	4.96	4.40	5.10	5.91	
R6: Capacity of catchment services	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	
R7: Risk of service failure to other exceptional events	5.51	5.90	6.59	5.54	5.90	6.61	6.01	6.85	7.87	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

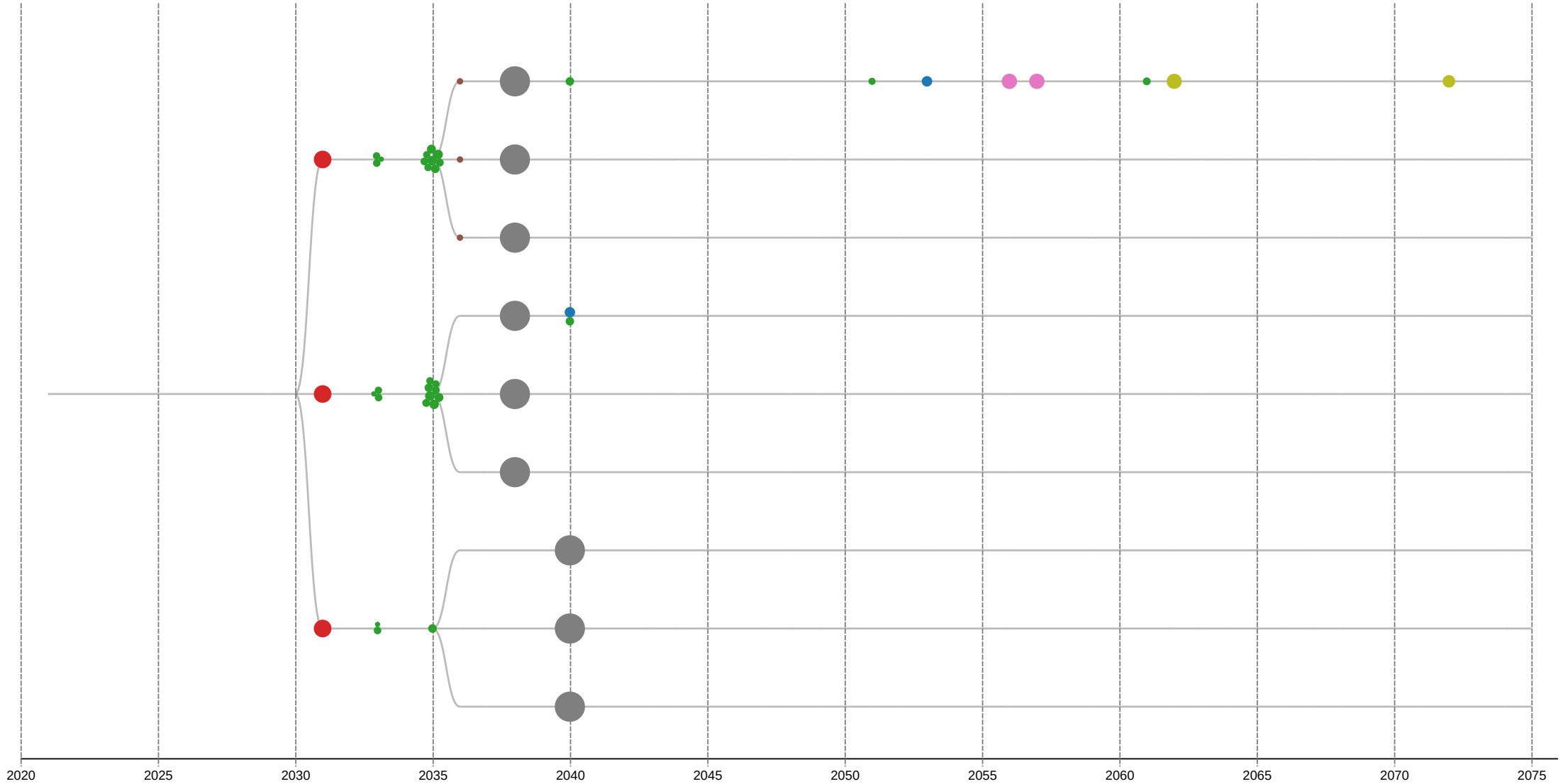
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	14.15	15.91	17.71	14.31	15.79	17.70	16.20	18.73	21.40	
A3: Operational complexity and flexibility	6.66	7.33	8.23	6.78	7.36	8.27	7.49	8.61	9.91	
A4: WRZ connectivity	7.45	8.54	9.45	7.51	8.41	9.40	8.68	10.08	11.45	
A7: Customer relations support engagement with demand management	0.03	0.04	0.04	0.02	0.03	0.03	0.03	0.03	0.03	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.42	20.64	22.74	19.23	20.58	22.81	20.95	23.86	27.10	
E1: Scaleability and modularity of proposed changes	8.86	9.65	10.74	8.87	9.70	10.79	9.83	11.29	12.88	
E2: Intervention lead times	4.28	4.31	4.57	4.10	4.19	4.58	4.32	4.82	5.37	
E3: Reliance on external bodies to deliver changes	6.28	6.67	7.42	6.25	6.69	7.44	6.81	7.76	8.85	
E5: Collaborative land management	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	

Option Selection (Thames Water)



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Utilisation (Thames Water)

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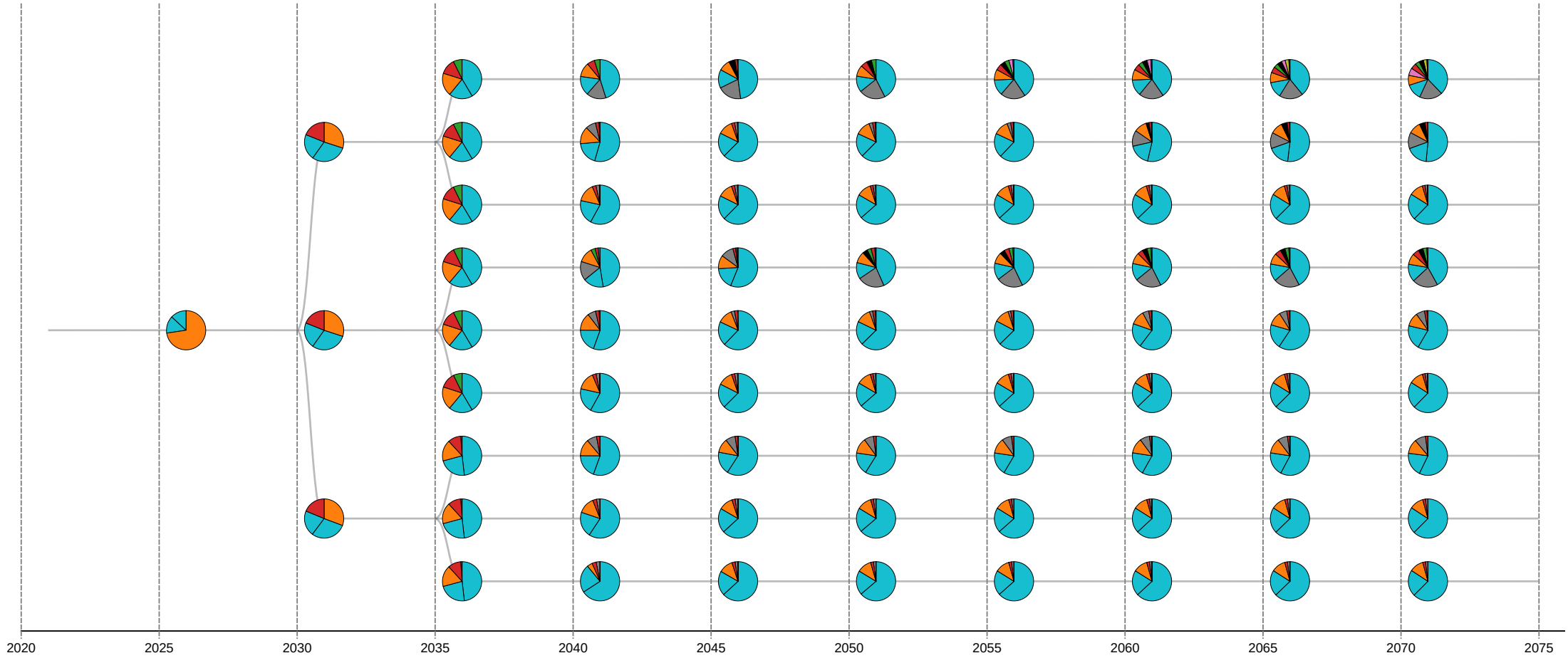

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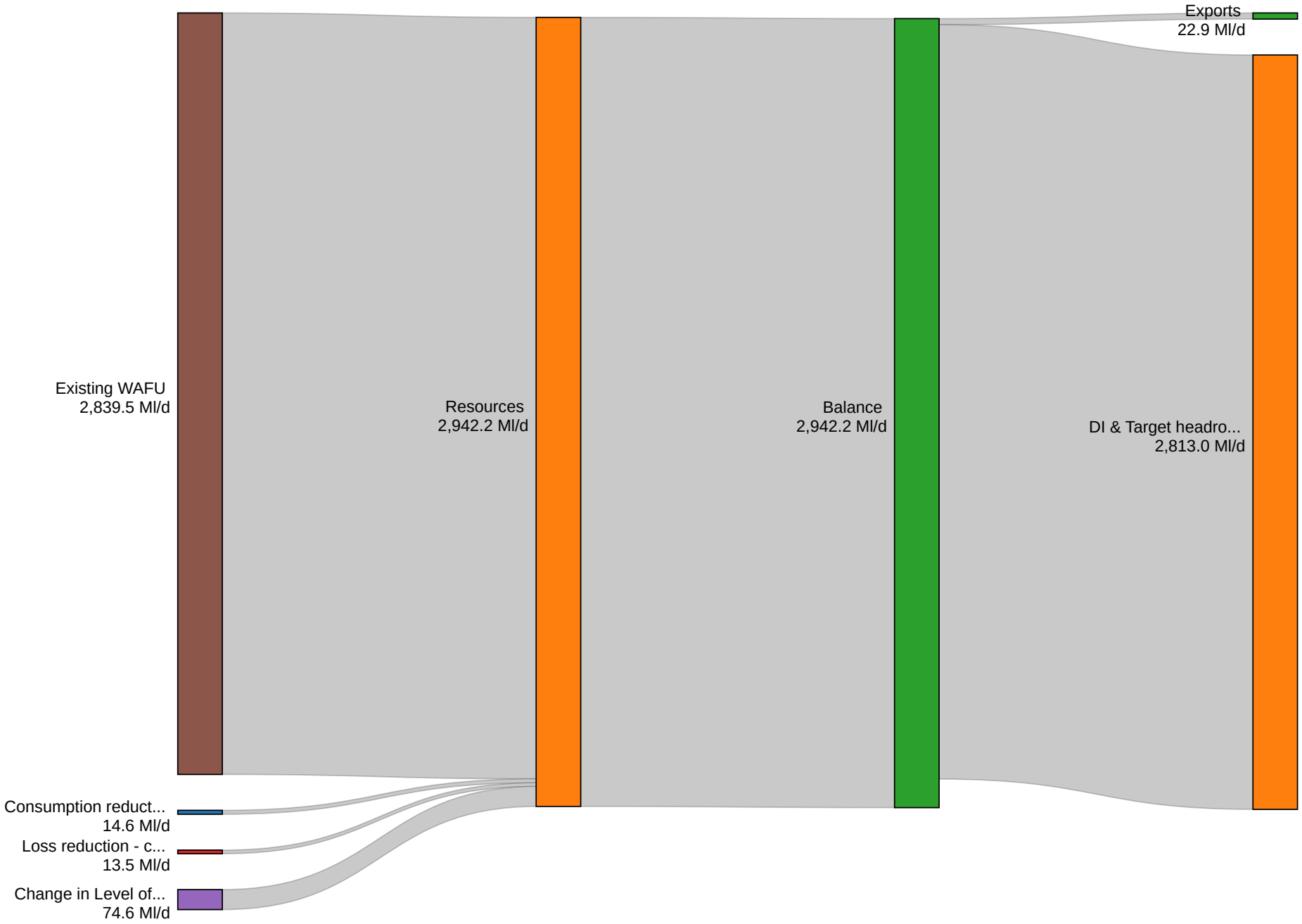
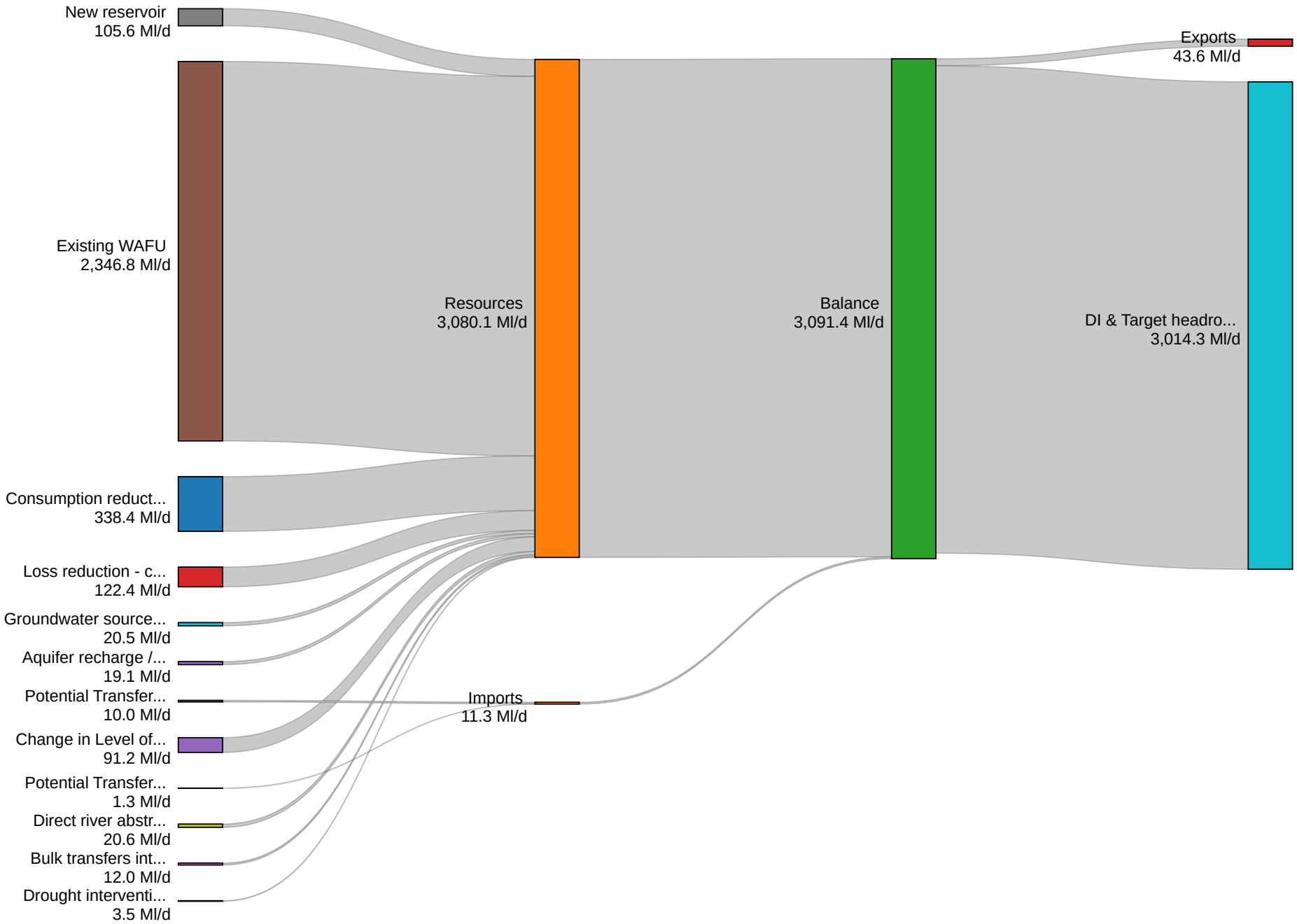
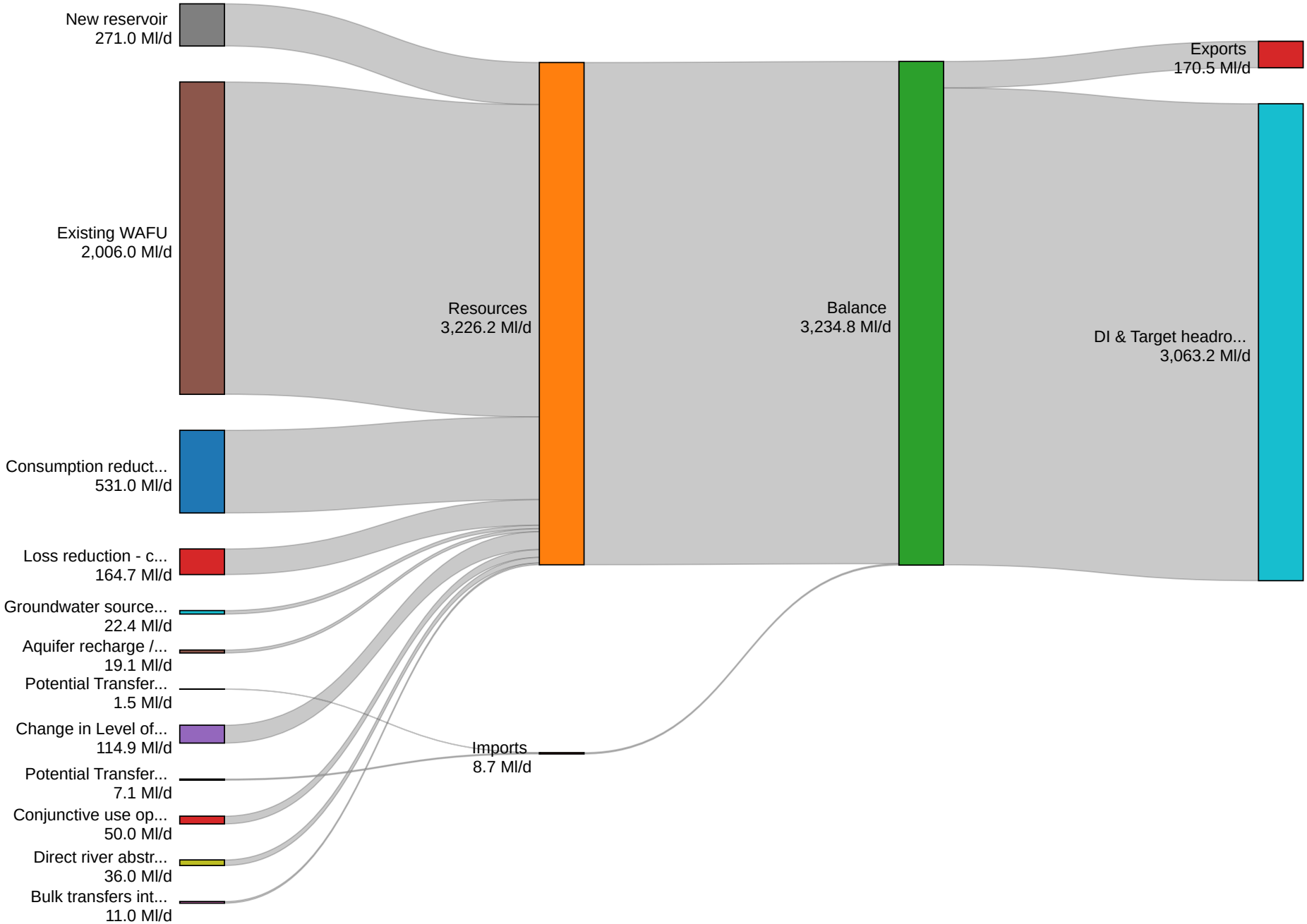
Situation 4 - 2026 (Thames Water)



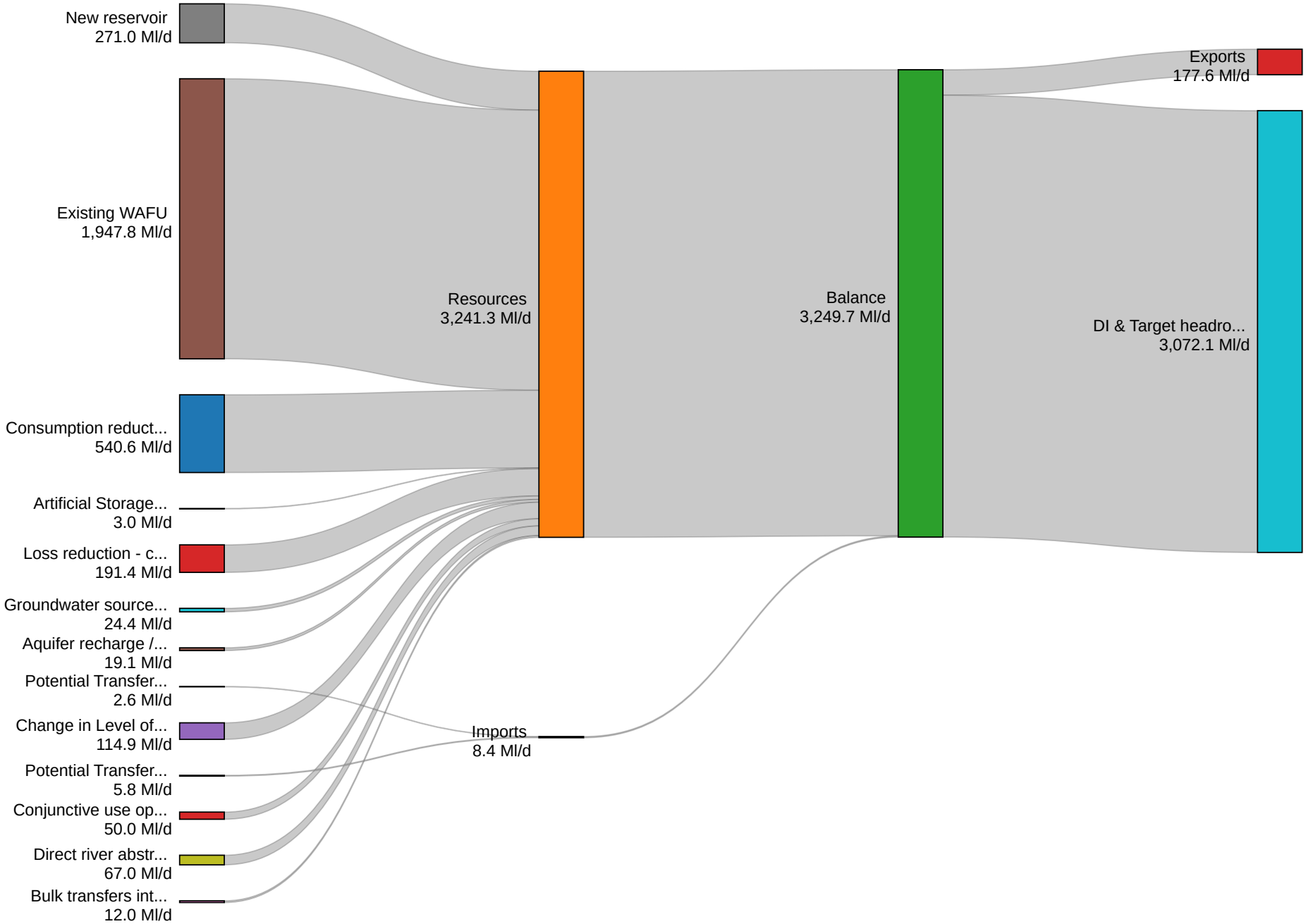
Situation 4 - 2040 (Thames Water)



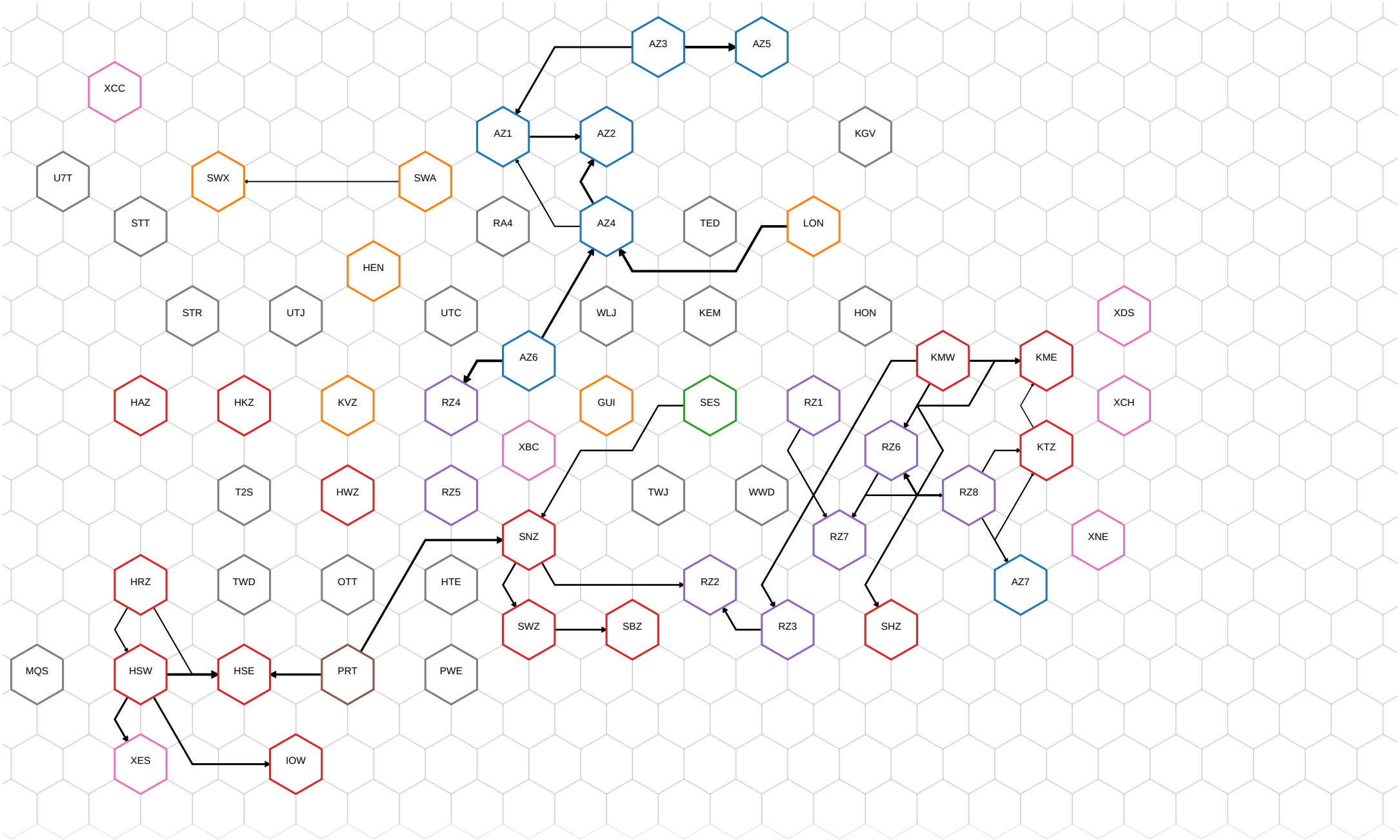
Situation 4 - 2050 (Thames Water)



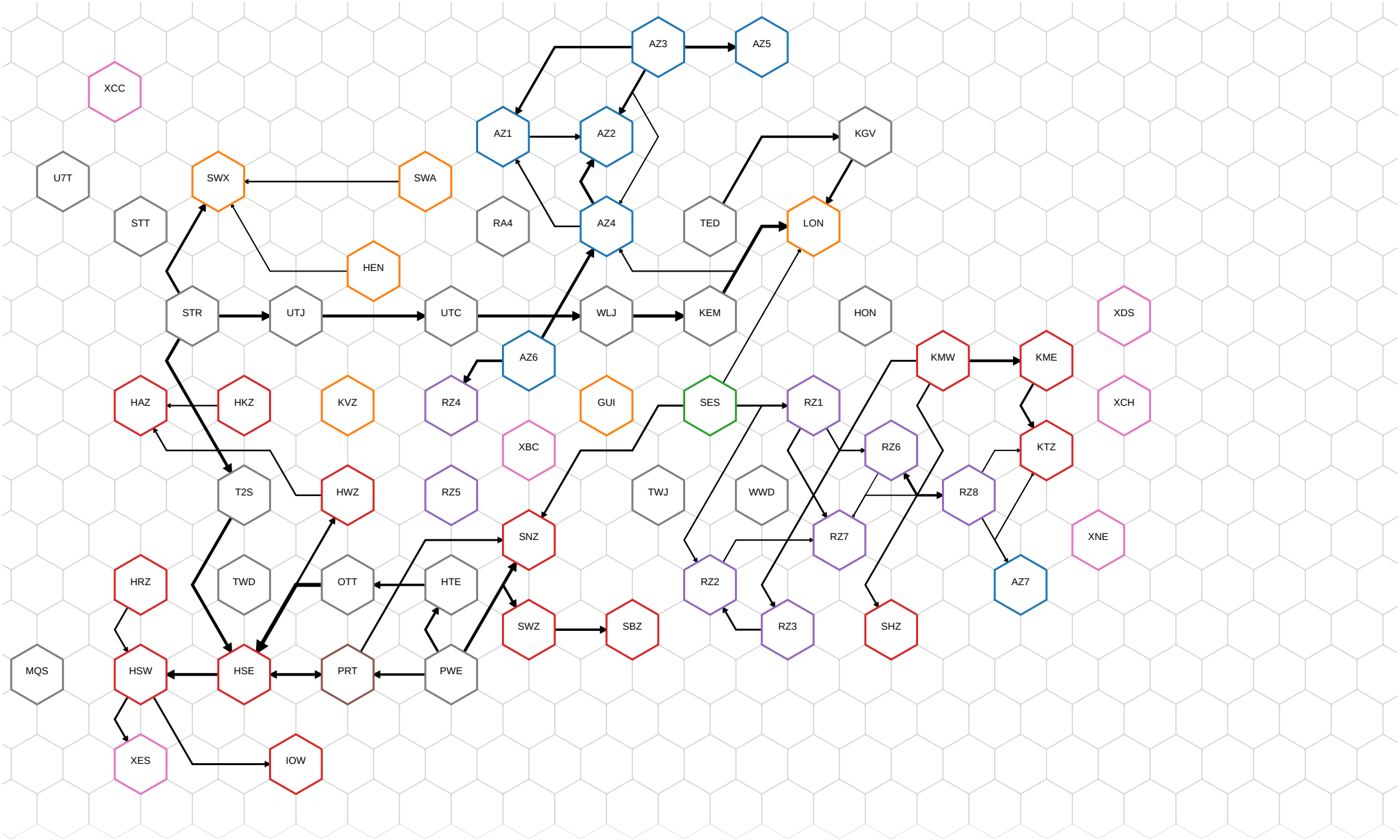
Situation 4 - 2075 (Thames Water)



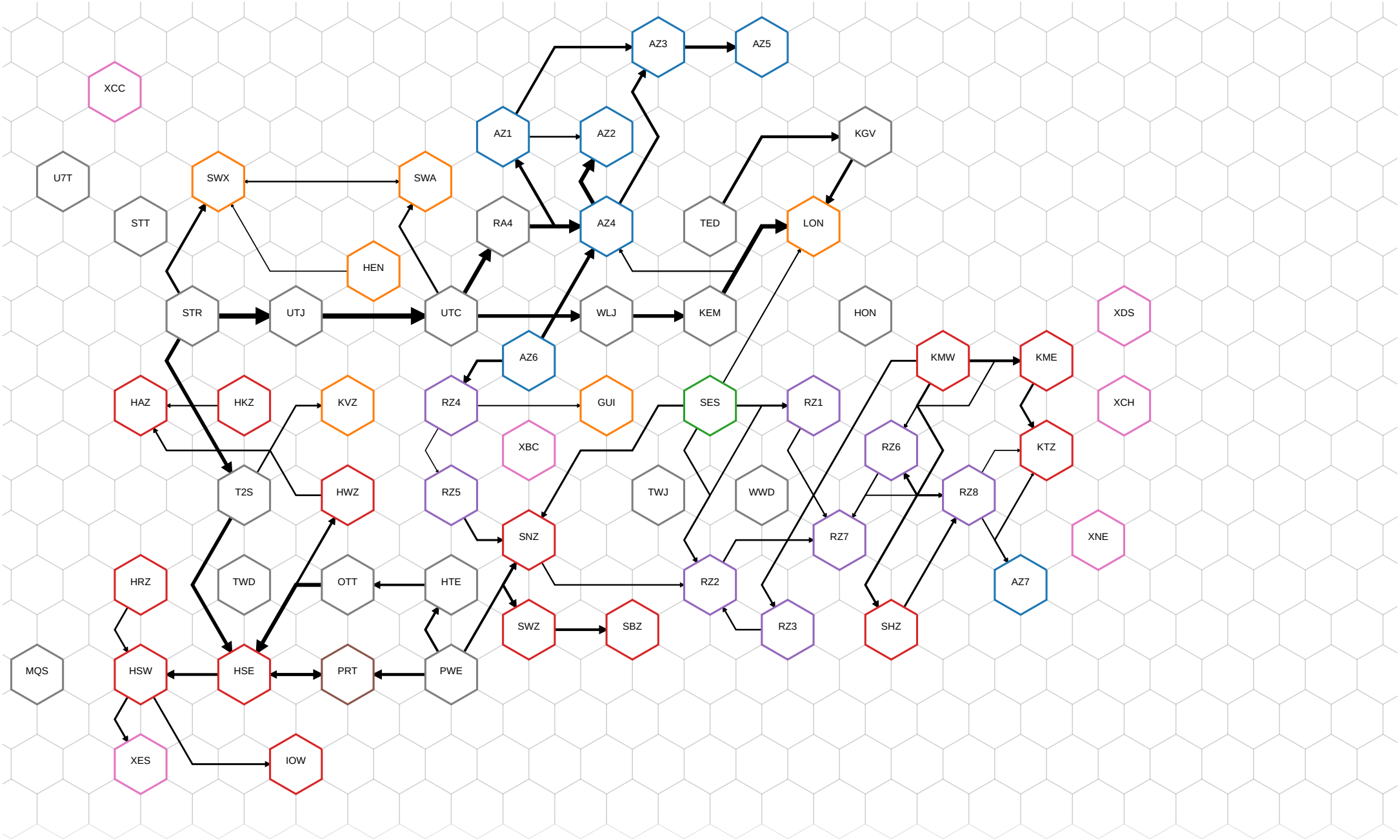
Situation 4 - 2026



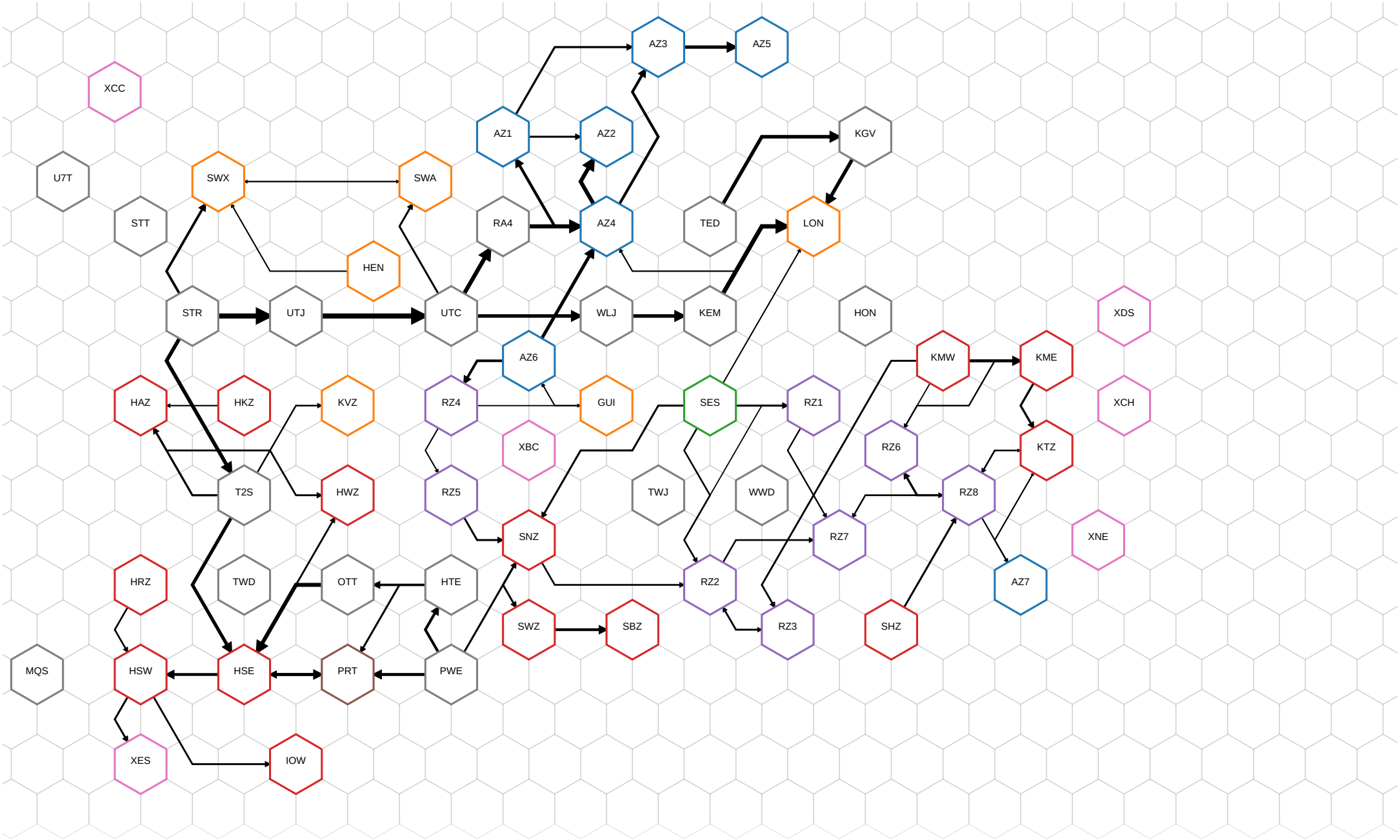
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

1:500 DROUGHT RESILIENCE IN 2045

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid2045-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-2075
Description	Least cost run with hybrid-c+2 government interventions with 1in500 achieved in 2045.
Created at	25/07/2023, 13:21:07
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets.
Optimised discount rate	STPR

Metrics

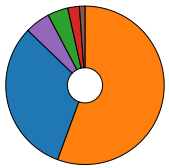
Net present value (Cost)

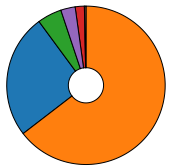
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	20,906	17,487	16,804	19,448	17,382	16,630	17,744	16,882	16,173	(£m)
Cost w/o deficit (STPR)	20,906	17,487	16,804	19,448	17,382	16,630	17,744	16,882	16,173	(£m)
Cost w/ deficit (IGEQ)	32,038	25,581	24,349	29,287	25,395	24,062	26,162	24,536	23,264	(£m)
Cost w/o deficit (IGEQ)	32,038	25,581	24,349	29,287	25,395	24,062	26,162	24,536	23,264	(£m)
Cost w/ deficit (LTDR)	23,059	19,083	18,298	21,365	18,962	18,102	19,397	18,395	17,581	(£m)
Cost w/o deficit (LTDR)	23,059	19,083	18,298	21,365	18,962	18,102	19,397	18,395	17,581	(£m)

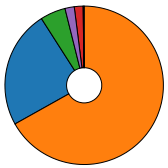
Cost breakdown (STPR)

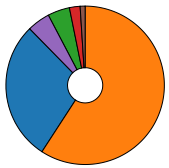
Select Company: Total

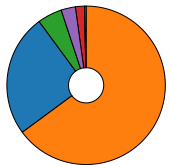
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	6,604	4,431	4,042	5,540	4,348	3,909	4,509	4,051	3,605	(£m)
Fixed opex	11,624	11,290	11,239	11,508	11,279	11,223	11,289	11,236	11,177	(£m)
Fixed operational carbon	881	869	869	877	871	870	872	867	866	(£m)
Embedded carbon	498	327	303	423	322	293	341	304	277	(£m)
Variable opex	1,067	514	317	903	506	303	640	387	232	(£m)
Variable carbon opex	234	55	34	196	57	33	95	37	17	(£m)

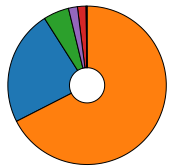
situation1 

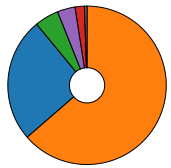
situation2 

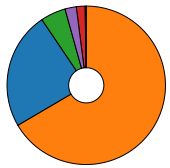
situation3 

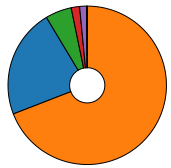
situation4 

situation5 

situation6 

situation7 

situation8 

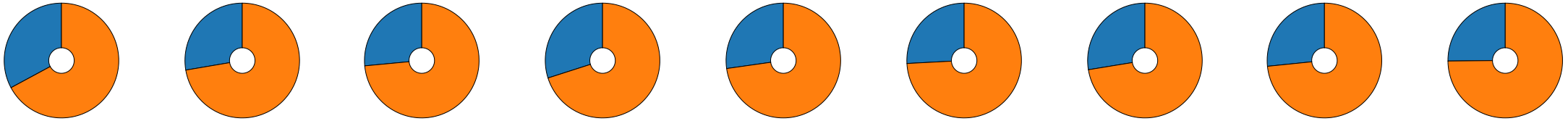
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,219,135	1,998,541	1,837,227	2,681,623	1,964,815	1,775,020	2,107,213	1,852,842	1,671,002	(tonnes)
Operational emissions	6,578,549	5,222,330	5,098,466	6,278,119	5,247,880	5,097,065	5,535,478	5,109,417	4,975,650	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

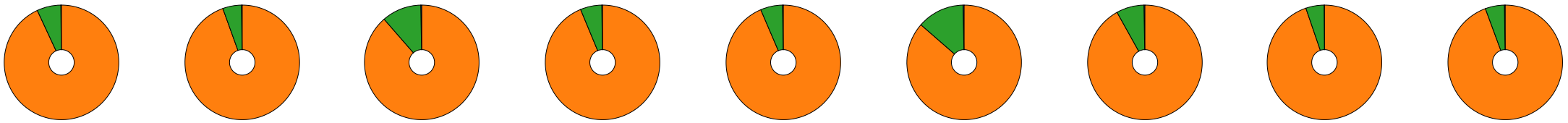


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	48	29	14	46	28	14	41	9	8	(GWh)
Grid	23,176	11,367	4,236	19,482	10,958	3,862	13,169	7,955	2,904	(GWh)
Renewable	1,678	634	532	1,255	727	594	1,118	433	166	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
SEA environmental benefit	69,681.00	63,959.00	63,265.00	67,493.00	63,374.00	62,543.00	64,622.00	62,498.00	61,291.00	
SEA environmental disbenefit	112,484.00	81,225.00	75,527.00	100,444.00	77,407.00	72,836.00	84,200.00	69,074.00	60,372.00	
Natural capital	84,566,551.28	81,376,692.58	84,196,941.69	78,116,496.95	81,515,582.18	84,145,117.81	80,949,547.19	81,835,447.95	84,598,755.93	
Bio-diversity net gain	−189,016.00	−113,629.00	−89,202.00	−167,102.00	−108,843.00	−89,713.00	−119,480.00	−91,797.00	−60,800.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	33,921.00	31,820.00	31,470.00	33,247.00	31,594.00	31,322.00	31,803.00	30,833.00	30,316.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	27.78	27.24	29.73	27.07	27.34	29.80	28.57	31.52	35.05	
R1: Uncertainty of option supply/demand benefit	5.76	4.92	5.33	5.35	4.95	5.34	5.29	5.70	6.31	
R3: Risk of service failure due to other physical hazards	6.66	6.75	7.54	6.58	6.78	7.56	7.05	7.97	9.10	
R4: Availability of additional headroom	6.44	6.78	6.99	6.50	6.80	7.00	7.10	7.46	7.70	
R5: Catchment/raw water quality risks (incl. climate change)	3.94	3.83	4.32	3.67	3.83	4.33	3.94	4.53	5.25	
R6: Capacity of catchment services	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	
R7: Risk of service failure to other exceptional events	4.98	4.96	5.55	4.96	4.98	5.57	5.19	5.85	6.70	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

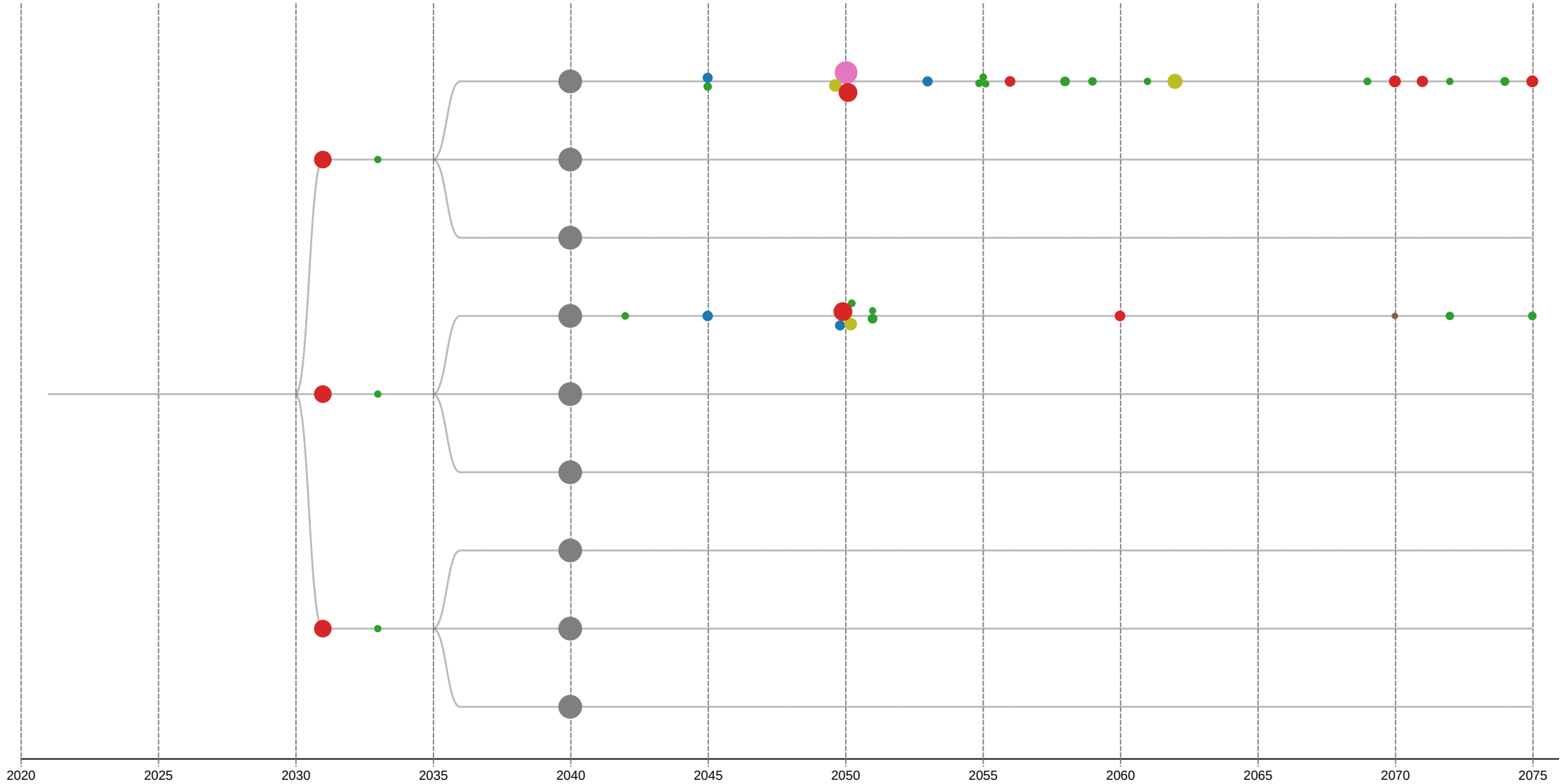
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	13.65	15.01	16.81	13.82	15.08	16.74	15.45	17.62	19.85	
A3: Operational complexity and flexibility	6.13	6.46	7.25	6.19	6.50	7.30	6.73	7.69	8.84	
A4: WRZ connectivity	7.49	8.53	9.53	7.59	8.55	9.41	8.69	9.90	10.97	
A7: Customer relations support engagement with demand management	0.02	0.03	0.03	0.04	0.03	0.03	0.03	0.03	0.04	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.43	19.63	21.76	19.01	19.73	21.70	20.25	22.94	26.01	
E1: Scaleability and modularity of proposed changes	8.92	9.37	10.43	8.82	9.45	10.51	9.70	11.12	12.68	
E2: Intervention lead times	4.29	4.00	4.36	4.06	3.97	4.18	4.03	4.41	4.89	
E3: Reliance on external bodies to deliver changes	6.22	6.27	6.97	6.13	6.31	7.01	6.52	7.41	8.44	
E5: Collaborative land management	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	

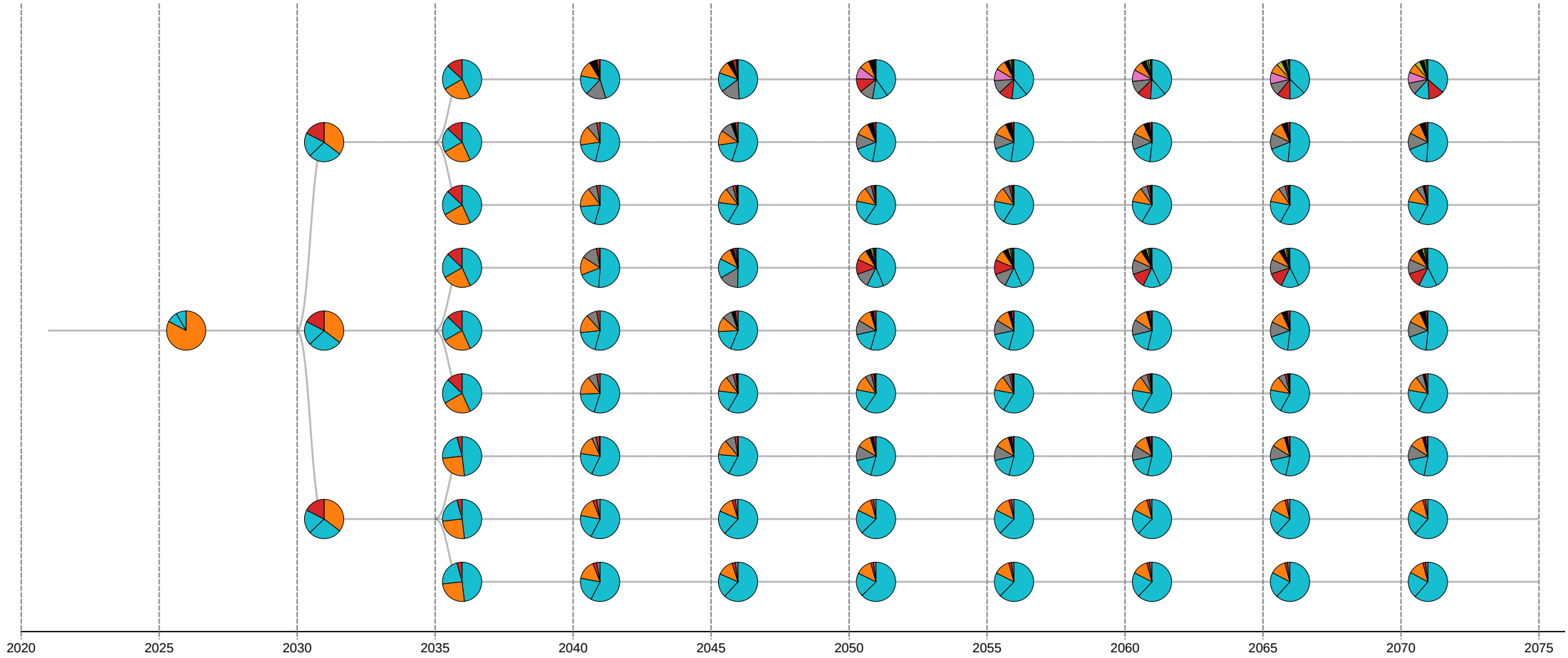
Option Selection (Thames Water)



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

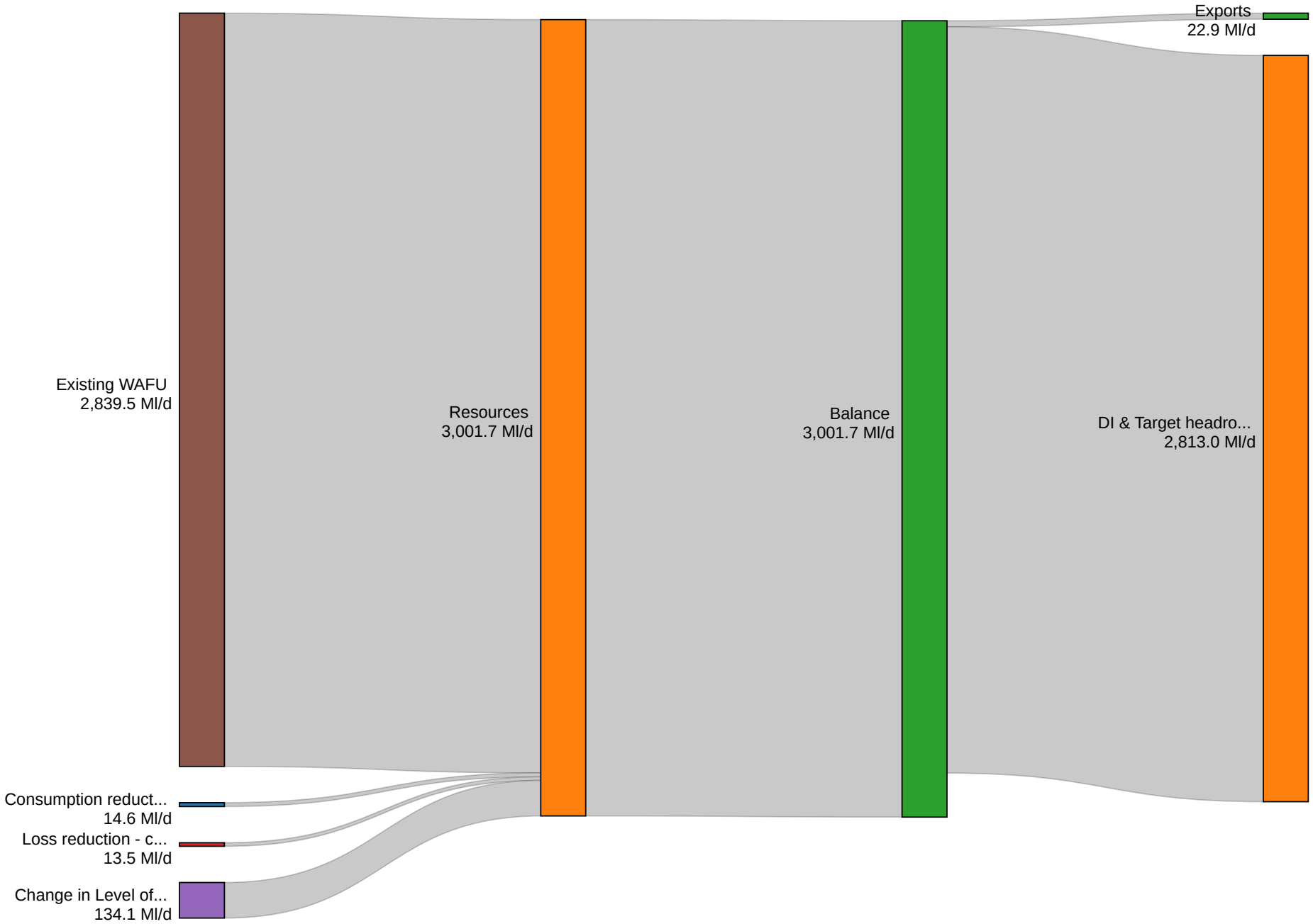
Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.

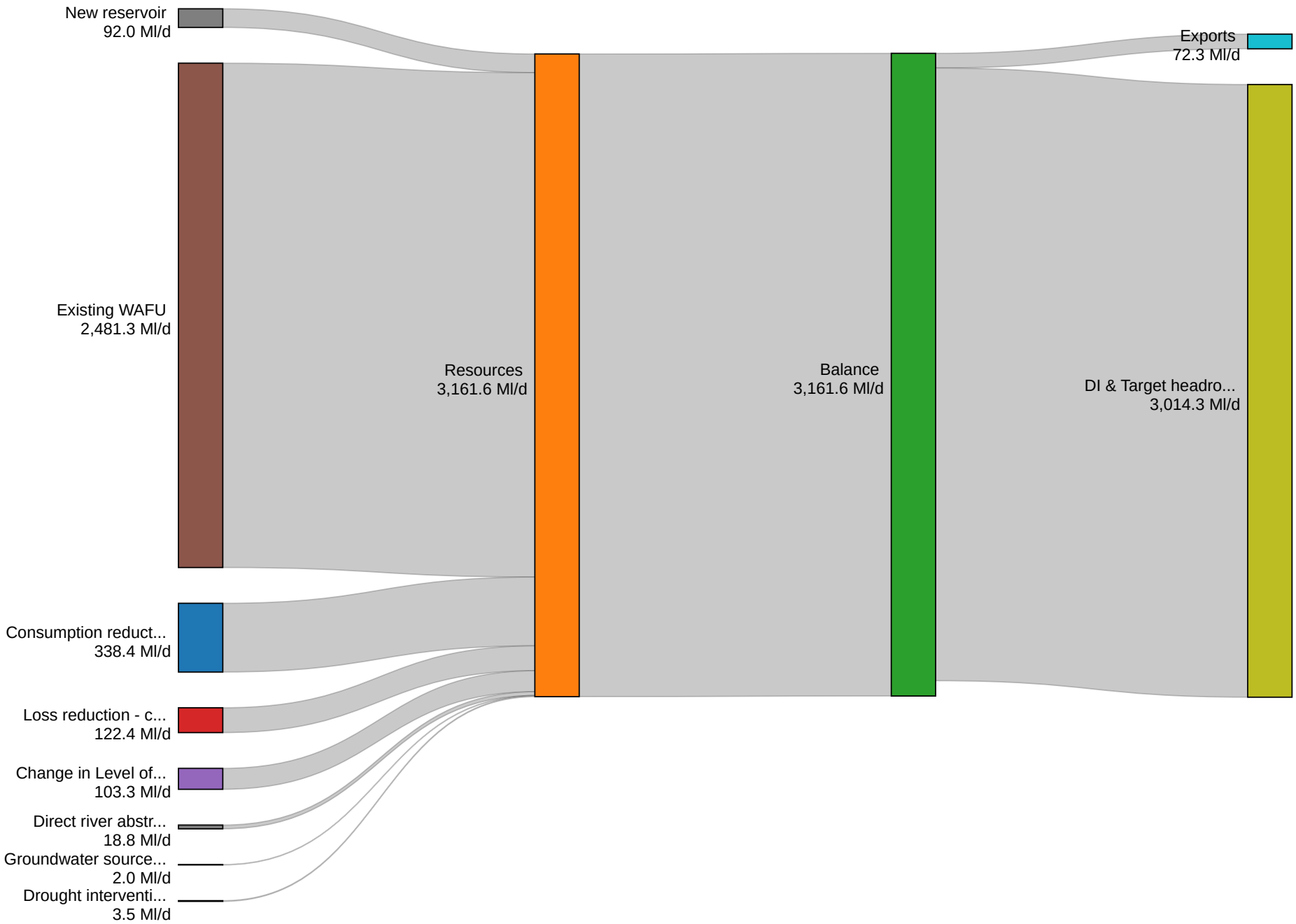


- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

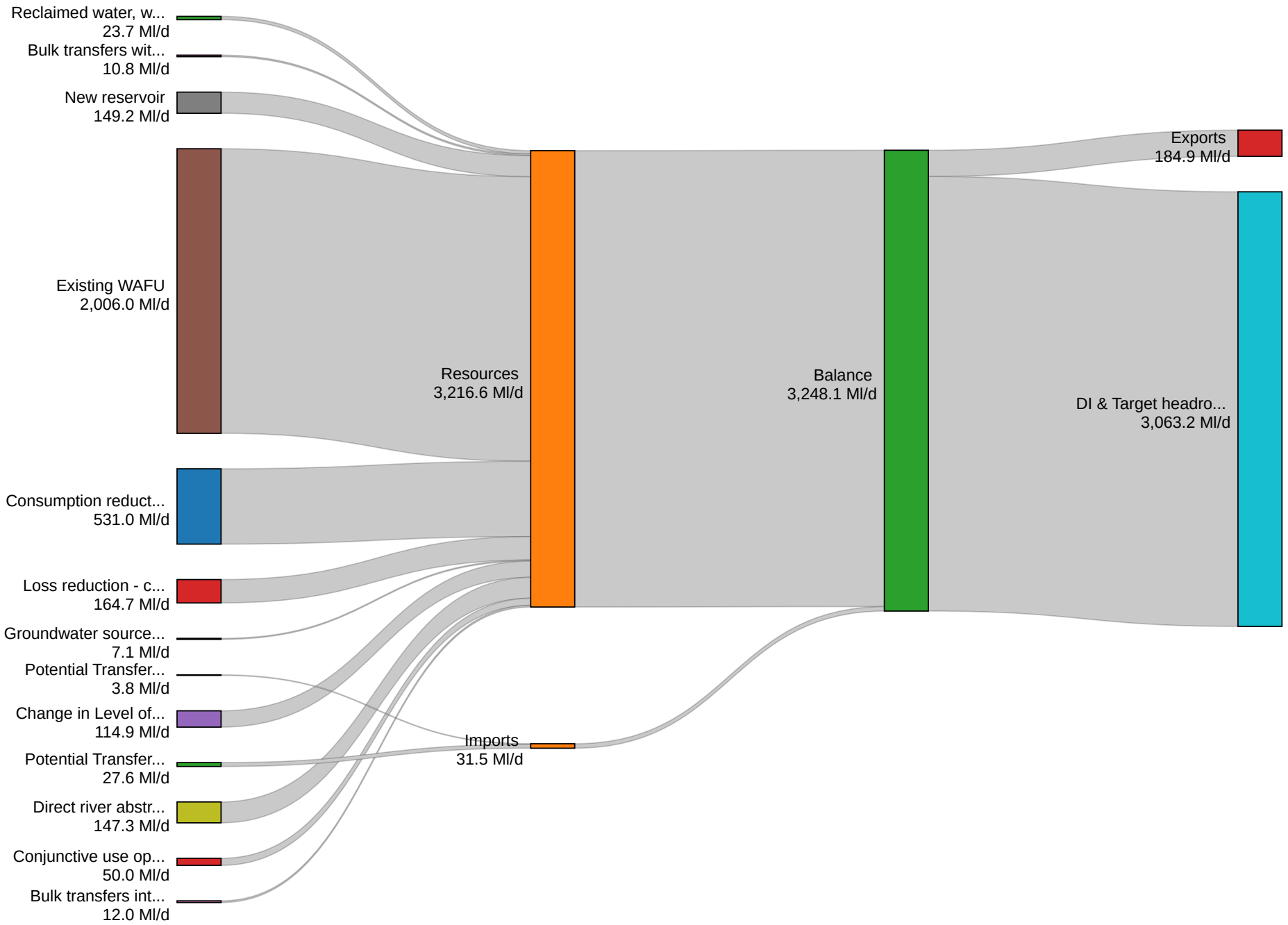
Situation 4 - 2026 (Thames Water)



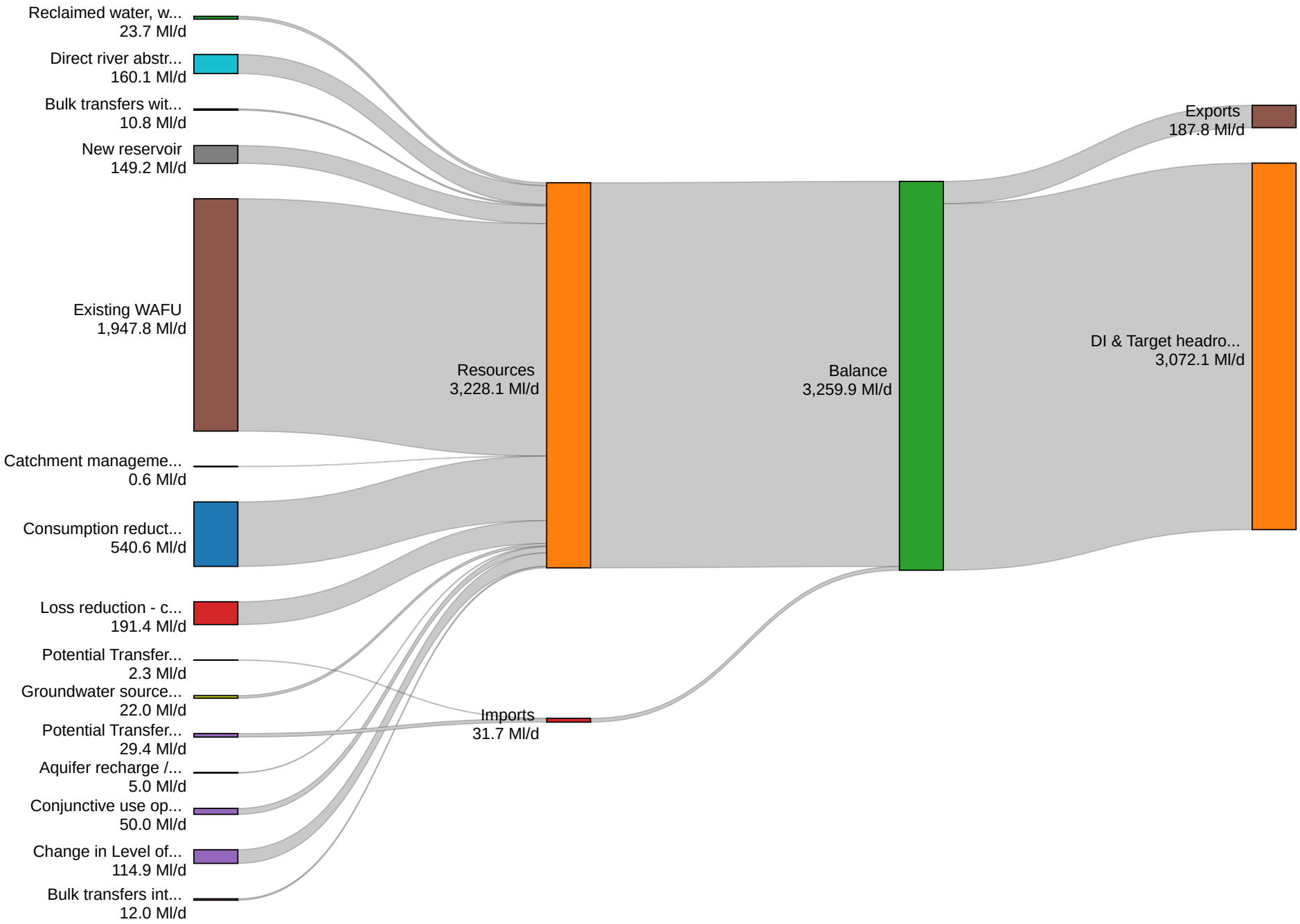
Situation 4 - 2040 (Thames Water)



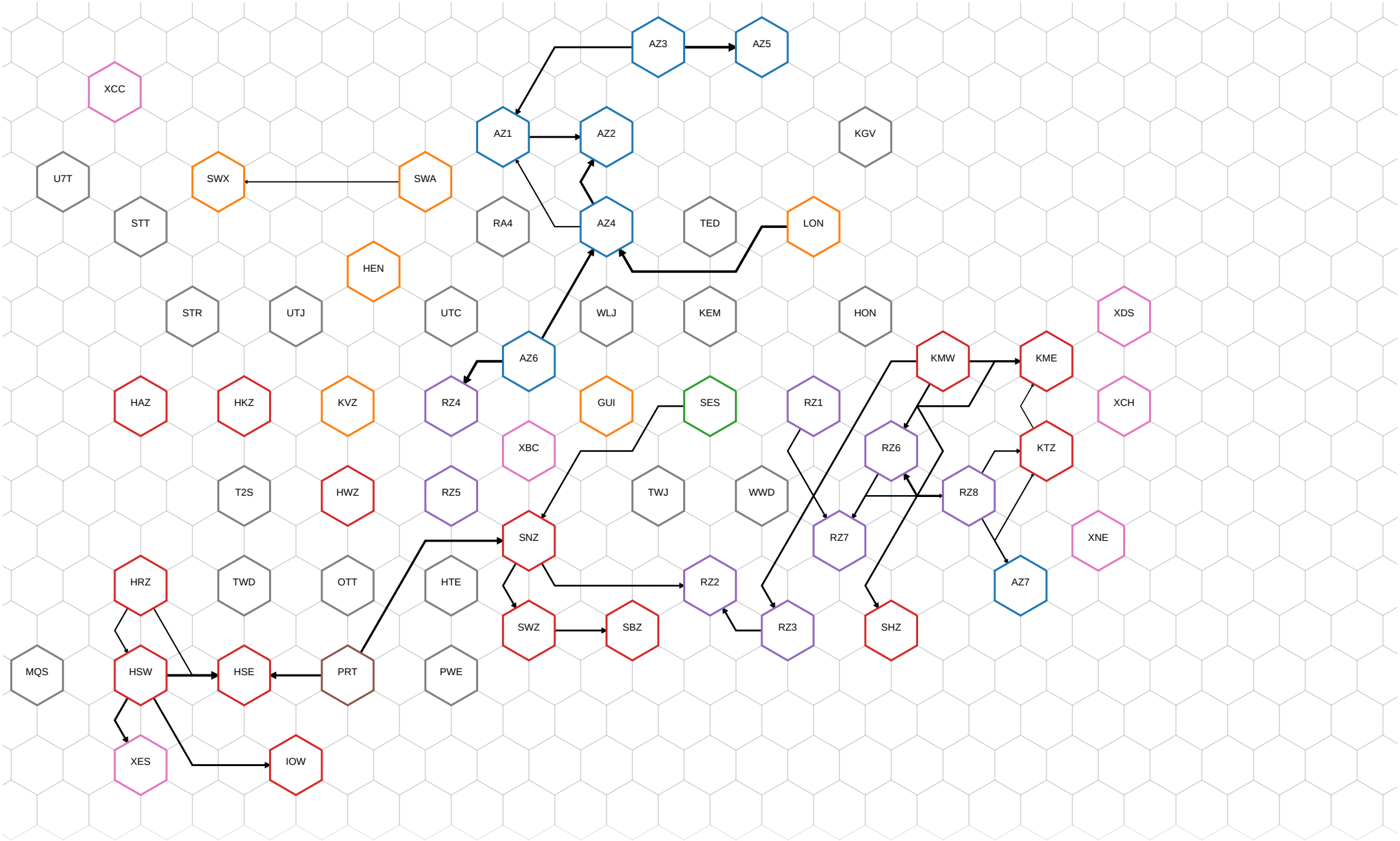
Situation 4 - 2050 (Thames Water)



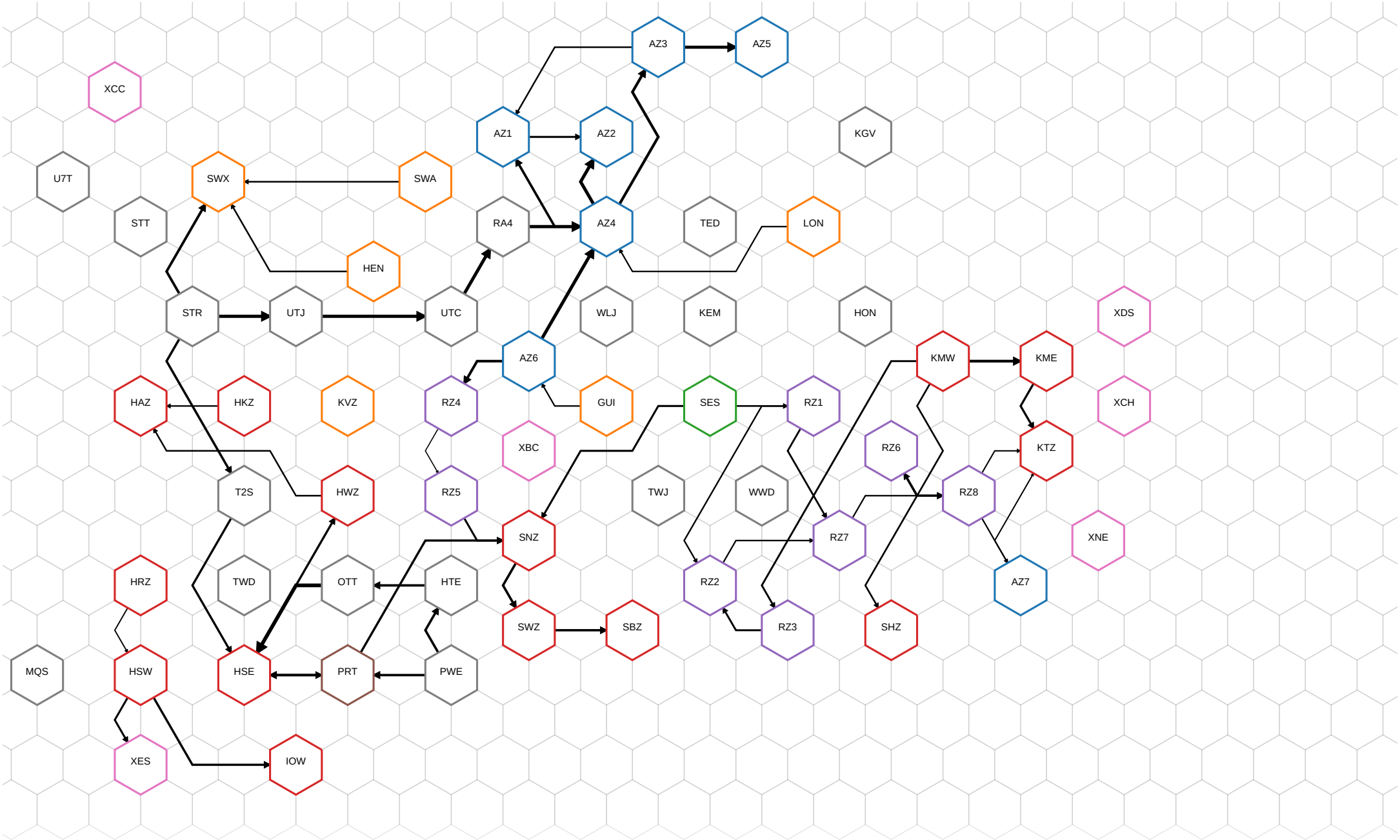
Situation 4 - 2075 (Thames Water)



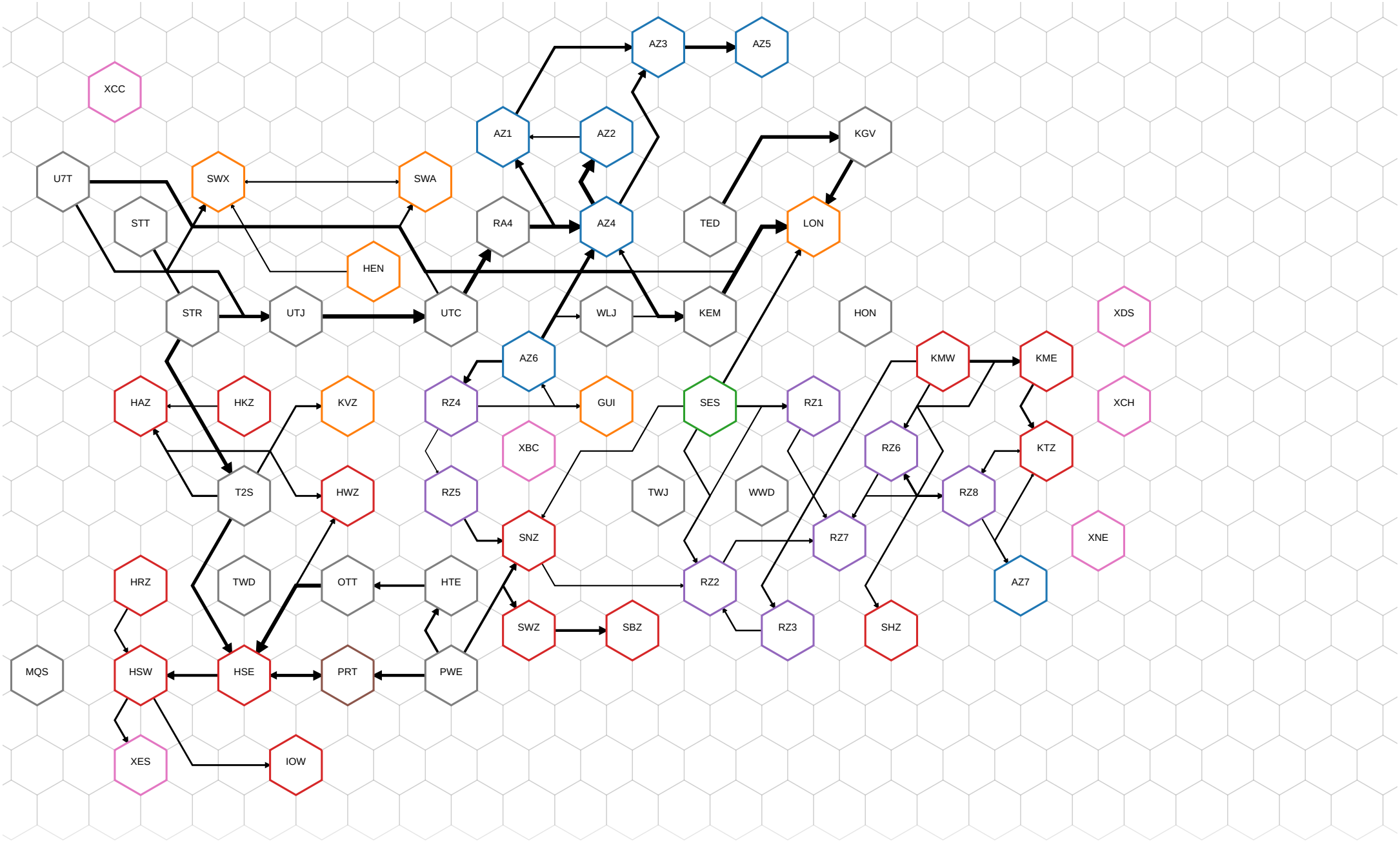
Situation 4 - 2026



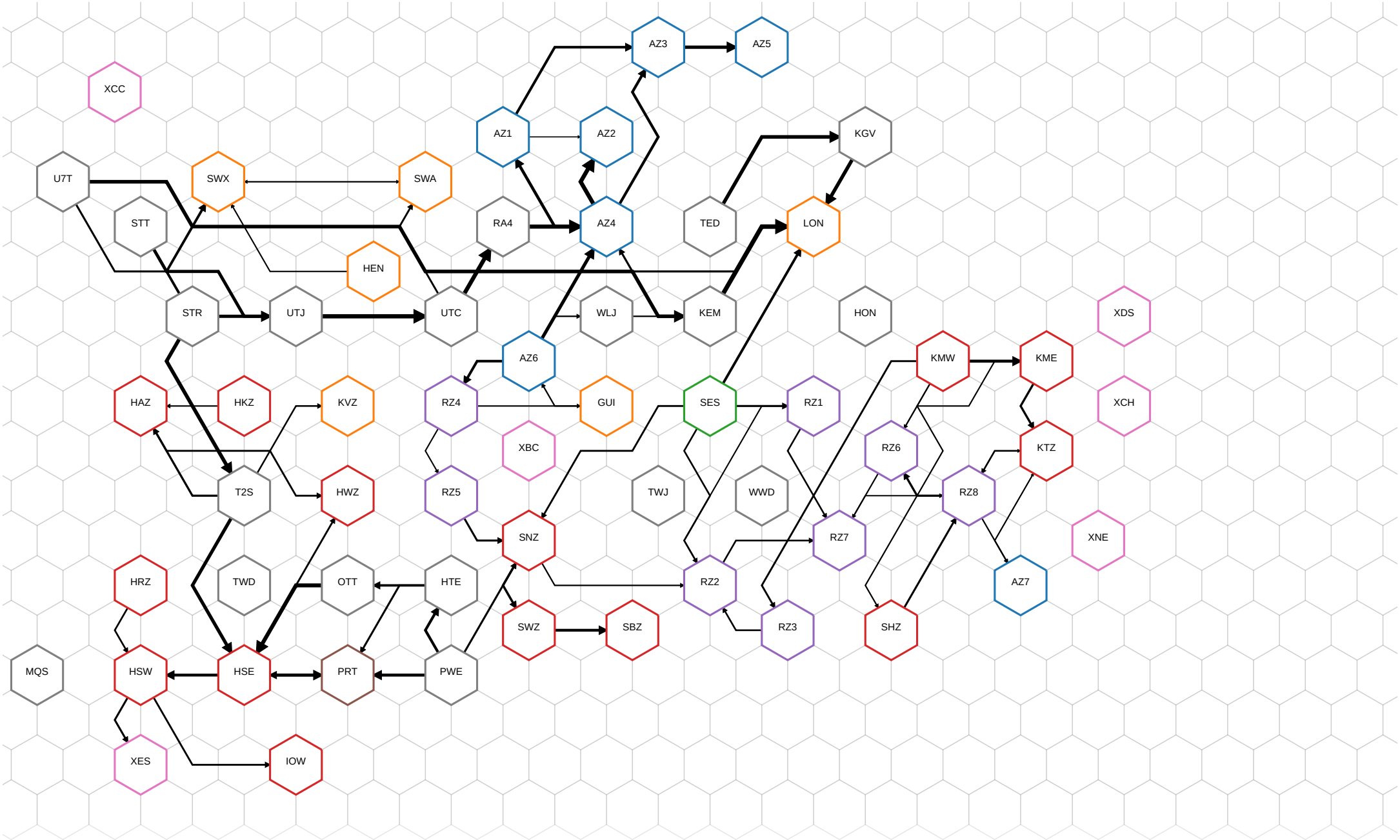
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

1:500 DROUGHT RESILIENCE IN 2050

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid2050-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-2075
Description	Least cost run with hybrid-c+2 government interventions with 1in500 achieved in 2050.
Created at	25/07/2023, 13:21:15
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets.
Optimised discount rate	STPR

Metrics

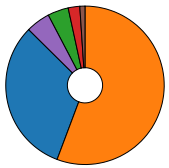
Net present value (Cost)

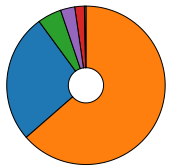
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	20,607	17,764	17,088	19,213	17,663	16,915	17,742	16,859	16,151	(£m)
Cost w/o deficit (STPR)	20,607	17,764	17,088	19,213	17,663	16,915	17,742	16,859	16,151	(£m)
Cost w/ deficit (IGEQ)	31,407	26,002	24,777	28,752	25,828	24,511	26,162	24,502	23,226	(£m)
Cost w/o deficit (IGEQ)	31,407	26,002	24,777	28,752	25,828	24,511	26,162	24,502	23,226	(£m)
Cost w/ deficit (LTDR)	22,698	19,388	18,610	21,075	19,273	18,418	19,395	18,370	17,556	(£m)
Cost w/o deficit (LTDR)	22,698	19,388	18,610	21,075	19,273	18,418	19,395	18,370	17,556	(£m)

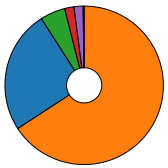
Cost breakdown (STPR)

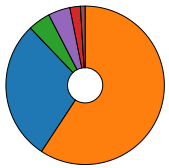
Select Company: Total

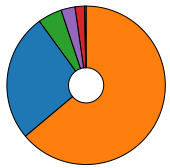
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	6,531	4,681	4,296	5,495	4,611	4,172	4,505	4,032	3,585	(£m)
Fixed opex	11,483	11,294	11,244	11,386	11,282	11,226	11,289	11,236	11,175	(£m)
Fixed operational carbon	880	869	870	877	869	868	872	867	866	(£m)
Embedded carbon	487	350	327	416	347	317	340	301	275	(£m)
Variable opex	1,011	514	316	855	501	302	641	386	232	(£m)
Variable carbon opex	215	55	35	183	54	30	95	37	17	(£m)

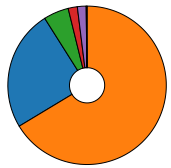
situation1 

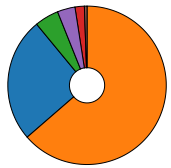
situation2 

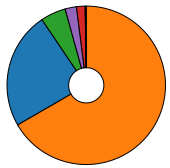
situation3 

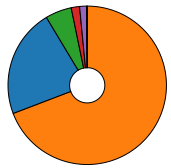
situation4 

situation5 

situation6 

situation7 

situation8 

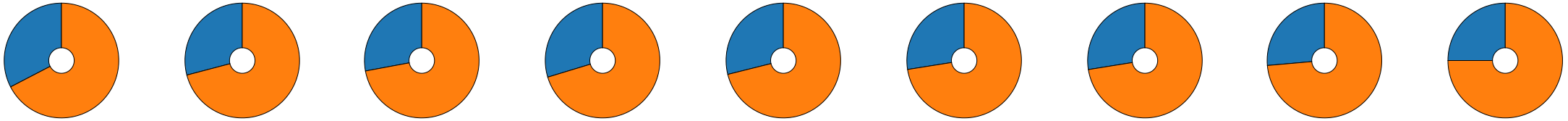
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,121,020	2,142,161	1,982,964	2,610,735	2,120,898	1,922,487	2,102,879	1,830,714	1,658,685	(tonnes)
Operational emissions	6,450,590	5,221,750	5,116,397	6,184,393	5,218,677	5,067,434	5,536,190	5,108,386	4,975,626	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

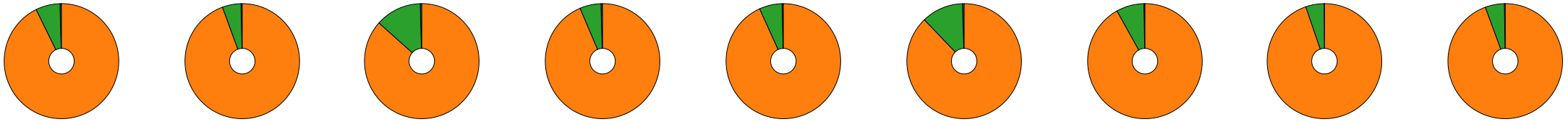


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	104	44	22	95	43	22	41	9	8	(GWh)
Grid	22,632	11,395	4,185	19,423	10,792	3,961	13,176	7,927	2,898	(GWh)
Renewable	1,672	634	628	1,235	741	529	1,120	434	166	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	69,333.00	64,060.00	63,182.00	66,997.00	63,477.00	62,857.00	64,687.00	62,339.00	61,135.00	
SEA environmental disbenefit	109,995.00	81,134.00	73,331.00	99,912.00	77,329.00	74,243.00	85,279.00	69,773.00	59,805.00	
Natural capital	81,361,369.55	77,269,903.33	80,152,624.57	75,509,424.66	77,394,848.58	79,890,639.11	80,874,482.45	81,694,766.15	84,568,691.44	
Bio-diversity net gain	−211,004.00	−145,790.00	−113,237.00	−205,946.00	−146,483.00	−133,787.00	−121,344.00	−90,444.00	−58,051.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	33,656.00	31,773.00	31,344.00	33,012.00	31,544.00	31,359.00	31,864.00	30,831.00	30,270.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	28.94	29.49	32.40	28.36	29.67	32.31	28.69	31.62	35.12	
R1: Uncertainty of option supply/demand benefit	5.96	5.38	5.92	5.57	5.43	5.83	5.32	5.73	6.32	
R3: Risk of service failure due to other physical hazards	6.97	7.36	8.27	6.94	7.42	8.25	7.08	8.00	9.11	
R4: Availability of additional headroom	6.58	6.95	7.17	6.66	6.97	7.17	7.11	7.47	7.71	
R5: Catchment/raw water quality risks (incl. climate change)	4.13	4.24	4.79	3.87	4.25	4.80	3.97	4.55	5.26	
R6: Capacity of catchment services	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
R7: Risk of service failure to other exceptional events	5.29	5.57	6.26	5.32	5.60	6.26	5.21	5.87	6.71	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

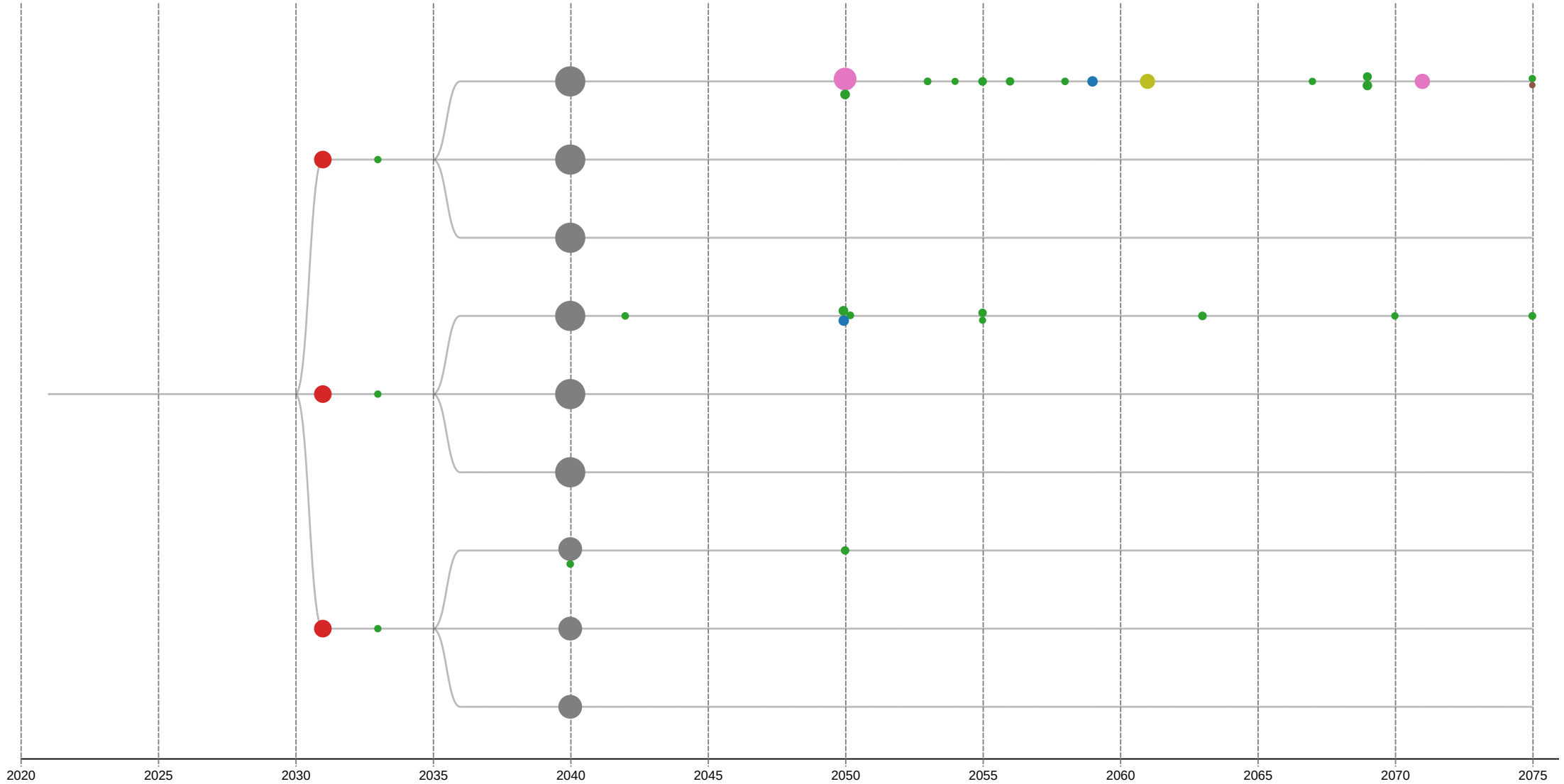
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	14.03	15.64	17.50	14.27	15.75	17.47	15.46	17.50	19.83	
A3: Operational complexity and flexibility	6.51	7.07	7.96	6.61	7.12	7.99	6.76	7.72	8.86	
A4: WRZ connectivity	7.48	8.54	9.52	7.63	8.60	9.45	8.67	9.75	10.93	
A7: Customer relations support engagement with demand management	0.04	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.04	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.15	19.94	22.22	18.84	20.06	22.00	20.35	23.01	26.06	
E1: Scaleability and modularity of proposed changes	8.80	9.36	10.47	8.71	9.46	10.48	9.73	11.16	12.71	
E2: Intervention lead times	4.16	4.15	4.55	4.02	4.13	4.35	4.06	4.42	4.90	
E3: Reliance on external bodies to deliver changes	6.18	6.43	7.19	6.11	6.48	7.18	6.55	7.43	8.46	
E5: Collaborative land management	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

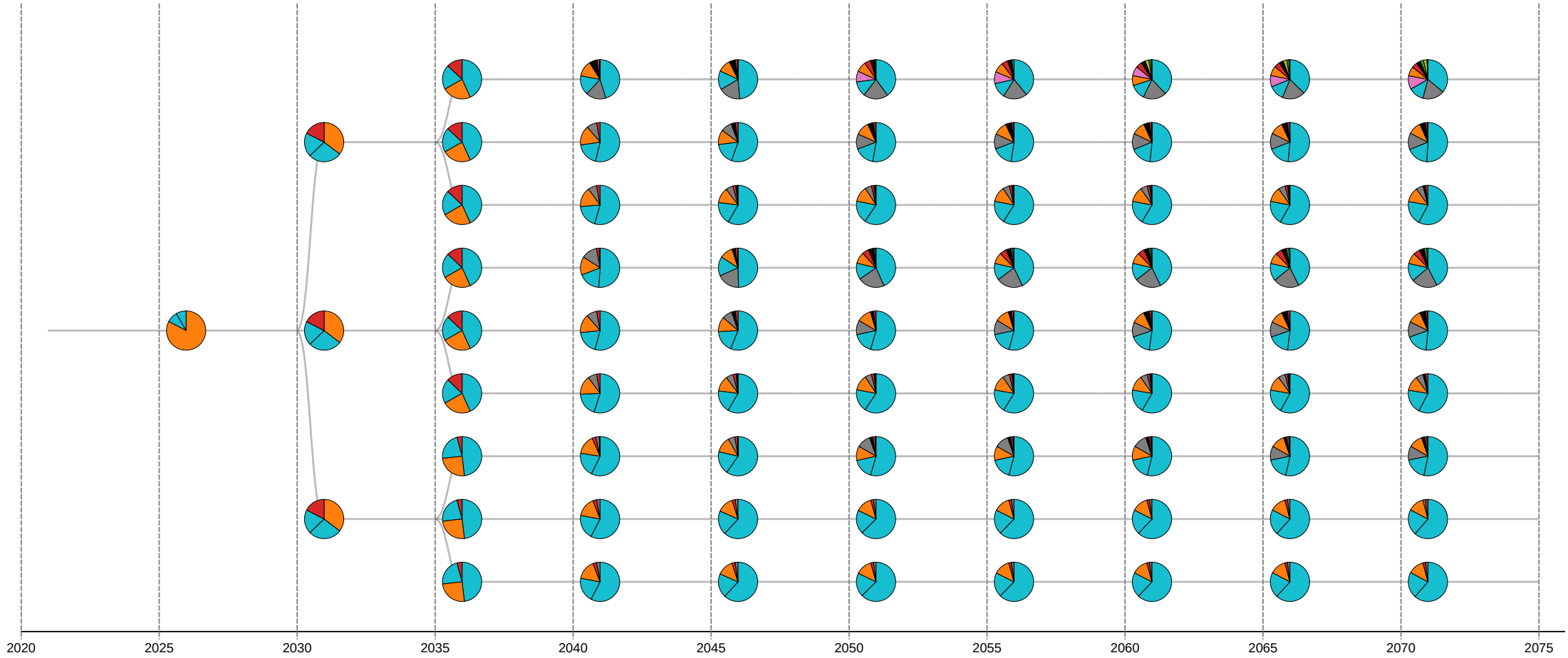
Option Selection (Thames Water)



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

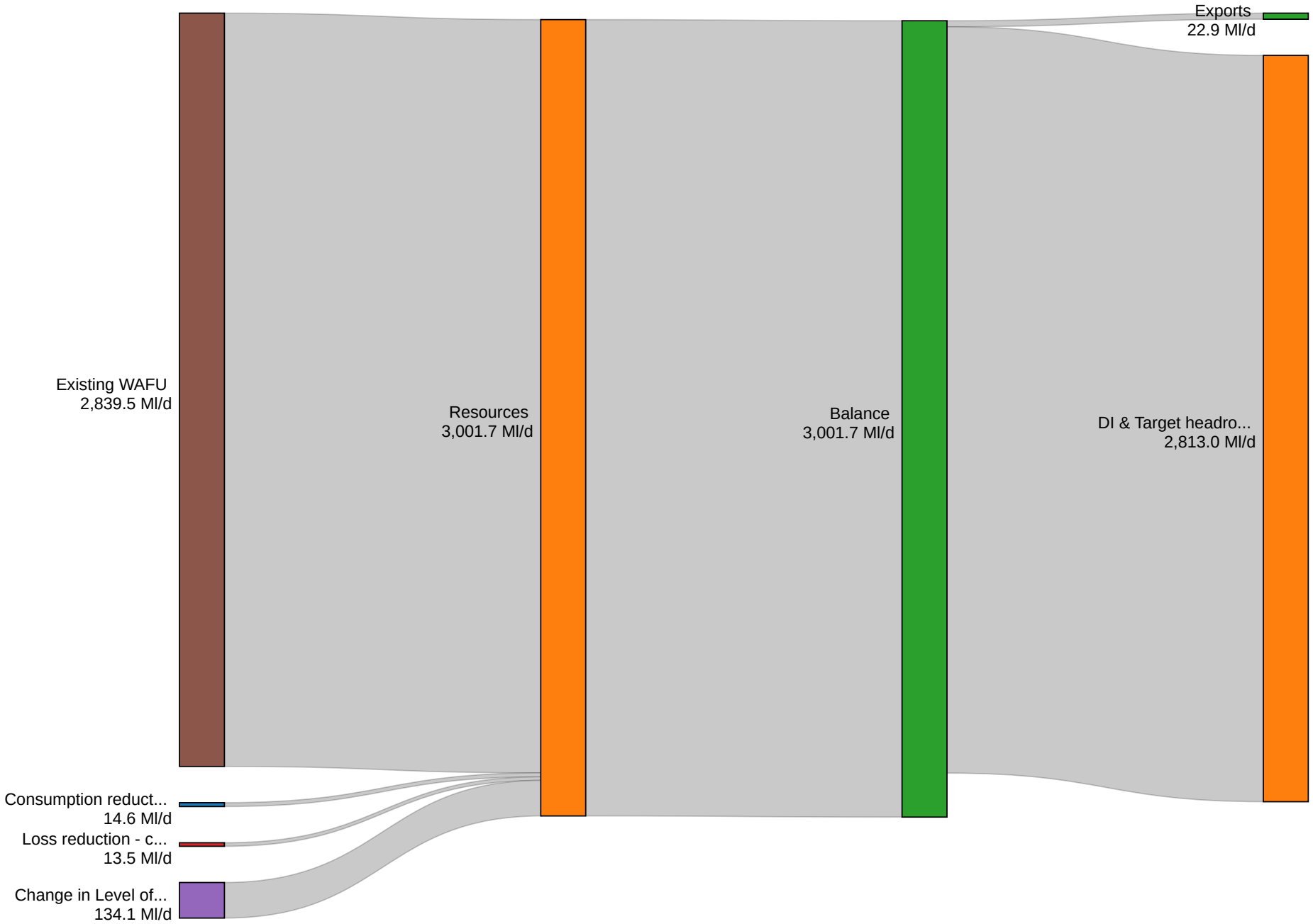
Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.

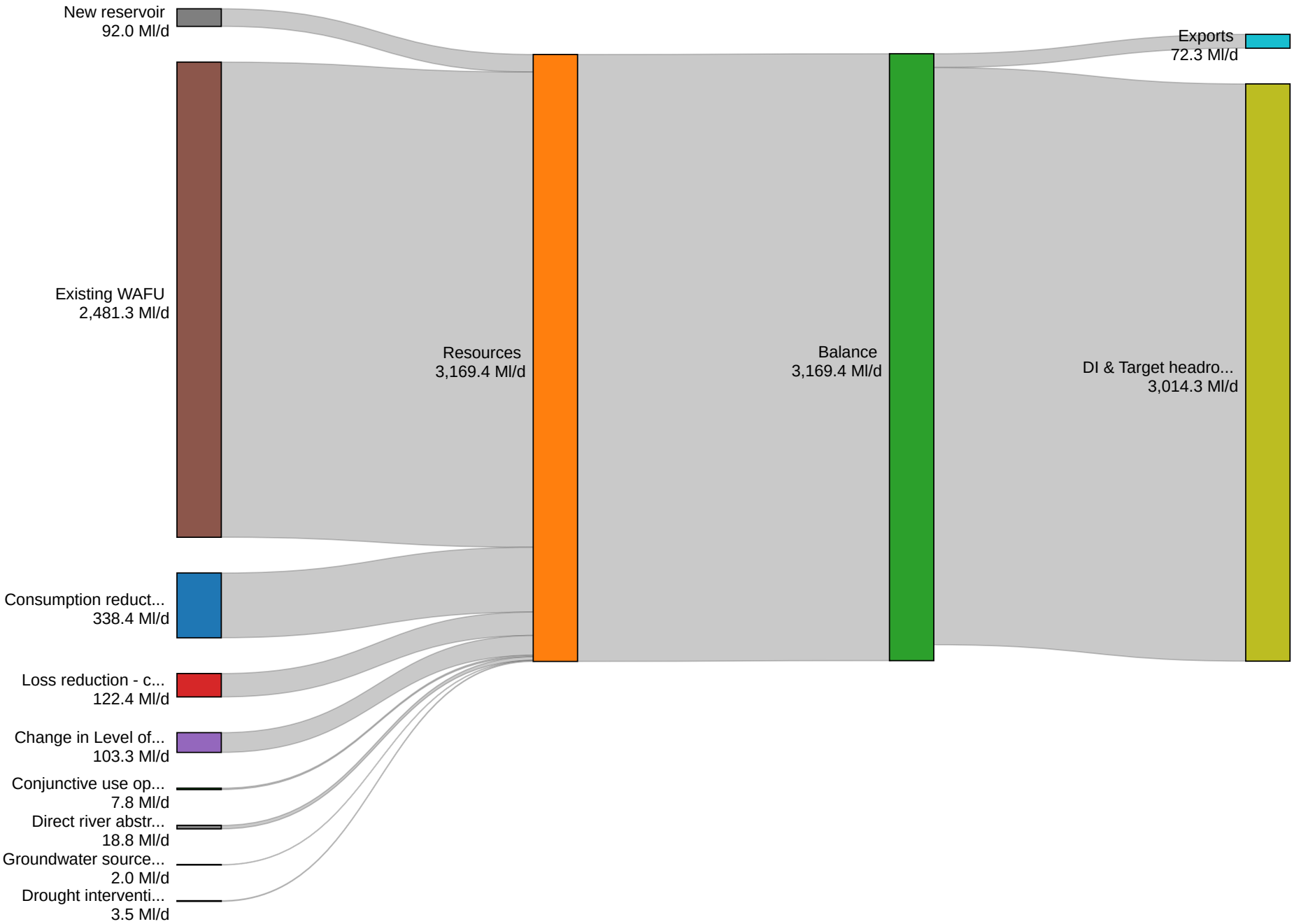


- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

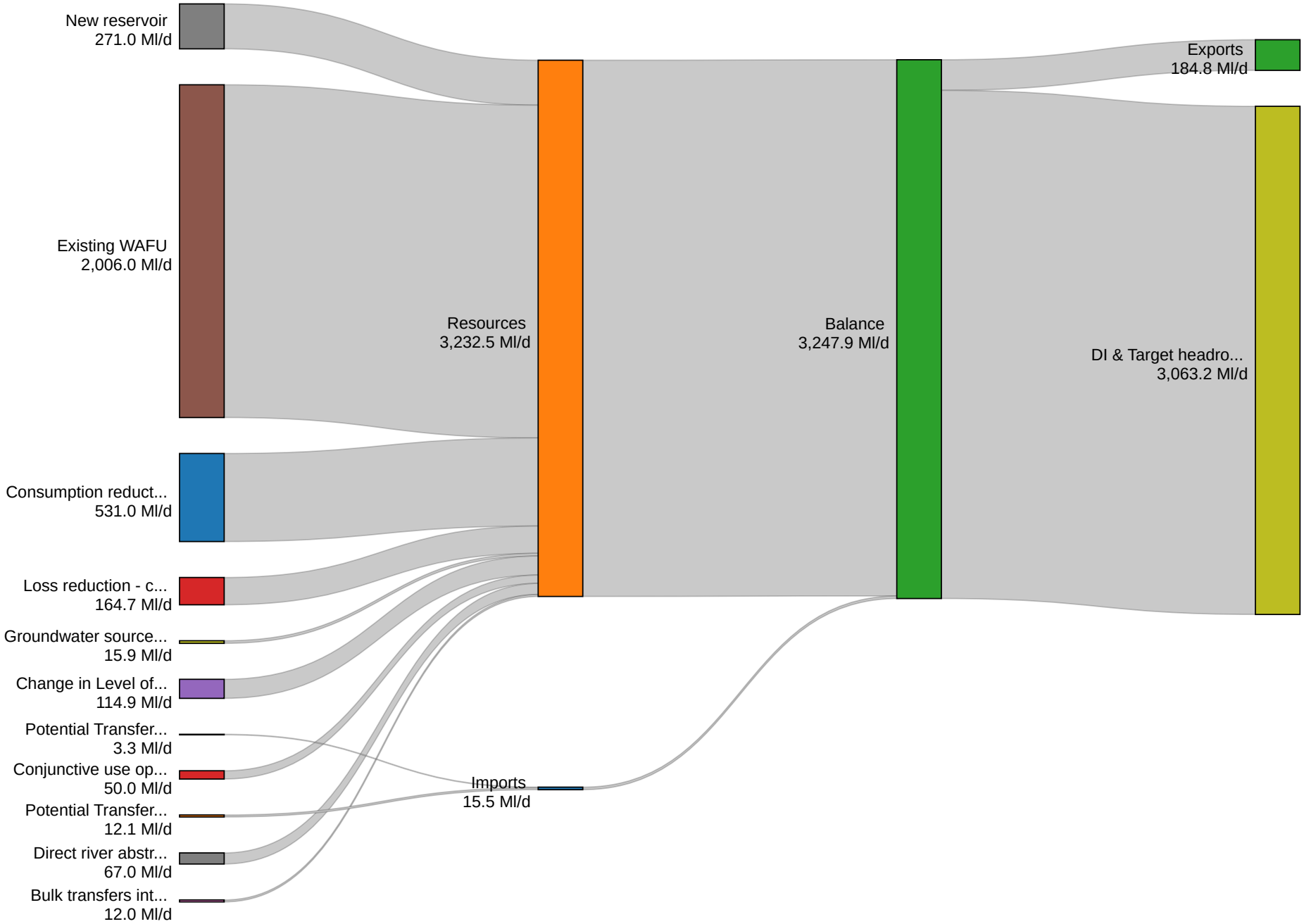
Situation 4 - 2026 (Thames Water)



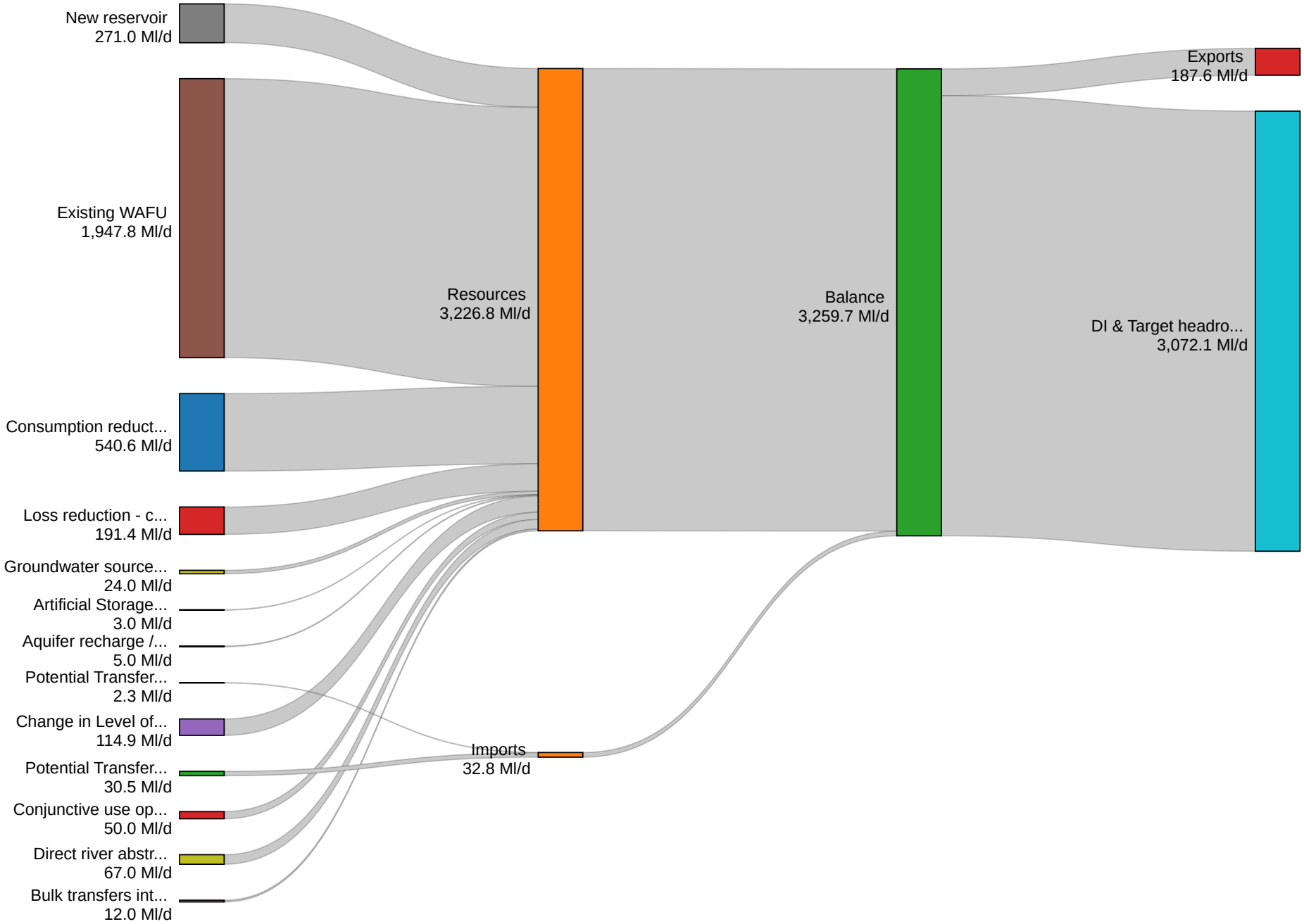
Situation 4 - 2040 (Thames Water)



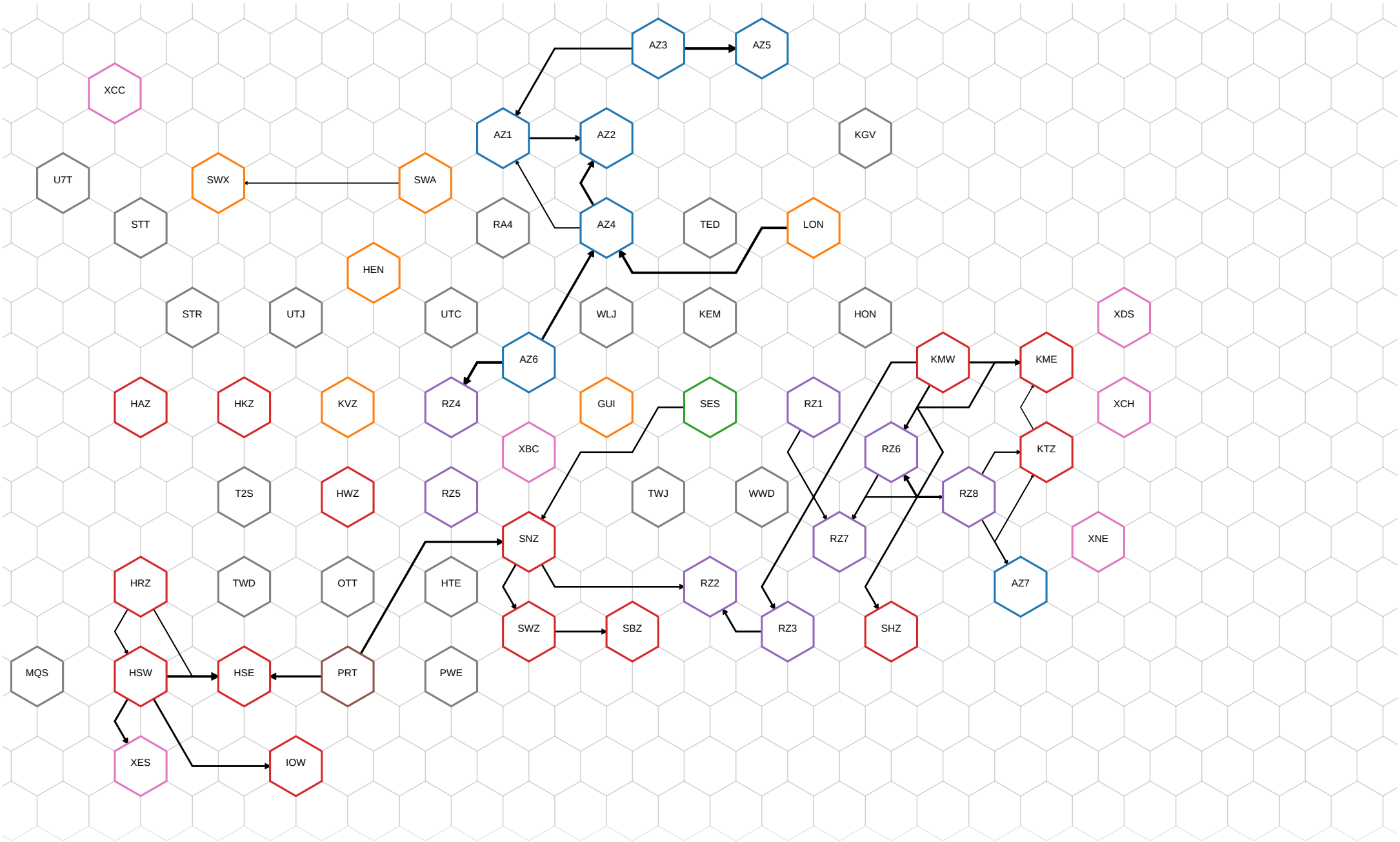
Situation 4 - 2050 (Thames Water)



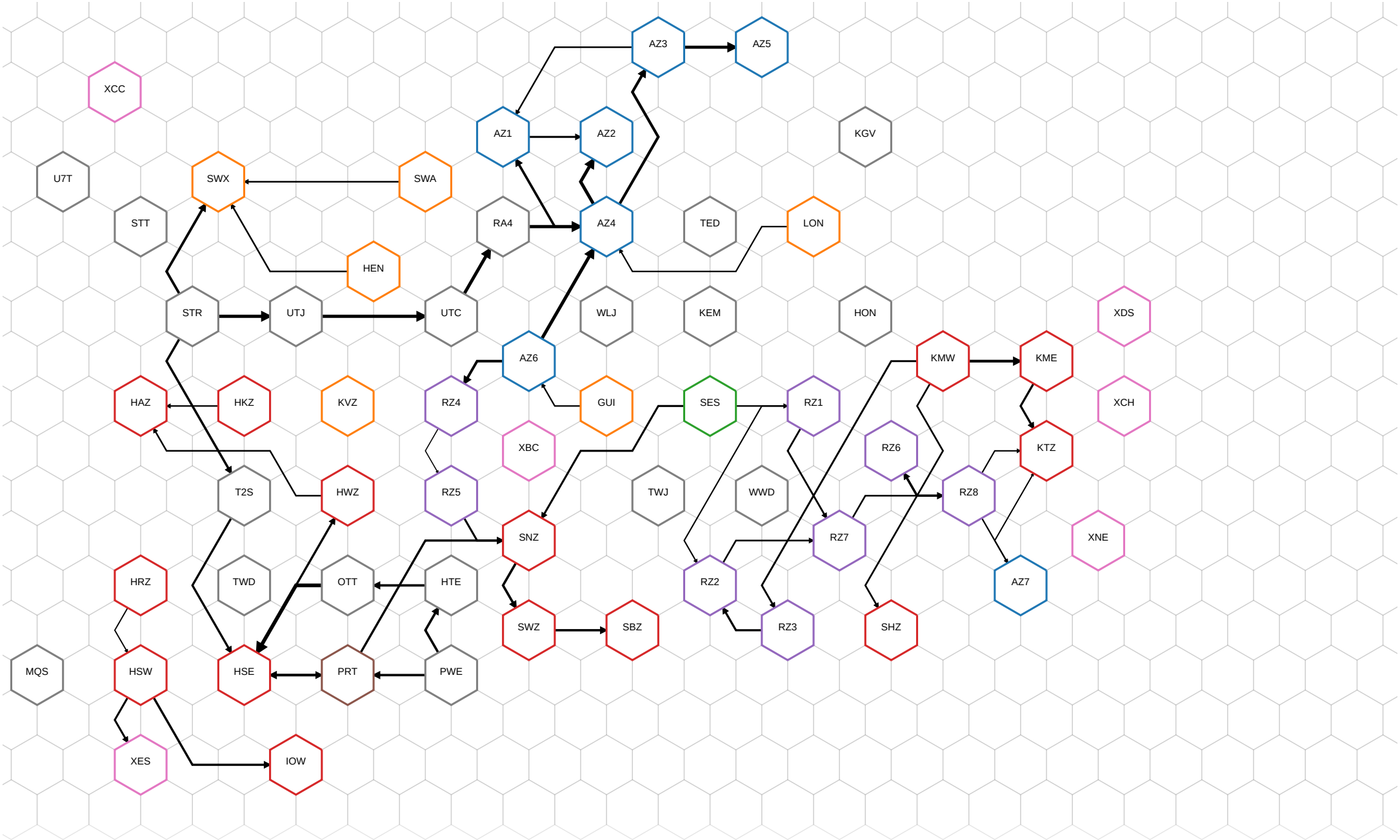
Situation 4 - 2075 (Thames Water)



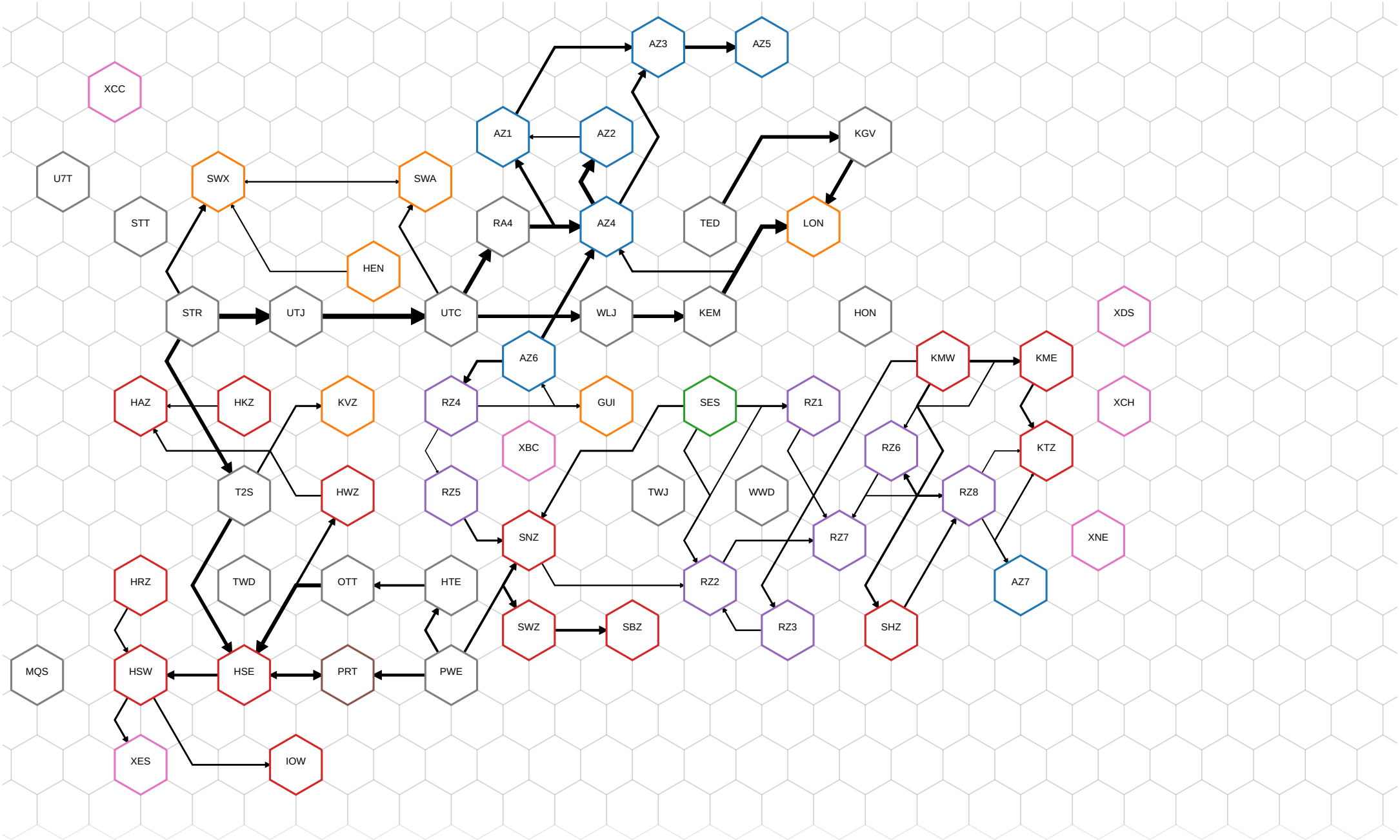
Situation 4 - 2026



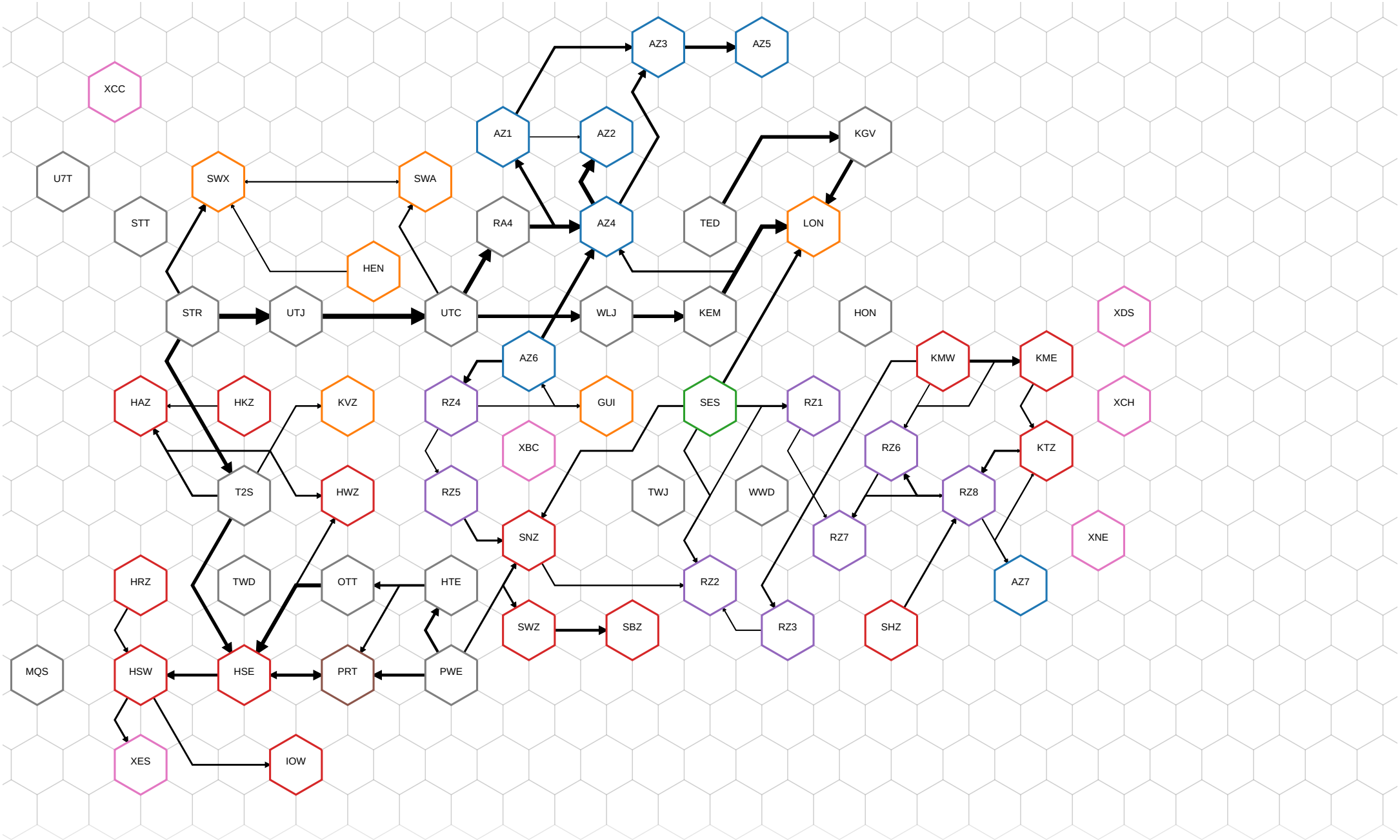
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

1:200 DROUGHT RESILIENCE IN 2035

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-lon-1in200-2035-2075
Description	Least cost run with hybrid-c+2 government interventions with delayed LON 1in200 resilience to 2035/36.
Created at	25/07/2023, 16:30:32
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2-lon-1in200-2035
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets. London 1in200 resilience change delayed to 2035 (DO increased by 116.23 Ml/d).
Optimised discount rate	STPR

Metrics

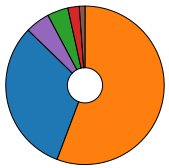
Net present value (Cost)

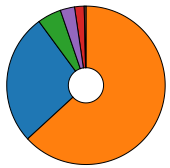
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	20,521	17,817	17,103	19,180	17,750	16,955	17,732	16,572	15,859	(£m)
Cost w/o deficit (STPR)	20,521	17,817	17,103	19,180	17,750	16,955	17,732	16,572	15,859	(£m)
Cost w/ deficit (IGEQ)	31,271	26,147	24,859	28,702	26,043	24,631	26,274	24,090	22,803	(£m)
Cost w/o deficit (IGEQ)	31,271	26,147	24,859	28,702	26,043	24,631	26,274	24,090	22,803	(£m)
Cost w/ deficit (LTDR)	22,605	19,458	18,637	21,041	19,384	18,474	19,406	18,058	17,239	(£m)
Cost w/o deficit (LTDR)	22,605	19,458	18,637	21,041	19,384	18,474	19,406	18,058	17,239	(£m)

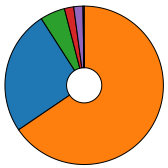
Cost breakdown (STPR)

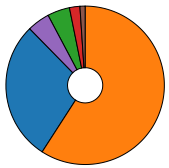
Select Company: Total

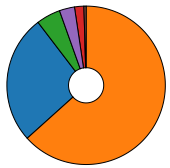
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	6,473	4,763	4,346	5,474	4,665	4,175	4,469	3,852	3,412	(£m)
Fixed opex	11,435	11,255	11,203	11,340	11,243	11,183	11,256	11,177	11,117	(£m)
Fixed operational carbon	878	867	869	878	875	874	869	864	863	(£m)
Embedded carbon	480	351	324	408	340	306	319	270	243	(£m)
Variable opex	1,021	518	320	879	549	352	649	371	209	(£m)
Variable carbon opex	234	62	41	202	78	66	170	38	15	(£m)

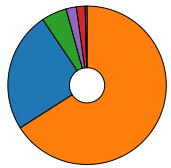
situation1 

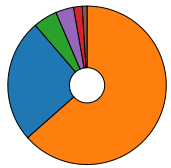
situation2 

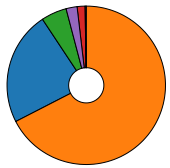
situation3 

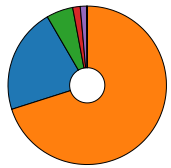
situation4 

situation5 

situation6 

situation7 

situation8 

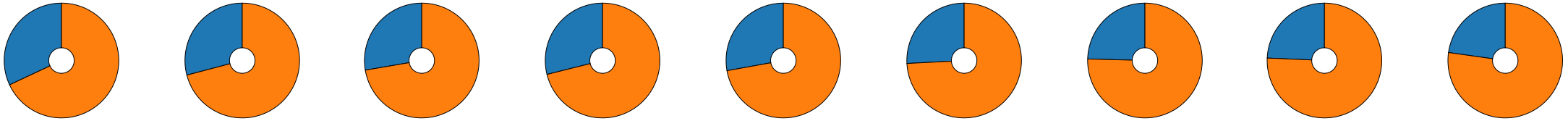
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,075,322	2,156,029	1,972,539	2,559,350	2,083,952	1,859,951	1,975,768	1,637,982	1,457,819	(tonnes)
Operational emissions	6,544,778	5,253,694	5,150,303	6,296,917	5,399,821	5,341,882	6,063,421	5,097,800	4,943,404	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

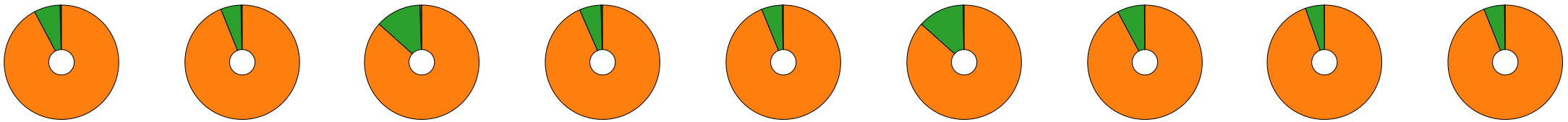


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	103	45	26	95	41	17	21	7	6	(GWh)
Grid	22,403	11,223	4,194	19,277	11,445	4,341	13,597	7,748	2,668	(GWh)
Renewable	1,785	681	619	1,250	713	654	1,137	434	165	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	68,486.00	63,538.00	62,655.00	66,453.00	63,785.00	62,619.00	63,316.00	60,772.00	59,805.00	
SEA environmental disbenefit	109,420.00	80,151.00	72,884.00	94,520.00	78,274.00	71,317.00	84,889.00	67,943.00	58,842.00	
Natural capital	81,838,252.29	77,213,852.33	80,095,717.32	75,553,726.70	77,256,999.01	80,098,357.13	64,476,175.89	66,397,818.24	68,070,958.52	
Bio-diversity net gain	−210,827.00	−151,606.00	−119,903.00	−197,575.00	−154,373.00	−125,454.00	−142,477.00	−96,639.00	−67,524.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	33,772.00	31,826.00	31,375.00	32,727.00	31,567.00	31,051.00	31,475.00	30,497.00	29,991.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	29.06	29.54	32.31	28.58	30.34	33.18	27.11	29.36	32.53	
R1: Uncertainty of option supply/demand benefit	6.02	5.50	6.00	5.79	6.00	6.54	5.22	5.43	5.98	
R3: Risk of service failure due to other physical hazards	6.98	7.32	8.19	6.96	7.56	8.44	6.59	7.33	8.34	
R4: Availability of additional headroom	6.66	6.98	7.19	6.68	6.96	7.17	7.03	7.37	7.61	
R5: Catchment/raw water quality risks (incl. climate change)	4.05	4.13	4.65	3.74	4.01	4.51	3.51	3.95	4.56	
R6: Capacity of catchment services	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	
R7: Risk of service failure to other exceptional events	5.34	5.61	6.27	5.39	5.82	6.51	4.76	5.28	6.03	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

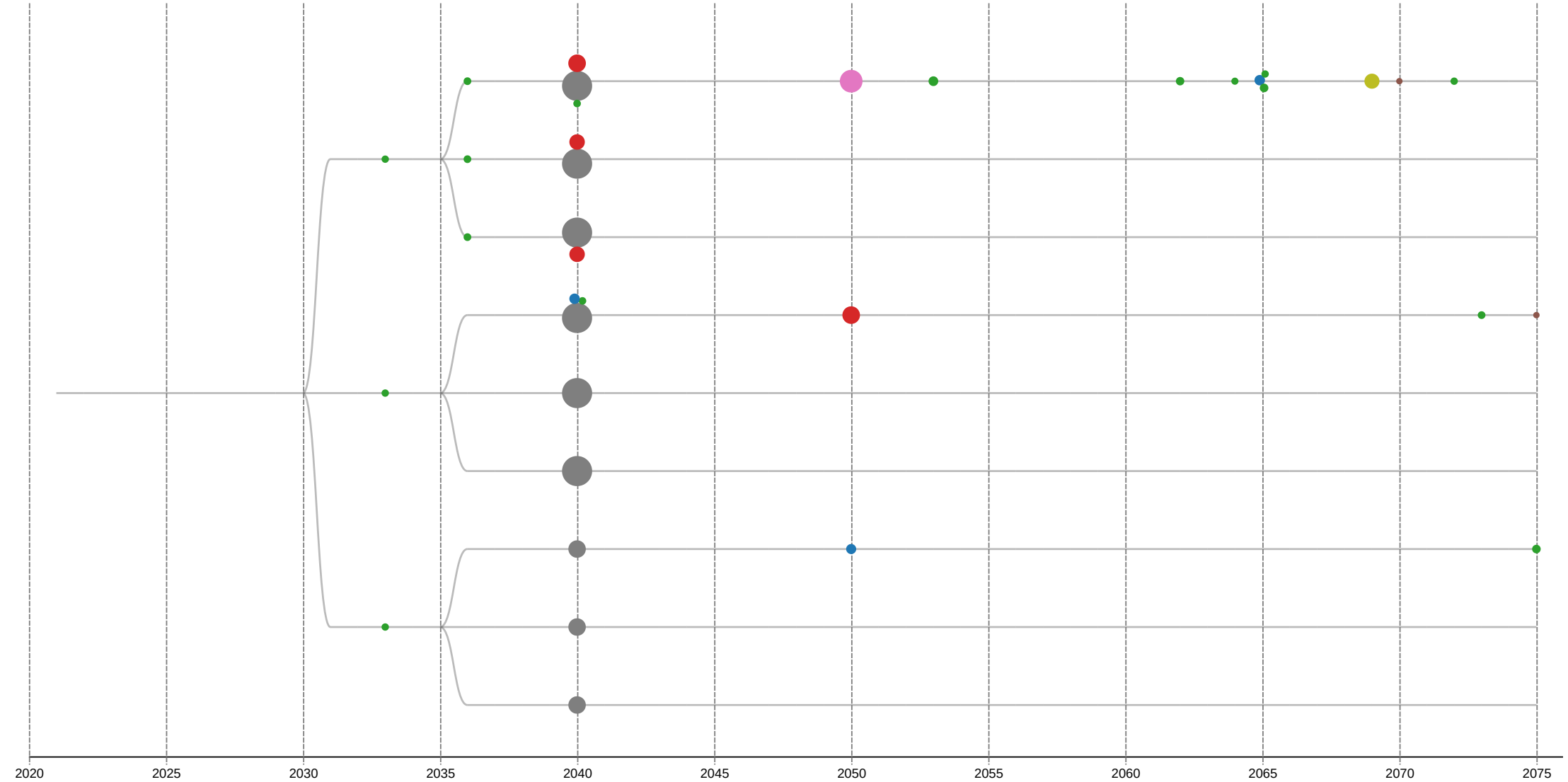
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	14.01	15.74	17.59	14.15	15.61	17.10	14.66	16.56	18.87	
A3: Operational complexity and flexibility	6.52	7.07	7.94	6.66	7.36	8.27	6.34	7.15	8.20	
A4: WRZ connectivity	7.45	8.64	9.62	7.46	8.22	8.79	8.29	9.38	10.63	
A7: Customer relations support engagement with demand management	0.04	0.03	0.03	0.04	0.03	0.03	0.03	0.03	0.04	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.19	20.03	22.09	18.97	20.63	22.68	20.06	22.40	25.38	
E1: Scaleability and modularity of proposed changes	8.76	9.34	10.40	8.73	9.61	10.70	9.48	10.74	12.23	
E2: Intervention lead times	4.23	4.21	4.47	4.04	4.21	4.40	4.03	4.32	4.79	
E3: Reliance on external bodies to deliver changes	6.19	6.48	7.21	6.19	6.81	7.58	6.55	7.34	8.36	
E5: Collaborative land management	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	

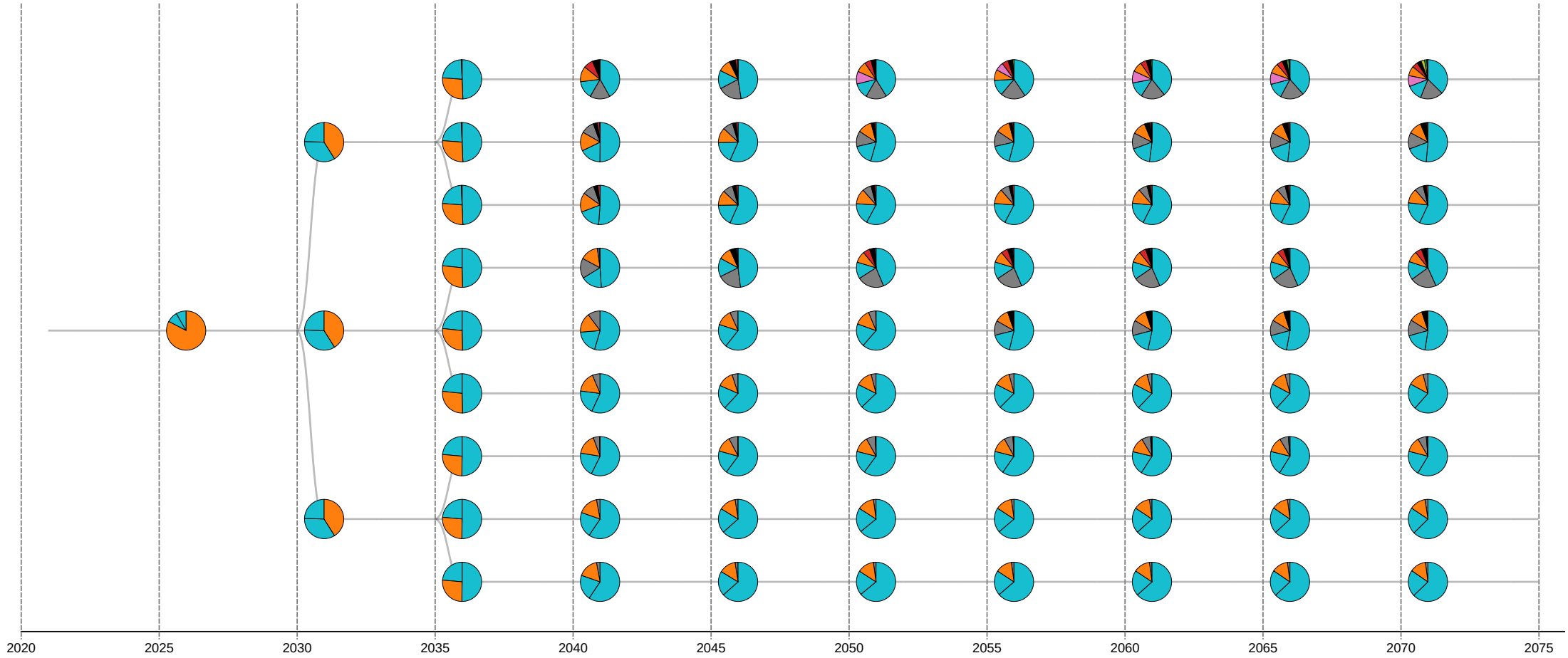
Option Selection (Thames Water)



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.



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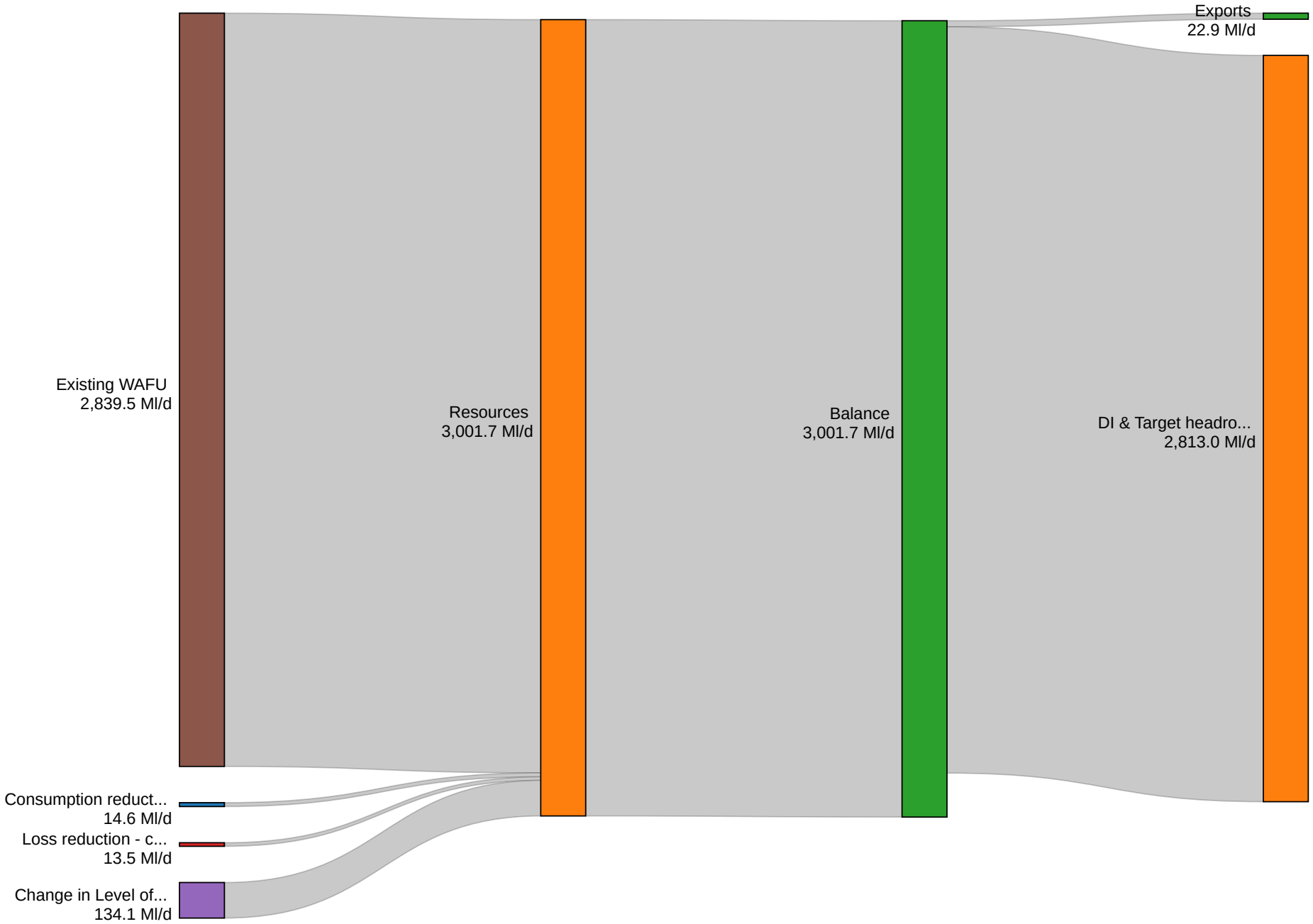
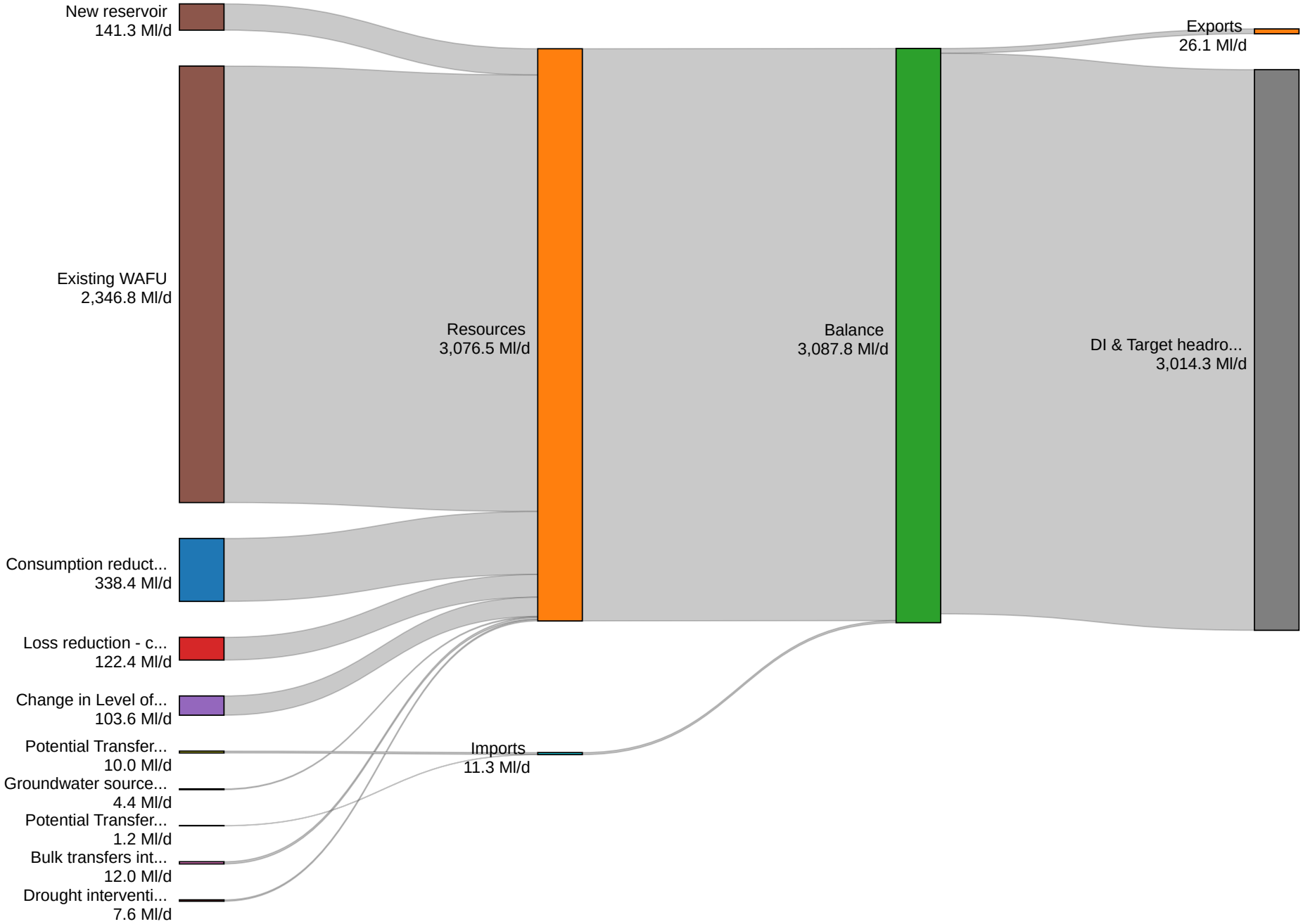
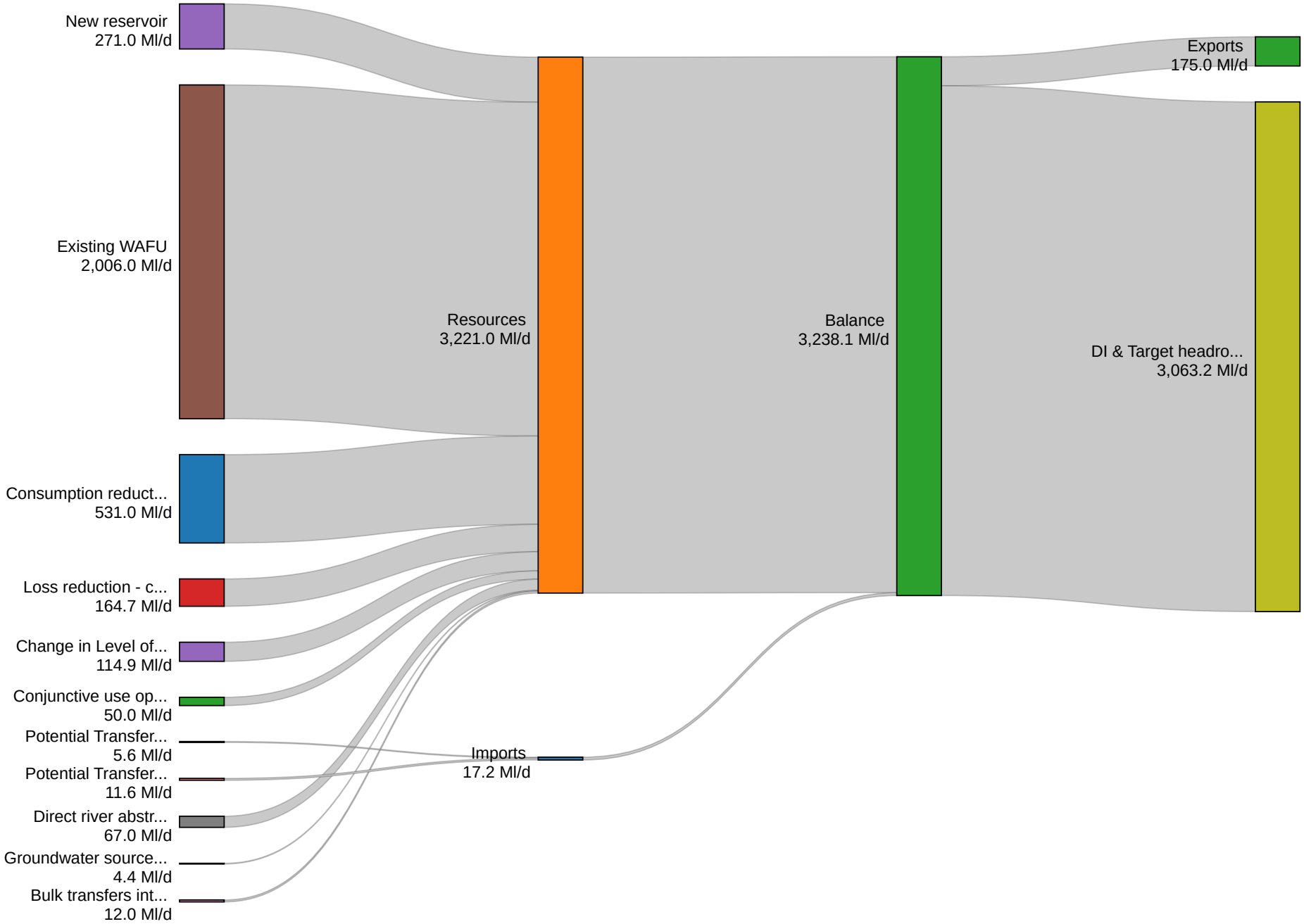
Situation 4 - 2026 (Thames Water)



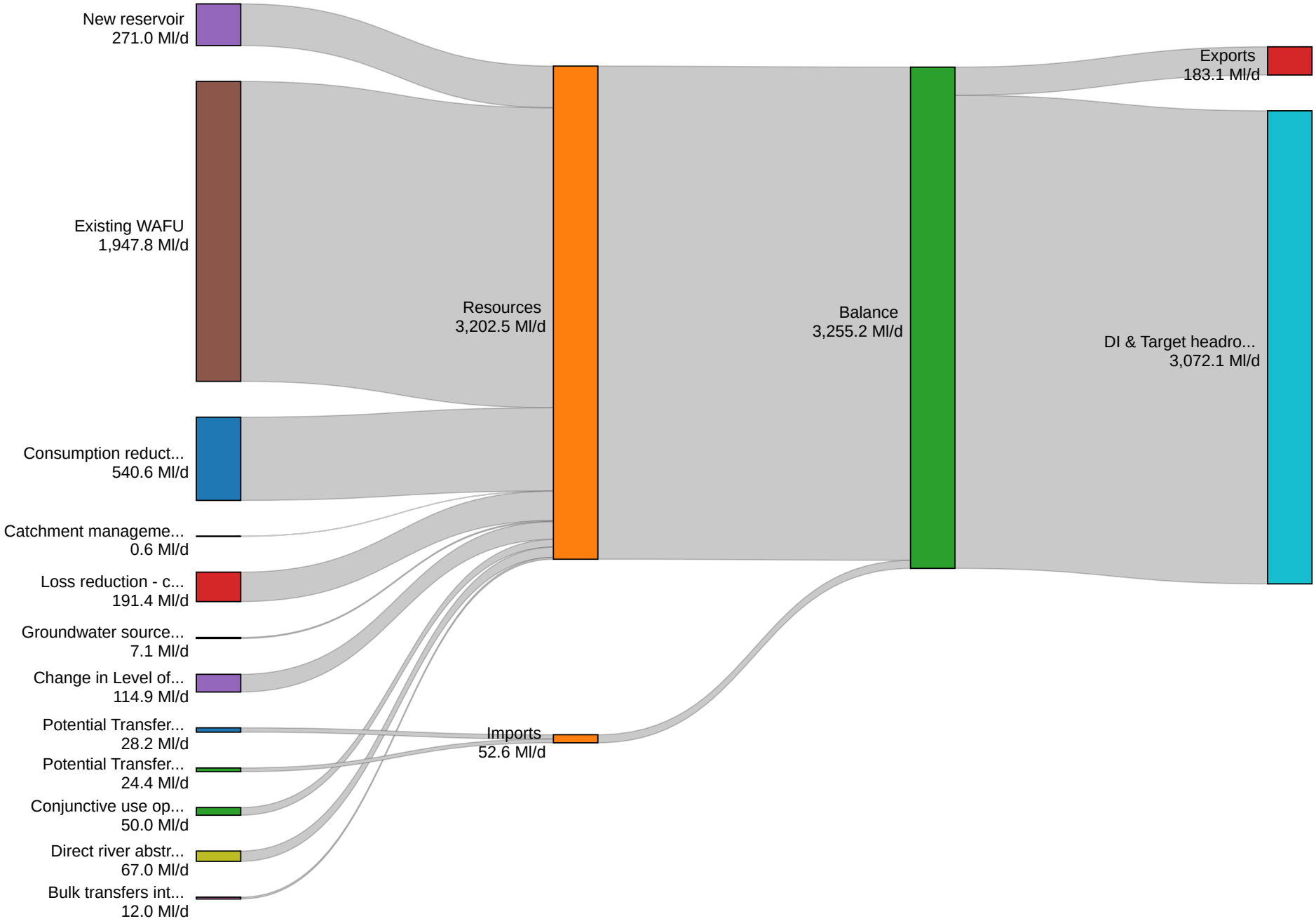
Situation 4 - 2040 (Thames Water)



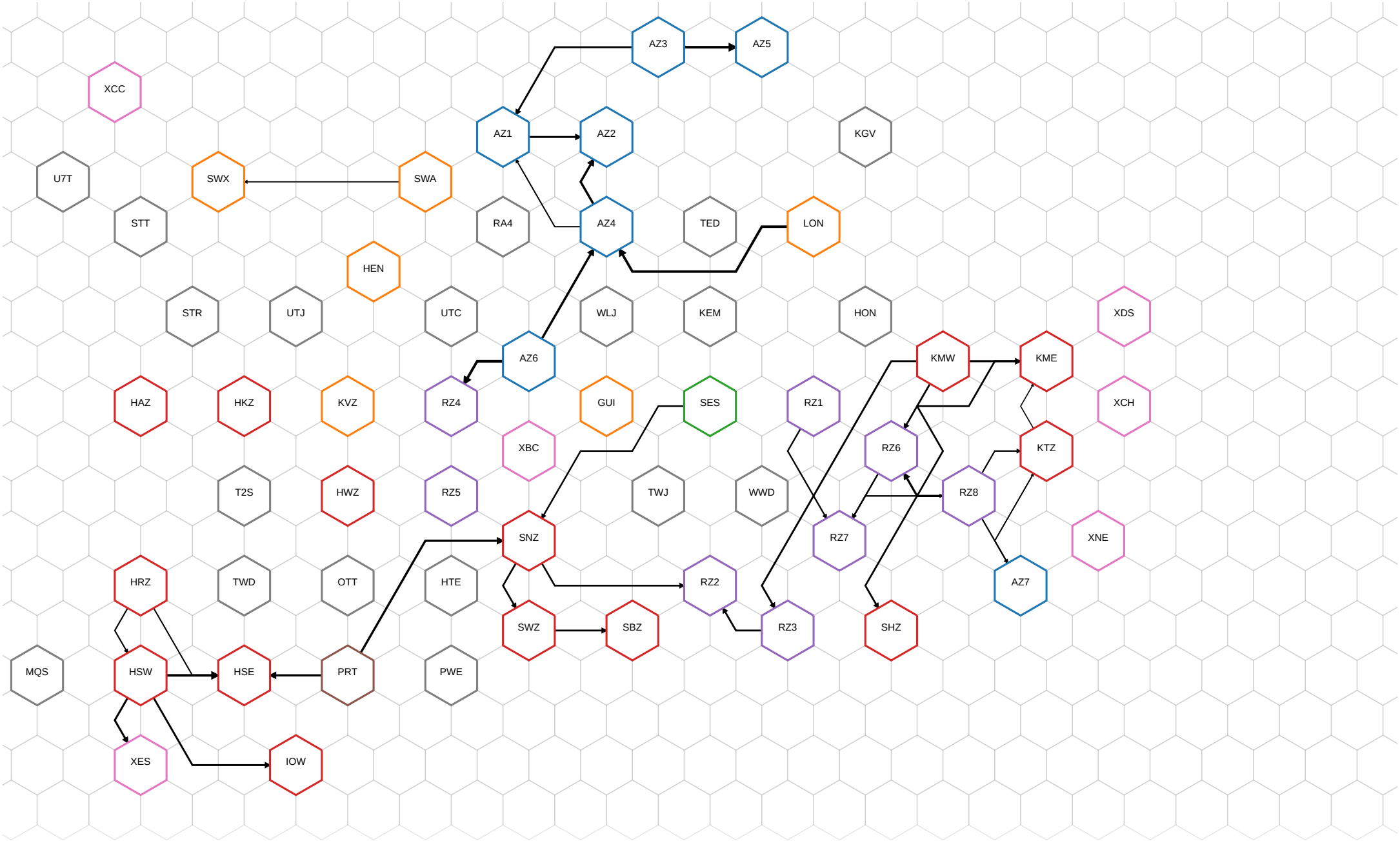
Situation 4 - 2050 (Thames Water)



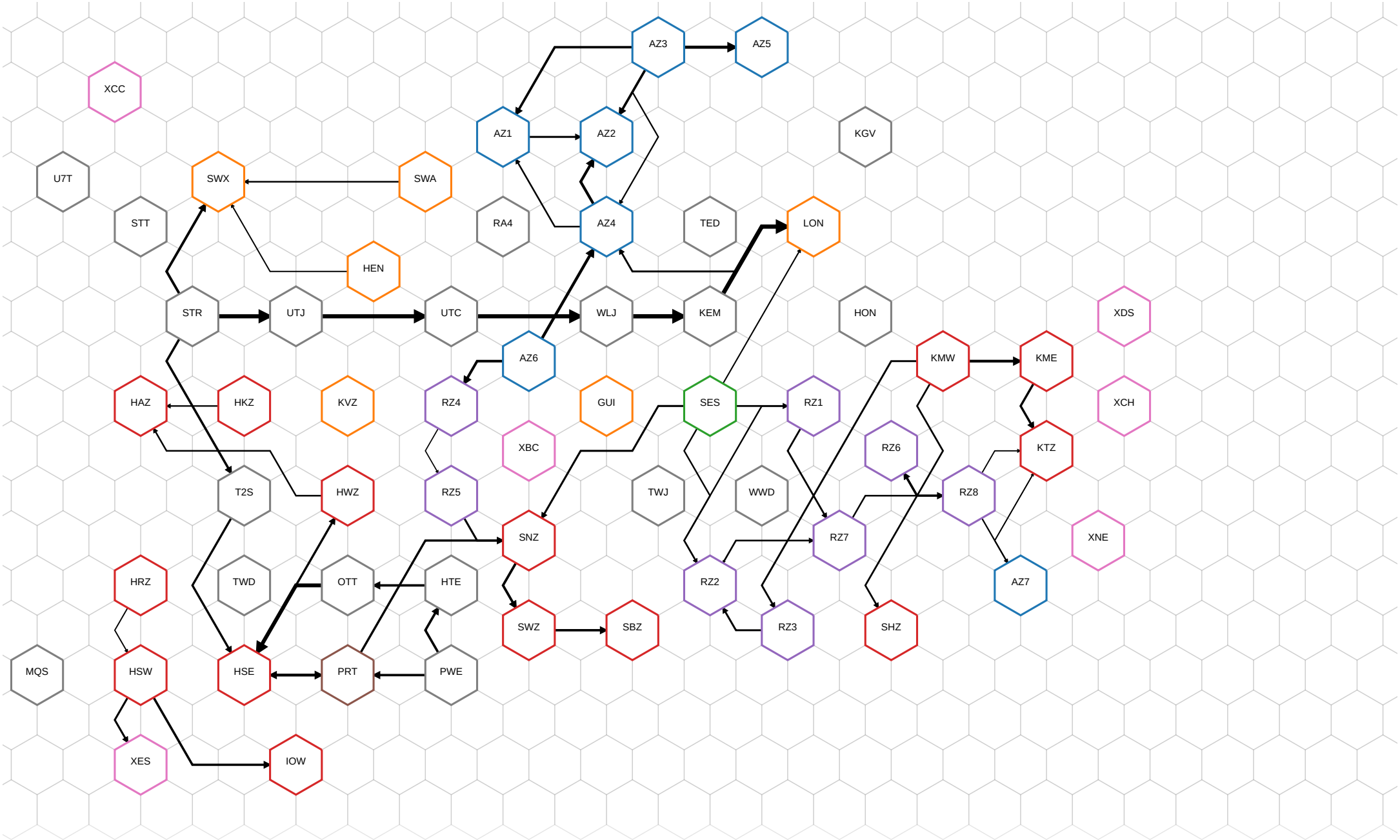
Situation 4 - 2075 (Thames Water)



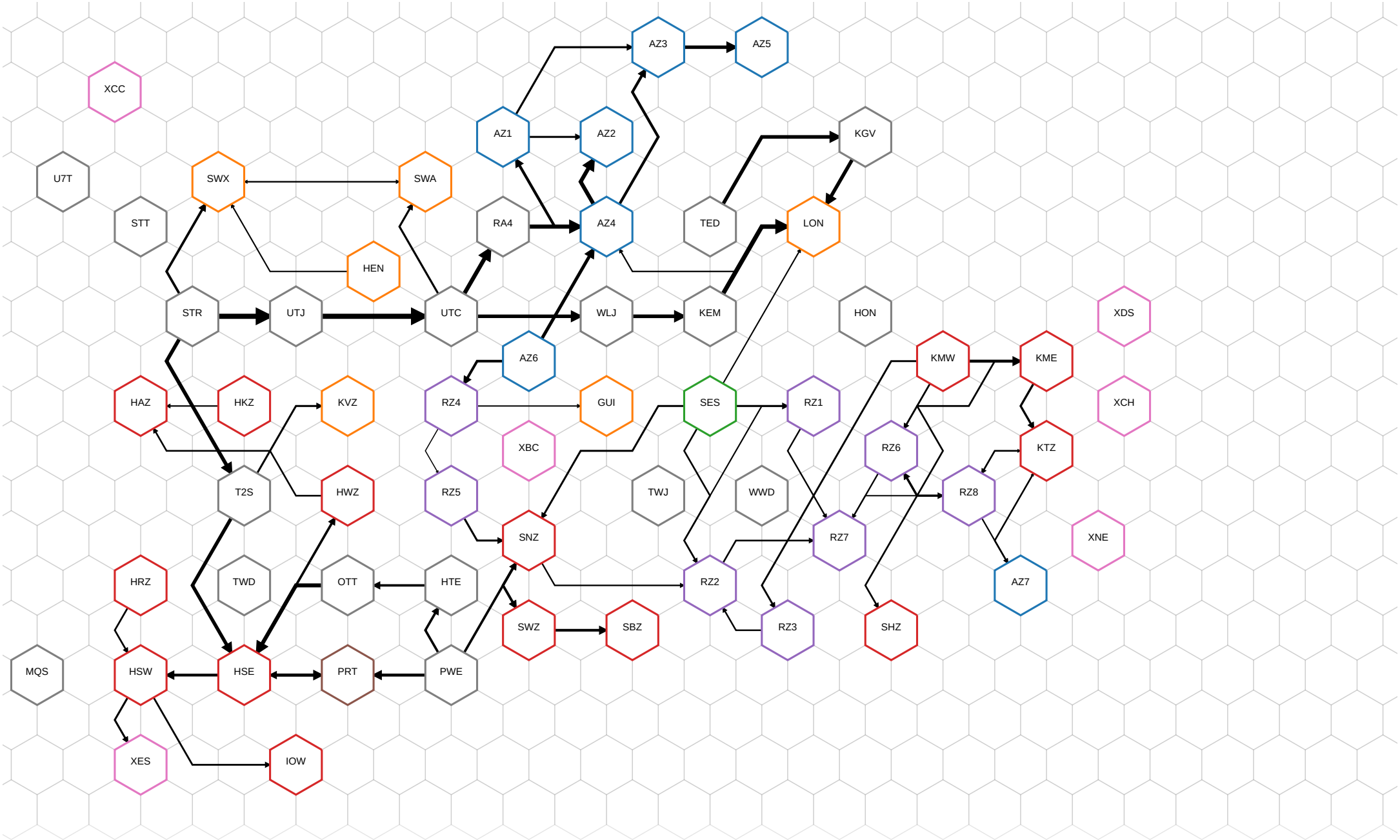
Situation 4 - 2026



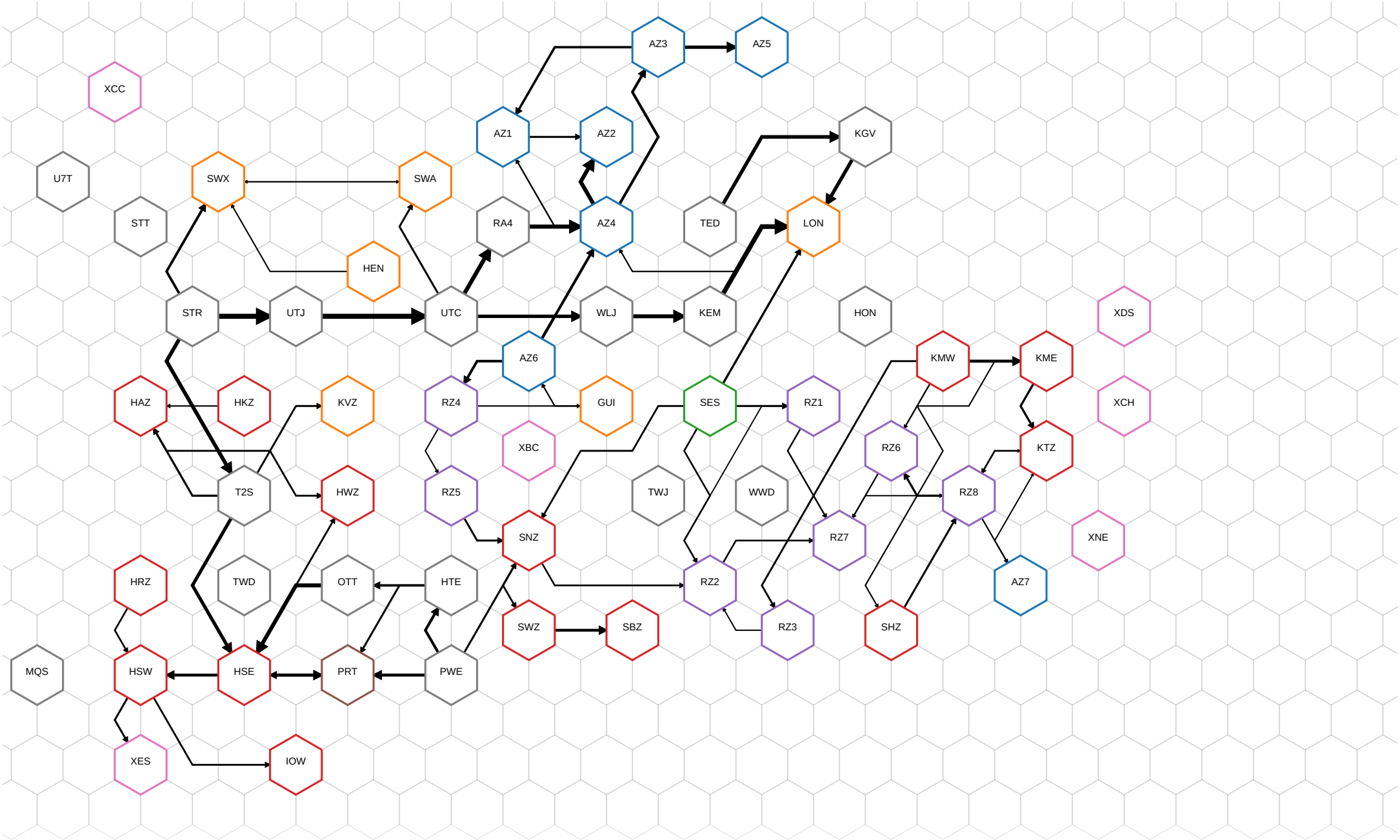
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

GATEWAY 50 Ml/d

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-adj-existing-beckton-do-01-2075
Description	Least cost run with hybrid-c+2 government interventions with LON DO reduced by 20 Ml/d to represent a permanent 50 Ml/d write-down from Beckton.
Created at	26/07/2023, 12:25:06
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2-adj-existing-beckton-do-01
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets. Reduced LON DO by 20 Ml/d to represent a permanent 50 Ml/d write-down from Beckton.
Optimised discount rate	STPR

Metrics

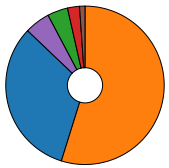
Net present value (Cost)

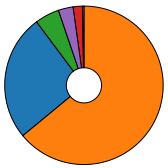
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	20,990	17,444	16,777	19,424	17,344	16,599	17,674	16,826	16,135	(£m)
Cost w/o deficit (STPR)	20,990	17,444	16,777	19,424	17,344	16,599	17,674	16,826	16,135	(£m)
Cost w/ deficit (IGEQ)	32,235	25,550	24,344	29,306	25,376	24,064	26,085	24,487	23,243	(£m)
Cost w/o deficit (IGEQ)	32,235	25,550	24,344	29,306	25,376	24,064	26,085	24,487	23,243	(£m)
Cost w/ deficit (LTDR)	23,163	19,042	18,275	21,348	18,928	18,077	19,326	18,340	17,546	(£m)
Cost w/o deficit (LTDR)	23,163	19,042	18,275	21,348	18,928	18,077	19,326	18,340	17,546	(£m)

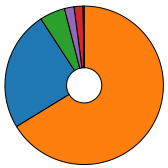
Cost breakdown (STPR)

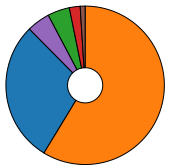
Select Company: Total

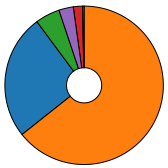
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	6,780	4,497	4,119	5,611	4,427	3,993	4,558	4,110	3,677	(£m)
Fixed opex	11,505	11,168	11,118	11,401	11,156	11,102	11,166	11,114	11,054	(£m)
Fixed operational carbon	880	869	870	878	870	868	872	867	866	(£m)
Embedded carbon	514	332	310	429	327	298	344	307	283	(£m)
Variable opex	1,081	523	324	912	511	308	643	393	239	(£m)
Variable carbon opex	230	55	35	194	54	30	92	35	17	(£m)

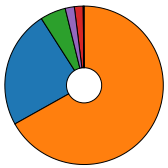
situation1 

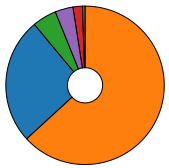
situation2 

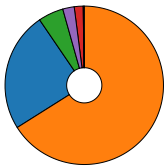
situation3 

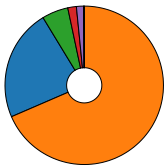
situation4 

situation5 

situation6 

situation7 

situation8 

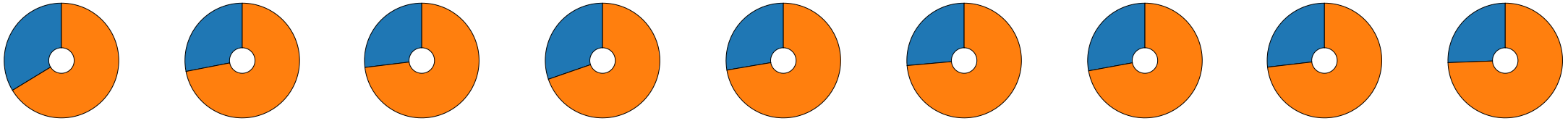
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,328,663	2,033,942	1,885,412	2,722,045	1,999,002	1,816,381	2,132,459	1,871,613	1,709,994	(tonnes)
Operational emissions	6,551,383	5,217,178	5,115,102	6,264,034	5,223,915	5,062,578	5,514,845	5,099,975	4,973,411	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

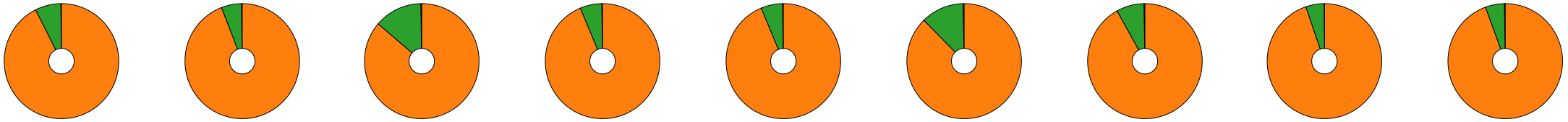


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	48	29	14	46	28	14	41	9	8	(GWh)
Grid	23,219	11,332	4,189	19,541	10,920	3,884	13,170	7,967	2,913	(GWh)
Renewable	1,816	681	655	1,277	706	536	1,115	433	165	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	70,067.00	64,299.00	63,522.00	68,166.00	63,971.00	63,179.00	65,000.00	62,726.00	61,670.00	
SEA environmental disbenefit	116,366.00	83,433.00	76,538.00	104,495.00	81,543.00	77,260.00	86,043.00	72,666.00	63,819.00	
Natural capital	84,444,188.12	81,278,697.51	84,132,787.66	77,785,726.19	81,286,961.69	83,791,199.63	80,935,083.36	81,713,547.87	84,585,470.22	
Bio-diversity net gain	−197,035.00	−119,345.00	−89,256.00	−172,506.00	−118,600.00	−102,726.00	−121,145.00	−93,987.00	−64,933.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	34,296.00	32,098.00	31,738.00	33,619.00	32,015.00	31,721.00	32,076.00	31,160.00	30,670.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	27.86	27.07	29.67	27.01	27.19	29.59	28.39	31.34	34.80	
R1: Uncertainty of option supply/demand benefit	5.79	4.89	5.36	5.35	4.93	5.29	5.27	5.69	6.27	
R3: Risk of service failure due to other physical hazards	6.67	6.69	7.51	6.56	6.74	7.49	6.99	7.91	9.01	
R4: Availability of additional headroom	6.40	6.72	6.94	6.45	6.74	6.94	7.04	7.39	7.63	
R5: Catchment/raw water quality risks (incl. climate change)	3.98	3.83	4.32	3.69	3.84	4.33	3.94	4.53	5.23	
R6: Capacity of catchment services	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
R7: Risk of service failure to other exceptional events	5.01	4.94	5.54	4.96	4.96	5.53	5.15	5.82	6.65	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

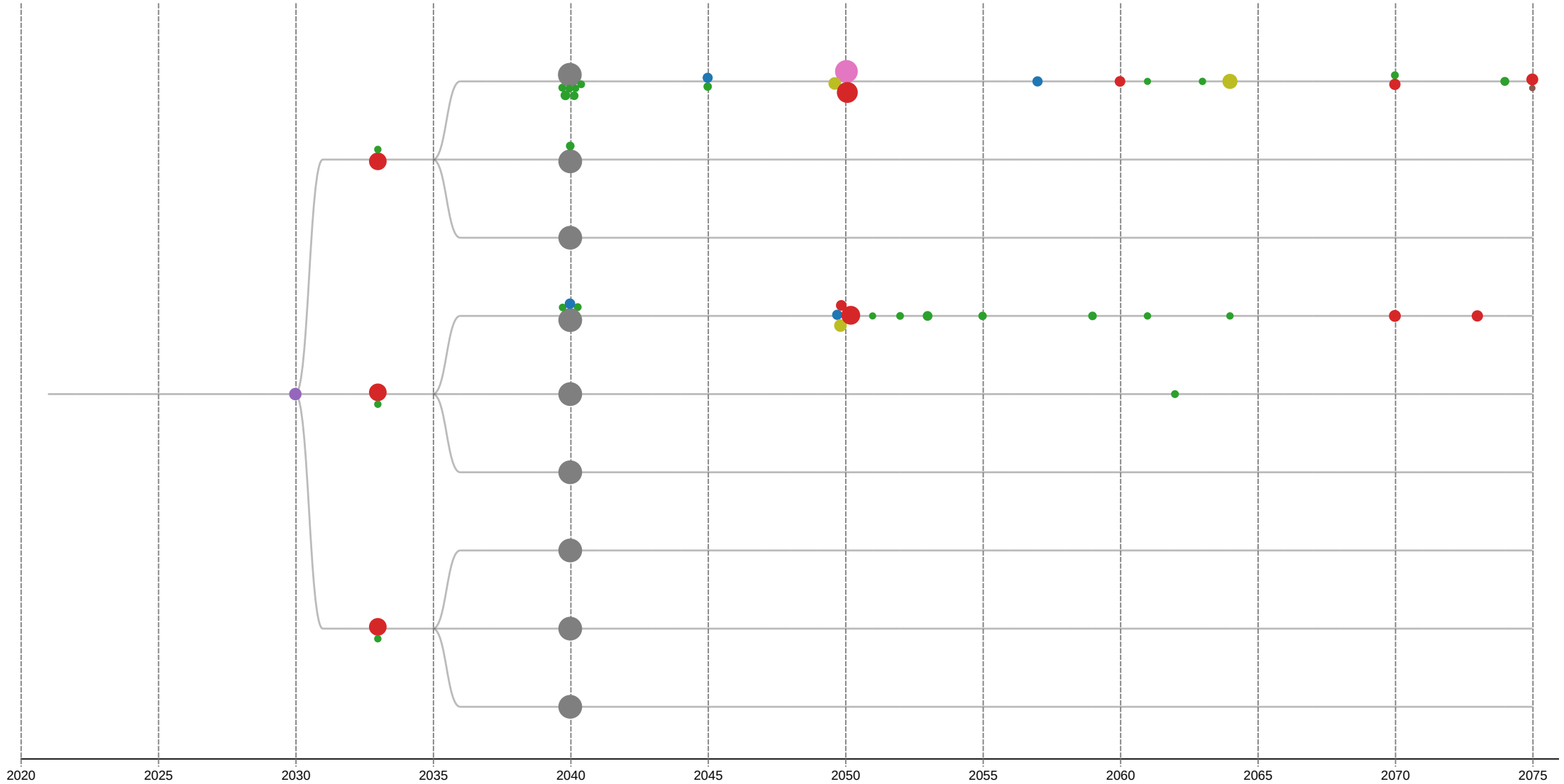
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	13.65	15.00	16.80	13.72	15.07	16.71	15.40	17.51	19.95	
A3: Operational complexity and flexibility	6.13	6.41	7.21	6.17	6.45	7.24	6.68	7.63	8.76	
A4: WRZ connectivity	7.49	8.56	9.56	7.53	8.59	9.44	8.69	9.84	11.16	
A7: Customer relations support engagement with demand management	0.03	0.03	0.03	0.02	0.03	0.03	0.03	0.03	0.03	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.60	19.51	21.71	18.96	19.59	21.50	20.10	22.77	25.78	
E1: Scaleability and modularity of proposed changes	8.98	9.30	10.41	8.78	9.38	10.41	9.62	11.03	12.56	
E2: Intervention lead times	4.37	3.98	4.35	4.07	3.96	4.15	4.01	4.39	4.86	
E3: Reliance on external bodies to deliver changes	6.24	6.22	6.95	6.11	6.26	6.94	6.47	7.35	8.36	
E5: Collaborative land management	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

Option Selection (Thames Water)



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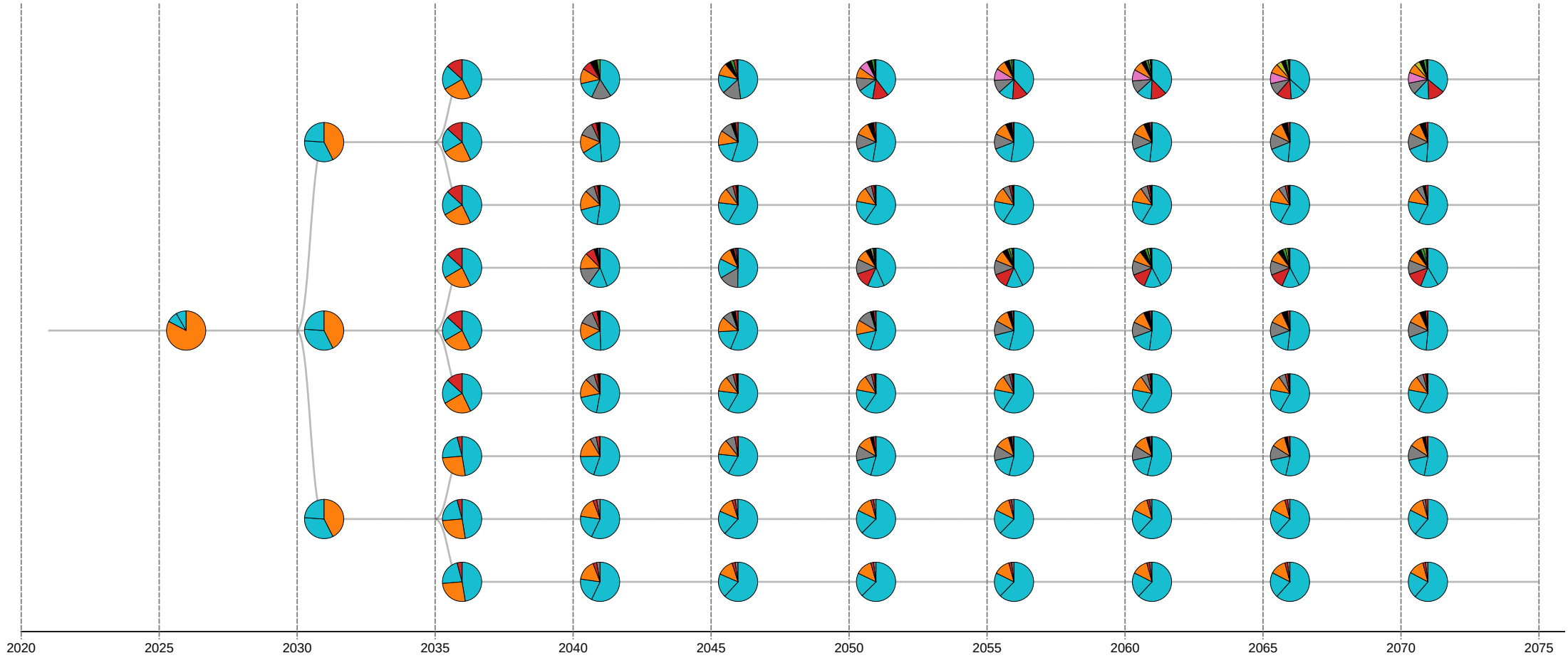
- Other

Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.



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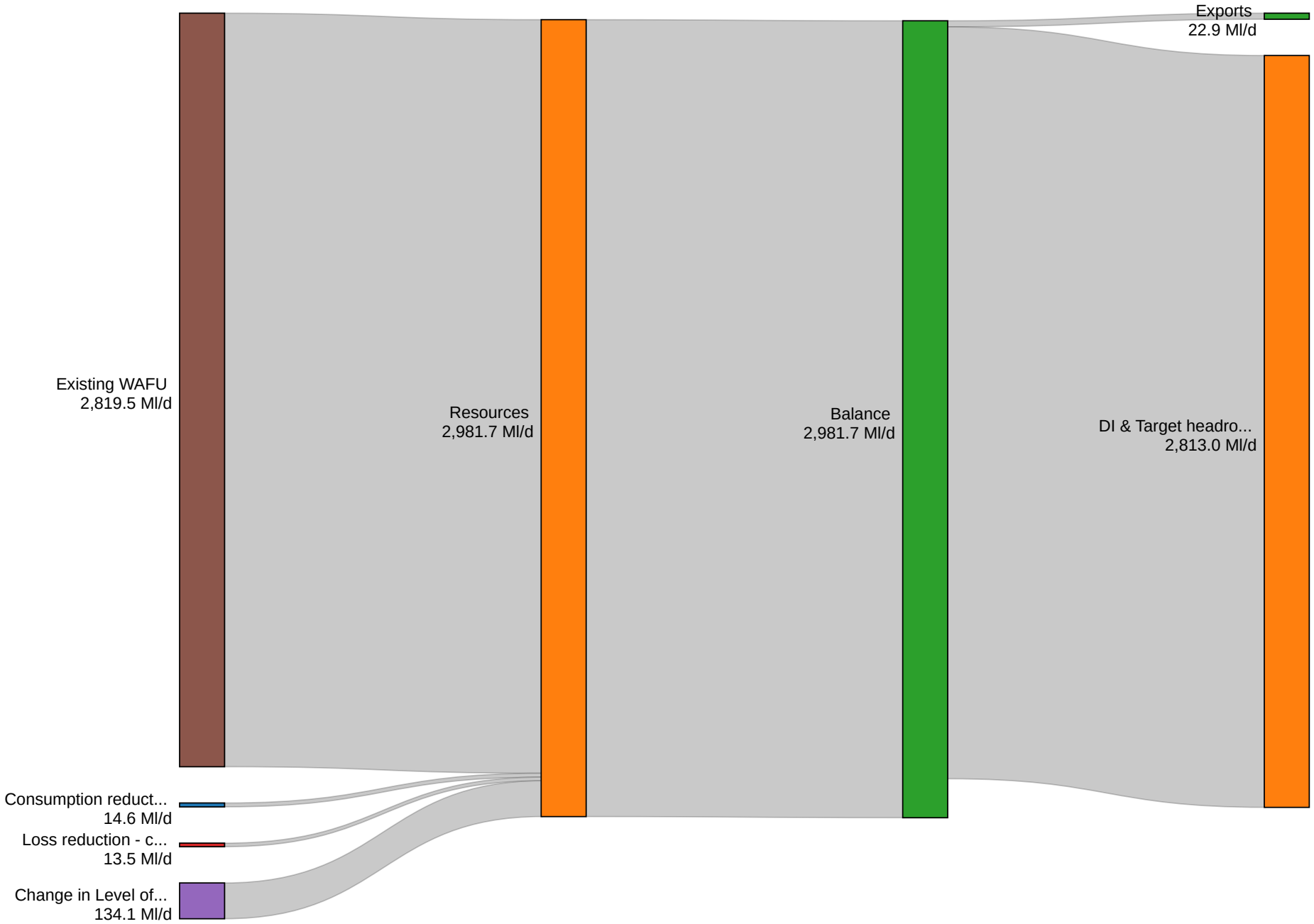
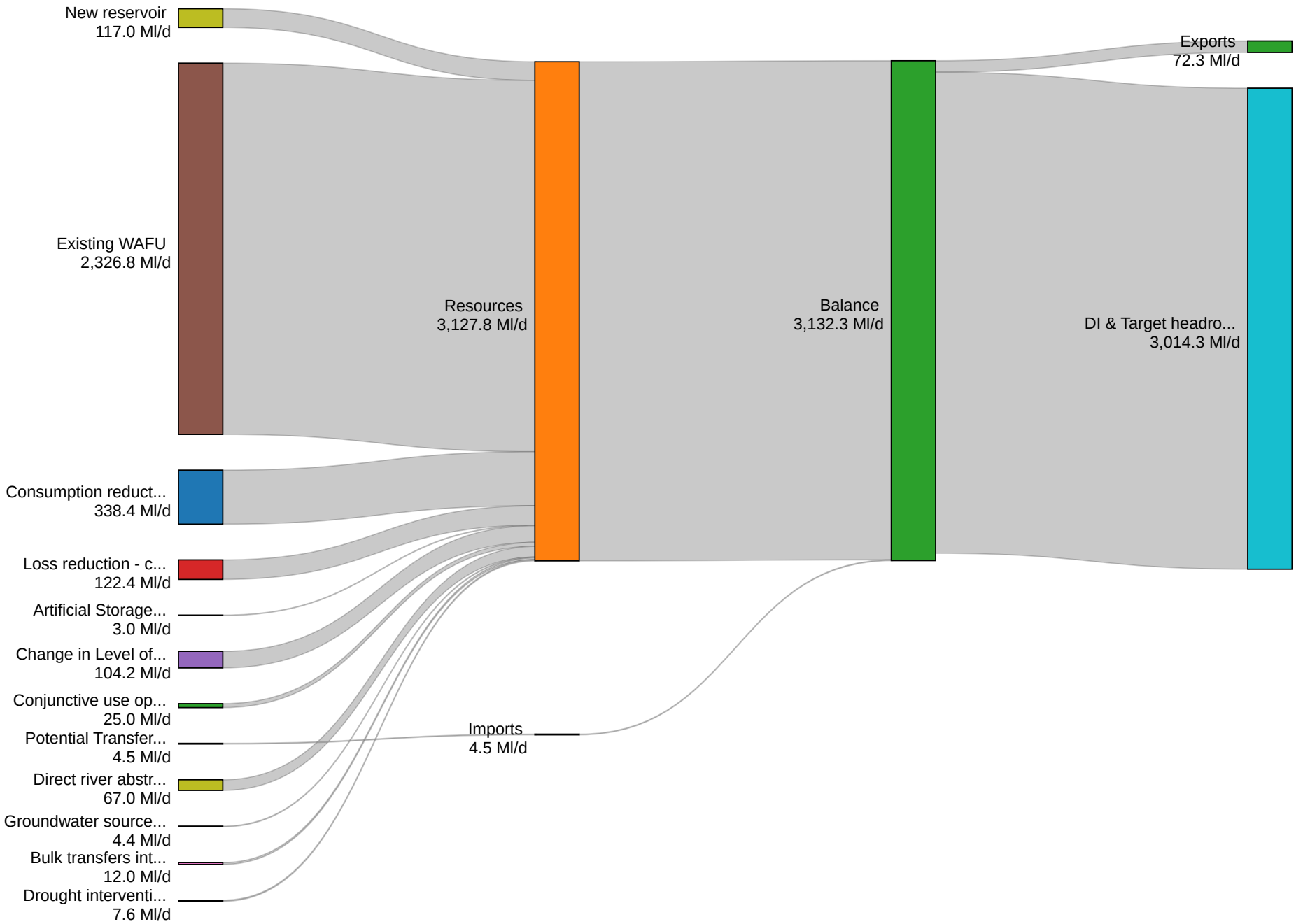
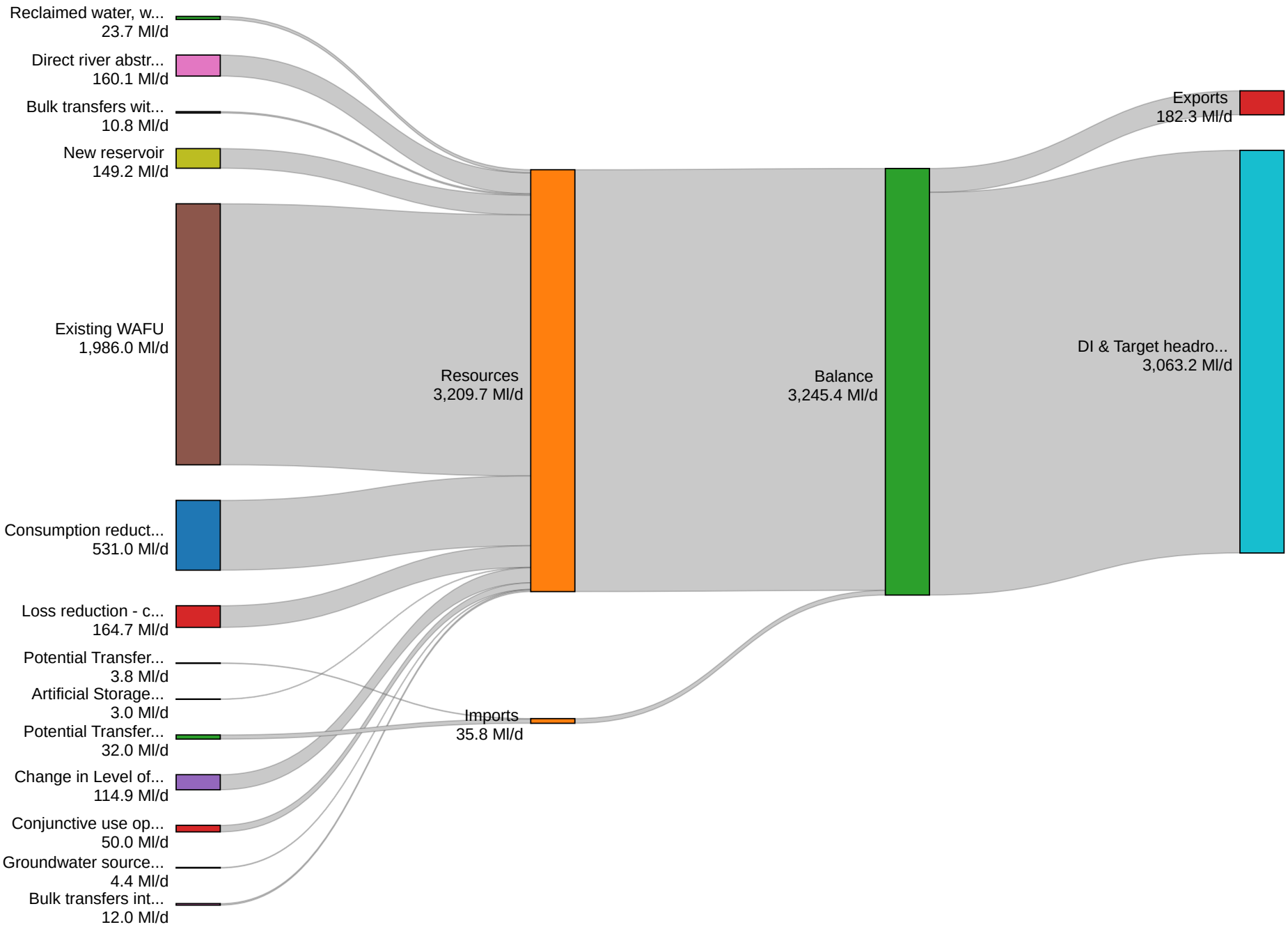
Situation 4 - 2026 (Thames Water)



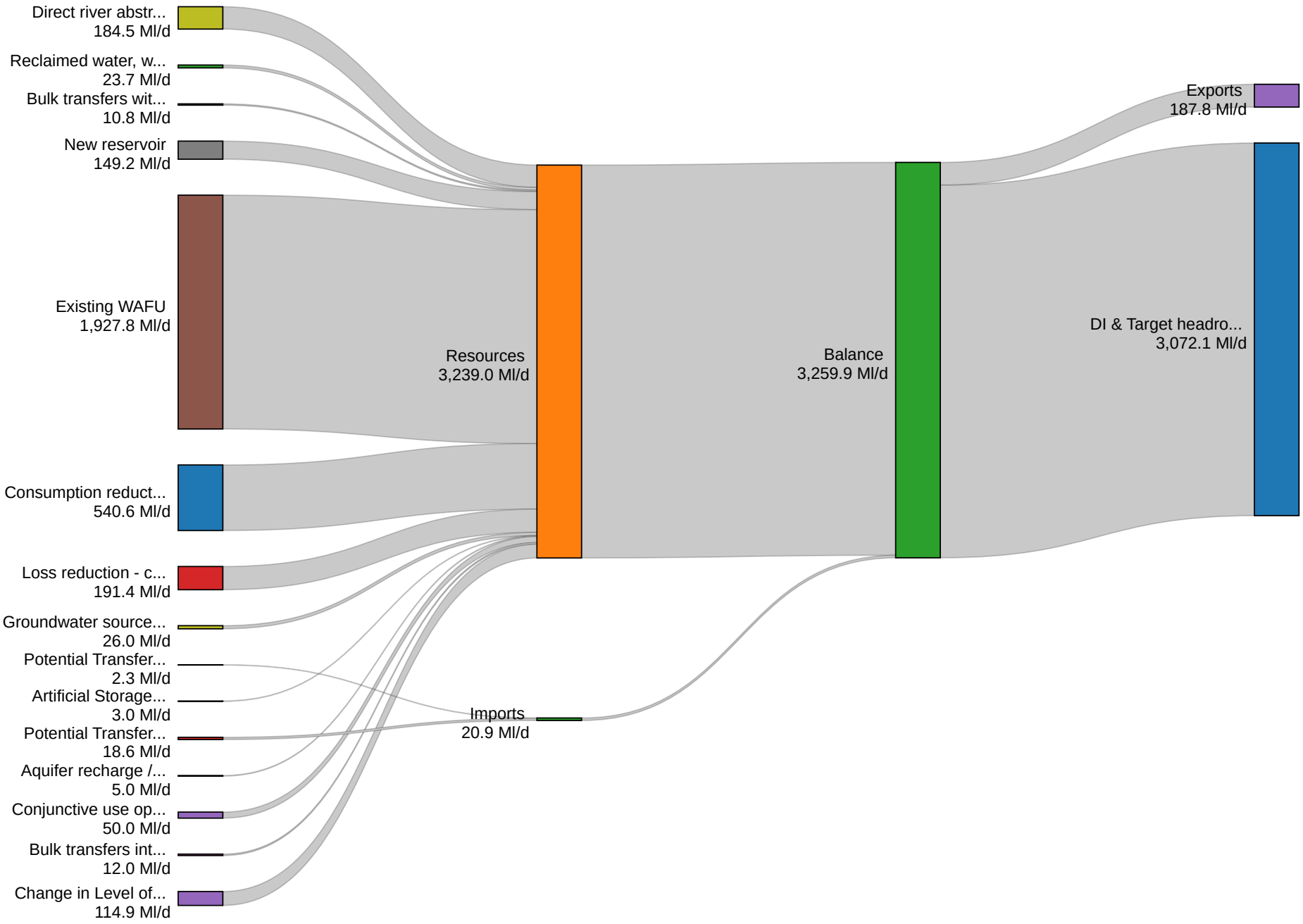
Situation 4 - 2040 (Thames Water)



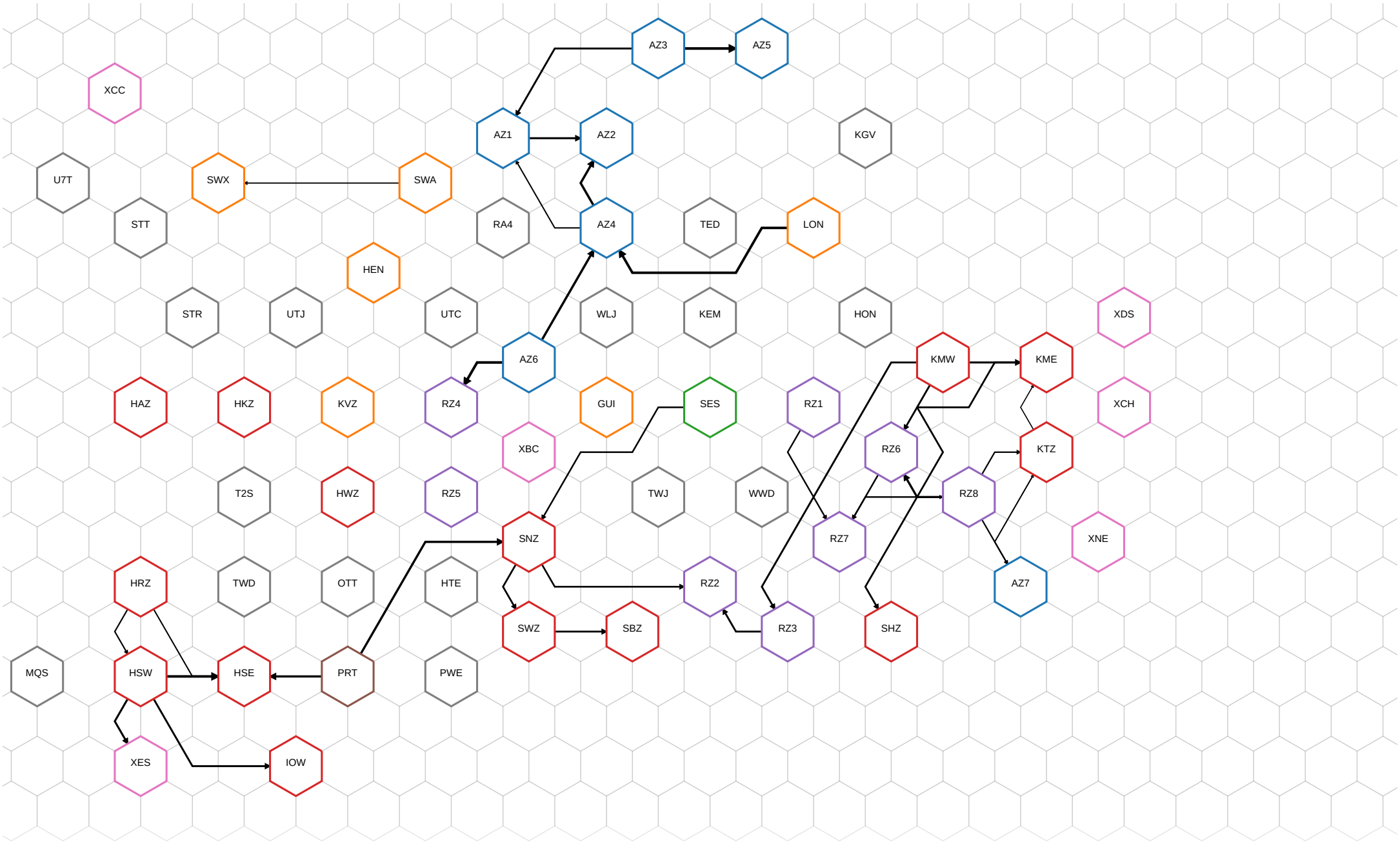
Situation 4 - 2050 (Thames Water)



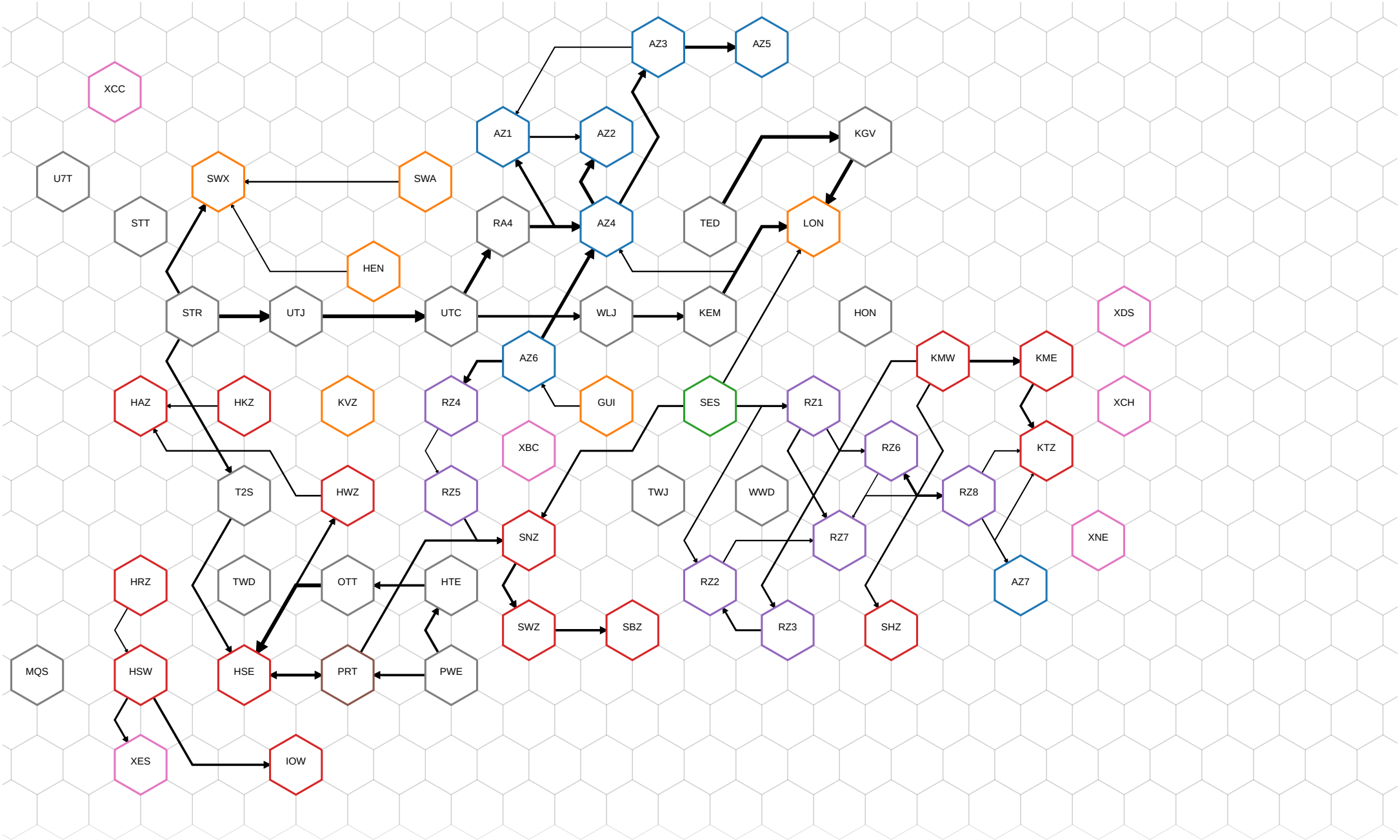
Situation 4 - 2075 (Thames Water)



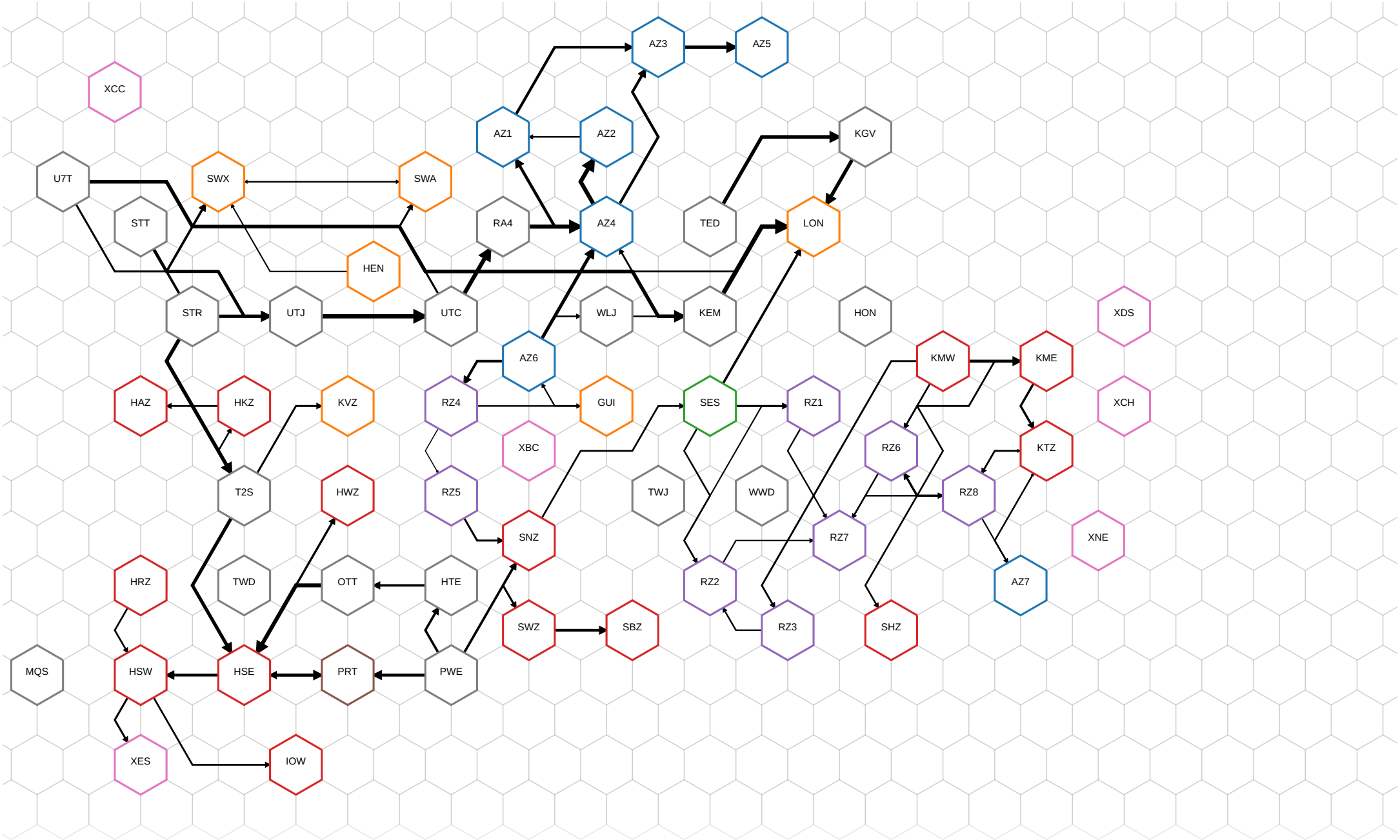
Situation 4 - 2026



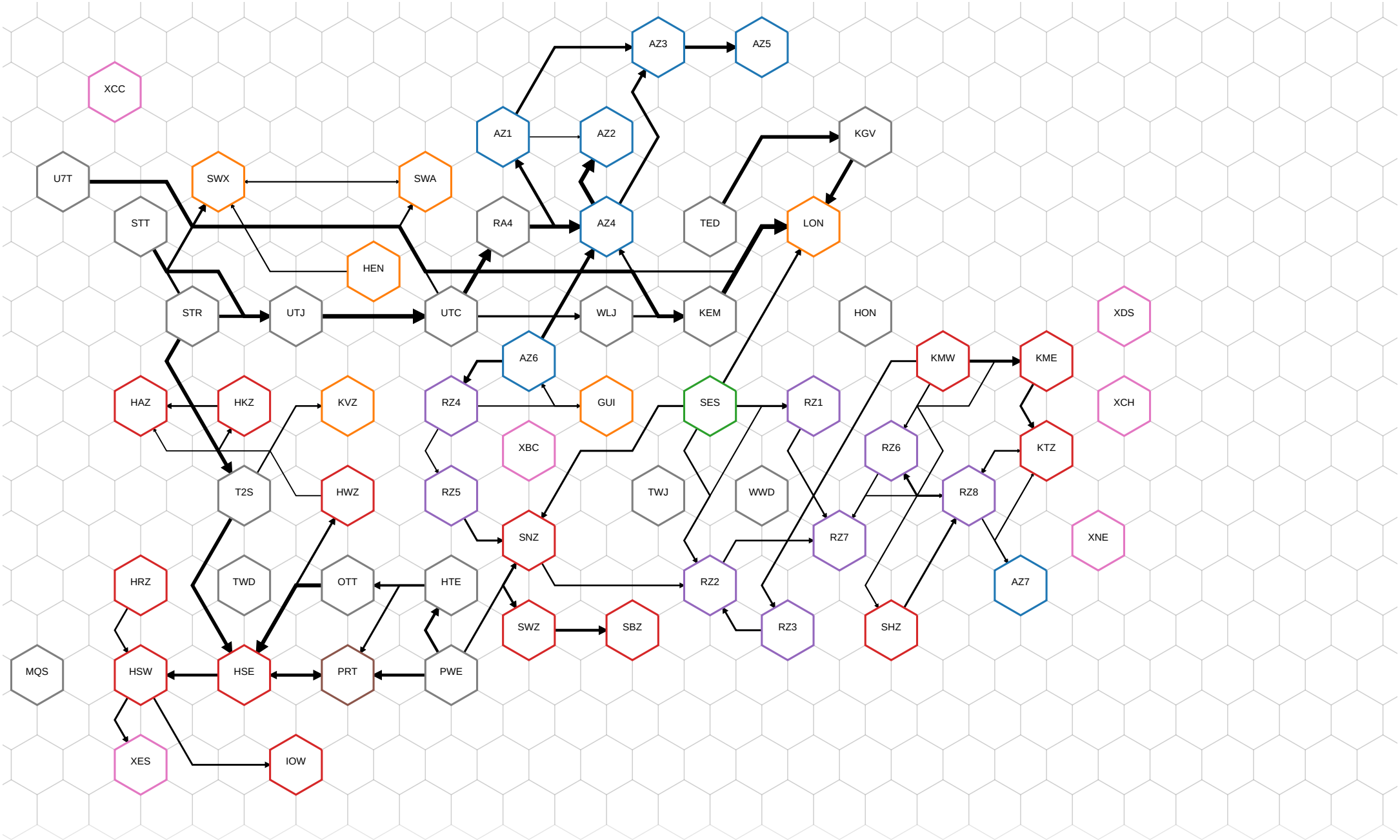
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

LOWER THAMES REDUCTIONS

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-ltrisks-rts-v2-2075
Description	Least cost run with hybrid-c+2 government interventions including baseline DO allowance for Lower Thames Risks (150 Ml/d from 2026) and River Thames Scheme (86 Ml/d from 2030) in LON. Includes emergency options to elimnate the deficits caused by these reducations until 2034
Created at	19/07/2023, 11:11:35
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2-ltrisks-rts-v2
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets. Includes DO reduction due to Lower Thames risks. Includes LON DO reduction of 80 Ml/d due to River Thames Scheme (RTS). Includes emergency options to eliminate the deficits caused by these reductions until 2034.
Optimised discount rate	STPR

Metrics

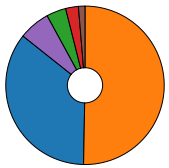
Net present value (Cost)

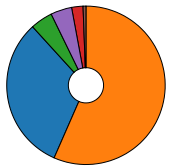
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	23,114	20,189	19,452	21,828	20,072	19,283	20,089	18,914	18,206	(£m)
Cost w/o deficit (STPR)	23,114	20,189	19,452	21,828	20,072	19,283	20,089	18,914	18,206	(£m)
Cost w/ deficit (IGEQ)	35,387	29,811	28,476	32,903	29,614	28,218	29,906	27,696	26,419	(£m)
Cost w/o deficit (IGEQ)	35,387	29,811	28,476	32,903	29,614	28,218	29,906	27,696	26,419	(£m)
Cost w/ deficit (LTDR)	25,487	22,079	21,231	23,985	21,947	21,044	22,009	20,644	19,831	(£m)
Cost w/o deficit (LTDR)	25,487	22,079	21,231	23,985	21,947	21,044	22,009	20,644	19,831	(£m)

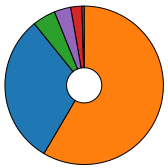
Cost breakdown (STPR)

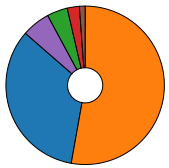
Select Company: Total

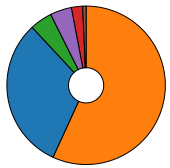
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	8,185	6,392	5,978	7,333	6,268	5,836	6,147	5,523	5,086	(£m)
Fixed opex	11,622	11,422	11,369	11,527	11,409	11,354	11,430	11,348	11,290	(£m)
Fixed operational carbon	929	916	918	921	917	915	912	906	906	(£m)
Embedded carbon	601	470	446	542	464	433	448	396	372	(£m)
Variable opex	1,471	869	652	1,254	876	650	956	665	502	(£m)
Variable carbon opex	306	118	89	251	138	96	197	75	51	(£m)

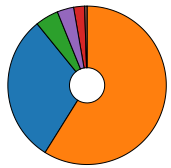
situation1 

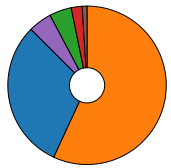
situation2 

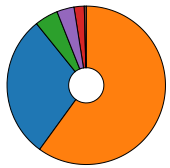
situation3 

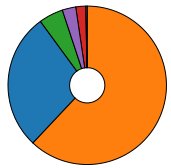
situation4 

situation5 

situation6 

situation7 

situation8 

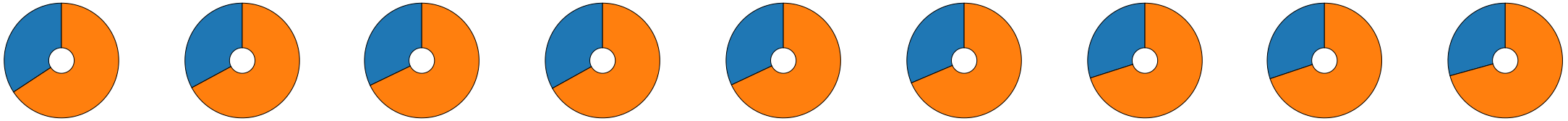
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,821,867	2,882,223	2,717,969	3,388,123	2,844,129	2,637,546	2,768,486	2,410,393	2,248,711	(tonnes)
Operational emissions	7,336,850	5,889,452	5,738,780	6,863,096	6,047,079	5,766,801	6,481,853	5,587,373	5,428,758	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

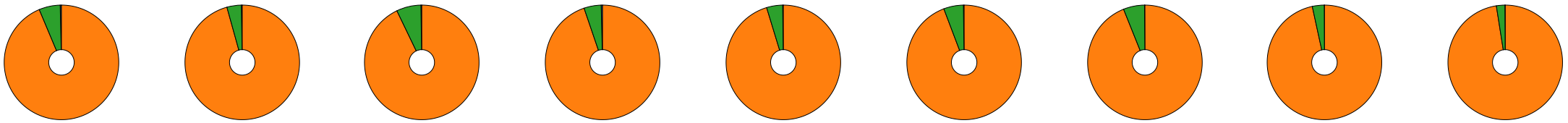


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	109	44	24	103	33	19	22	8	6	(GWh)
Grid	28,273	16,072	8,813	24,367	15,593	8,648	17,950	11,839	6,735	(GWh)
Renewable	1,804	681	655	1,243	739	510	1,140	411	165	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	70,756.00	66,455.00	65,502.00	69,426.00	66,060.00	65,226.00	66,319.00	63,740.00	62,760.00	
SEA environmental disbenefit	118,155.00	89,509.00	82,361.00	108,358.00	87,214.00	82,063.00	94,167.00	77,684.00	68,300.00	
Natural capital	81,363,372.16	77,185,333.79	80,167,727.74	75,535,721.00	77,325,166.80	79,977,793.28	64,339,842.93	66,259,586.51	67,916,342.84	
Bio-diversity net gain	−228,637.00	−160,879.00	−128,590.00	−208,092.00	−158,183.00	−138,540.00	−148,881.00	−106,667.00	−74,227.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	34,717.00	32,805.00	32,336.00	34,080.00	32,620.00	32,357.00	32,881.00	31,912.00	31,391.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	29.79	31.51	34.30	29.81	31.72	34.48	29.99	33.05	36.79	
R1: Uncertainty of option supply/demand benefit	6.85	6.84	7.47	6.66	6.92	7.48	6.55	7.08	7.89	
R3: Risk of service failure due to other physical hazards	7.09	7.74	8.57	7.19	7.80	8.62	7.29	8.23	9.36	
R4: Availability of additional headroom	6.25	6.58	6.80	6.33	6.61	6.81	6.66	7.00	7.24	
R5: Catchment/raw water quality risks (incl. climate change)	4.12	4.25	4.72	3.99	4.26	4.77	4.01	4.58	5.27	
R6: Capacity of catchment services	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	
R7: Risk of service failure to other exceptional events	5.49	6.10	6.75	5.63	6.14	6.80	5.47	6.16	7.03	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

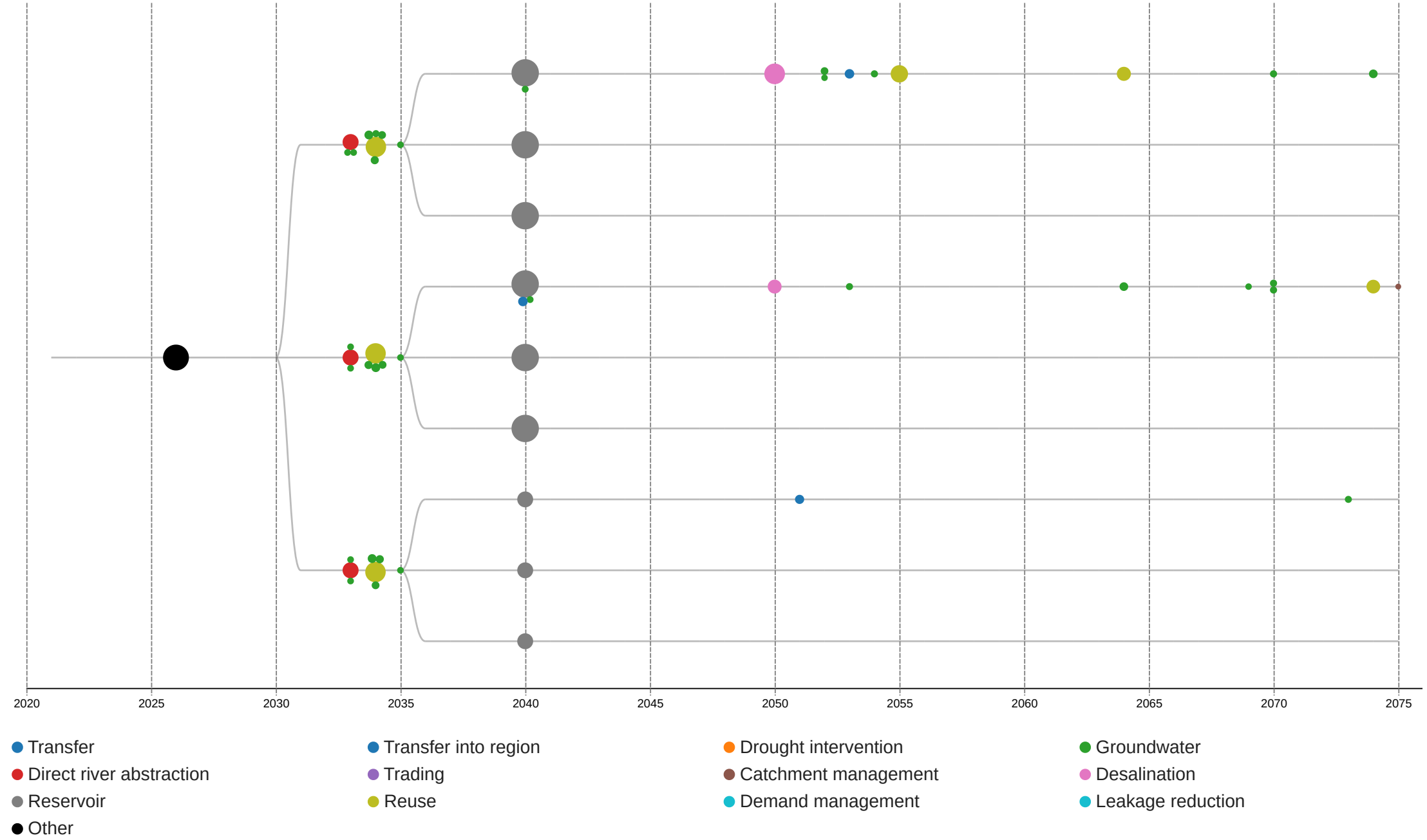
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	13.12	15.00	16.48	13.56	14.98	16.40	15.07	17.11	19.47	
A3: Operational complexity and flexibility	6.54	7.39	8.21	6.76	7.46	8.28	6.88	7.84	8.97	
A4: WRZ connectivity	6.55	7.58	8.24	6.77	7.49	8.09	8.17	9.24	10.47	
A7: Customer relations support engagement with demand management	0.02	0.03	0.03	0.04	0.03	0.03	0.03	0.03	0.03	

Evolvablility

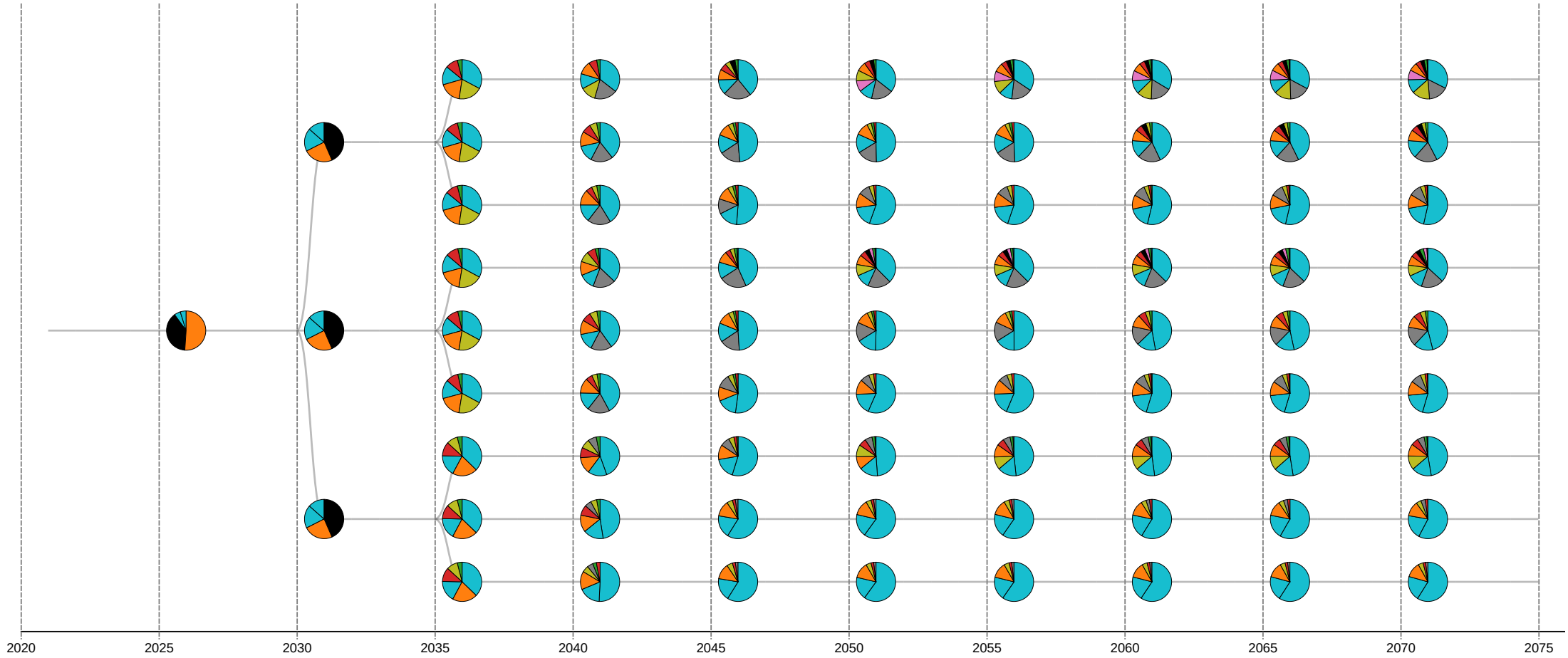
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.49	20.94	22.90	19.55	21.01	23.04	21.66	24.45	27.68	
E1: Scaleability and modularity of proposed changes	8.91	9.76	10.77	9.02	9.86	10.84	10.23	11.70	13.31	
E2: Intervention lead times	4.17	4.21	4.44	4.06	4.12	4.46	4.30	4.66	5.18	
E3: Reliance on external bodies to deliver changes	6.41	6.97	7.69	6.47	7.03	7.73	7.13	8.09	9.20	
E5: Collaborative land management	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	

Option Selection (Thames Water)



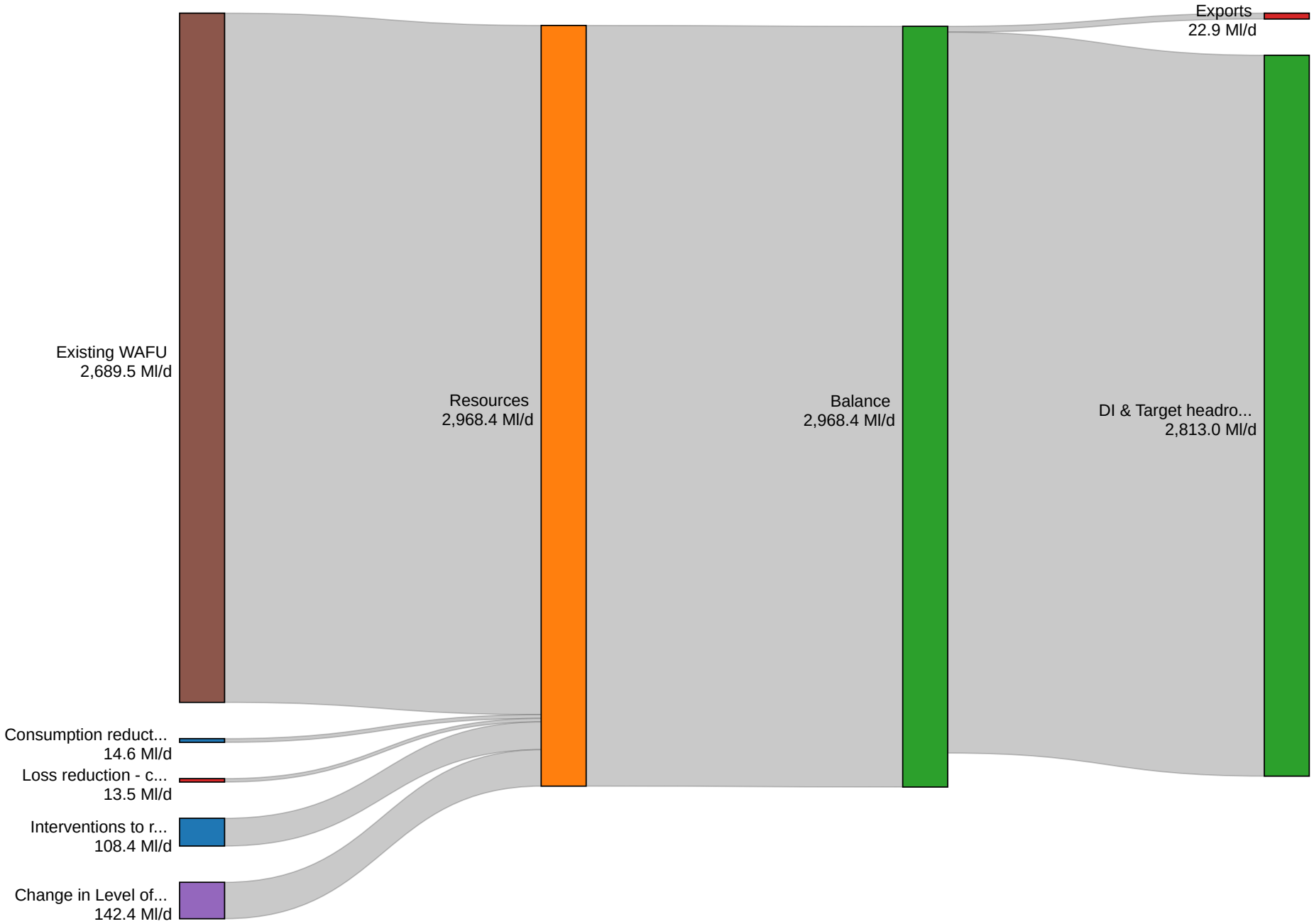
Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.

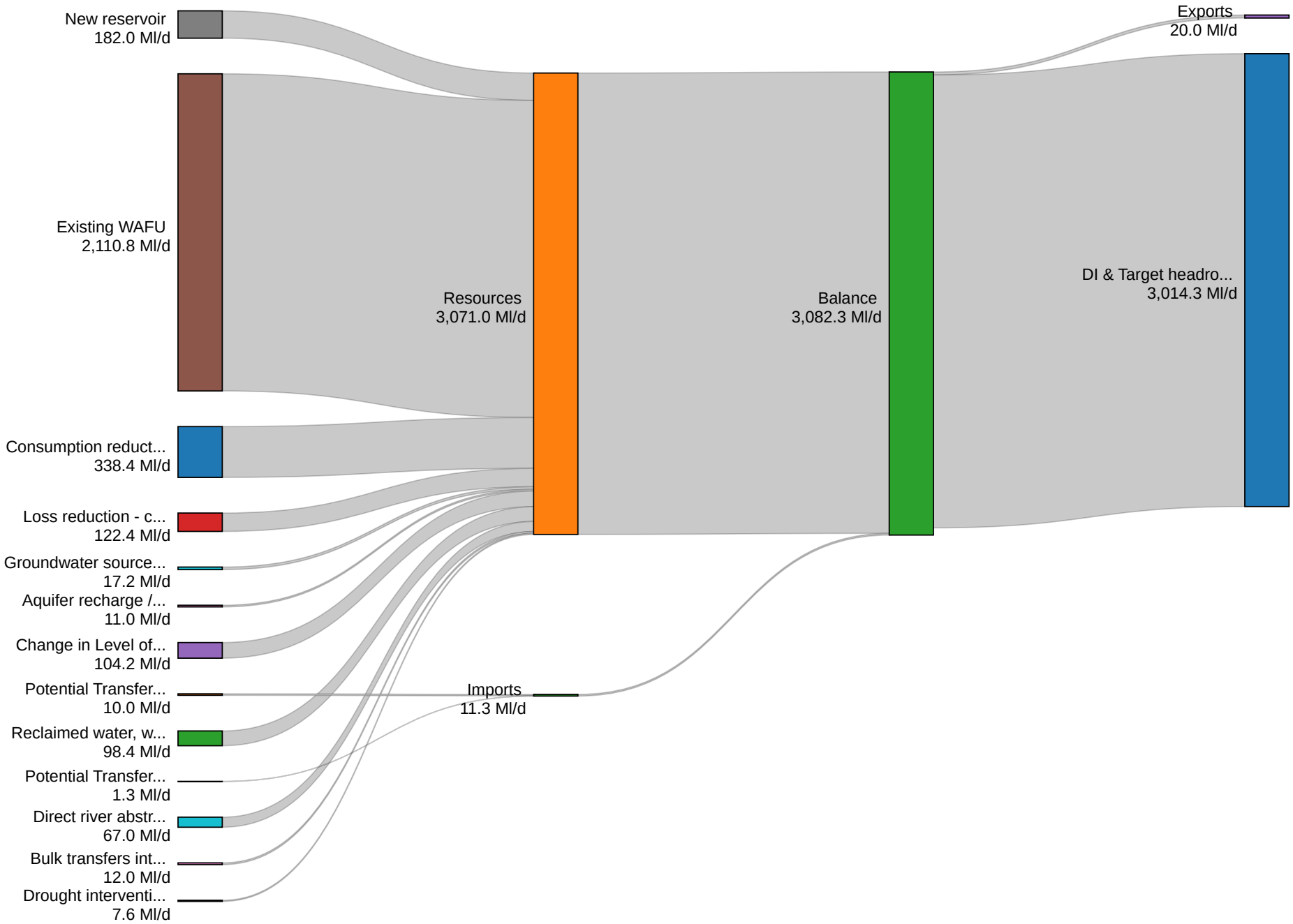


- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

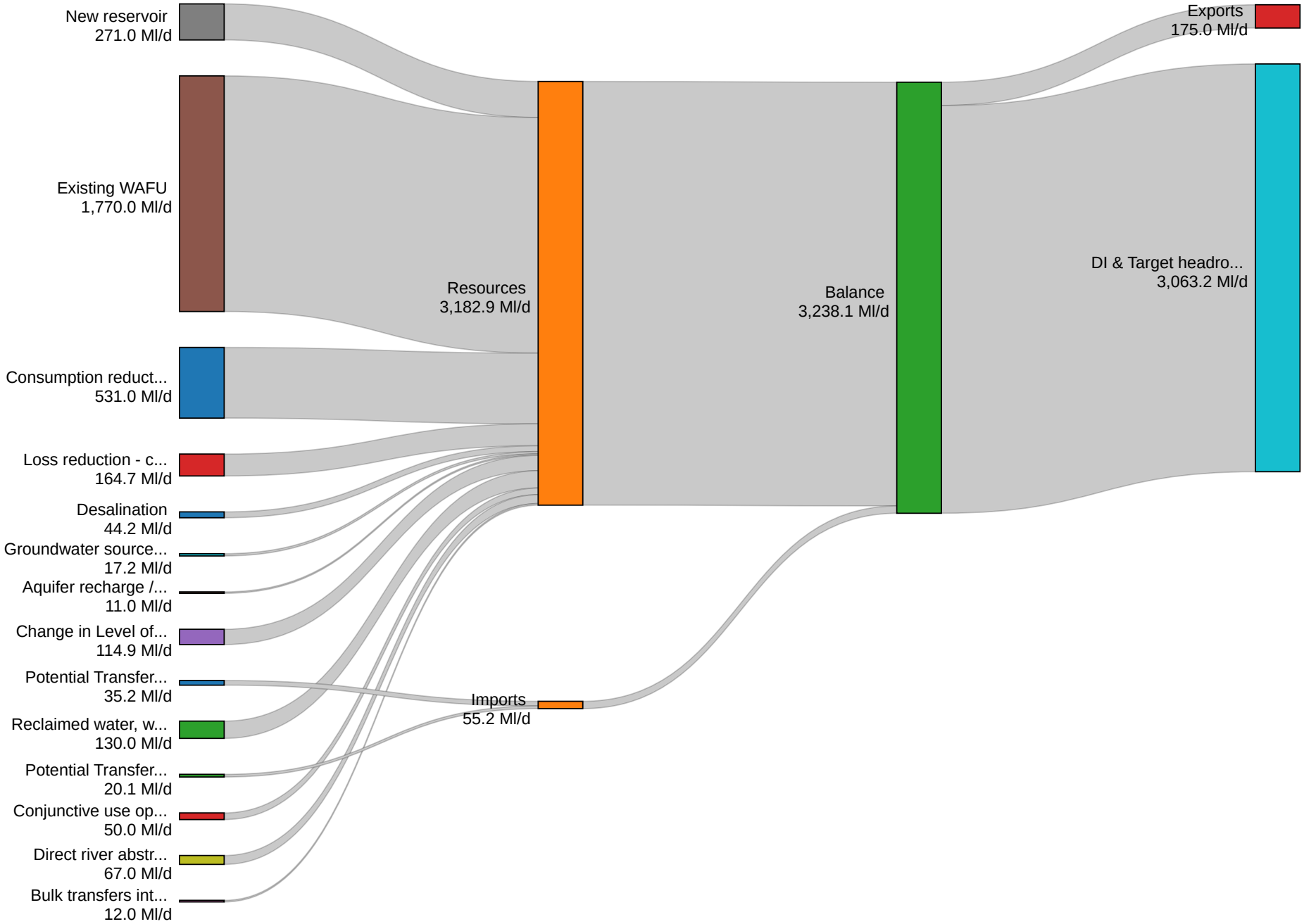
Situation 4 - 2026 (Thames Water)



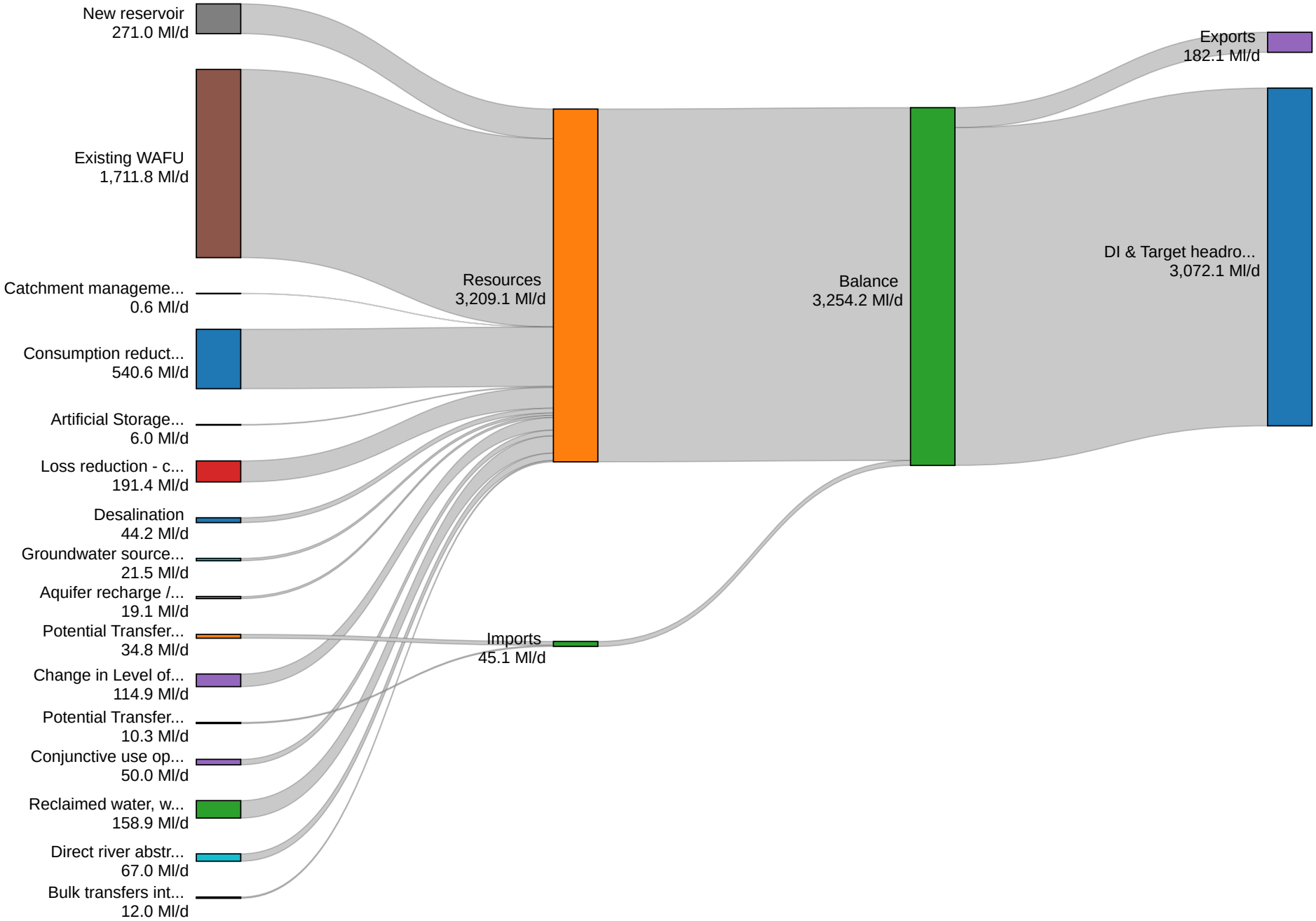
Situation 4 - 2040 (Thames Water)



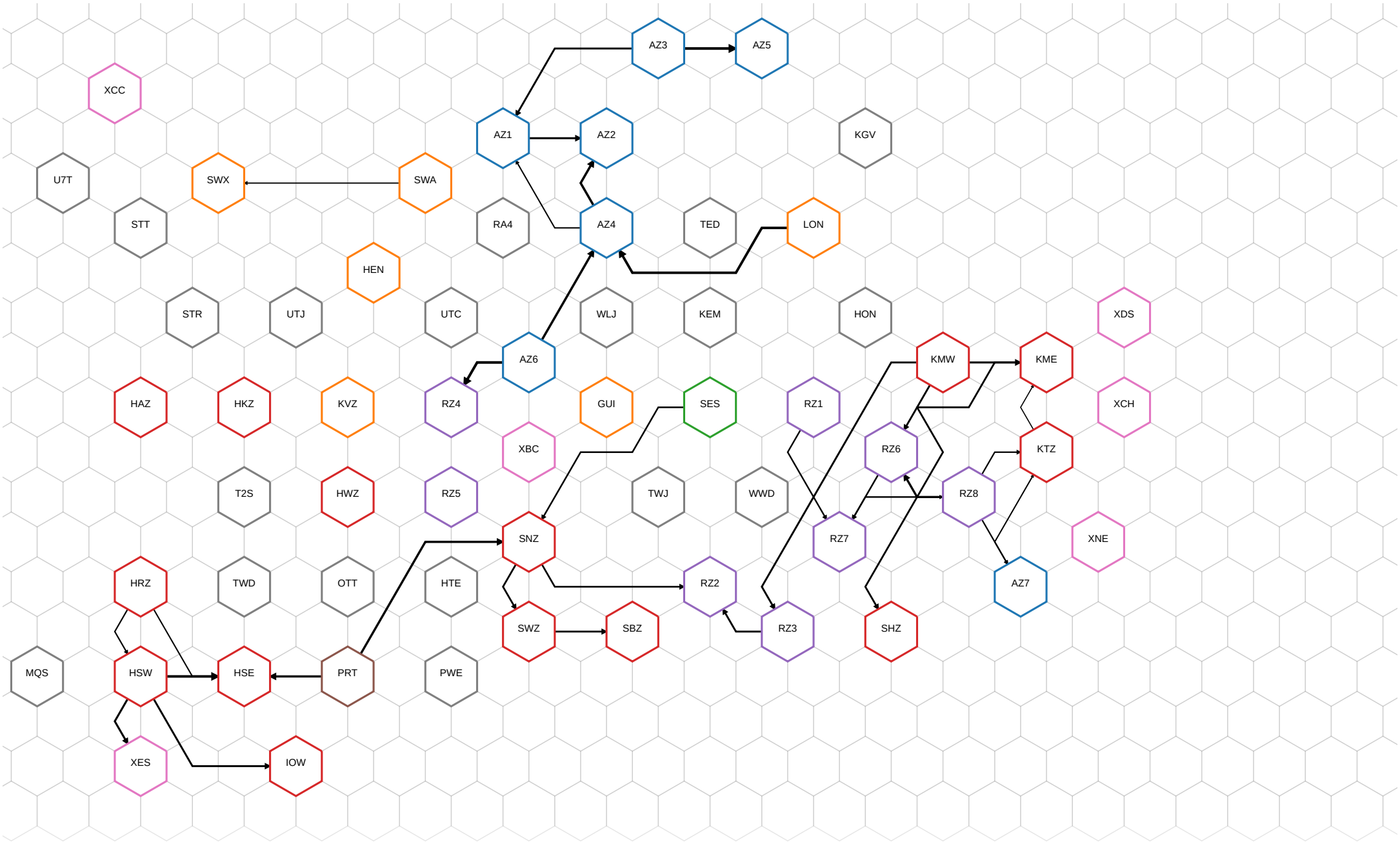
Situation 4 - 2050 (Thames Water)



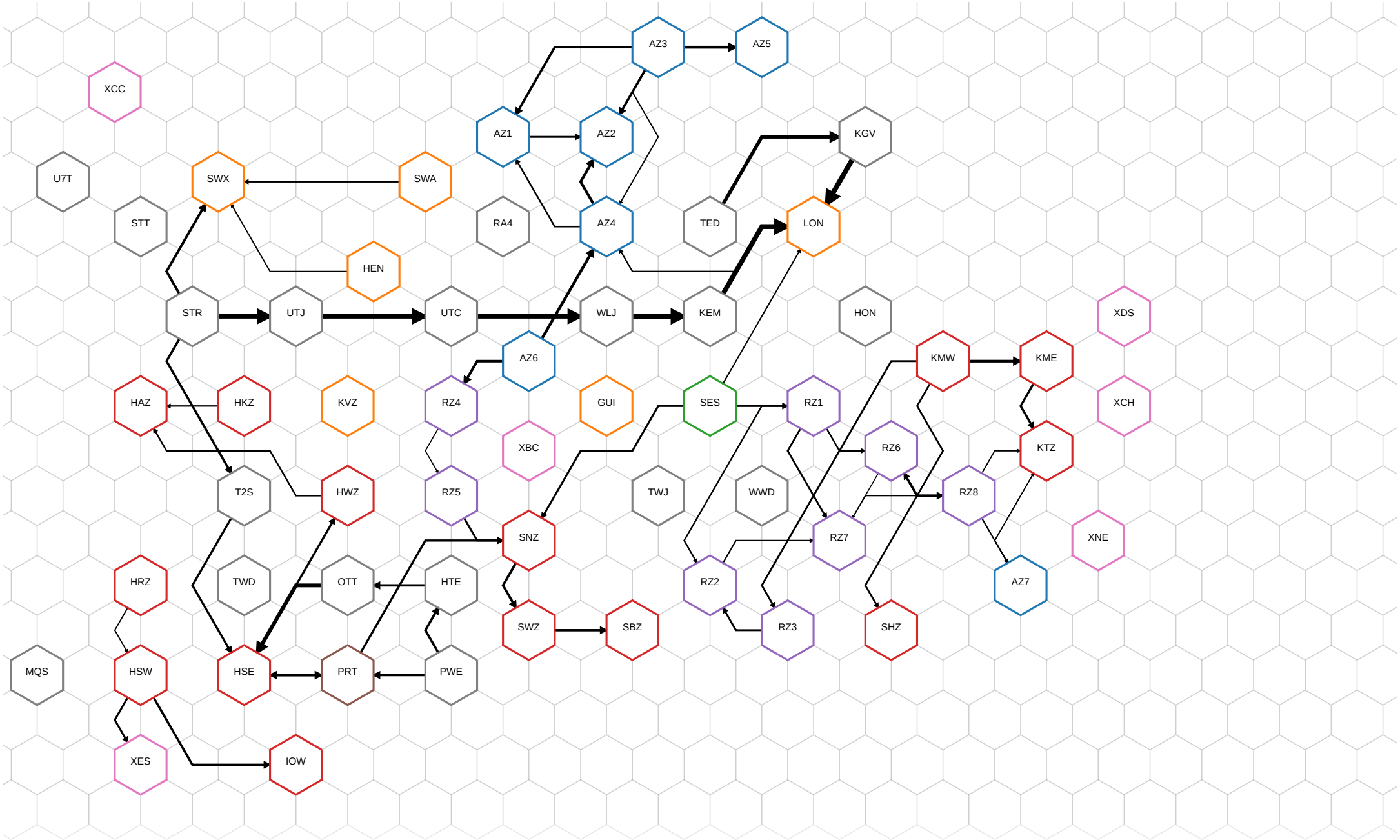
Situation 4 - 2075 (Thames Water)



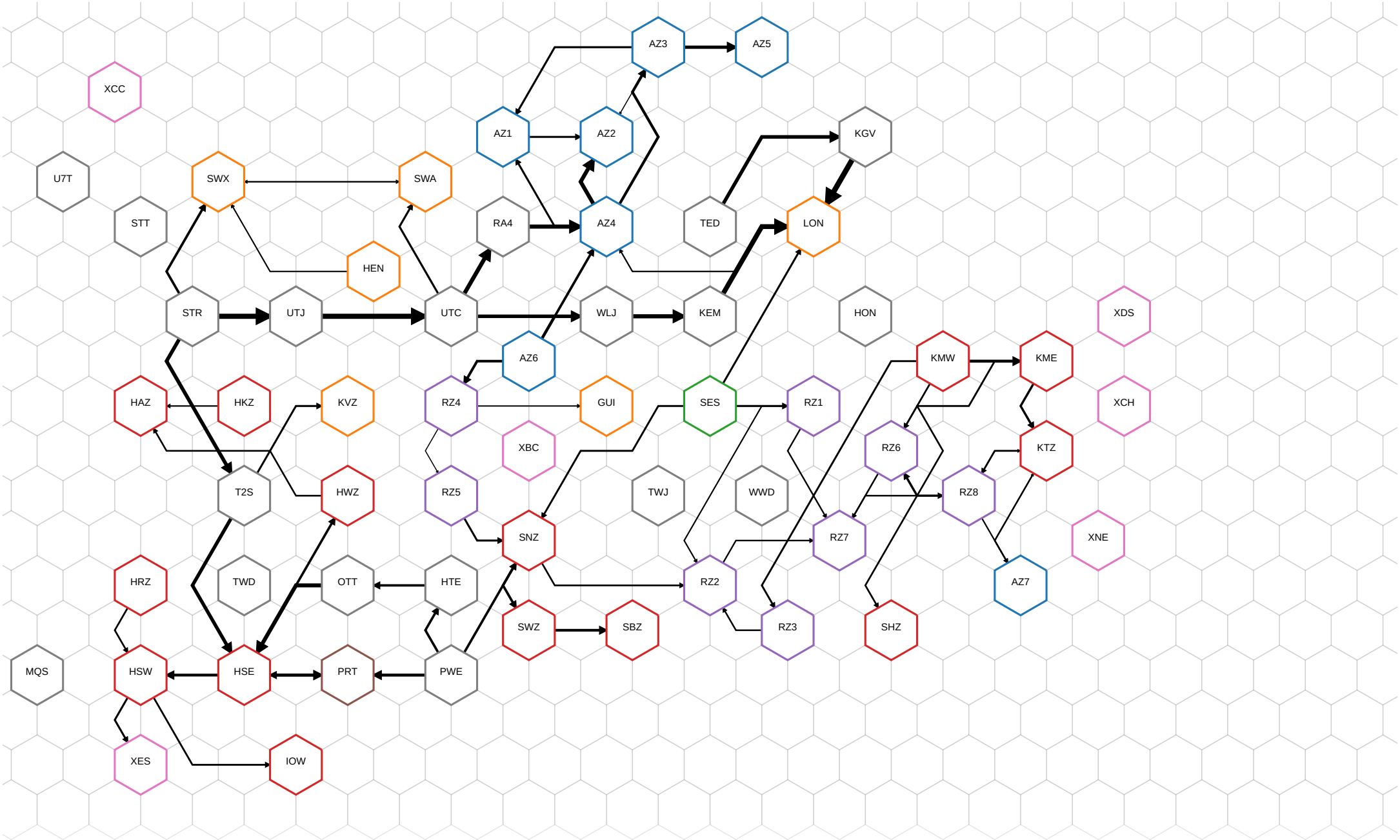
Situation 4 - 2026



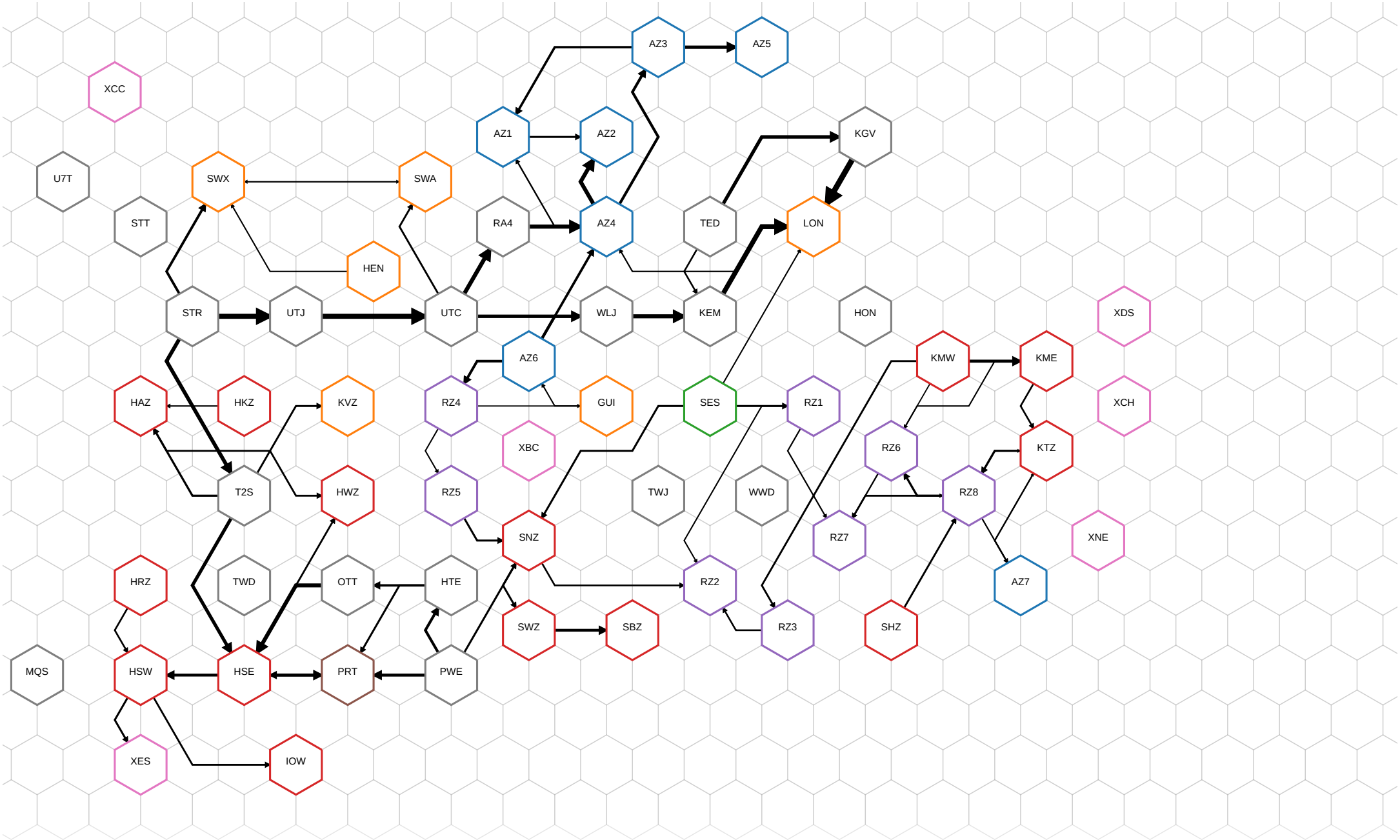
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

LOWER THAMES REDUCTIONS (MITIGATED BY TUNNEL)

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-ltrisks-rts-v4-2075
Description	Least cost run with hybrid-c+2 government interventions including baseline DO allowance for Lower Thames Risks (150 Ml/d from 2026) and River Thames Scheme (86 Ml/d from 2030) in LON. Includes emergency options to eliminate the deficits caused by these reductions until 2034 (including delaying 1in200 resilence). Includes Lower Thames tunnel option as an additional dependency for Teddington DRA, Mogden Reuse and Beckton Reuse. Modifies this option to move it to LON and make it a resource option.
Created at	20/07/2023, 10:56:57
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2-ltrisks-rts-v4
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets. Includes DO reduction due to Lower Thames risks. Includes LON DO reduction of 80 Ml/d due to River Thames Scheme (RTS). Includes emergency options to eliminate the deficits caused by these reductions until 2034. Includes Lower Thames tunnel option as an additional dependency for Teddington DRA, Mogden Reuse and Beckton Reuse. Modifies this option to move it to LON and make it a resource option.
Optimised discount rate	STPR

Metrics

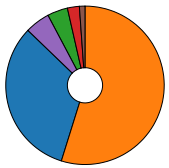
Net present value (Cost)

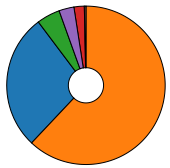
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	20,899	18,183	17,503	19,562	18,120	17,324	17,963	17,095	16,380	(£m)
Cost w/o deficit (STPR)	20,899	18,183	17,503	19,562	18,120	17,324	17,963	17,095	16,380	(£m)
Cost w/ deficit (IGEQ)	31,831	26,659	25,424	29,245	26,556	25,142	26,491	24,861	23,569	(£m)
Cost w/o deficit (IGEQ)	31,831	26,659	25,424	29,245	26,556	25,142	26,491	24,861	23,569	(£m)
Cost w/ deficit (LTDR)	23,017	19,852	19,069	21,453	19,782	18,870	19,637	18,630	17,807	(£m)
Cost w/o deficit (LTDR)	23,017	19,852	19,069	21,453	19,782	18,870	19,637	18,630	17,807	(£m)

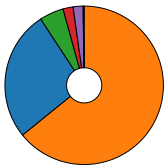
Cost breakdown (STPR)

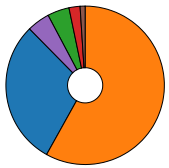
Select Company: Total

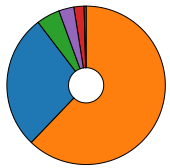
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	6,767	5,039	4,656	5,778	4,981	4,491	4,708	4,249	3,818	(£m)
Fixed opex	11,457	11,279	11,230	11,362	11,261	11,200	11,256	11,201	11,142	(£m)
Fixed operational carbon	874	865	865	876	869	868	869	864	863	(£m)
Embedded carbon	509	384	358	442	380	346	357	315	291	(£m)
Variable opex	1,056	556	356	905	556	359	670	420	250	(£m)
Variable carbon opex	236	60	37	199	73	60	102	46	15	(£m)

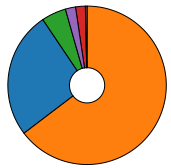
situation1 

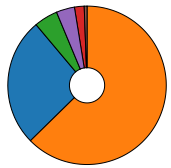
situation2 

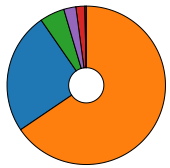
situation3 

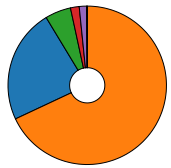
situation4 

situation5 

situation6 

situation7 

situation8 

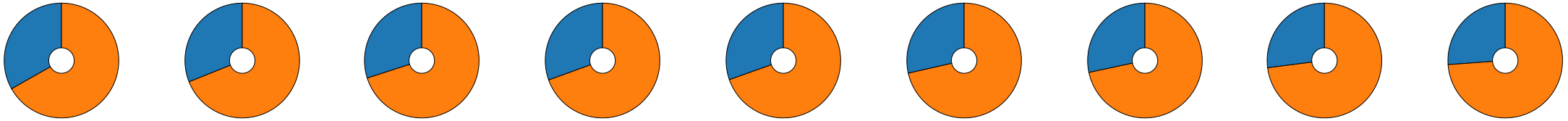
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,245,534	2,350,442	2,176,758	2,752,009	2,325,936	2,101,935	2,198,923	1,909,275	1,749,837	(tonnes)
Operational emissions	6,529,230	5,218,021	5,091,569	6,267,565	5,317,858	5,259,912	5,558,361	5,154,662	4,944,076	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

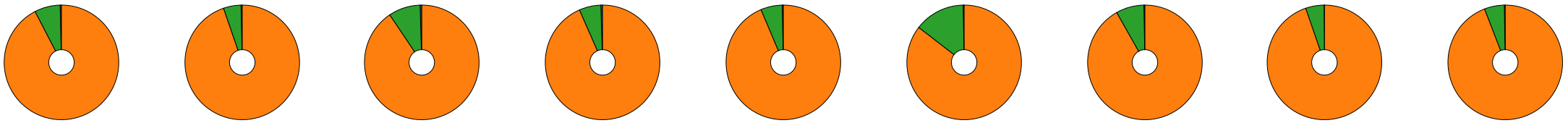


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	91	42	24	99	38	13	41	9	7	(GWh)
Grid	22,505	11,489	4,640	19,207	11,036	3,914	13,029	7,904	2,771	(GWh)
Renewable	1,763	600	459	1,258	713	654	1,121	433	165	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	68,121.00	63,469.00	62,581.00	66,509.00	63,345.00	62,179.00	63,721.00	61,364.00	60,428.00	
SEA environmental disbenefit	110,738.00	79,943.00	72,571.00	96,452.00	78,903.00	71,946.00	81,695.00	68,063.00	59,411.00	
Natural capital	83,838,008.90	79,112,142.47	81,992,514.02	75,570,441.04	77,228,210.62	80,069,568.75	81,087,645.19	83,070,160.92	84,713,407.40	
Bio-diversity net gain	−195,368.00	−147,638.00	−114,803.00	−196,740.00	−149,853.00	−120,934.00	−118,669.00	−91,565.00	−62,946.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	33,871.00	31,904.00	31,475.00	33,058.00	31,848.00	31,352.00	31,688.00	30,762.00	30,289.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	25.42	26.25	28.40	25.95	26.97	29.15	26.32	29.11	32.21	
R1: Uncertainty of option supply/demand benefit	5.06	4.79	5.16	5.11	4.94	5.30	4.97	5.39	5.92	
R3: Risk of service failure due to other physical hazards	5.96	6.36	7.03	6.23	6.58	7.25	6.40	7.27	8.24	
R4: Availability of additional headroom	6.28	6.61	6.82	6.37	6.66	6.87	6.74	7.10	7.34	
R5: Catchment/raw water quality risks (incl. climate change)	3.61	3.64	4.05	3.42	3.74	4.16	3.47	4.00	4.60	
R6: Capacity of catchment services	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
R7: Risk of service failure to other exceptional events	4.51	4.84	5.35	4.82	5.05	5.57	4.74	5.36	6.10	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

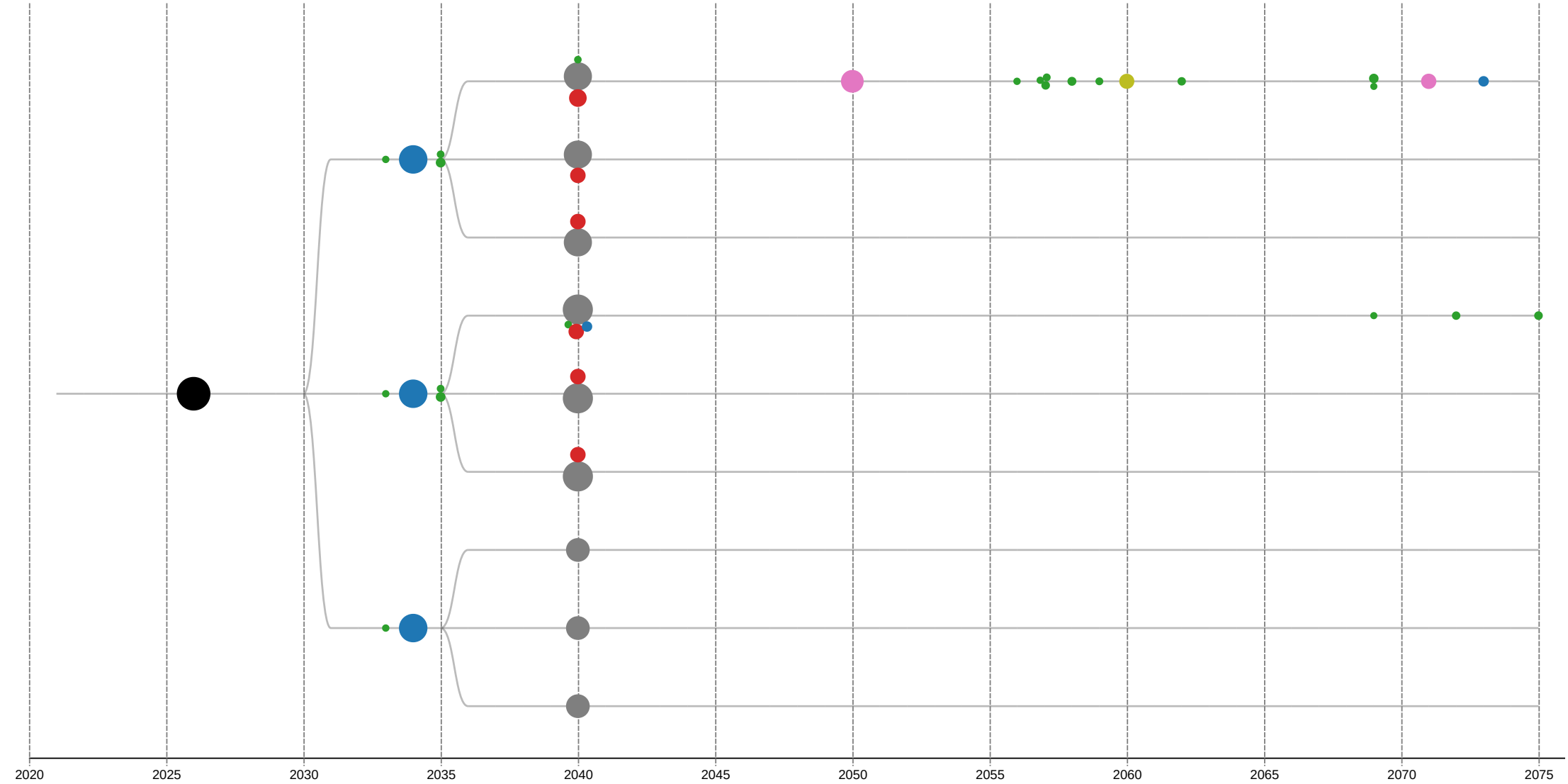
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	12.13	13.82	15.24	12.74	14.00	15.15	14.08	15.93	18.11	
A3: Operational complexity and flexibility	5.57	6.16	6.83	5.98	6.39	7.09	6.22	7.13	8.16	
A4: WRZ connectivity	6.54	7.64	8.38	6.73	7.59	8.03	7.84	8.76	9.93	
A7: Customer relations support engagement with demand management	0.02	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	16.81	17.86	19.44	17.08	18.08	19.62	18.80	21.38	24.11	
E1: Scaleability and modularity of proposed changes	7.74	8.35	9.19	7.87	8.46	9.30	8.95	10.31	11.69	
E2: Intervention lead times	3.67	3.73	3.91	3.63	3.76	3.88	3.72	4.08	4.49	
E3: Reliance on external bodies to deliver changes	5.40	5.78	6.35	5.57	5.86	6.44	6.12	6.99	7.92	
E5: Collaborative land management	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

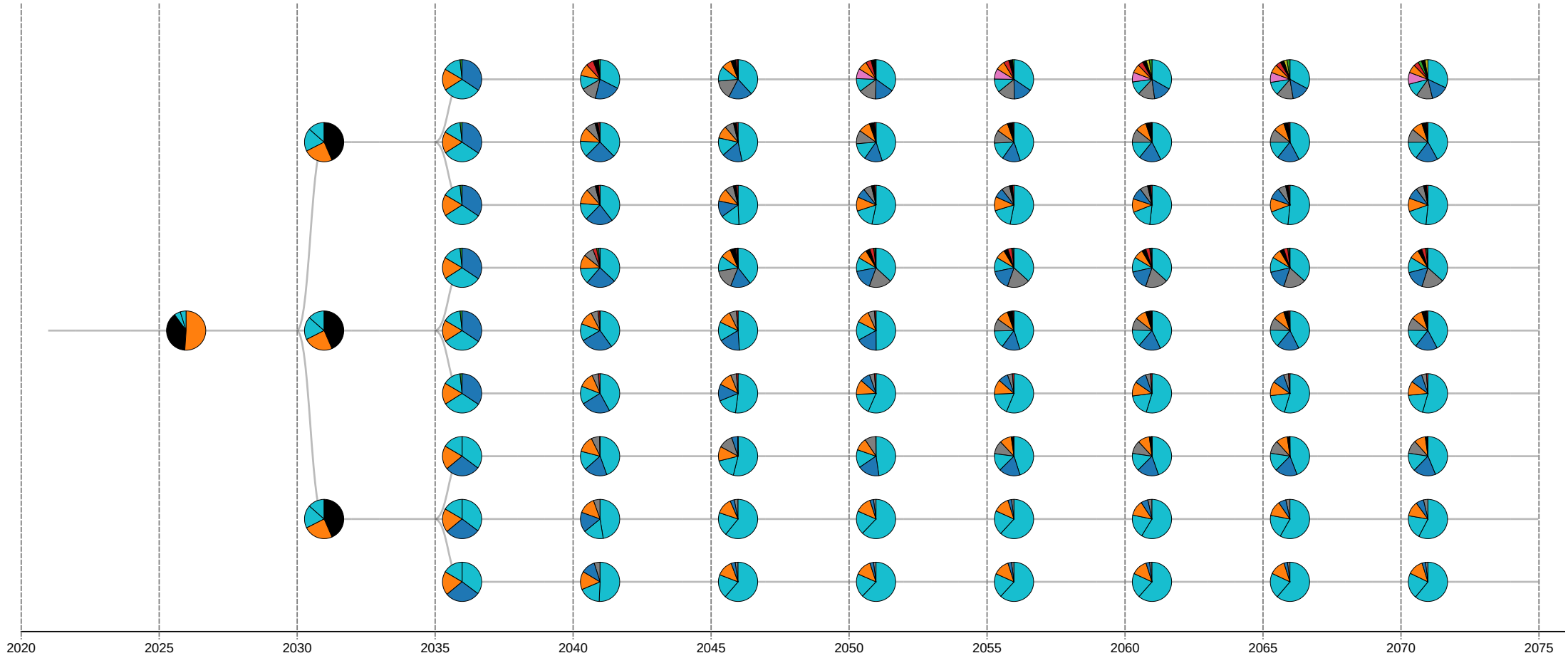
Option Selection (Thames Water)



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

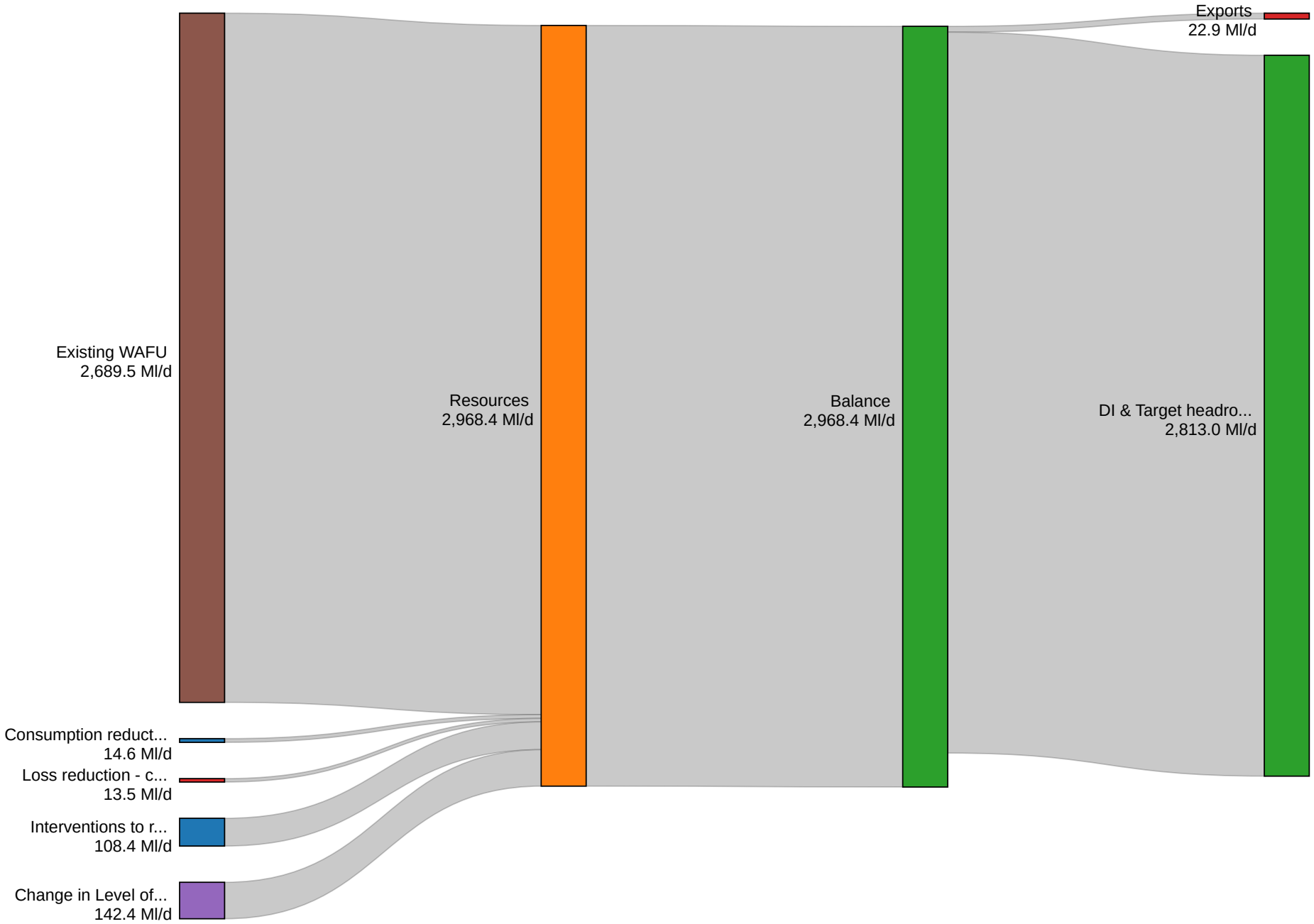
Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.

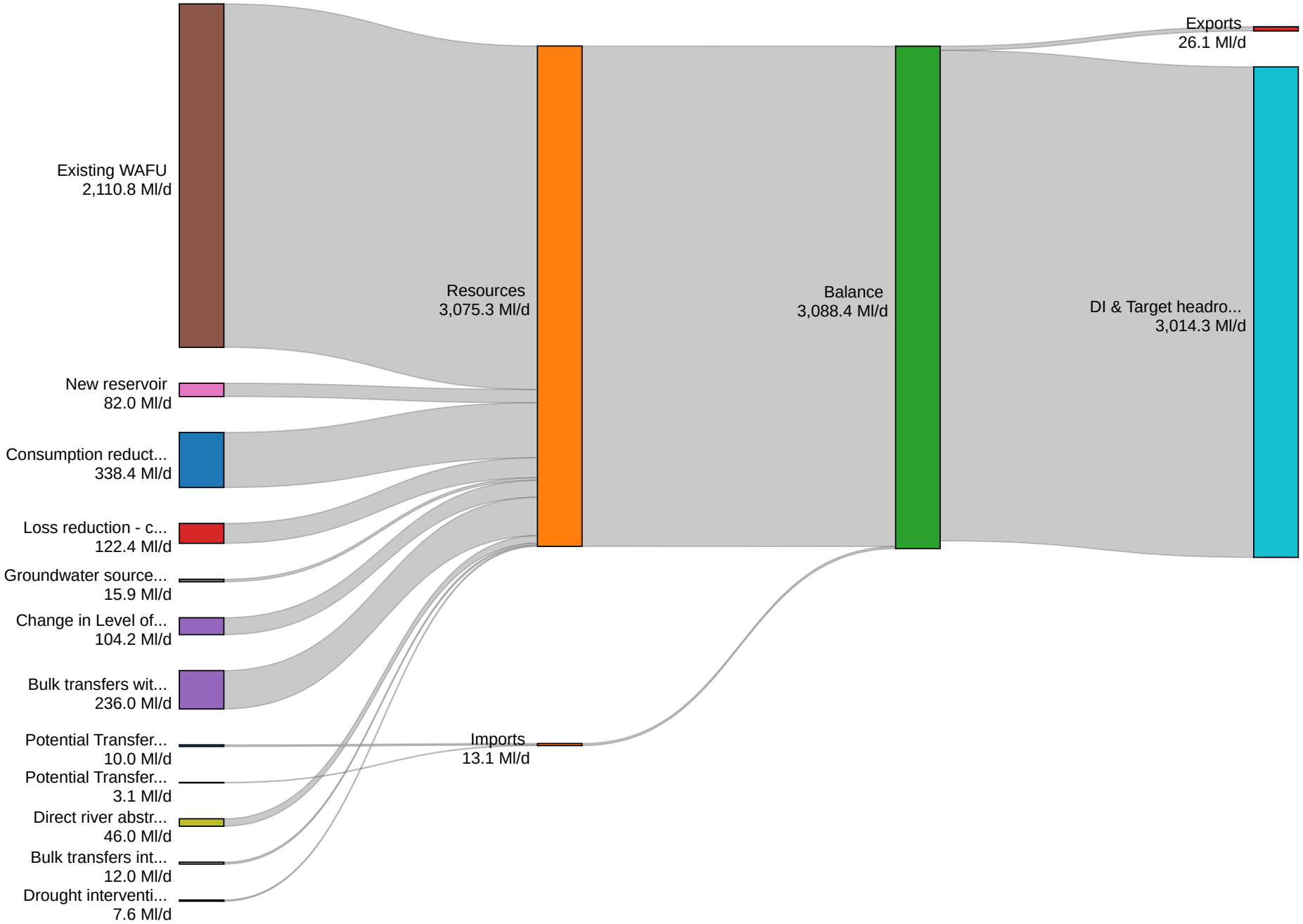


- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

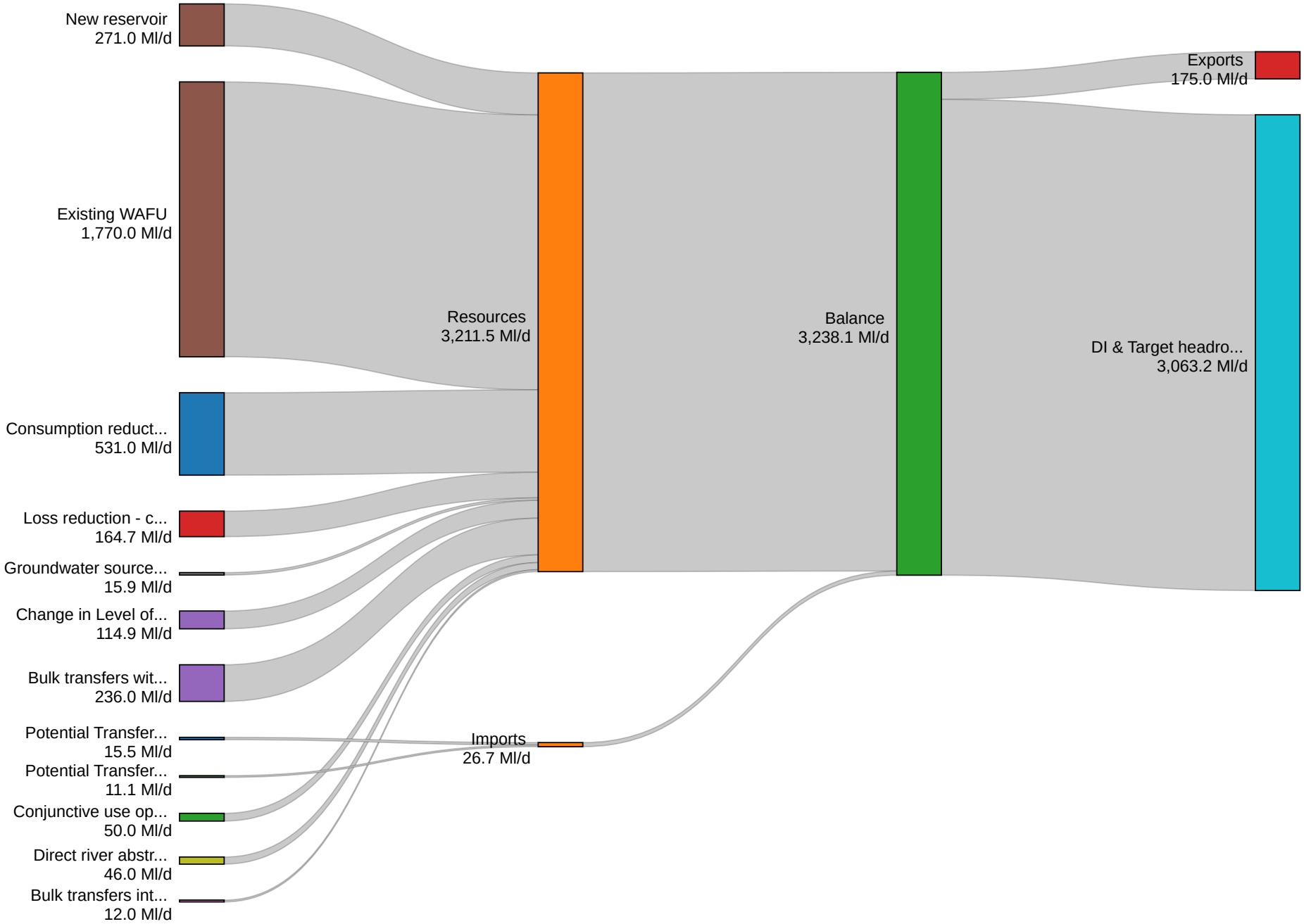
Situation 4 - 2026 (Thames Water)



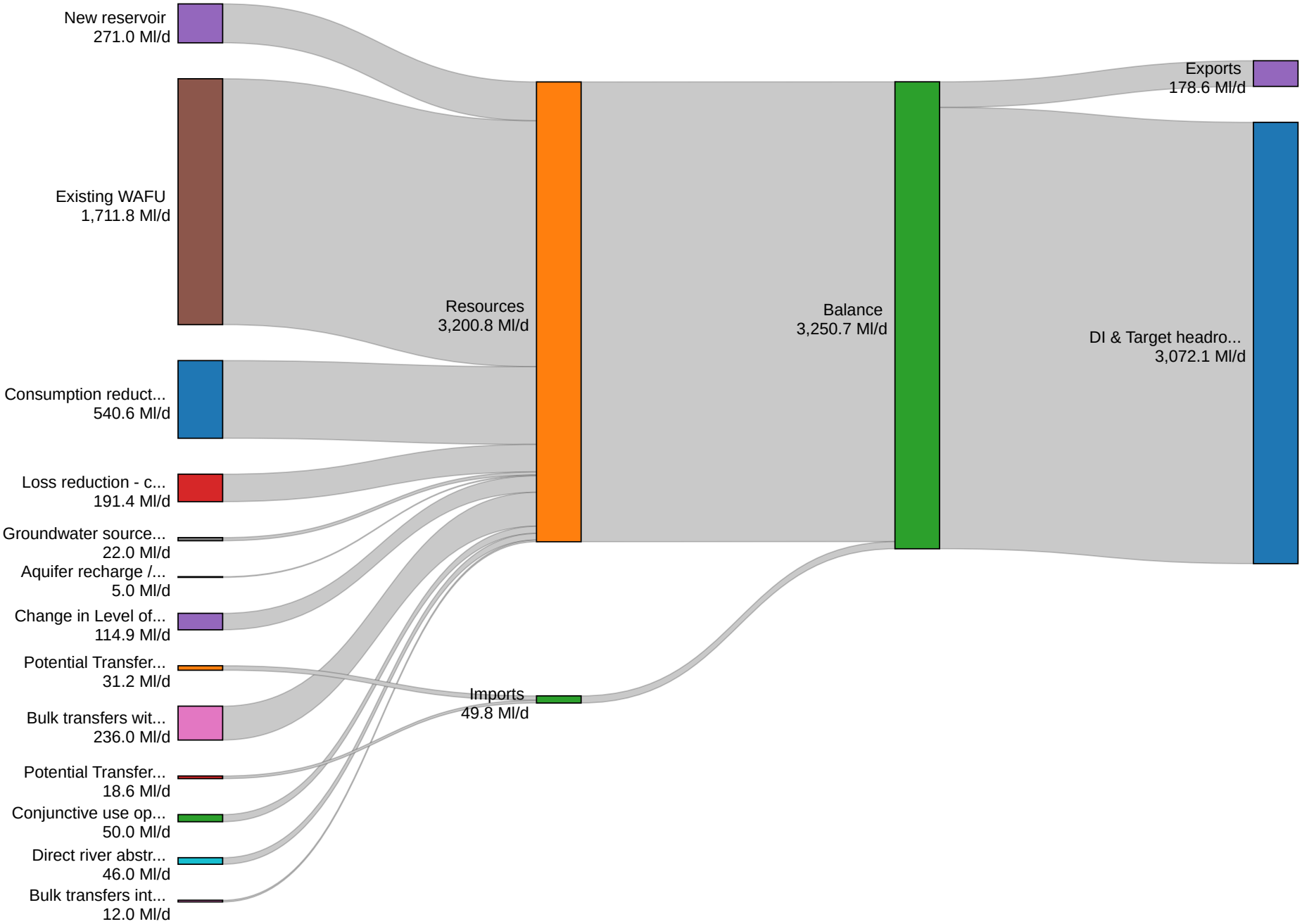
Situation 4 - 2040 (Thames Water)



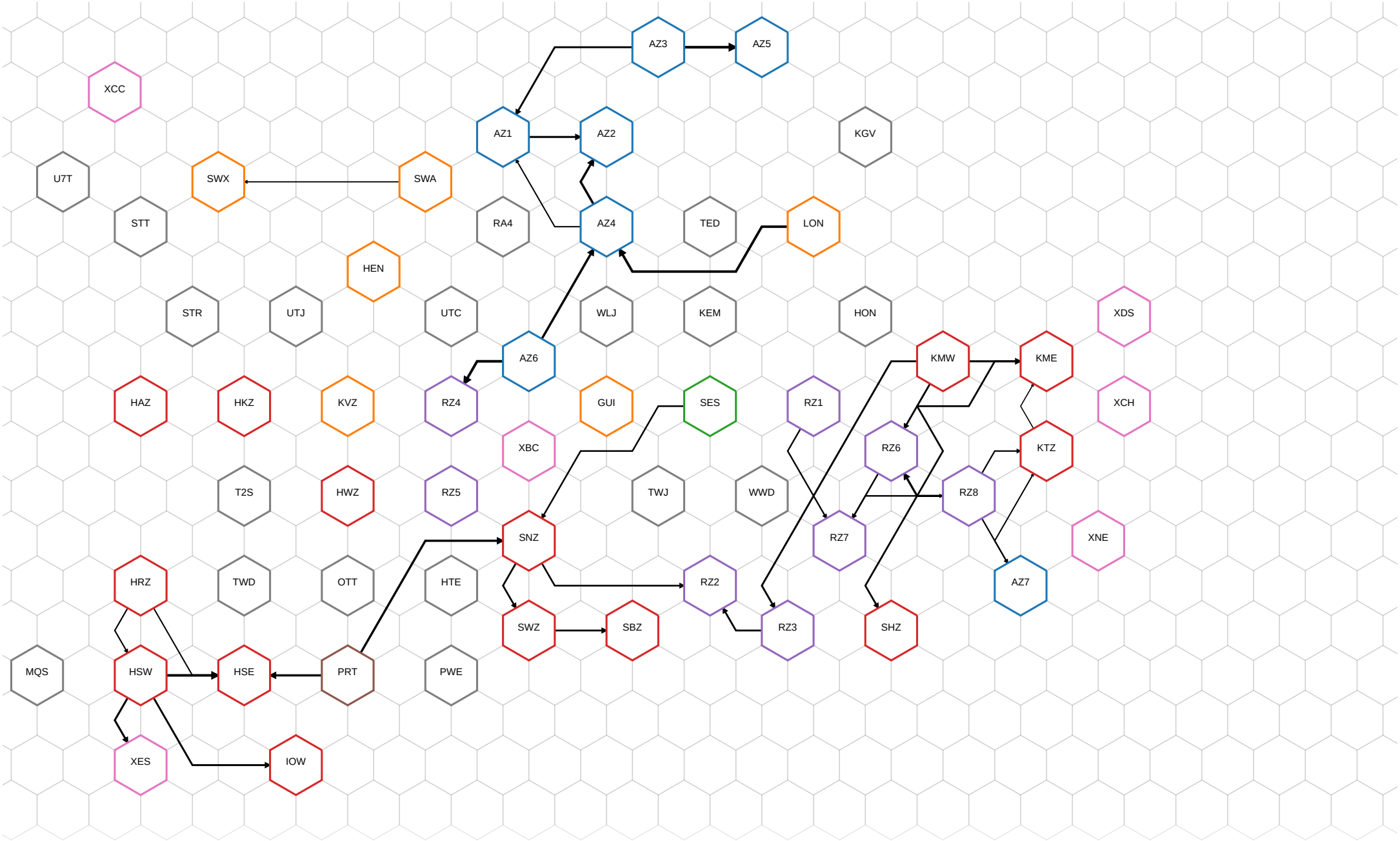
Situation 4 - 2050 (Thames Water)



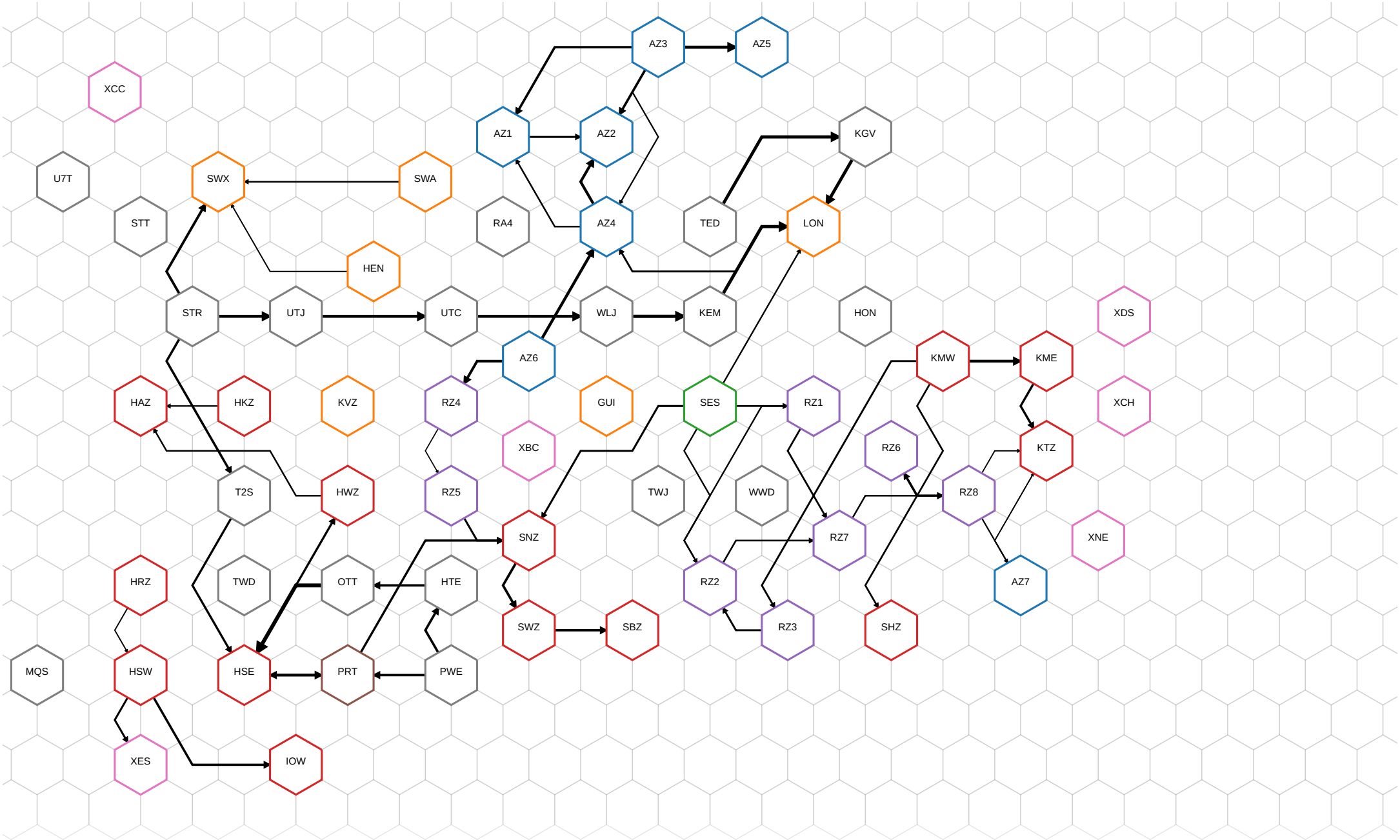
Situation 4 - 2075 (Thames Water)



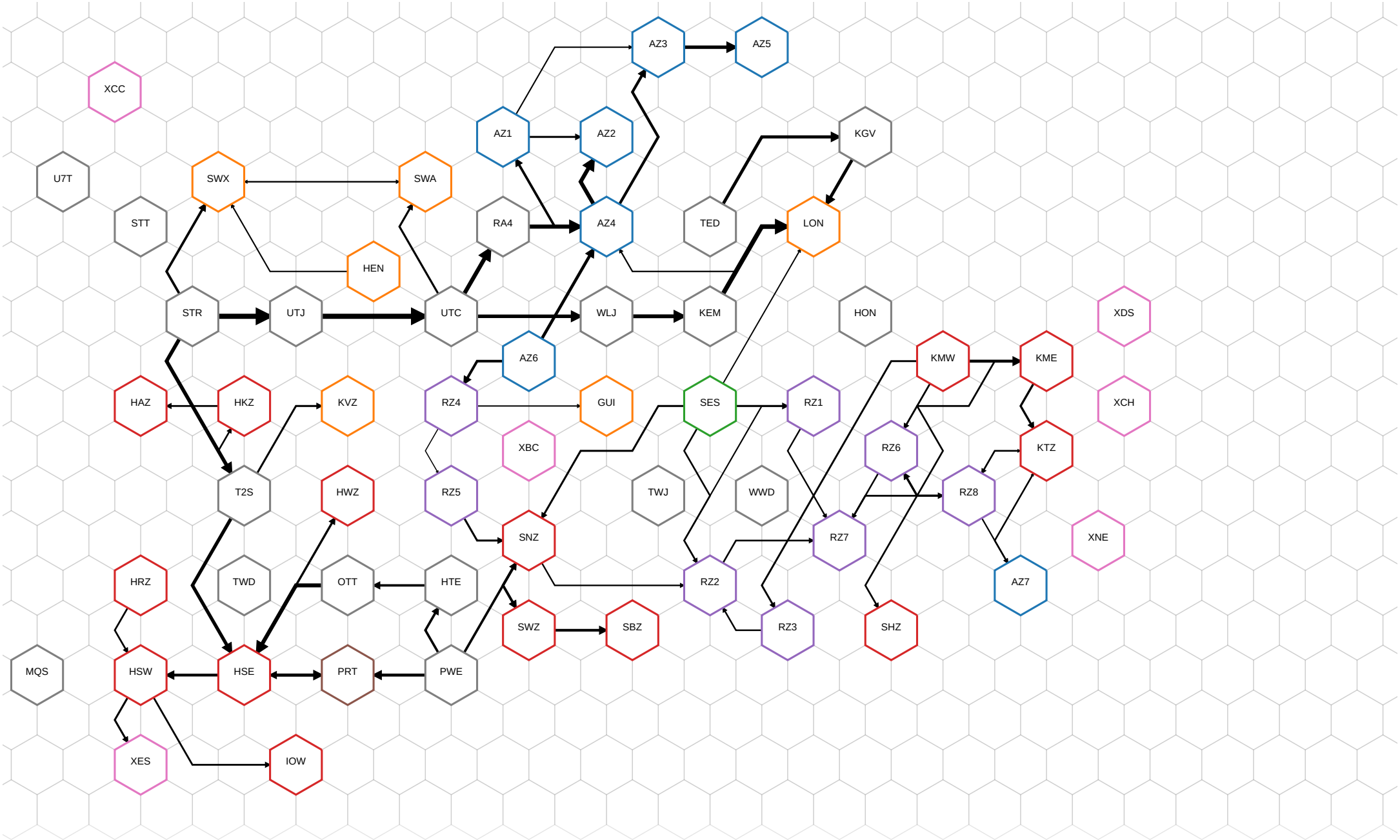
Situation 4 - 2026



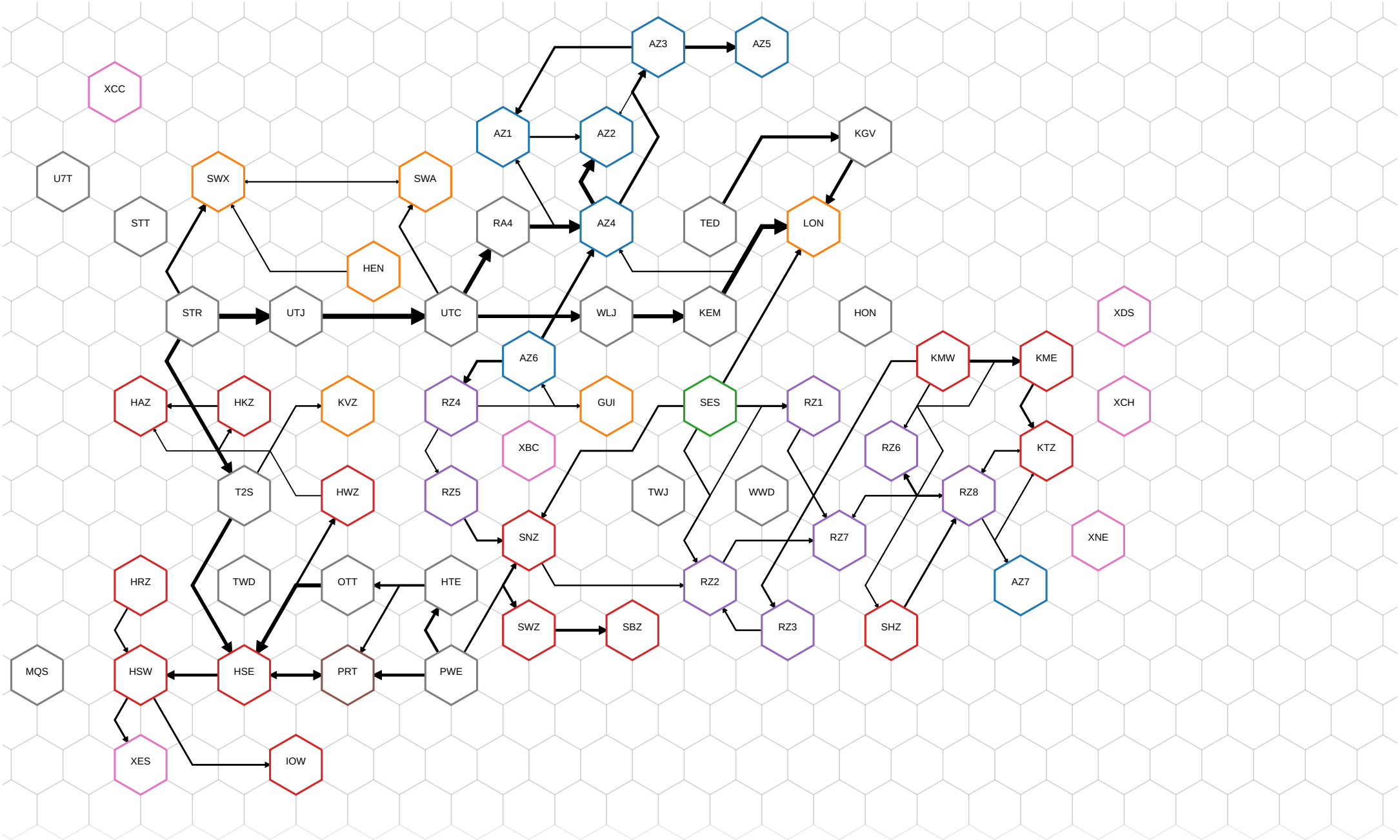
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

WBGWS WITHDRAWN IN 2040

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-excl-wbgws-2040-2075
Description	Least cost run with hybrid-c+2 government interventions excluding WBGWS from 2040 onwards.
Created at	25/07/2023, 22:54:39
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2-excl-wbgws-2040
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets. WBGWs excluded from 2040.
Optimised discount rate	STPR

Metrics

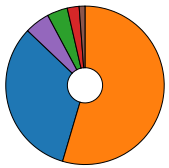
Net present value (Cost)

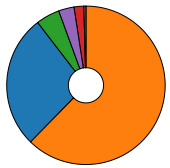
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	21,020	18,078	17,371	19,662	17,999	17,191	18,055	16,876	16,146	(£m)
Cost w/o deficit (STPR)	21,020	18,078	17,371	19,662	17,999	17,191	18,055	16,876	16,146	(£m)
Cost w/ deficit (IGEQ)	32,176	26,554	25,275	29,570	26,419	24,983	26,781	24,561	23,242	(£m)
Cost w/o deficit (IGEQ)	32,176	26,554	25,275	29,570	26,419	24,983	26,781	24,561	23,242	(£m)
Cost w/ deficit (LTDR)	23,177	19,747	18,934	21,593	19,658	18,732	19,765	18,394	17,555	(£m)
Cost w/o deficit (LTDR)	23,177	19,747	18,934	21,593	19,658	18,732	19,765	18,394	17,555	(£m)

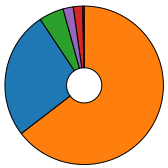
Cost breakdown (STPR)

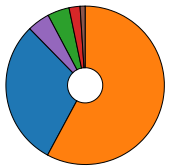
Select Company: Total

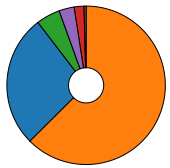
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	6,841	4,927	4,533	5,864	4,872	4,375	4,709	4,092	3,633	(£m)
Fixed opex	11,468	11,266	11,216	11,376	11,256	11,196	11,273	11,195	11,132	(£m)
Fixed operational carbon	884	876	878	882	877	877	871	867	865	(£m)
Embedded carbon	508	362	338	440	362	331	343	295	267	(£m)
Variable opex	1,070	568	359	899	556	355	671	387	231	(£m)
Variable carbon opex	248	78	48	202	76	57	188	40	18	(£m)

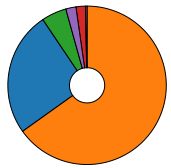
situation1 

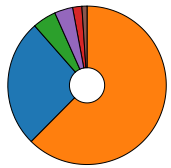
situation2 

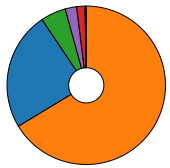
situation3 

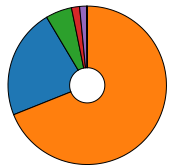
situation4 

situation5 

situation6 

situation7 

situation8 

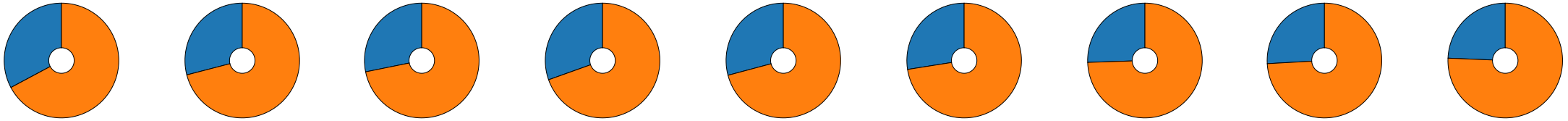
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,263,598	2,217,620	2,058,741	2,773,227	2,222,374	2,012,855	2,125,634	1,791,755	1,602,585	(tonnes)
Operational emissions	6,687,695	5,419,096	5,249,219	6,334,165	5,402,809	5,308,567	6,201,868	5,131,542	4,979,014	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

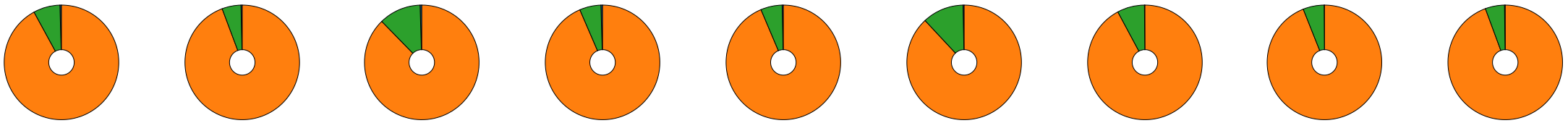


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	107	47	26	97	42	16	21	7	6	(GWh)
Grid	22,896	12,025	4,852	19,476	11,447	4,526	13,771	7,728	2,877	(GWh)
Renewable	1,870	681	655	1,253	739	598	1,150	489	165	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	69,598.00	64,725.00	63,941.00	68,219.00	64,534.00	63,223.00	64,461.00	62,039.00	60,235.00	
SEA environmental disbenefit	114,249.00	80,141.00	73,217.00	103,141.00	79,208.00	72,972.00	85,143.00	68,948.00	59,023.00	
Natural capital	81,682,503.78	77,201,581.83	80,055,887.75	79,750,858.81	77,244,736.98	80,053,771.07	64,464,312.11	65,102,223.78	68,004,077.52	
Bio-diversity net gain	−222,630.00	−155,673.00	−125,254.00	−202,531.00	−154,293.00	−127,091.00	−133,365.00	−97,019.00	−67,447.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	34,104.00	31,923.00	31,498.00	33,583.00	31,861.00	31,410.00	32,011.00	30,922.00	30,299.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	29.50	30.58	33.53	29.25	30.84	33.59	27.62	29.98	33.12	
R1: Uncertainty of option supply/demand benefit	6.26	6.02	6.62	6.00	6.10	6.59	5.33	5.58	6.09	
R3: Risk of service failure due to other physical hazards	7.08	7.61	8.52	7.13	7.69	8.54	6.72	7.49	8.49	
R4: Availability of additional headroom	6.56	6.90	7.12	6.65	6.93	7.13	6.98	7.33	7.57	
R5: Catchment/raw water quality risks (incl. climate change)	4.12	4.13	4.64	3.89	4.15	4.67	3.66	4.12	4.75	
R6: Capacity of catchment services	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	
R7: Risk of service failure to other exceptional events	5.47	5.92	6.63	5.58	5.97	6.66	4.93	5.47	6.23	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

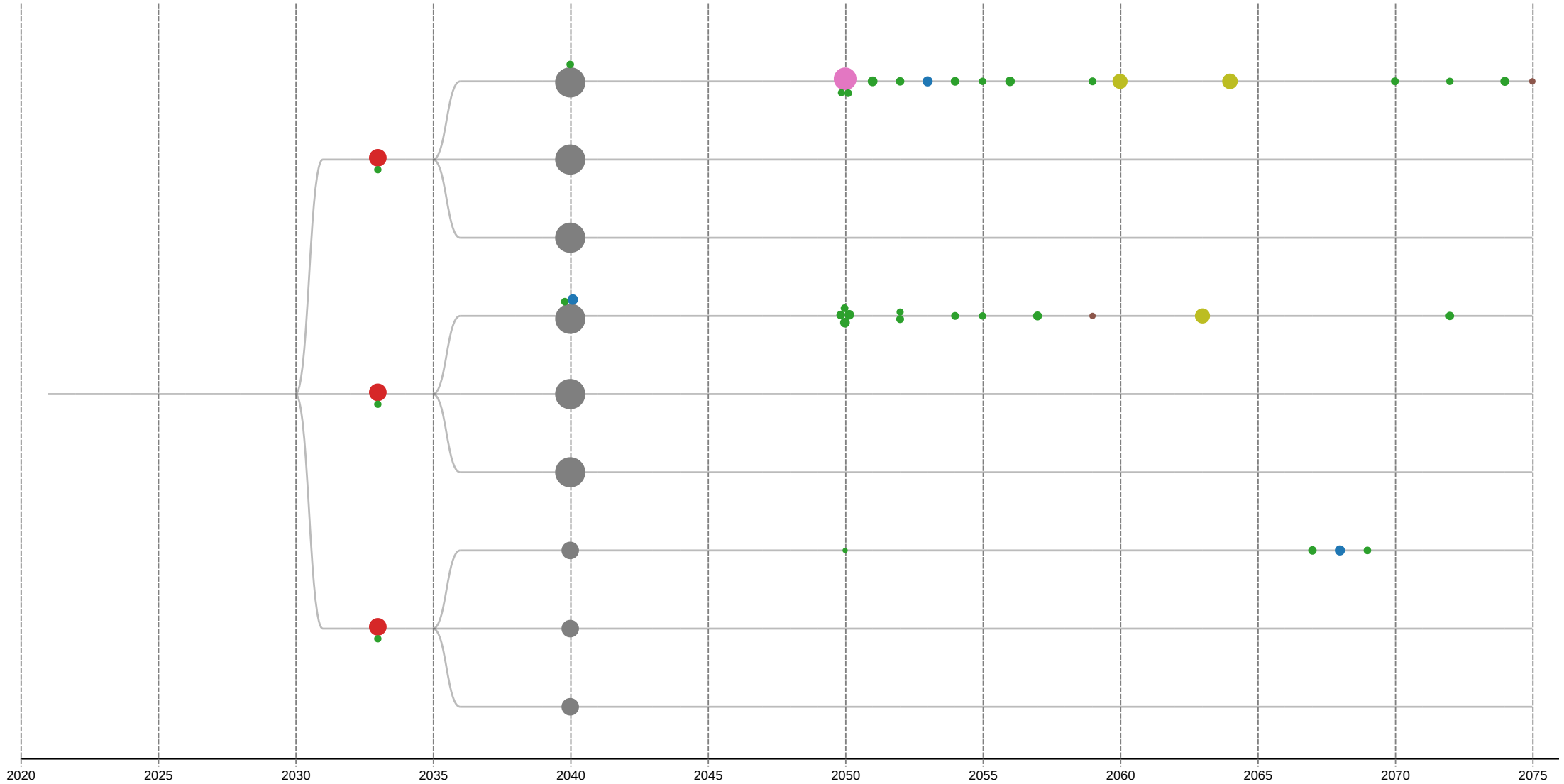
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	14.04	15.78	17.67	14.37	15.85	17.39	15.02	16.95	19.23	
A3: Operational complexity and flexibility	6.61	7.33	8.24	6.80	7.40	8.30	6.39	7.20	8.24	
A4: WRZ connectivity	7.39	8.43	9.41	7.53	8.42	9.07	8.59	9.71	10.96	
A7: Customer relations support engagement with demand management	0.03	0.03	0.03	0.04	0.03	0.03	0.03	0.03	0.03	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.45	20.60	22.75	19.39	20.79	22.78	20.23	22.58	25.47	
E1: Scaleability and modularity of proposed changes	8.90	9.59	10.71	8.91	9.71	10.76	9.58	10.85	12.30	
E2: Intervention lead times	4.24	4.29	4.55	4.15	4.29	4.50	4.13	4.42	4.89	
E3: Reliance on external bodies to deliver changes	6.31	6.71	7.49	6.32	6.79	7.51	6.52	7.31	8.28	
E5: Collaborative land management	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	

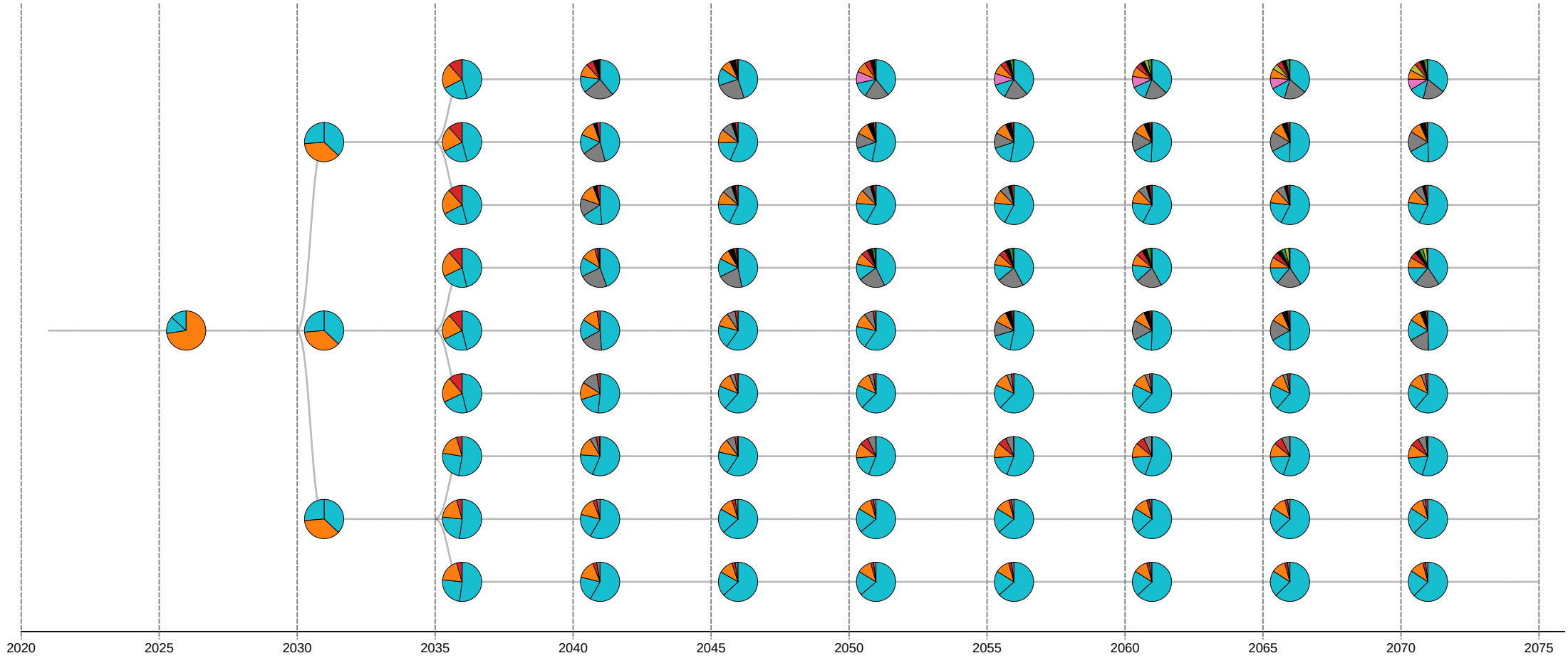
Option Selection (Thames Water)



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.



- Transfer
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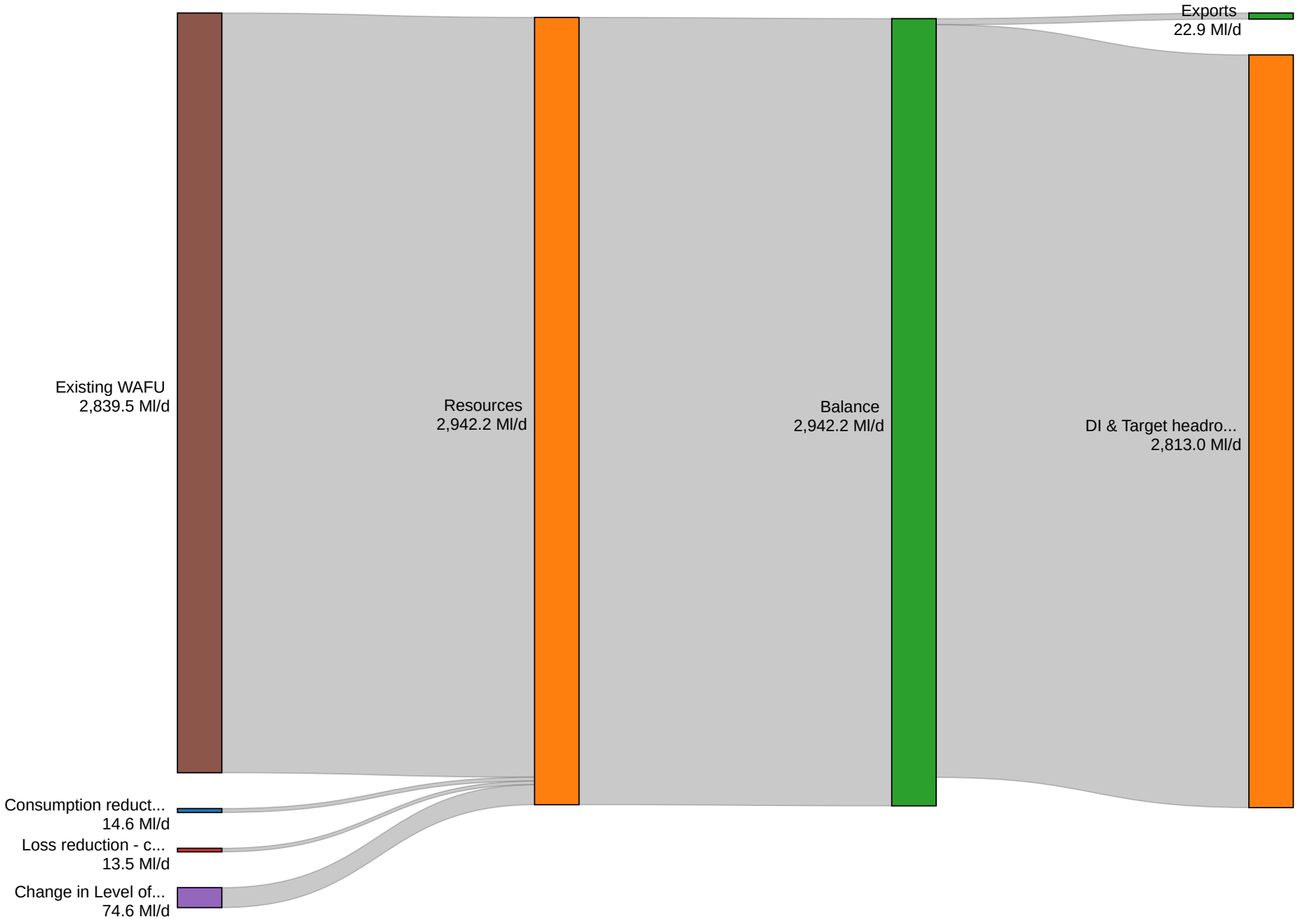
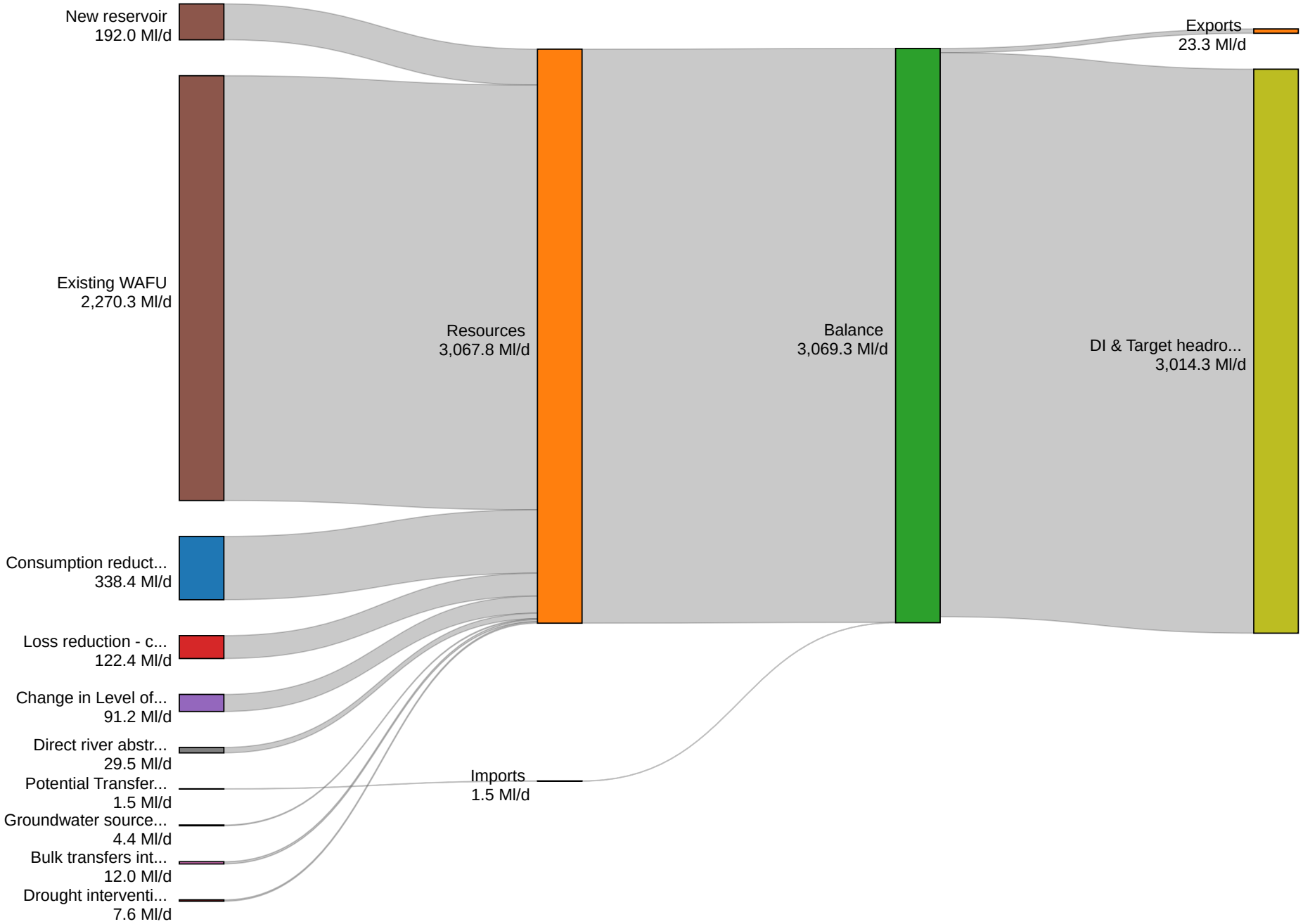
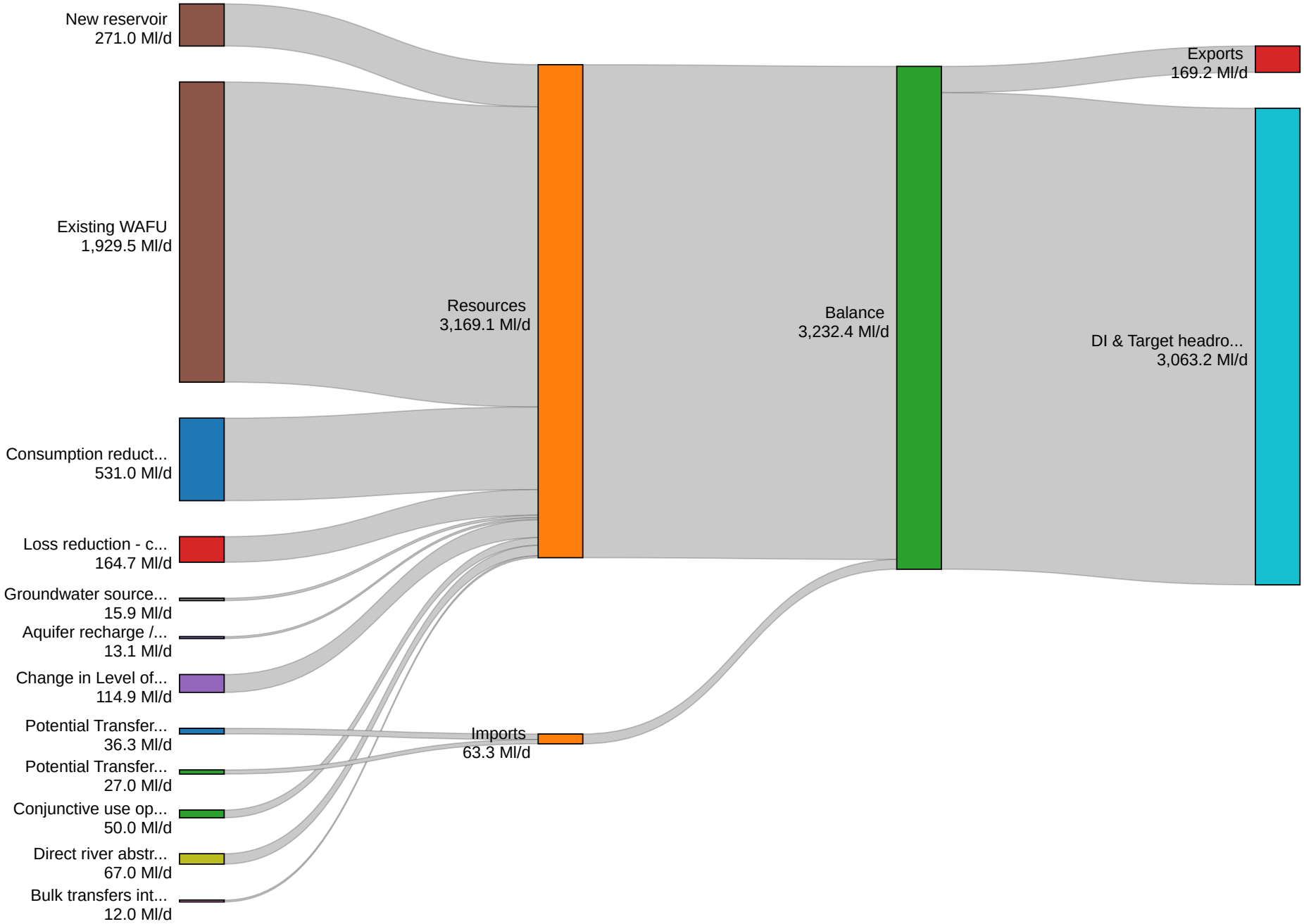
Situation 4 - 2026 (Thames Water)



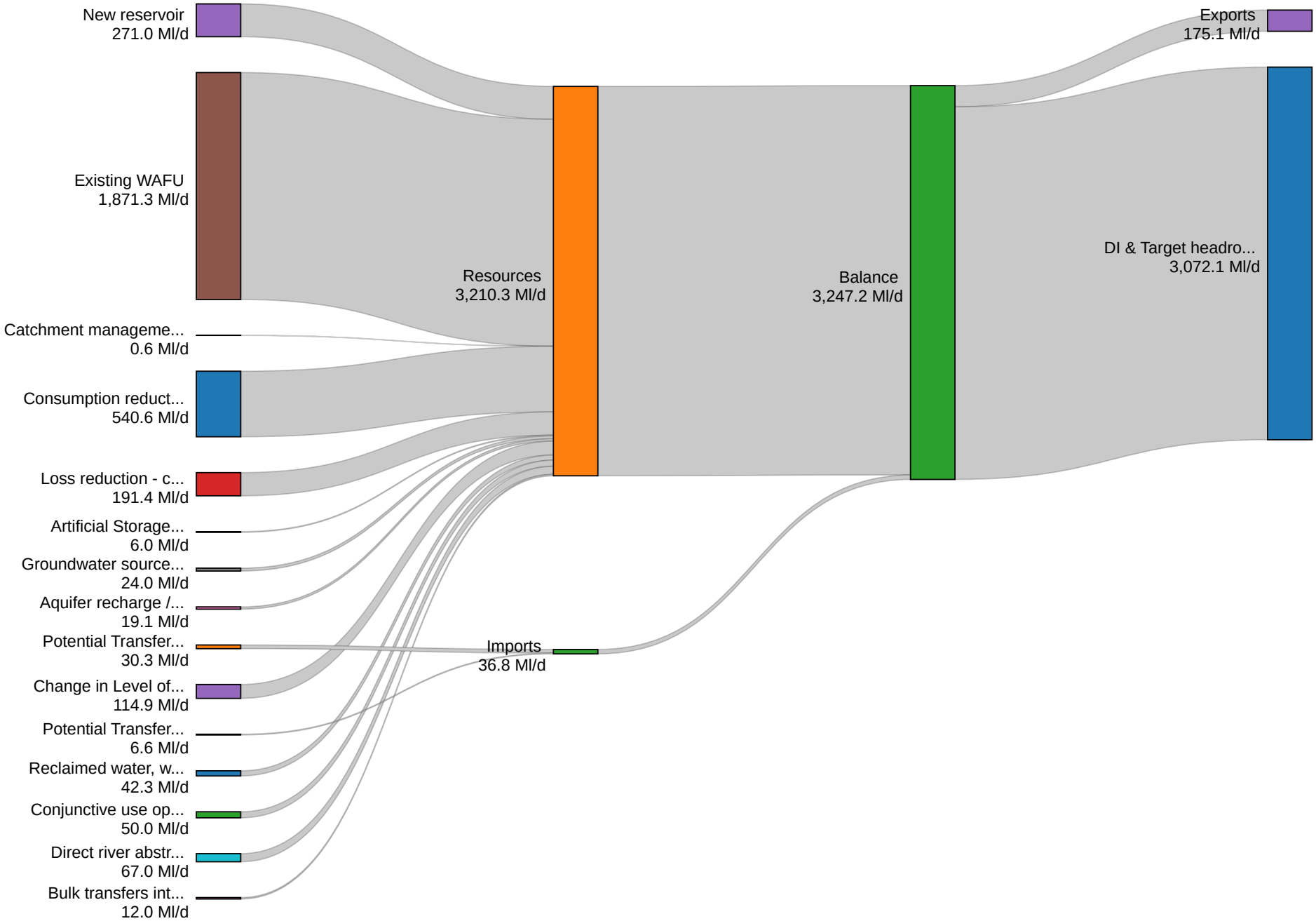
Situation 4 - 2040 (Thames Water)



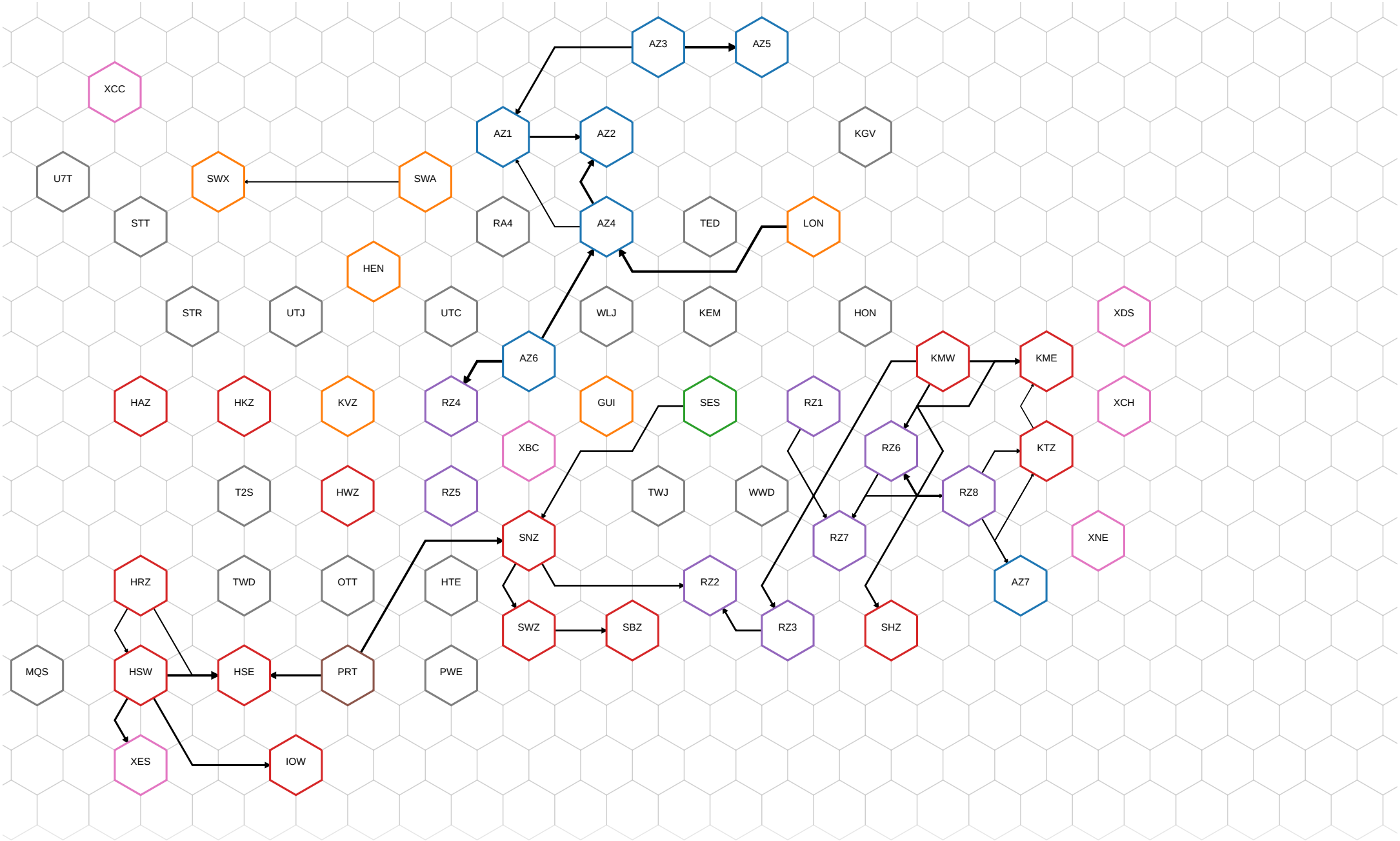
Situation 4 - 2050 (Thames Water)



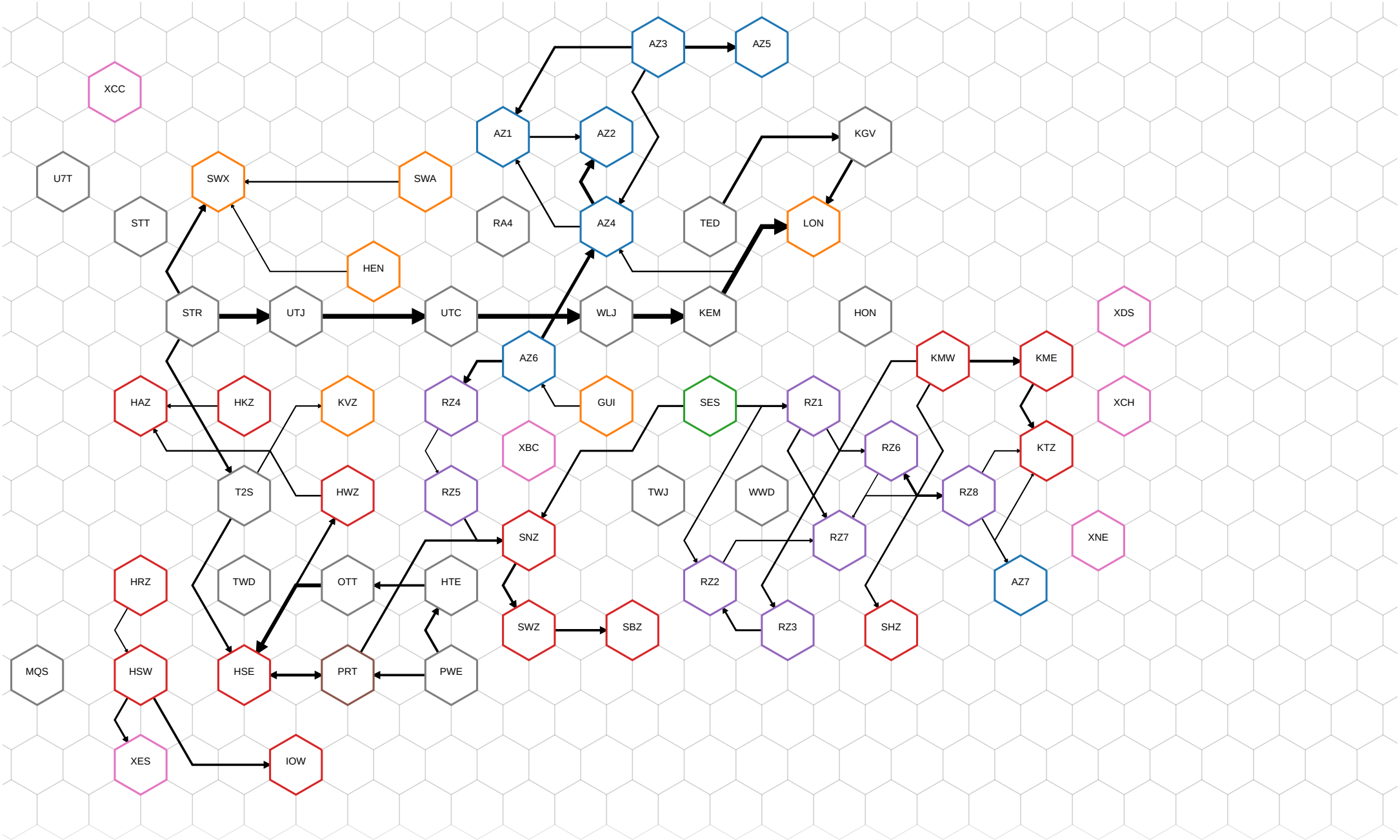
Situation 4 - 2075 (Thames Water)



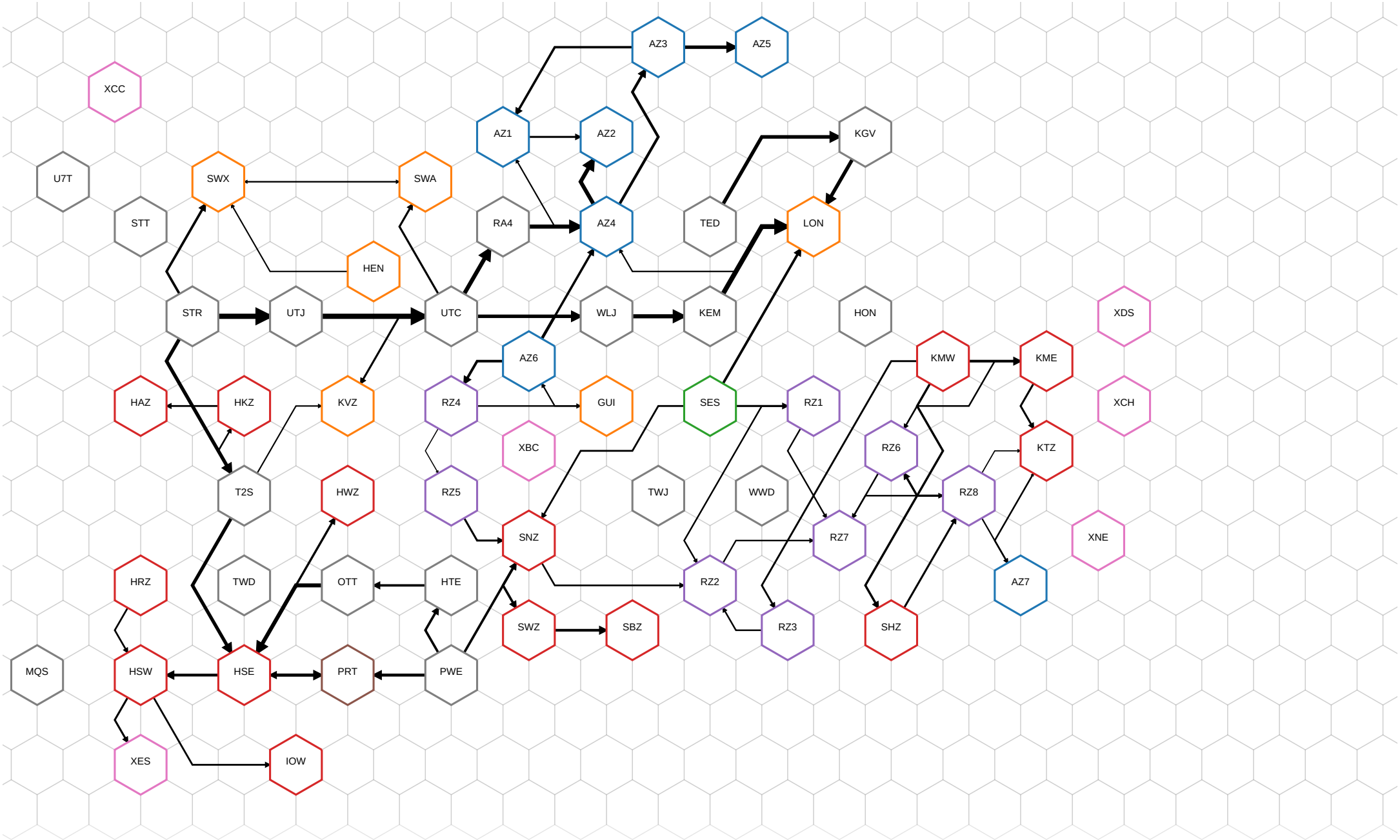
Situation 4 - 2026



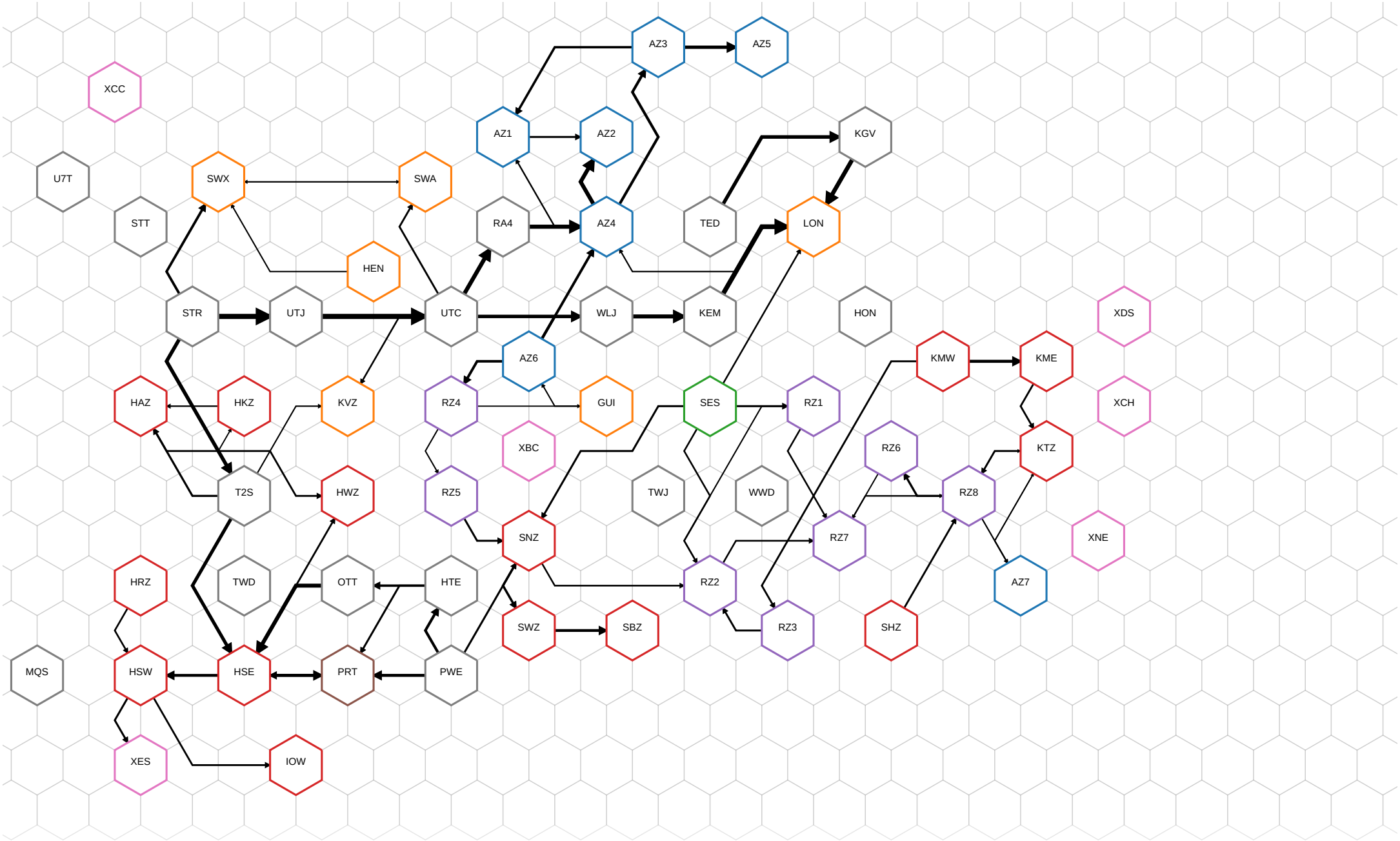
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

WBGWS WITHDRAWN IN 2050

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-excl-wbgws-2050-2075
Description	Least cost run with hybrid-c+2 government interventions excluding WBGWS from 2050 onwards.
Created at	28/06/2023, 10:50:48
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2-excl-wbgws-2050
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets. WBGWs excluded from 2050.
Optimised discount rate	STPR

Metrics

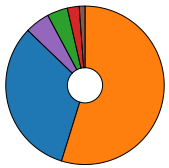
Net present value (Cost)

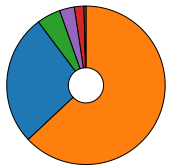
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	20,920	17,865	17,150	19,539	17,760	16,957	18,020	16,848	16,133	(£m)
Cost w/o deficit (STPR)	20,920	17,865	17,150	19,539	17,760	16,957	18,020	16,848	16,133	(£m)
Cost w/ deficit (IGEQ)	32,015	26,197	24,903	29,379	26,018	24,589	26,718	24,511	23,222	(£m)
Cost w/o deficit (IGEQ)	32,015	26,197	24,903	29,379	26,018	24,589	26,718	24,511	23,222	(£m)
Cost w/ deficit (LTDR)	23,065	19,507	18,684	21,456	19,388	18,468	19,724	18,363	17,541	(£m)
Cost w/o deficit (LTDR)	23,065	19,507	18,684	21,456	19,388	18,468	19,724	18,363	17,541	(£m)

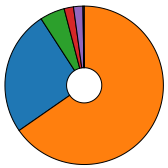
Cost breakdown (STPR)

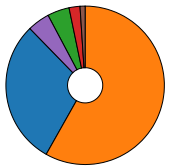
Select Company: Total

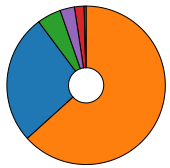
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	6,779	4,783	4,379	5,772	4,706	4,216	4,689	4,066	3,621	(£m)
Fixed opex	11,460	11,255	11,204	11,366	11,243	11,184	11,271	11,192	11,130	(£m)
Fixed operational carbon	880	869	870	879	870	870	871	867	865	(£m)
Embedded carbon	507	352	327	435	351	320	342	293	266	(£m)
Variable opex	1,051	536	327	884	520	317	674	390	232	(£m)
Variable carbon opex	244	72	43	202	70	51	172	41	18	(£m)

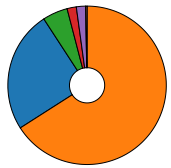
situation1 

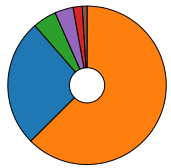
situation2 

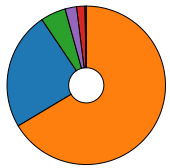
situation3 

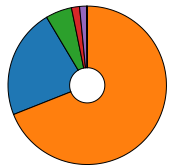
situation4 

situation5 

situation6 

situation7 

situation8 

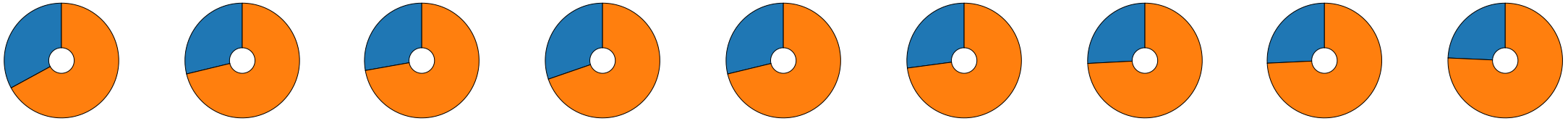
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,254,351	2,151,050	1,987,949	2,745,895	2,146,913	1,939,911	2,119,813	1,780,602	1,597,794	(tonnes)
Operational emissions	6,630,233	5,325,774	5,166,274	6,324,737	5,315,017	5,216,350	6,091,712	5,133,949	4,980,427	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

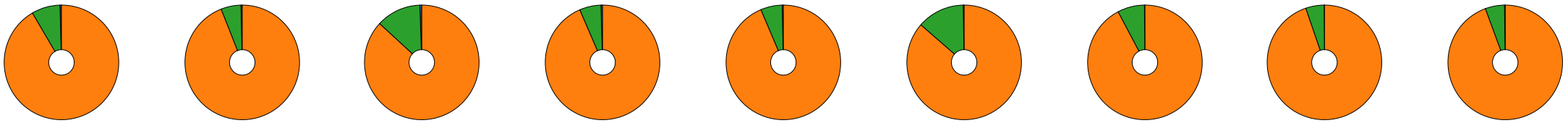


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	106	45	26	94	39	12	21	7	6	(GWh)
Grid	22,488	11,386	4,265	19,411	10,917	3,864	13,816	7,903	2,881	(GWh)
Renewable	1,971	681	619	1,253	706	598	1,137	433	165	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	69,427.00	63,545.00	62,688.00	67,697.00	63,274.00	62,051.00	63,751.00	61,291.00	60,204.00	
SEA environmental disbenefit	112,682.00	77,411.00	70,625.00	100,731.00	76,495.00	70,342.00	85,274.00	67,189.00	57,908.00	
Natural capital	81,690,503.58	77,234,892.40	80,088,893.46	75,499,770.74	77,271,910.70	80,086,757.98	64,405,338.69	65,102,566.14	68,004,382.28	
Bio-diversity net gain	−223,464.00	−148,747.00	−118,812.00	−201,160.00	−147,951.00	−120,660.00	−142,405.00	−96,757.00	−67,207.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	33,886.00	31,594.00	31,204.00	33,258.00	31,533.00	31,072.00	31,795.00	30,678.00	30,145.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	29.53	29.63	32.39	29.17	29.82	32.50	27.80	30.17	33.46	
R1: Uncertainty of option supply/demand benefit	6.20	5.52	6.02	5.92	5.57	6.02	5.33	5.58	6.15	
R3: Risk of service failure due to other physical hazards	7.09	7.35	8.21	7.10	7.41	8.25	6.77	7.54	8.59	
R4: Availability of additional headroom	6.62	6.95	7.16	6.69	6.97	7.17	7.03	7.38	7.62	
R5: Catchment/raw water quality risks (incl. climate change)	4.17	4.17	4.69	3.91	4.19	4.72	3.70	4.16	4.81	
R6: Capacity of catchment services	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	
R7: Risk of service failure to other exceptional events	5.45	5.64	6.31	5.54	5.68	6.35	4.96	5.51	6.30	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

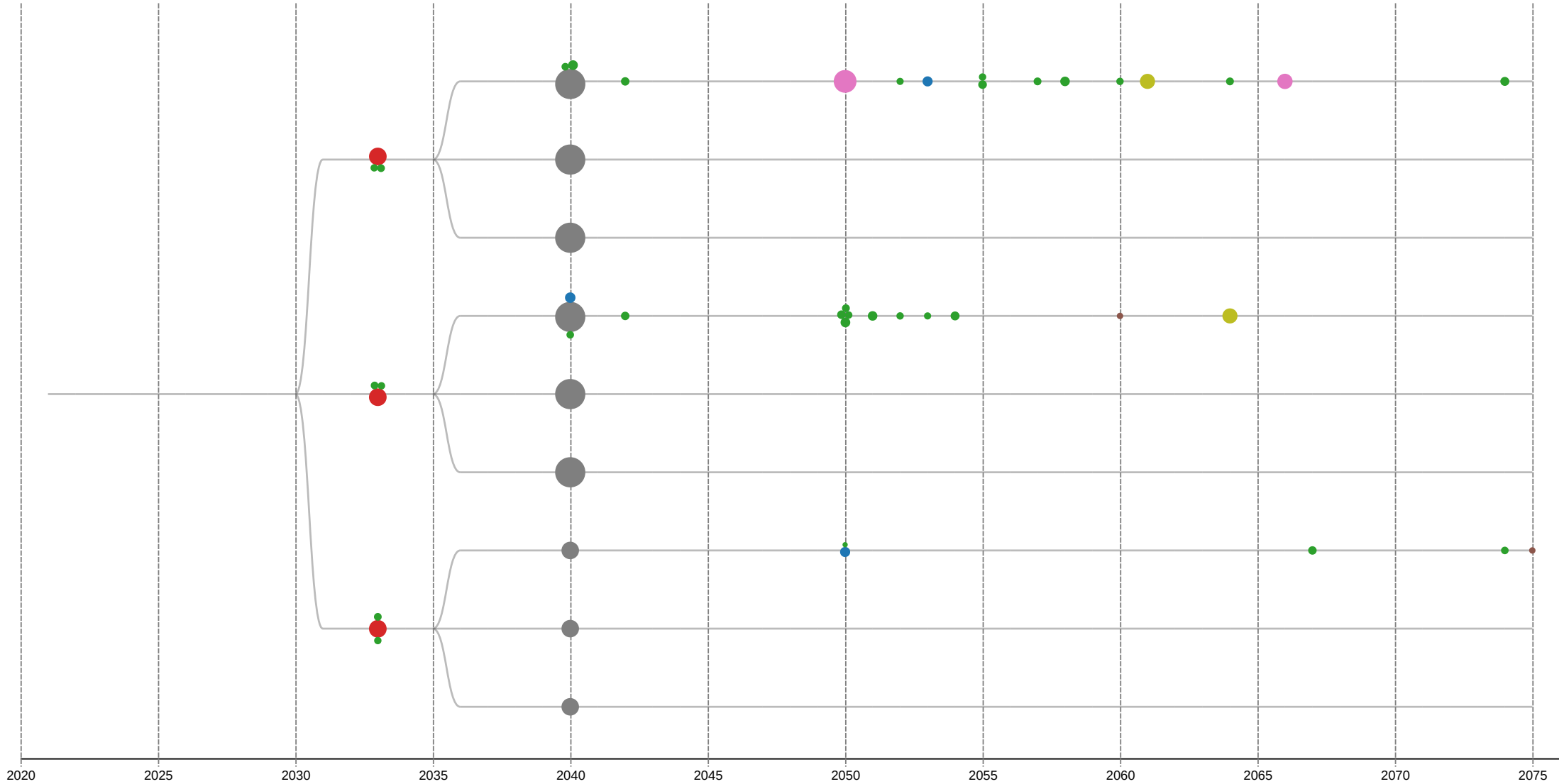
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	14.07	15.59	17.45	14.38	15.63	17.14	15.08	17.07	19.41	
A3: Operational complexity and flexibility	6.61	7.07	7.93	6.77	7.13	8.00	6.44	7.27	8.34	
A4: WRZ connectivity	7.44	8.50	9.49	7.58	8.47	9.11	8.60	9.78	11.04	
A7: Customer relations support engagement with demand management	0.02	0.03	0.03	0.04	0.03	0.03	0.04	0.03	0.03	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.46	20.02	22.07	19.38	20.18	22.12	20.36	22.75	25.76	
E1: Scaleability and modularity of proposed changes	8.91	9.35	10.41	8.90	9.44	10.48	9.64	10.92	12.44	
E2: Intervention lead times	4.26	4.23	4.48	4.17	4.24	4.43	4.15	4.47	4.95	
E3: Reliance on external bodies to deliver changes	6.30	6.45	7.17	6.30	6.50	7.21	6.56	7.36	8.37	
E5: Collaborative land management	0.00	0.00	0.00	0.01	0.00	0.00	0.01	0.00	0.00	

Option Selection (Thames Water)



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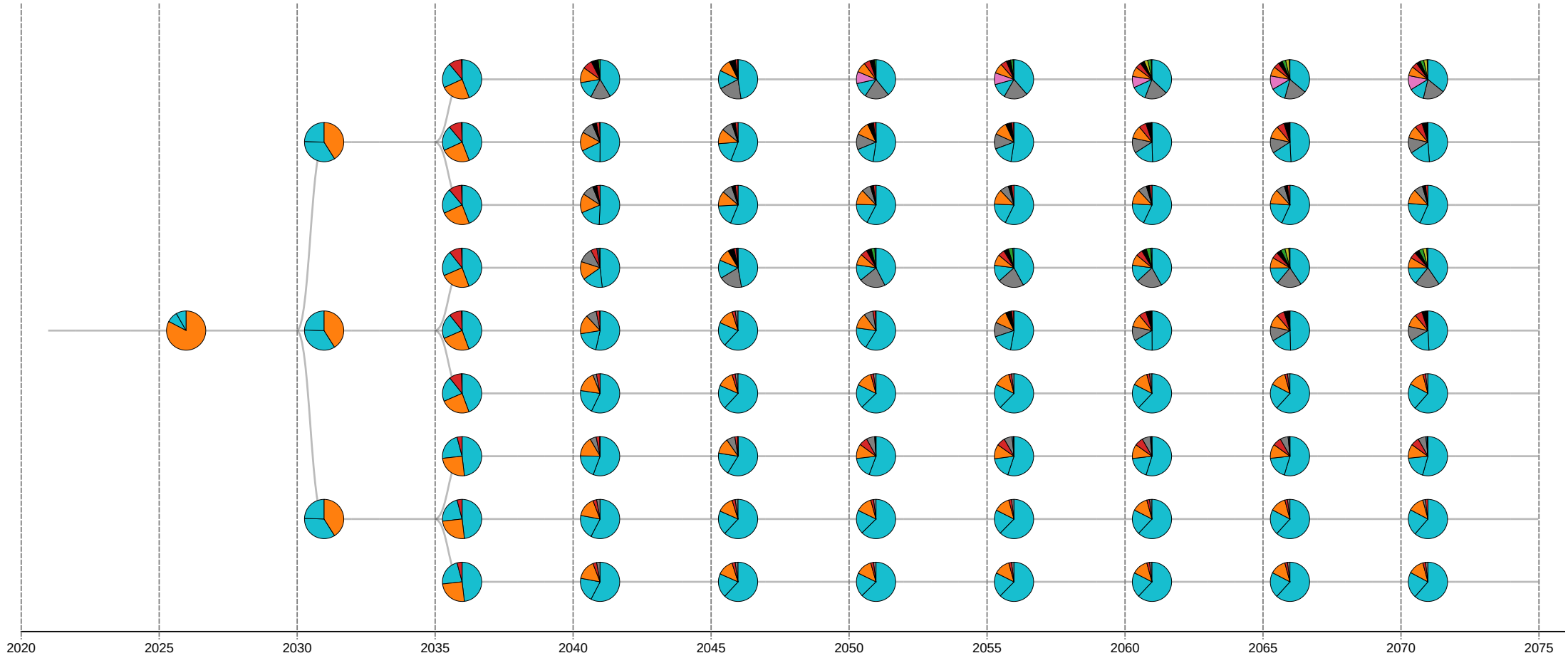
Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.



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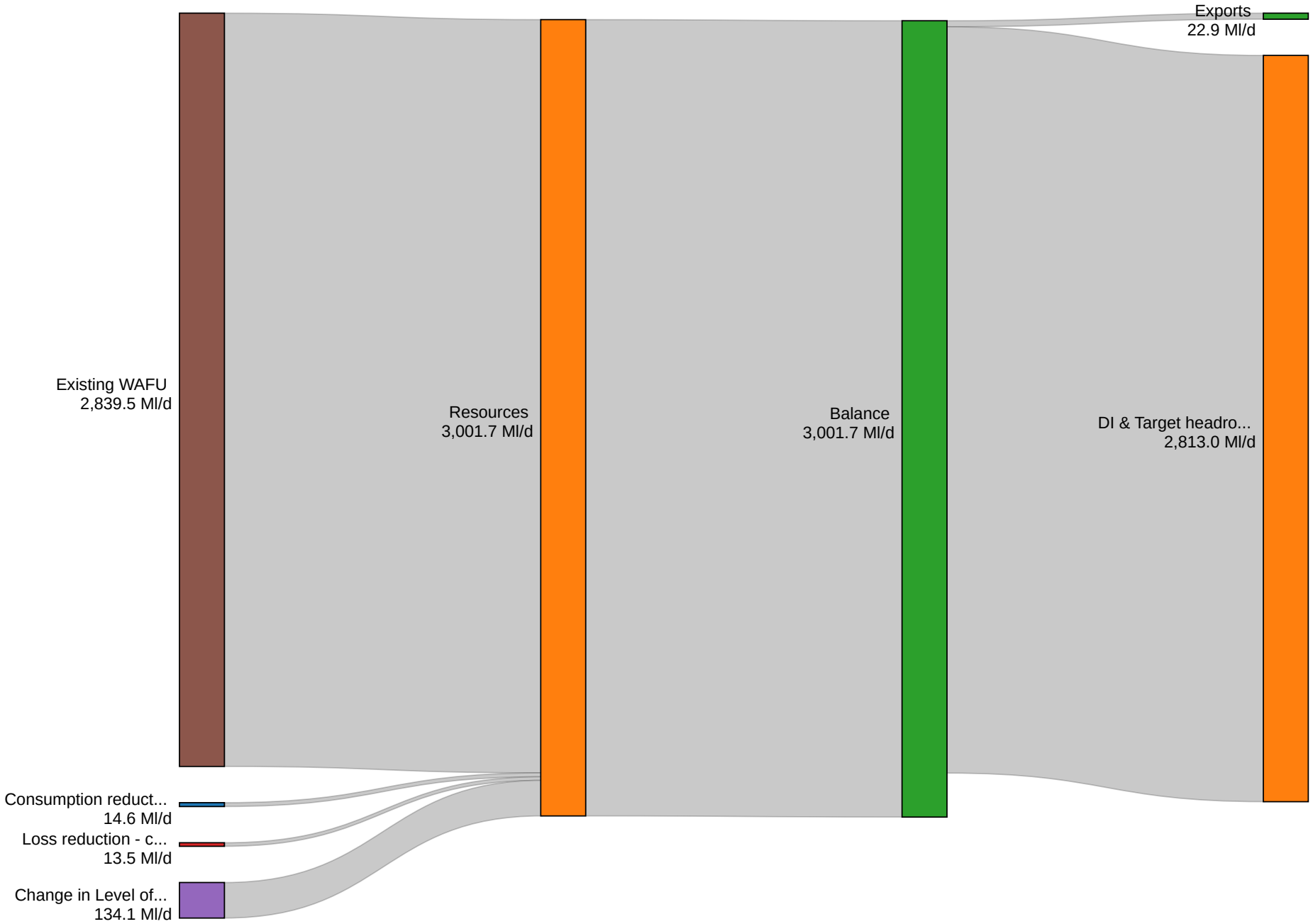
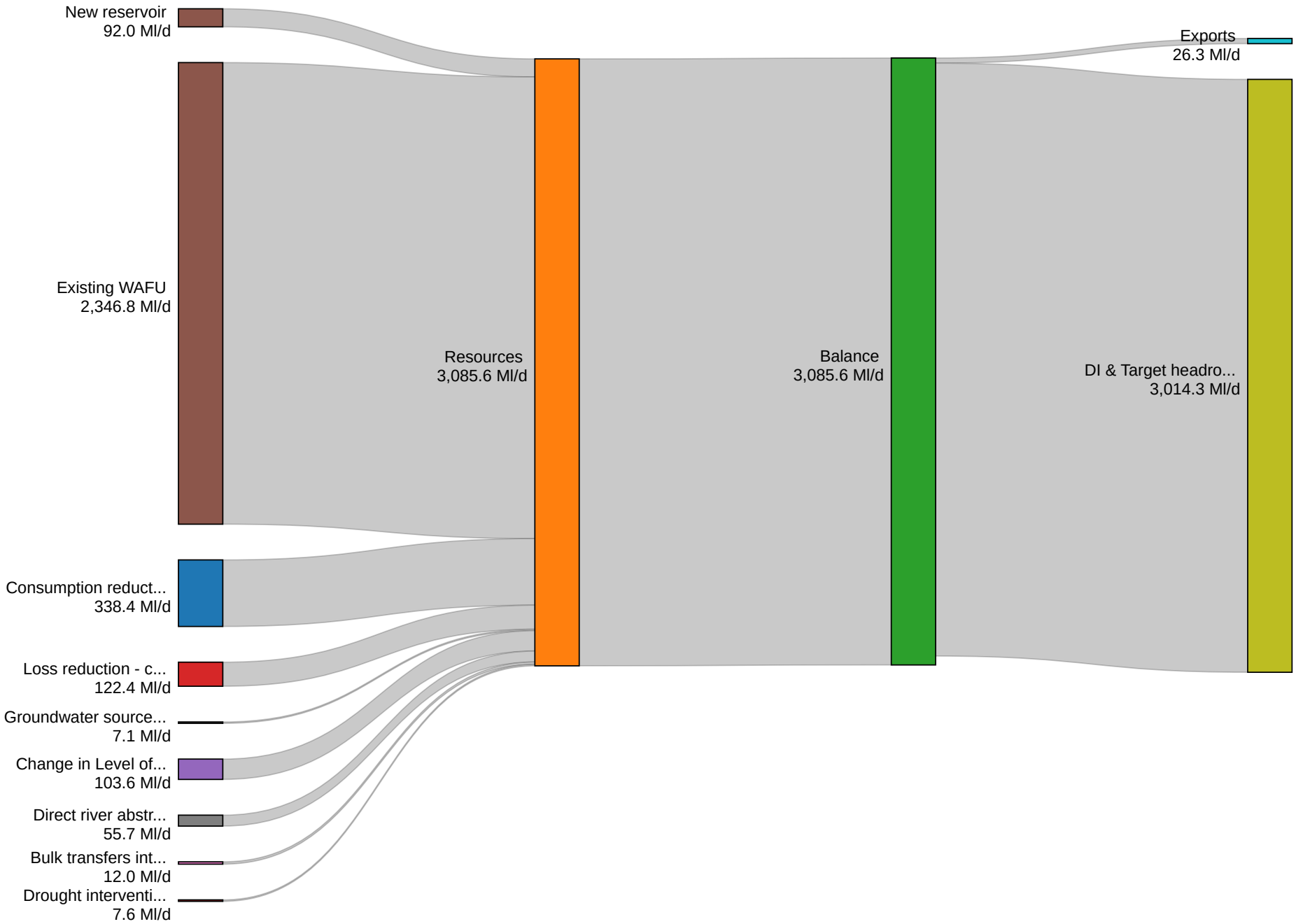
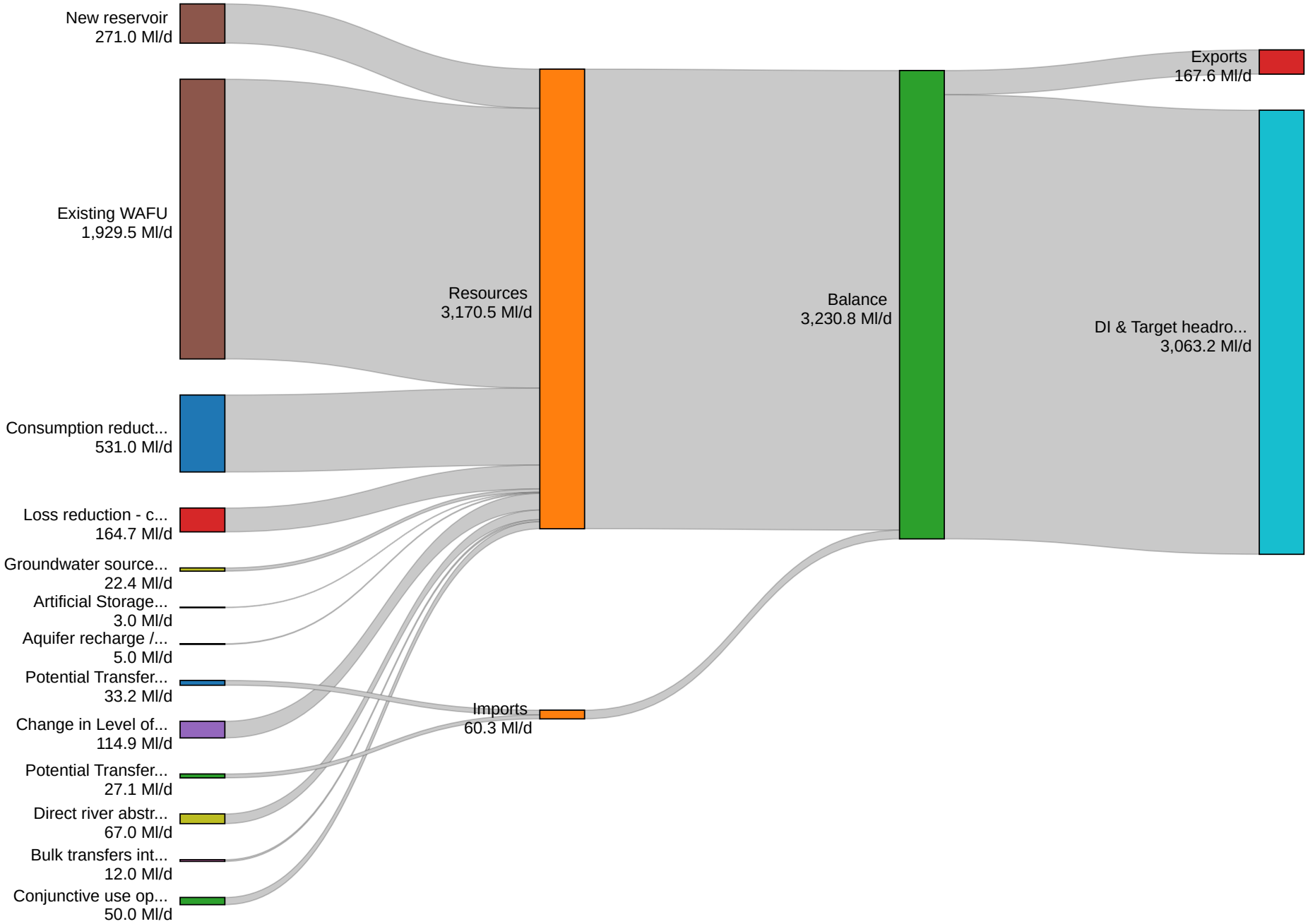
Situation 4 - 2026 (Thames Water)



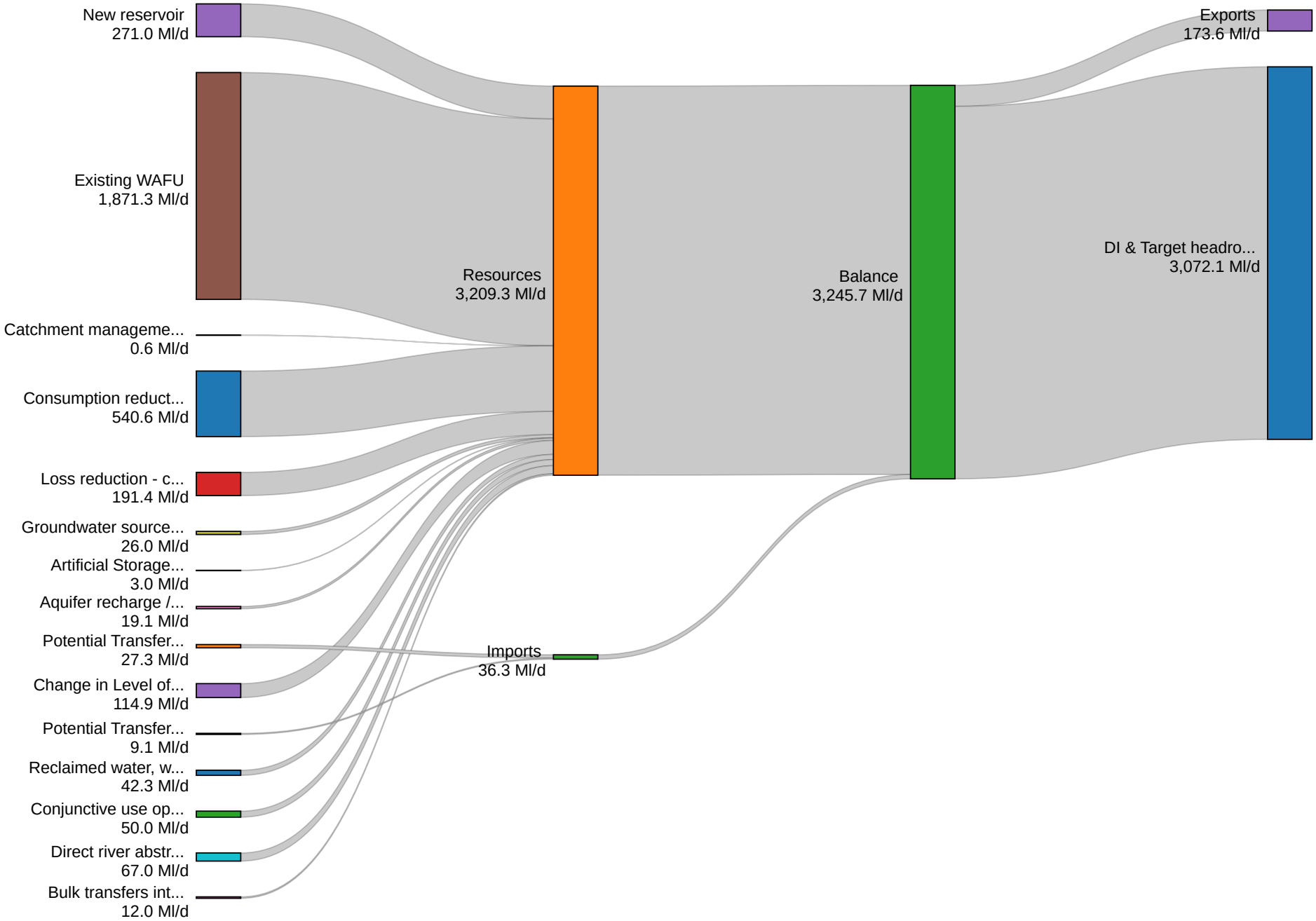
Situation 4 - 2040 (Thames Water)



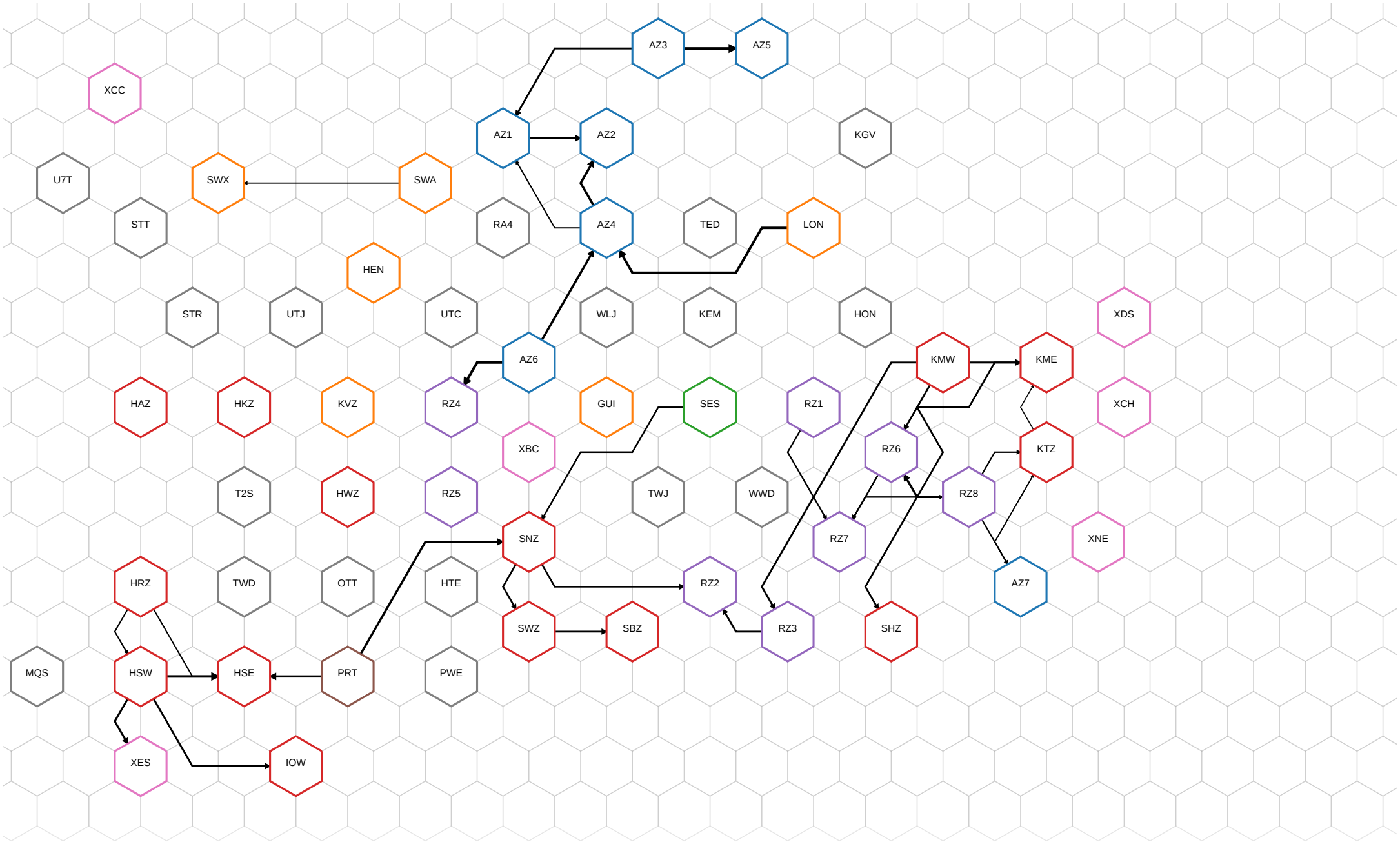
Situation 4 - 2050 (Thames Water)



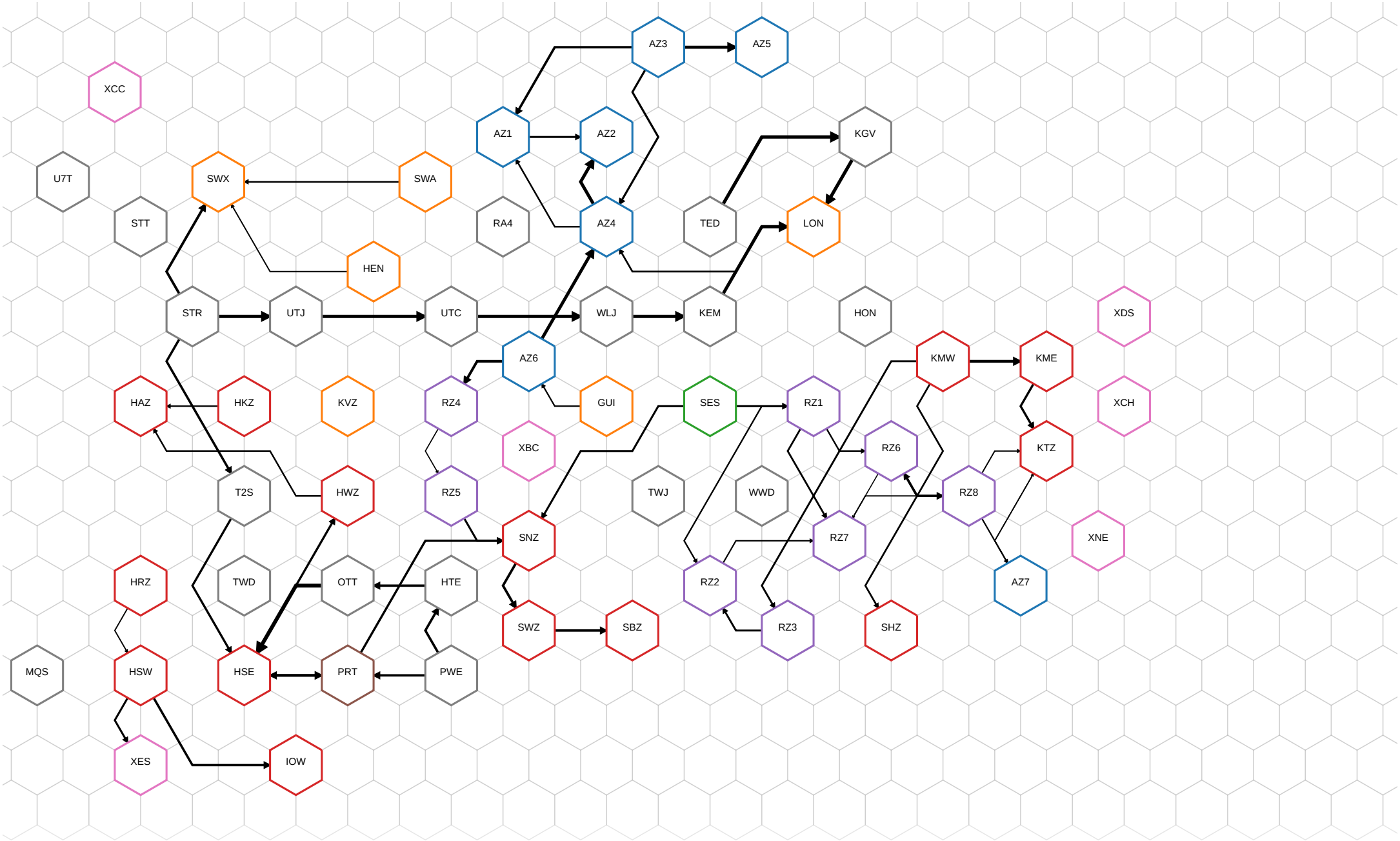
Situation 4 - 2075 (Thames Water)



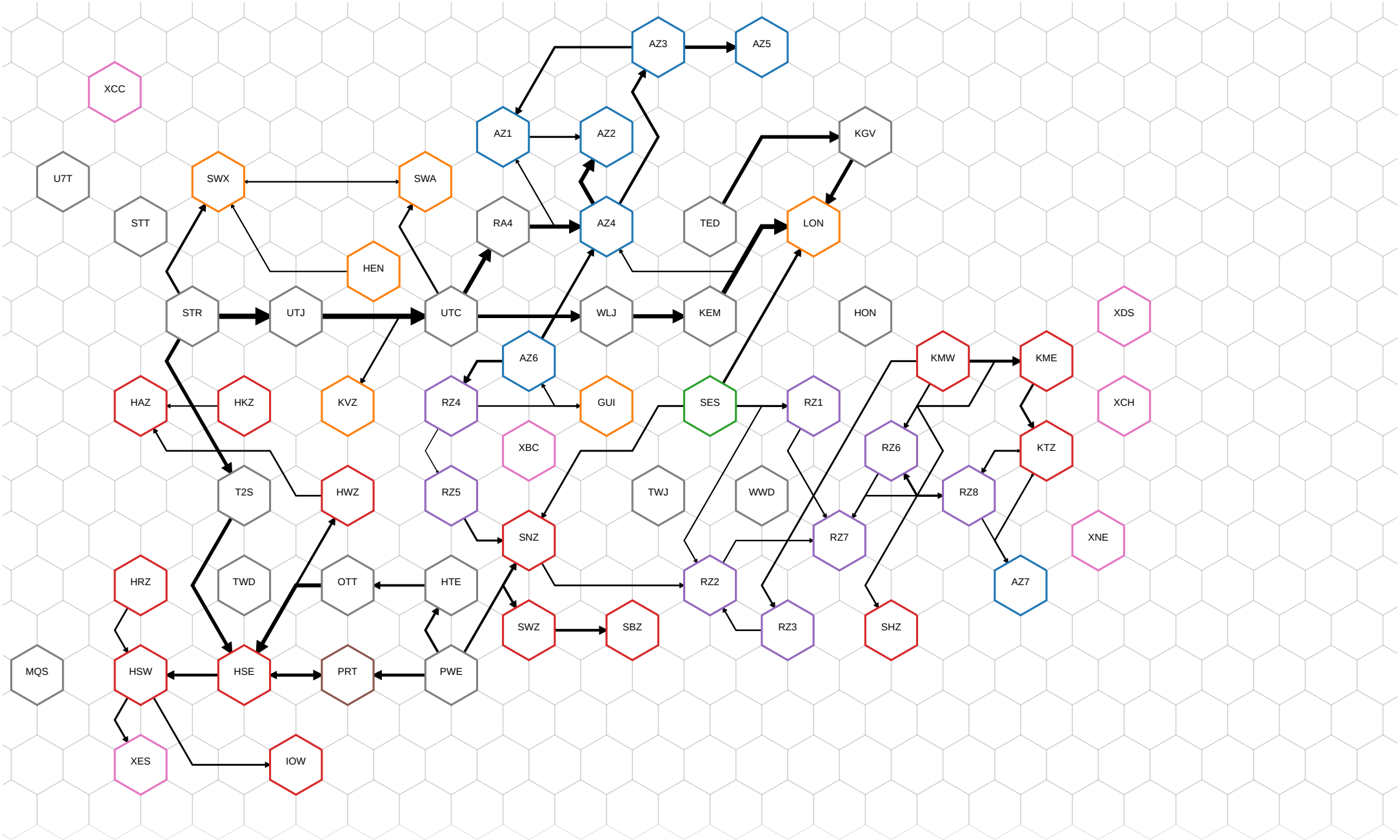
Situation 4 - 2026



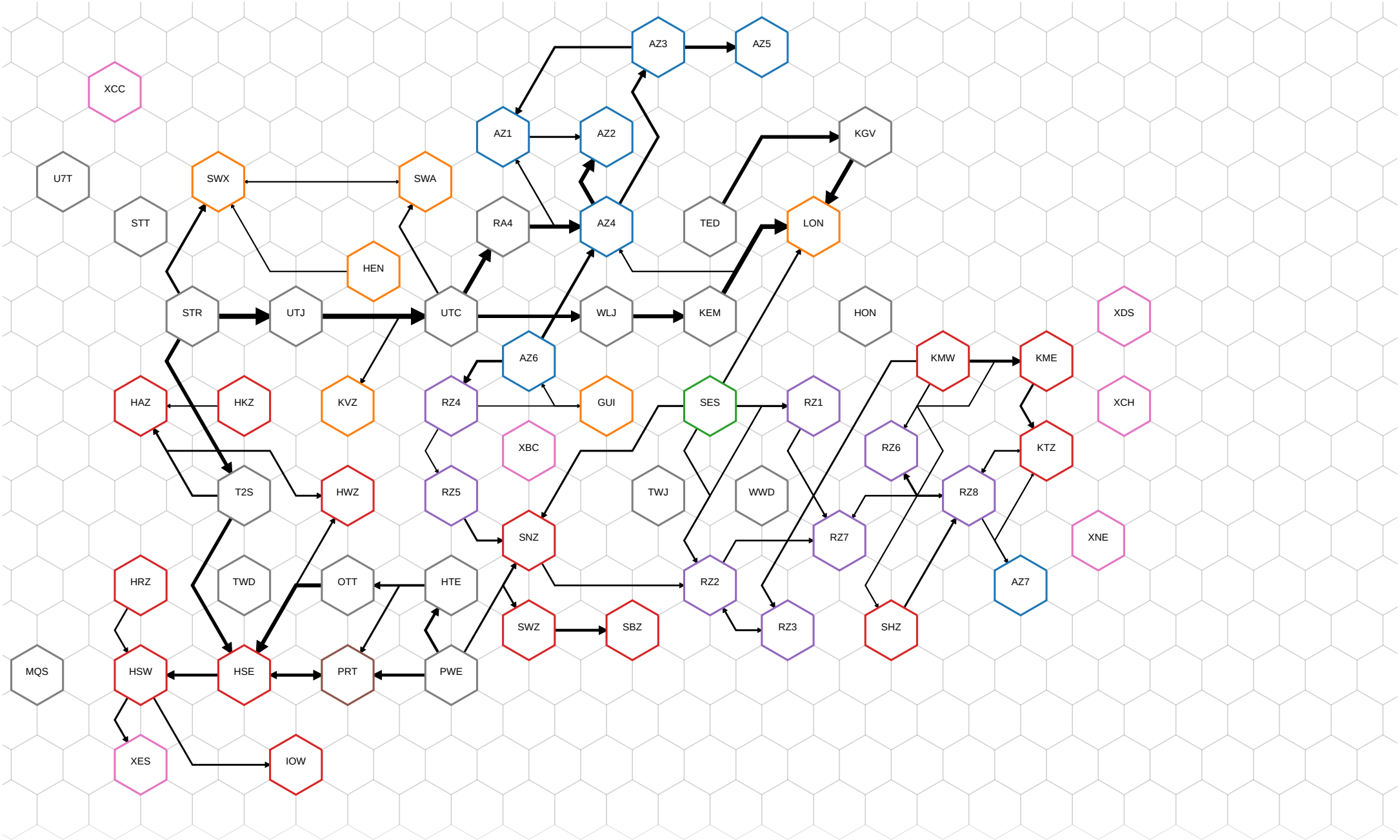
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

ESW EXPORT INCREASED IN 2030

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-chingford-2030-2075
Description	Least cost run with hybrid-c+2 government interventions with Chingford (ESW) reduced export ending in 2030.
Created at	03/08/2023, 15:19:07
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2-chingford-2030
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets. Chingford (ESW) reduced export ends in 2030.
Optimised discount rate	STPR

Metrics

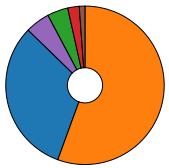
Net present value (Cost)

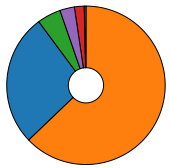
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	20,587	17,926	17,204	19,272	17,810	17,009	18,050	16,895	16,178	(£m)
Cost w/o deficit (STPR)	20,587	17,926	17,204	19,272	17,810	17,009	18,050	16,895	16,178	(£m)
Cost w/ deficit (IGEQ)	31,323	26,279	24,980	28,824	26,092	24,668	26,738	24,582	23,289	(£m)
Cost w/o deficit (IGEQ)	31,323	26,279	24,980	28,824	26,092	24,668	26,738	24,582	23,289	(£m)
Cost w/ deficit (LTDR)	22,668	19,572	18,742	21,138	19,443	18,524	19,754	18,414	17,590	(£m)
Cost w/o deficit (LTDR)	22,668	19,572	18,742	21,138	19,443	18,524	19,754	18,414	17,590	(£m)

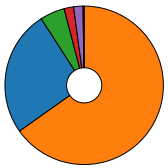
Cost breakdown (STPR)

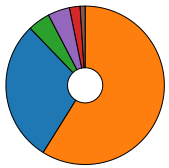
Select Company: Total

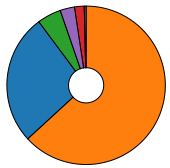
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	6,525	4,841	4,424	5,576	4,749	4,258	4,725	4,098	3,654	(£m)
Fixed opex	11,440	11,266	11,212	11,346	11,250	11,190	11,269	11,197	11,135	(£m)
Fixed operational carbon	878	867	867	877	869	869	870	867	865	(£m)
Embedded carbon	483	360	332	421	353	322	343	295	267	(£m)
Variable opex	1,023	530	328	856	522	320	670	397	237	(£m)
Variable carbon opex	238	62	39	195	67	49	172	41	18	(£m)

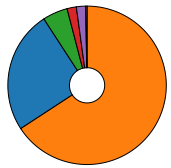
situation1 

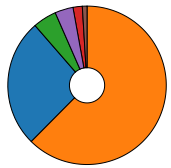
situation2 

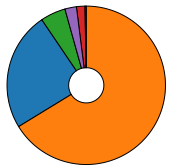
situation3 

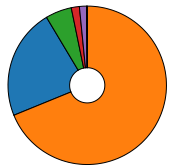
situation4 

situation5 

situation6 

situation7 

situation8 

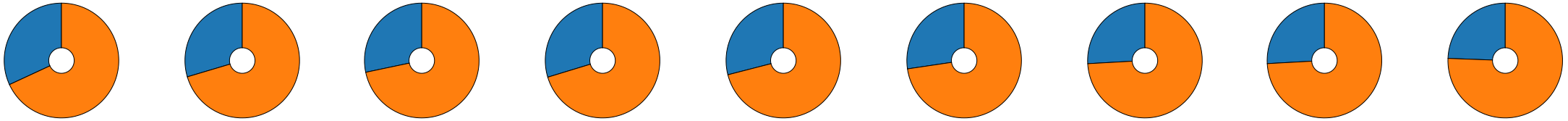
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,078,717	2,202,942	2,020,348	2,640,377	2,161,708	1,955,459	2,123,219	1,791,572	1,608,764	(tonnes)
Operational emissions	6,574,373	5,240,658	5,119,407	6,251,302	5,291,719	5,197,484	6,079,590	5,134,857	4,980,444	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

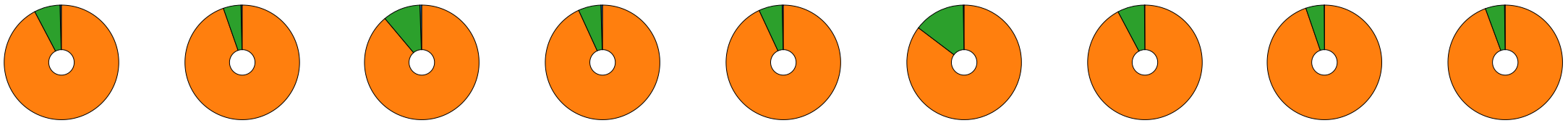


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	103	45	26	94	39	12	21	7	6	(GWh)
Grid	22,393	11,444	4,365	18,270	10,795	3,853	13,783	7,944	2,883	(GWh)
Renewable	1,766	601	519	1,249	765	652	1,139	433	165	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	68,909.00	63,898.00	63,153.00	67,026.00	63,692.00	62,533.00	64,289.00	62,320.00	61,233.00	
SEA environmental disbenefit	108,827.00	78,640.00	72,694.00	95,095.00	78,012.00	71,701.00	83,907.00	69,740.00	60,459.00	
Natural capital	81,915,016.81	77,207,703.19	80,081,855.21	75,481,231.68	77,206,308.50	80,024,246.57	64,518,524.68	65,102,274.08	68,004,090.22	
Bio-diversity net gain	−206,896.00	−154,887.00	−126,946.00	−199,087.00	−148,386.00	−119,985.00	−135,081.00	−96,987.00	−67,437.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	33,763.00	31,809.00	31,430.00	32,901.00	31,707.00	31,282.00	31,852.00	30,997.00	30,476.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	28.96	29.77	32.51	28.41	29.91	32.64	27.57	30.25	33.55	
R1: Uncertainty of option supply/demand benefit	5.98	5.55	6.03	5.67	5.60	6.06	5.23	5.59	6.16	
R3: Risk of service failure due to other physical hazards	6.95	7.38	8.23	6.92	7.43	8.29	6.71	7.56	8.61	
R4: Availability of additional headroom	6.62	6.96	7.16	6.67	6.97	7.18	7.04	7.38	7.62	
R5: Catchment/raw water quality risks (incl. climate change)	4.07	4.22	4.75	3.79	4.21	4.74	3.69	4.19	4.84	
R6: Capacity of catchment services	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
R7: Risk of service failure to other exceptional events	5.33	5.67	6.33	5.36	5.70	6.38	4.90	5.54	6.32	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

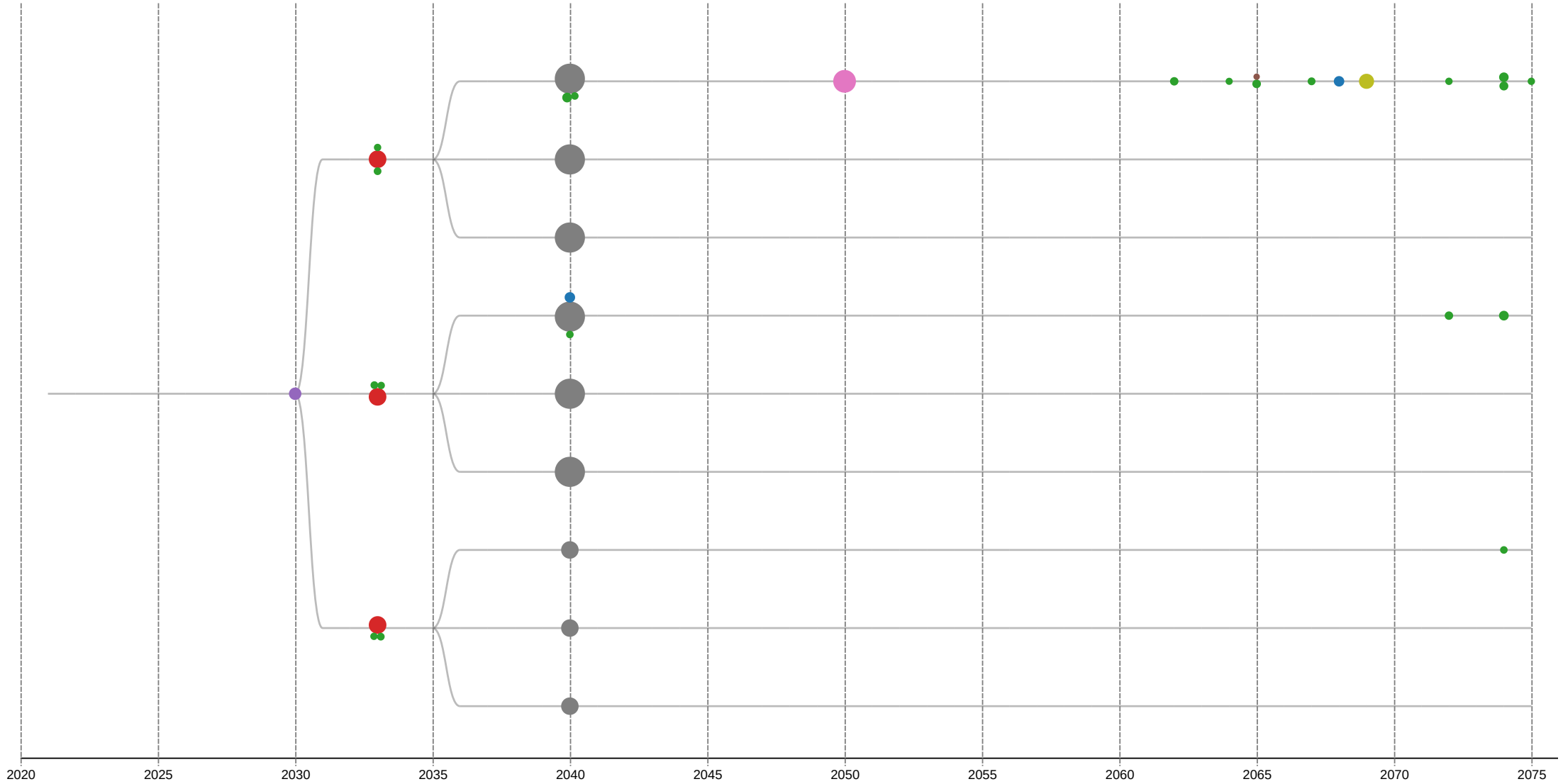
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	13.91	15.68	17.53	14.77	15.71	17.24	15.04	17.17	19.51	
A3: Operational complexity and flexibility	6.49	7.09	7.95	6.59	7.15	8.03	6.38	7.29	8.36	
A4: WRZ connectivity	7.39	8.57	9.55	8.15	8.53	9.18	8.64	9.85	11.12	
A7: Customer relations support engagement with demand management	0.03	0.03	0.03	0.02	0.03	0.03	0.03	0.03	0.03	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.07	20.11	22.12	18.81	20.25	22.22	20.18	22.81	25.83	
E1: Scaleability and modularity of proposed changes	8.73	9.38	10.43	8.67	9.48	10.53	9.58	10.94	12.46	
E2: Intervention lead times	4.18	4.25	4.50	4.04	4.24	4.44	4.10	4.49	4.98	
E3: Reliance on external bodies to deliver changes	6.16	6.47	7.19	6.10	6.53	7.25	6.50	7.38	8.39	
E5: Collaborative land management	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

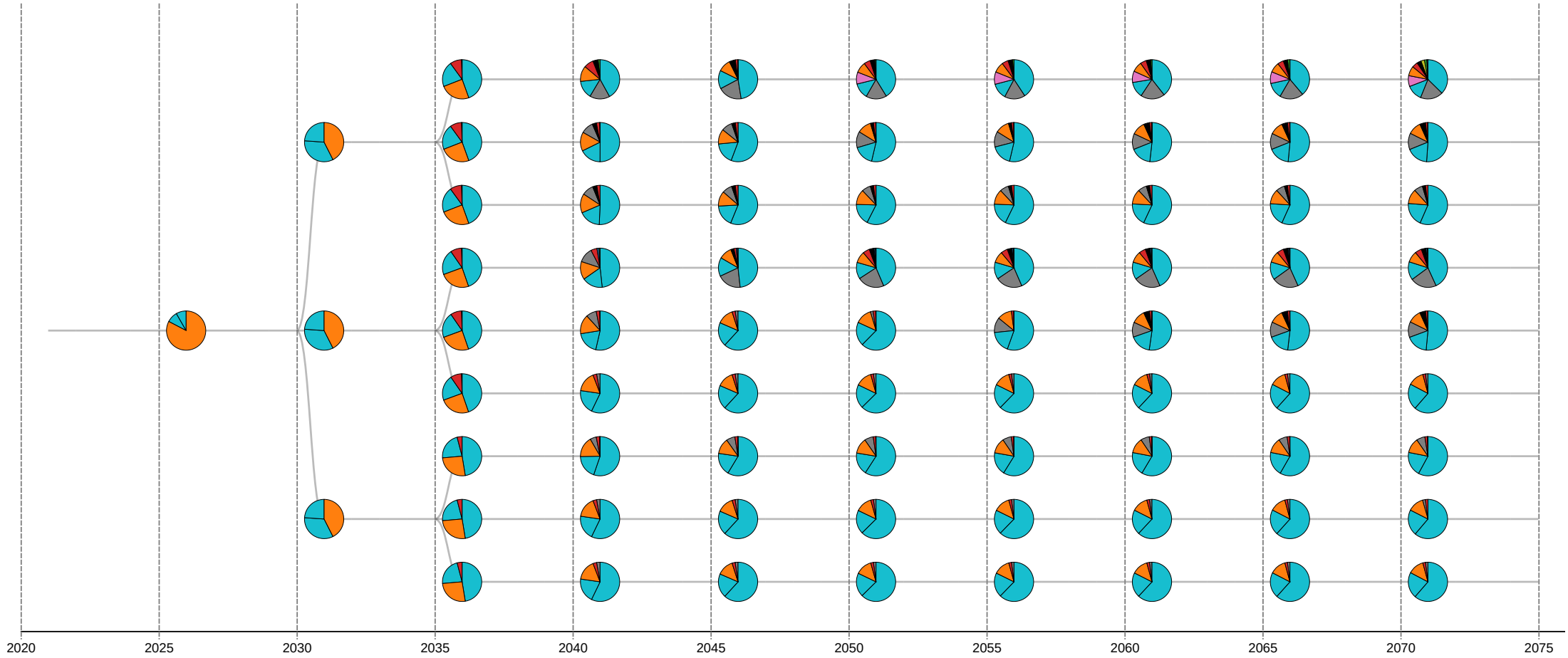
Option Selection (Thames Water)



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

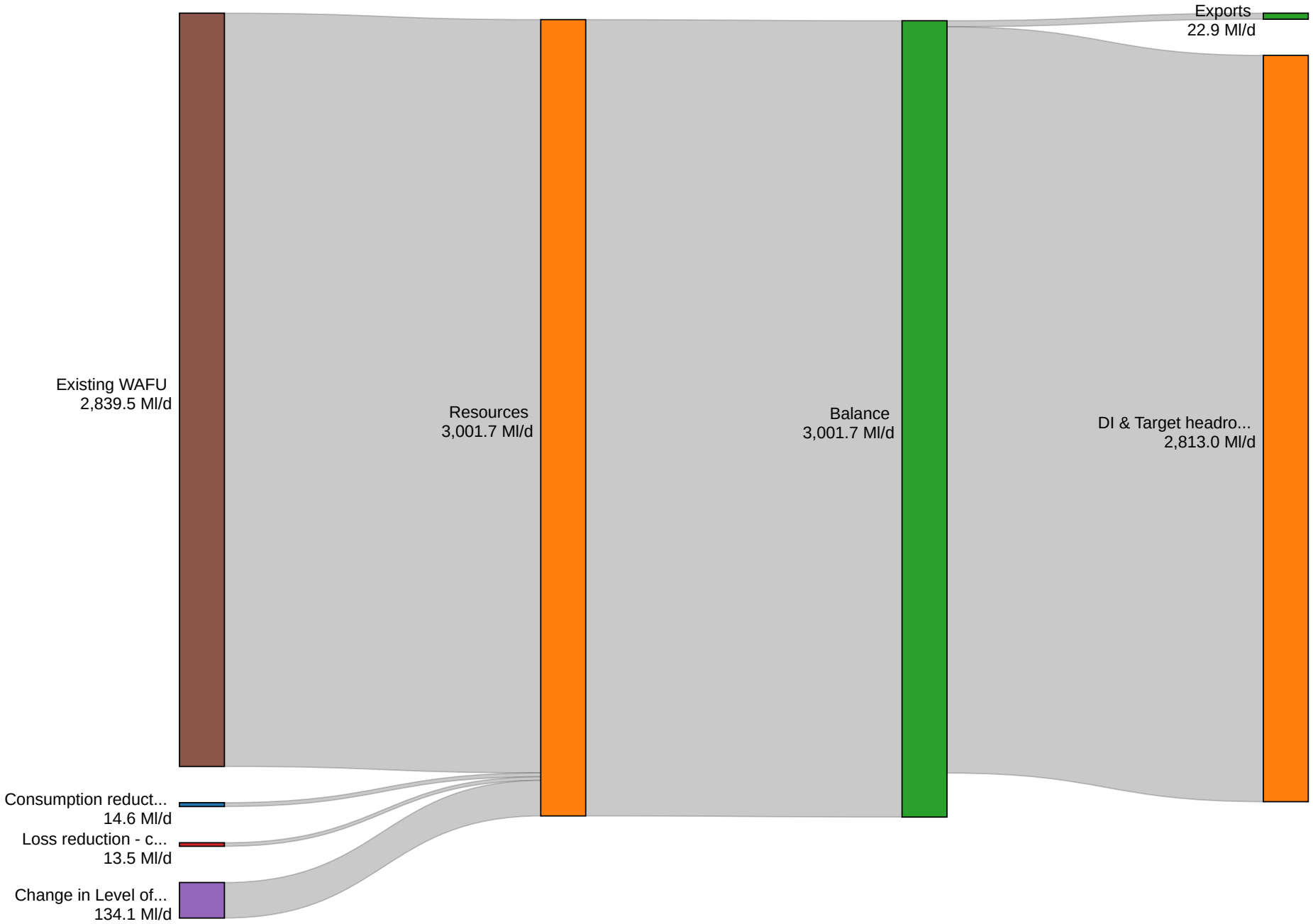
Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.

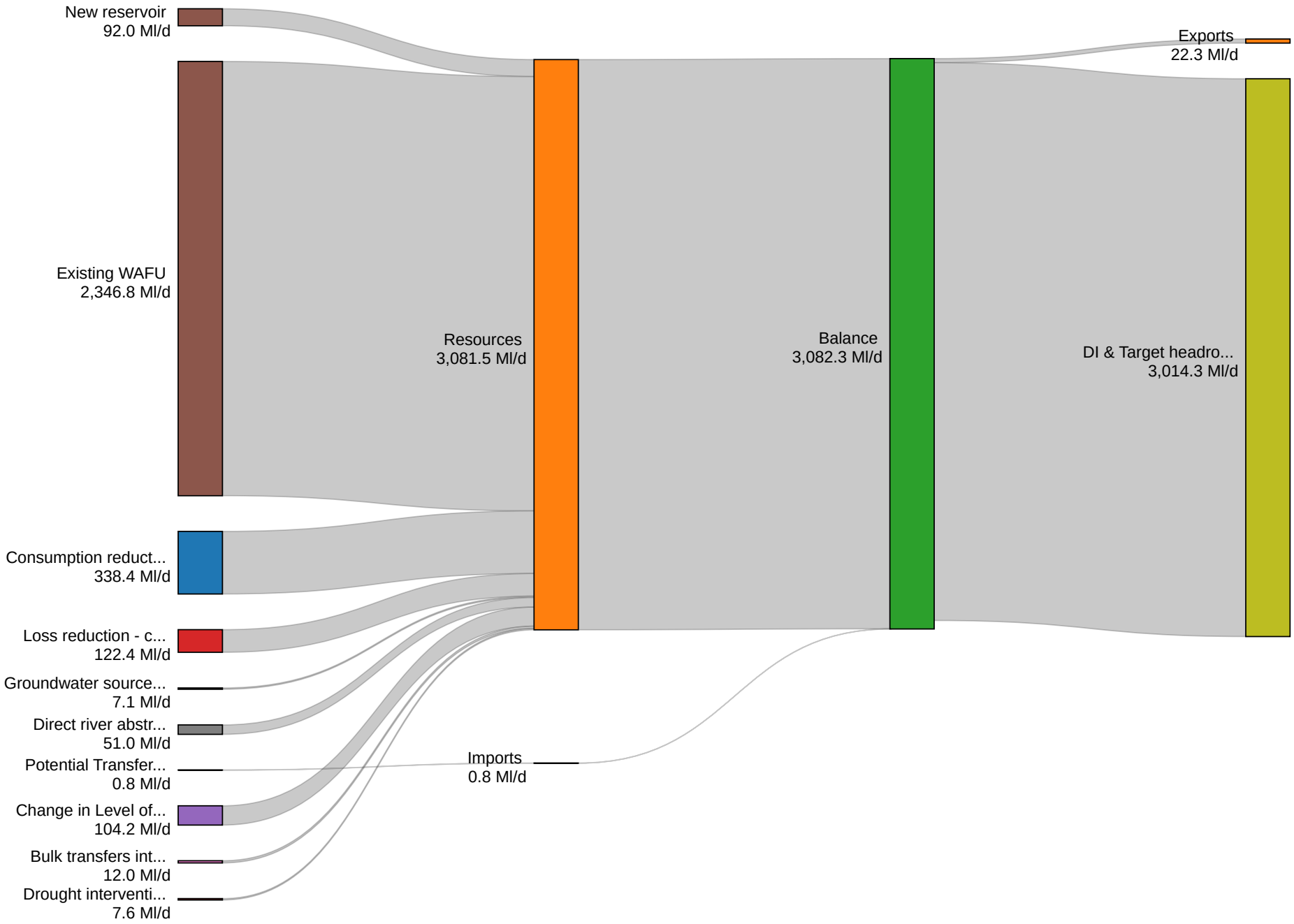


- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

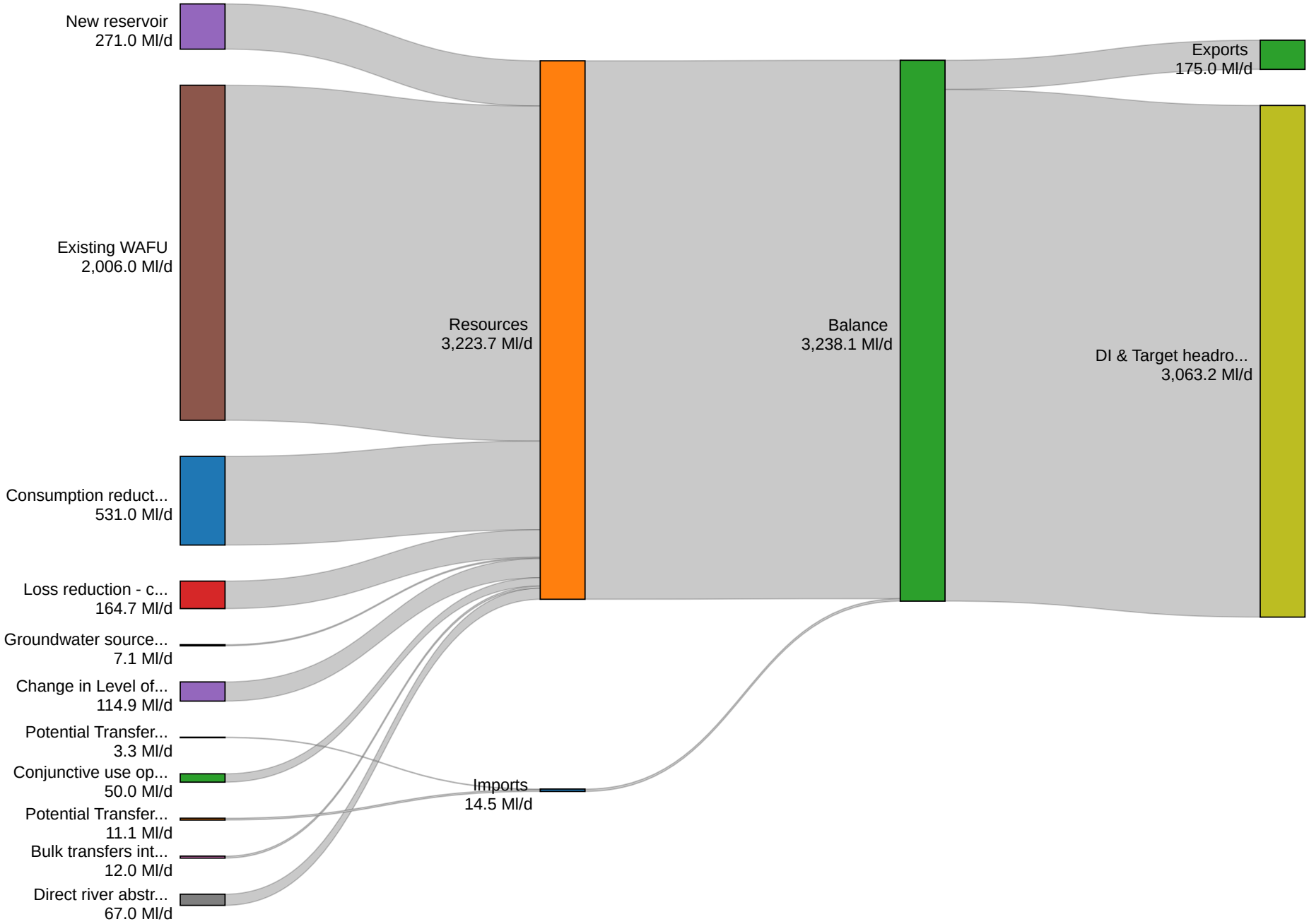
Situation 4 - 2026 (Thames Water)



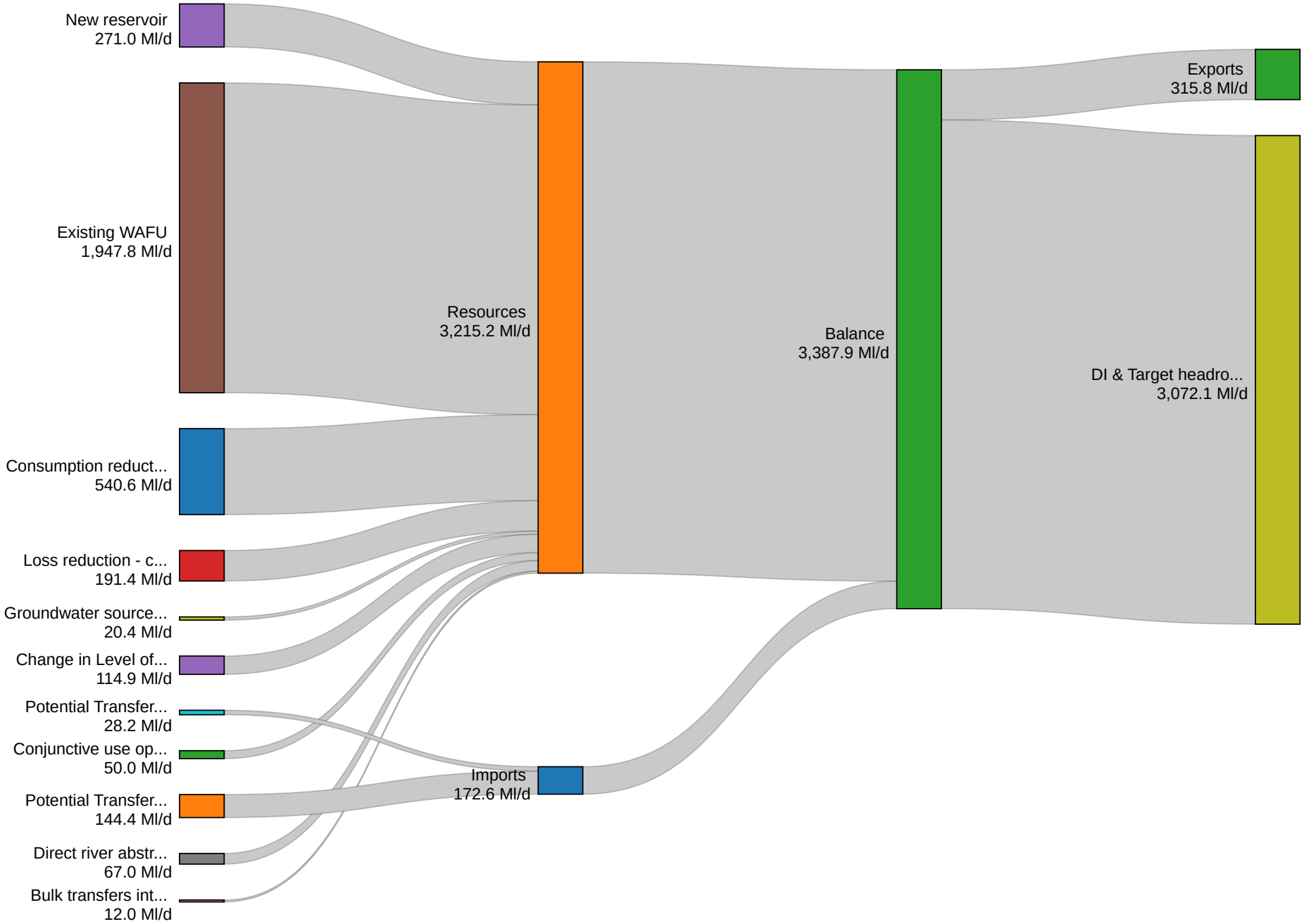
Situation 4 - 2040 (Thames Water)



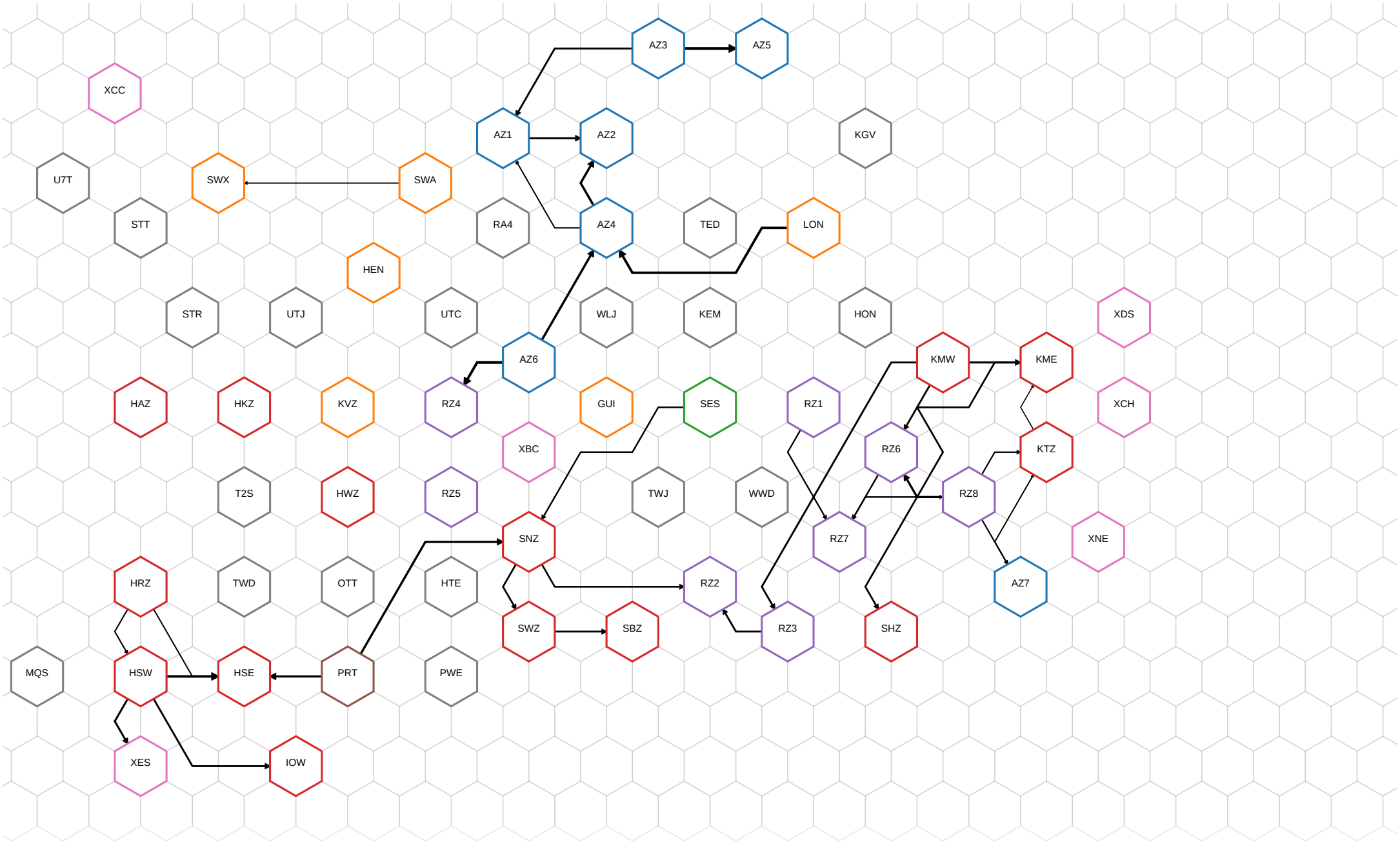
Situation 4 - 2050 (Thames Water)



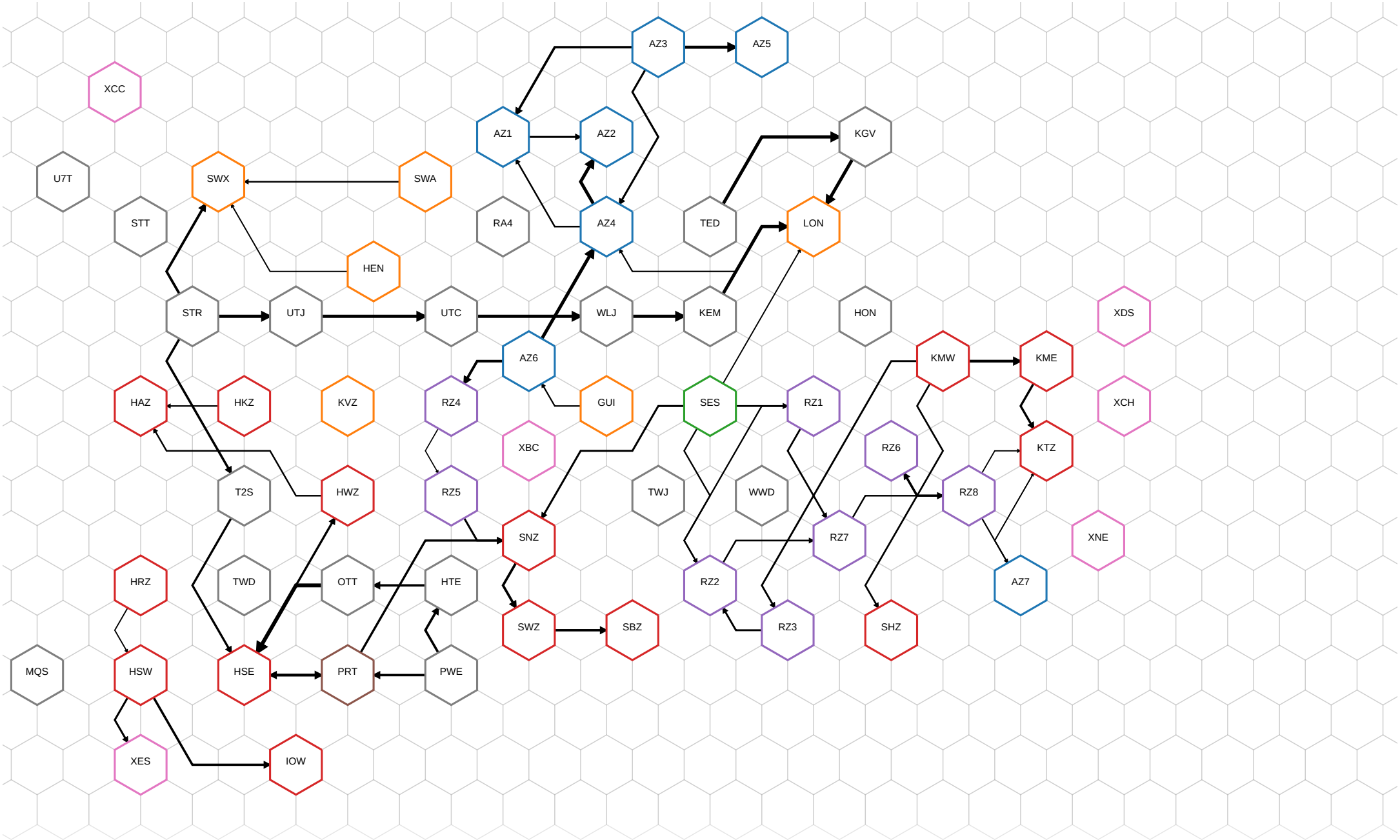
Situation 4 - 2075 (Thames Water)



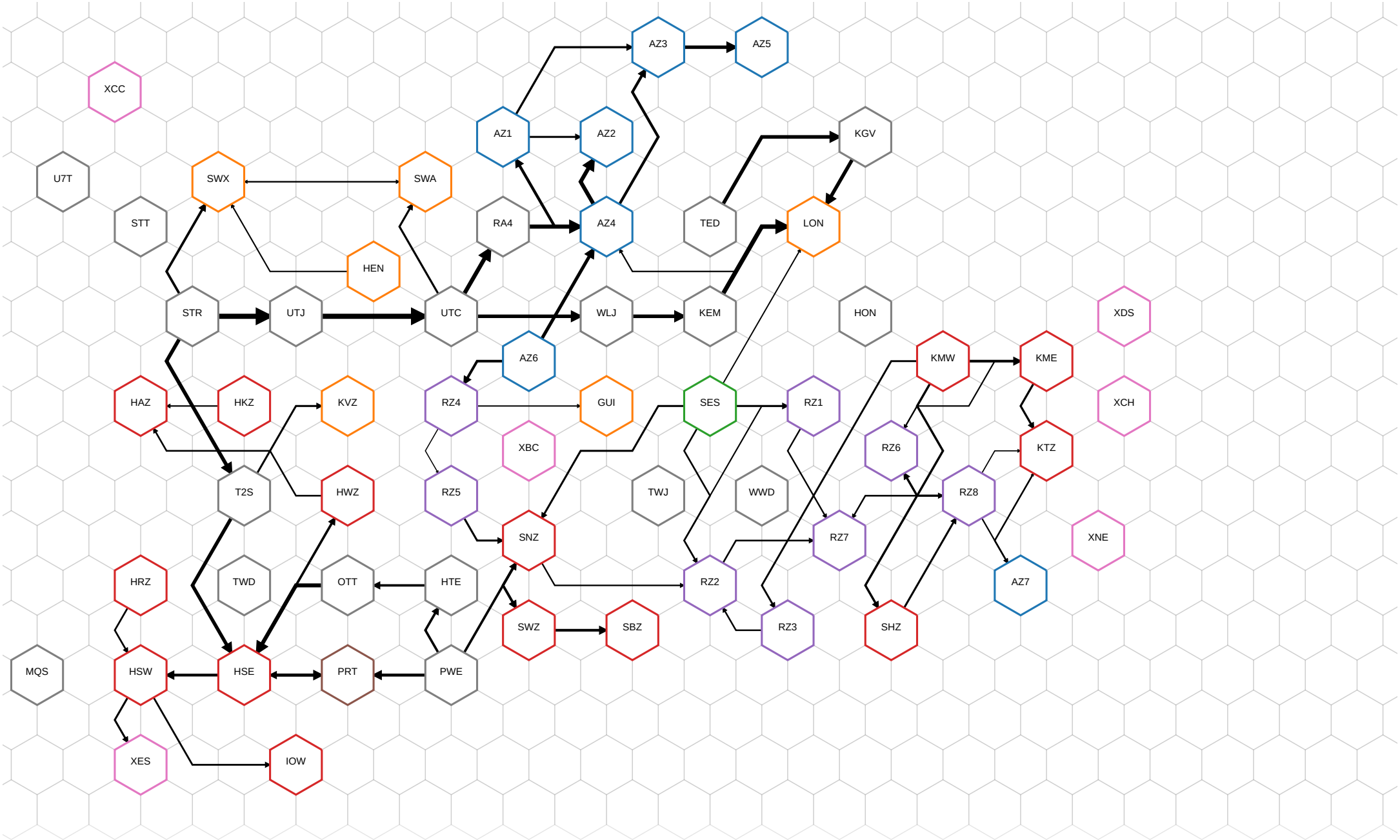
Situation 4 - 2026



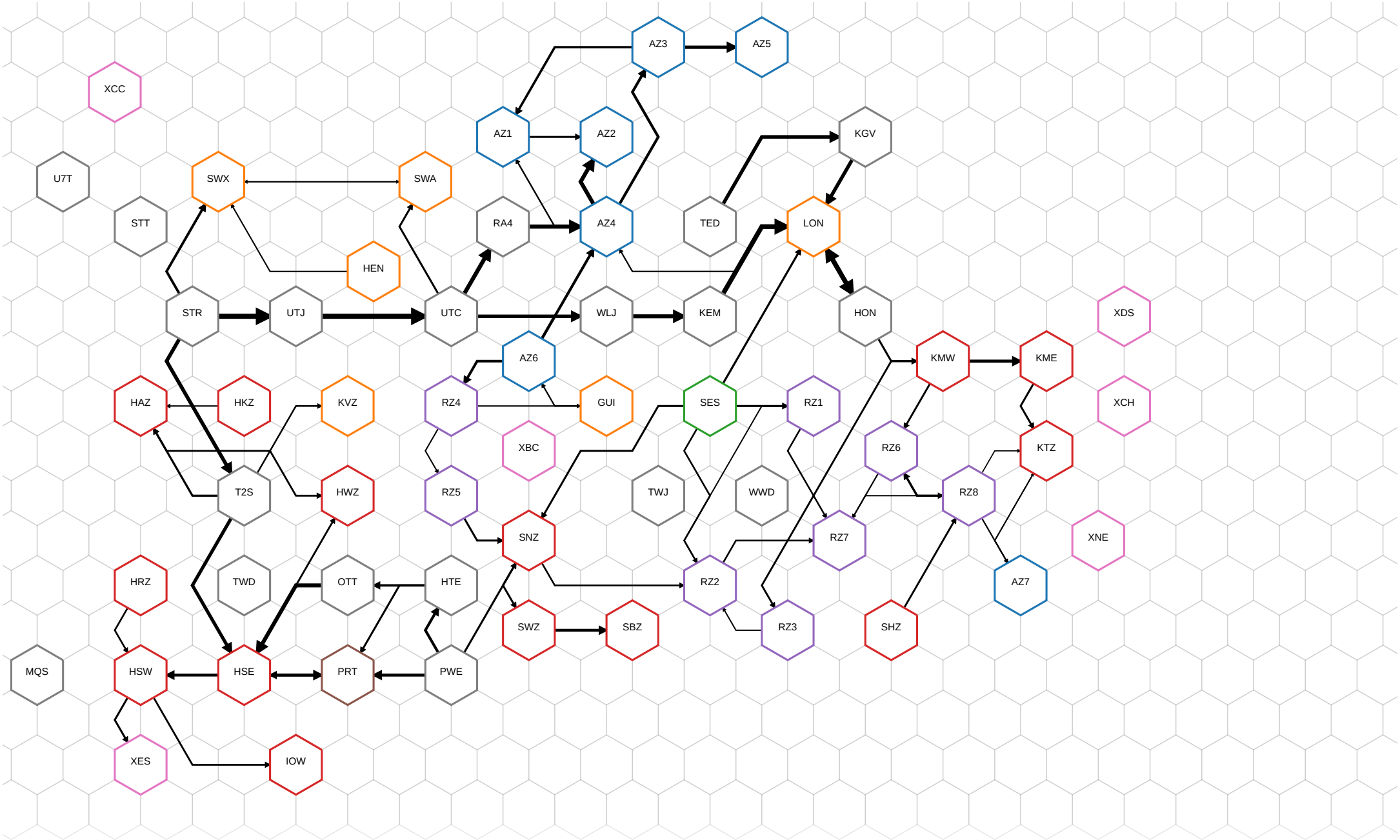
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

GOVERNMENT-LED H + NON SESRO

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridh-large-sws-prt-transfer-v4-excl-sesro-2075
Description	Least cost run with hybrid-h government interventions with increased capacity of T2S transfer to 200 Ml/d and increased Otterbourne - Gaters Mill transfer to 95 Ml/d. No cost changes to account for the increased capacities have been included. Includes a 6 Ml/d emergency deficit in RZ6 in 2049. Excludes SESRO. Extend Testwood and Candover drought permits to 2040.
Created at	08/07/2023, 03:13:16
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridh-large-sws-prt-transfer-v4-excl-sesro
Setting description	Emergency options in RZ6 (2049). Excluding SES low, medium and high DMP baskets. Increase capacity of T2S transfer to 200 Ml/d and expand Otterbourne - Gaters Mill transfer to 95 Ml/d. Excludes SESRO. Extend Testwood and Candover drought permits to 2040.
Optimised discount rate	STPR

Metrics

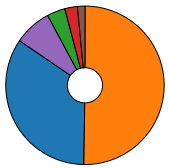
Net present value (Cost)

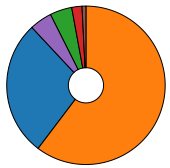
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	24,308	19,391	18,260	22,659	18,827	17,344	19,615	17,271	16,377	(£m)
Cost w/o deficit (STPR)	24,308	19,391	18,260	22,659	18,827	17,344	19,615	17,271	16,377	(£m)
Cost w/ deficit (IGEQ)	38,364	29,036	26,975	35,159	28,227	25,496	29,686	25,433	23,793	(£m)
Cost w/o deficit (IGEQ)	38,364	29,036	26,975	35,159	28,227	25,496	29,686	25,433	23,793	(£m)
Cost w/ deficit (LTDR)	27,001	21,278	19,974	25,073	20,662	18,950	21,576	18,877	17,845	(£m)
Cost w/o deficit (LTDR)	27,001	21,278	19,974	25,073	20,662	18,950	21,576	18,877	17,845	(£m)

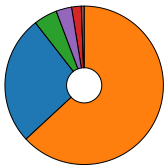
Cost breakdown (STPR)

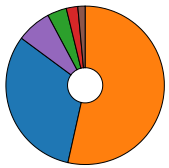
Select Company: Total

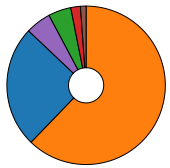
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	8,339	5,376	4,814	7,171	4,681	3,979	5,280	3,862	3,416	(£m)
Fixed opex	12,208	11,697	11,524	12,120	11,712	11,474	11,758	11,467	11,408	(£m)
Fixed operational carbon	908	876	875	897	878	874	877	869	866	(£m)
Embedded carbon	626	405	361	530	371	312	400	300	269	(£m)
Variable opex	1,858	883	579	1,602	970	587	1,108	657	363	(£m)
Variable carbon opex	369	154	106	337	215	118	192	115	56	(£m)

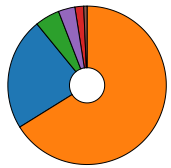
situation1 

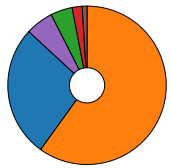
situation2 

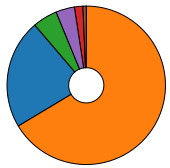
situation3 

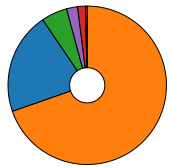
situation4 

situation5 

situation6 

situation7 

situation8 

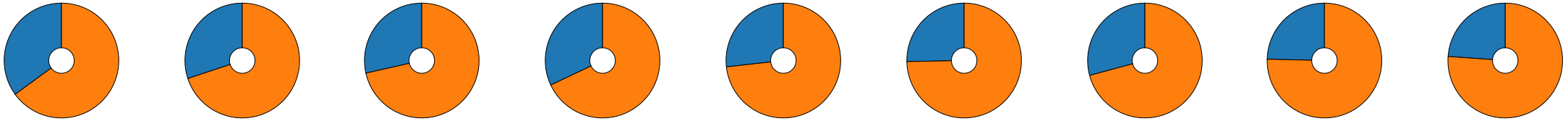
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	4,133,573	2,543,262	2,242,066	3,436,061	2,332,196	1,923,609	2,545,449	1,847,785	1,639,508	(tonnes)
Operational emissions	7,665,719	5,913,392	5,612,786	7,290,025	6,376,054	5,678,443	6,178,152	5,649,831	5,227,755	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

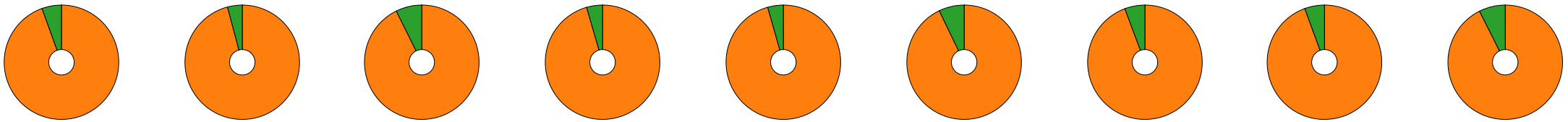


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	0	0	0	0	0	0	0	0	0	(GWh)
Grid	36,243	17,548	8,482	30,864	17,806	8,342	21,042	12,012	4,359	(GWh)
Renewable	2,117	761	671	1,453	821	642	1,272	708	349	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
SEA environmental benefit	71,568.00	65,049.00	63,438.00	68,595.00	64,556.00	62,054.00	65,164.00	60,728.00	59,622.00	
SEA environmental disbenefit	129,521.00	91,717.00	79,758.00	116,335.00	92,593.00	76,677.00	93,825.00	71,992.00	64,015.00	
Natural capital	5,763,871.47	2,370,200.55	4,409,095.82	1,369,605.36	5,207,504.77	10,155,152.19	3,150,325.80	7,854,747.62	10,378,394.70	
Bio-diversity net gain	−274,807.00	−198,214.00	−182,062.00	−239,532.00	−231,066.00	−191,205.00	−198,693.00	−177,460.00	−165,132.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	35,501.00	33,069.00	32,314.00	34,662.00	33,174.00	32,099.00	33,094.00	31,480.00	31,083.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	30.32	28.97	30.22	29.67	28.66	29.27	30.12	29.46	32.33	
R1: Uncertainty of option supply/demand benefit	7.14	6.06	6.23	6.79	6.07	6.01	6.37	5.80	6.27	
R3: Risk of service failure due to other physical hazards	6.66	6.55	6.93	6.54	6.44	6.66	6.76	6.61	7.42	
R4: Availability of additional headroom	6.41	6.58	6.76	6.47	6.55	6.70	6.91	7.14	7.37	
R5: Catchment/raw water quality risks (incl. climate change)	4.95	4.61	4.87	4.74	4.49	4.66	4.76	4.79	5.51	
R6: Capacity of catchment services	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	
R7: Risk of service failure to other exceptional events	5.17	5.17	5.43	5.12	5.12	5.24	5.32	5.11	5.76	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

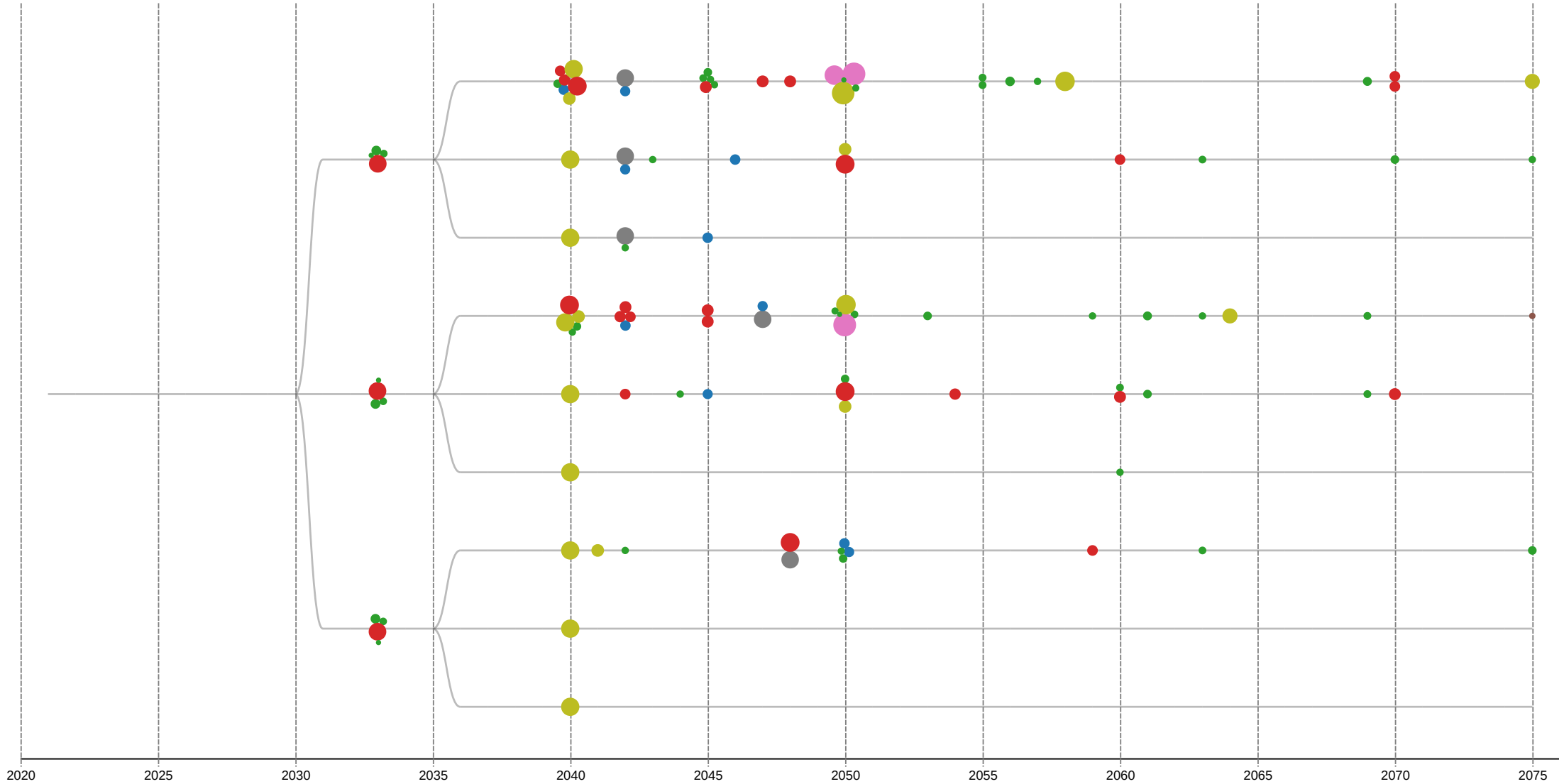
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	14.67	15.07	16.58	13.94	15.05	16.15	15.31	16.60	18.75	
A3: Operational complexity and flexibility	5.71	5.91	6.34	5.71	5.80	6.09	6.05	6.01	6.82	
A4: WRZ connectivity	8.92	9.11	10.19	8.18	9.21	10.01	9.22	10.54	11.88	
A7: Customer relations support engagement with demand management	0.04	0.04	0.05	0.05	0.04	0.05	0.05	0.05	0.06	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.78	19.27	20.20	19.61	19.44	19.93	20.08	20.23	22.56	
E1: Scaleability and modularity of proposed changes	8.35	8.20	8.80	8.21	8.27	8.73	8.49	8.88	9.93	
E2: Intervention lead times	5.30	5.15	5.16	5.38	5.22	5.08	5.45	5.26	5.82	
E3: Reliance on external bodies to deliver changes	6.13	5.92	6.23	6.02	5.95	6.12	6.14	6.09	6.81	
E5: Collaborative land management	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	

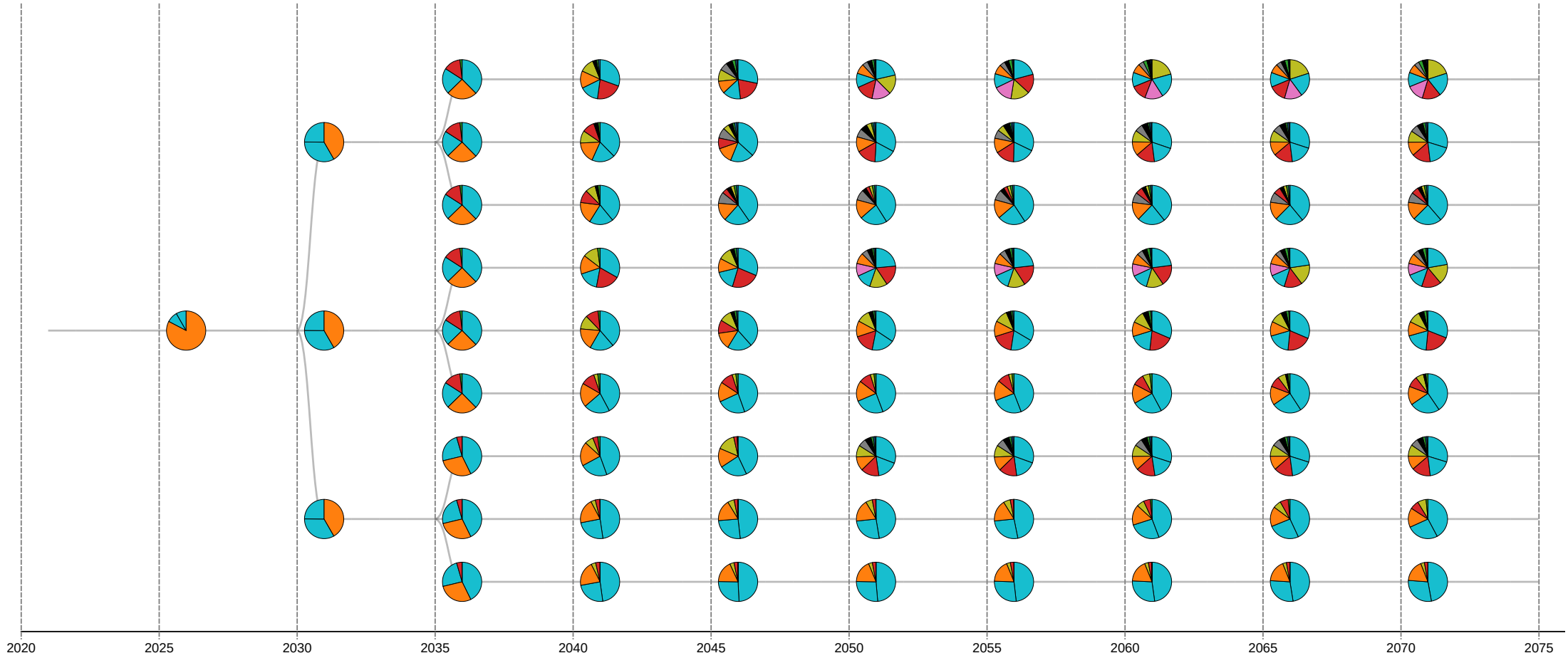
Option Selection (Thames Water)



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
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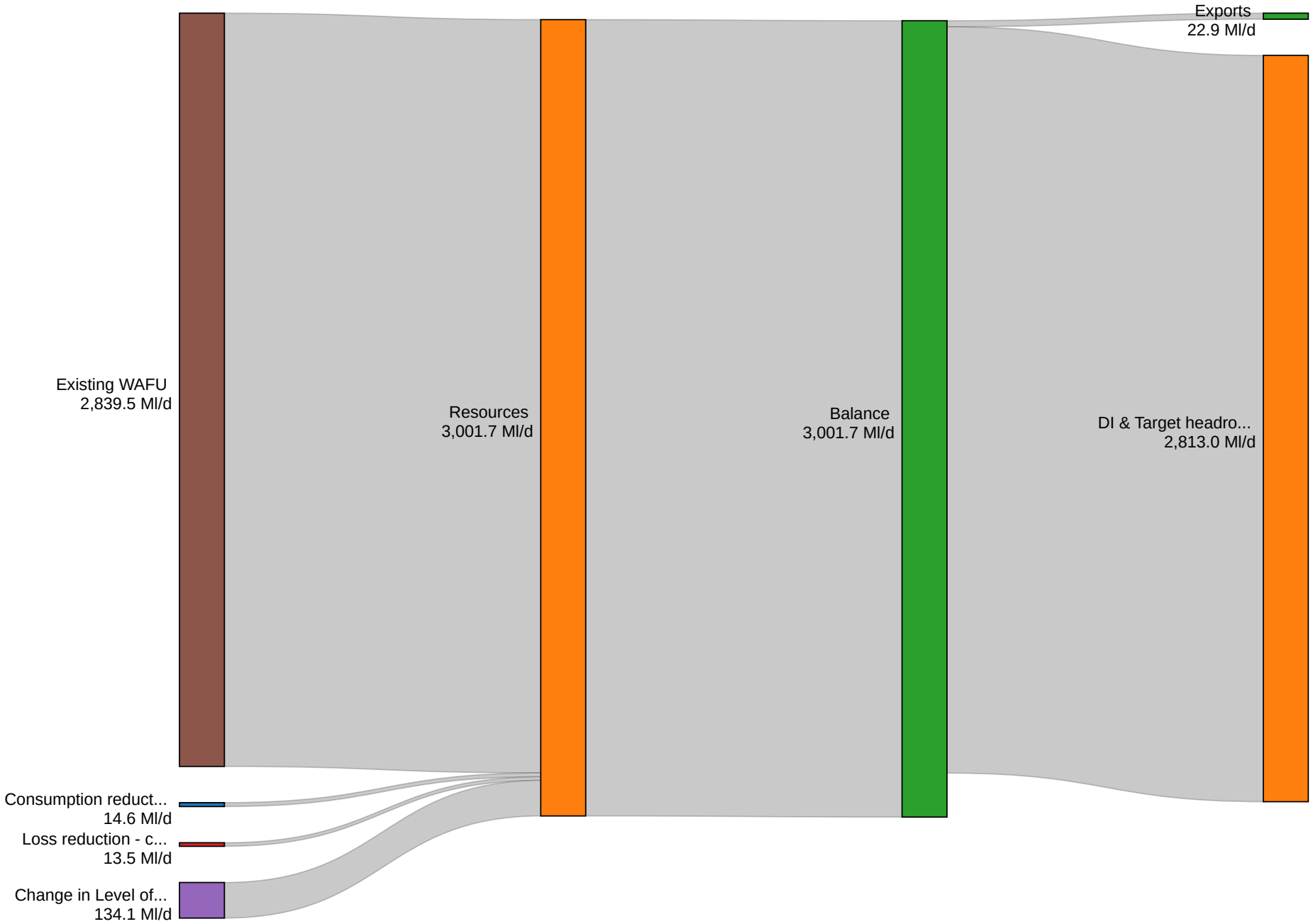
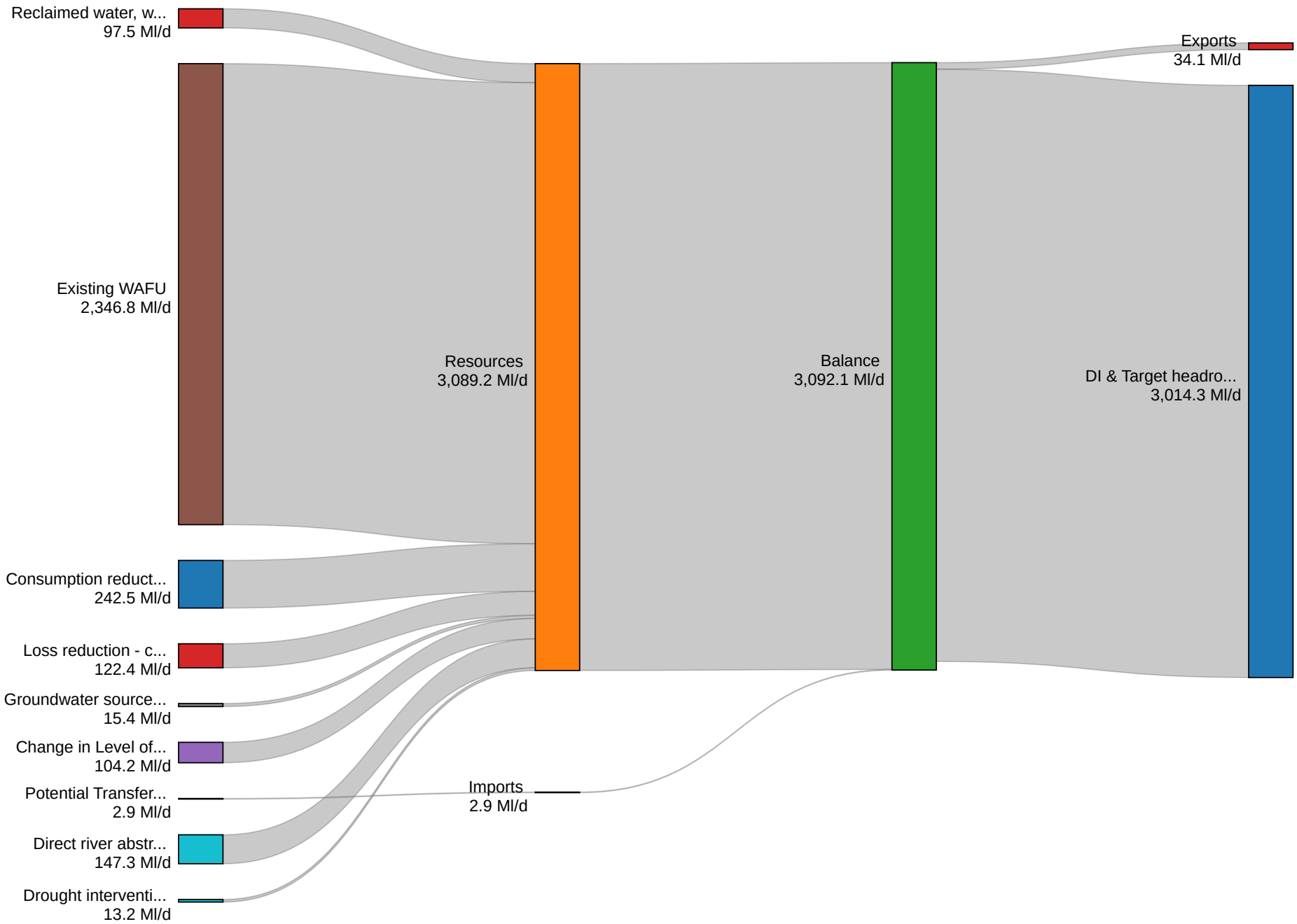
- Demand management
- Leakage reduction
- Other

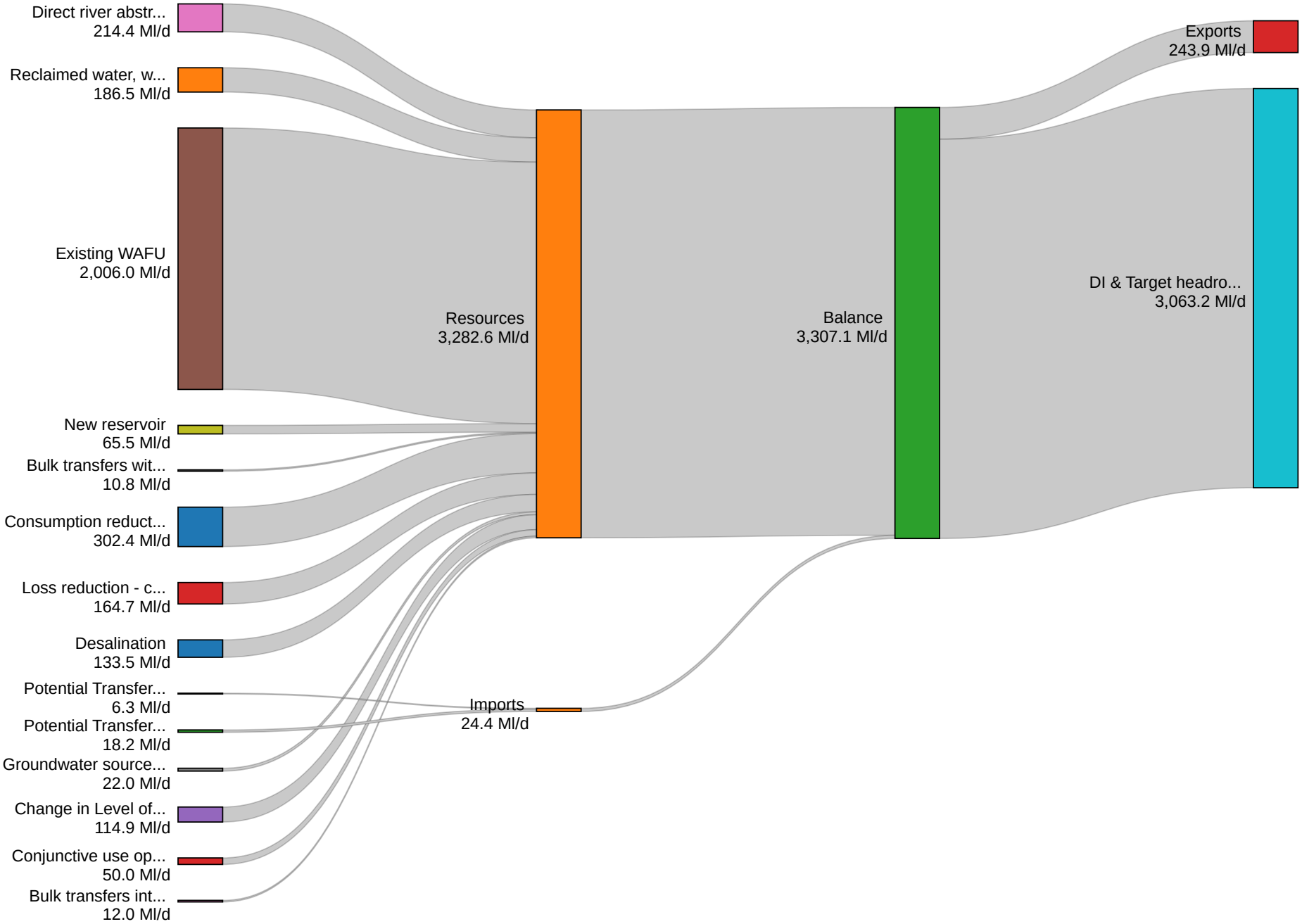
Situation 4 - 2026 (Thames Water)



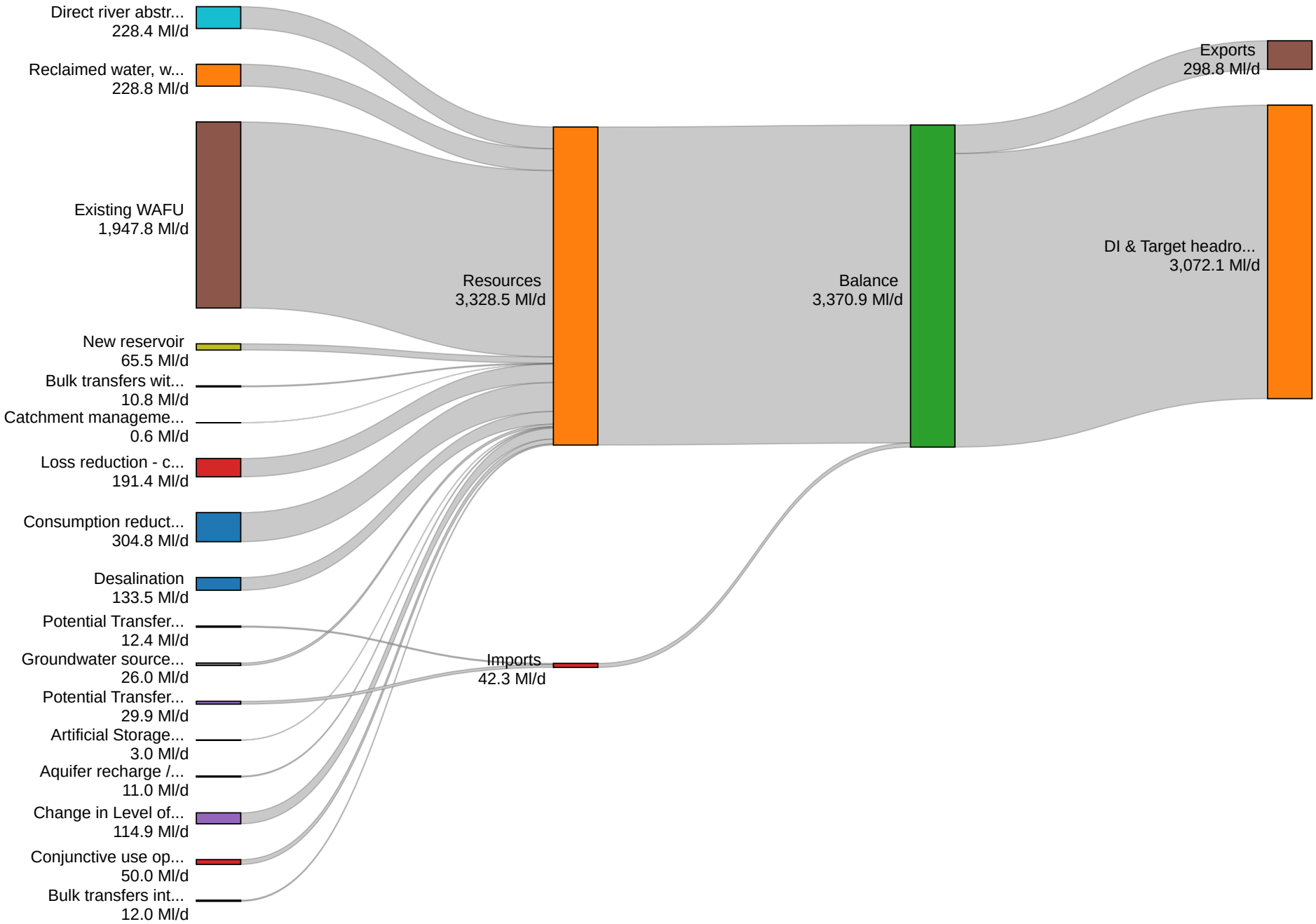
Situation 4 - 2040 (Thames Water)



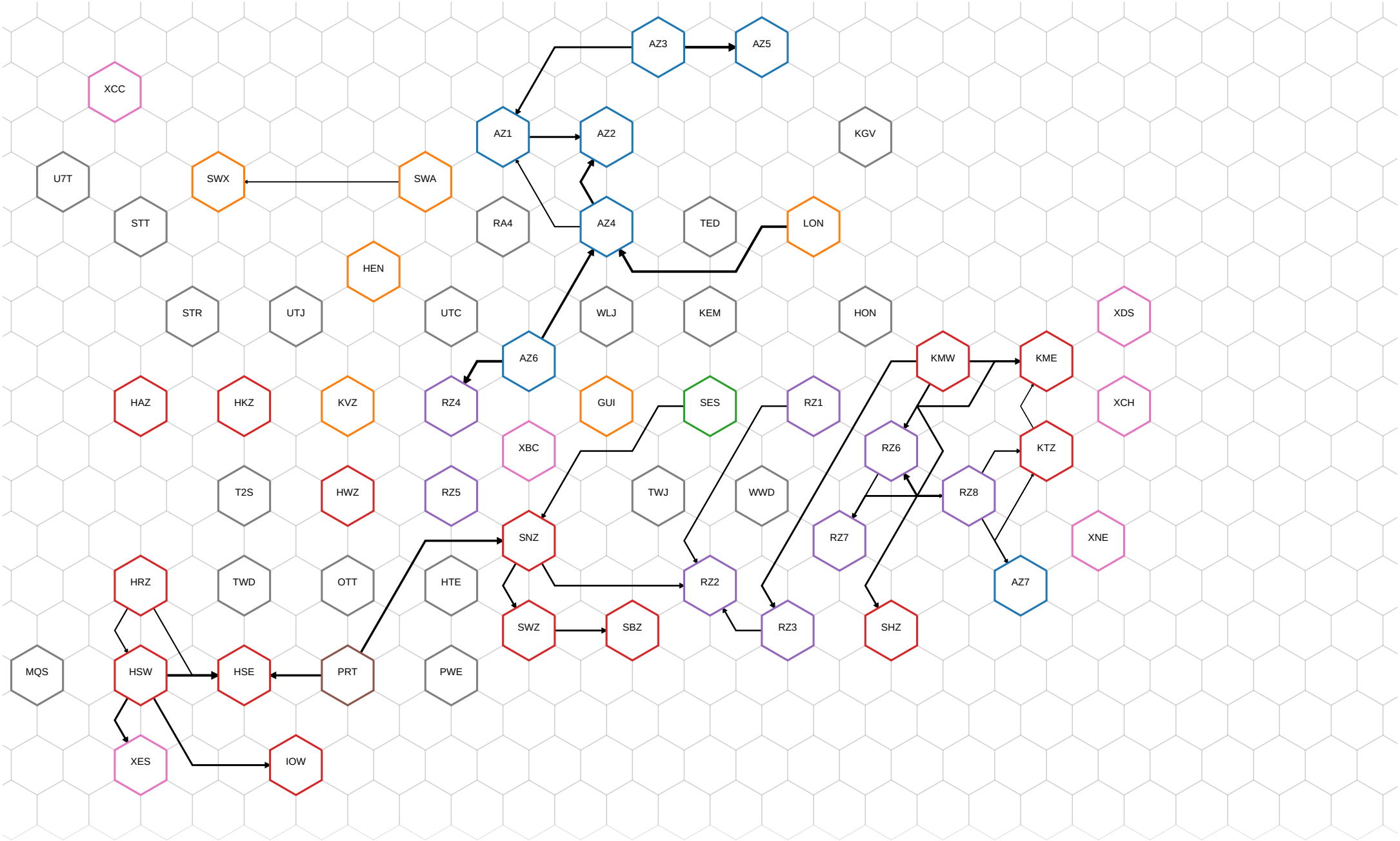
Situation 4 - 2050 (Thames Water)



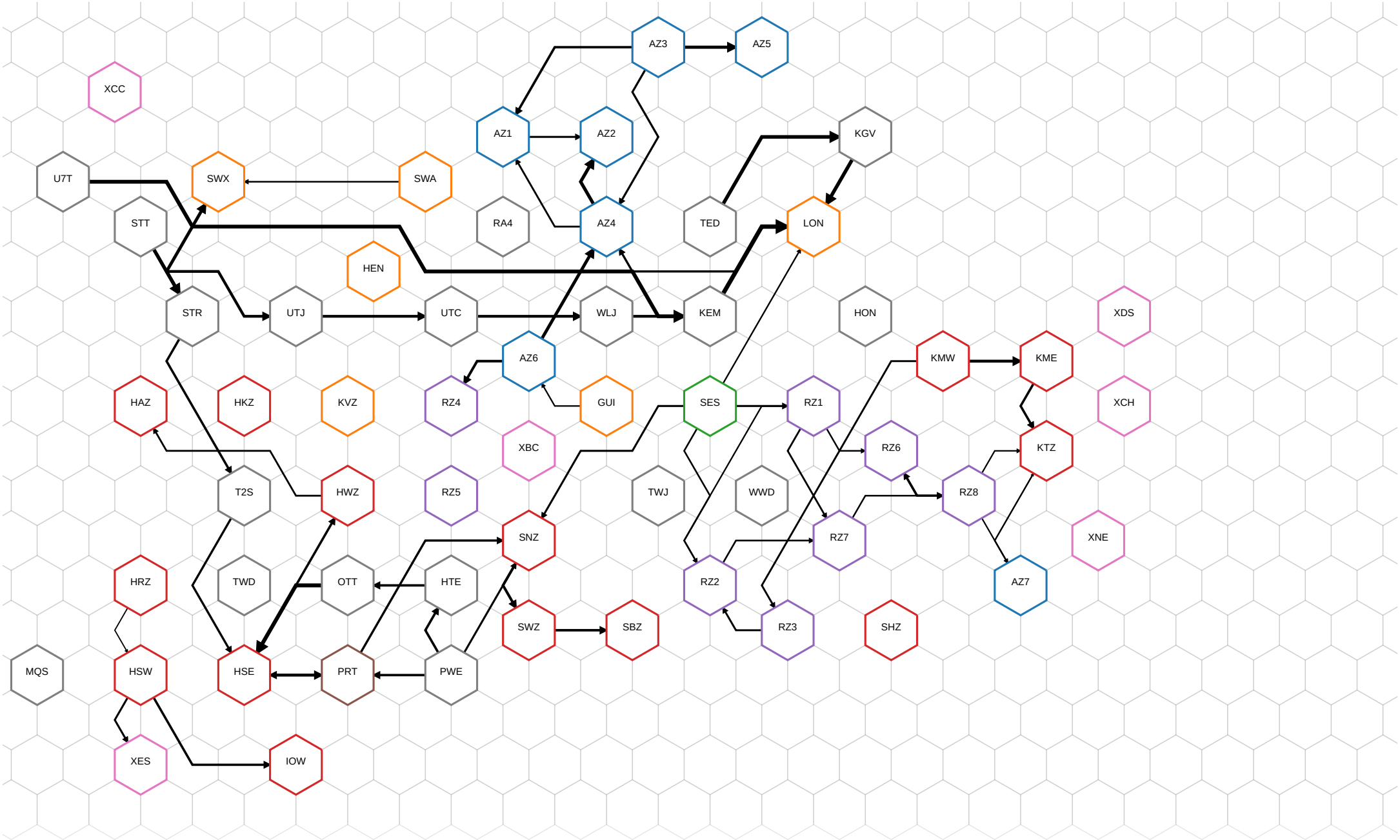
Situation 4 - 2075 (Thames Water)



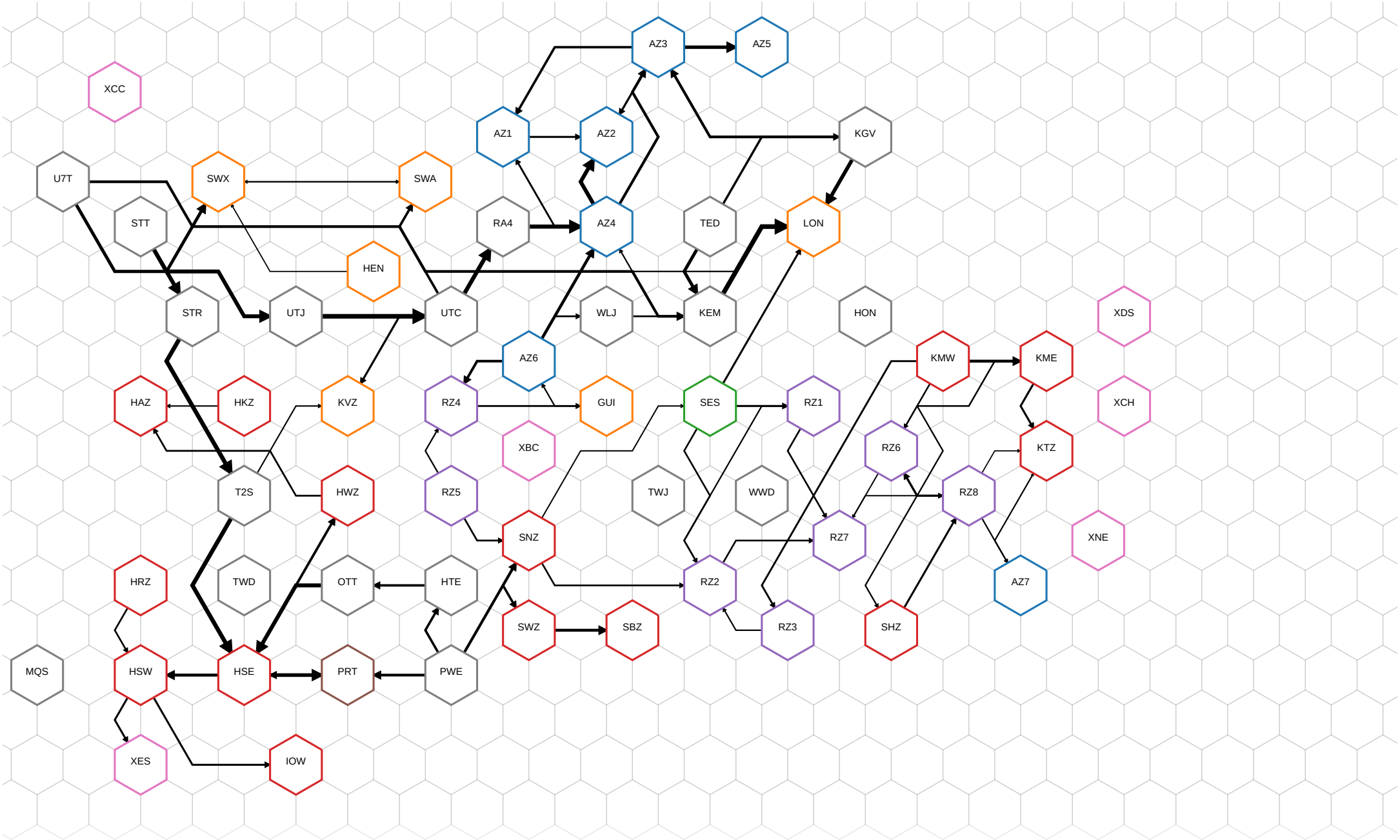
Situation 4 - 2026



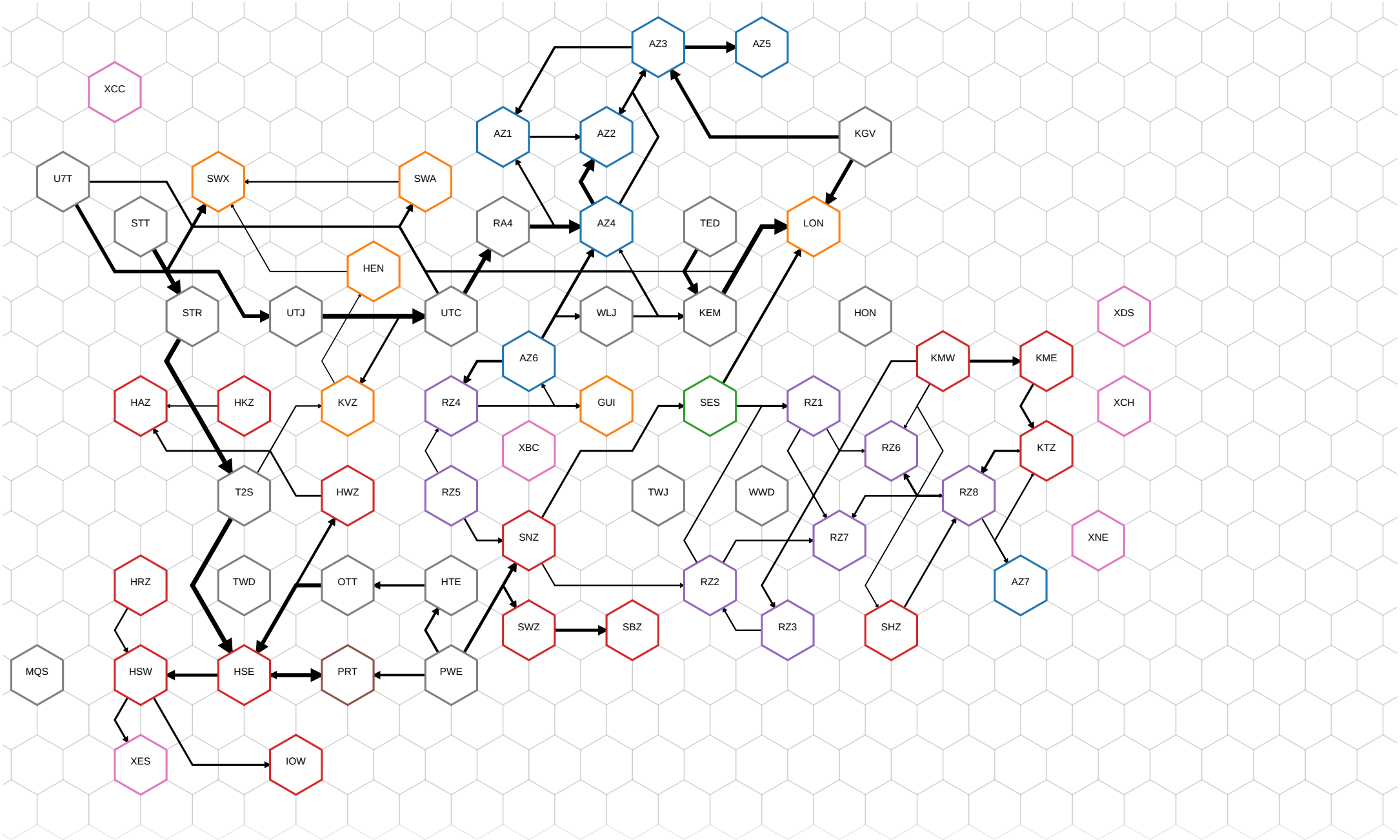
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

GOVERNMENT-LED H + SESRO 125

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridh-large-sws-prt-transfer-v4-only-sesro125-2075
Description	Least cost run with hybrid-h government interventions with increased capacity of T2S transfer to 200 Ml/d and increased Otterbourne - Gaters Mill transfer to 95 Ml/d. No cost changes to account for the increased capacities have been included. Includes a 6 Ml/d emergency deficit in RZ6 in 2049. Includes only SESRO 125 Mm3. Extend Testwood and Candover drought permits to 2040.
Created at	06/07/2023, 21:29:10
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridh-large-sws-prt-transfer-v4-only-sesro125
Setting description	Emergency options in RZ6 (2049). Excluding SES low, medium and high DMP baskets. Increase capacity of T2S transfer to 200 Ml/d and expand Otterbourne - Gaters Mill transfer to 95 Ml/d. Exclude all SESRO variants except 125. Extend Testwood and Candover drought permits to 2040.
Optimised discount rate	STPR

Metrics

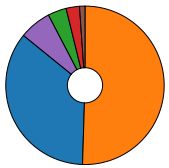
Net present value (Cost)

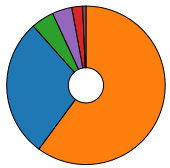
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	23,448	18,842	17,863	21,716	18,540	17,509	18,902	17,460	16,638	(£m)
Cost w/o deficit (STPR)	23,448	18,842	17,863	21,716	18,540	17,509	18,902	17,460	16,638	(£m)
Cost w/ deficit (IGEQ)	36,694	28,004	26,217	33,423	27,503	25,625	28,325	25,610	24,117	(£m)
Cost w/o deficit (IGEQ)	36,694	28,004	26,217	33,423	27,503	25,625	28,325	25,610	24,117	(£m)
Cost w/ deficit (LTDR)	25,992	20,637	19,510	23,981	20,298	19,110	20,741	19,066	18,119	(£m)
Cost w/o deficit (LTDR)	25,992	20,637	19,510	23,981	20,298	19,110	20,741	19,066	18,119	(£m)

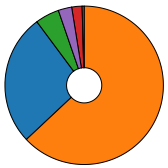
Cost breakdown (STPR)

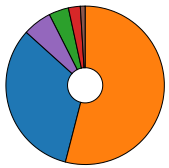
Select Company: Total

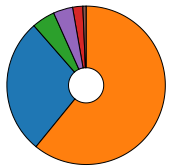
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	8,291	5,340	4,791	7,093	5,132	4,534	5,284	4,443	3,981	(£m)
Fixed opex	11,839	11,323	11,255	11,728	11,288	11,212	11,311	11,208	11,148	(£m)
Fixed operational carbon	895	877	875	884	876	874	877	869	866	(£m)
Embedded carbon	639	420	379	525	388	339	405	334	302	(£m)
Variable opex	1,525	756	490	1,274	734	477	886	537	301	(£m)
Variable carbon opex	259	125	74	211	122	72	139	68	41	(£m)

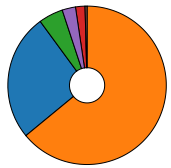
situation1 

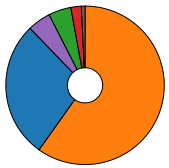
situation2 

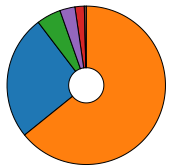
situation3 

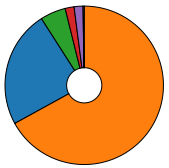
situation4 

situation5 

situation6 

situation7 

situation8 

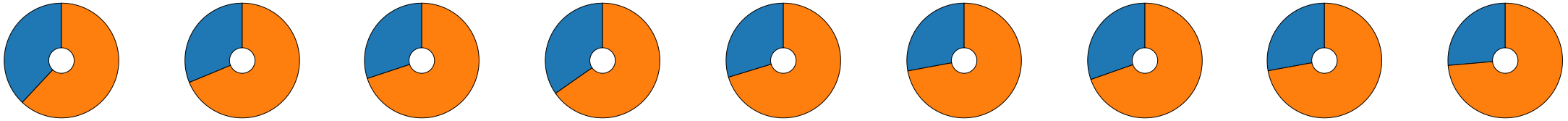
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	4,171,354	2,609,613	2,323,795	3,383,444	2,416,126	2,083,580	2,549,740	2,052,377	1,835,965	(tonnes)
Operational emissions	6,797,617	5,742,754	5,402,684	6,367,846	5,715,147	5,380,949	5,845,938	5,312,516	5,125,823	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

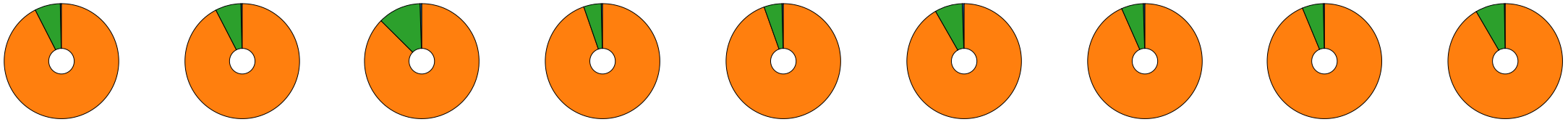


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	114	67	45	113	67	43	93	39	11	(GWh)
Grid	30,673	15,884	7,674	27,541	15,654	7,581	19,010	11,156	3,911	(GWh)
Renewable	2,392	1,241	1,061	1,436	836	644	1,260	708	349	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	72,536.00	66,503.00	65,362.00	69,748.00	65,884.00	64,100.00	66,496.00	62,869.00	61,739.00	
SEA environmental disbenefit	126,191.00	92,453.00	80,645.00	113,294.00	89,052.00	75,250.00	95,370.00	72,804.00	66,134.00	
Natural capital	81,646,424.80	86,250,881.11	86,441,888.99	74,822,185.27	78,538,530.84	81,825,059.38	78,315,858.90	79,463,053.53	82,109,154.20	
Bio-diversity net gain	−249,294.00	−180,073.00	−163,166.00	−211,008.00	−166,297.00	−135,551.00	−172,687.00	−123,668.00	−109,240.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	35,400.00	33,207.00	32,445.00	34,591.00	33,037.00	32,242.00	33,221.00	31,716.00	31,296.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	31.42	30.75	33.15	30.63	30.58	32.71	31.66	33.26	36.70	
R1: Uncertainty of option supply/demand benefit	7.18	6.37	6.82	6.72	6.31	6.68	6.57	6.54	7.11	
R3: Risk of service failure due to other physical hazards	7.02	7.10	7.79	6.89	7.07	7.70	7.27	7.76	8.74	
R4: Availability of additional headroom	6.51	6.75	6.95	6.54	6.74	6.93	7.05	7.37	7.60	
R5: Catchment/raw water quality risks (incl. climate change)	5.09	4.80	5.32	4.89	4.76	5.22	4.94	5.44	6.26	
R6: Capacity of catchment services	0.00	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00	
R7: Risk of service failure to other exceptional events	5.62	5.72	6.27	5.59	5.68	6.18	5.82	6.15	6.98	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

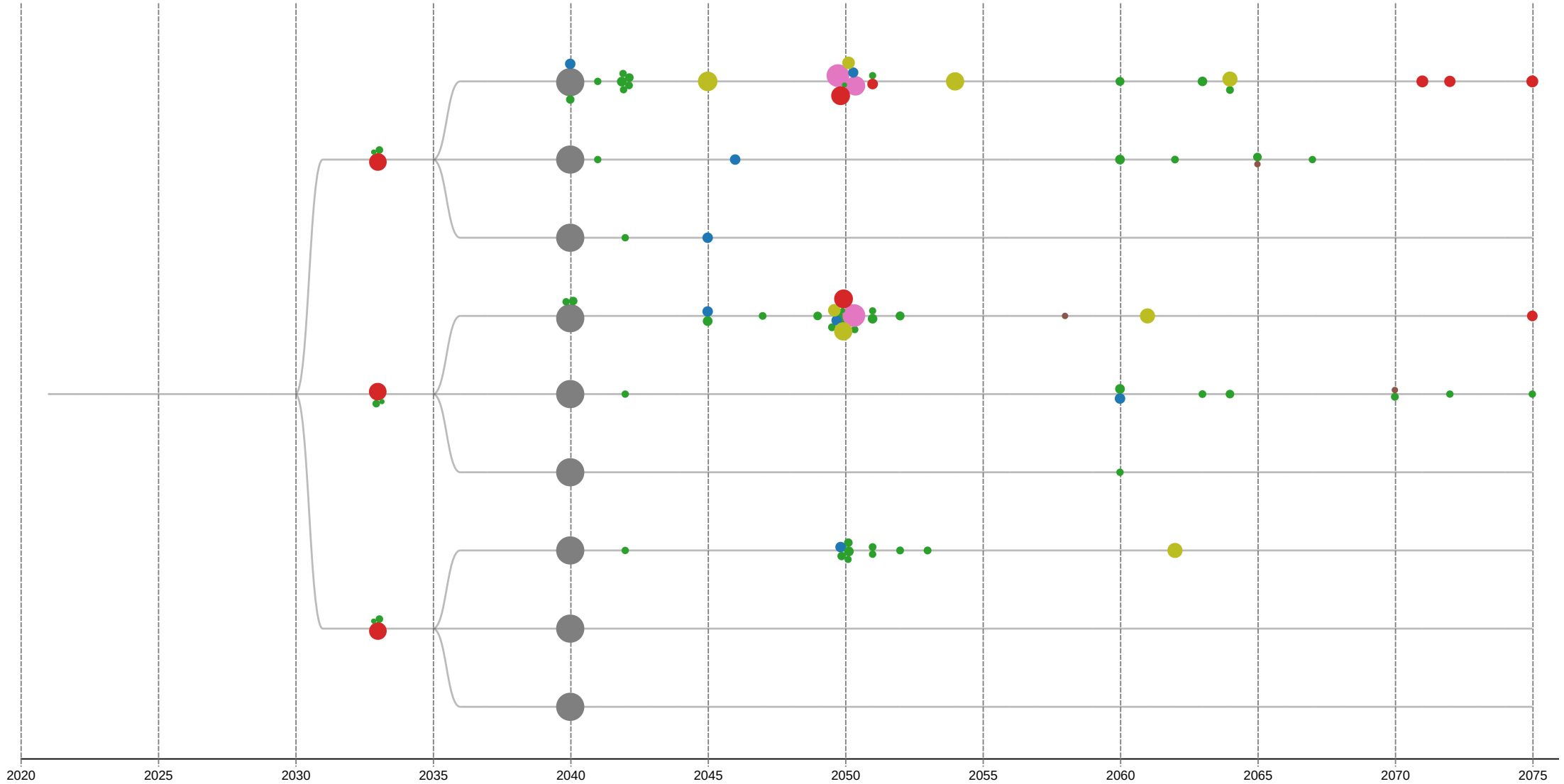
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	15.15	15.68	17.41	14.35	15.79	17.41	15.97	17.95	20.18	
A3: Operational complexity and flexibility	6.18	6.56	7.22	6.19	6.58	7.19	6.71	7.22	8.24	
A4: WRZ connectivity	8.93	9.07	10.14	8.11	9.16	10.18	9.21	10.68	11.89	
A7: Customer relations support engagement with demand management	0.04	0.06	0.05	0.05	0.06	0.05	0.05	0.05	0.06	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.38	19.01	20.69	18.90	18.98	20.50	19.62	20.87	23.15	
E1: Scaleability and modularity of proposed changes	8.13	8.13	8.86	7.96	8.14	8.81	8.39	9.02	10.10	
E2: Intervention lead times	5.31	5.06	5.50	5.16	5.07	5.47	5.28	5.61	6.08	
E3: Reliance on external bodies to deliver changes	5.94	5.81	6.32	5.78	5.76	6.22	5.95	6.24	6.98	
E5: Collaborative land management	0.00	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00	

Option Selection (Thames Water)



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
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- Trading
- Catchment management
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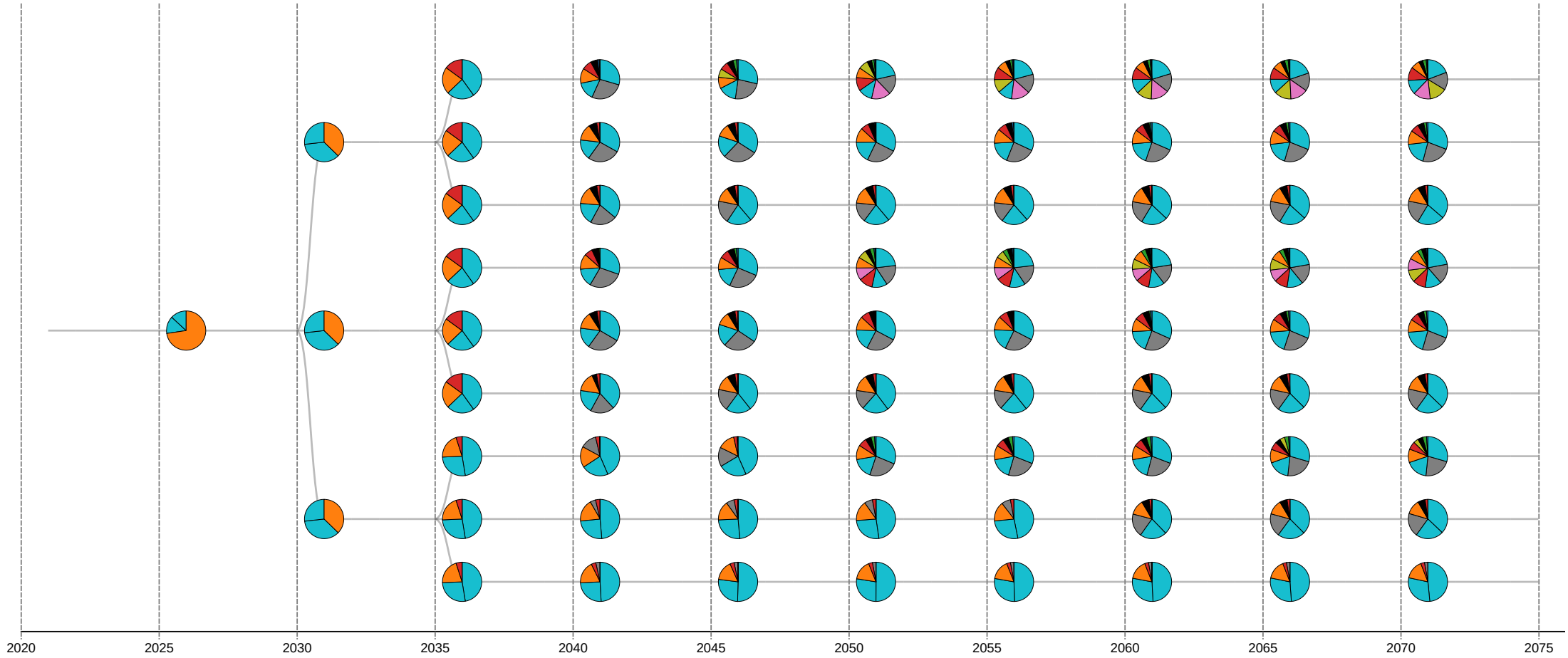
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

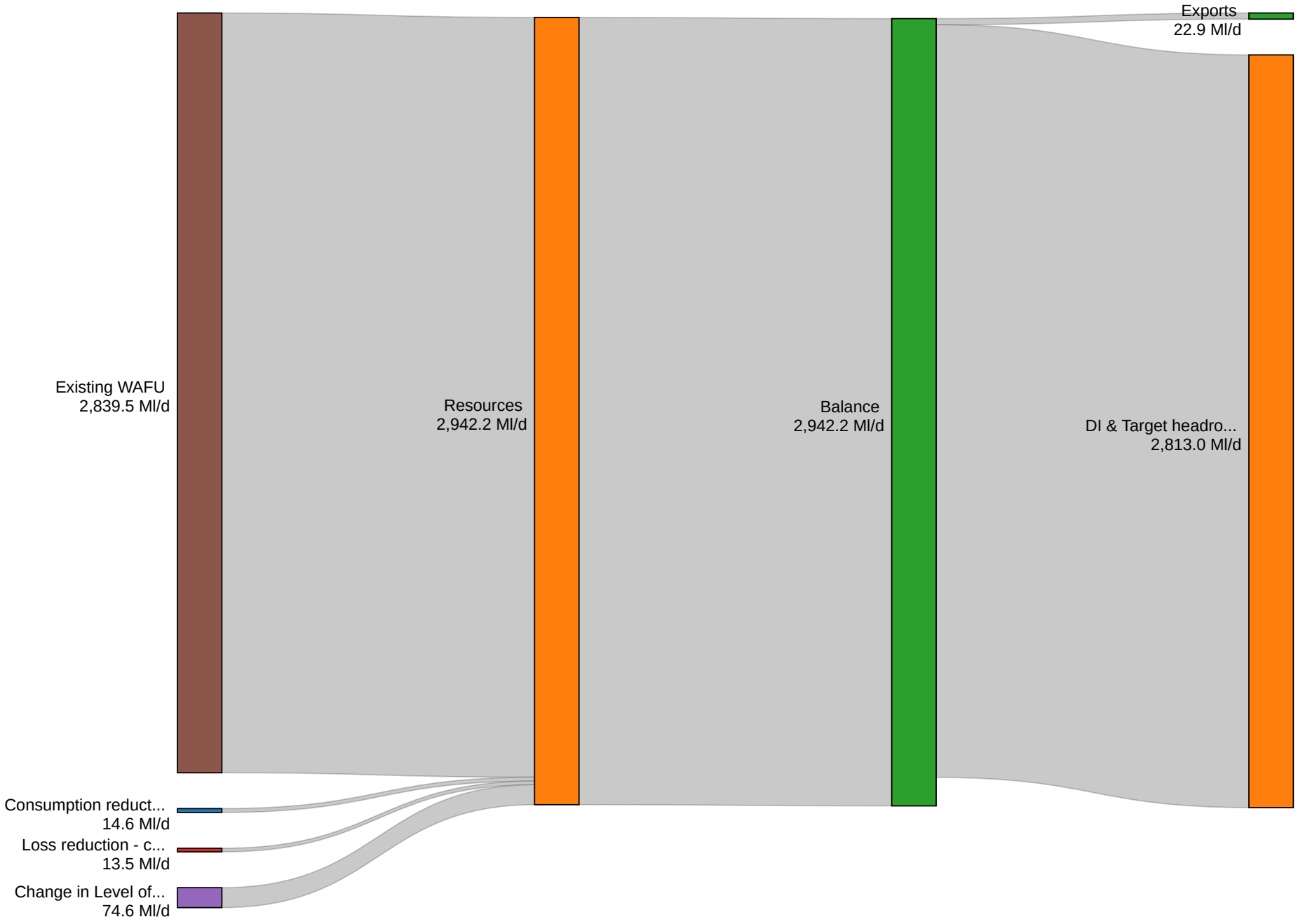
Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.

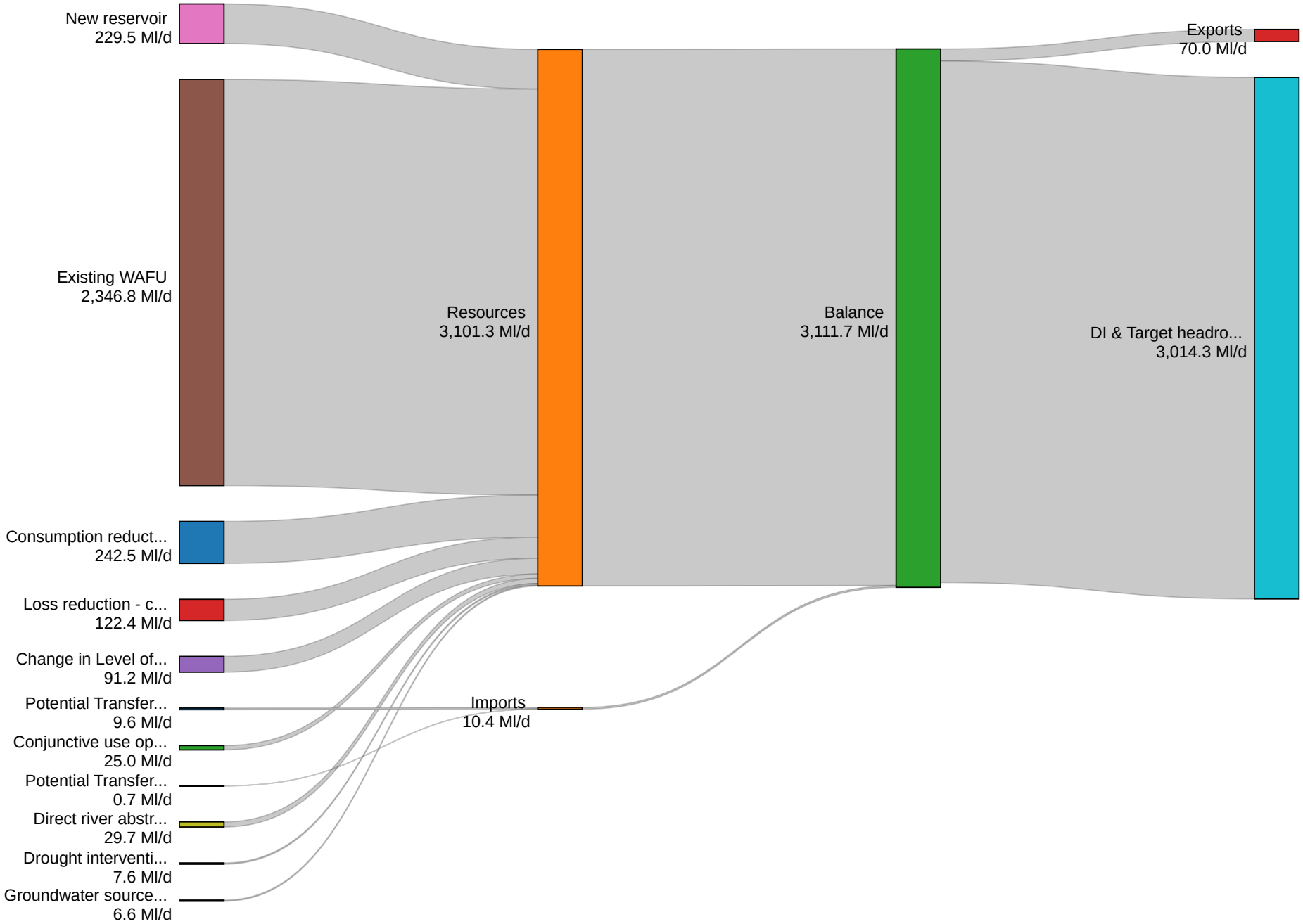


- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

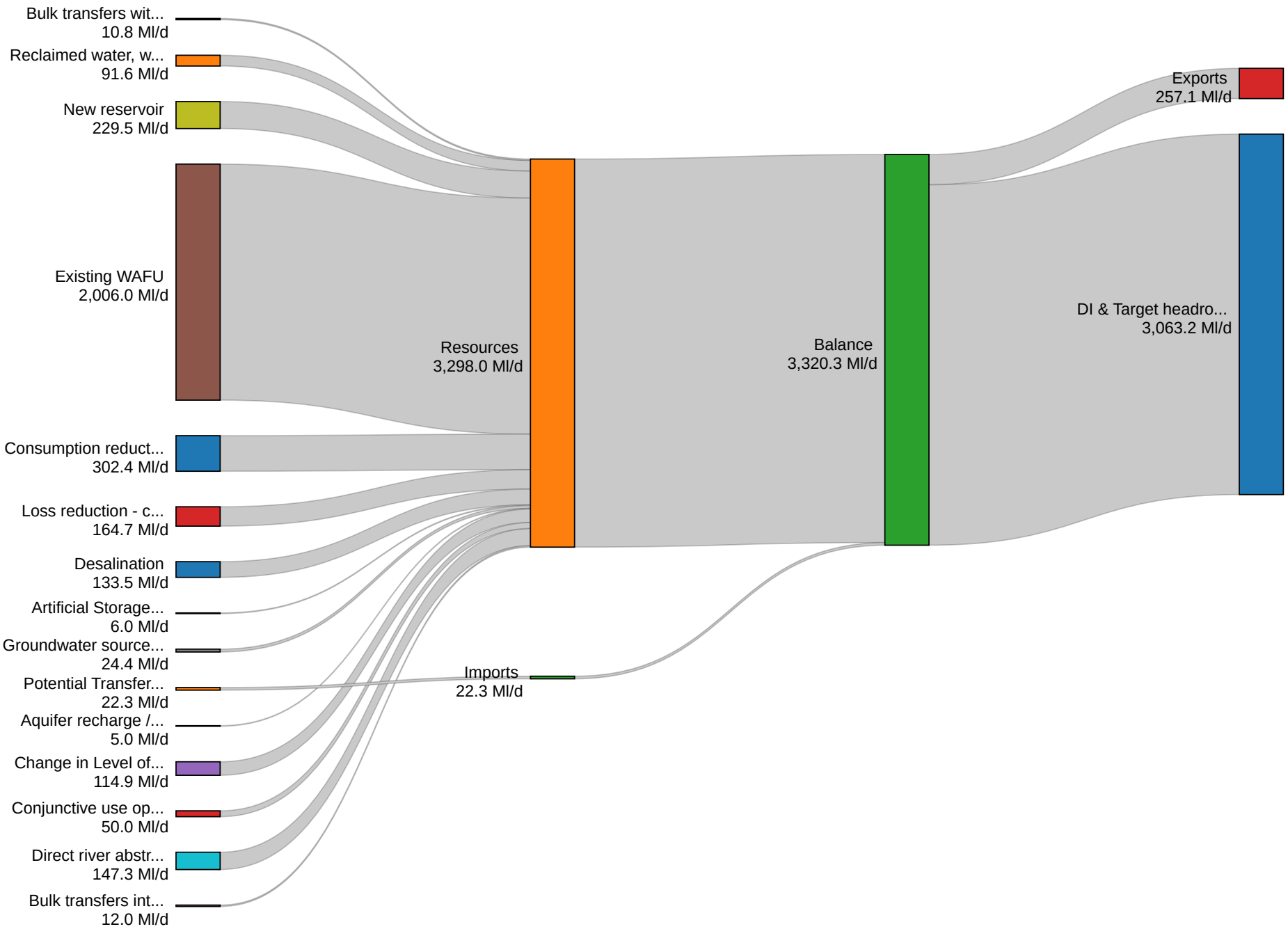
Situation 4 - 2026 (Thames Water)



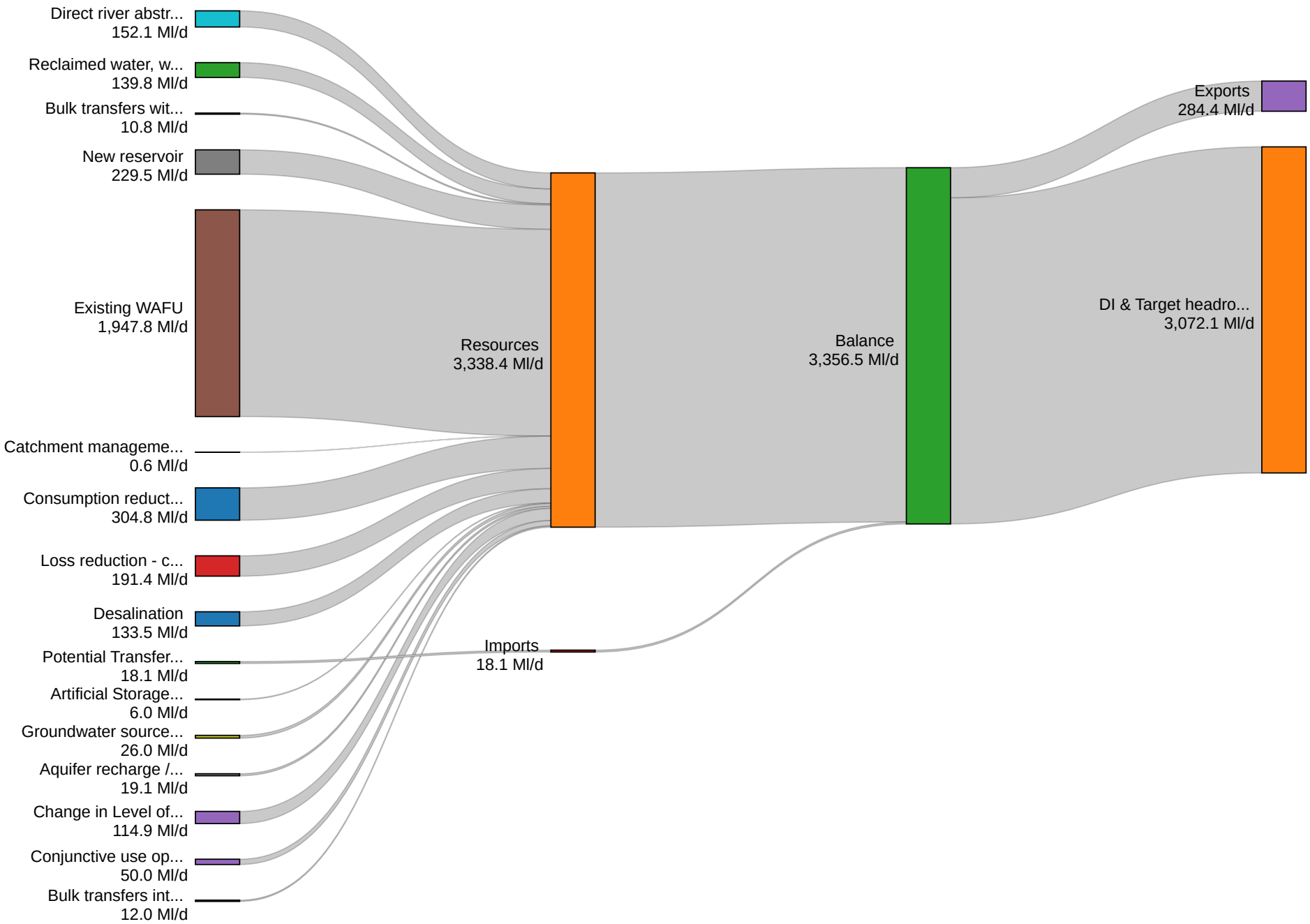
Situation 4 - 2040 (Thames Water)



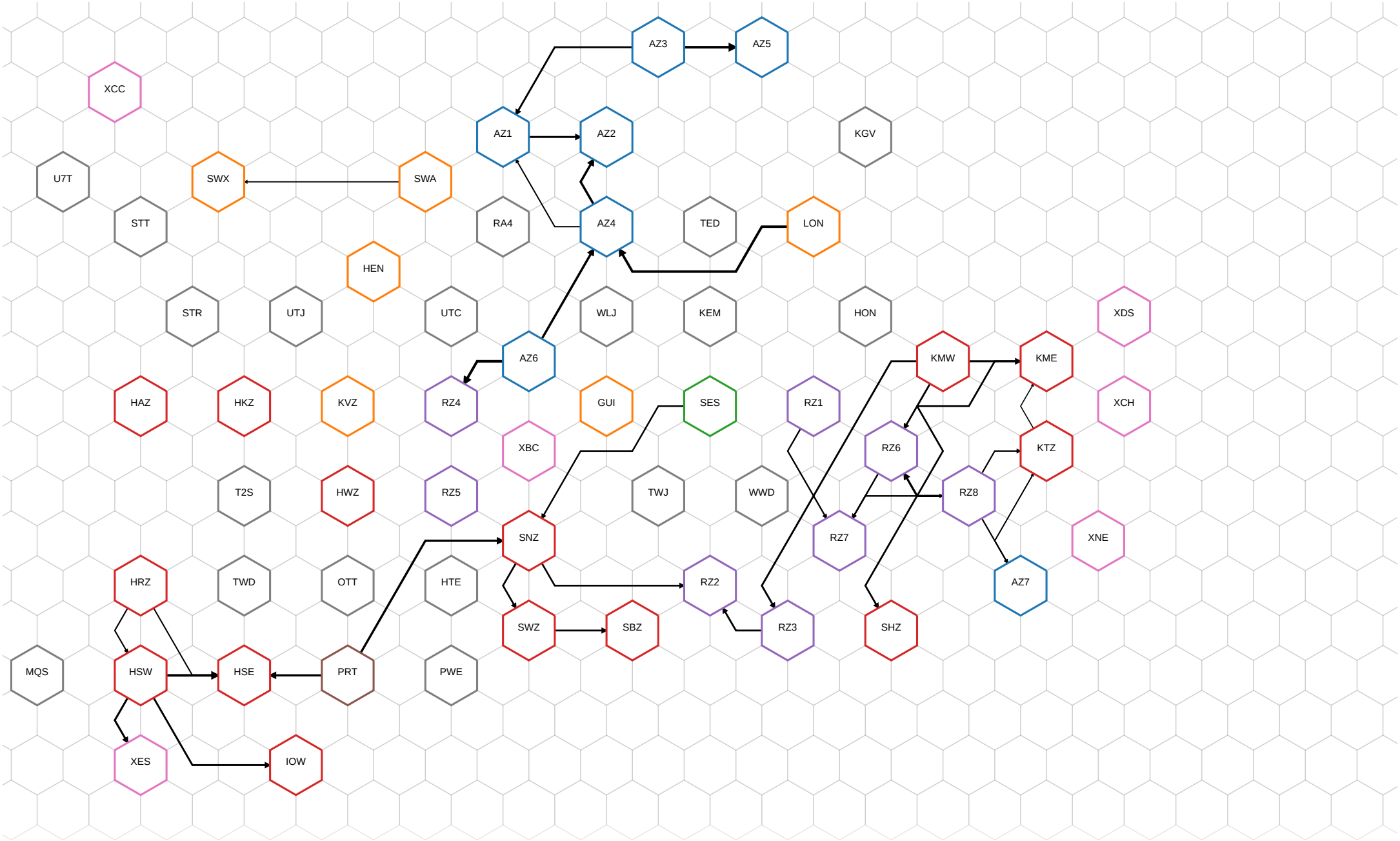
Situation 4 - 2050 (Thames Water)



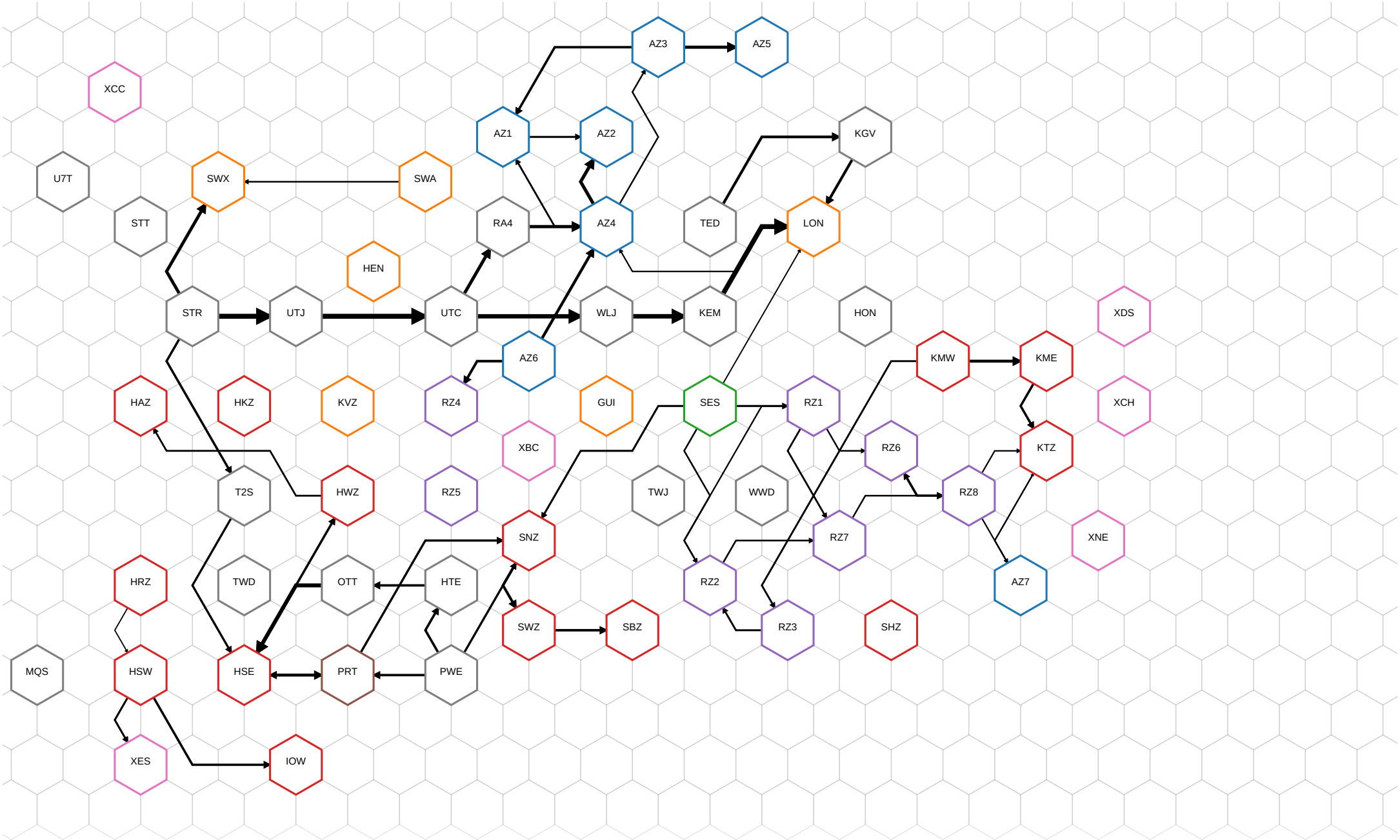
Situation 4 - 2075 (Thames Water)



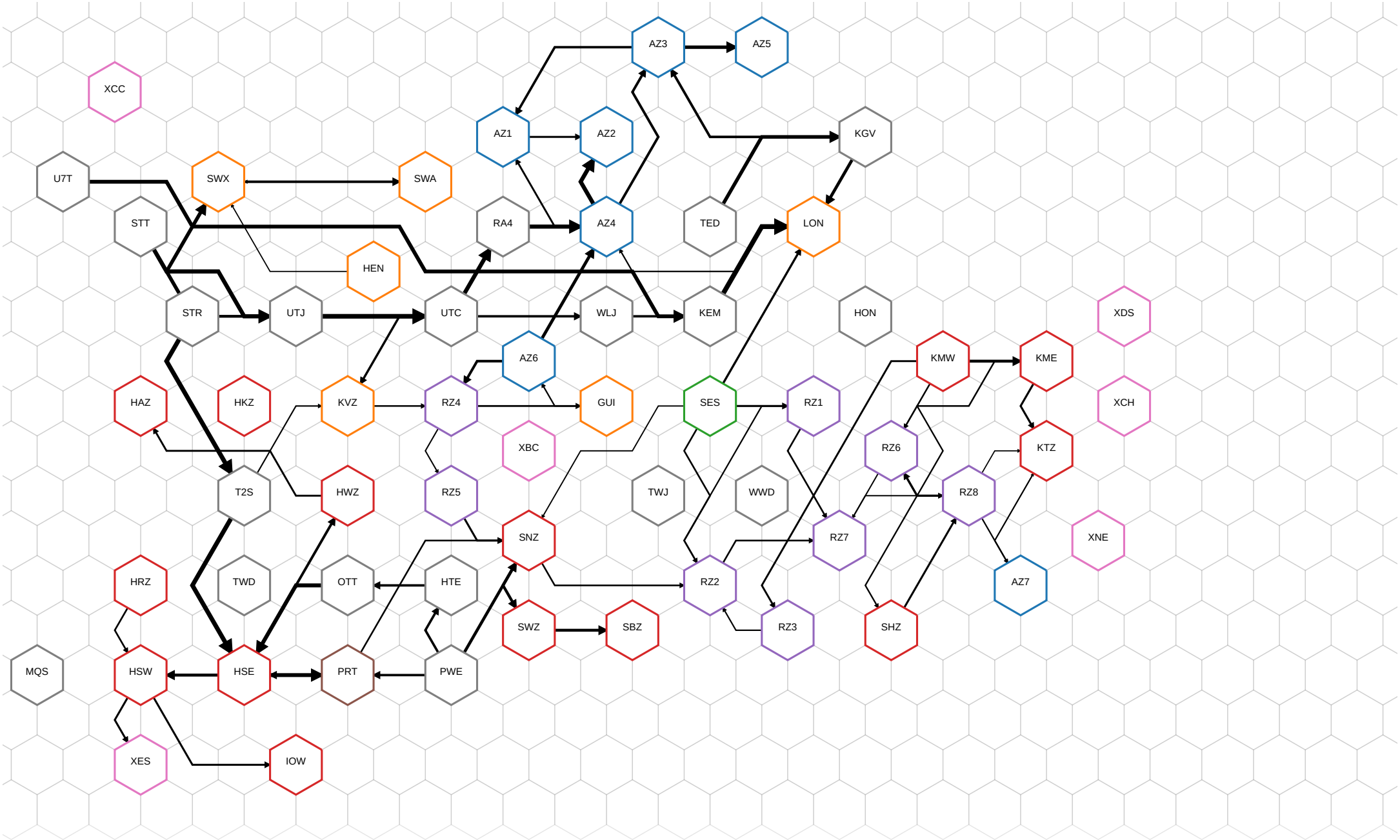
Situation 4 - 2026



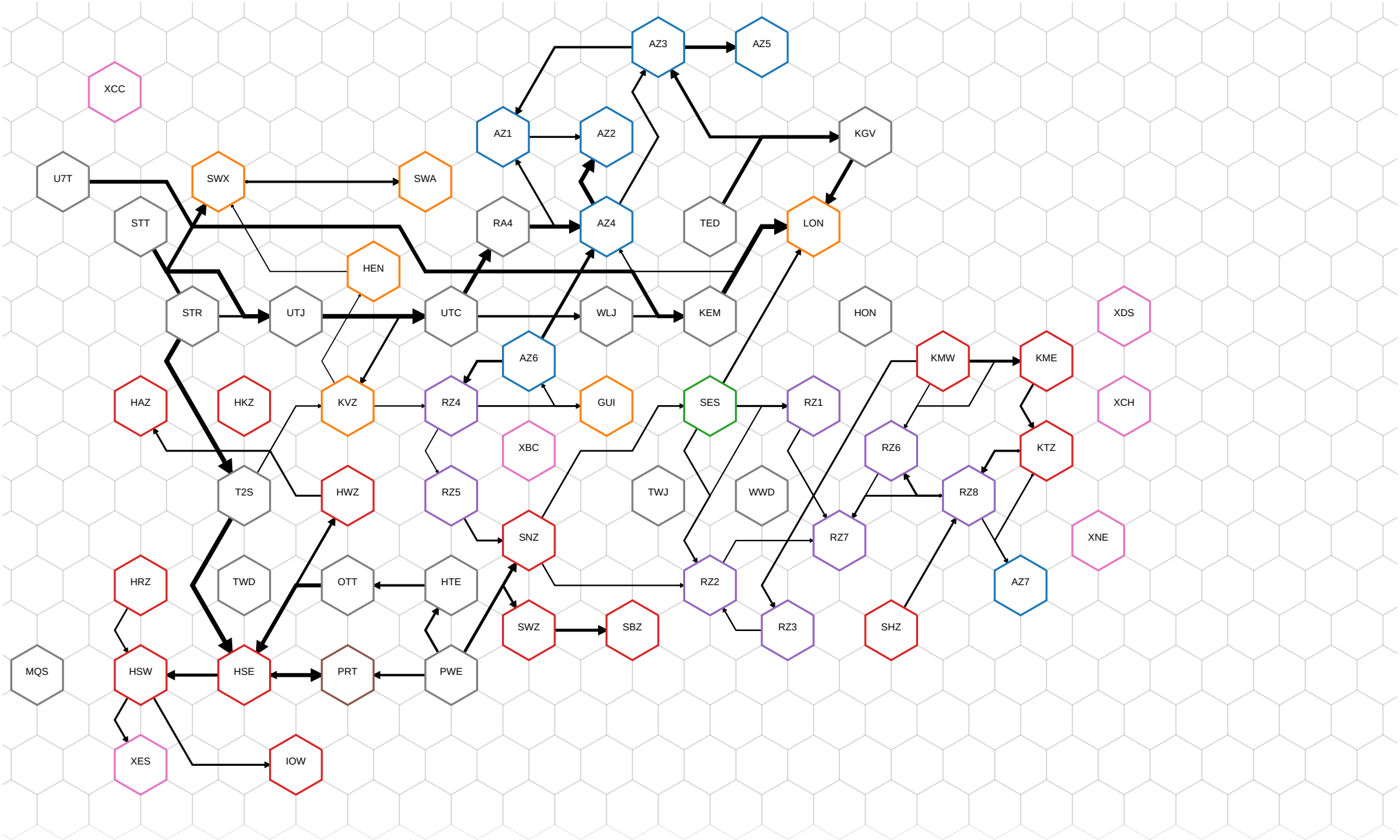
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

GOVERNMENT-LED H + SESRO 100

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridh-large-sws-prt-transfer-v4-only-sesro100-2075
Description	Least cost run with hybrid-h government interventions with increased capacity of T2S transfer to 200 Ml/d and increased Otterbourne - Gaters Mill transfer to 95 Ml/d. No cost changes to account for the increased capacities have been included. Includes a 6 Ml/d emergency deficit in RZ6 in 2049. Includes only SESRO 100 Mm3. Extend Testwood and Candover drought permits to 2040.
Created at	06/07/2023, 16:57:42
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridh-large-sws-prt-transfer-v4-only-sesro100
Setting description	Emergency options in RZ6 (2049). Excluding SES low, medium and high DMP baskets. Increase capacity of T2S transfer to 200 Ml/d and expand Otterbourne - Gaters Mill transfer to 95 Ml/d. Exclude all SESRO variants except 100. Extend Testwood and Candover drought permits to 2040.
Optimised discount rate	STPR

Metrics

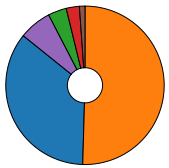
Net present value (Cost)

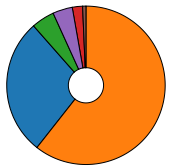
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	23,542	18,655	17,516	21,831	18,499	17,377	19,049	17,317	16,498	(£m)
Cost w/o deficit (STPR)	23,542	18,655	17,516	21,831	18,499	17,377	19,049	17,317	16,498	(£m)
Cost w/ deficit (IGEQ)	36,893	27,777	25,668	33,655	27,505	25,439	28,655	25,409	23,917	(£m)
Cost w/o deficit (IGEQ)	36,893	27,777	25,668	33,655	27,505	25,439	28,655	25,409	23,917	(£m)
Cost w/ deficit (LTDR)	26,105	20,441	19,124	24,118	20,263	18,967	20,922	18,912	17,968	(£m)
Cost w/o deficit (LTDR)	26,105	20,441	19,124	24,118	20,263	18,967	20,922	18,912	17,968	(£m)

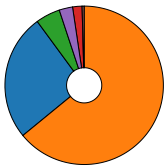
Cost breakdown (STPR)

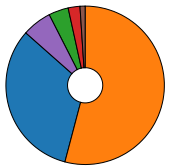
Select Company: Total

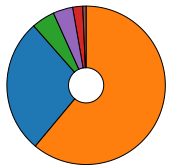
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	8,316	5,203	4,527	7,077	5,077	4,414	5,282	4,309	3,855	(£m)
Fixed opex	11,878	11,307	11,223	11,812	11,296	11,211	11,409	11,207	11,147	(£m)
Fixed operational carbon	893	877	875	886	876	874	877	870	866	(£m)
Embedded carbon	632	392	338	524	382	328	410	321	290	(£m)
Variable opex	1,558	749	479	1,305	743	477	923	540	301	(£m)
Variable carbon opex	264	126	74	227	125	72	148	70	41	(£m)

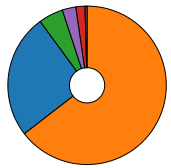
situation1 

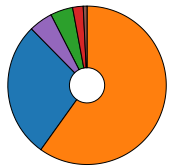
situation2 

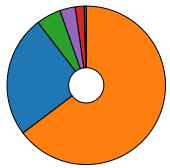
situation3 

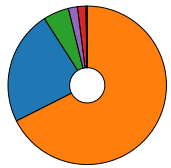
situation4 

situation5 

situation6 

situation7 

situation8 

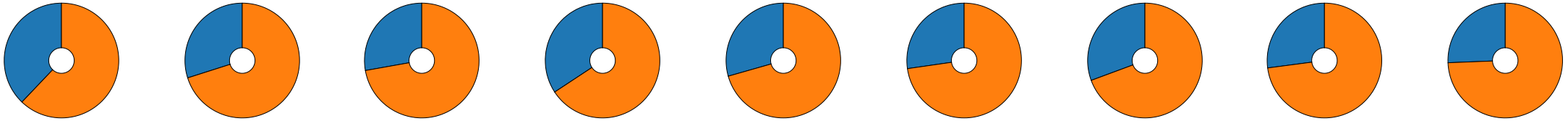
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	4,157,496	2,455,047	2,080,573	3,382,662	2,390,739	2,017,534	2,606,401	1,978,583	1,765,846	(tonnes)
Operational emissions	6,816,903	5,755,720	5,403,813	6,491,262	5,739,222	5,381,025	5,902,830	5,328,765	5,125,830	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

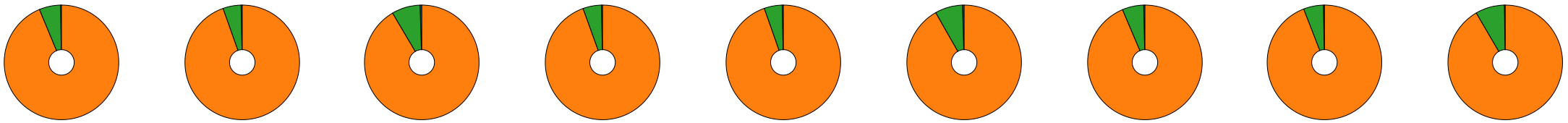


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	93	58	41	93	58	40	75	36	10	(GWh)
Grid	31,948	15,945	7,663	27,262	15,750	7,577	19,133	11,325	3,903	(GWh)
Renewable	2,044	858	671	1,500	839	642	1,232	673	349	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	72,527.00	66,402.00	64,831.00	69,698.00	65,992.00	64,063.00	66,366.00	62,749.00	61,695.00	
SEA environmental disbenefit	126,177.00	92,978.00	79,140.00	114,804.00	89,990.00	75,259.00	91,488.00	73,026.00	66,126.00	
Natural capital	80,439,586.07	78,355,842.07	78,853,256.92	74,984,281.09	79,347,410.91	82,621,093.96	77,549,721.71	80,227,178.60	82,905,171.51	
Bio-diversity net gain	−233,051.00	−163,345.00	−144,579.00	−209,889.00	−154,518.00	−123,261.00	−153,767.00	−113,062.00	−97,141.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	35,431.00	33,236.00	32,420.00	34,690.00	33,119.00	32,232.00	33,050.00	31,735.00	31,295.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	31.17	29.91	31.66	30.11	29.96	31.73	30.90	32.15	35.50	
R1: Uncertainty of option supply/demand benefit	7.13	6.23	6.48	6.61	6.23	6.48	6.39	6.29	6.86	
R3: Risk of service failure due to other physical hazards	6.94	6.88	7.41	6.74	6.89	7.43	7.07	7.45	8.42	
R4: Availability of additional headroom	6.47	6.67	6.86	6.50	6.68	6.86	6.97	7.30	7.54	
R5: Catchment/raw water quality risks (incl. climate change)	5.07	4.65	5.01	4.80	4.67	5.04	4.82	5.25	6.04	
R6: Capacity of catchment services	0.01	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00	
R7: Risk of service failure to other exceptional events	5.55	5.48	5.90	5.45	5.48	5.91	5.65	5.86	6.65	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

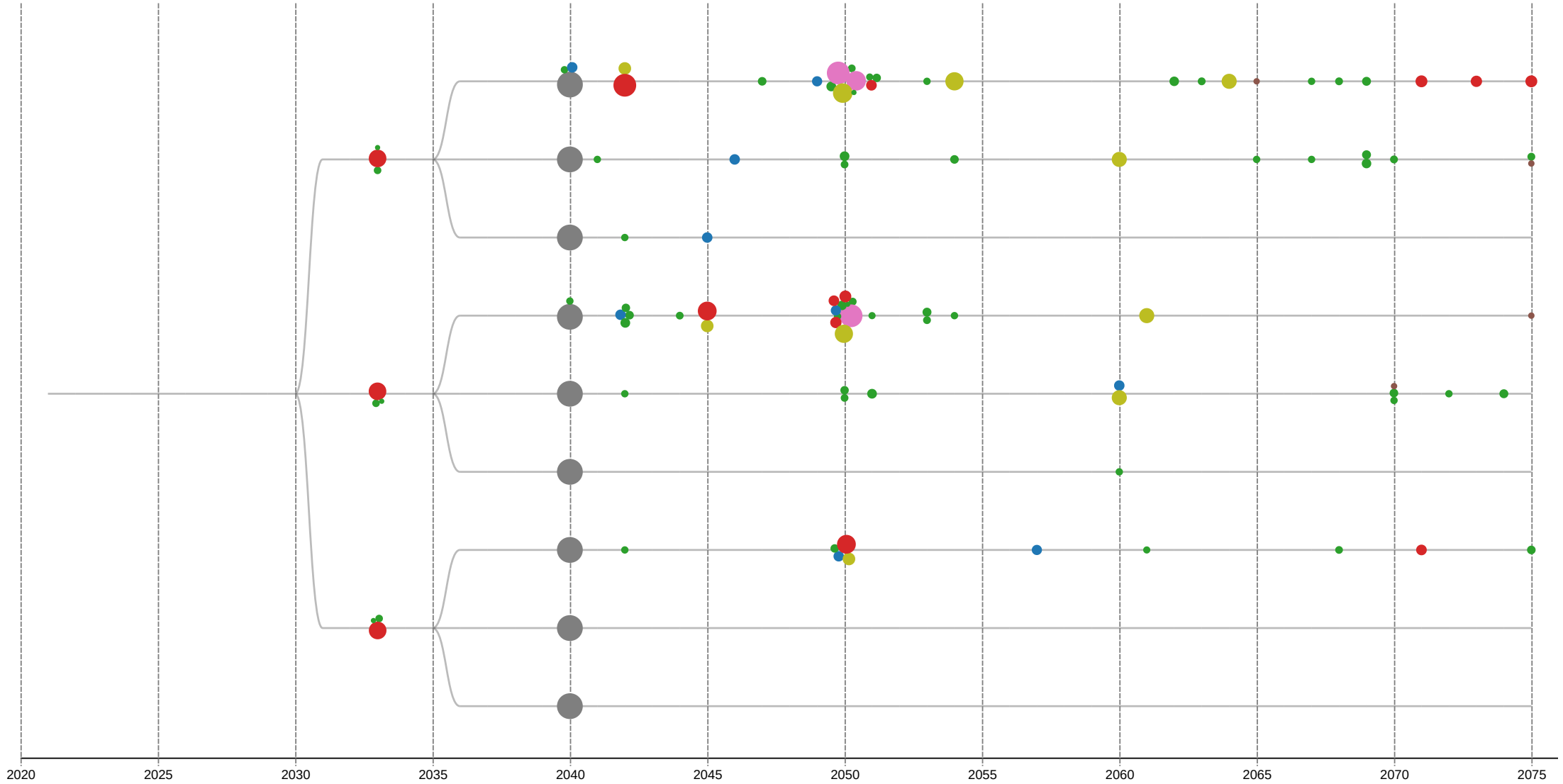
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	15.01	15.50	17.08	14.20	15.60	17.14	15.71	17.66	19.85	
A3: Operational complexity and flexibility	6.06	6.35	6.88	6.03	6.37	6.92	6.47	6.93	7.91	
A4: WRZ connectivity	8.89	9.09	10.15	8.12	9.17	10.18	9.19	10.68	11.89	
A7: Customer relations support engagement with demand management	0.05	0.06	0.05	0.05	0.06	0.05	0.05	0.05	0.06	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	20.13	19.17	20.49	19.06	19.21	20.55	19.75	20.87	23.21	
E1: Scaleability and modularity of proposed changes	8.62	8.35	8.95	8.12	8.37	8.99	8.48	9.18	10.32	
E2: Intervention lead times	5.50	5.06	5.41	5.15	5.07	5.40	5.34	5.55	5.99	
E3: Reliance on external bodies to deliver changes	6.00	5.75	6.14	5.78	5.76	6.16	5.93	6.15	6.90	
E5: Collaborative land management	0.01	0.01	0.00	0.01	0.01	0.00	0.00	0.00	0.00	

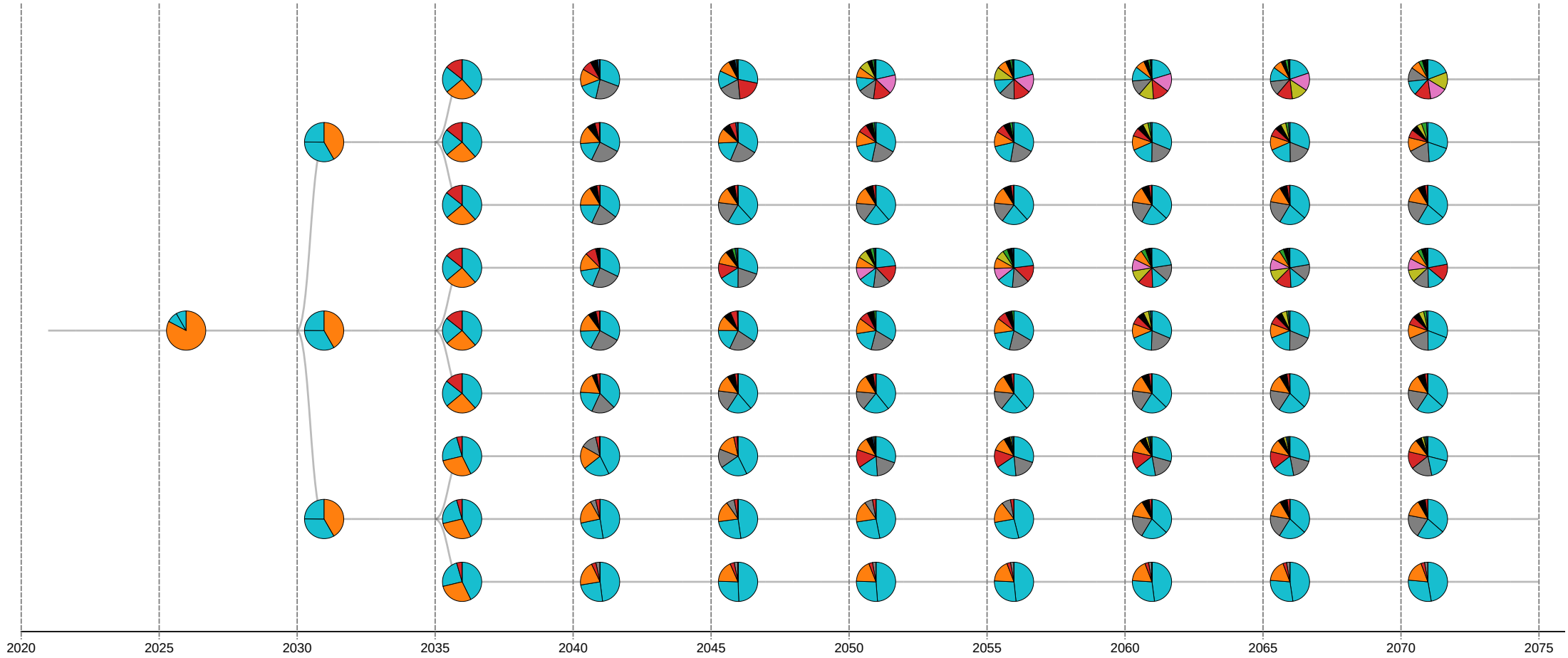
Option Selection (Thames Water)



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
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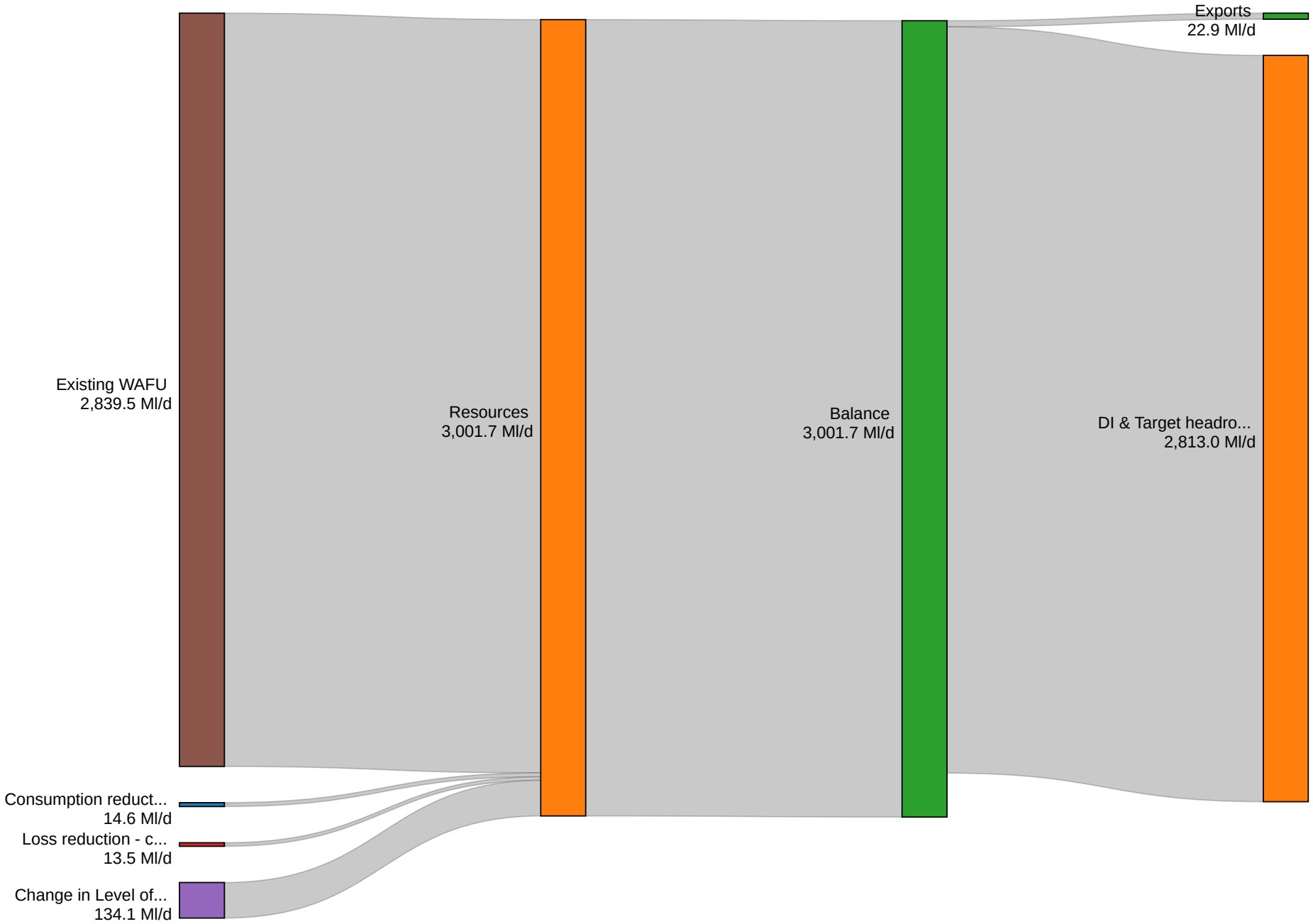
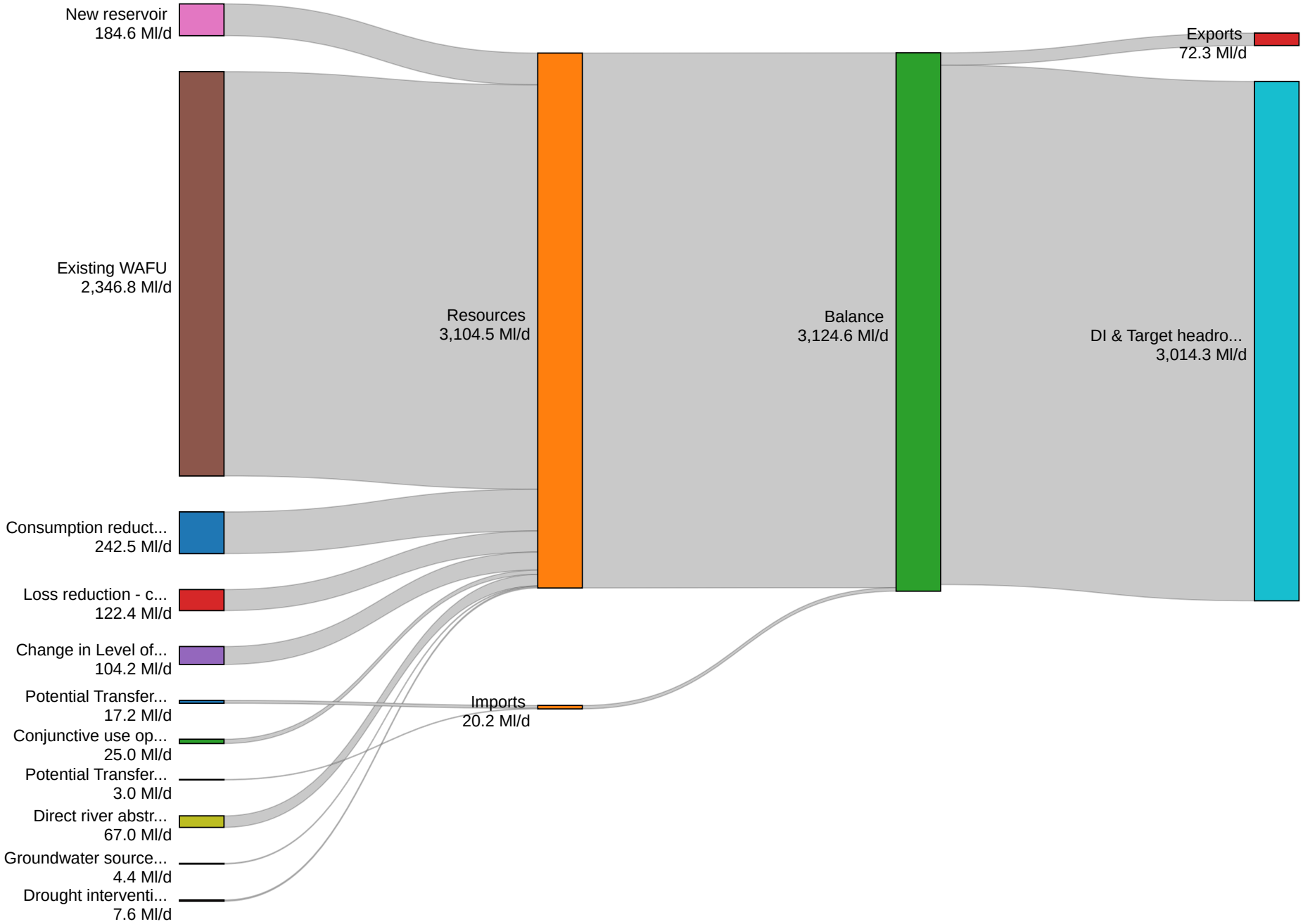
- Other

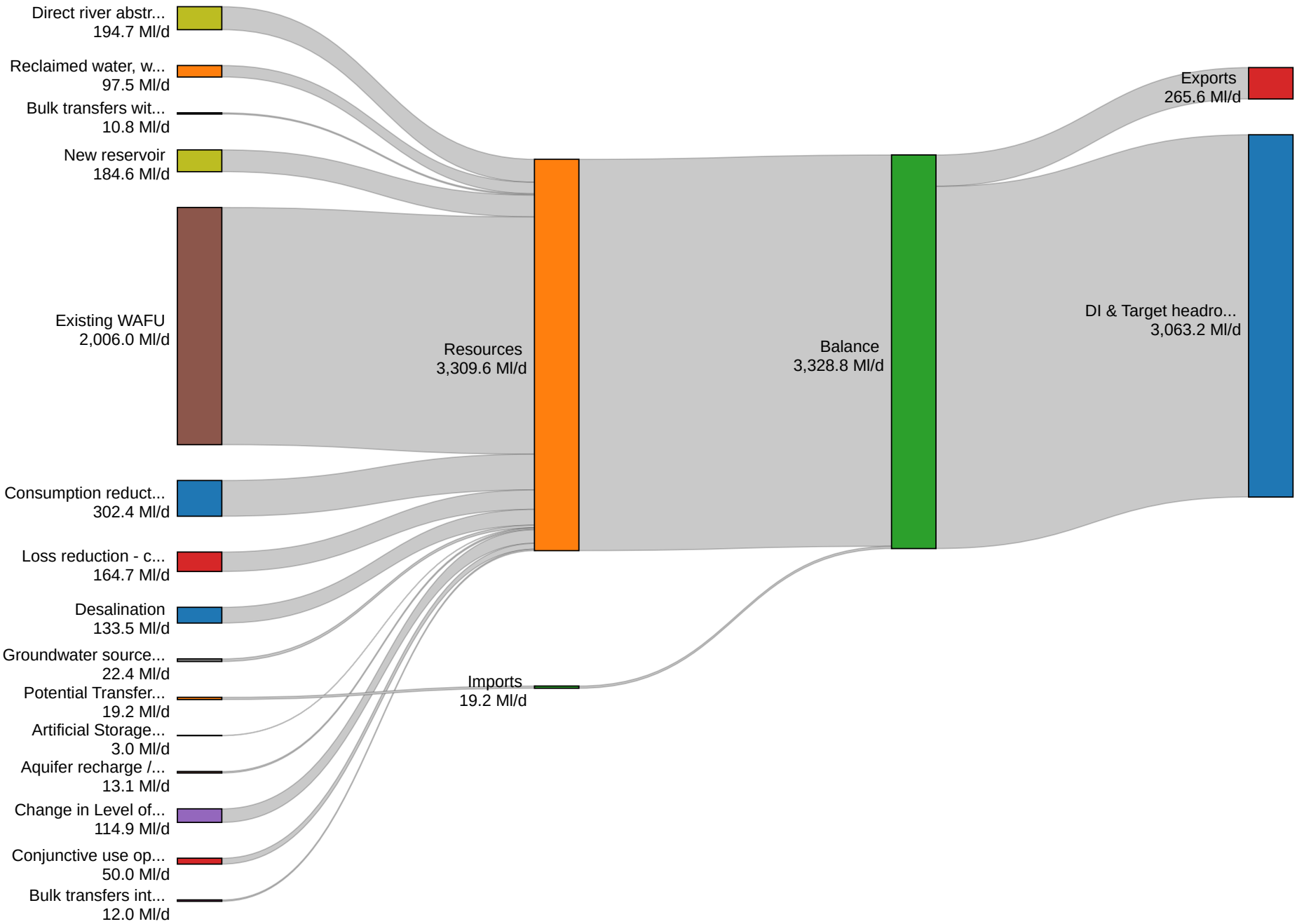
Situation 4 - 2026 (Thames Water)



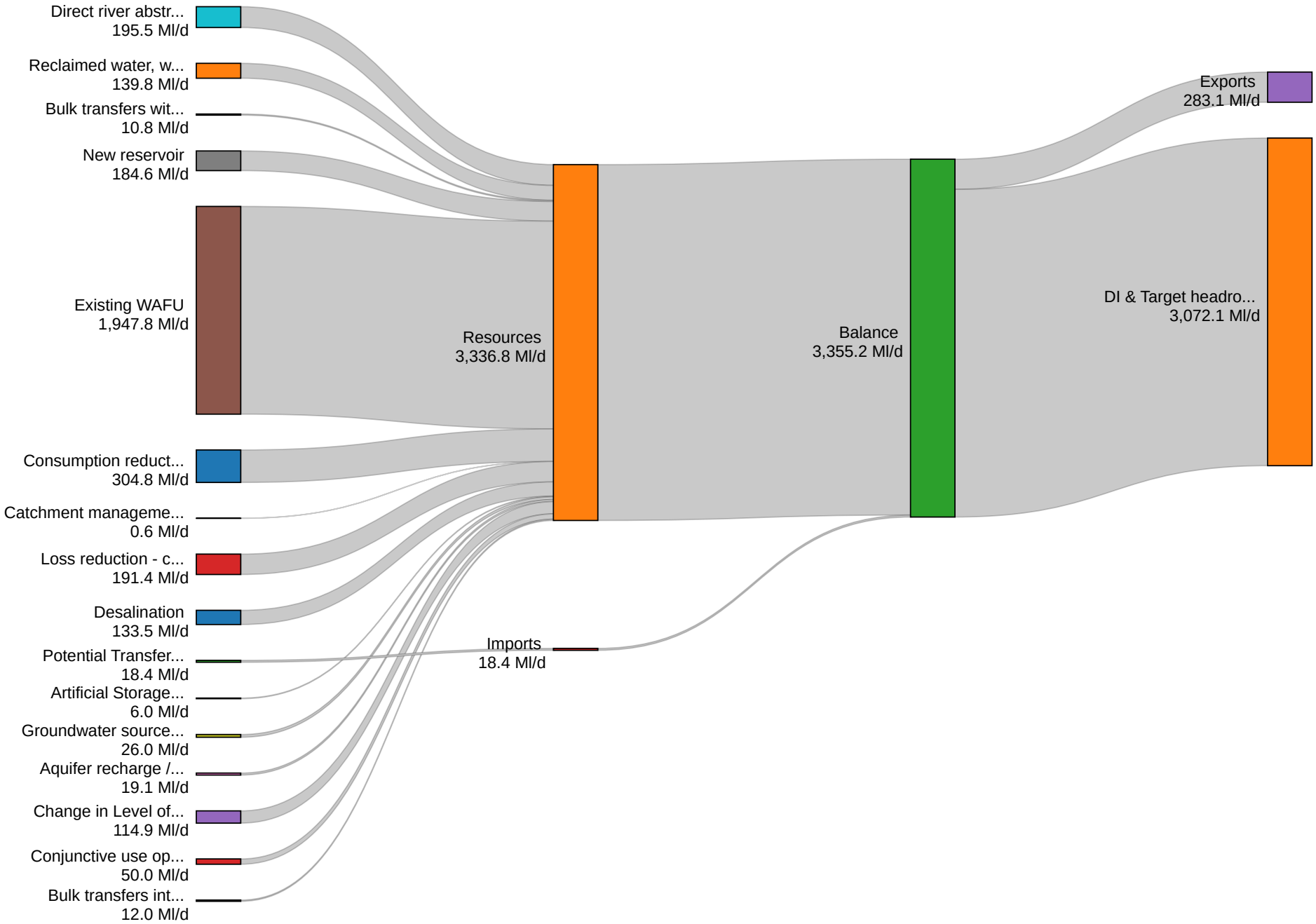
Situation 4 - 2040 (Thames Water)



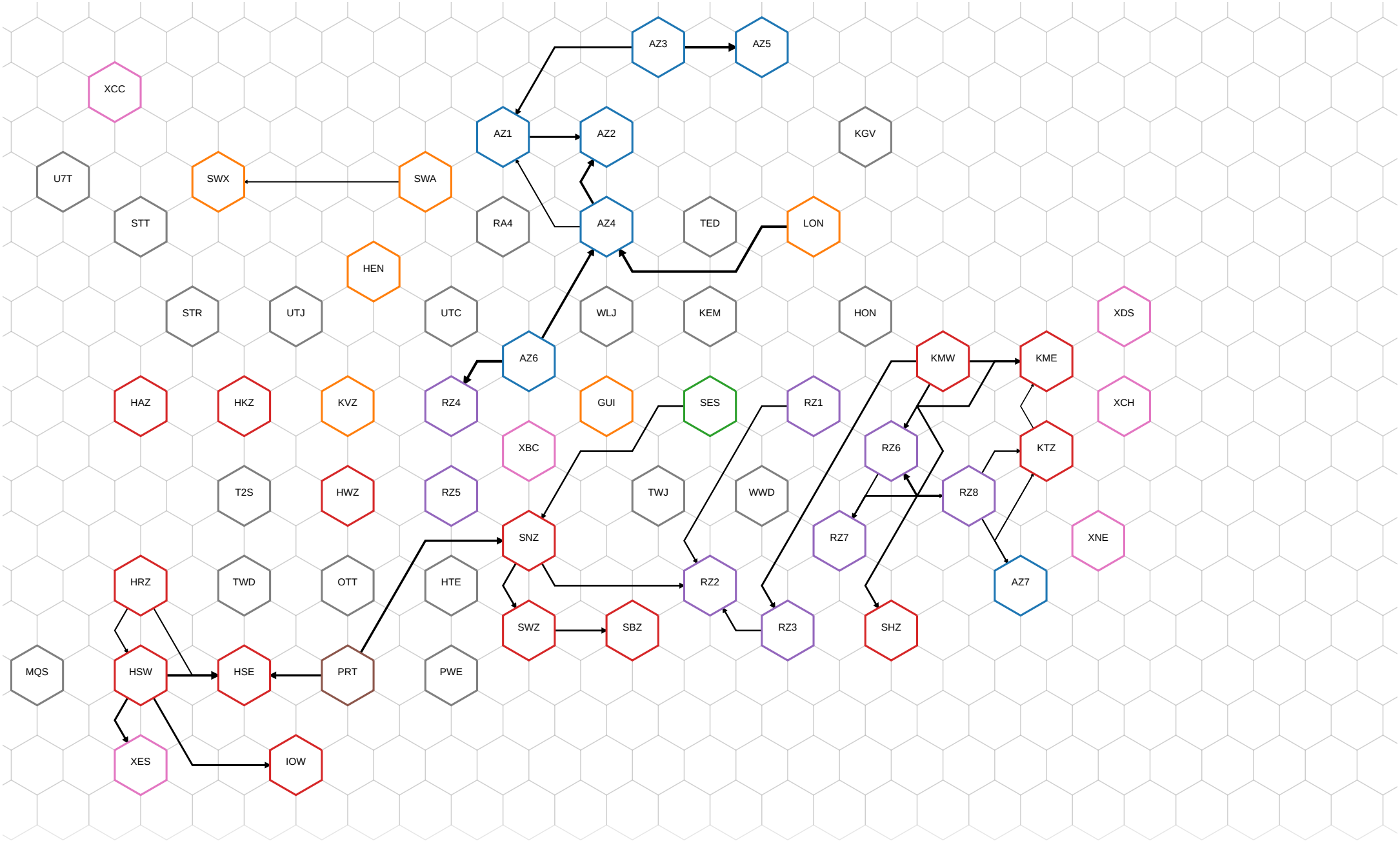
Situation 4 - 2050 (Thames Water)



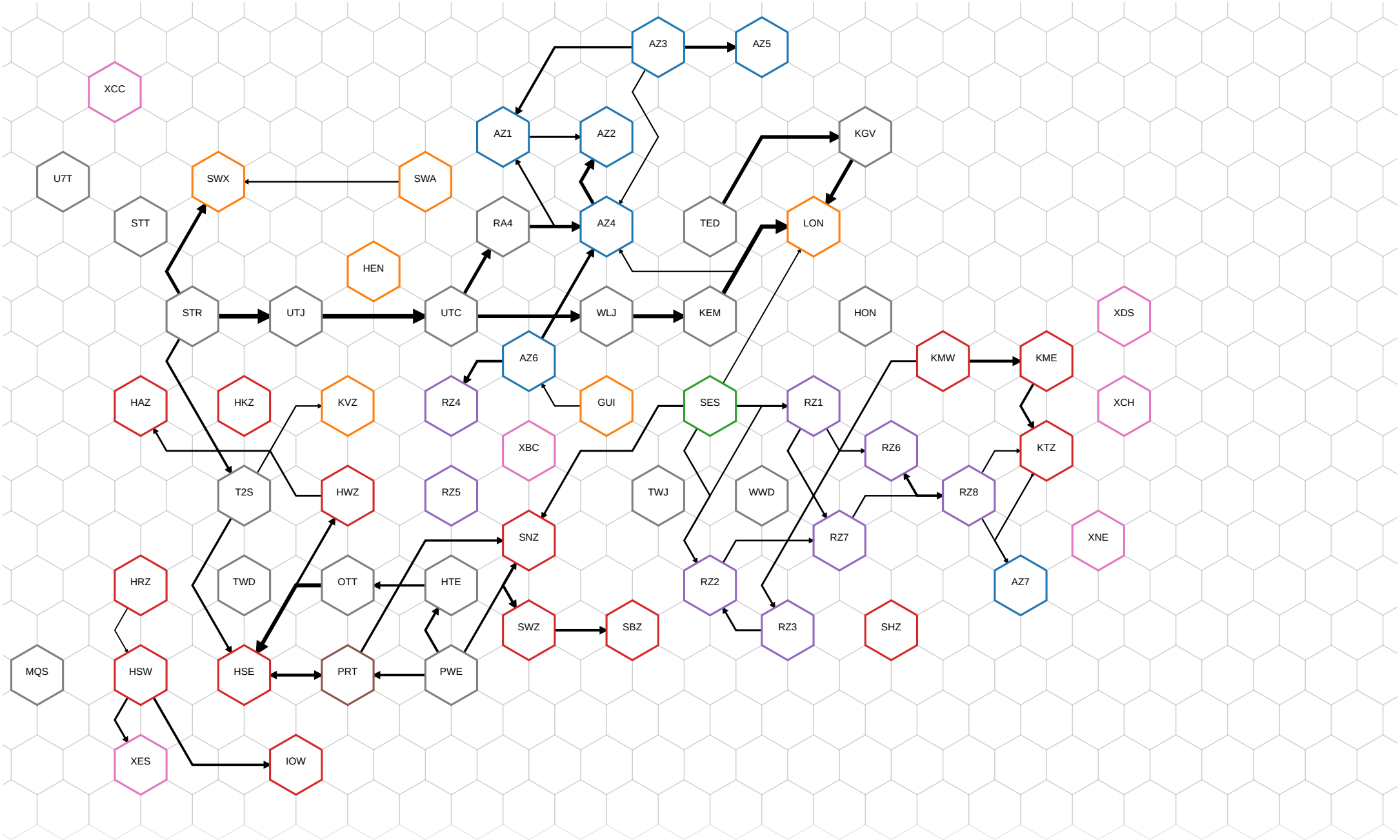
Situation 4 - 2075 (Thames Water)



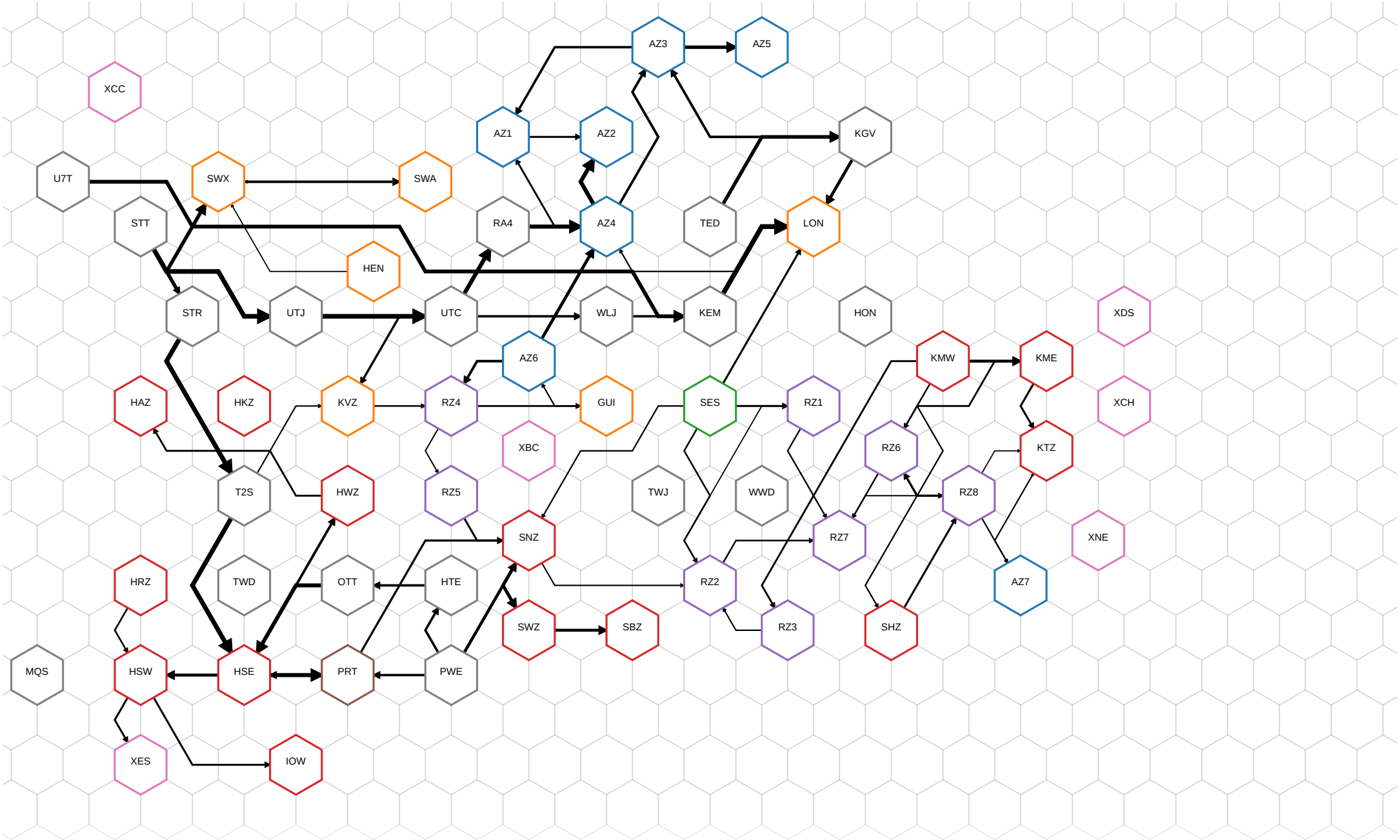
Situation 4 - 2026



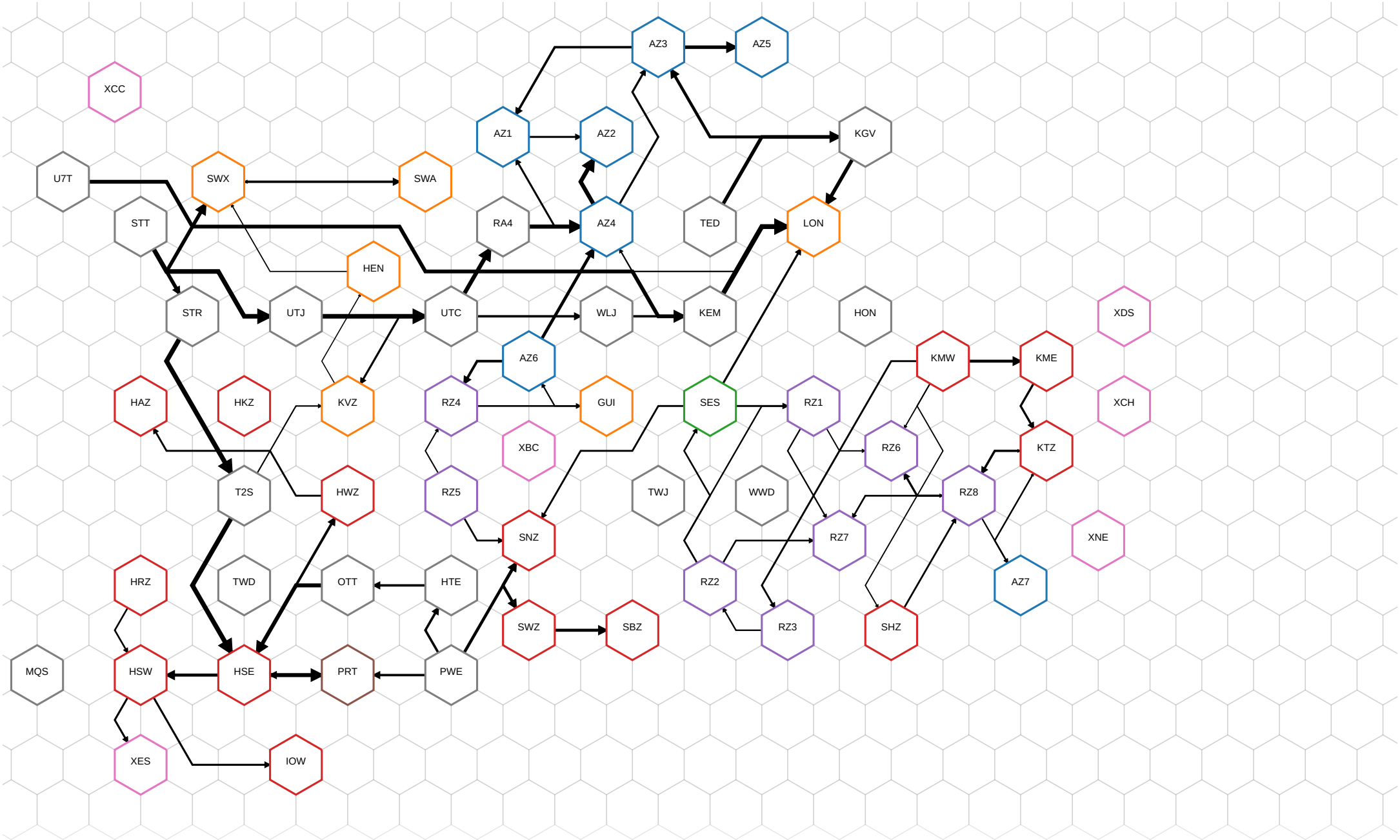
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

GOVERNMENT-LED H + SESRO 75

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridh-large-sws-prt-transfer-v4-only-sesro75-2075
Description	Least cost run with hybrid-h government interventions with increased capacity of T2S transfer to 200 Ml/d and increased Otterbourne - Gaters Mill transfer to 95 Ml/d. No cost changes to account for the increased capacities have been included. Includes a 6 Ml/d emergency deficit in RZ6 in 2049. Includes only SESRO 75 Mm3. Extend Testwood and Candover drought permits to 2040.
Created at	06/07/2023, 14:58:57
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridh-large-sws-prt-transfer-v4-only-sesro75
Setting description	Emergency options in RZ6 (2049). Excluding SES low, medium and high DMP baskets. Increase capacity of T2S transfer to 200 Ml/d and expand Otterbourne - Gaters Mill transfer to 95 Ml/d. Exclude all SESRO variants except 75. Extend Testwood and Candover drought permits to 2040.
Optimised discount rate	STPR

Metrics

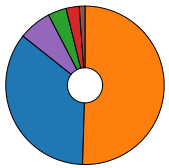
Net present value (Cost)

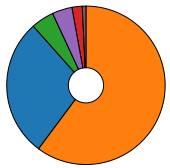
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	23,635	18,814	17,476	21,970	18,634	17,329	19,082	17,248	16,423	(£m)
Cost w/o deficit (STPR)	23,635	18,814	17,476	21,970	18,634	17,329	19,082	17,248	16,423	(£m)
Cost w/ deficit (IGEQ)	37,068	28,115	25,605	33,905	27,792	25,361	28,741	25,301	23,796	(£m)
Cost w/o deficit (IGEQ)	37,068	28,115	25,605	33,905	27,792	25,361	28,741	25,301	23,796	(£m)
Cost w/ deficit (LTDR)	26,214	20,632	19,079	24,277	20,425	18,914	20,964	18,835	17,884	(£m)
Cost w/o deficit (LTDR)	26,214	20,632	19,079	24,277	20,425	18,914	20,964	18,835	17,884	(£m)

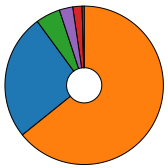
Cost breakdown (STPR)

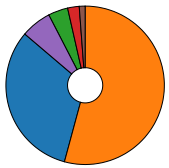
Select Company: Total

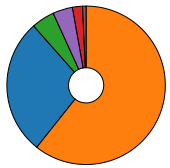
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	8,322	5,311	4,494	7,033	5,178	4,376	5,293	4,232	3,788	(£m)
Fixed opex	11,931	11,326	11,224	11,909	11,310	11,210	11,415	11,204	11,145	(£m)
Fixed operational carbon	894	878	875	888	877	874	877	869	866	(£m)
Embedded carbon	633	396	333	519	389	324	413	314	283	(£m)
Variable opex	1,581	763	477	1,360	748	475	937	547	300	(£m)
Variable carbon opex	274	140	73	261	132	70	146	81	41	(£m)

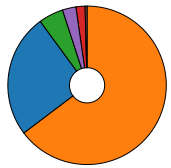
situation1 

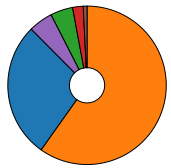
situation2 

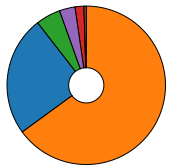
situation3 

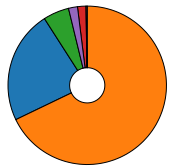
situation4 

situation5 

situation6 

situation7 

situation8 

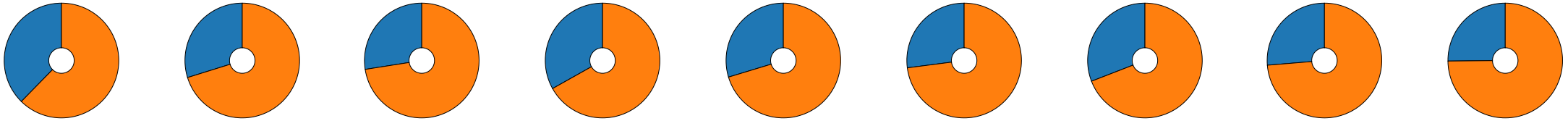
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	4,165,556	2,490,852	2,047,057	3,344,691	2,446,137	1,990,986	2,630,365	1,929,919	1,722,175	(tonnes)
Operational emissions	6,897,816	5,868,301	5,403,160	6,751,960	5,797,539	5,371,771	5,888,408	5,406,322	5,125,830	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

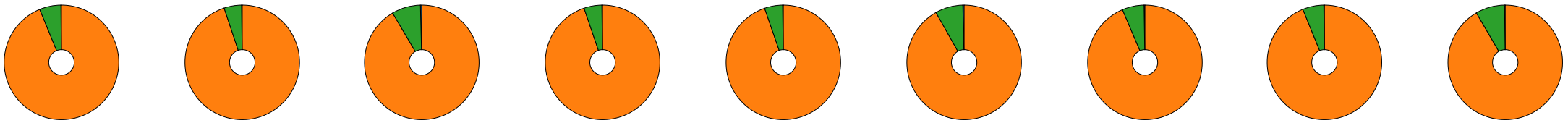


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	59	36	32	60	37	31	53	22	8	(GWh)
Grid	32,115	16,354	7,573	27,860	15,964	7,559	19,584	11,138	3,892	(GWh)
Renewable	2,062	848	671	1,482	859	642	1,290	708	349	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
SEA environmental benefit	72,758.00	66,900.00	64,857.00	69,632.00	66,236.00	64,063.00	66,349.00	62,780.00	61,695.00	
SEA environmental disbenefit	129,059.00	97,813.00	79,400.00	113,879.00	93,694.00	75,259.00	91,908.00	72,701.00	66,126.00	
Natural capital	81,558,381.38	79,708,686.12	80,494,992.20	76,334,113.15	80,559,488.38	84,033,933.96	78,945,440.89	81,701,070.78	84,318,011.51	
Bio-diversity net gain	−217,036.00	−158,203.00	−130,889.00	−194,783.00	−153,486.00	−112,129.00	−145,018.00	−99,937.00	−86,009.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	35,509.00	33,607.00	32,529.00	34,689.00	33,302.00	32,253.00	33,021.00	31,668.00	31,295.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	31.02	29.75	30.96	29.66	29.79	31.06	30.52	31.41	34.66	
R1: Uncertainty of option supply/demand benefit	7.15	6.25	6.33	6.53	6.25	6.34	6.33	6.15	6.69	
R3: Risk of service failure due to other physical hazards	6.89	6.82	7.22	6.62	6.83	7.25	6.95	7.25	8.18	
R4: Availability of additional headroom	6.45	6.64	6.81	6.47	6.66	6.83	6.93	7.26	7.49	
R5: Catchment/raw water quality risks (incl. climate change)	5.02	4.62	4.89	4.71	4.63	4.91	4.76	5.10	5.88	
R6: Capacity of catchment services	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	
R7: Risk of service failure to other exceptional events	5.51	5.42	5.71	5.32	5.41	5.72	5.54	5.65	6.42	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

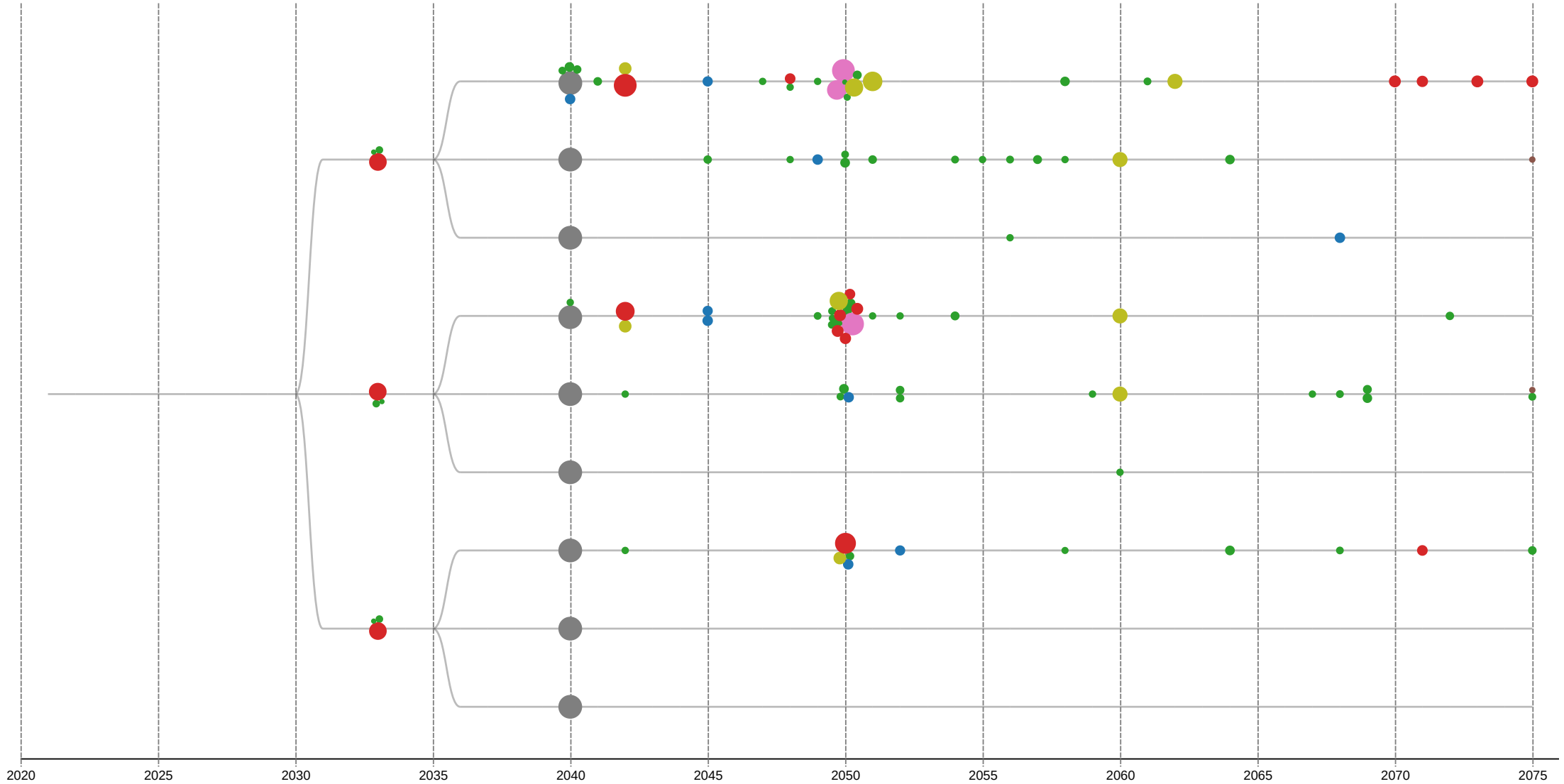
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	14.96	15.52	16.95	14.05	15.57	16.96	15.59	17.37	19.62	
A3: Operational complexity and flexibility	6.00	6.29	6.69	5.89	6.30	6.73	6.35	6.73	7.68	
A4: WRZ connectivity	8.92	9.17	10.21	8.12	9.21	10.18	9.19	10.59	11.89	
A7: Customer relations support engagement with demand management	0.04	0.06	0.05	0.04	0.06	0.05	0.05	0.05	0.06	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	20.26	19.39	20.30	18.96	19.39	20.39	19.88	20.55	22.98	
E1: Scaleability and modularity of proposed changes	8.66	8.40	8.85	8.06	8.42	8.90	8.54	9.09	10.20	
E2: Intervention lead times	5.54	5.16	5.37	5.13	5.14	5.38	5.40	5.36	5.94	
E3: Reliance on external bodies to deliver changes	6.06	5.82	6.09	5.77	5.82	6.11	5.95	6.10	6.84	
E5: Collaborative land management	0.00	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	

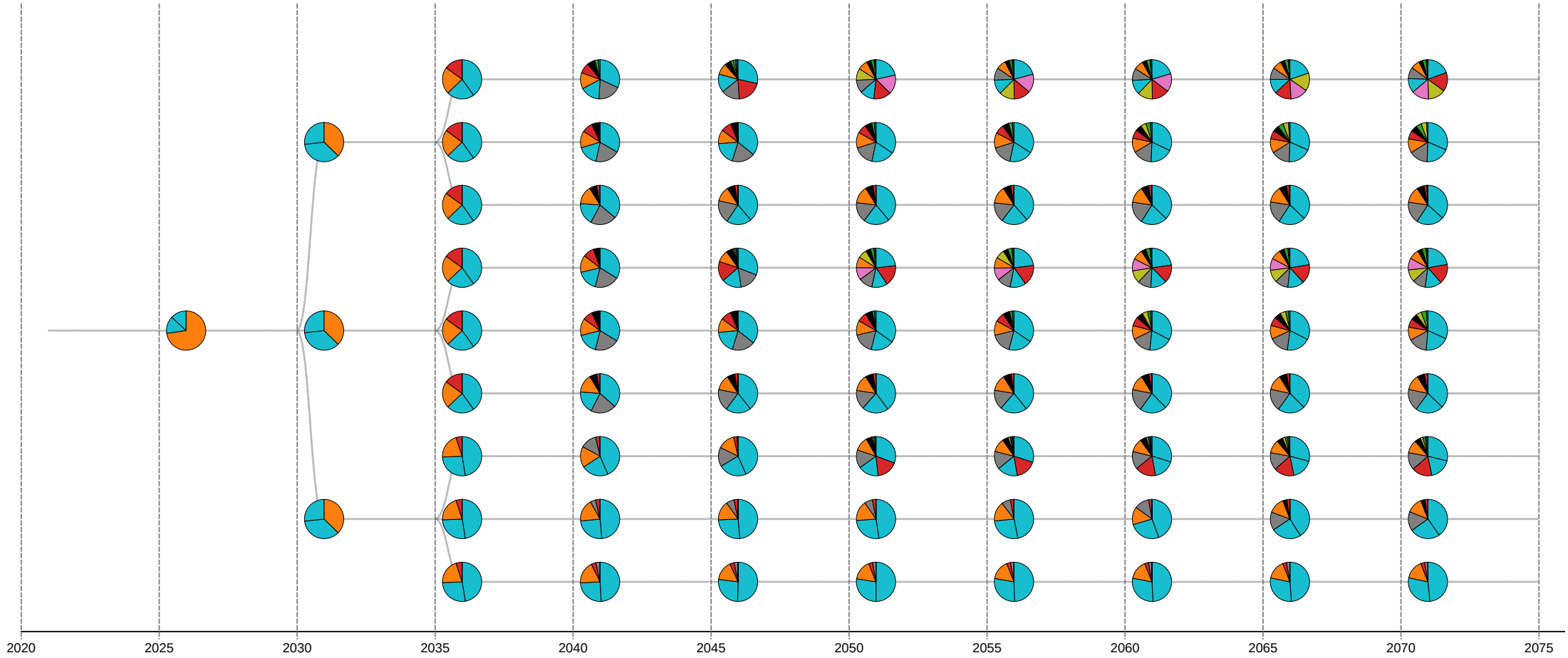
Option Selection (Thames Water)



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

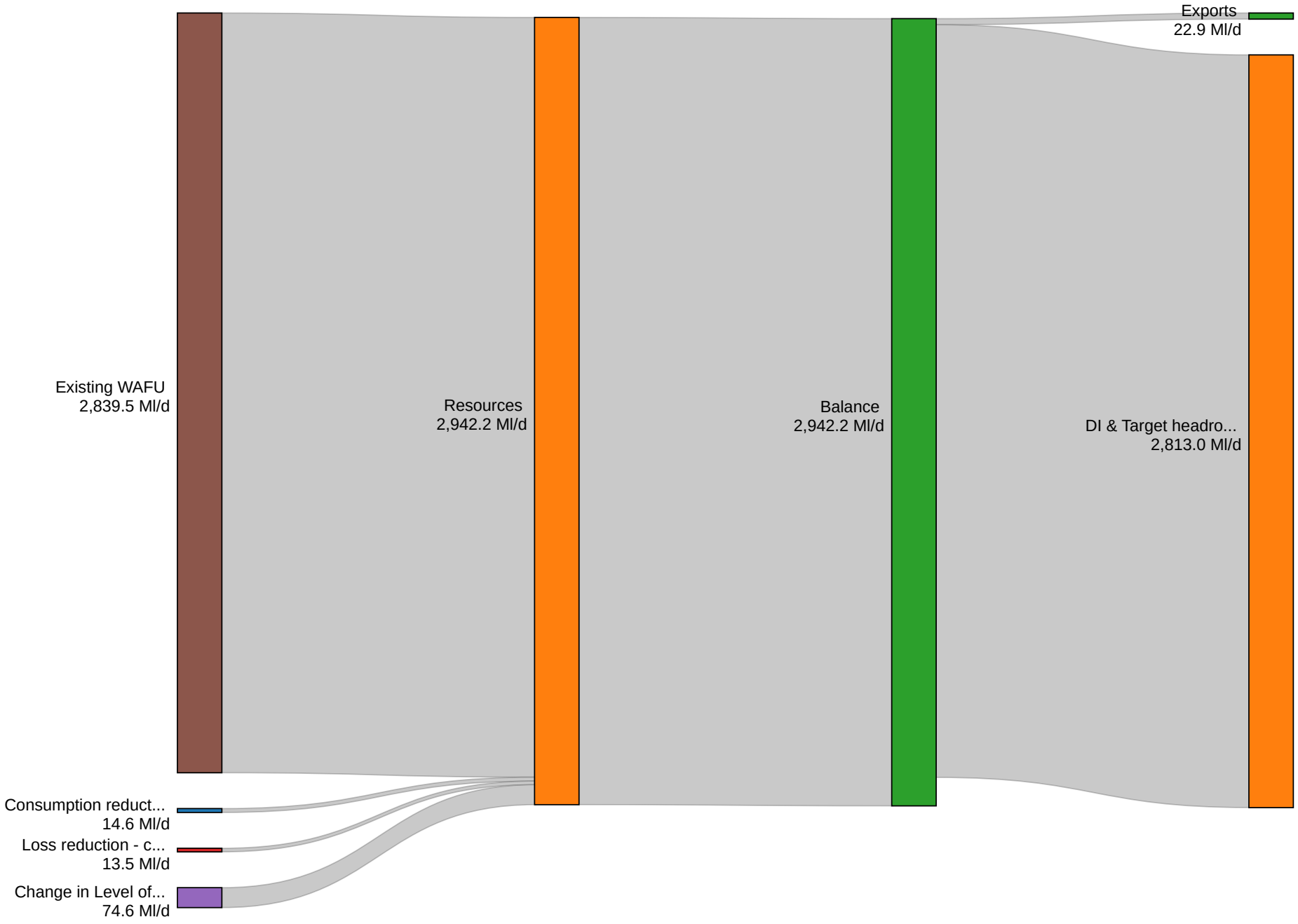
Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.

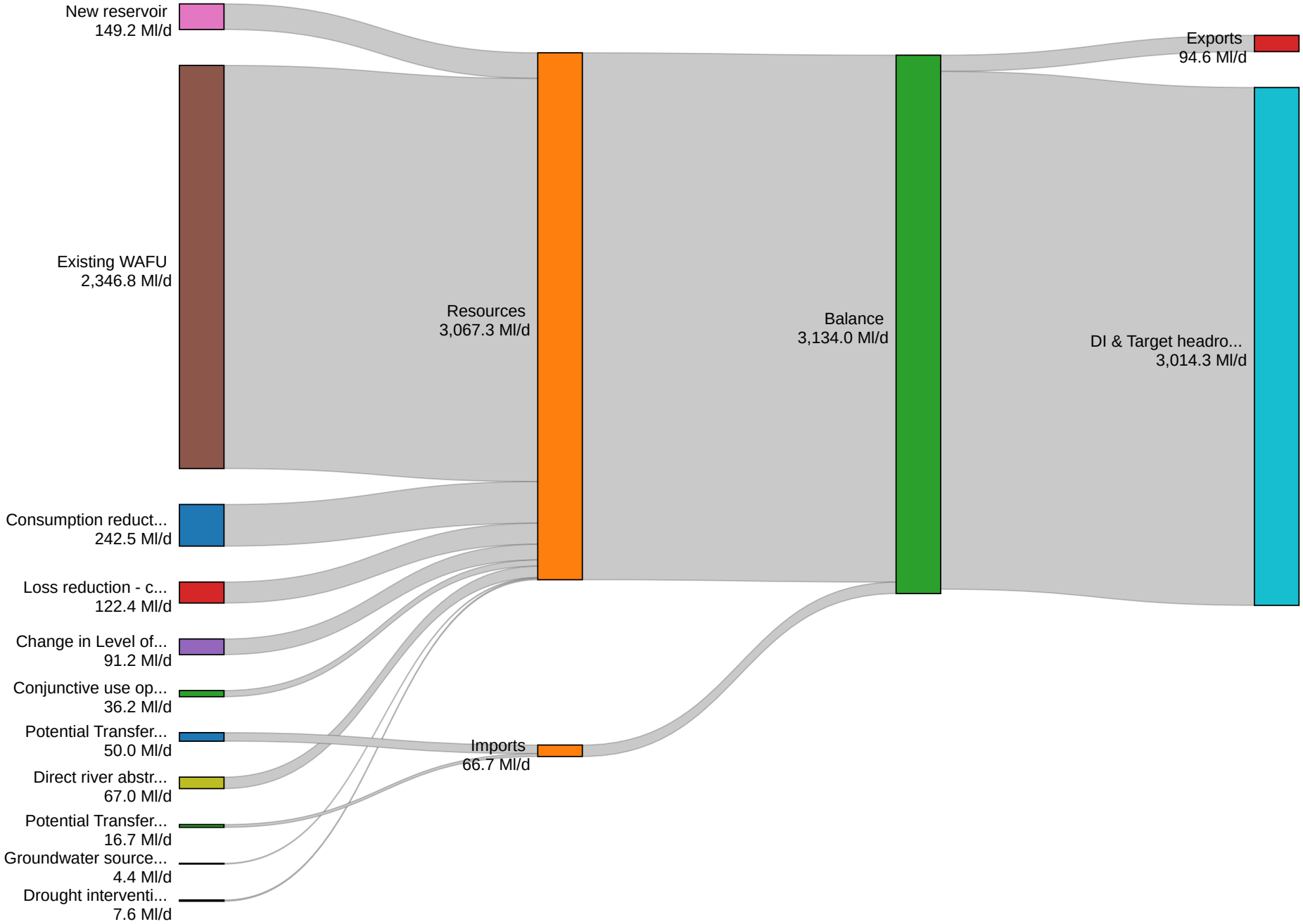


- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

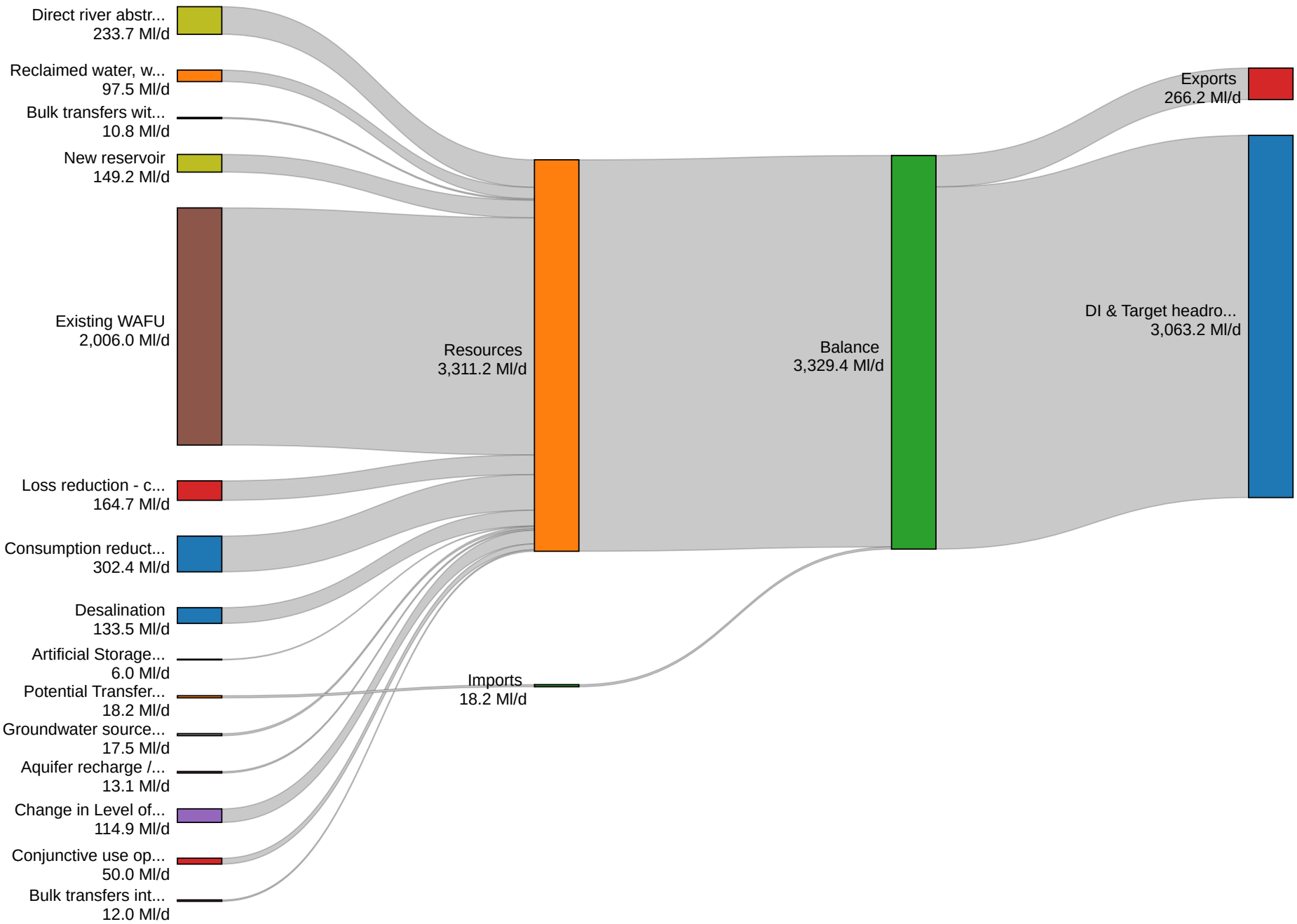
Situation 4 - 2026 (Thames Water)



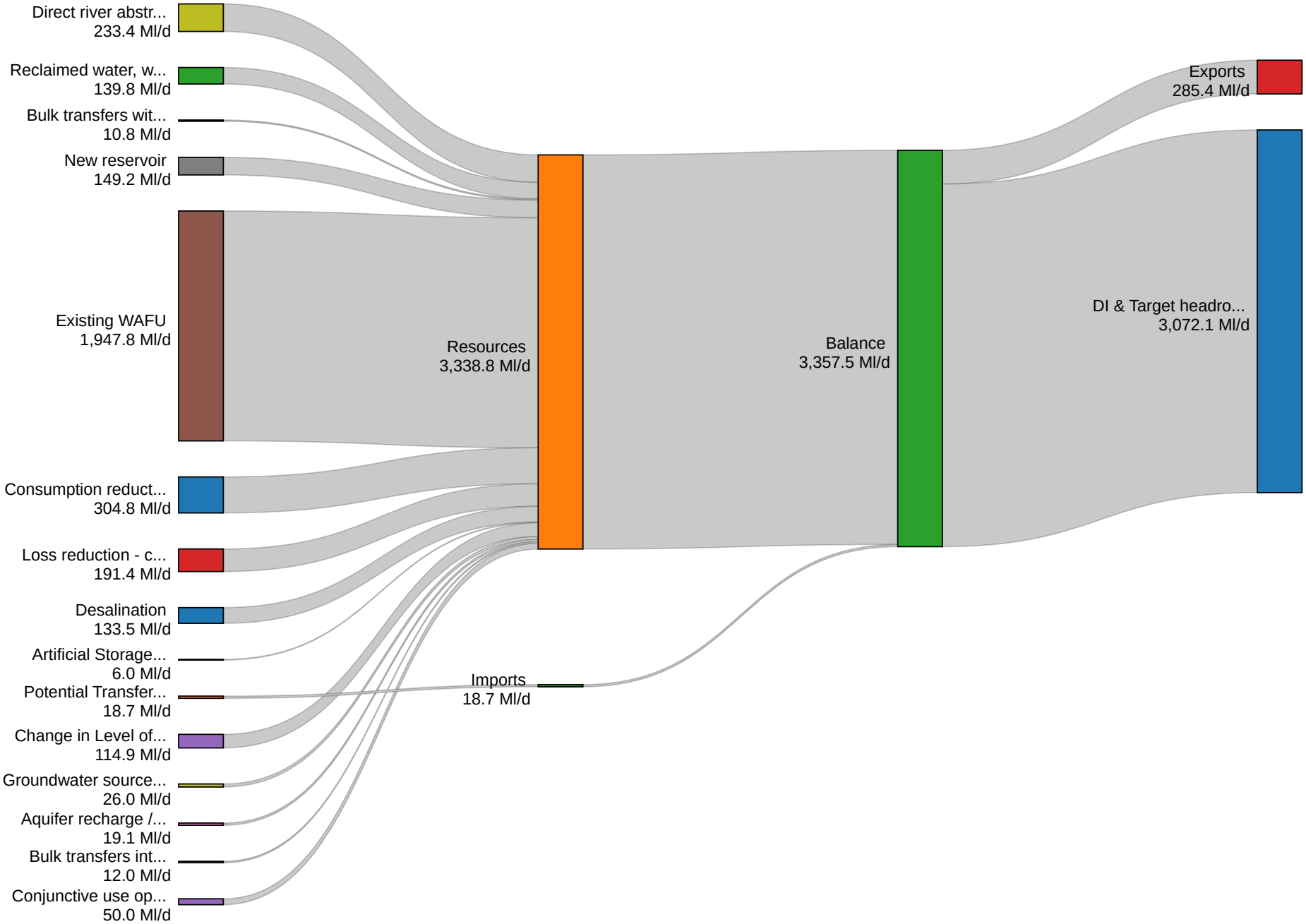
Situation 4 - 2040 (Thames Water)



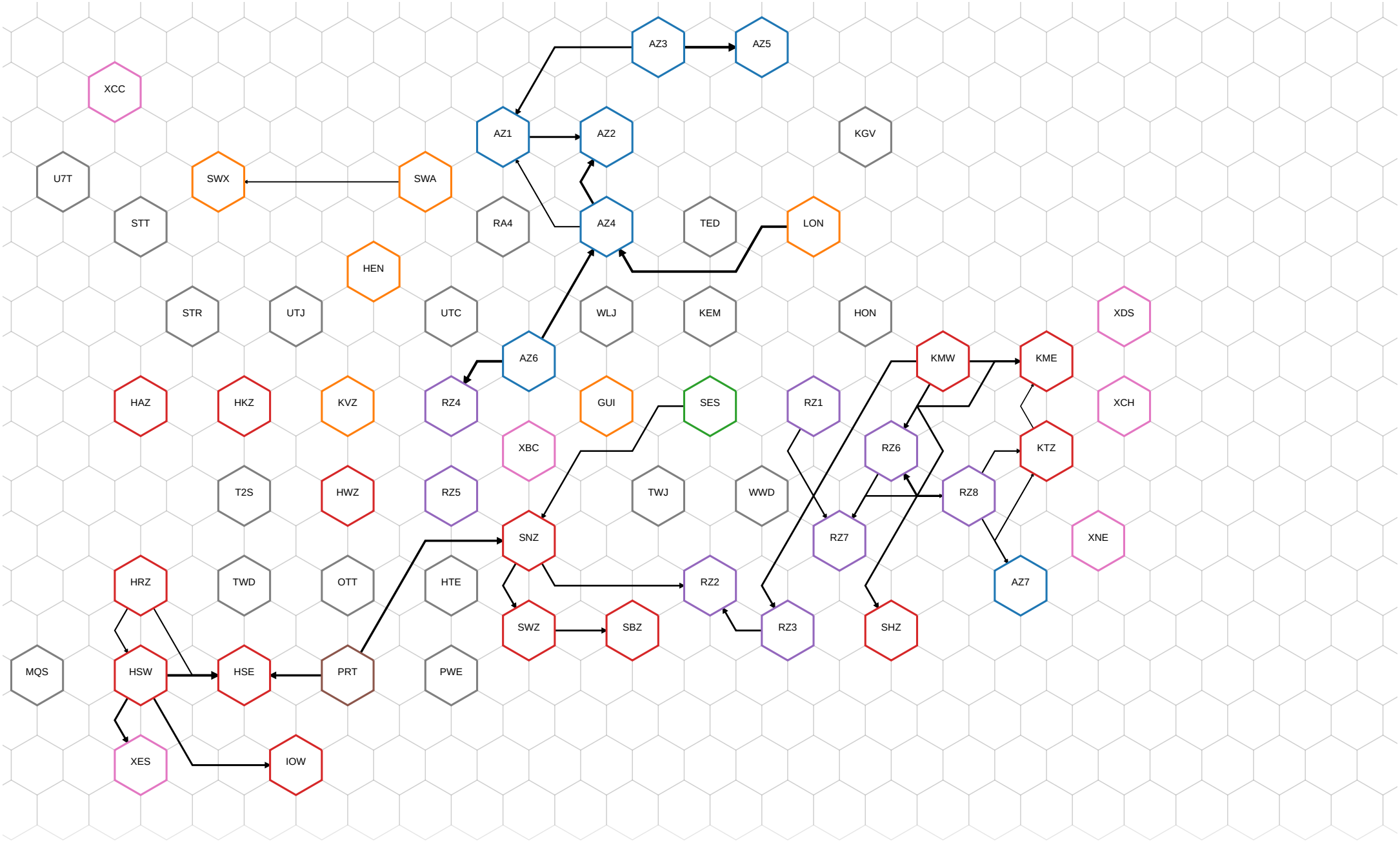
Situation 4 - 2050 (Thames Water)



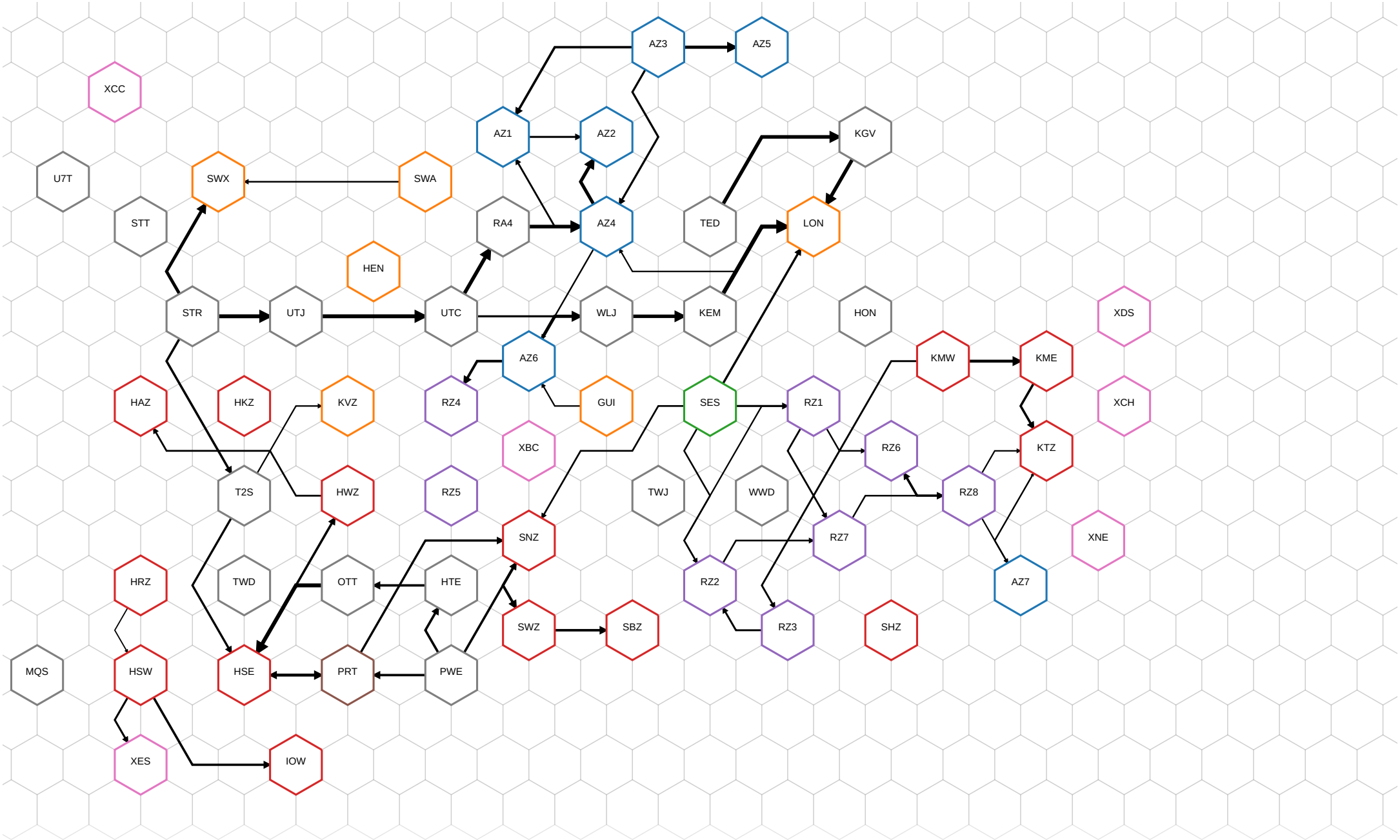
Situation 4 - 2075 (Thames Water)



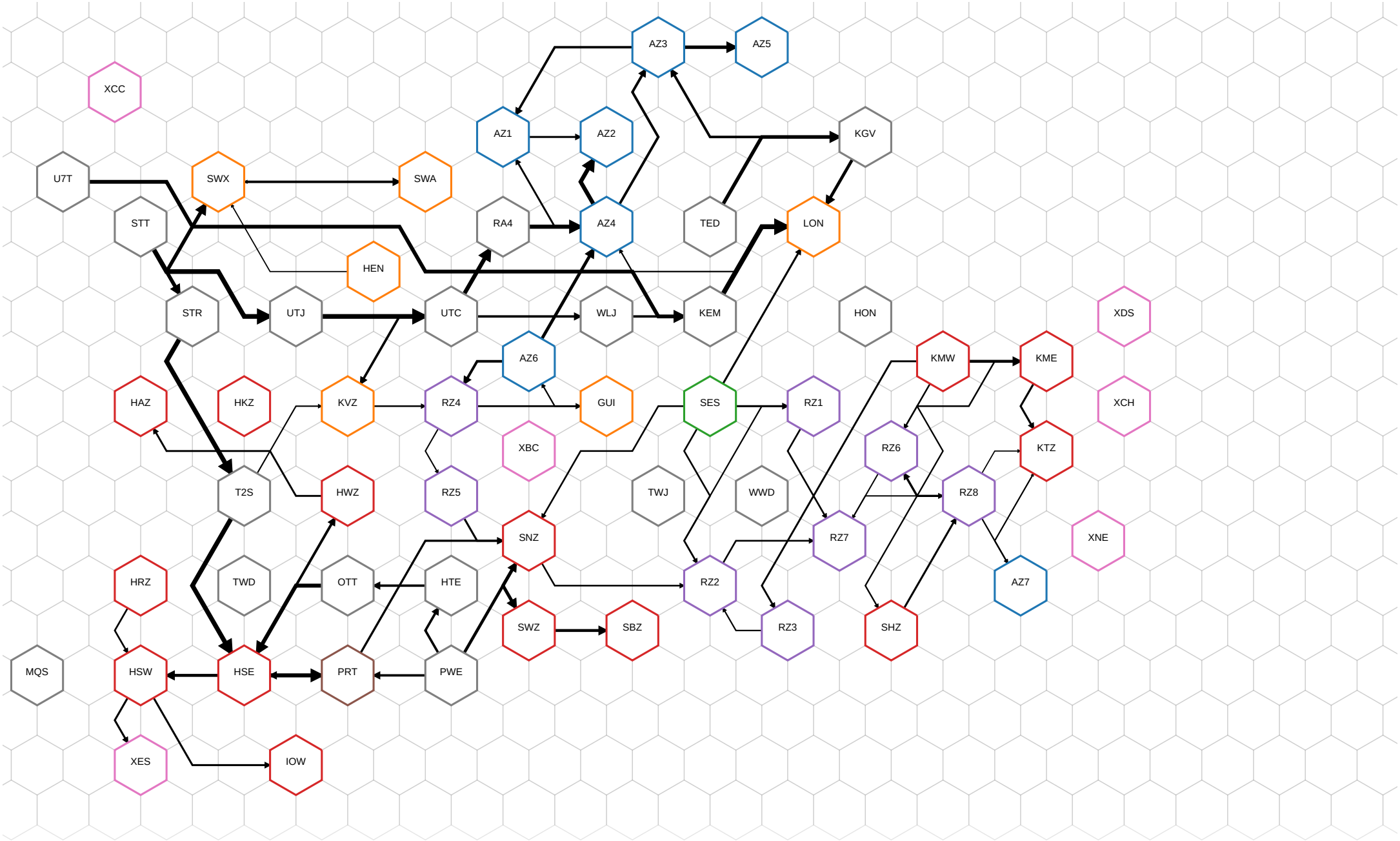
Situation 4 - 2026



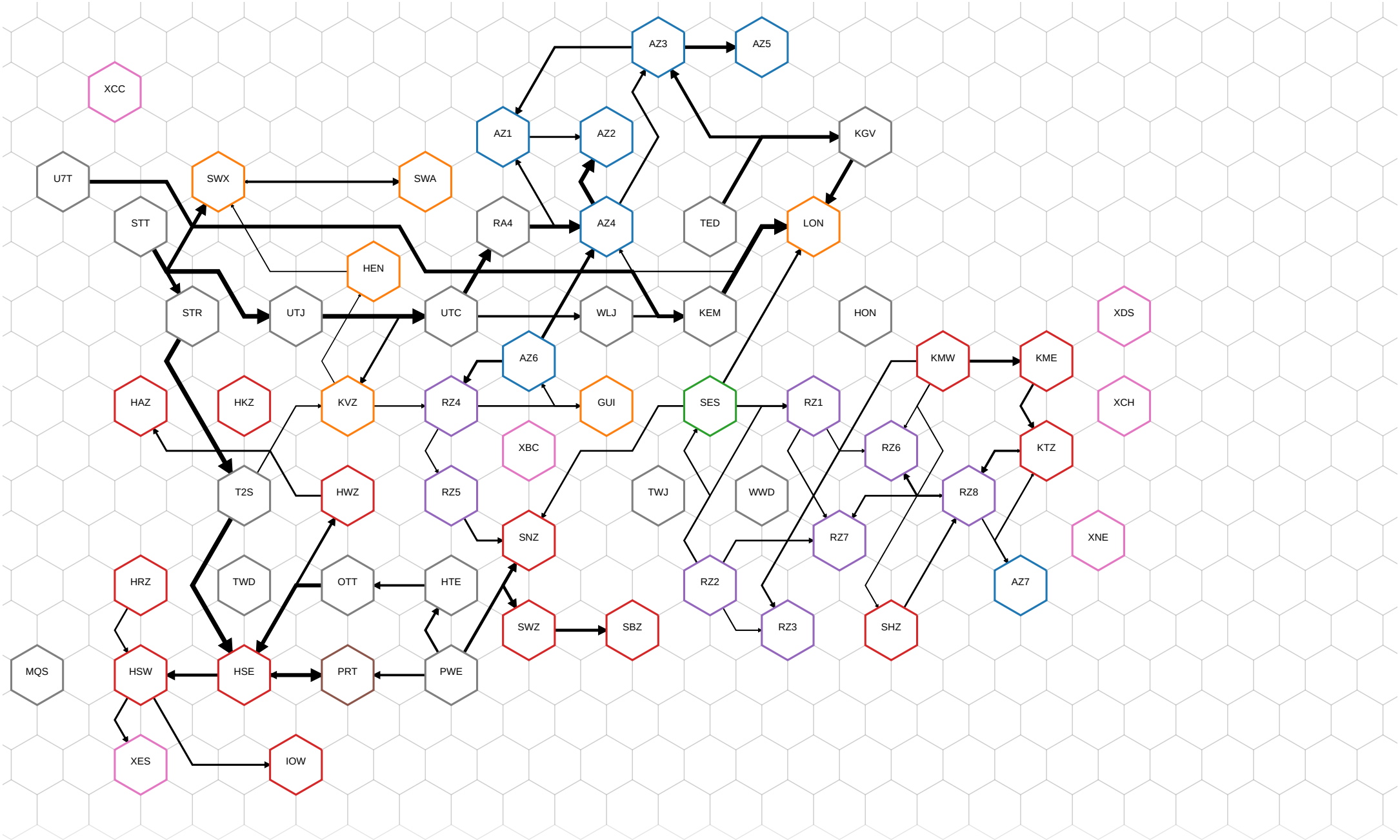
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

GOVERNMENT-LED G + SESRO 150

IVM Summary: Thames Water

! This run contained total deficits of 29.9 Ml/d in the **"100a-dyaa-hplan-fthr"** planning scenario.

! This run contained total deficits of 4.9 Ml/d in the **"hybrida-dyaa-hplan-fthr"** planning scenario.

! This run contained total deficits of 23.9 Ml/d in the **"normal-hplan-fthr"** planning scenario.

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridg-only-sesro150-2075
Description	Least cost run with hybrid-g government interventions including only SESRO 150 Mm3.
Created at	18/07/2023, 13:34:16
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridg-only-sesro150
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets. Exclude all SESRO variants except 150.
Optimised discount rate	STPR

Metrics

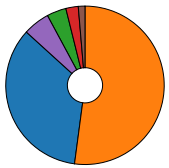
Net present value (Cost)

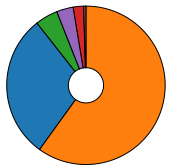
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	4,702,908	1,920,025	1,919,213	921,530	919,535	918,763	518,938	517,940	517,373	(£m)
Cost w/o deficit (STPR)	22,221	18,951	18,140	20,706	18,711	17,939	18,800	17,802	17,235	(£m)
Cost w/ deficit (IGEQ)	4,714,671	1,928,923	1,927,462	931,976	928,270	926,912	527,929	526,066	525,038	(£m)
Cost w/o deficit (IGEQ)	33,984	27,850	26,389	31,152	27,446	26,088	27,791	25,929	24,900	(£m)
Cost w/ deficit (LTDR)	4,705,186	1,921,776	1,920,844	923,567	921,256	920,373	520,702	519,545	518,892	(£m)
Cost w/o deficit (LTDR)	24,499	20,703	19,771	22,743	20,432	19,549	20,564	19,407	18,754	(£m)

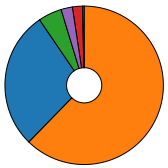
Cost breakdown (STPR)

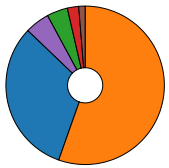
Select Company: Total

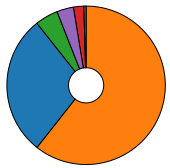
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	7,695	5,580	5,115	6,573	5,374	4,929	5,306	4,766	4,486	(£m)
Fixed opex	11,580	11,362	11,300	11,473	11,342	11,282	11,336	11,274	11,237	(£m)
Fixed operational carbon	884	874	874	884	876	875	872	866	866	(£m)
Embedded carbon	562	407	377	479	397	365	395	357	340	(£m)
Variable opex	1,200	640	417	1,029	636	424	748	478	280	(£m)
Variable carbon opex	301	88	57	269	86	64	143	61	26	(£m)

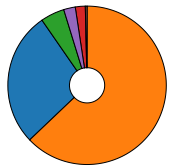
situation1 

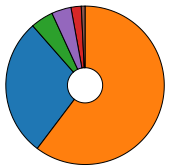
situation2 

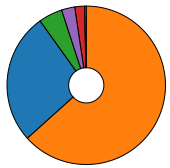
situation3 

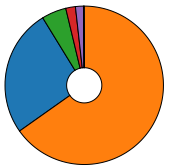
situation4 

situation5 

situation6 

situation7 

situation8 

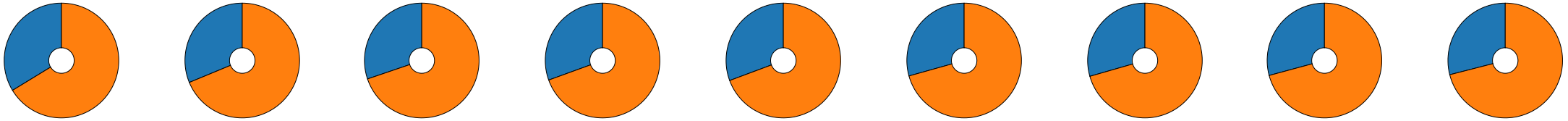
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,566,344	2,477,667	2,278,740	2,984,623	2,412,988	2,207,798	2,432,916	2,158,713	2,047,473	(tonnes)
Operational emissions	7,014,978	5,453,275	5,264,710	6,789,340	5,454,385	5,316,925	5,830,334	5,234,823	5,015,951	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

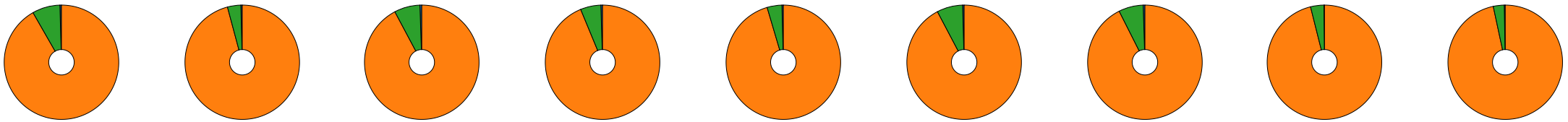


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	119	59	36	111	58	29	80	16	12	(GWh)
Grid	24,853	14,103	6,402	21,697	13,764	5,997	15,142	9,696	4,029	(GWh)
Renewable	2,121	554	504	1,331	602	473	1,134	379	129	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	71,321.00	66,590.00	65,813.00	69,125.00	65,883.00	65,109.00	65,869.00	63,822.00	62,805.00	
SEA environmental disbenefit	125,170.00	92,992.00	86,330.00	112,398.00	89,718.00	83,399.00	92,095.00	78,566.00	72,110.00	
Natural capital	85,811,425.58	87,284,792.42	87,682,330.55	78,736,673.32	80,279,871.37	82,889,264.70	79,691,425.92	80,671,720.66	83,448,004.21	
Bio-diversity net gain	−268,008.00	−190,404.00	−155,543.00	−225,791.00	−167,637.00	−152,616.00	−168,242.00	−133,777.00	−105,637.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	34,914.00	32,952.00	32,614.00	34,221.00	32,822.00	32,399.00	32,881.00	31,854.00	31,373.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	31.18	32.36	35.38	30.90	32.37	35.43	32.58	35.97	40.45	
R1: Uncertainty of option supply/demand benefit	6.48	6.12	6.65	6.23	6.10	6.63	5.98	6.38	7.24	
R3: Risk of service failure due to other physical hazards	7.20	7.74	8.59	7.23	7.76	8.66	7.72	8.70	9.97	
R4: Availability of additional headroom	6.53	6.83	7.04	6.59	6.84	7.04	7.15	7.50	7.75	
R5: Catchment/raw water quality risks (incl. climate change)	5.29	5.48	6.17	5.10	5.48	6.17	5.63	6.50	7.53	
R6: Capacity of catchment services	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
R7: Risk of service failure to other exceptional events	5.67	6.20	6.93	5.75	6.20	6.93	6.10	6.89	7.95	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

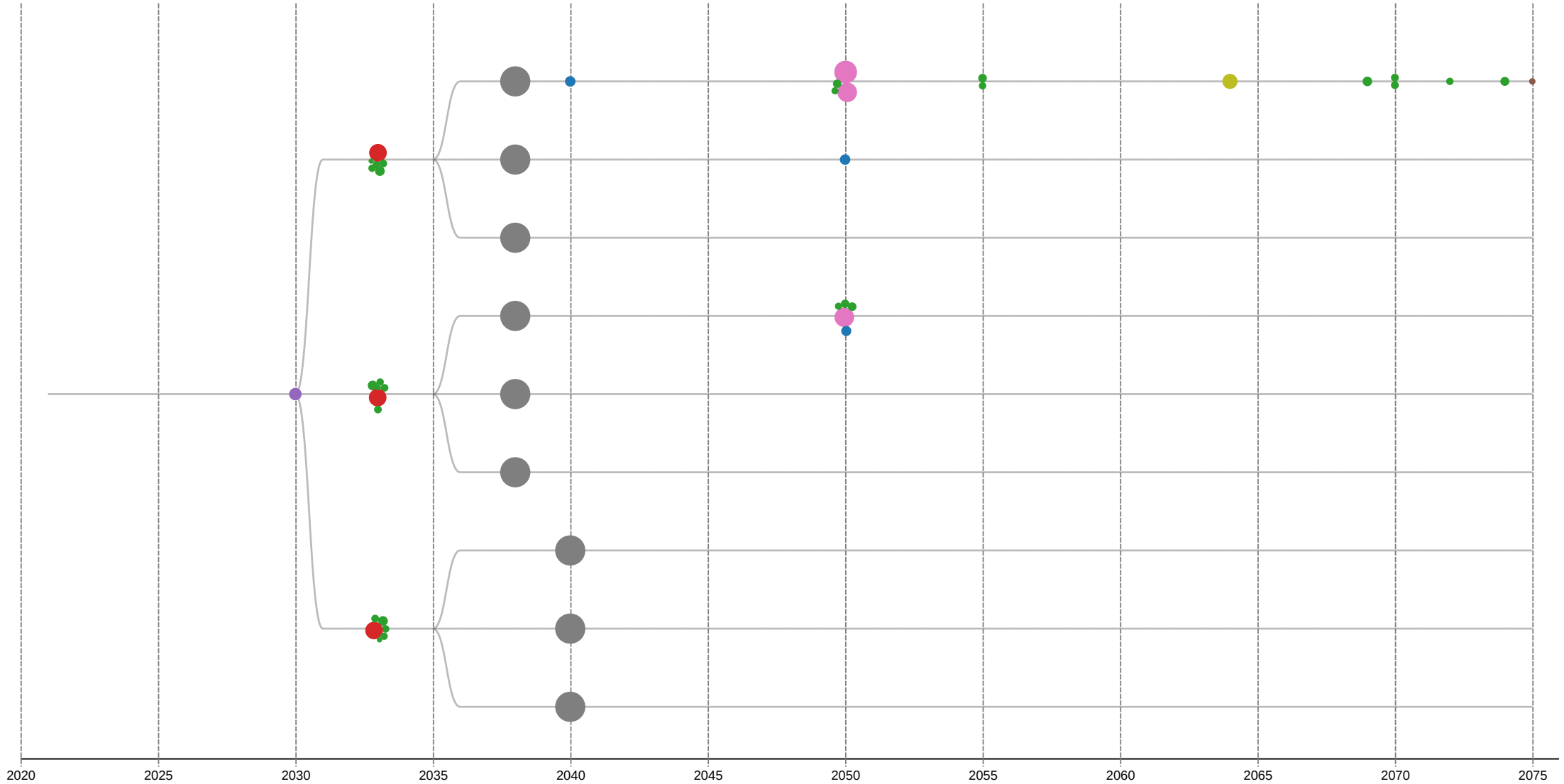
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	13.97	15.84	17.80	14.31	15.85	17.75	15.90	18.10	20.71	
A3: Operational complexity and flexibility	6.36	7.08	7.92	6.51	7.08	7.94	7.00	7.97	9.21	
A4: WRZ connectivity	7.56	8.72	9.83	7.75	8.73	9.77	8.85	10.07	11.45	
A7: Customer relations support engagement with demand management	0.05	0.04	0.05	0.04	0.04	0.05	0.05	0.05	0.06	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.01	19.89	22.01	18.87	19.96	21.94	20.02	22.29	25.46	
E1: Scaleability and modularity of proposed changes	8.17	8.61	9.54	8.11	8.64	9.59	8.63	9.76	11.21	
E2: Intervention lead times	5.34	5.60	6.19	5.33	5.64	6.08	5.80	6.28	7.09	
E3: Reliance on external bodies to deliver changes	5.49	5.68	6.28	5.43	5.67	6.27	5.60	6.24	7.15	
E5: Collaborative land management	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

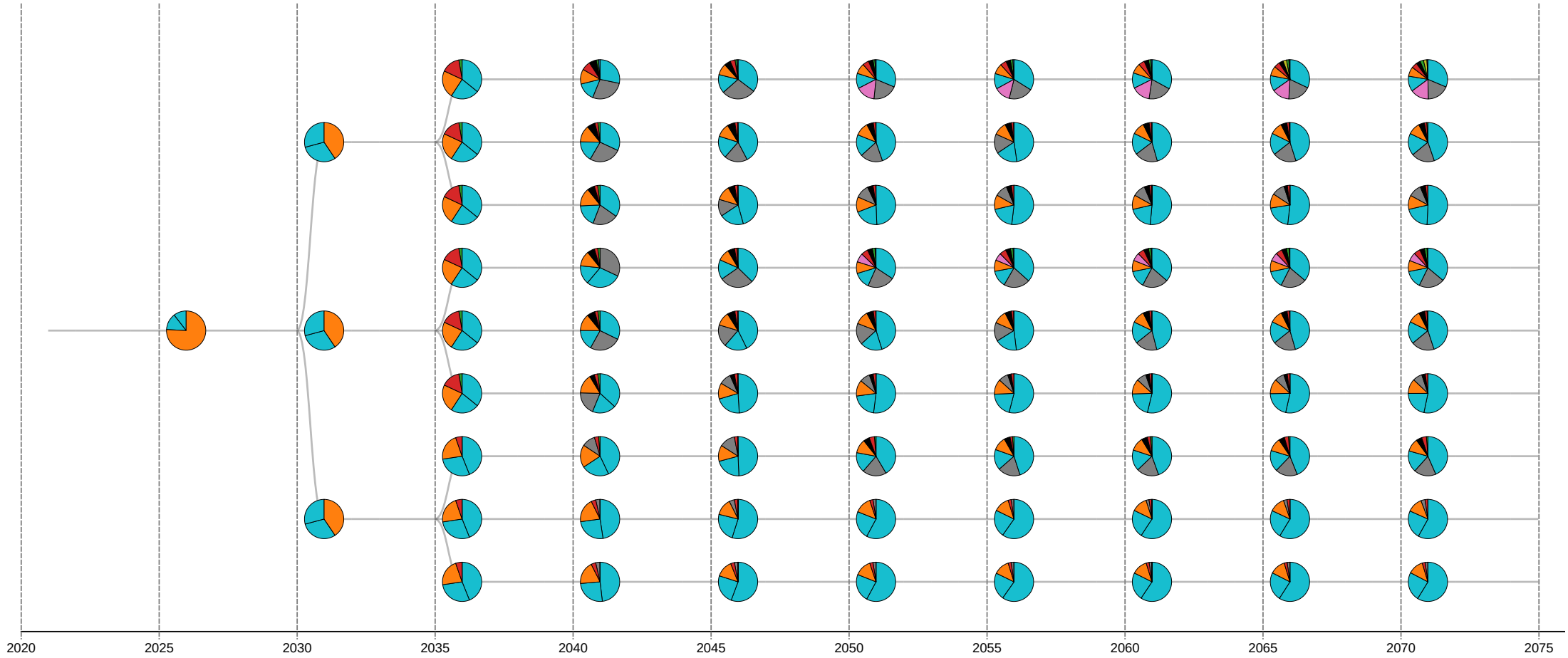
Option Selection (Thames Water)



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.



- Transfer
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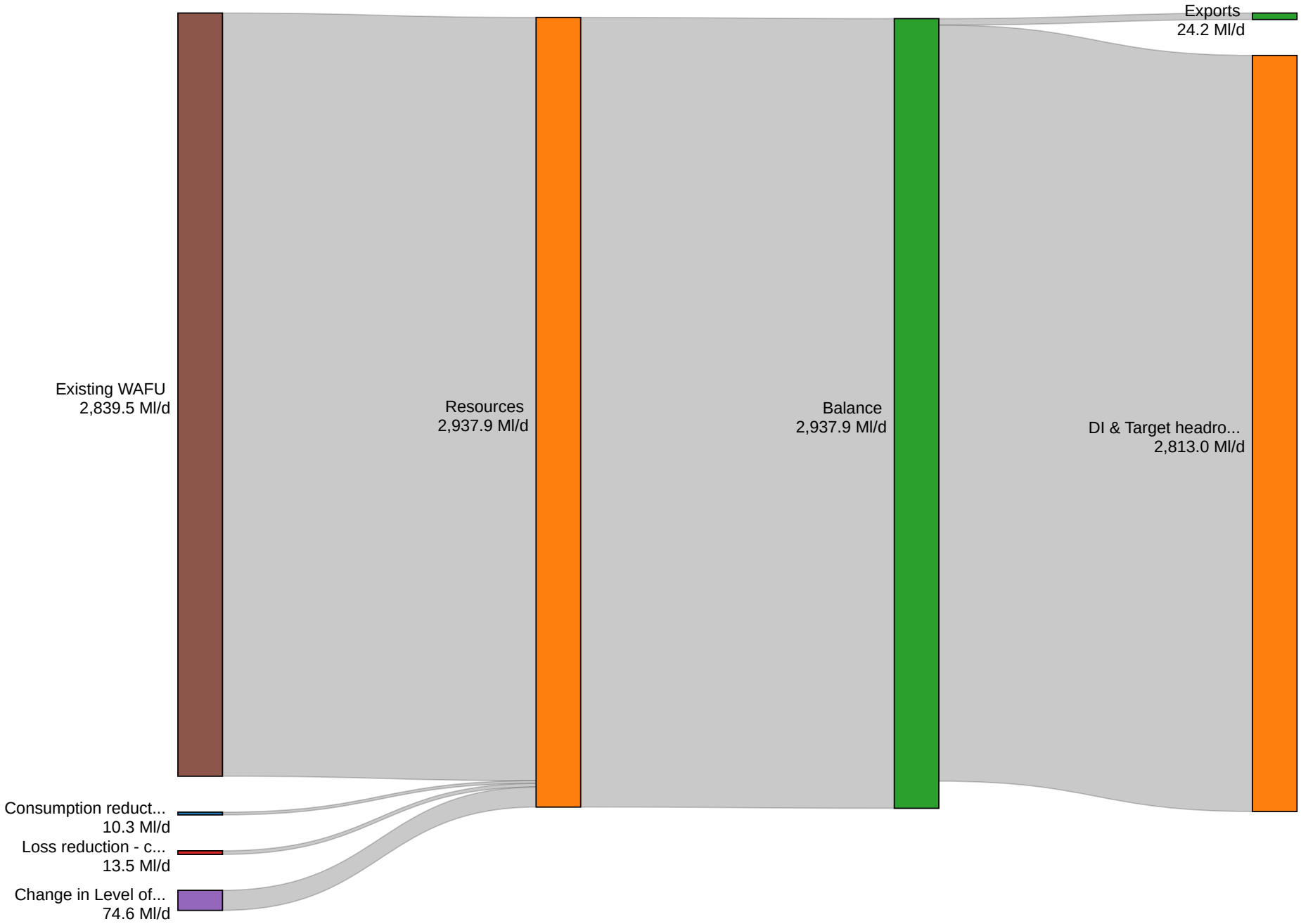
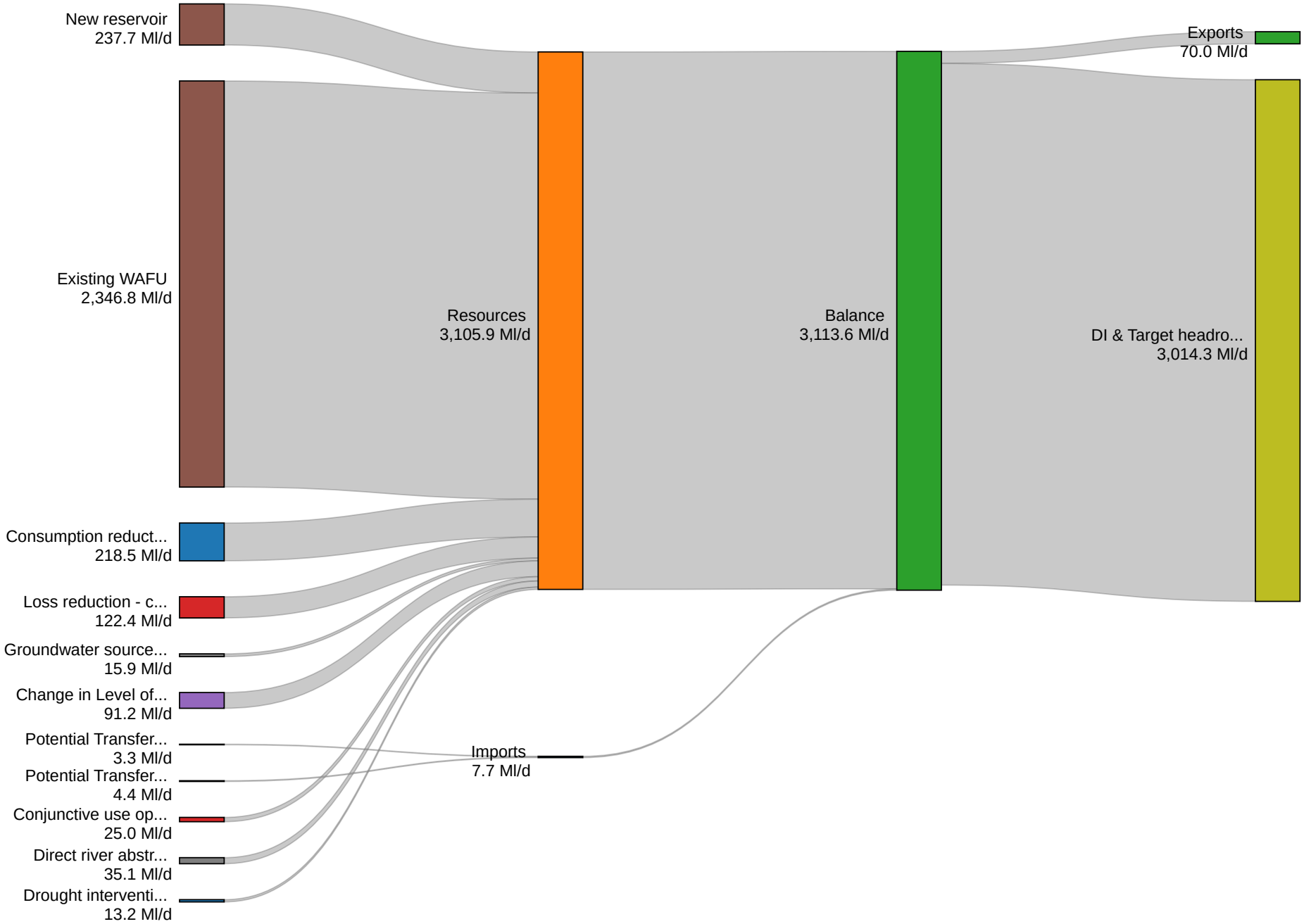
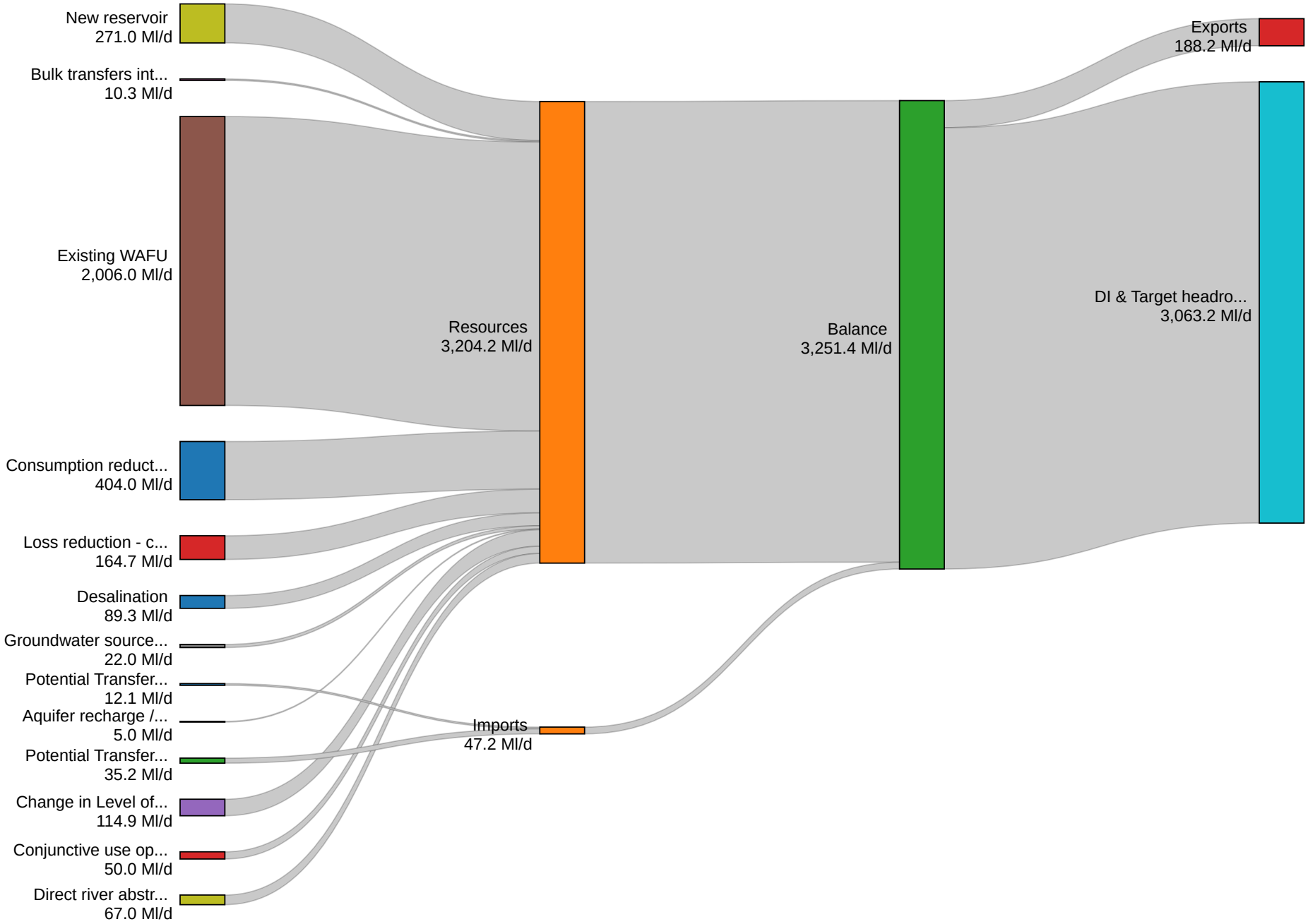
Situation 4 - 2026 (Thames Water)



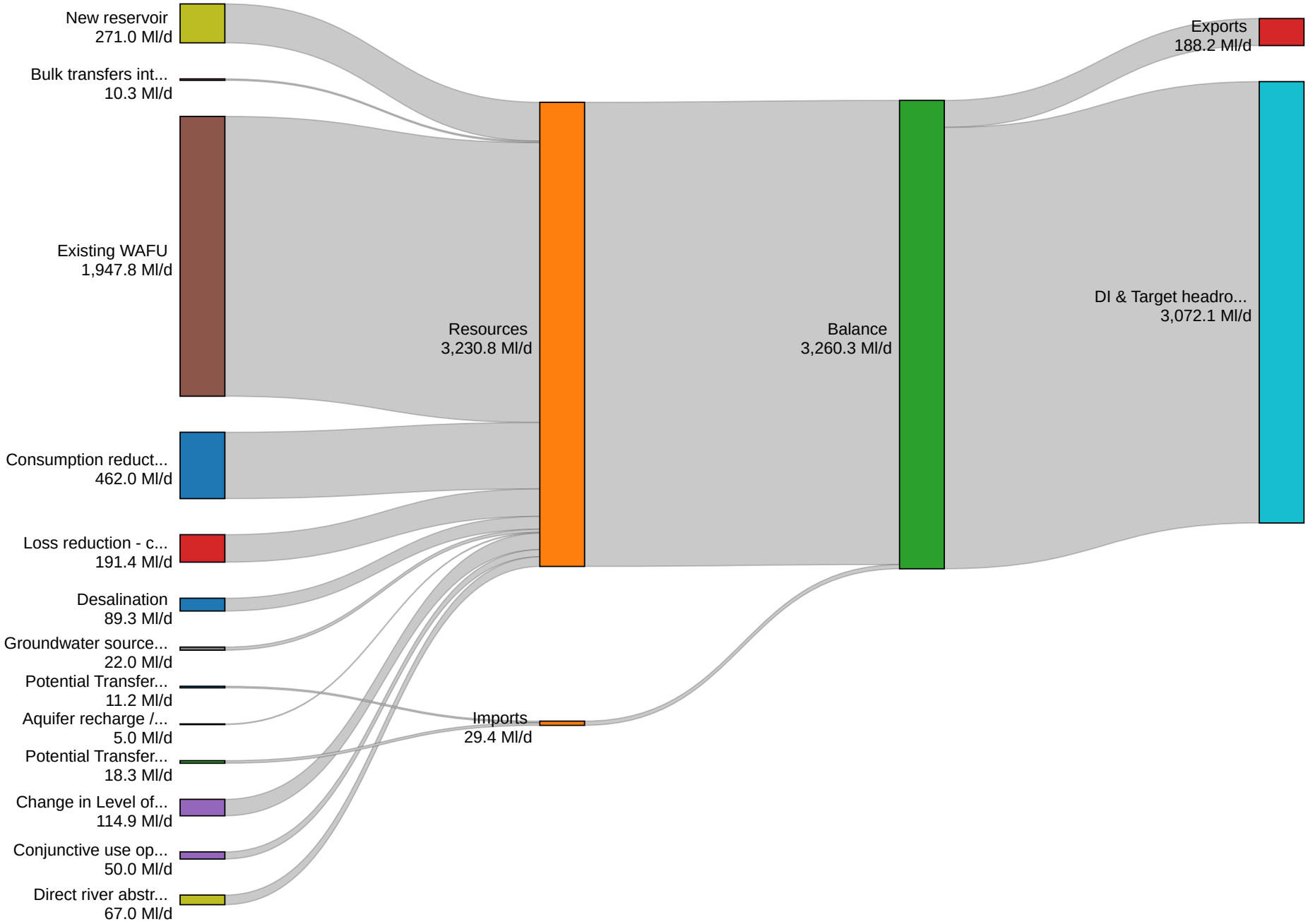
Situation 4 - 2040 (Thames Water)



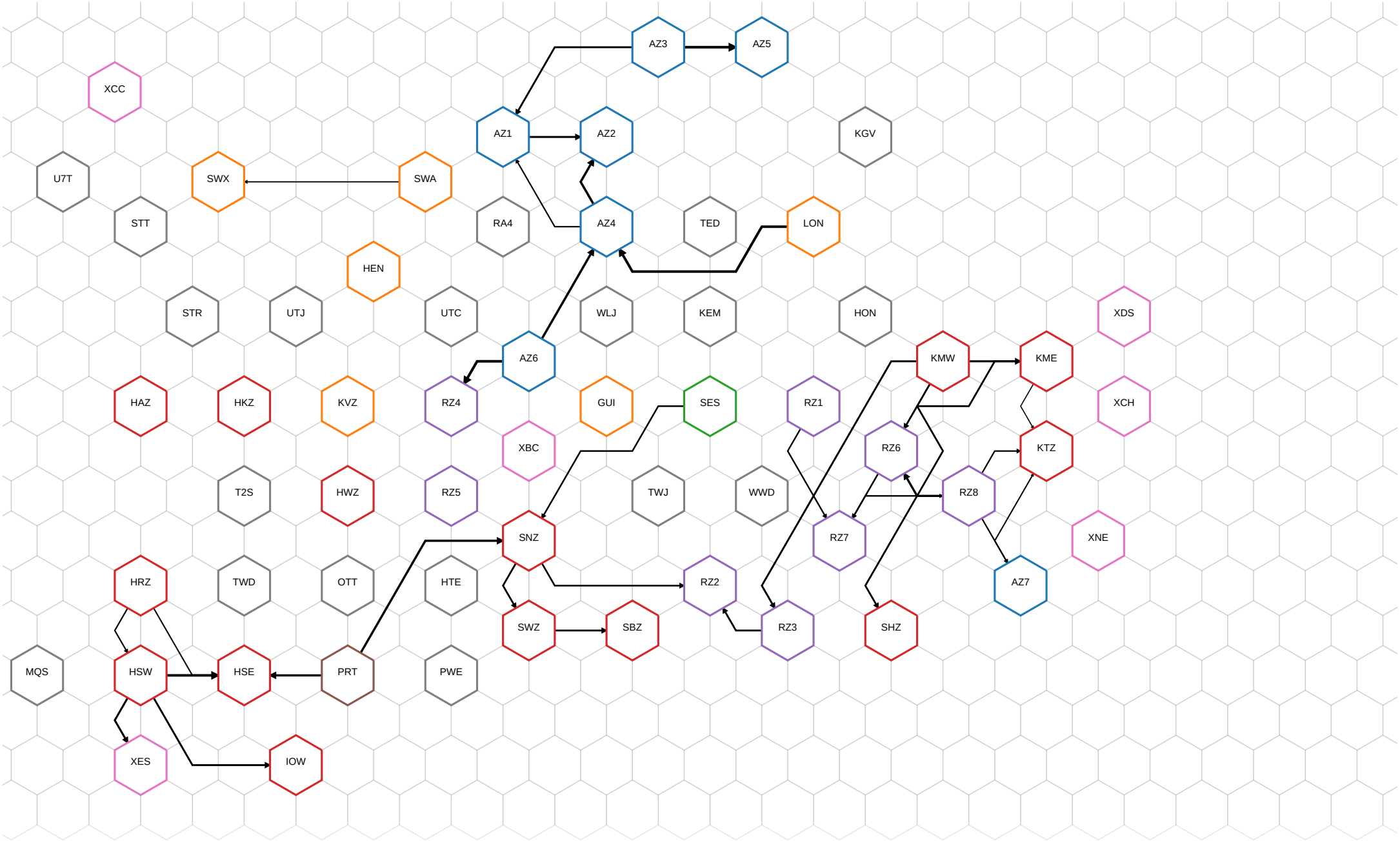
Situation 4 - 2050 (Thames Water)



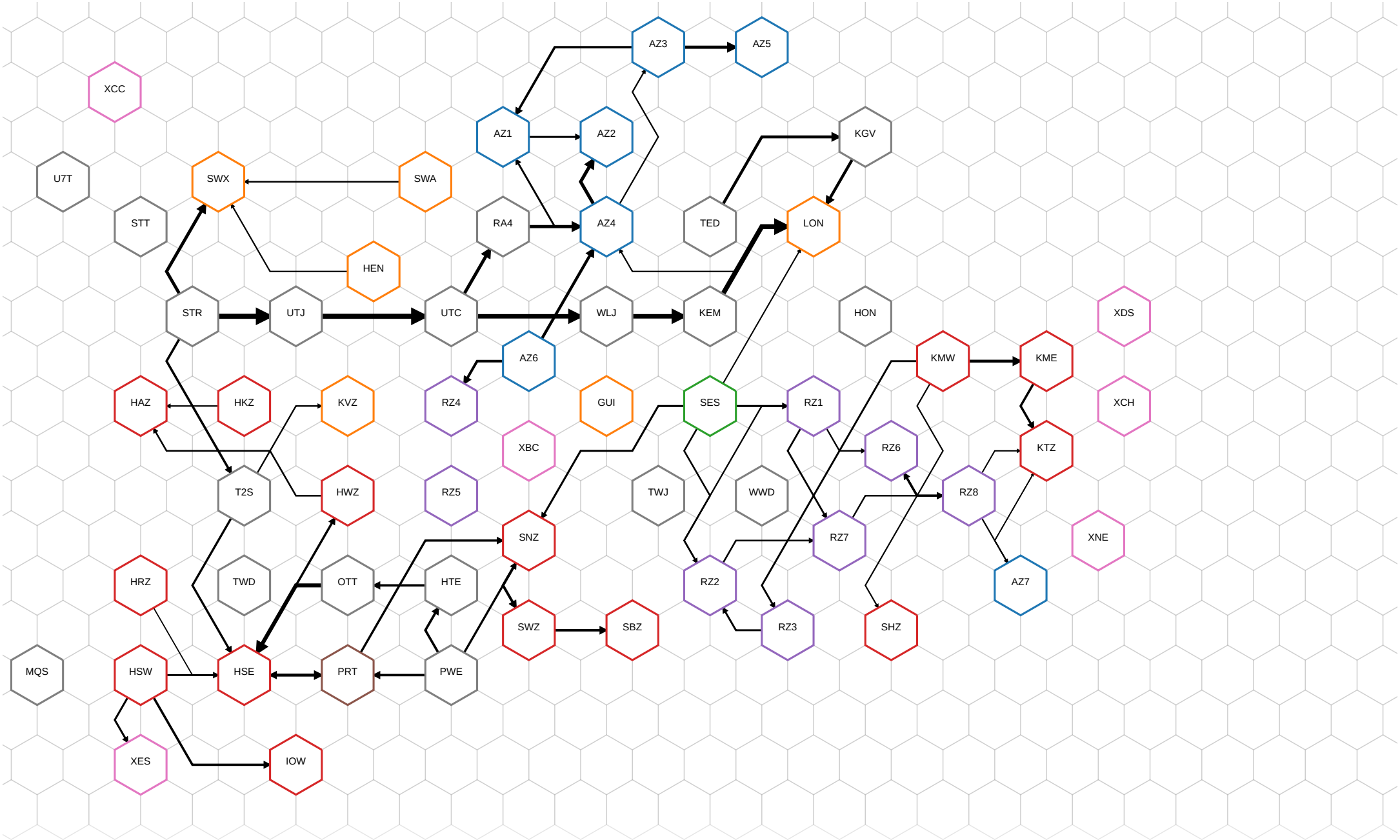
Situation 4 - 2075 (Thames Water)



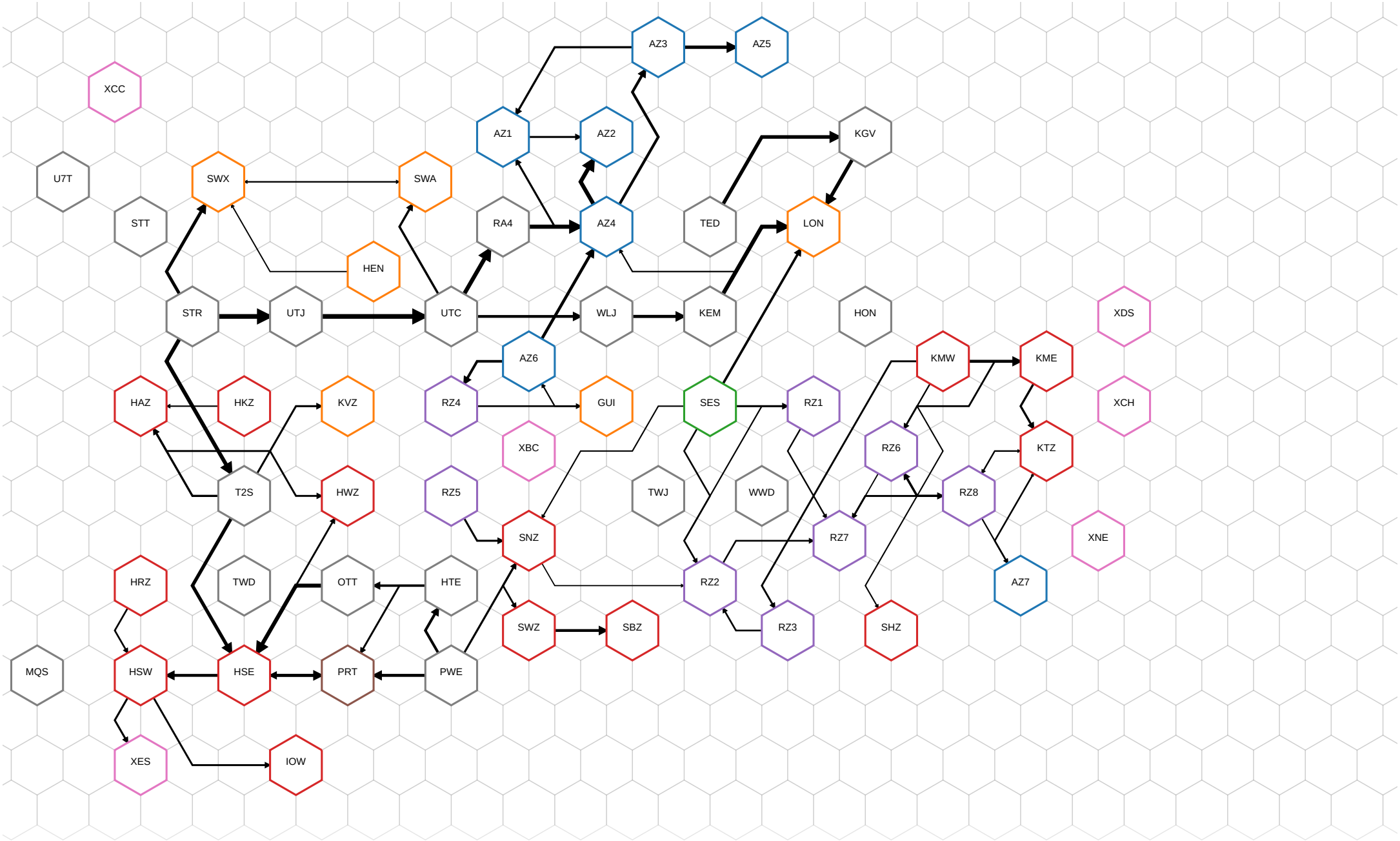
Situation 4 - 2026



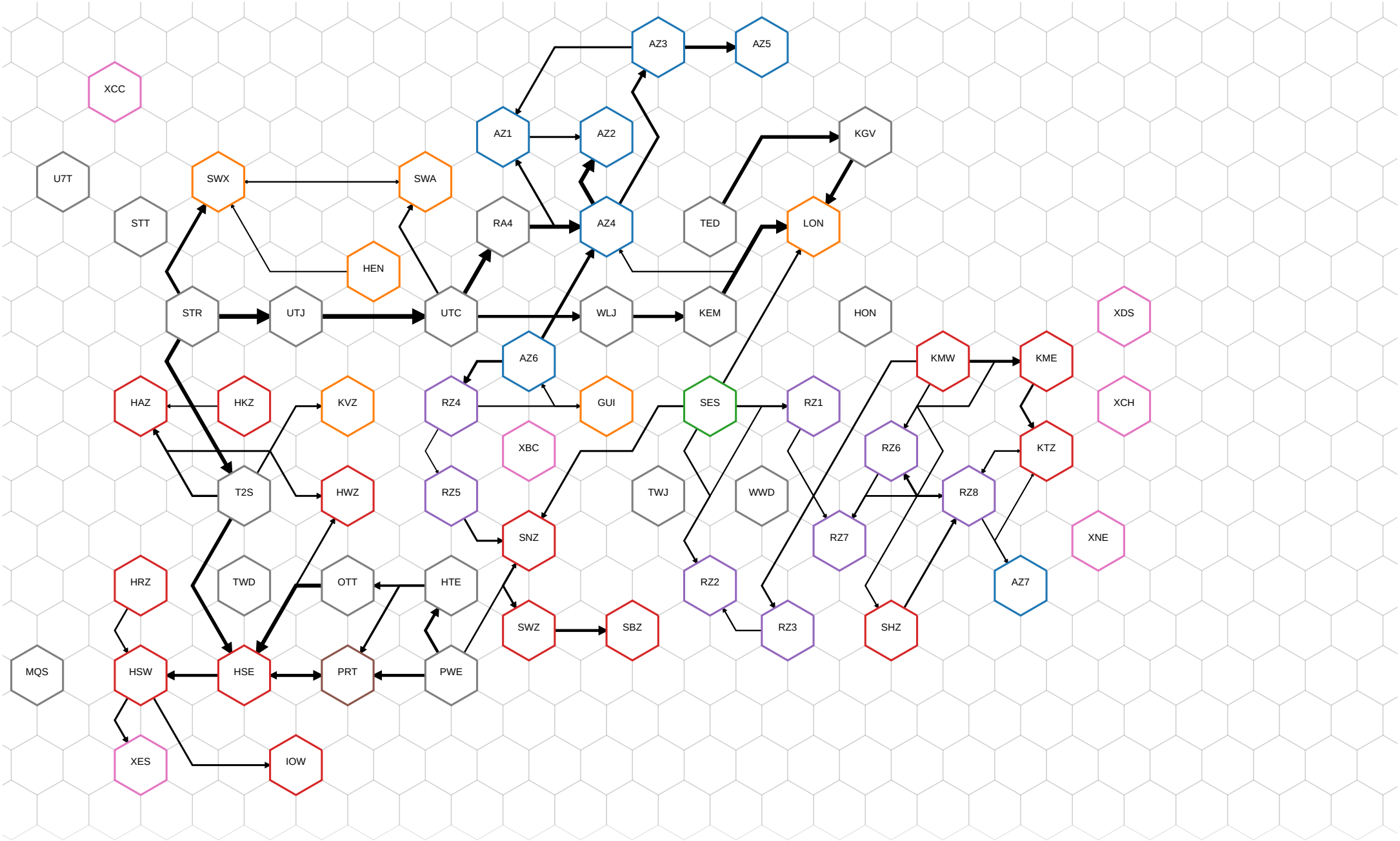
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

GOVERNMENT-LED G + SESRO 125

IVM Summary: Thames Water

! This run contained total deficits of 29.9 Ml/d in the **"100a-dyaa-hplan-fthr"** planning scenario.

! This run contained total deficits of 4.9 Ml/d in the **"hybrida-dyaa-hplan-fthr"** planning scenario.

! This run contained total deficits of 23.9 Ml/d in the **"normal-hplan-fthr"** planning scenario.

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridg-only-sesro125-2075
Description	Least cost run with hybrid-g government interventions including only SESRO 125 Mm3.
Created at	18/07/2023, 12:30:04
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridg-only-sesro125
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets. Exclude all SESRO variants except 125.
Optimised discount rate	STPR

Metrics

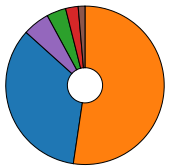
Net present value (Cost)

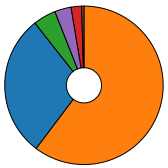
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	4,703,011	1,919,927	1,919,041	921,648	919,459	918,675	518,869	517,865	517,296	(£m)
Cost w/o deficit (STPR)	22,323	18,853	17,967	20,824	18,635	17,850	18,731	17,727	17,159	(£m)
Cost w/ deficit (IGEQ)	4,714,923	1,928,769	1,927,184	932,232	928,154	926,766	527,829	525,954	524,920	(£m)
Cost w/o deficit (IGEQ)	34,236	27,696	26,110	31,408	27,330	25,942	27,692	25,816	24,783	(£m)
Cost w/ deficit (LTDR)	4,705,314	1,921,667	1,920,651	923,709	921,172	920,274	520,627	519,463	518,808	(£m)
Cost w/o deficit (LTDR)	24,627	20,594	19,578	22,885	20,348	19,450	20,489	19,325	18,670	(£m)

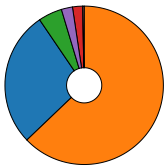
Cost breakdown (STPR)

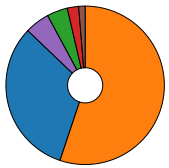
Select Company: Total

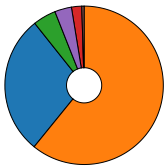
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	7,657	5,486	4,966	6,661	5,300	4,848	5,243	4,697	4,417	(£m)
Fixed opex	11,687	11,367	11,295	11,481	11,341	11,280	11,336	11,274	11,236	(£m)
Fixed operational carbon	885	876	874	885	876	876	872	866	866	(£m)
Embedded carbon	571	409	370	481	391	359	390	351	335	(£m)
Variable opex	1,214	627	407	1,044	638	424	748	478	280	(£m)
Variable carbon opex	308	88	56	272	88	64	143	61	26	(£m)

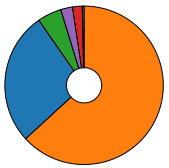
situation1 

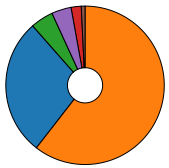
situation2 

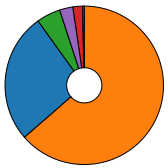
situation3 

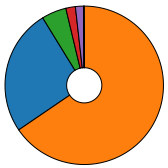
situation4 

situation5 

situation6 

situation7 

situation8 

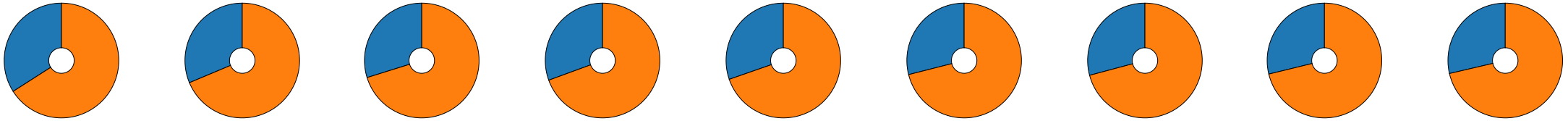
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,652,844	2,493,240	2,233,669	3,003,540	2,378,098	2,169,774	2,400,646	2,121,040	2,013,836	(tonnes)
Operational emissions	7,079,540	5,467,897	5,260,899	6,820,526	5,465,876	5,324,044	5,832,248	5,242,388	5,015,952	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

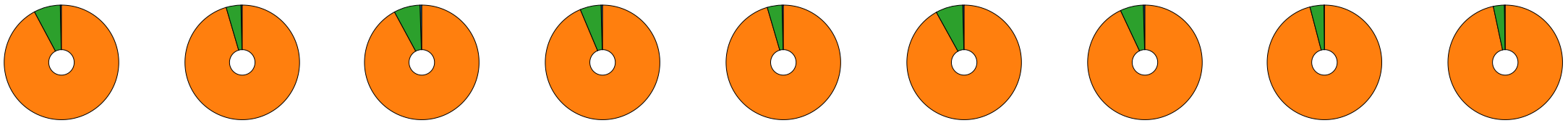


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	94	53	34	99	53	26	74	14	11	(GWh)
Grid	25,052	13,660	6,091	21,125	13,748	5,962	15,275	9,689	4,020	(GWh)
Renewable	2,027	596	488	1,331	600	496	1,074	397	129	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	71,257.00	66,089.00	65,157.00	69,397.00	65,743.00	64,902.00	65,597.00	63,621.00	62,615.00	
SEA environmental disbenefit	127,546.00	92,002.00	85,792.00	113,126.00	89,764.00	83,718.00	90,746.00	78,468.00	72,066.00	
Natural capital	84,333,304.64	80,436,684.39	81,294,285.21	80,688,691.40	82,262,116.14	84,884,091.31	81,756,331.78	82,658,333.62	85,430,476.90	
Bio-diversity net gain	−248,725.00	−166,576.00	−151,956.00	−217,176.00	−158,317.00	−141,037.00	−154,640.00	−121,516.00	−96,227.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	35,150.00	32,923.00	32,609.00	34,269.00	32,785.00	32,383.00	32,804.00	31,798.00	31,339.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	30.76	31.72	34.41	30.62	31.60	34.58	31.84	35.10	39.42	
R1: Uncertainty of option supply/demand benefit	6.35	5.99	6.45	6.21	5.94	6.46	5.83	6.21	7.03	
R3: Risk of service failure due to other physical hazards	7.13	7.59	8.33	7.14	7.55	8.43	7.53	8.46	9.69	
R4: Availability of additional headroom	6.46	6.78	6.98	6.56	6.78	6.99	7.10	7.44	7.70	
R5: Catchment/raw water quality risks (incl. climate change)	5.18	5.33	5.98	5.08	5.33	6.01	5.49	6.33	7.34	
R6: Capacity of catchment services	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	
R7: Risk of service failure to other exceptional events	5.63	6.02	6.68	5.61	5.99	6.69	5.90	6.65	7.67	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

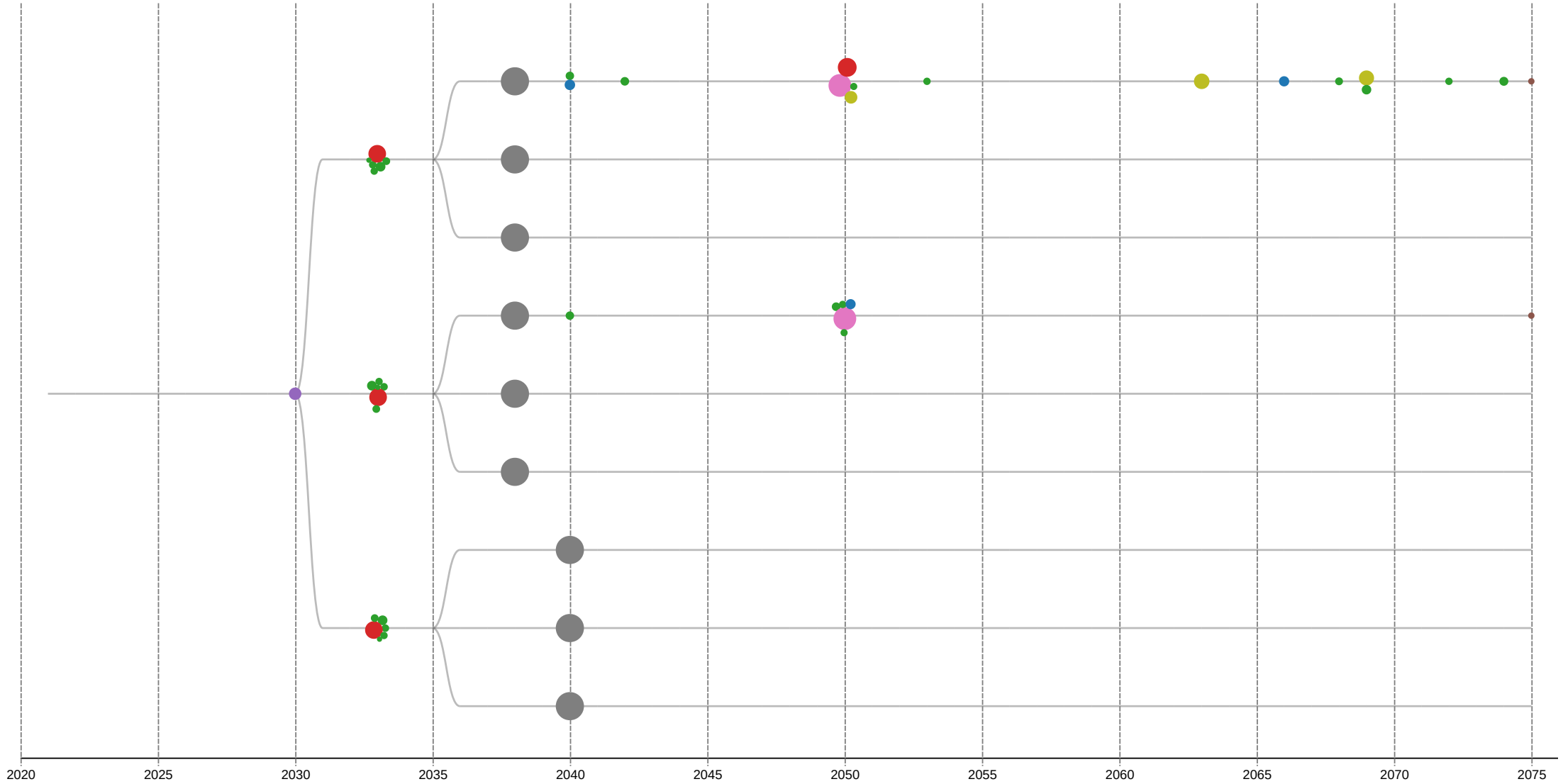
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	13.77	15.54	17.41	14.86	15.64	17.52	15.69	17.85	20.43	
A3: Operational complexity and flexibility	6.27	6.91	7.66	6.37	6.87	7.71	6.80	7.73	8.92	
A4: WRZ connectivity	7.45	8.59	9.71	8.44	8.73	9.77	8.85	10.06	11.45	
A7: Customer relations support engagement with demand management	0.05	0.04	0.05	0.05	0.04	0.05	0.05	0.05	0.06	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.17	19.81	21.82	18.96	19.78	21.77	19.88	22.12	25.24	
E1: Scaleability and modularity of proposed changes	8.10	8.59	9.48	8.16	8.59	9.53	8.58	9.71	11.14	
E2: Intervention lead times	5.54	5.58	6.14	5.34	5.57	6.02	5.75	6.23	7.02	
E3: Reliance on external bodies to deliver changes	5.52	5.64	6.20	5.45	5.62	6.22	5.56	6.18	7.08	
E5: Collaborative land management	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	

Option Selection (Thames Water)



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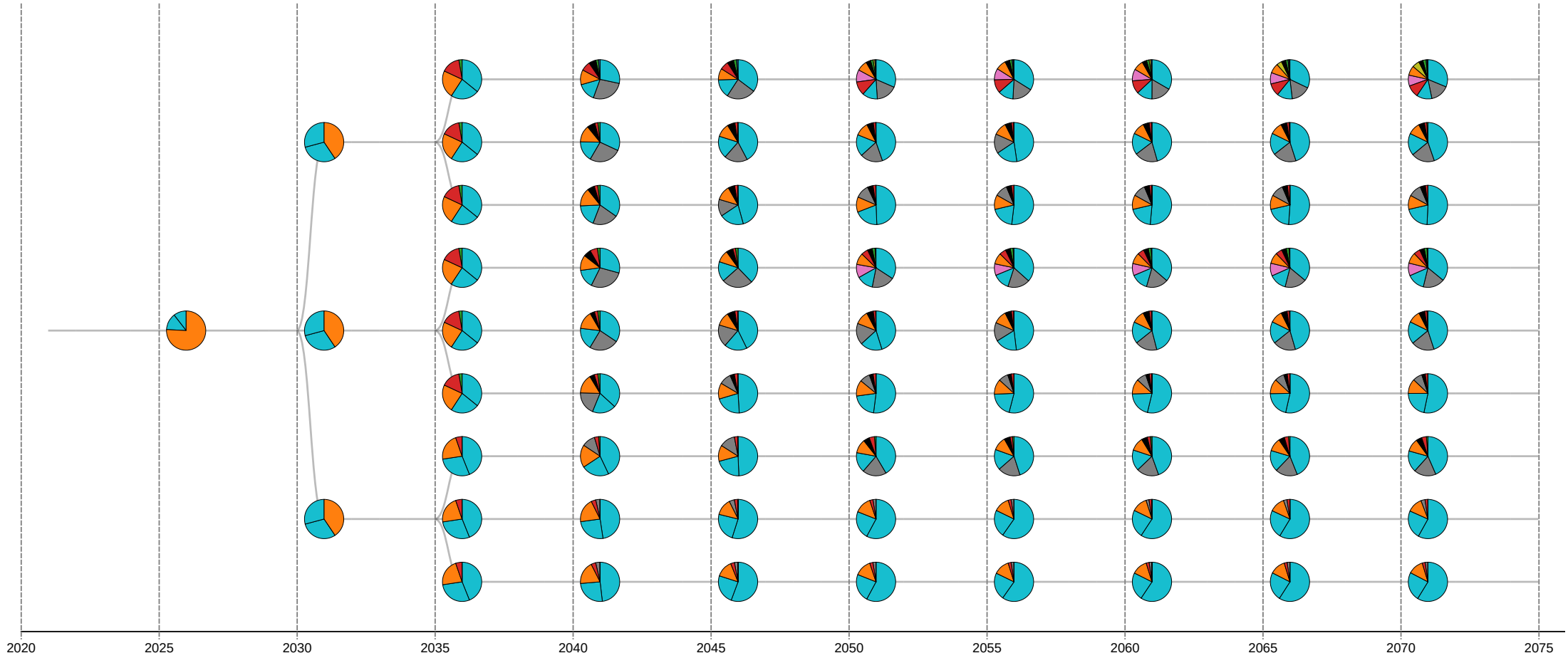
- Other

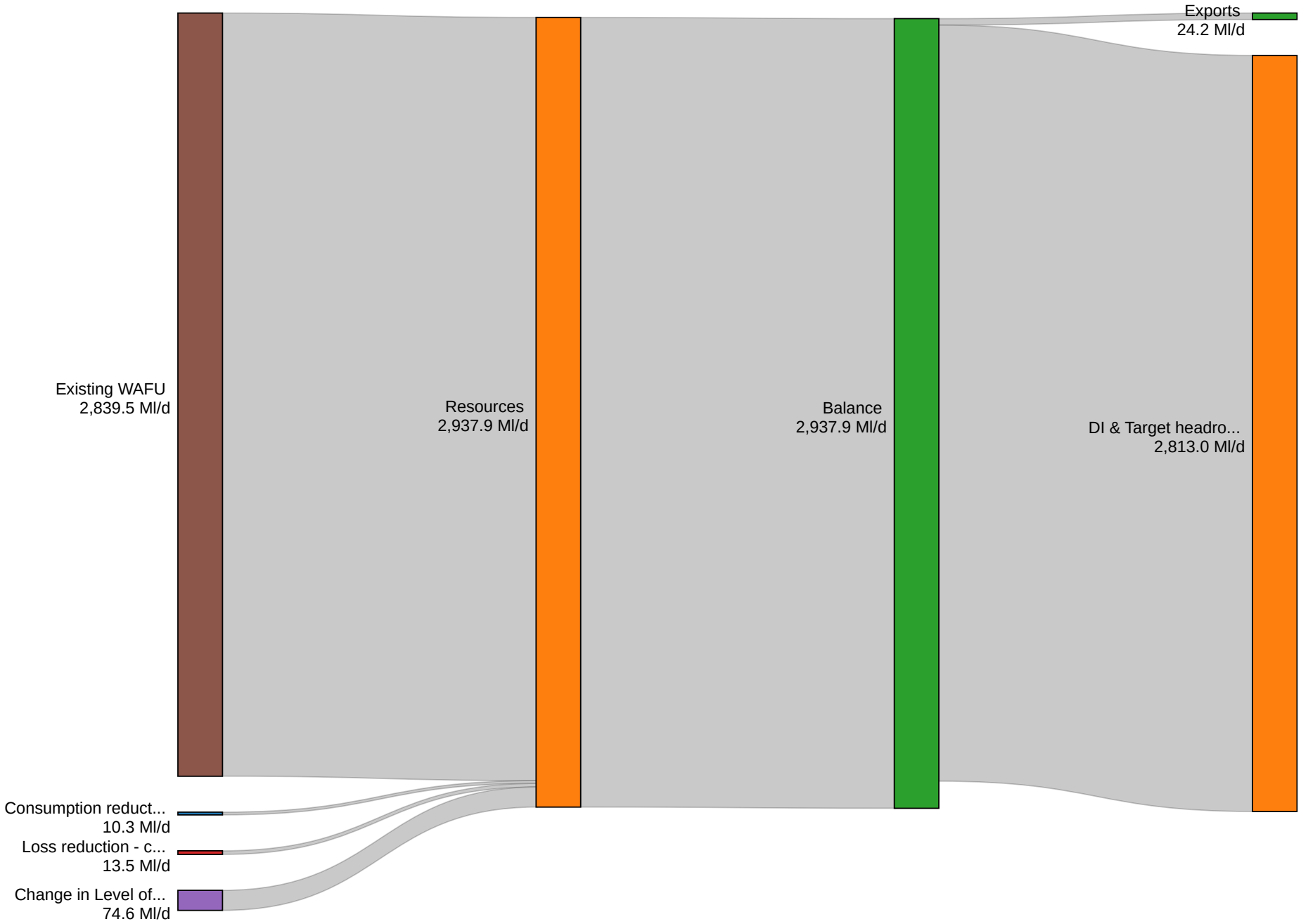
Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.

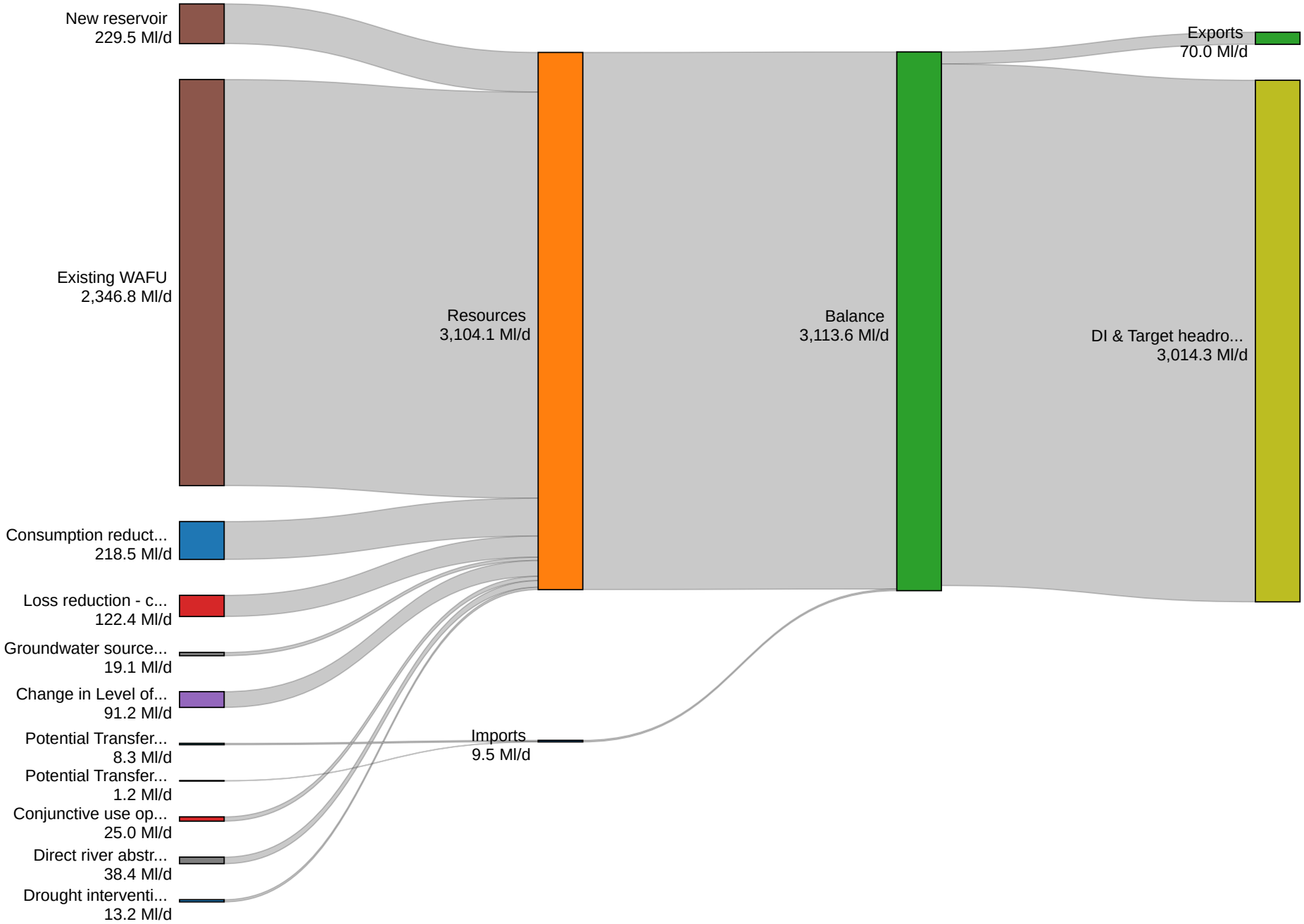


- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

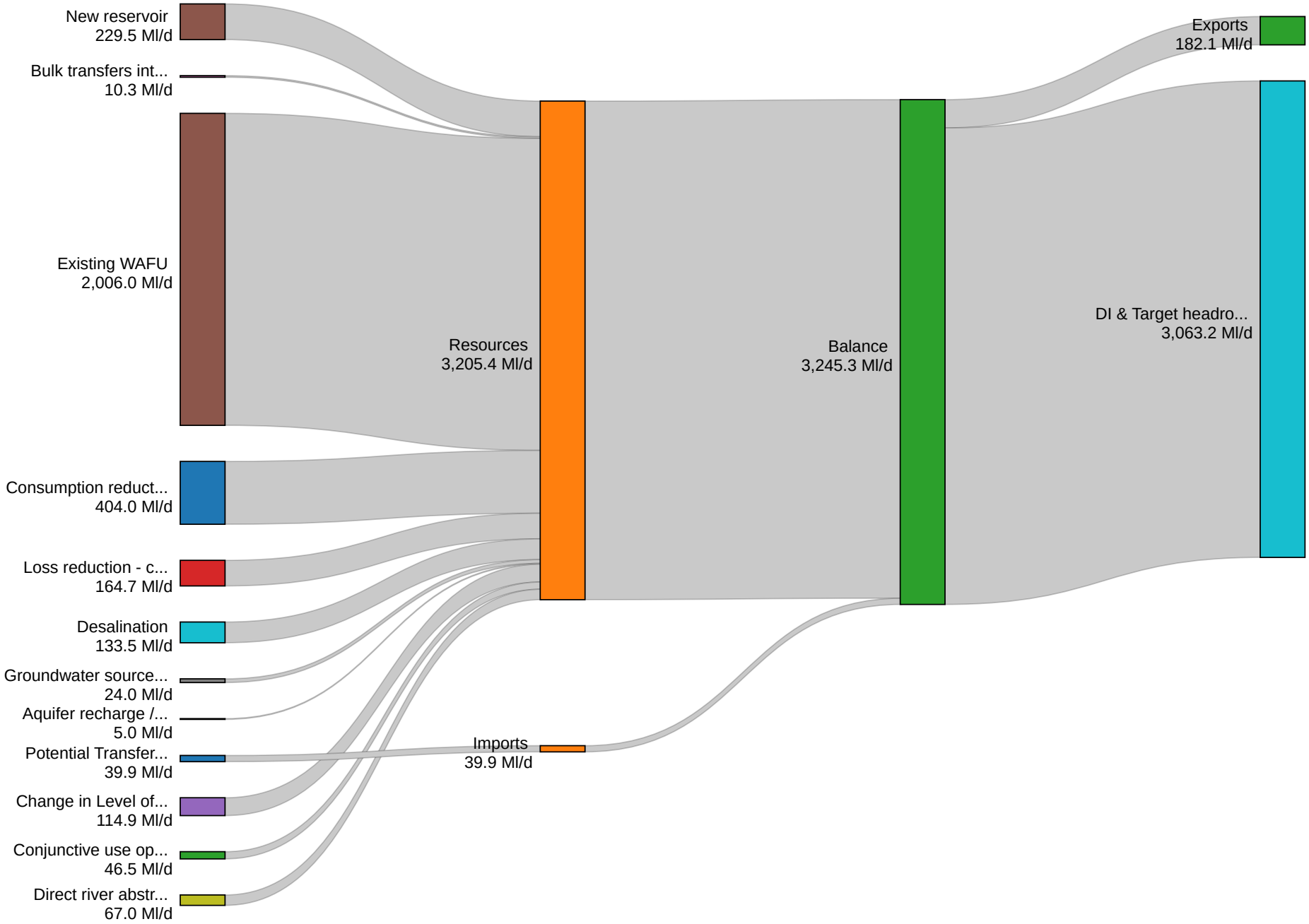
Situation 4 - 2026 (Thames Water)



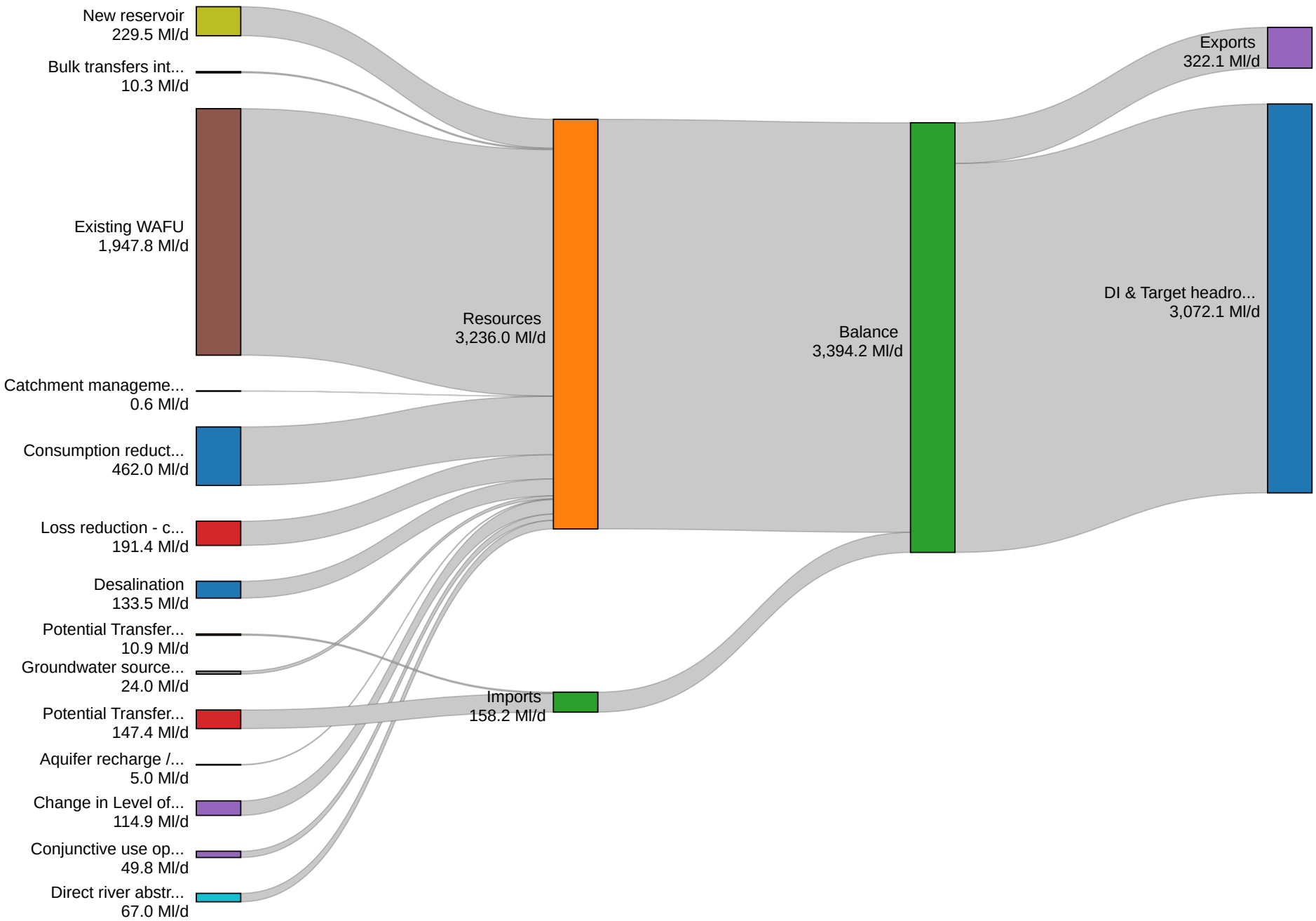
Situation 4 - 2040 (Thames Water)



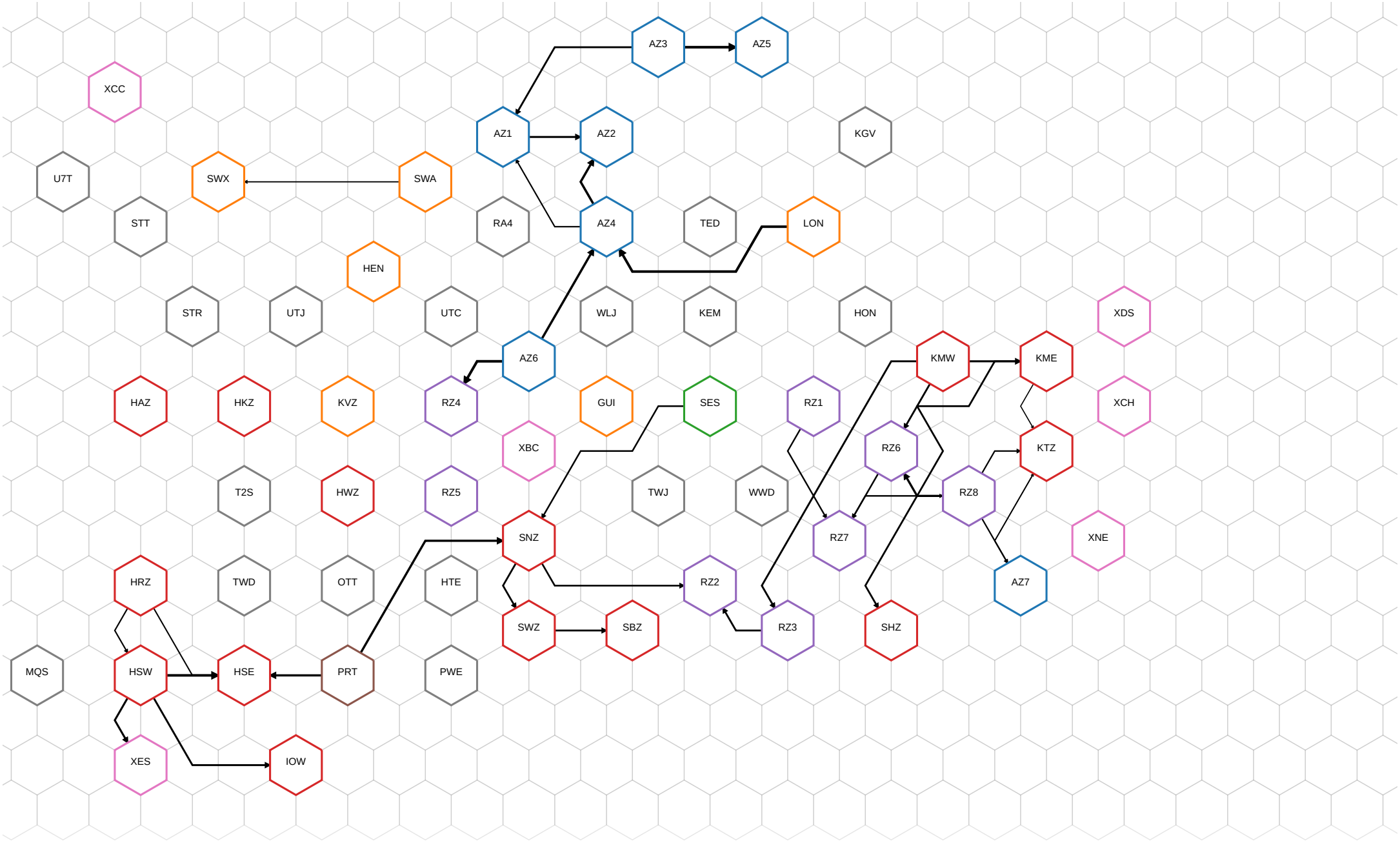
Situation 4 - 2050 (Thames Water)



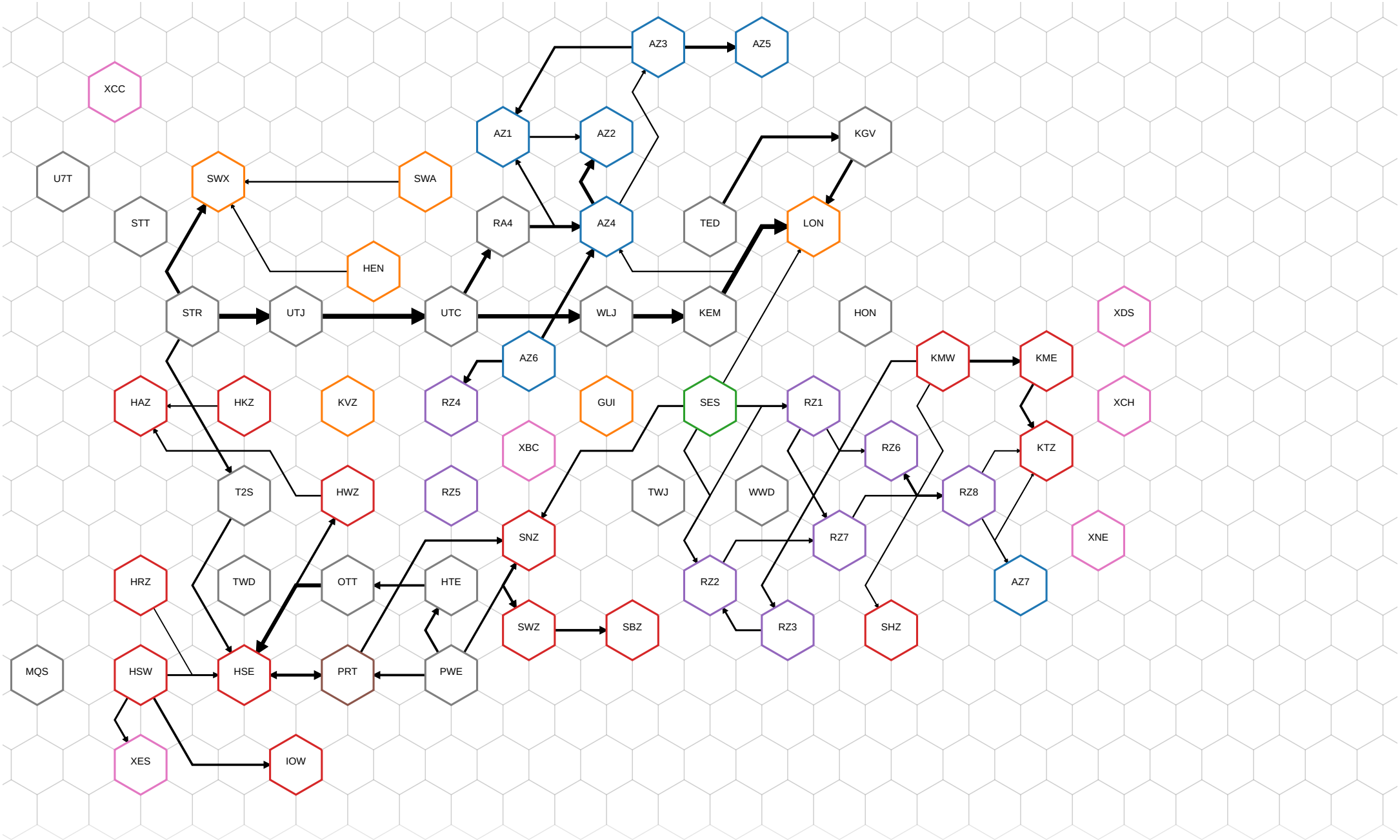
Situation 4 - 2075 (Thames Water)



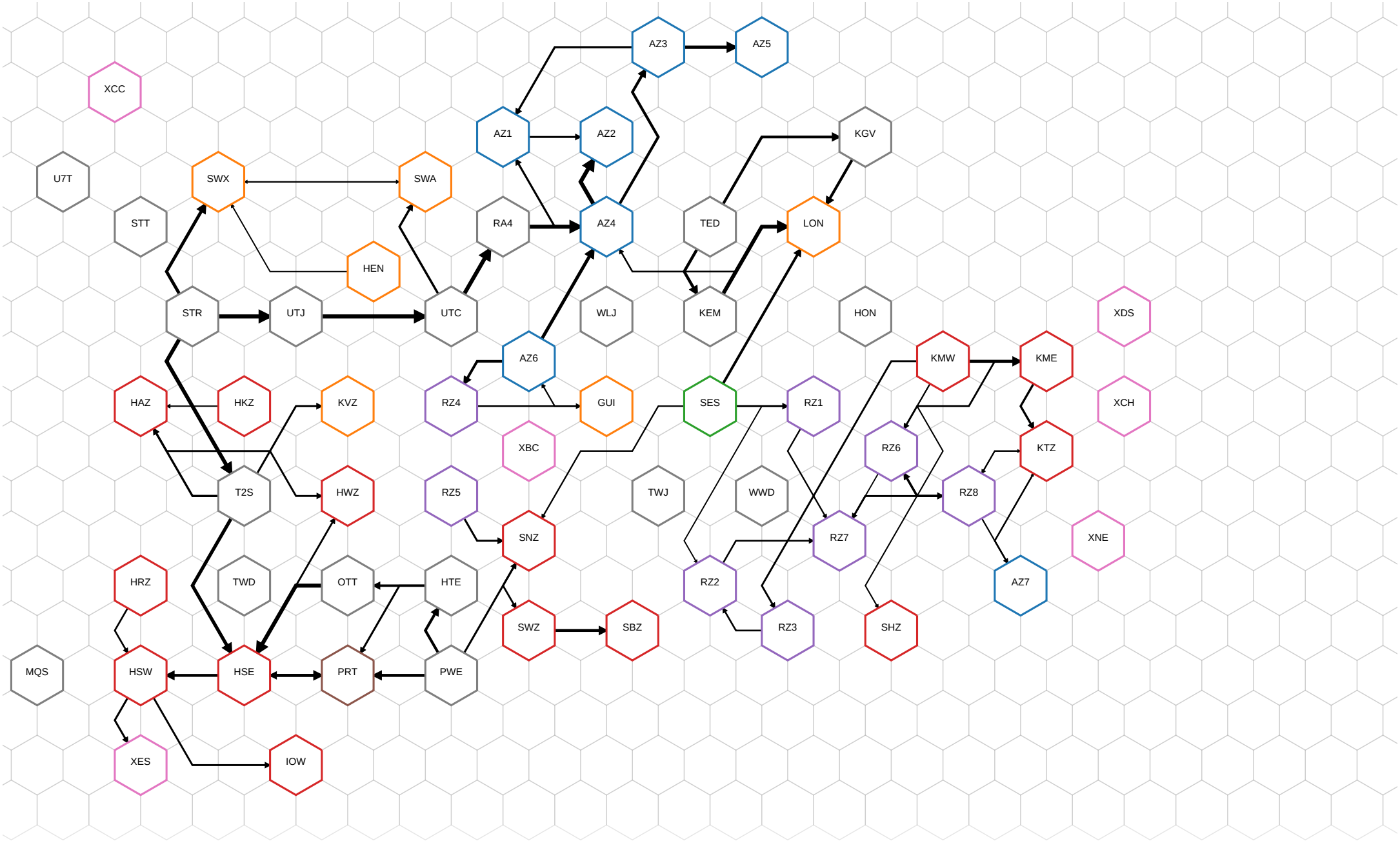
Situation 4 - 2026



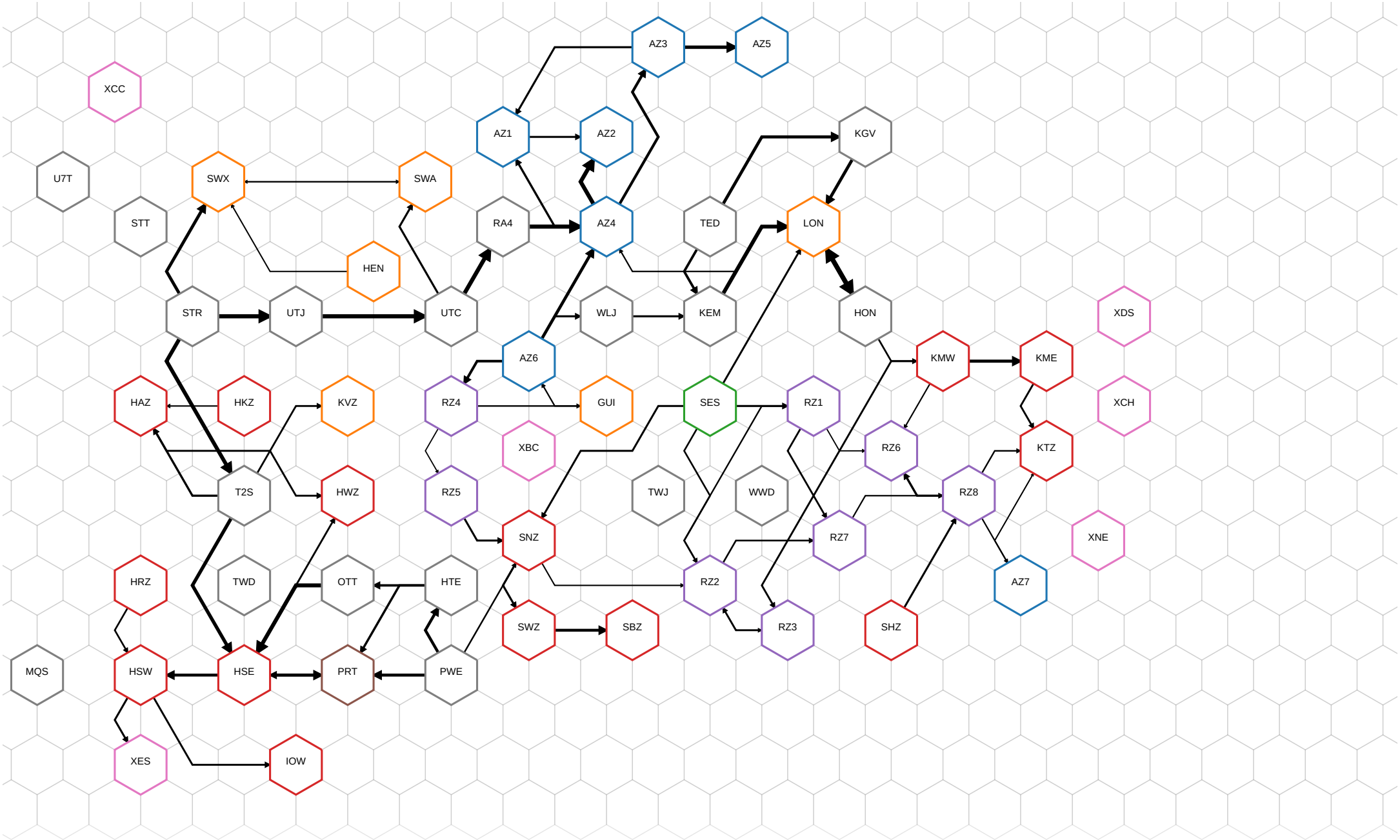
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

GOVERNMENT-LED G + SESRO 100

IVM Summary: Thames Water

! This run contained total deficits of 29.9 Ml/d in the **"100a-dyaa-hplan-fthr"** planning scenario.

! This run contained total deficits of 4.9 Ml/d in the **"hybrida-dyaa-hplan-fthr"** planning scenario.

! This run contained total deficits of 23.9 Ml/d in the **"normal-hplan-fthr"** planning scenario.

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridg-only-sesro100-2075
Description	Least cost run with hybrid-g government interventions including only SESRO 100 Mm3.
Created at	18/07/2023, 12:29:57
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridg-only-sesro100
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets. Exclude all SESRO variants except 100.
Optimised discount rate	STPR

Metrics

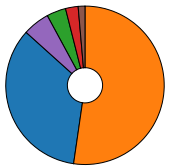
Net present value (Cost)

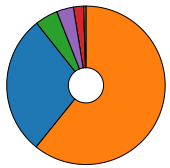
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	4,703,079	1,919,746	1,918,969	922,055	919,327	918,547	518,758	517,752	516,984	(£m)
Cost w/o deficit (STPR)	22,392	18,673	17,896	21,231	18,503	17,723	18,620	17,614	16,846	(£m)
Cost w/ deficit (IGEQ)	4,715,113	1,928,517	1,927,104	933,044	927,997	926,622	527,689	525,820	524,441	(£m)
Cost w/o deficit (IGEQ)	34,426	27,444	26,031	32,220	27,173	25,798	27,551	25,682	24,303	(£m)
Cost w/ deficit (LTDR)	4,705,404	1,921,472	1,920,578	924,192	921,034	920,143	520,510	519,345	518,463	(£m)
Cost w/o deficit (LTDR)	24,717	20,399	19,504	23,368	20,210	19,319	20,372	19,207	18,325	(£m)

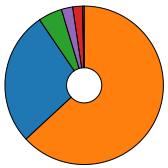
Cost breakdown (STPR)

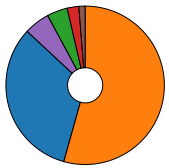
Select Company: Total

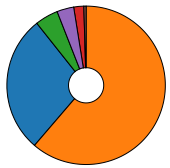
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	7,695	5,328	4,901	6,922	5,187	4,732	5,144	4,596	4,156	(£m)
Fixed opex	11,710	11,354	11,294	11,536	11,340	11,280	11,335	11,274	11,211	(£m)
Fixed operational carbon	883	874	874	893	874	874	872	866	866	(£m)
Embedded carbon	576	389	364	504	380	349	380	341	313	(£m)
Variable opex	1,218	641	407	1,106	636	424	744	477	275	(£m)
Variable carbon opex	309	88	56	270	85	64	145	61	25	(£m)

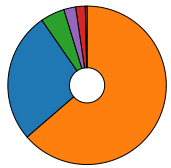
situation1 

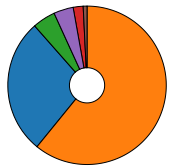
situation2 

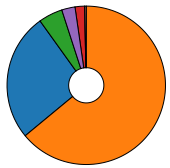
situation3 

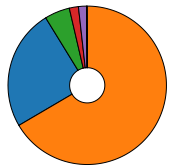
situation4 

situation5 

situation6 

situation7 

situation8 

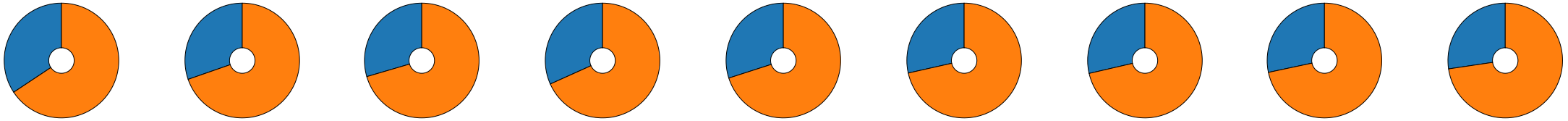
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,693,625	2,372,332	2,204,601	3,189,885	2,323,600	2,118,111	2,342,508	2,068,451	1,885,437	(tonnes)
Operational emissions	7,070,197	5,451,762	5,260,972	6,867,883	5,434,868	5,312,120	5,843,869	5,235,000	5,011,003	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

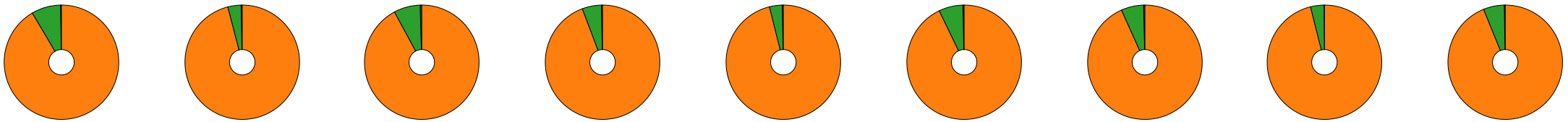


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	75	50	31	80	49	24	66	13	10	(GWh)
Grid	24,404	13,920	6,098	22,753	13,863	6,065	15,851	9,645	3,429	(GWh)
Renewable	2,186	537	492	1,307	514	443	1,073	378	215	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	71,742.00	65,983.00	65,204.00	69,606.00	65,754.00	64,874.00	65,548.00	63,573.00	62,512.00	
SEA environmental disbenefit	129,994.00	91,492.00	85,861.00	115,933.00	89,265.00	82,808.00	91,852.00	78,369.00	71,063.00	
Natural capital	86,518,256.08	82,055,266.80	82,304,327.77	81,605,407.89	83,107,280.01	85,868,905.44	82,720,830.91	83,561,094.22	86,331,420.67	
Bio-diversity net gain	−239,392.00	−160,028.00	−142,844.00	−205,052.00	−152,701.00	−124,497.00	−131,903.00	−111,830.00	−84,026.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	35,243.00	32,857.00	32,589.00	34,474.00	32,710.00	32,285.00	32,841.00	31,821.00	31,359.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	30.32	30.66	33.57	30.36	30.85	33.76	30.95	34.12	38.14	
R1: Uncertainty of option supply/demand benefit	6.28	5.76	6.26	6.26	5.80	6.32	5.66	6.01	6.68	
R3: Risk of service failure due to other physical hazards	7.00	7.29	8.13	7.04	7.35	8.21	7.25	8.19	9.38	
R4: Availability of additional headroom	6.43	6.71	6.93	6.53	6.73	6.93	7.04	7.38	7.62	
R5: Catchment/raw water quality risks (incl. climate change)	5.11	5.16	5.83	5.03	5.19	5.84	5.33	6.15	7.13	
R6: Capacity of catchment services	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
R7: Risk of service failure to other exceptional events	5.51	5.74	6.43	5.50	5.78	6.47	5.67	6.39	7.33	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

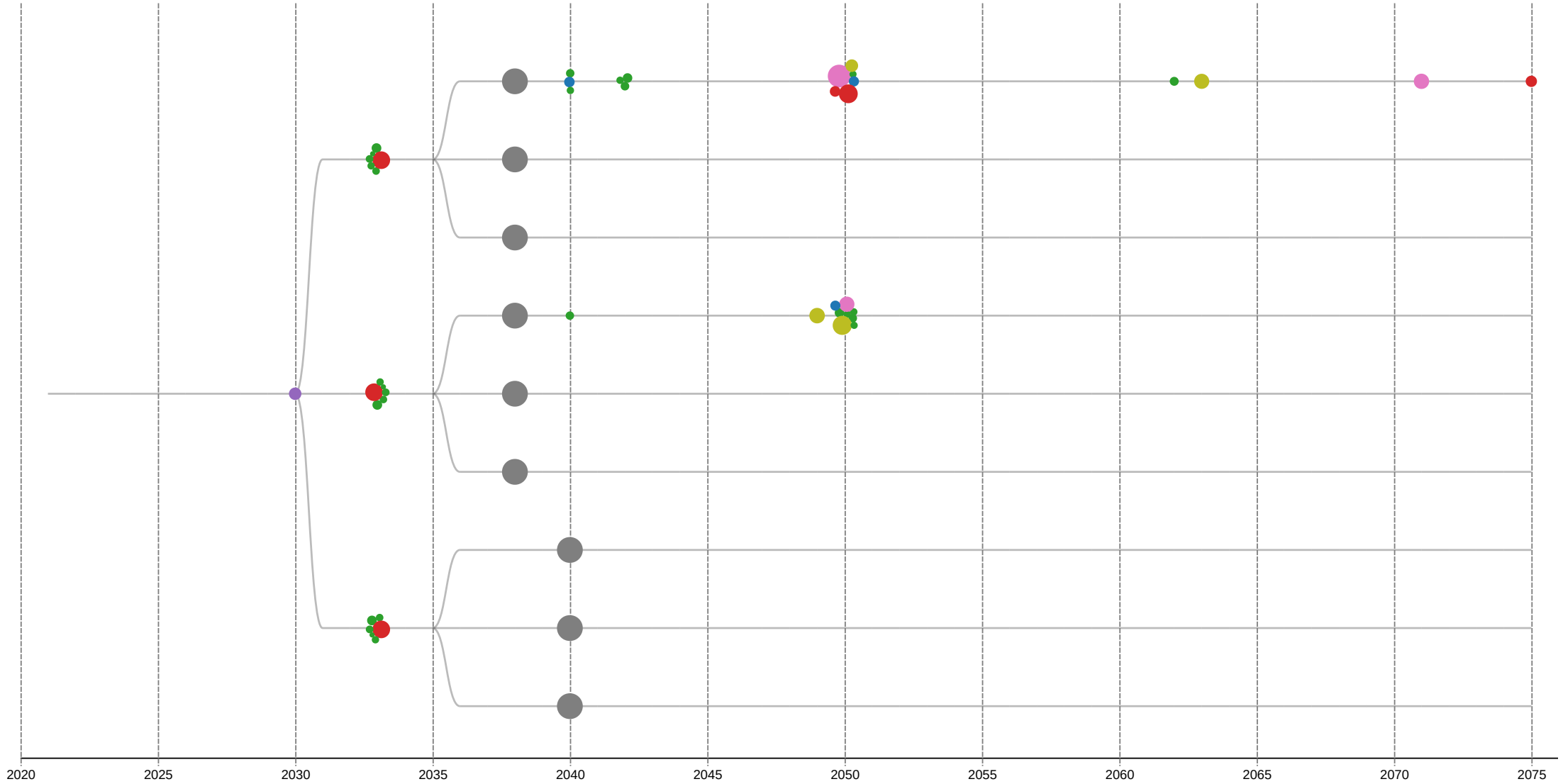
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	14.15	15.37	17.31	14.14	15.43	17.28	15.50	17.64	20.20	
A3: Operational complexity and flexibility	6.13	6.61	7.41	6.26	6.66	7.47	6.58	7.46	8.59	
A4: WRZ connectivity	7.98	8.72	9.85	7.84	8.73	9.76	8.87	10.13	11.56	
A7: Customer relations support engagement with demand management	0.04	0.04	0.05	0.04	0.04	0.05	0.05	0.05	0.06	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.37	19.76	21.95	19.62	19.90	21.92	19.89	22.19	25.18	
E1: Scaleability and modularity of proposed changes	8.32	8.71	9.67	8.47	8.78	9.76	8.75	9.92	11.29	
E2: Intervention lead times	5.52	5.51	6.14	5.64	5.54	5.98	5.65	6.15	6.95	
E3: Reliance on external bodies to deliver changes	5.54	5.54	6.14	5.52	5.58	6.18	5.50	6.12	6.94	
E5: Collaborative land management	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

Option Selection (Thames Water)



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
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- Trading
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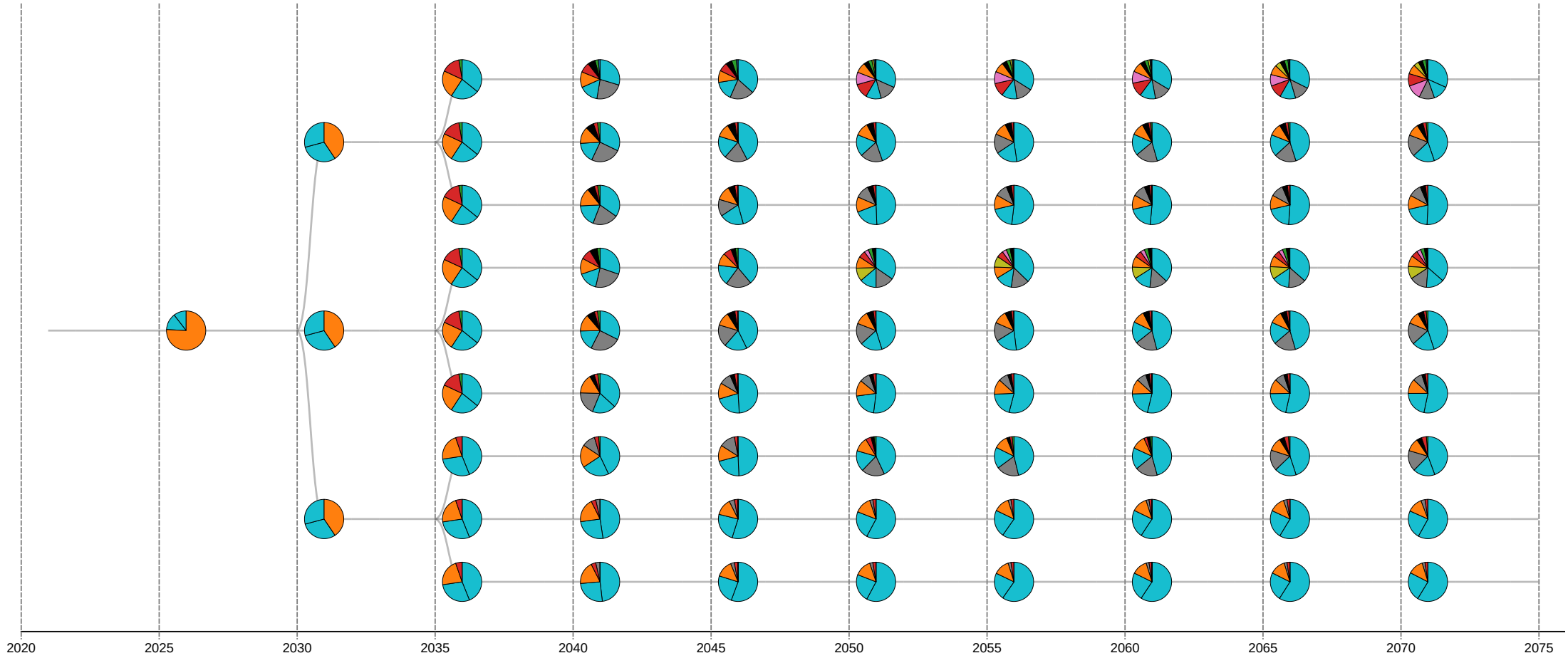
- Leakage reduction
- Other

Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.



- Transfer
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- Drought intervention
- Groundwater
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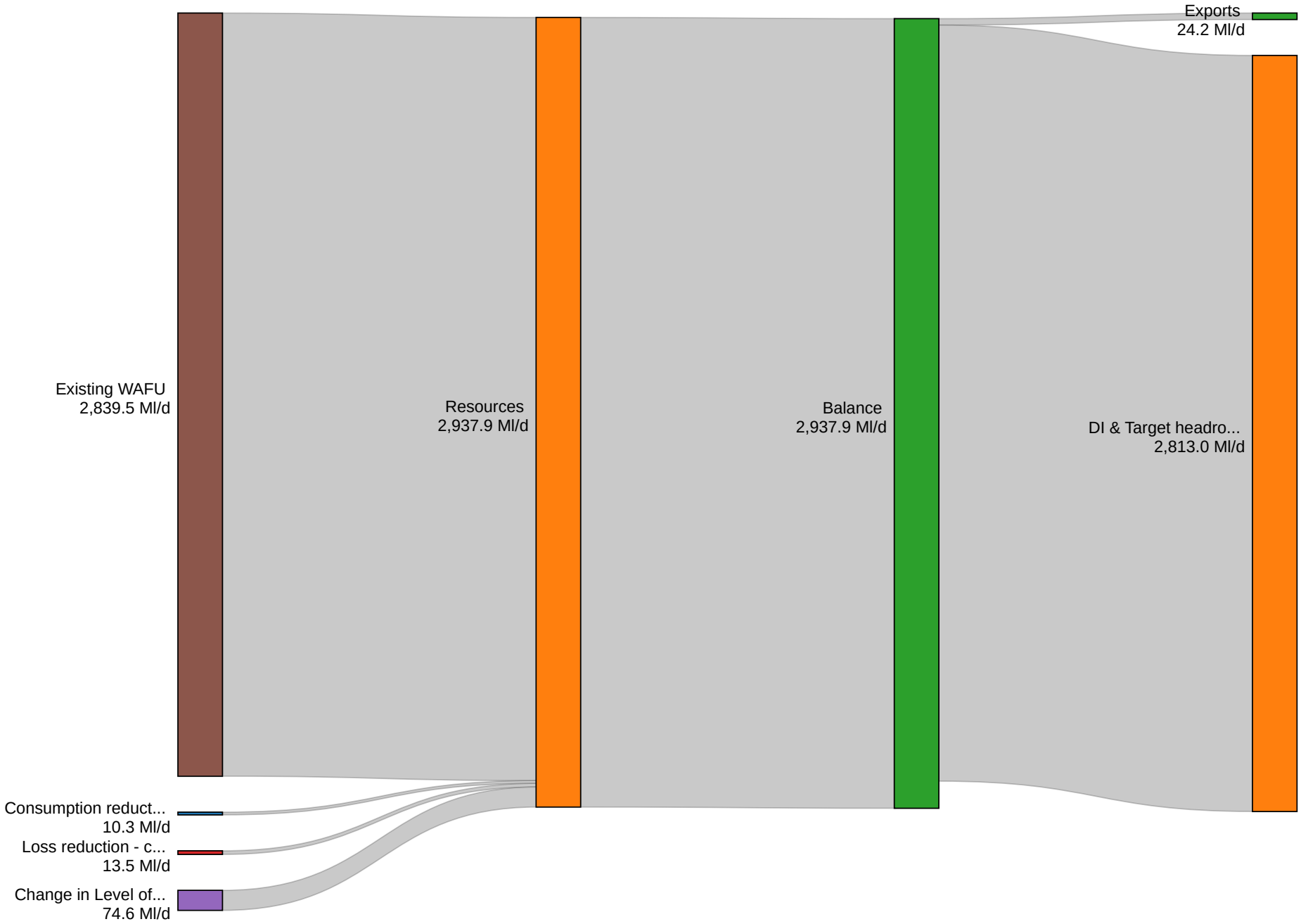
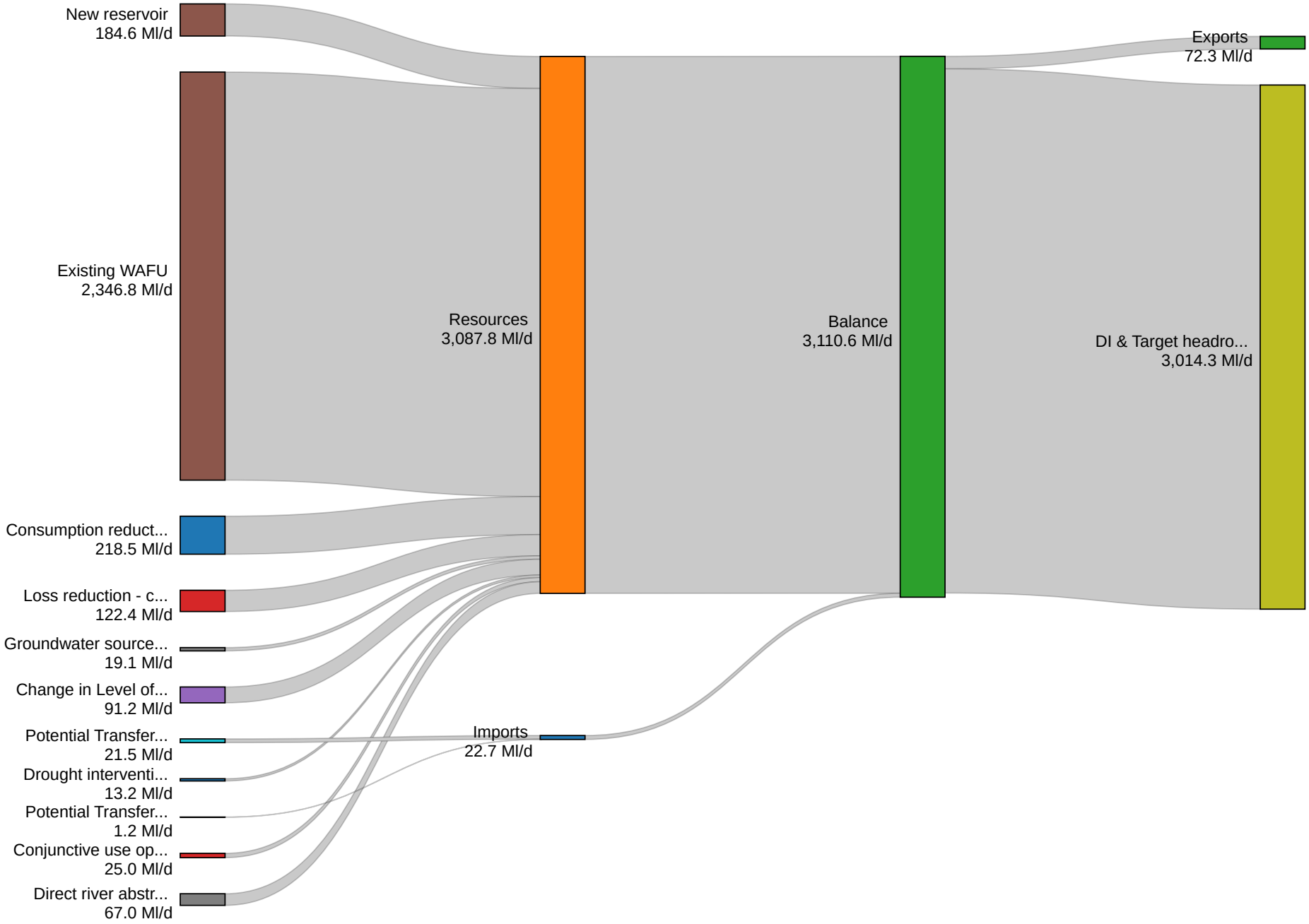
- Other

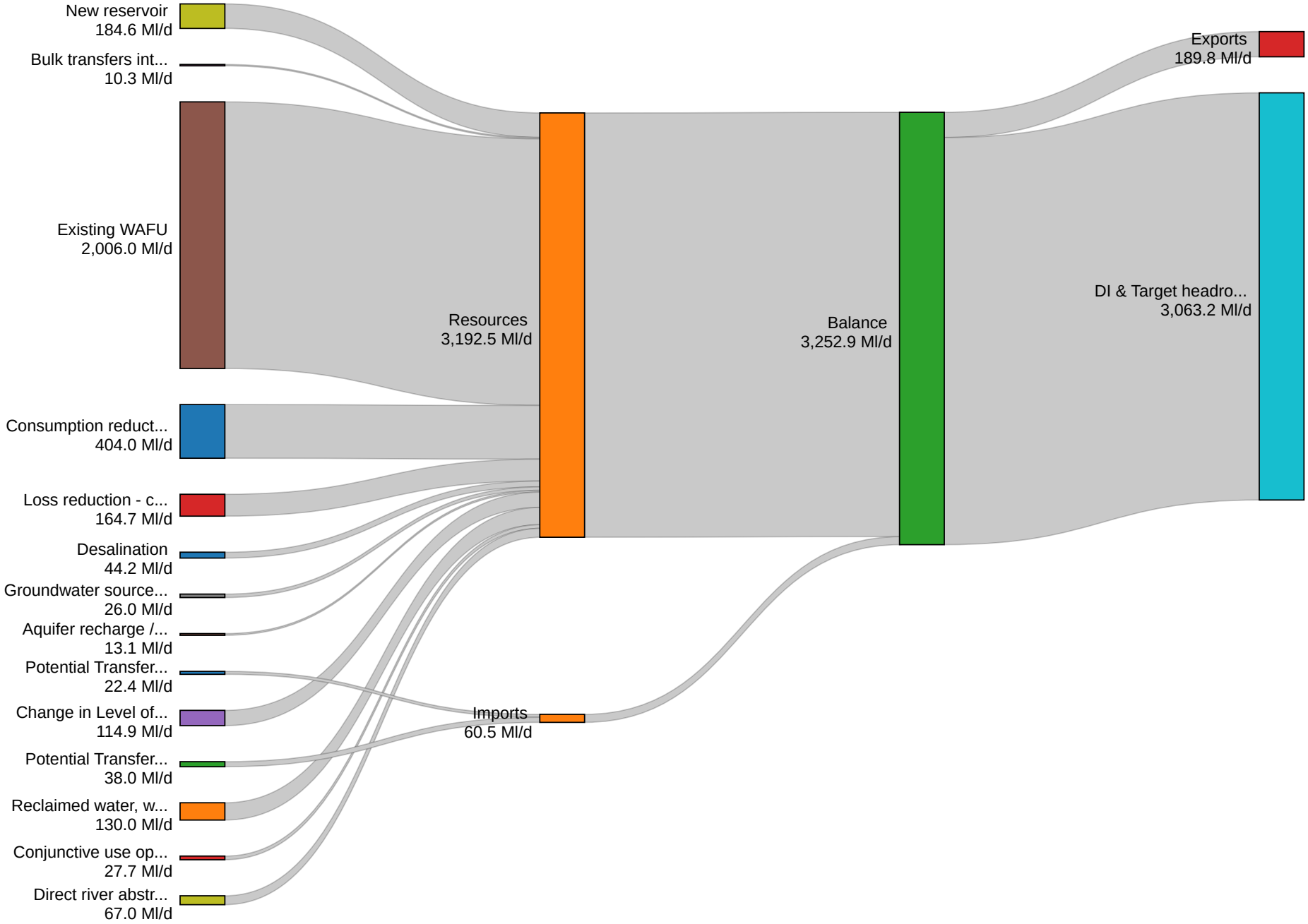
Situation 4 - 2026 (Thames Water)



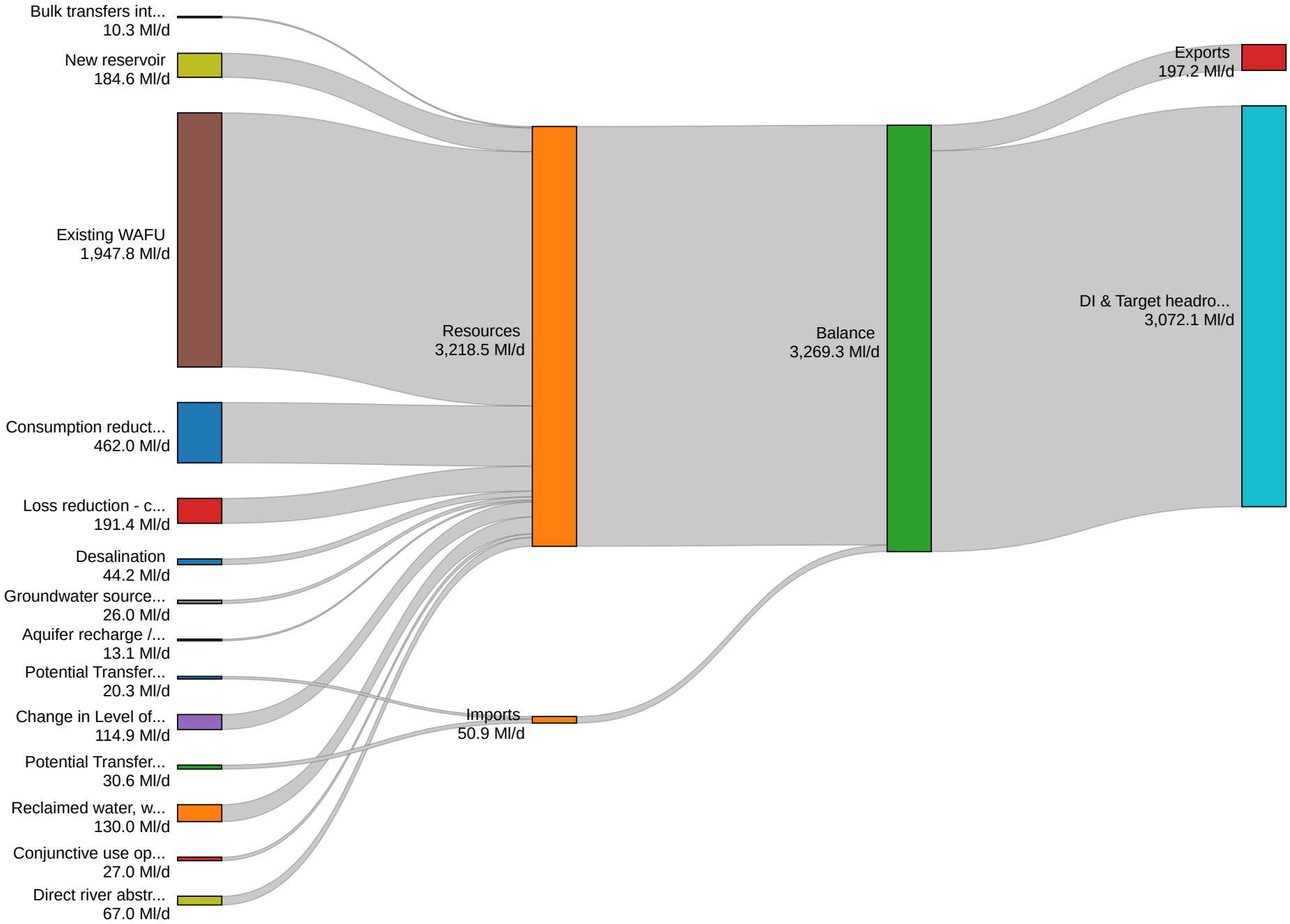
Situation 4 - 2040 (Thames Water)



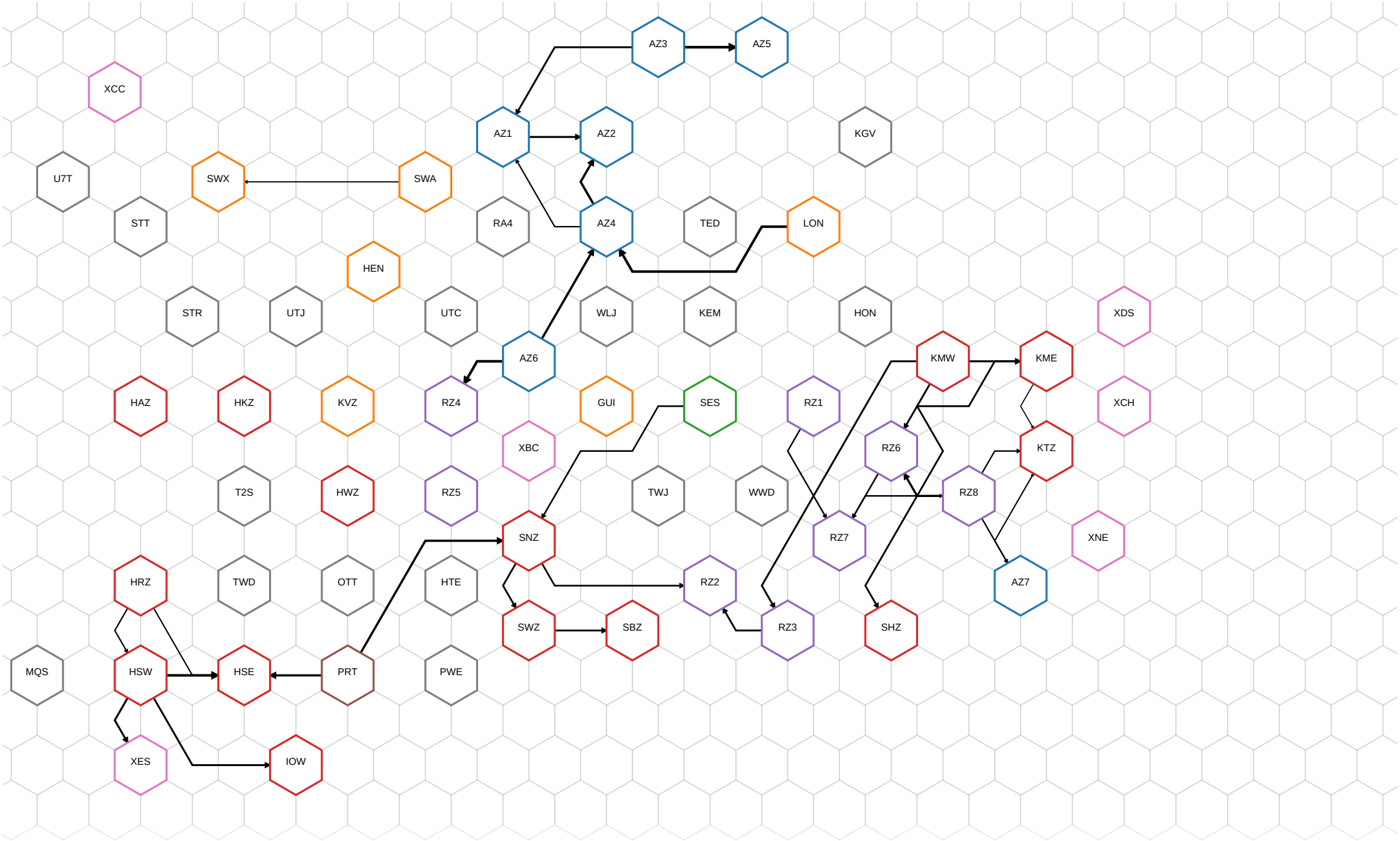
Situation 4 - 2050 (Thames Water)



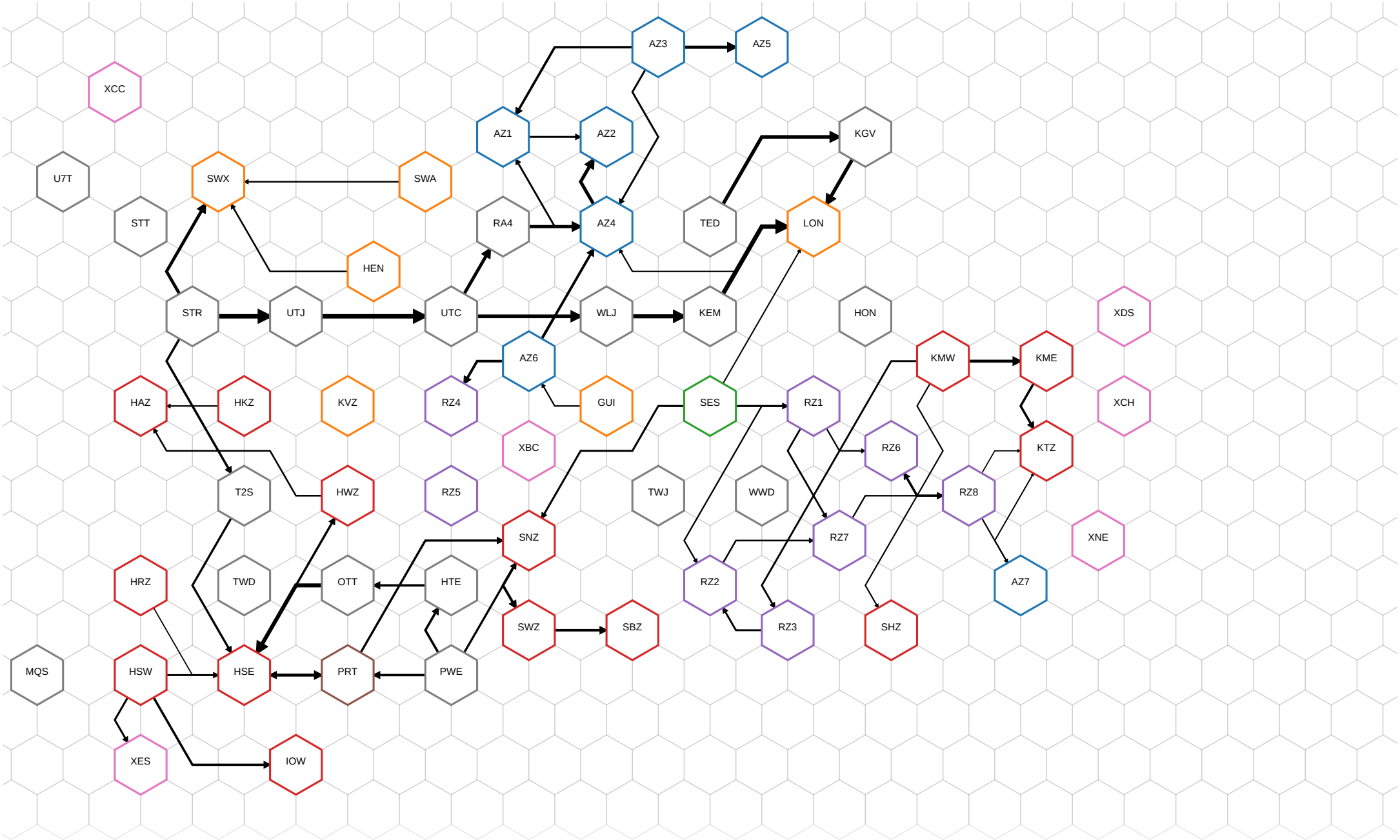
Situation 4 - 2075 (Thames Water)



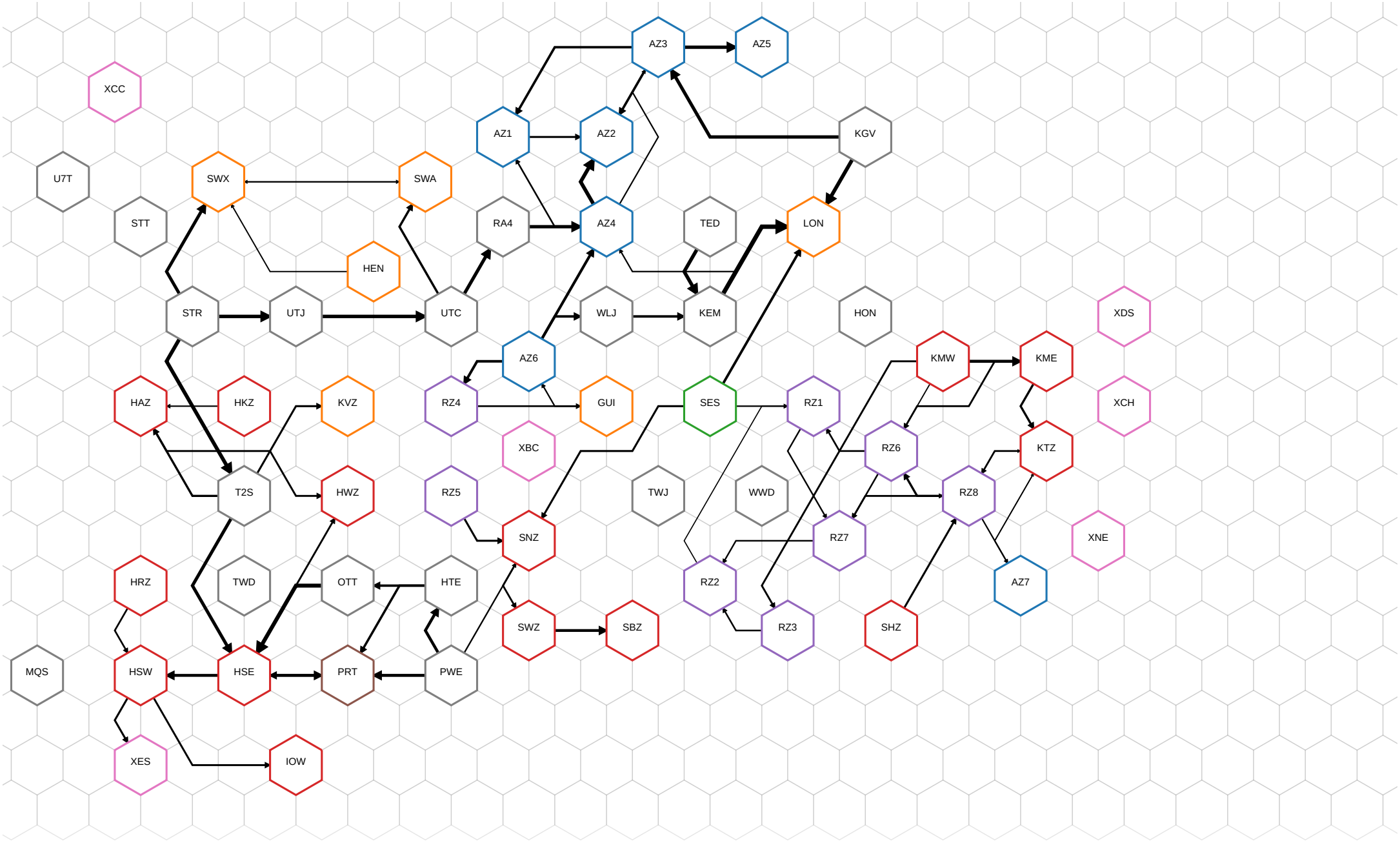
Situation 4 - 2026



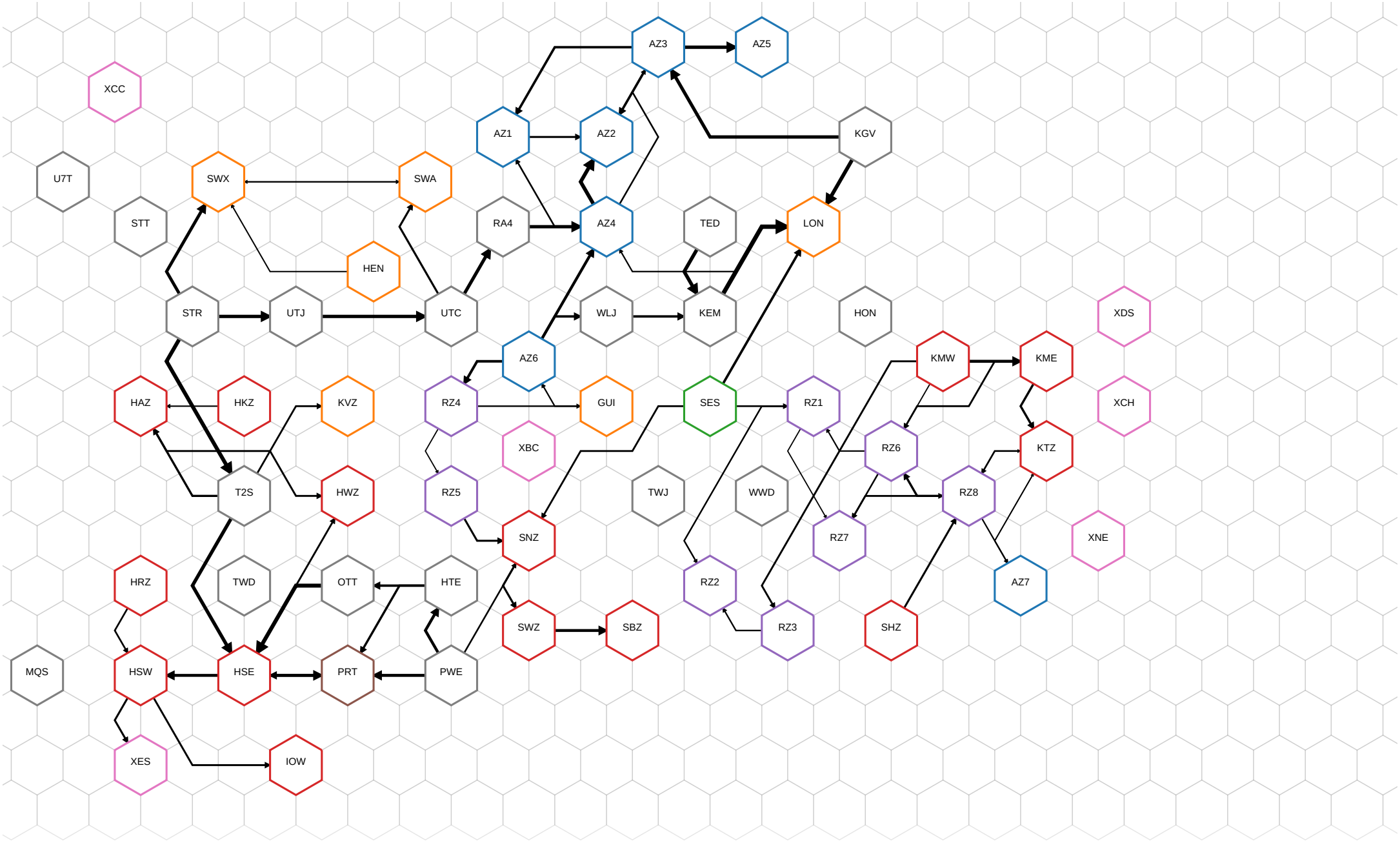
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

GOVERNMENT-LED G + SESRO 75

IVM Summary: Thames Water

! This run contained total deficits of 29.9 Ml/d in the **"100a-dyaa-hplan-fthr"** planning scenario.

! This run contained total deficits of 4.9 Ml/d in the **"hybrida-dyaa-hplan-fthr"** planning scenario.

! This run contained total deficits of 23.9 Ml/d in the **"normal-hplan-fthr"** planning scenario.

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridg-only-sesro75-2075
Description	Least cost run with hybrid-g government interventions including only SESRO 75 Mm3.
Created at	18/07/2023, 14:21:52
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridg-only-sesro75
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets. Exclude all SESRO variants except 75.
Optimised discount rate	STPR

Metrics

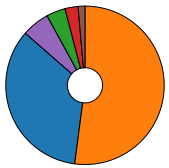
Net present value (Cost)

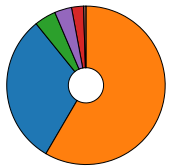
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	4,703,316	1,920,919	1,920,180	921,867	919,370	918,451	518,720	517,669	516,918	(£m)
Cost w/o deficit (STPR)	22,629	19,846	19,106	21,043	18,546	17,627	18,582	17,531	16,780	(£m)
Cost w/ deficit (IGEQ)	4,715,369	1,930,464	1,929,137	932,667	928,075	926,438	527,655	525,674	524,336	(£m)
Cost w/o deficit (IGEQ)	34,681	29,390	28,063	31,843	27,251	25,614	27,517	25,536	24,198	(£m)
Cost w/ deficit (LTDR)	4,705,648	1,922,794	1,921,945	923,969	921,084	920,031	520,471	519,250	518,390	(£m)
Cost w/o deficit (LTDR)	24,961	21,720	20,872	23,145	20,260	19,207	20,334	19,113	18,252	(£m)

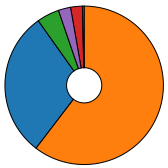
Cost breakdown (STPR)

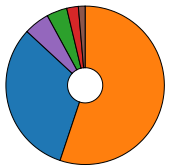
Select Company: Total

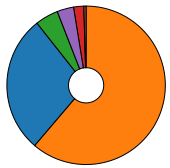
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	7,773	6,102	5,691	6,683	5,219	4,674	5,104	4,521	4,098	(£m)
Fixed opex	11,784	11,595	11,538	11,599	11,354	11,277	11,336	11,271	11,209	(£m)
Fixed operational carbon	884	875	874	883	874	875	872	866	866	(£m)
Embedded carbon	602	485	461	497	386	342	380	334	308	(£m)
Variable opex	1,270	691	476	1,092	626	406	745	478	275	(£m)
Variable carbon opex	316	98	67	289	86	54	146	61	25	(£m)

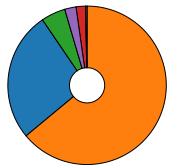
situation1 

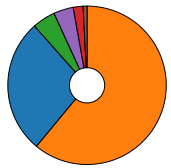
situation2 

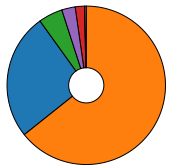
situation3 

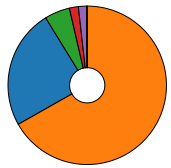
situation4 

situation5 

situation6 

situation7 

situation8 

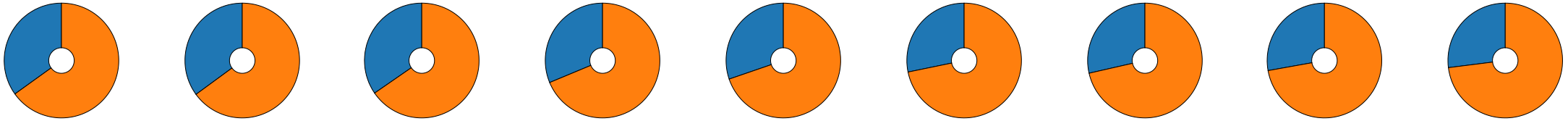
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,819,416	2,981,687	2,821,883	3,140,077	2,361,202	2,065,276	2,342,385	2,020,379	1,852,181	(tonnes)
Operational emissions	7,122,579	5,525,007	5,331,394	6,902,097	5,443,869	5,251,607	5,860,948	5,242,296	5,010,421	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

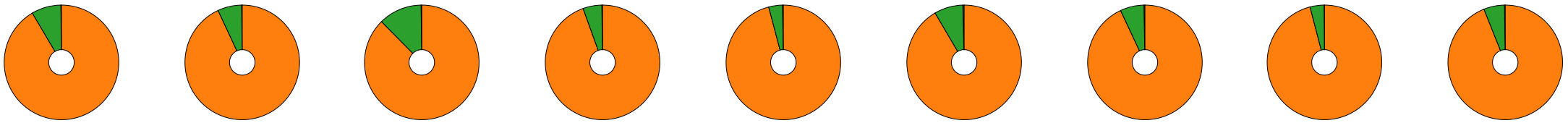


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	50	29	16	50	35	23	45	10	8	(GWh)
Grid	24,924	14,078	6,705	22,853	13,606	5,647	15,026	9,659	3,433	(GWh)
Renewable	2,264	1,021	935	1,285	550	499	1,083	397	214	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	71,354.00	67,057.00	66,264.00	69,277.00	65,616.00	64,652.00	65,709.00	63,578.00	62,517.00	
SEA environmental disbenefit	124,112.00	93,288.00	87,015.00	113,113.00	89,282.00	83,556.00	92,054.00	78,405.00	71,108.00	
Natural capital	88,423,114.42	90,150,594.70	90,448,439.25	81,526,256.81	83,919,492.37	87,150,646.71	87,304,150.39	85,038,092.68	87,808,449.17	
Bio-diversity net gain	−219,971.00	−158,996.00	−134,085.00	−185,302.00	−129,638.00	−120,741.00	−132,083.00	−97,377.00	−72,444.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	35,028.00	32,920.00	32,637.00	34,309.00	32,734.00	32,483.00	32,842.00	31,803.00	31,340.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	30.42	32.27	35.40	29.80	30.45	33.12	30.32	33.37	37.26	
R1: Uncertainty of option supply/demand benefit	6.31	6.19	6.76	6.02	5.73	6.18	5.52	5.86	6.50	
R3: Risk of service failure due to other physical hazards	7.00	7.64	8.53	6.95	7.25	8.03	7.11	7.99	9.14	
R4: Availability of additional headroom	6.45	6.80	7.01	6.45	6.70	6.90	6.99	7.33	7.57	
R5: Catchment/raw water quality risks (incl. climate change)	5.15	5.55	6.27	4.89	5.11	5.73	5.21	6.01	6.96	
R6: Capacity of catchment services	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
R7: Risk of service failure to other exceptional events	5.50	6.09	6.82	5.48	5.67	6.29	5.49	6.18	7.09	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

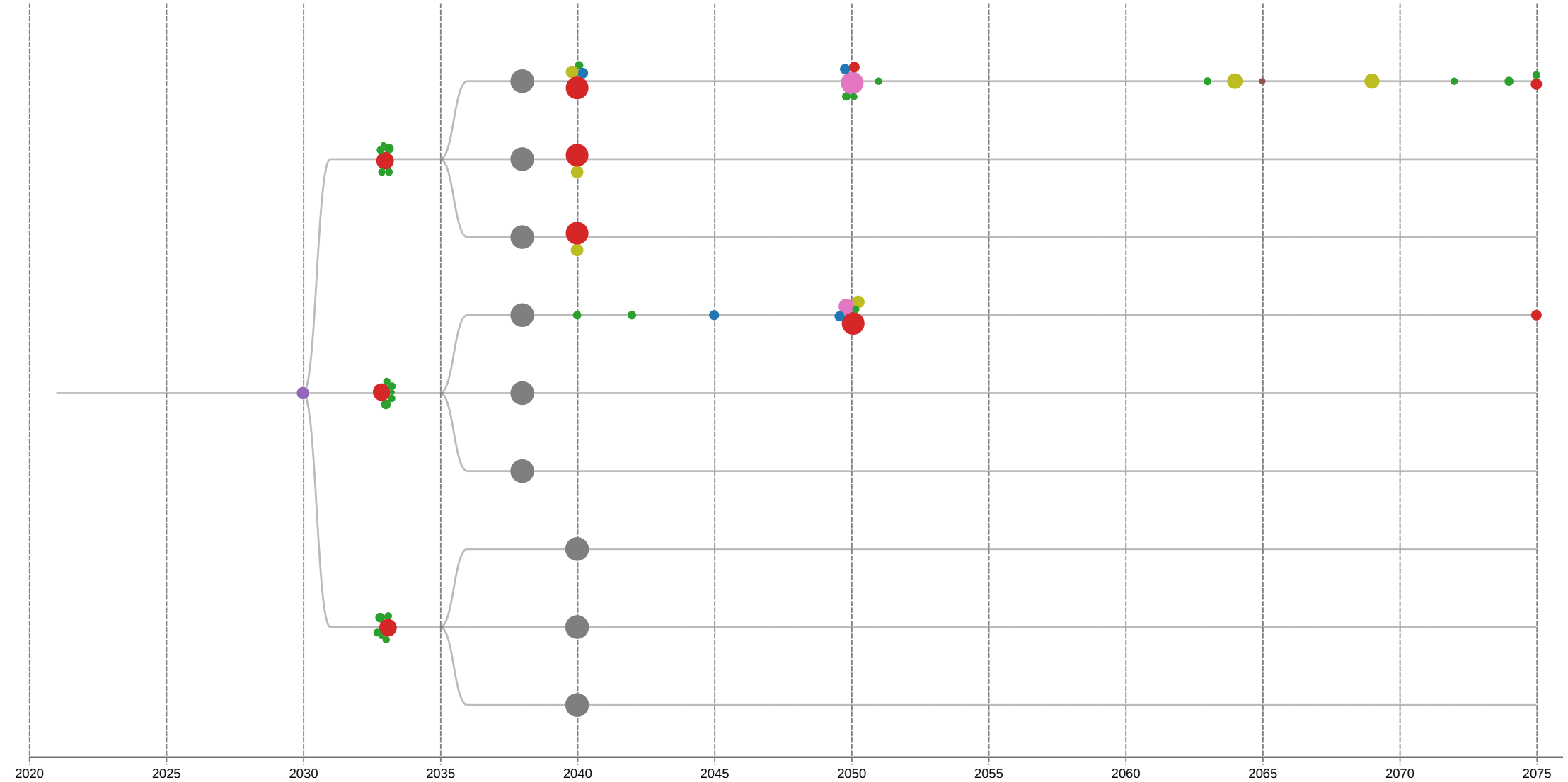
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	13.67	15.51	17.45	13.76	15.14	16.90	15.27	17.37	19.89	
A3: Operational complexity and flexibility	6.07	6.77	7.60	6.14	6.56	7.28	6.41	7.26	8.34	
A4: WRZ connectivity	7.55	8.70	9.80	7.58	8.53	9.57	8.81	10.06	11.49	
A7: Customer relations support engagement with demand management	0.05	0.04	0.05	0.04	0.04	0.05	0.05	0.05	0.06	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.93	21.46	23.89	19.59	19.82	21.94	19.60	21.99	24.93	
E1: Scaleability and modularity of proposed changes	8.55	9.30	10.35	8.44	8.73	9.66	8.65	9.81	11.17	
E2: Intervention lead times	5.74	6.14	6.86	5.63	5.52	6.13	5.50	6.11	6.89	
E3: Reliance on external bodies to deliver changes	5.63	6.02	6.69	5.52	5.57	6.14	5.45	6.07	6.88	
E5: Collaborative land management	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

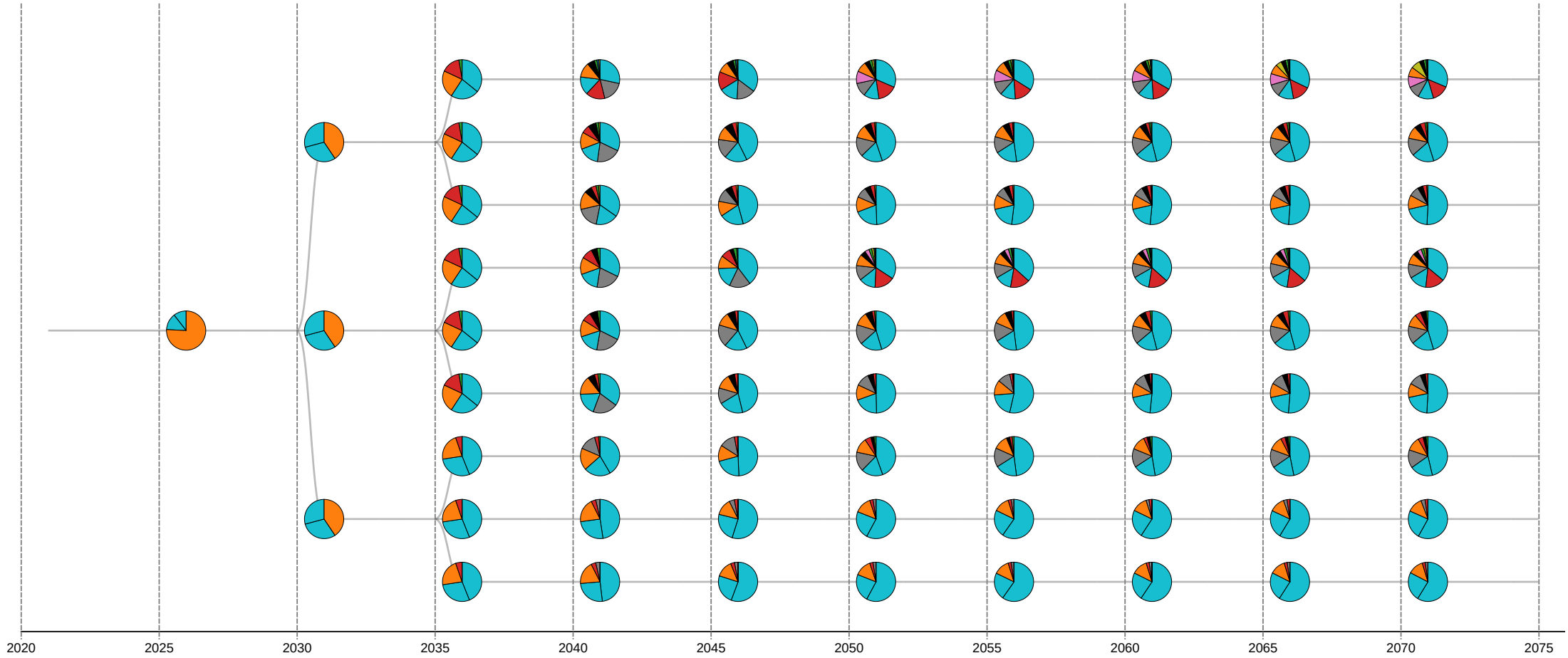
Option Selection (Thames Water)



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

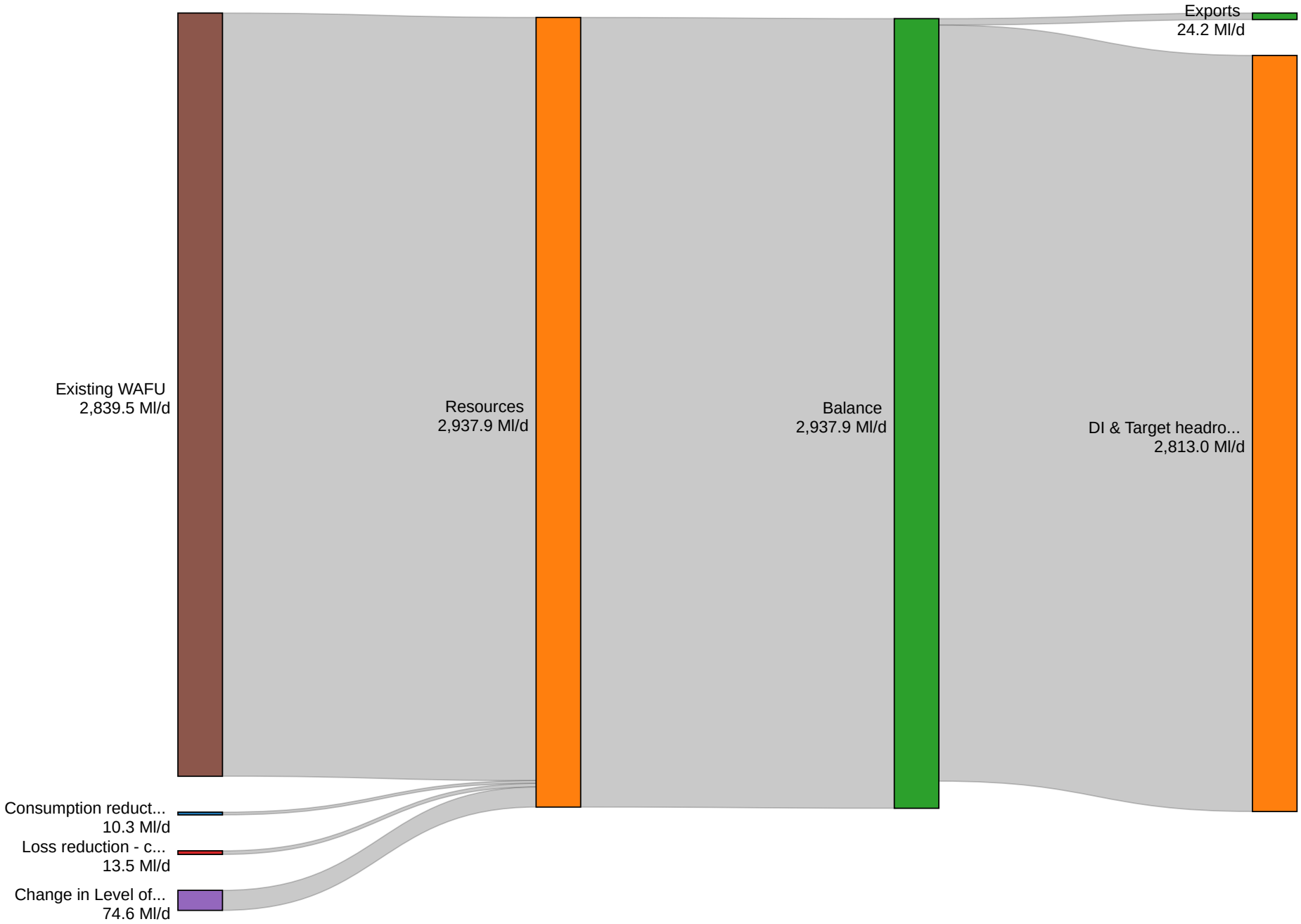
Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.

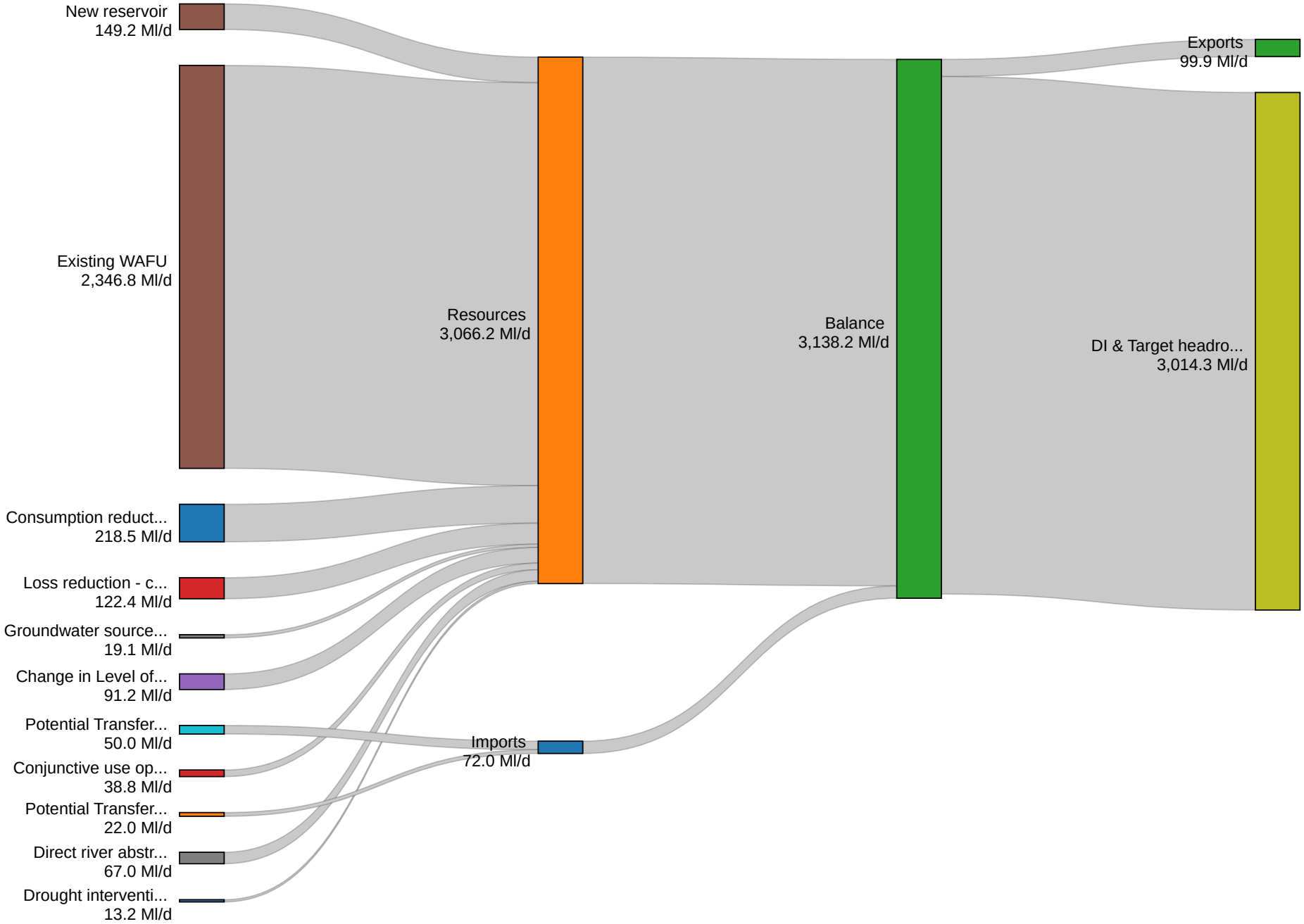


- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

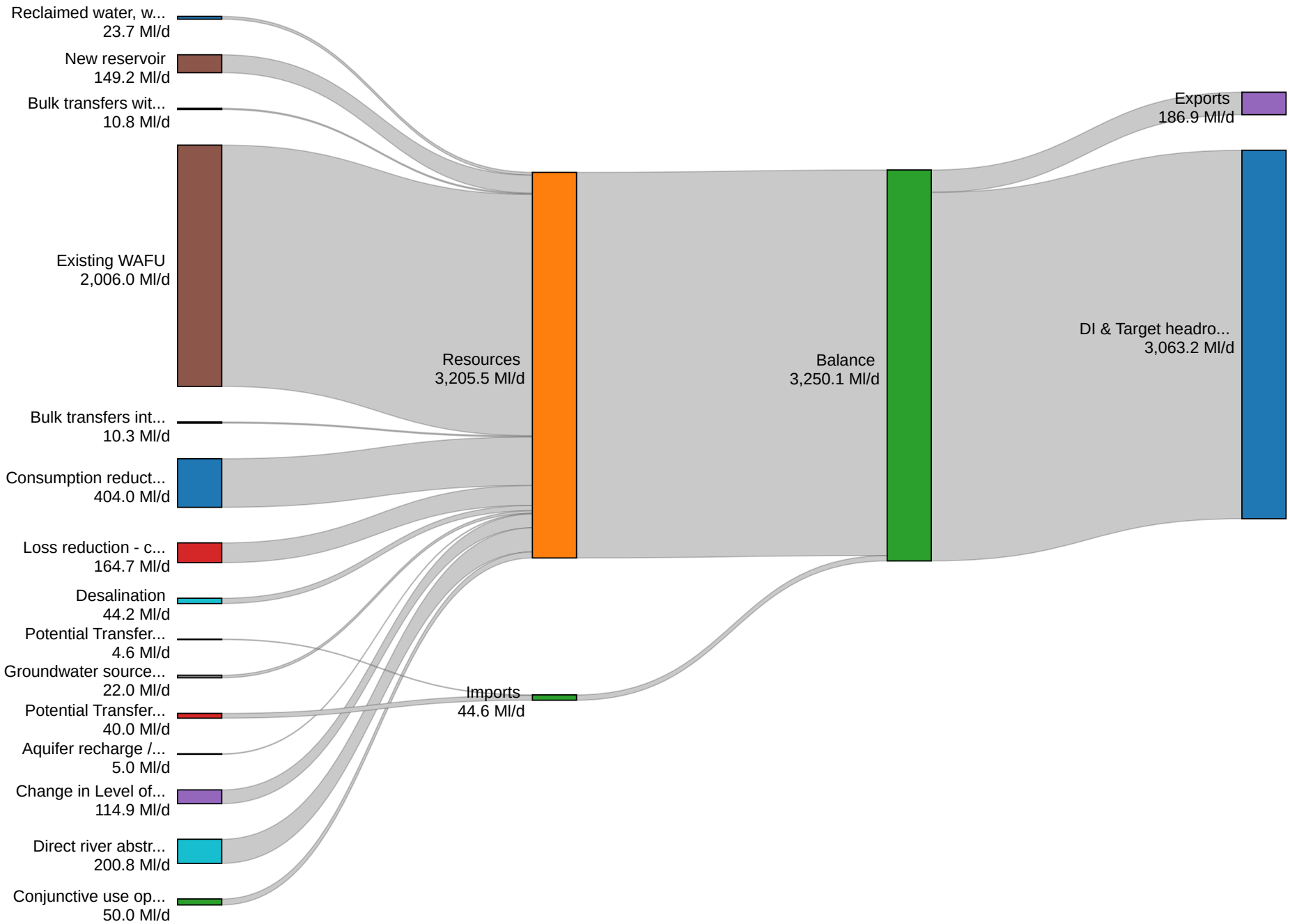
Situation 4 - 2026 (Thames Water)



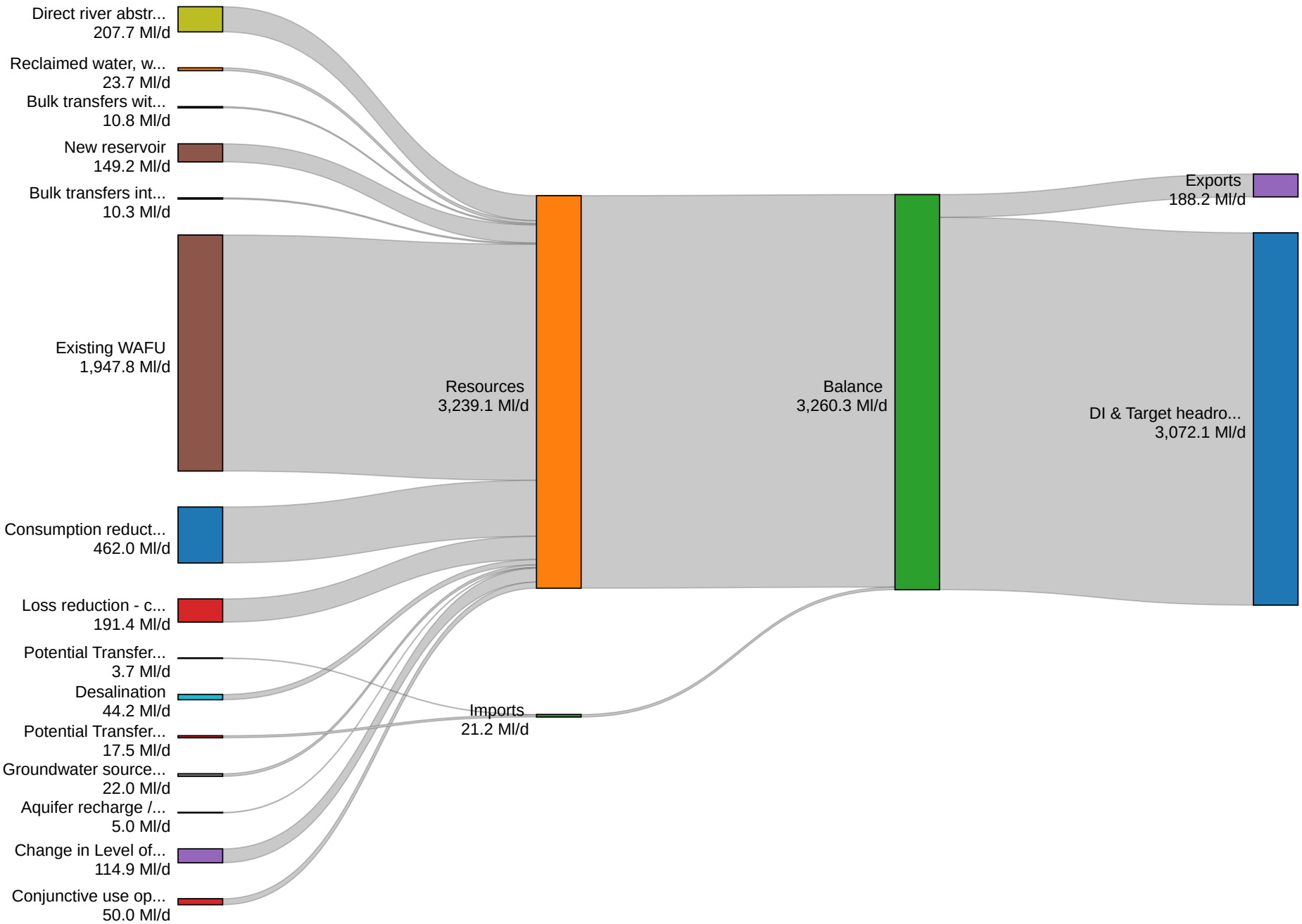
Situation 4 - 2040 (Thames Water)



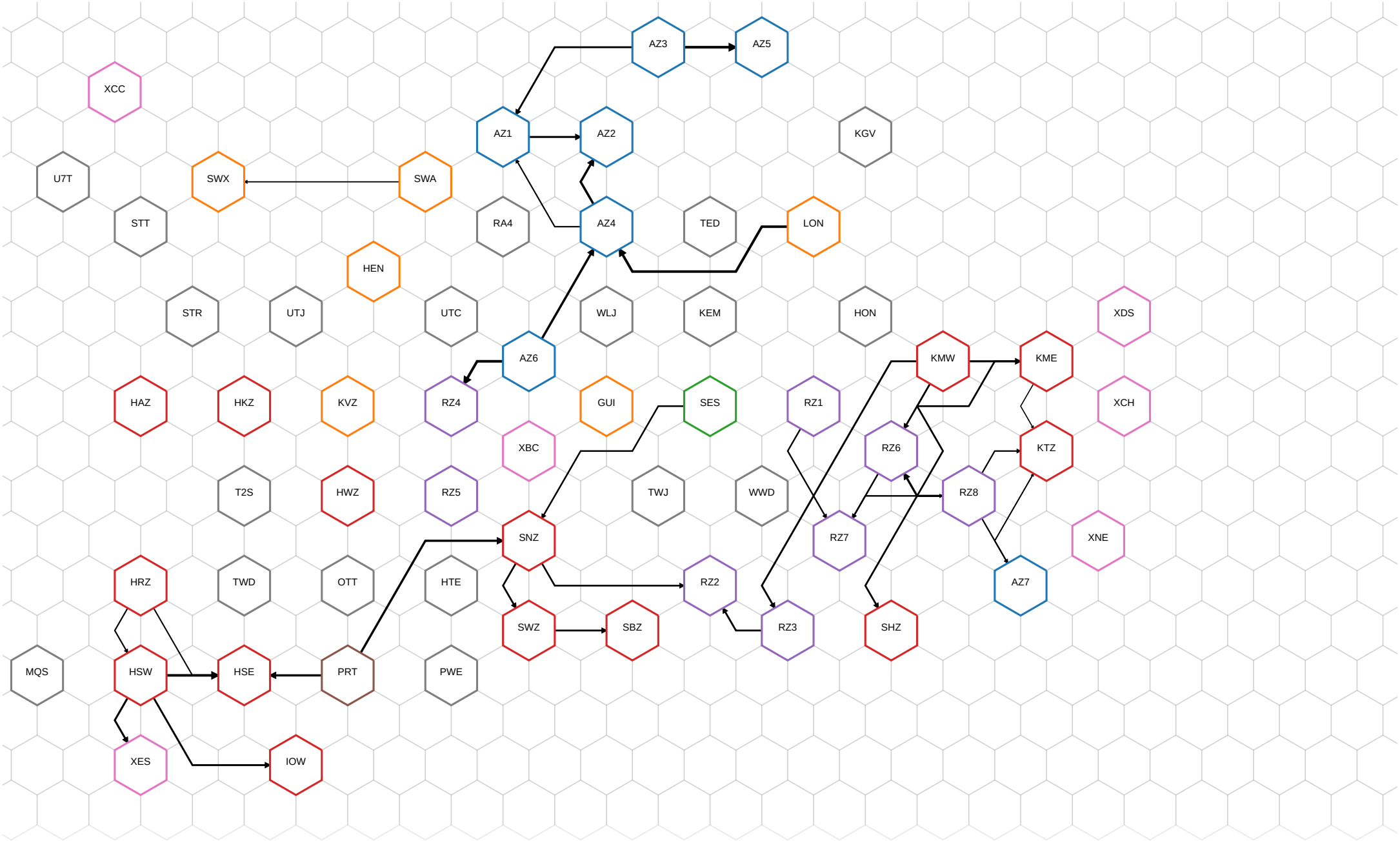
Situation 4 - 2050 (Thames Water)



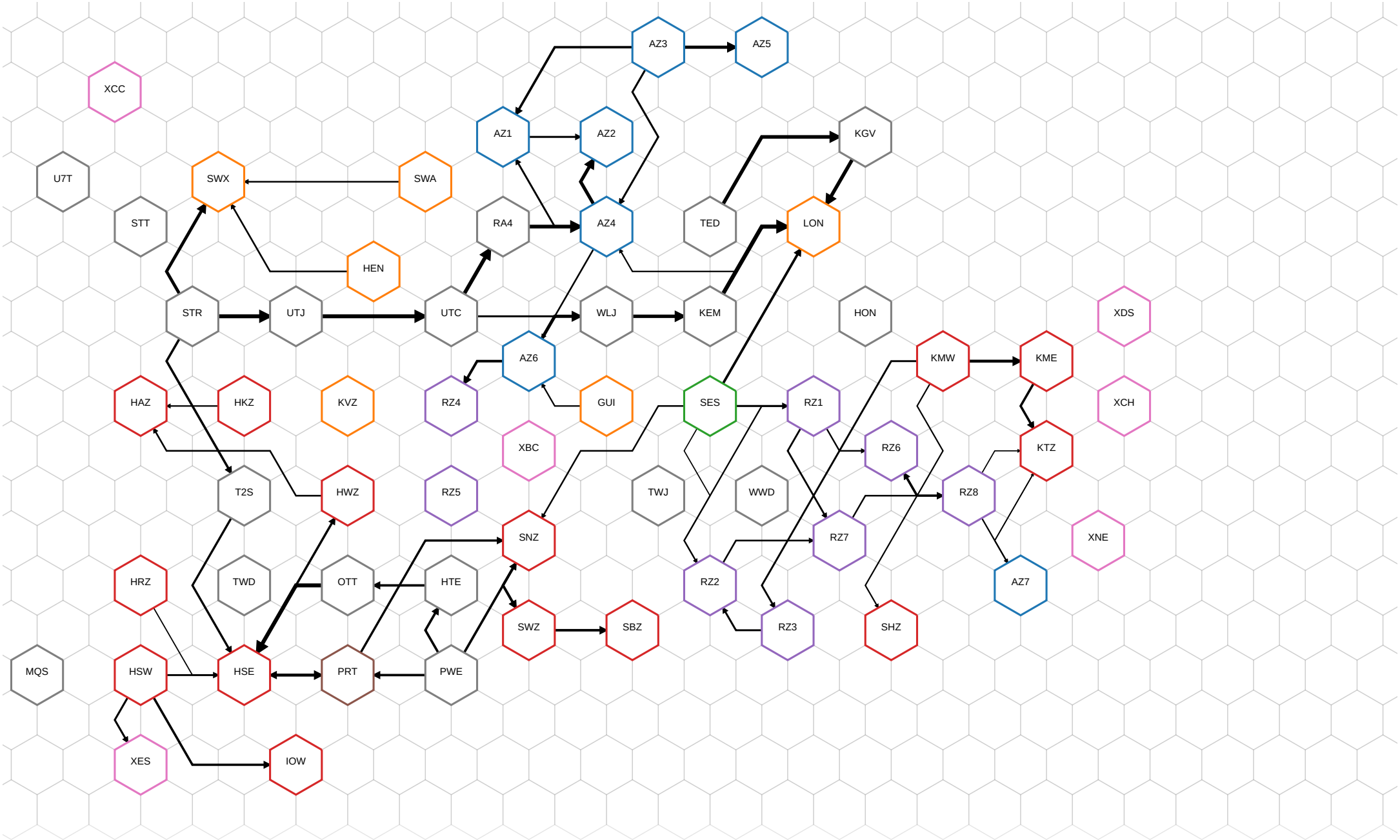
Situation 4 - 2075 (Thames Water)



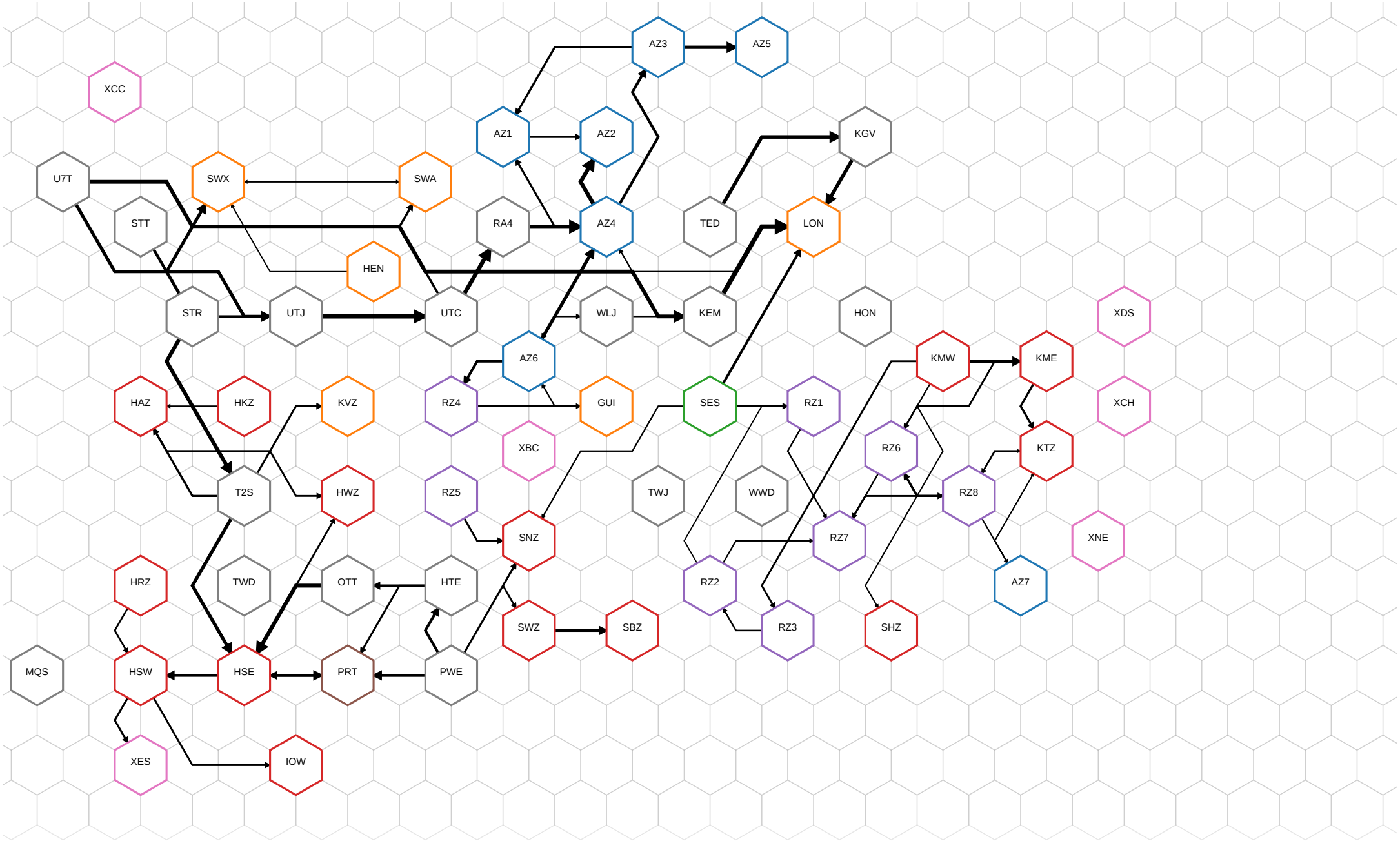
Situation 4 - 2026



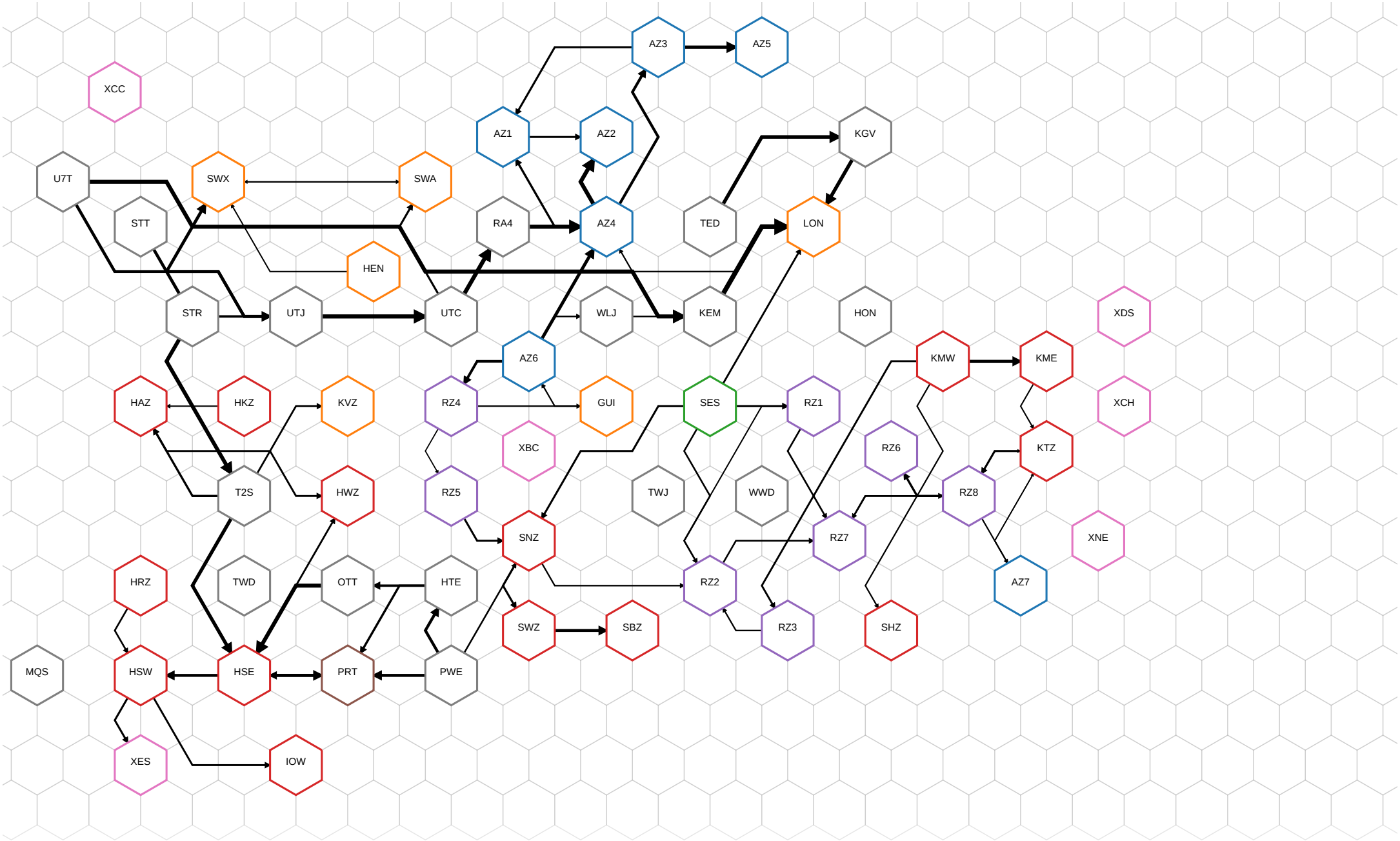
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

RESILIENCE + SESRO 150

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-only-guc100-only-sesro150-only-t2a50-2075-resilience-07_50-v3
Description	Resilience run with hybrid-c+2 government interventions including only GUC 100 Ml/d, SESRO 150 Mm3 and 50 Ml/d T2A transfer. Constrained to 7.5% improvement in worst BVP metrics from "st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-only-sesro150-2075".
Created at	24/07/2023, 10:07:49
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2-only-guc100-only-sesro150-only-t2a50
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets. Exclude all GUC variants except 100. Exclude all SESRO variants except 150. Excludes T2A 100 Ml/d transfer (i.e. only 50 Ml/d).
Optimised discount rate	STPR

Metrics

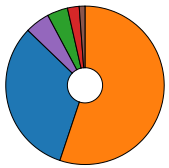
Net present value (Cost)

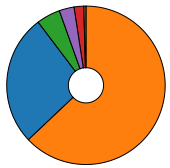
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	20,772	17,880	17,163	19,317	17,772	16,998	18,112	17,253	16,537	(£m)
Cost w/o deficit (STPR)	20,772	17,880	17,163	19,317	17,772	16,998	18,112	17,253	16,537	(£m)
Cost w/ deficit (IGEQ)	31,676	26,225	24,927	28,938	26,042	24,659	26,750	25,138	23,845	(£m)
Cost w/o deficit (IGEQ)	31,676	26,225	24,927	28,938	26,042	24,659	26,750	25,138	23,845	(£m)
Cost w/ deficit (LTDR)	22,884	19,524	18,699	21,195	19,401	18,514	19,807	18,811	17,987	(£m)
Cost w/o deficit (LTDR)	22,884	19,524	18,699	21,195	19,401	18,514	19,807	18,811	17,987	(£m)

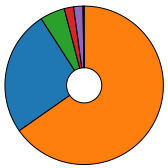
Cost breakdown (STPR)

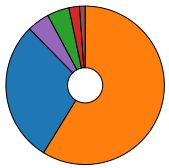
Select Company: Total

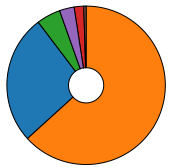
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	6,663	4,784	4,398	5,571	4,695	4,252	4,866	4,419	3,975	(£m)
Fixed opex	11,450	11,254	11,202	11,352	11,243	11,189	11,256	11,204	11,143	(£m)
Fixed operational carbon	880	869	869	877	870	868	871	867	866	(£m)
Embedded carbon	496	354	329	417	350	322	369	331	303	(£m)
Variable opex	1,041	541	324	882	531	318	647	391	232	(£m)
Variable carbon opex	243	79	41	218	84	49	102	41	18	(£m)

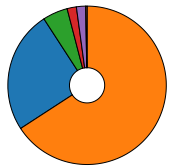
situation1 

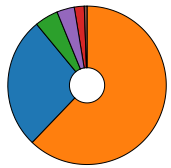
situation2 

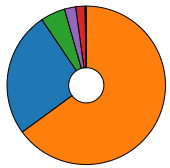
situation3 

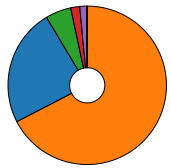
situation4 

situation5 

situation6 

situation7 

situation8 

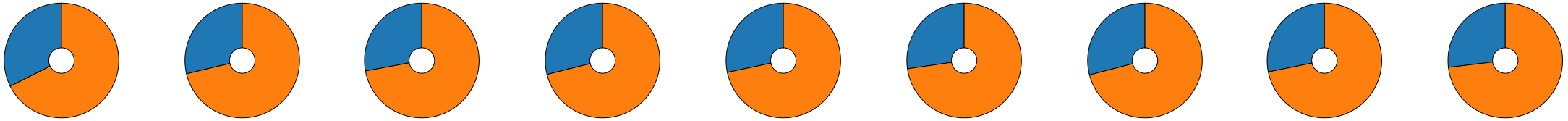
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,172,065	2,166,121	1,995,147	2,606,013	2,137,966	1,951,839	2,282,161	2,016,496	1,833,688	(tonnes)
Operational emissions	6,614,521	5,376,013	5,146,493	6,407,007	5,409,389	5,195,410	5,573,796	5,134,766	4,980,353	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

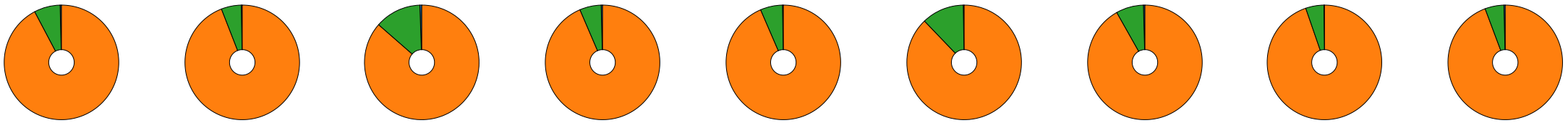


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	95	34	26	82	29	12	61	13	12	(GWh)
Grid	22,658	11,367	4,200	19,236	10,935	4,096	13,210	7,983	2,920	(GWh)
Renewable	1,804	681	633	1,245	730	556	1,115	433	165	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	70,814.00	64,856.00	64,183.00	68,363.00	64,537.00	63,181.00	65,576.00	63,395.00	62,308.00	
SEA environmental disbenefit	113,479.00	79,965.00	73,682.00	100,185.00	78,560.00	71,047.00	83,142.00	69,741.00	60,460.00	
Natural capital	81,356,818.38	77,198,202.63	80,078,304.13	76,465,995.80	77,198,746.94	80,024,906.65	76,868,216.71	77,637,864.08	80,539,680.22	
Bio-diversity net gain	−216,032.00	−149,912.00	−122,785.00	−204,879.00	−150,080.00	−118,585.00	−151,610.00	−124,608.00	−95,058.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	34,167.00	31,912.00	31,567.00	33,273.00	31,830.00	31,306.00	31,938.00	31,052.00	30,531.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	29.55	29.61	32.52	29.33	29.79	32.64	31.14	34.61	38.58	
R1: Uncertainty of option supply/demand benefit	6.08	5.50	6.05	5.86	5.55	6.06	5.93	6.48	7.20	
R3: Risk of service failure due to other physical hazards	7.01	7.34	8.25	7.05	7.40	8.29	7.69	8.76	10.00	
R4: Availability of additional headroom	6.62	6.96	7.17	6.69	6.98	7.19	7.30	7.66	7.90	
R5: Catchment/raw water quality risks (incl. climate change)	4.07	4.17	4.71	3.82	4.19	4.74	4.32	4.99	5.77	
R6: Capacity of catchment services	0.29	0.00	0.00	0.31	0.00	0.00	0.00	0.00	0.00	
R7: Risk of service failure to other exceptional events	5.38	5.64	6.34	5.49	5.68	6.37	5.91	6.72	7.71	
R8: Soil health	0.11	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	

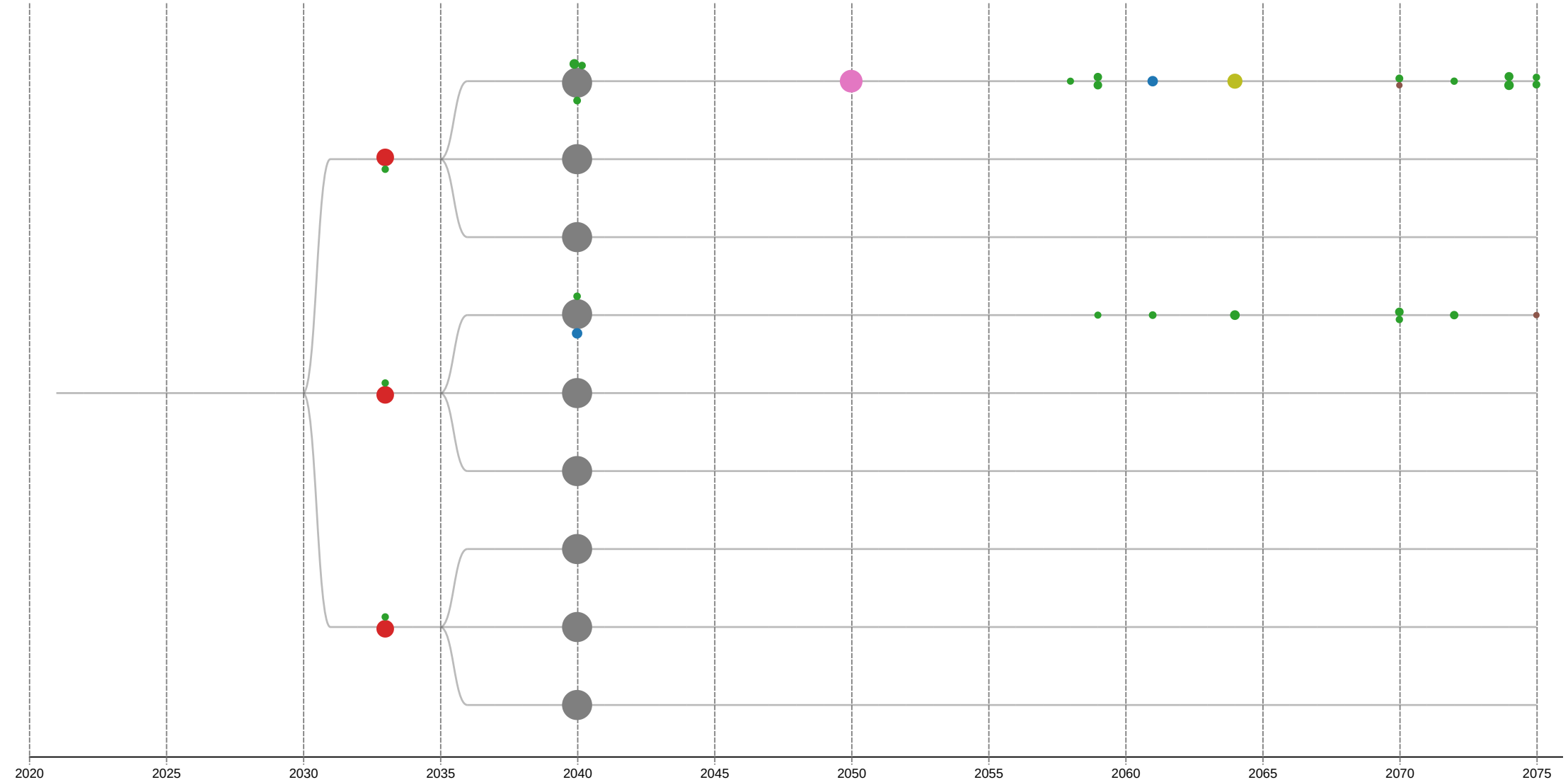
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	14.30	15.64	17.48	14.38	15.65	17.28	16.14	18.40	20.95	
A3: Operational complexity and flexibility	6.56	7.07	7.96	6.73	7.13	8.03	7.38	8.48	9.75	
A4: WRZ connectivity	7.65	8.54	9.49	7.53	8.49	9.22	8.73	9.89	11.17	
A7: Customer relations support engagement with demand management	0.09	0.03	0.03	0.13	0.03	0.03	0.03	0.03	0.03	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.64	19.89	22.15	19.62	20.05	22.23	20.79	23.62	26.77	
E1: Scaleability and modularity of proposed changes	8.80	9.35	10.46	8.81	9.44	10.53	9.71	11.15	12.71	
E2: Intervention lead times	4.20	4.10	4.49	4.12	4.12	4.46	4.34	4.79	5.32	
E3: Reliance on external bodies to deliver changes	6.21	6.44	7.20	6.23	6.50	7.24	6.74	7.68	8.74	
E5: Collaborative land management	0.43	0.00	0.00	0.46	0.00	0.00	0.00	0.00	0.00	

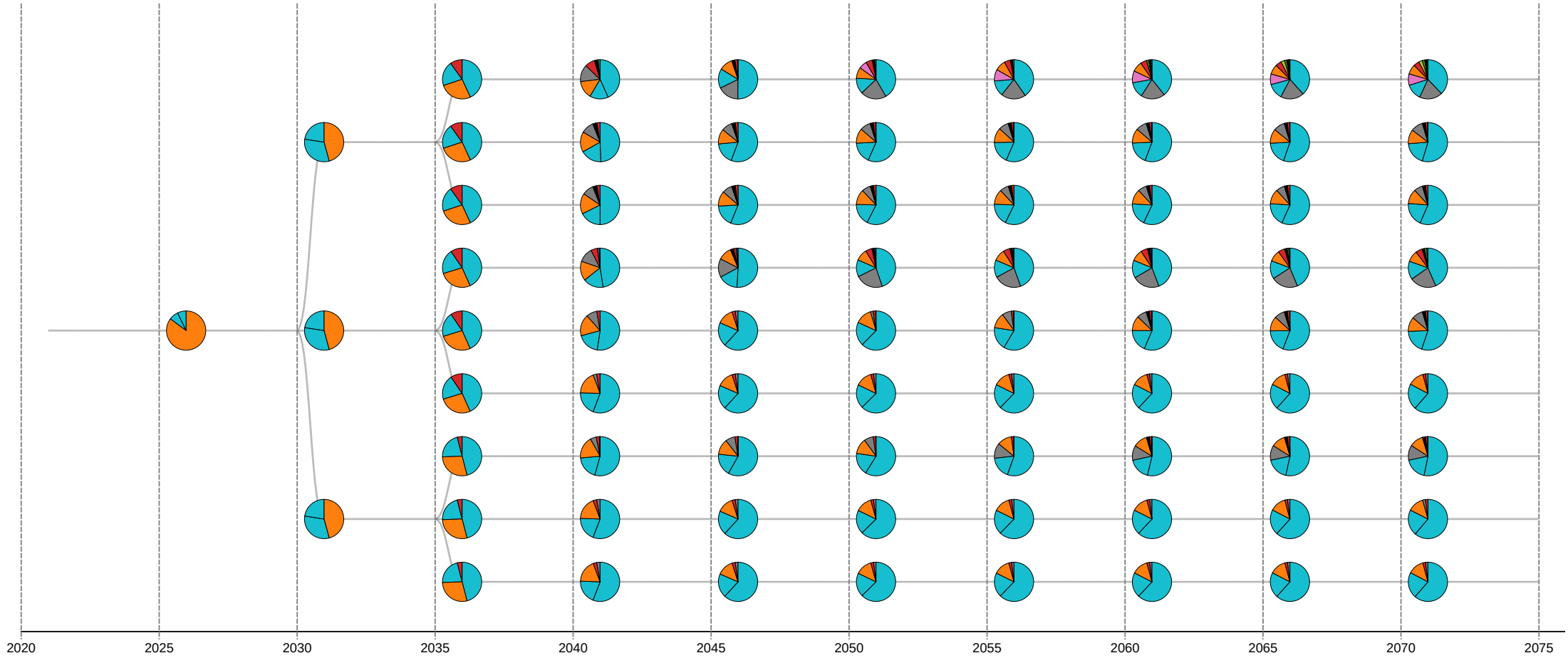
Option Selection (Thames Water)



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.



- Transfer
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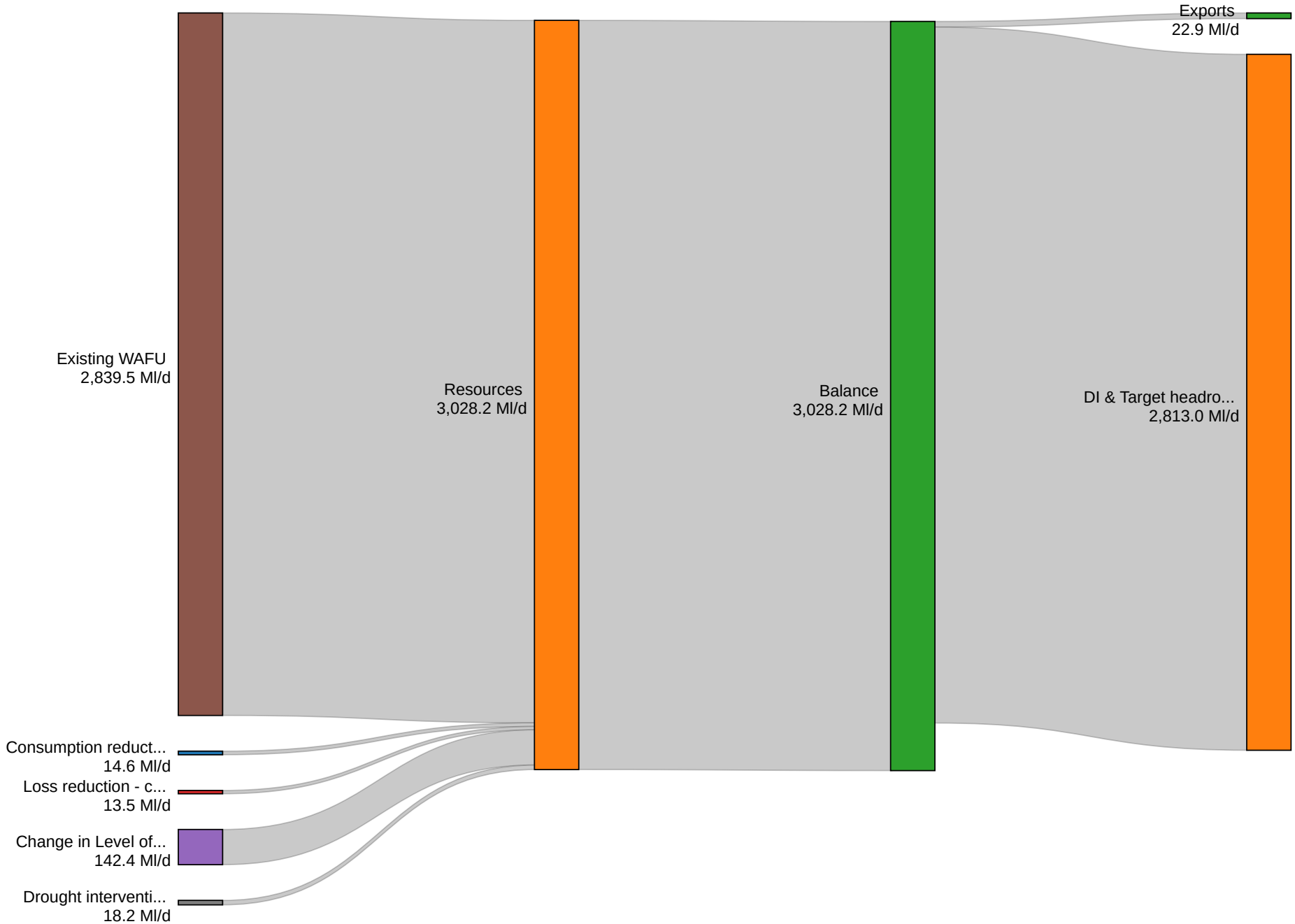
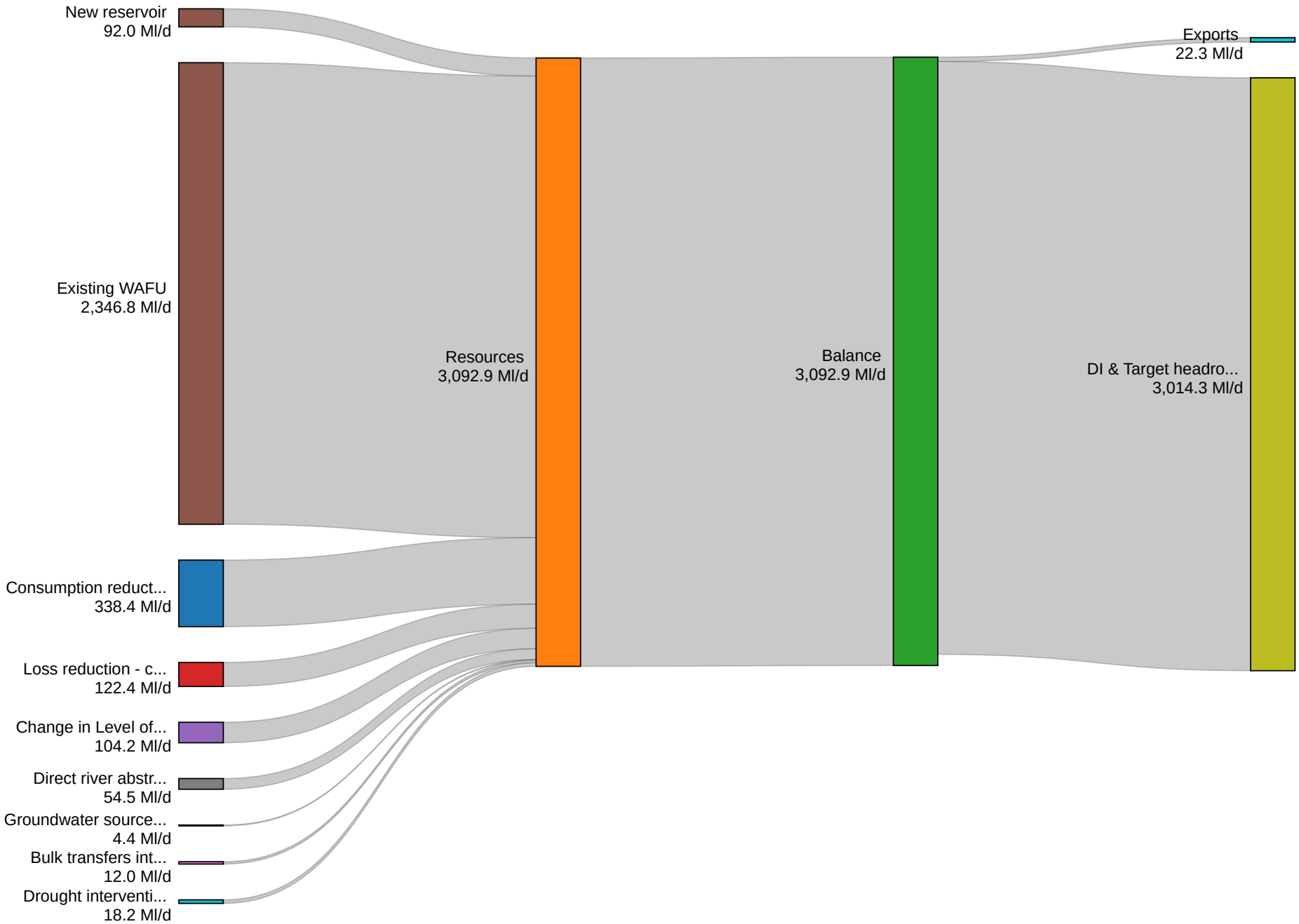
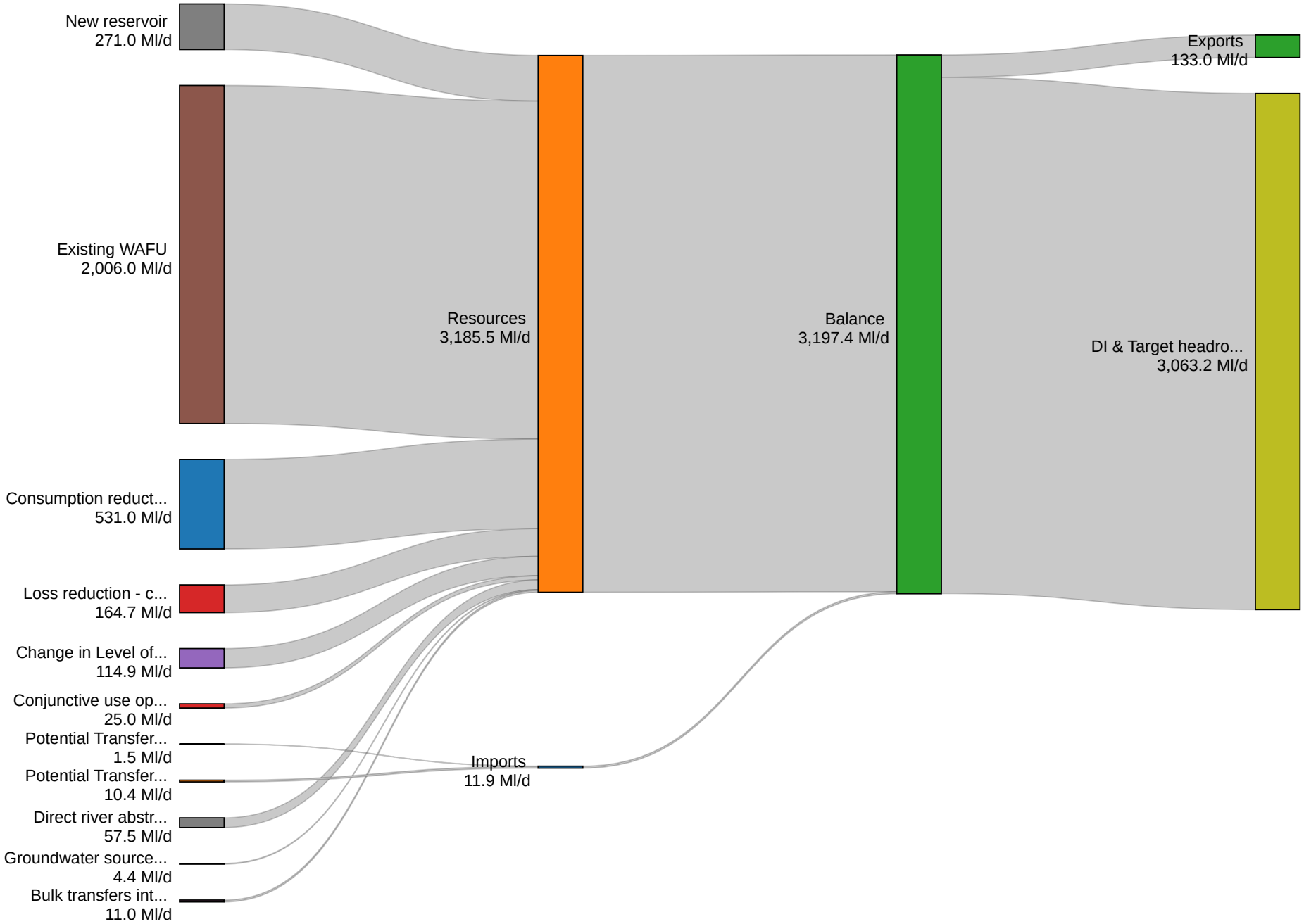
Situation 4 - 2026 (Thames Water)



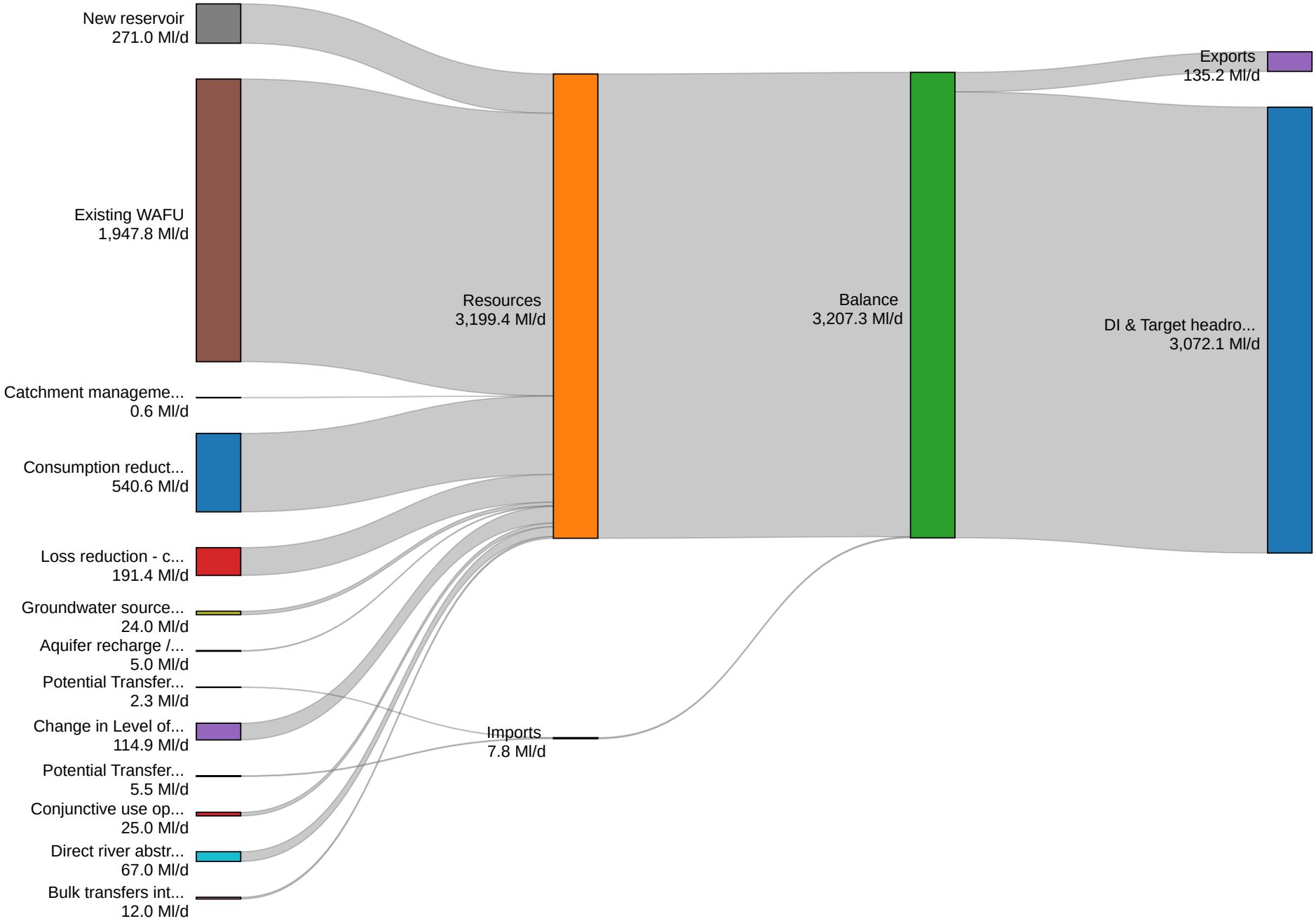
Situation 4 - 2040 (Thames Water)



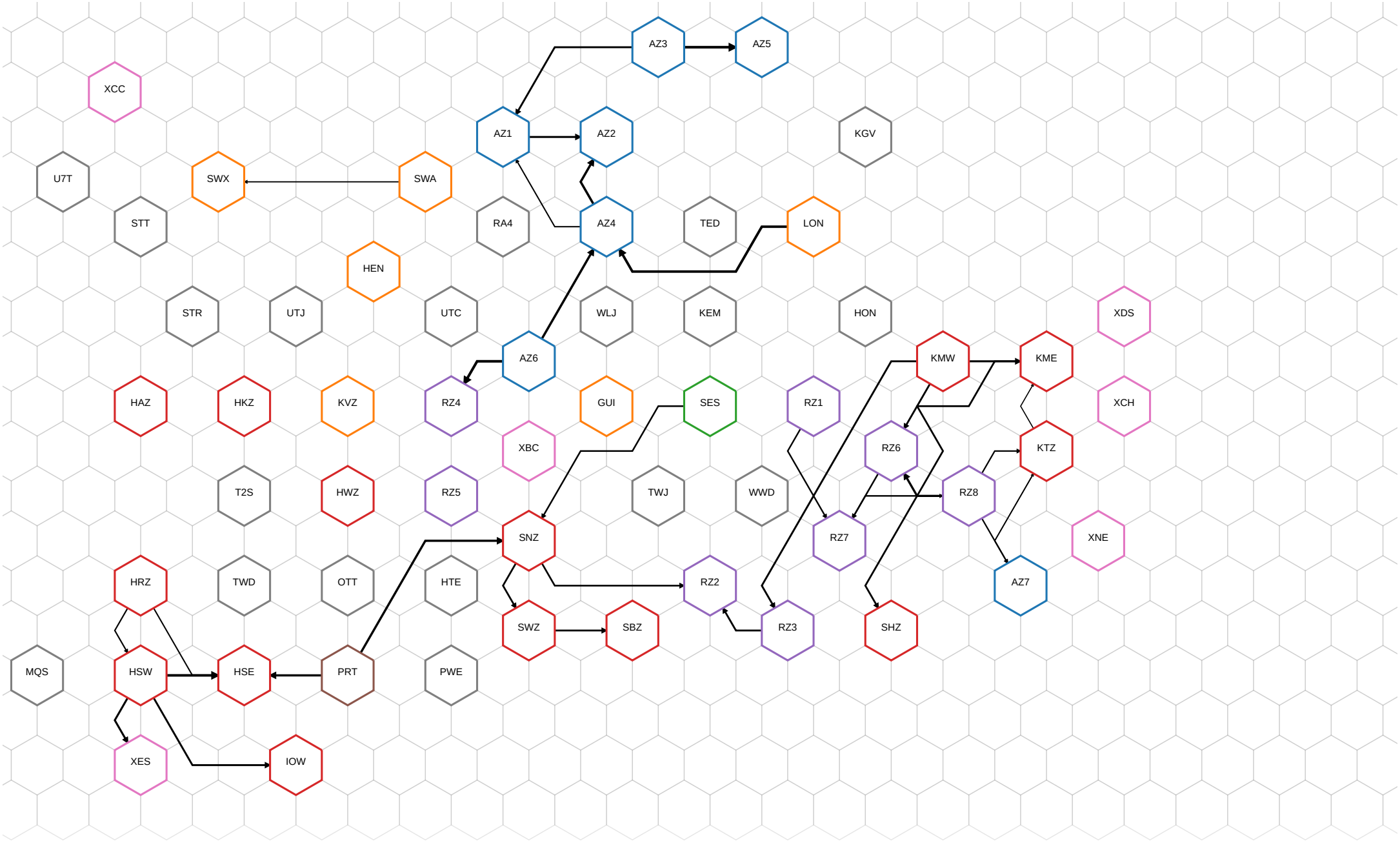
Situation 4 - 2050 (Thames Water)



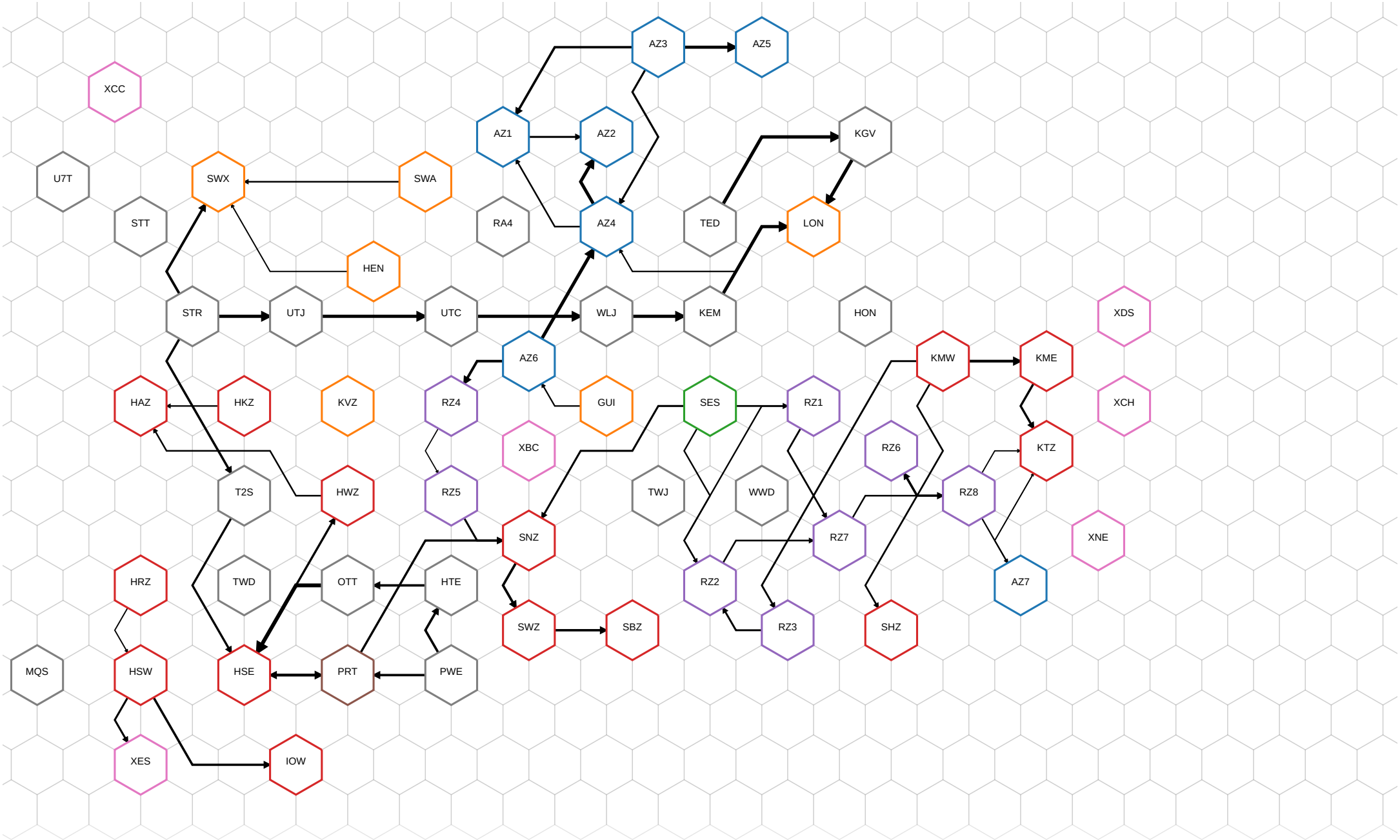
Situation 4 - 2075 (Thames Water)



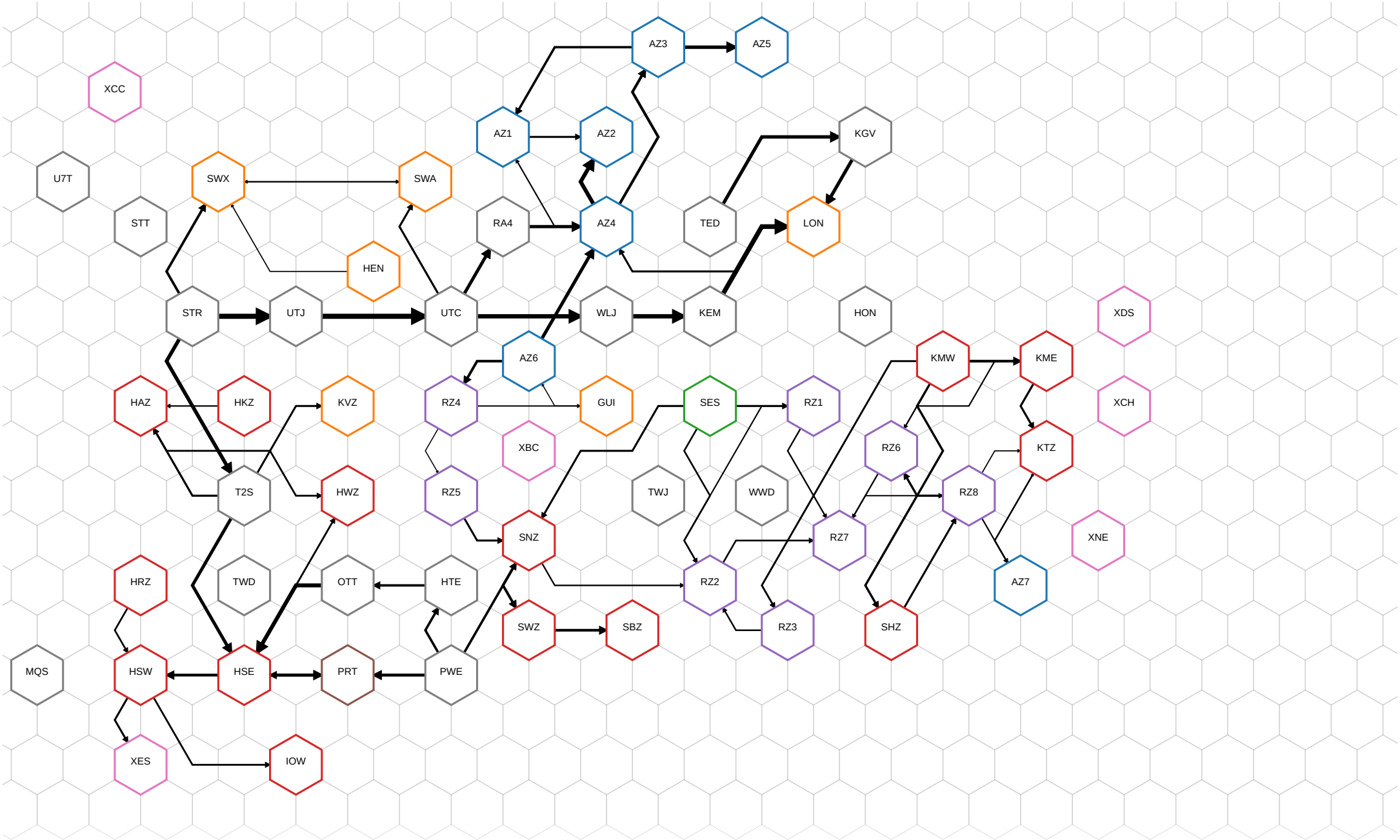
Situation 4 - 2026



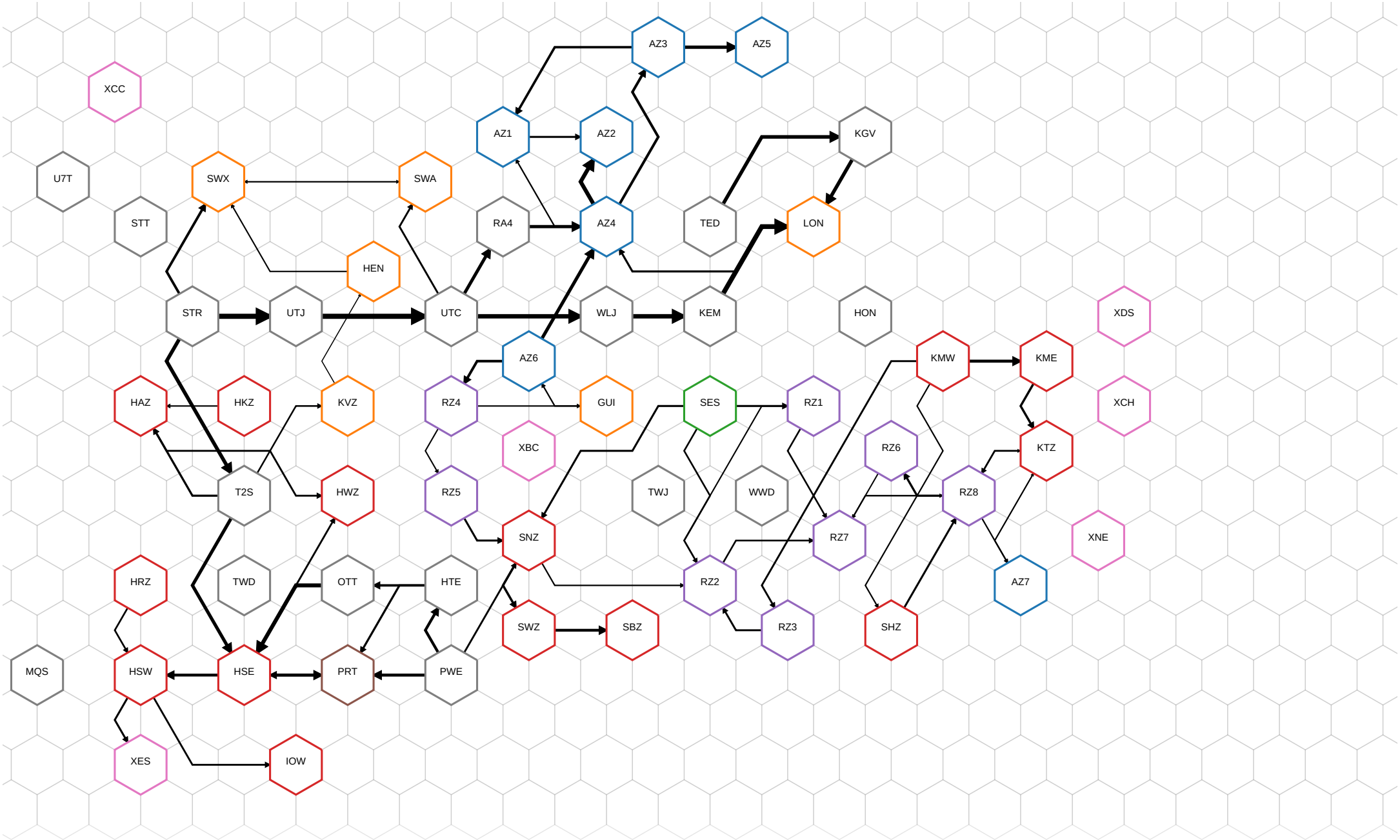
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

RESILIENCE + SESRO 125

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-only-guc100-only-sesro125-only-t2a50-2075-resilience-07_50-v3
Description	Resilience run with hybrid-c+2 government interventions including only GUC 100 Ml/d, SESRO 125 Mm3 and 50 Ml/d T2A transfer. Constrained to 7.5% improvement in worst BVP metrics from "st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-only-sesro150-2075".
Created at	24/07/2023, 10:07:08
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2-only-guc100-only-sesro125-only-t2a50
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets. Exclude all GUC variants except 100. Exclude all SESRO variants except 125. Excludes T2A 100 Ml/d transfer (i.e. only 50 Ml/d).
Optimised discount rate	STPR

Metrics

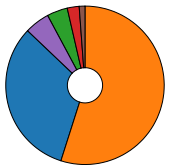
Net present value (Cost)

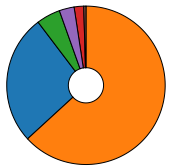
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	20,873	17,810	17,090	19,339	17,701	16,895	18,043	17,184	16,468	(£m)
Cost w/o deficit (STPR)	20,873	17,810	17,090	19,339	17,701	16,895	18,043	17,184	16,468	(£m)
Cost w/ deficit (IGEQ)	31,915	26,113	24,808	29,009	25,929	24,491	26,641	25,028	23,736	(£m)
Cost w/o deficit (IGEQ)	31,915	26,113	24,808	29,009	25,929	24,491	26,641	25,028	23,736	(£m)
Cost w/ deficit (LTDR)	23,009	19,445	18,618	21,225	19,322	18,399	19,731	18,734	17,910	(£m)
Cost w/o deficit (LTDR)	23,009	19,445	18,618	21,225	19,322	18,399	19,731	18,734	17,910	(£m)

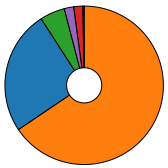
Cost breakdown (STPR)

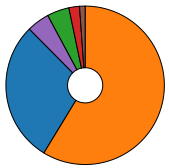
Select Company: Total

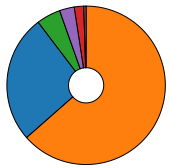
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	6,719	4,719	4,329	5,581	4,630	4,163	4,804	4,356	3,912	(£m)
Fixed opex	11,462	11,253	11,202	11,354	11,242	11,185	11,256	11,203	11,142	(£m)
Fixed operational carbon	883	869	870	877	870	869	871	867	866	(£m)
Embedded carbon	507	349	323	420	344	315	364	326	298	(£m)
Variable opex	1,058	541	326	889	531	314	647	391	232	(£m)
Variable carbon opex	244	79	41	218	84	49	102	41	18	(£m)

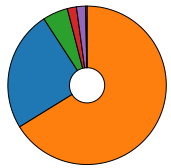
situation1 

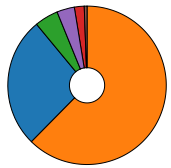
situation2 

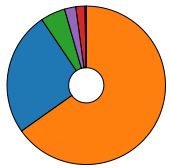
situation3 

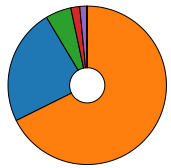
situation4 

situation5 

situation6 

situation7 

situation8 

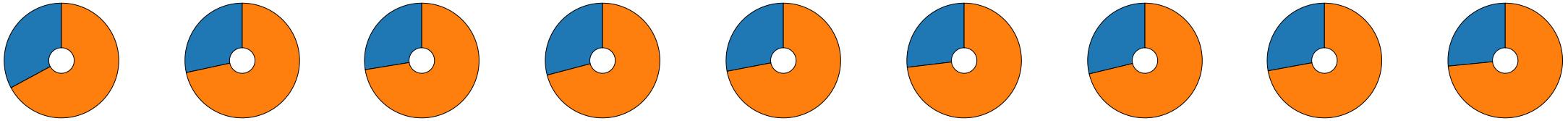
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,258,706	2,131,473	1,961,071	2,630,705	2,104,941	1,912,151	2,250,045	1,984,379	1,801,571	(tonnes)
Operational emissions	6,654,239	5,378,166	5,154,408	6,408,023	5,410,932	5,197,459	5,573,172	5,134,766	4,980,353	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

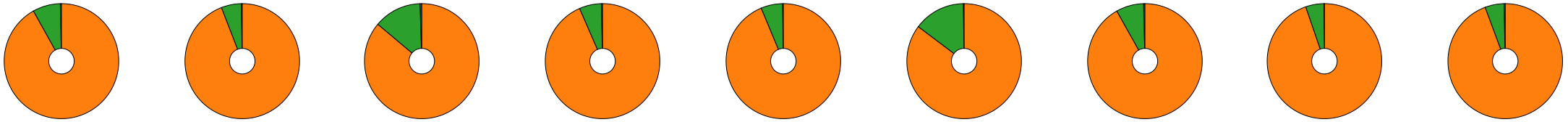


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	85	32	25	74	27	11	57	12	11	(GWh)
Grid	22,725	11,358	4,204	19,376	10,978	3,840	13,204	7,975	2,912	(GWh)
Renewable	1,926	681	655	1,284	713	654	1,116	433	165	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	70,494.00	64,636.00	63,827.00	68,523.00	64,287.00	63,117.00	65,396.00	63,215.00	62,128.00	
SEA environmental disbenefit	113,458.00	79,895.00	72,552.00	103,135.00	78,153.00	71,497.00	83,142.00	69,741.00	60,460.00	
Natural capital	83,278,072.01	79,101,734.35	81,986,682.60	77,132,998.55	79,104,427.30	81,922,734.05	78,766,316.71	79,535,964.08	82,437,780.22	
Bio-diversity net gain	−210,753.00	−140,654.00	−110,053.00	−198,101.00	−139,375.00	−110,832.00	−142,610.00	−115,608.00	−86,058.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	34,140.00	31,875.00	31,492.00	33,524.00	31,738.00	31,337.00	31,968.00	31,054.00	30,533.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	29.15	28.88	31.72	28.84	29.07	31.82	30.42	33.74	37.57	
R1: Uncertainty of option supply/demand benefit	6.09	5.35	5.89	5.75	5.40	5.89	5.78	6.30	6.99	
R3: Risk of service failure due to other physical hazards	6.91	7.14	8.03	6.92	7.20	8.06	7.50	8.52	9.72	
R4: Availability of additional headroom	6.57	6.91	7.13	6.64	6.93	7.14	7.25	7.61	7.85	
R5: Catchment/raw water quality risks (incl. climate change)	4.05	4.03	4.56	3.76	4.06	4.58	4.18	4.83	5.58	
R6: Capacity of catchment services	0.20	0.00	0.00	0.30	0.00	0.00	0.00	0.00	0.00	
R7: Risk of service failure to other exceptional events	5.26	5.44	6.11	5.36	5.48	6.15	5.71	6.49	7.43	
R8: Soil health	0.08	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	

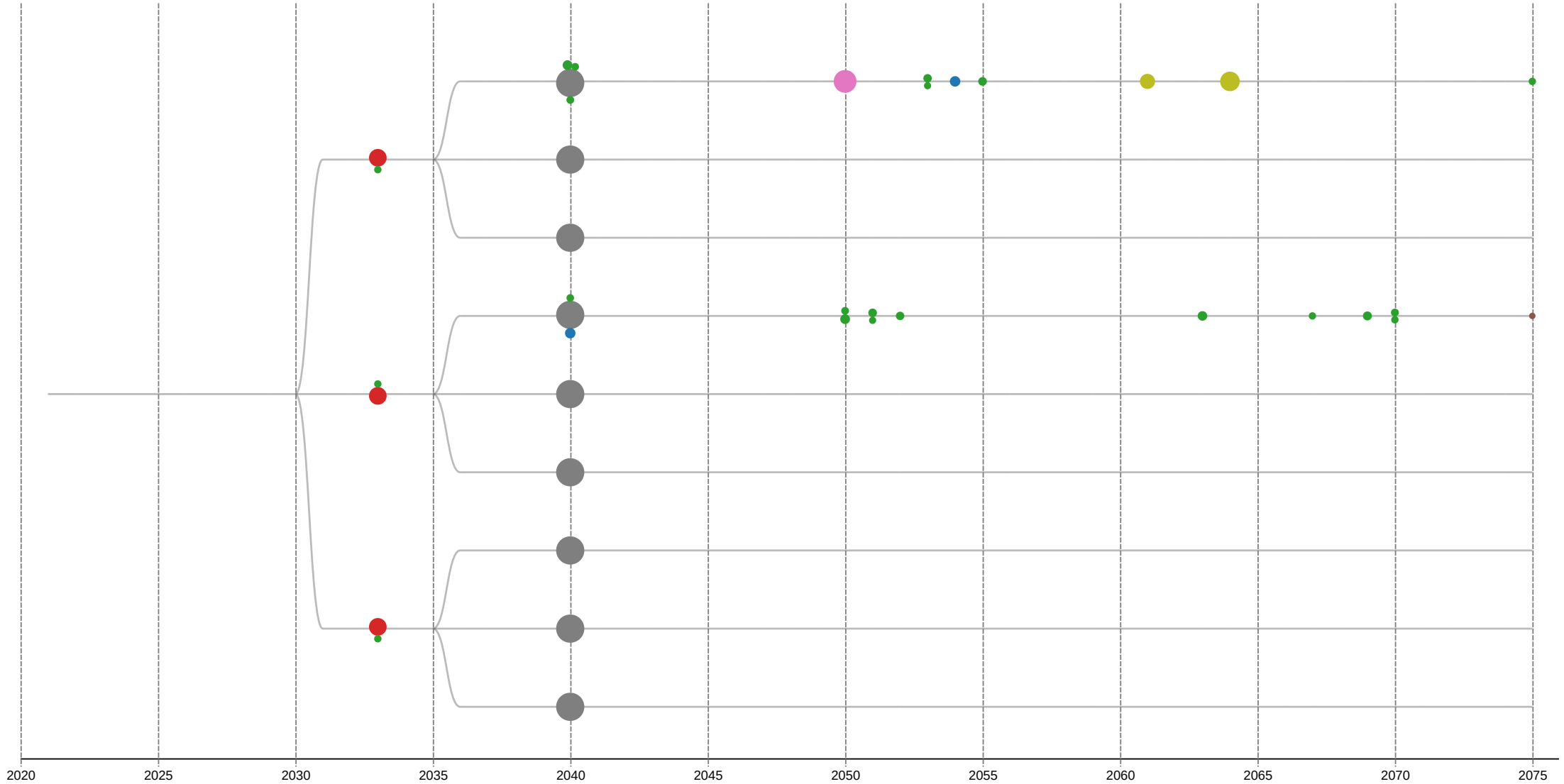
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	14.28	15.41	17.24	14.29	15.45	17.05	15.95	18.17	20.68	
A3: Operational complexity and flexibility	6.43	6.87	7.74	6.59	6.94	7.80	7.18	8.24	9.47	
A4: WRZ connectivity	7.78	8.51	9.47	7.57	8.49	9.22	8.74	9.90	11.18	
A7: Customer relations support engagement with demand management	0.08	0.03	0.03	0.13	0.03	0.03	0.03	0.03	0.03	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.64	19.74	21.99	19.62	19.91	22.05	20.64	23.44	26.56	
E1: Scaleability and modularity of proposed changes	8.85	9.30	10.40	8.82	9.39	10.48	9.66	11.09	12.64	
E2: Intervention lead times	4.22	4.05	4.44	4.12	4.07	4.38	4.29	4.73	5.26	
E3: Reliance on external bodies to deliver changes	6.24	6.39	7.15	6.23	6.45	7.19	6.69	7.62	8.67	
E5: Collaborative land management	0.34	0.00	0.00	0.45	0.00	0.00	0.00	0.00	0.00	

Option Selection (Thames Water)



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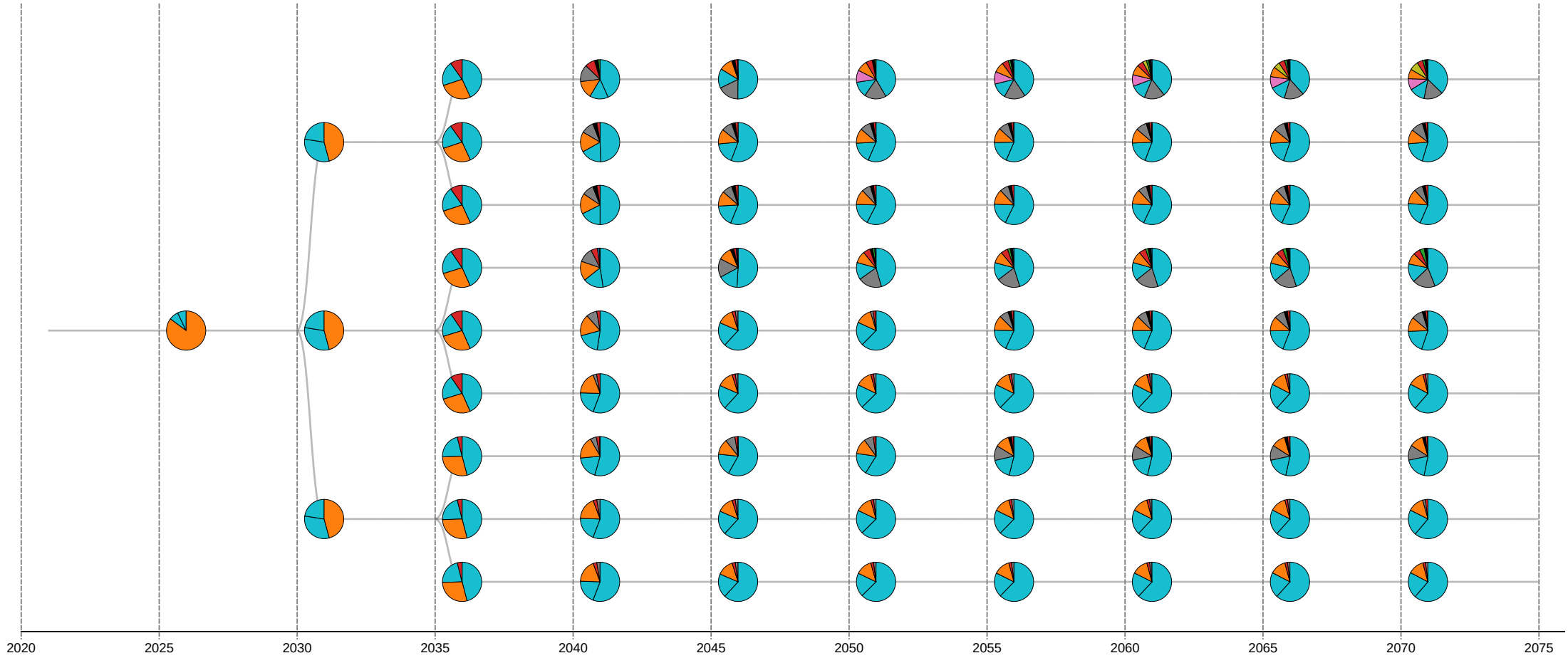
Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.



- Transfer
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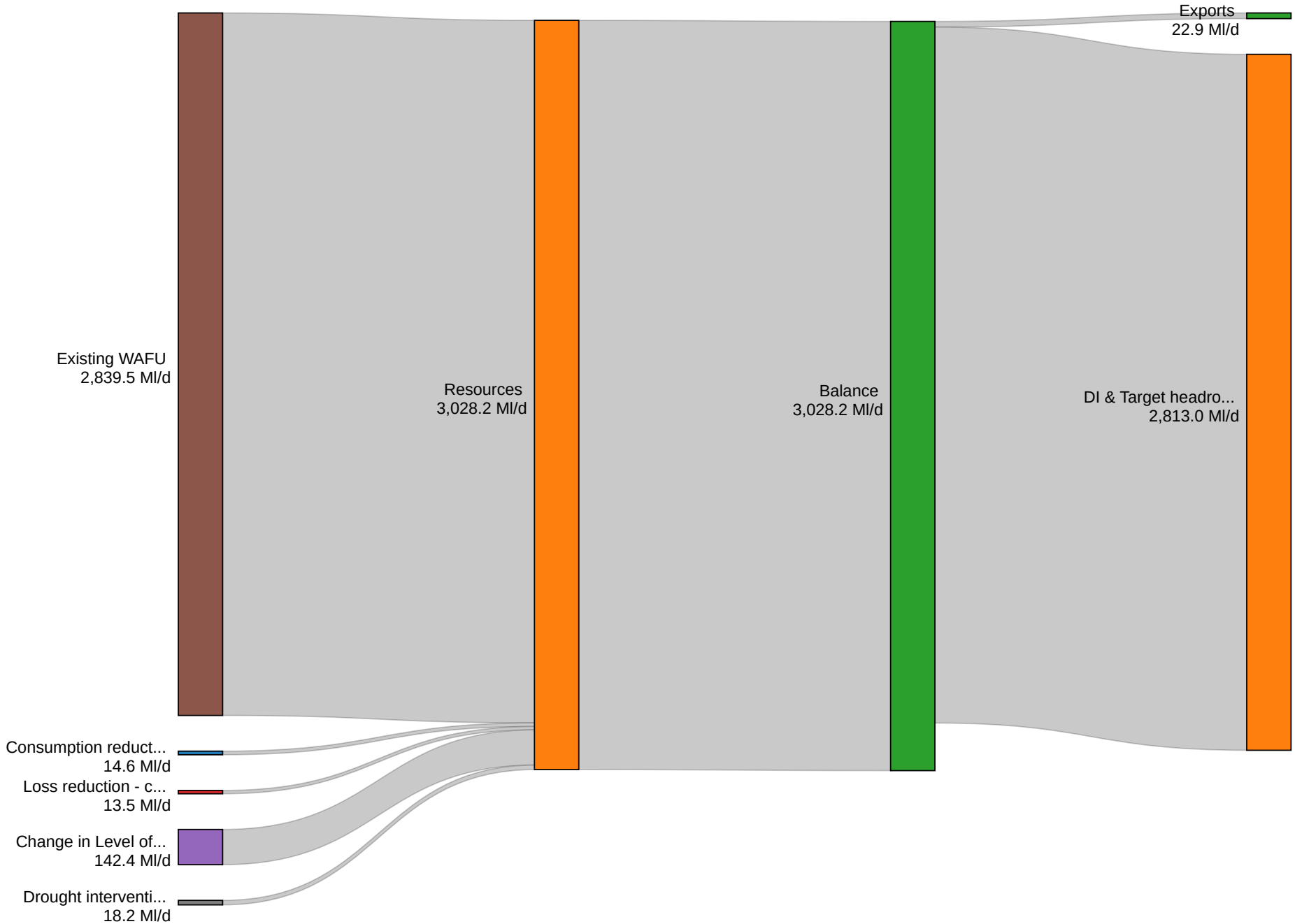
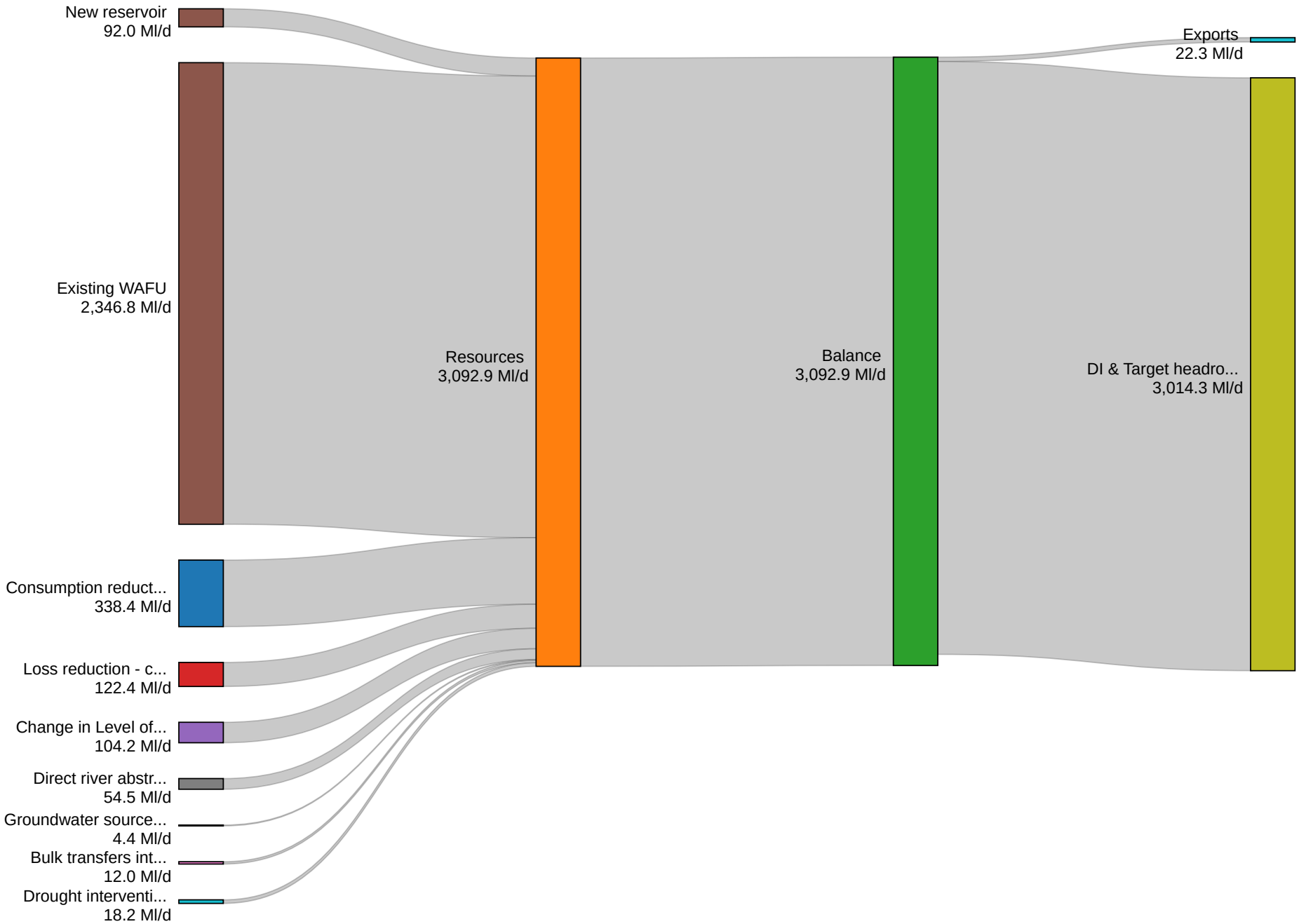
- Leakage reduction
- Other

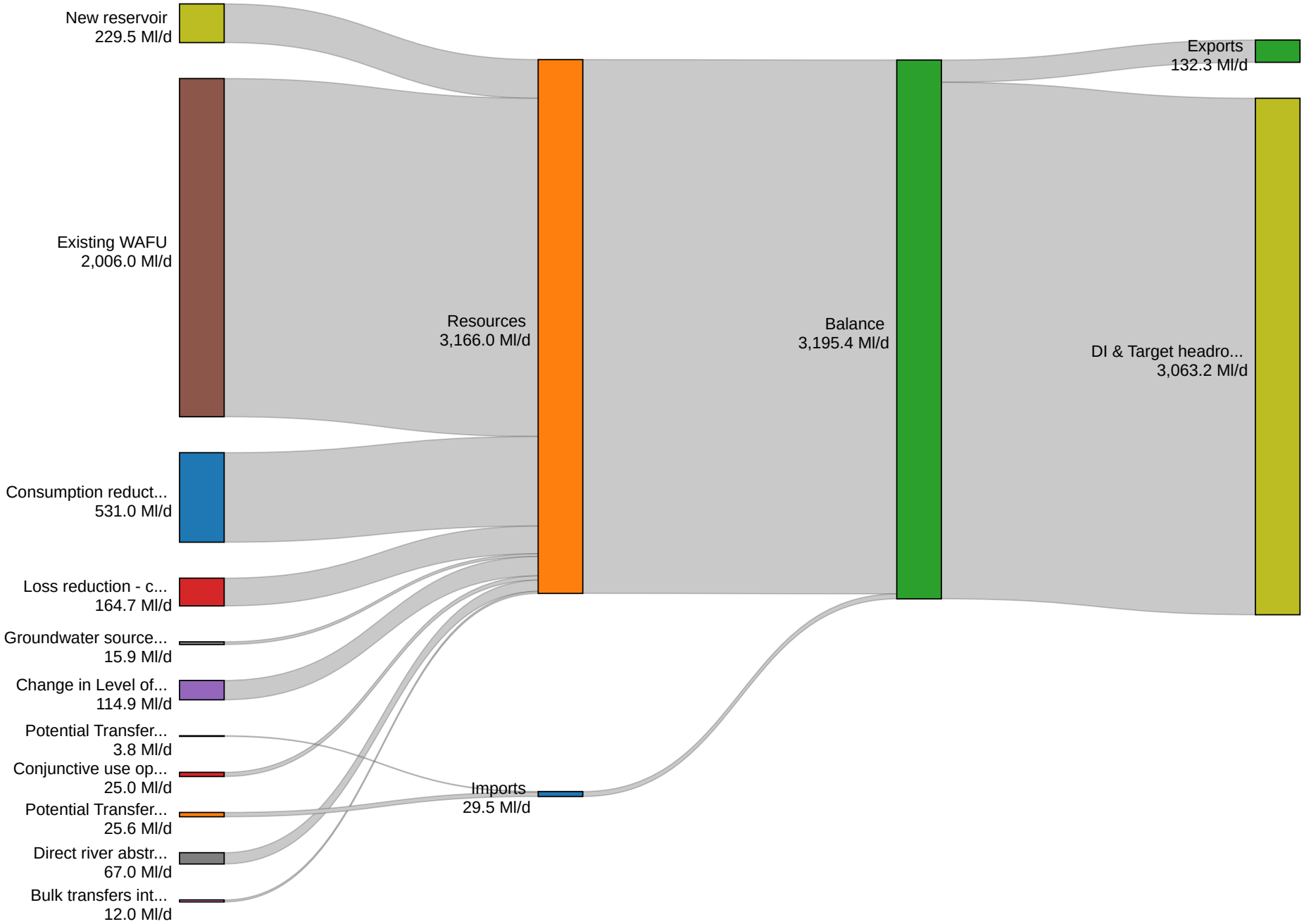
Situation 4 - 2026 (Thames Water)



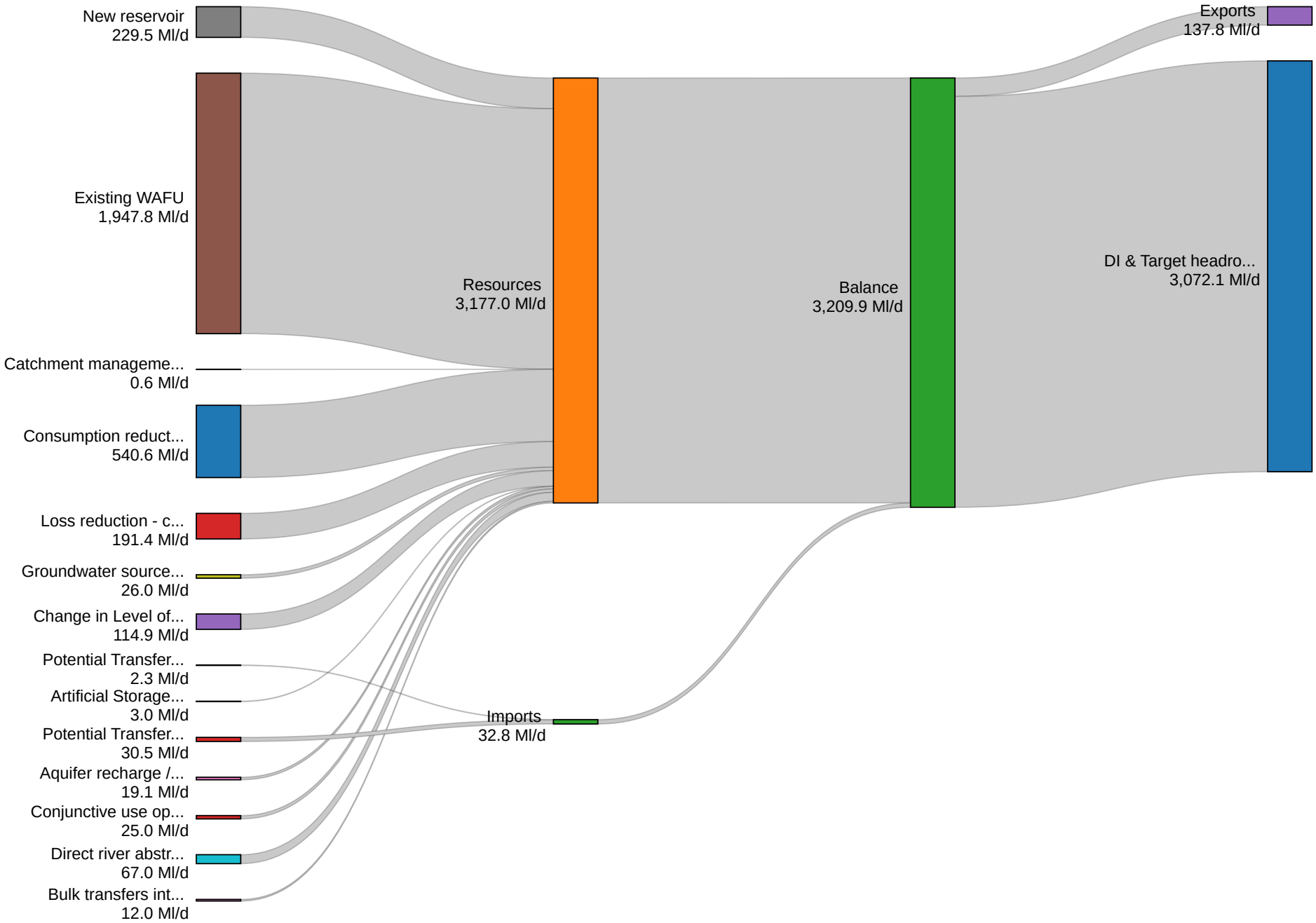
Situation 4 - 2040 (Thames Water)



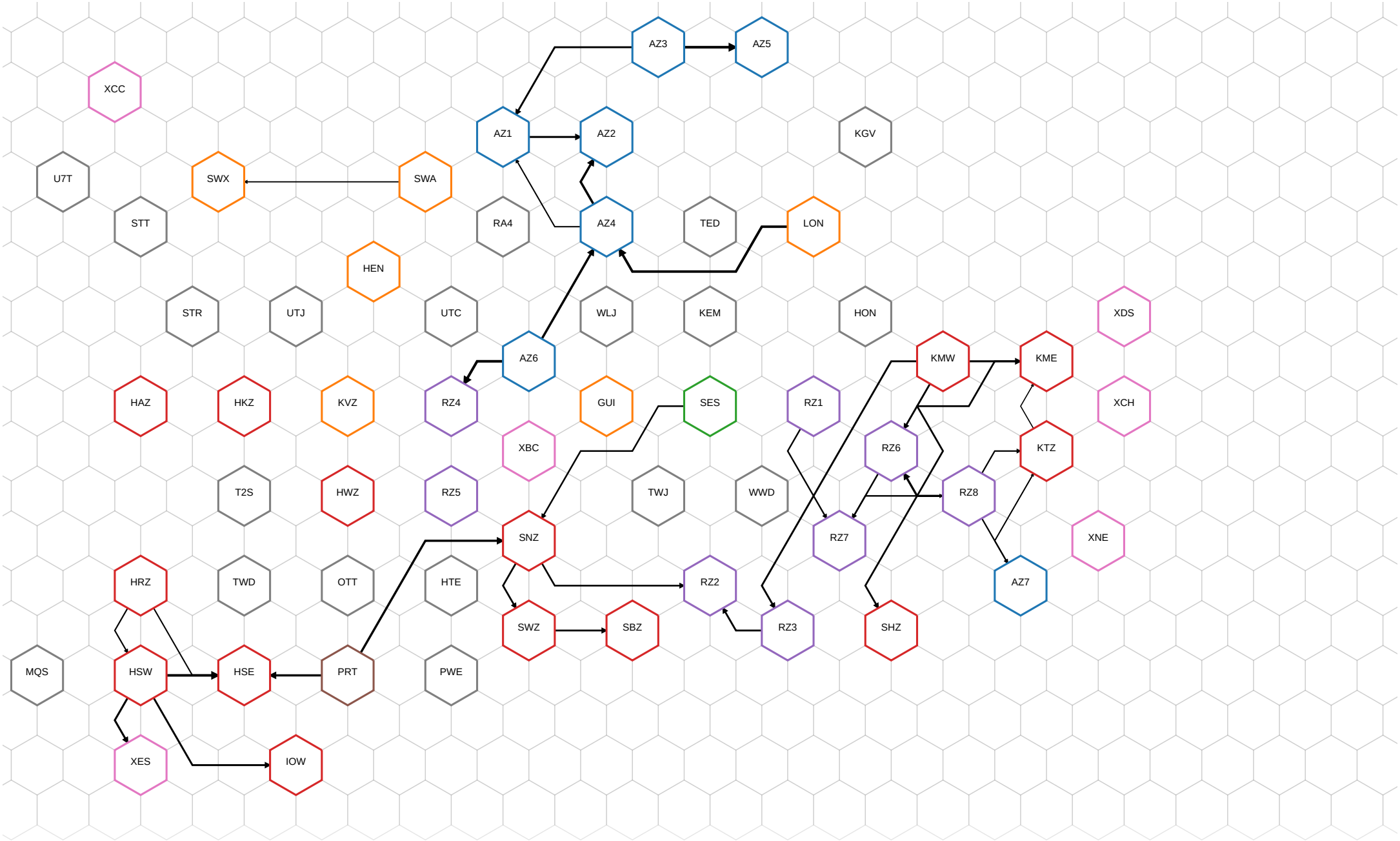
Situation 4 - 2050 (Thames Water)



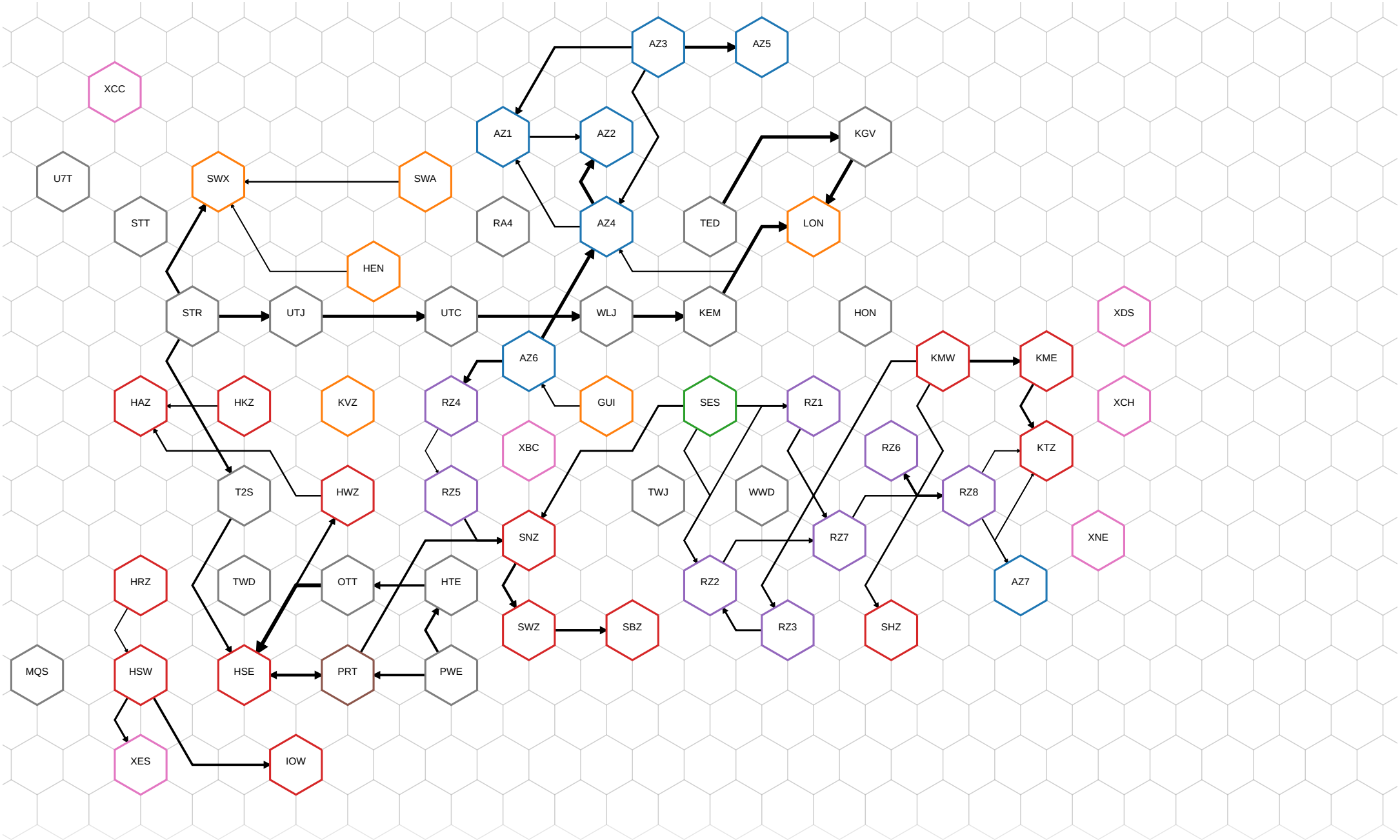
Situation 4 - 2075 (Thames Water)



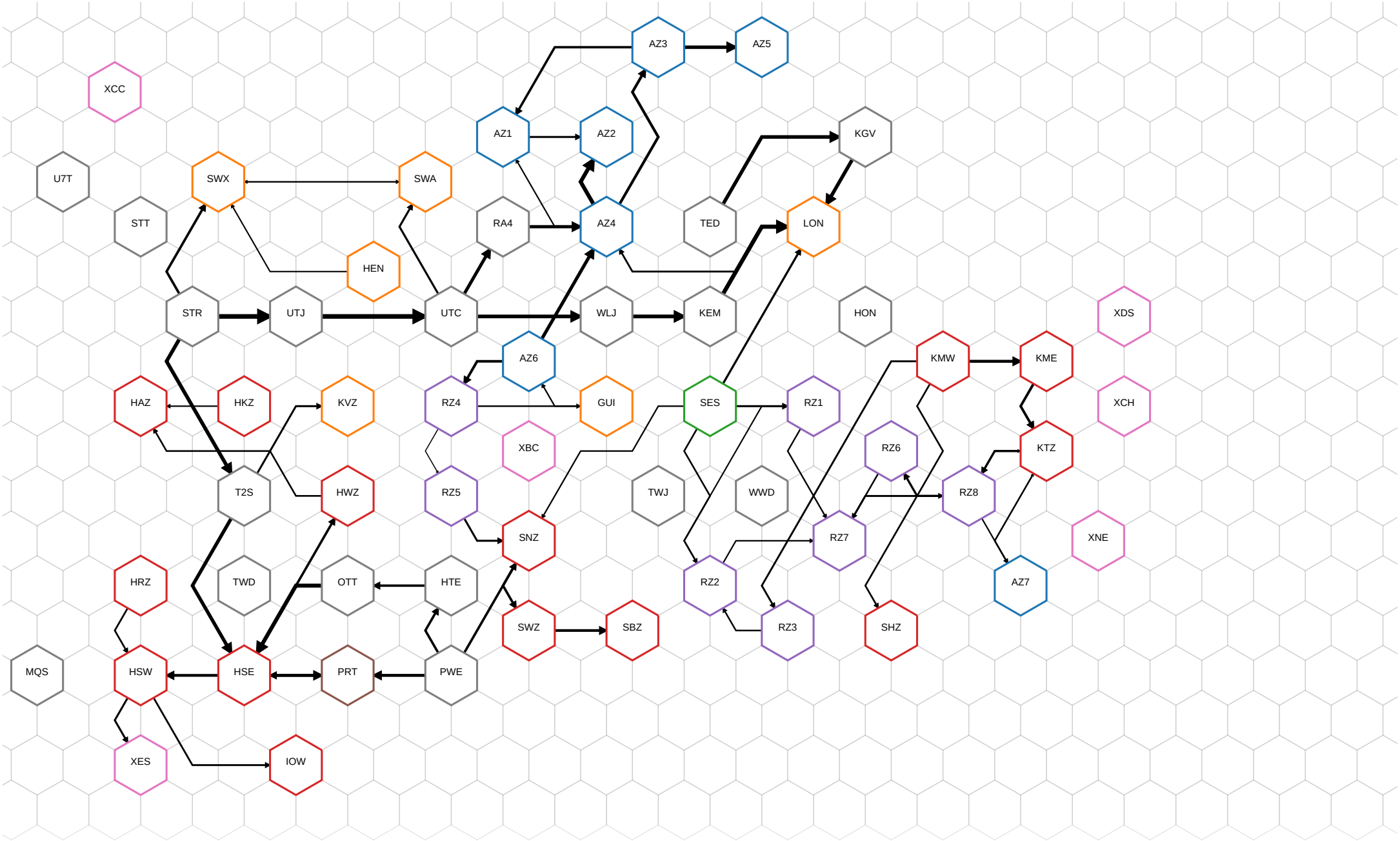
Situation 4 - 2026



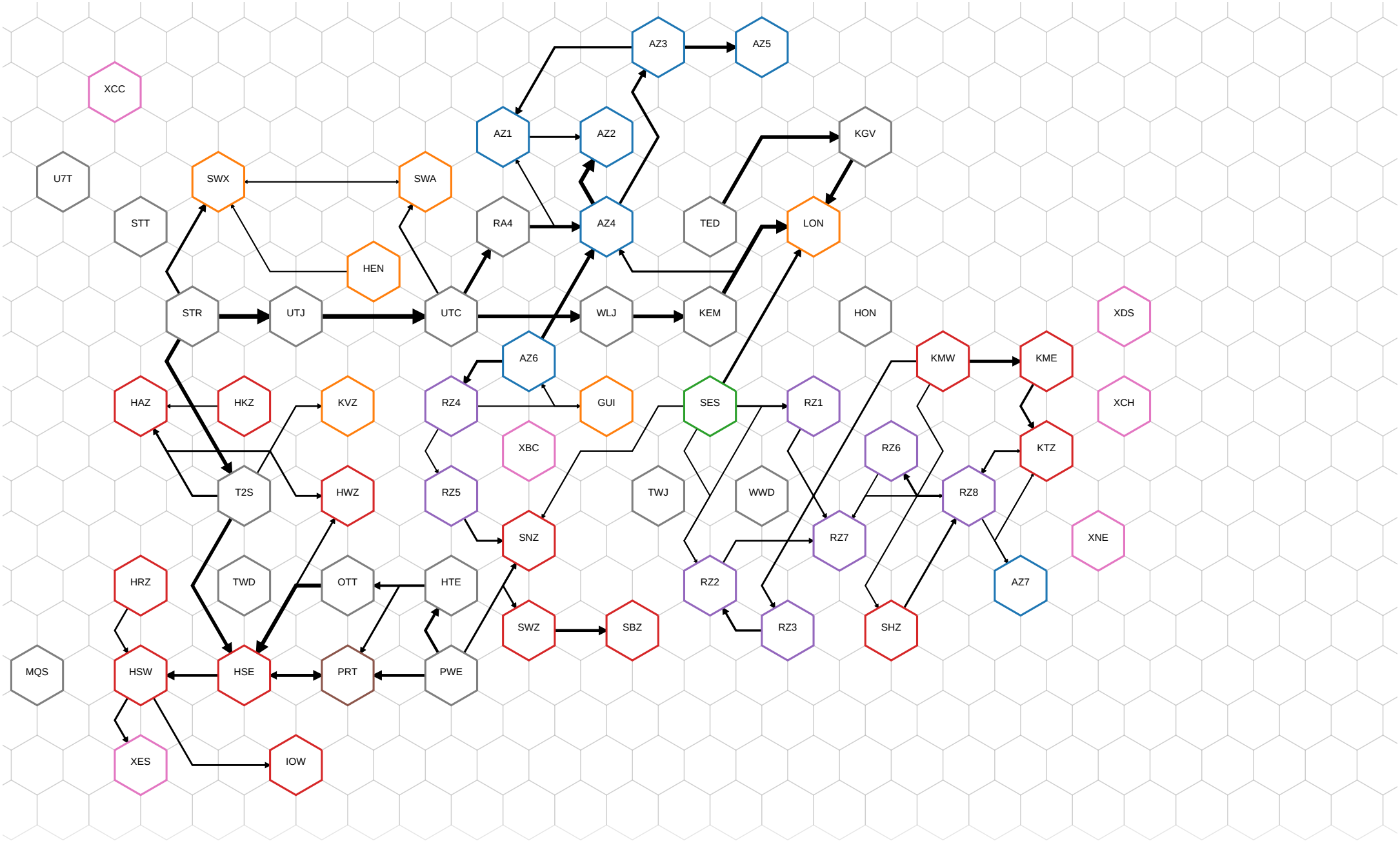
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

RESILIENCE + SESRO 100

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-only-guc100-only-sesro100-only-t2a50-2075-resilience-07_50-v3
Description	Resilience run with hybrid-c+2 government interventions including only GUC 100 Ml/d, SESRO 100 Mm3 and 50 Ml/d T2A transfer. Constrained to 7.5% improvement in worst BVP metrics from "st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-only-sesro150-2075".
Created at	24/07/2023, 10:06:56
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2-only-guc100-only-sesro100-only-t2a50
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets. Exclude all GUC variants except 100. Exclude all SESRO variants except 100. Excludes T2A 100 Ml/d transfer (i.e. only 50 Ml/d).
Optimised discount rate	STPR

Metrics

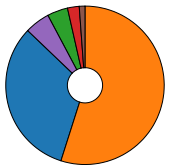
Net present value (Cost)

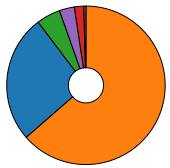
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	20,895	17,710	17,015	19,428	17,558	16,775	17,905	17,047	16,330	(£m)
Cost w/o deficit (STPR)	20,895	17,710	17,015	19,428	17,558	16,775	17,905	17,047	16,330	(£m)
Cost w/ deficit (IGEQ)	32,025	25,972	24,706	29,250	25,723	24,322	26,445	24,833	23,541	(£m)
Cost w/o deficit (IGEQ)	32,025	25,972	24,706	29,250	25,723	24,322	26,445	24,833	23,541	(£m)
Cost w/ deficit (LTDR)	23,046	19,337	18,537	21,341	19,168	18,269	19,581	18,585	17,761	(£m)
Cost w/o deficit (LTDR)	23,046	19,337	18,537	21,341	19,168	18,269	19,581	18,585	17,761	(£m)

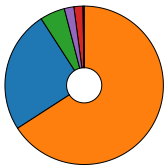
Cost breakdown (STPR)

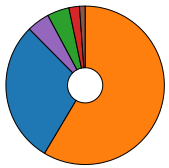
Select Company: Total

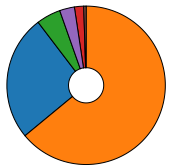
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	6,735	4,625	4,254	5,639	4,501	4,056	4,679	4,231	3,787	(£m)
Fixed opex	11,473	11,258	11,209	11,375	11,240	11,184	11,254	11,202	11,141	(£m)
Fixed operational carbon	882	867	866	877	870	867	871	867	866	(£m)
Embedded carbon	499	341	316	419	333	305	352	314	287	(£m)
Variable opex	1,064	541	330	897	531	316	646	391	232	(£m)
Variable carbon opex	242	77	39	221	84	47	102	41	18	(£m)

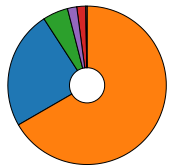
situation1 

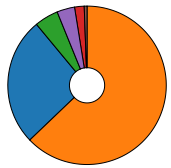
situation2 

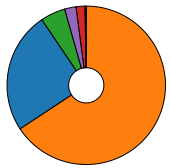
situation3 

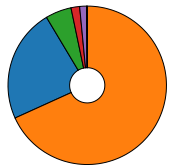
situation4 

situation5 

situation6 

situation7 

situation8 

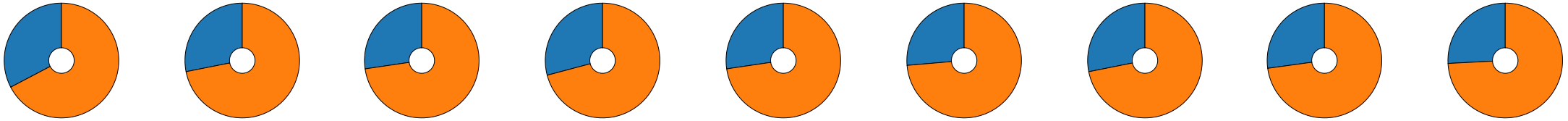
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,222,569	2,091,996	1,923,699	2,642,311	2,035,543	1,848,941	2,181,712	1,916,046	1,733,238	(tonnes)
Operational emissions	6,635,439	5,348,014	5,114,192	6,428,577	5,412,890	5,167,244	5,573,796	5,134,766	4,980,353	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

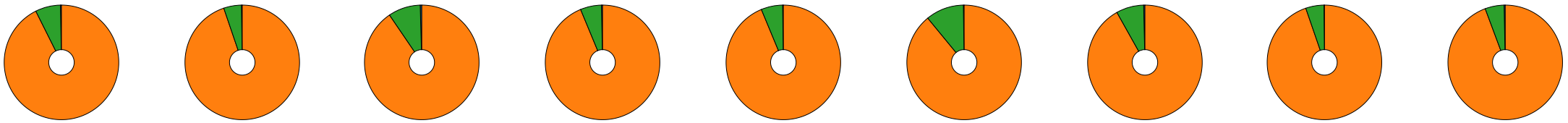


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	72	29	23	65	24	10	52	11	10	(GWh)
Grid	23,019	11,417	4,591	19,614	10,928	4,058	13,184	7,966	2,904	(GWh)
Renewable	1,765	601	461	1,244	706	490	1,115	433	165	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	70,438.00	64,521.00	63,571.00	69,623.00	64,315.00	63,093.00	65,349.00	63,168.00	62,081.00	
SEA environmental disbenefit	114,753.00	78,612.00	70,922.00	108,020.00	78,467.00	71,954.00	83,079.00	69,678.00	60,397.00	
Natural capital	84,114,351.42	79,897,868.04	82,783,146.26	82,483,867.07	79,965,748.64	82,776,434.01	79,562,346.71	80,331,994.08	83,233,810.22	
Bio-diversity net gain	−191,229.00	−134,007.00	−100,936.00	−187,772.00	−127,072.00	−100,124.00	−130,501.00	−103,499.00	−73,949.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	34,229.00	31,845.00	31,436.00	33,789.00	31,795.00	31,370.00	31,936.00	31,051.00	30,530.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	28.34	28.21	30.79	28.27	28.20	30.77	29.54	32.70	36.38	
R1: Uncertainty of option supply/demand benefit	5.82	5.20	5.69	5.64	5.22	5.65	5.60	6.09	6.74	
R3: Risk of service failure due to other physical hazards	6.64	6.92	7.77	6.75	6.97	7.78	7.26	8.23	9.39	
R4: Availability of additional headroom	6.54	6.85	7.07	6.59	6.86	7.07	7.18	7.54	7.78	
R5: Catchment/raw water quality risks (incl. climate change)	3.99	3.91	4.42	3.73	3.90	4.40	4.02	4.64	5.36	
R6: Capacity of catchment services	0.26	0.08	0.00	0.26	0.00	0.00	0.00	0.00	0.00	
R7: Risk of service failure to other exceptional events	4.98	5.21	5.85	5.19	5.25	5.87	5.47	6.20	7.10	
R8: Soil health	0.11	0.03	0.00	0.10	0.00	0.00	0.00	0.00	0.00	

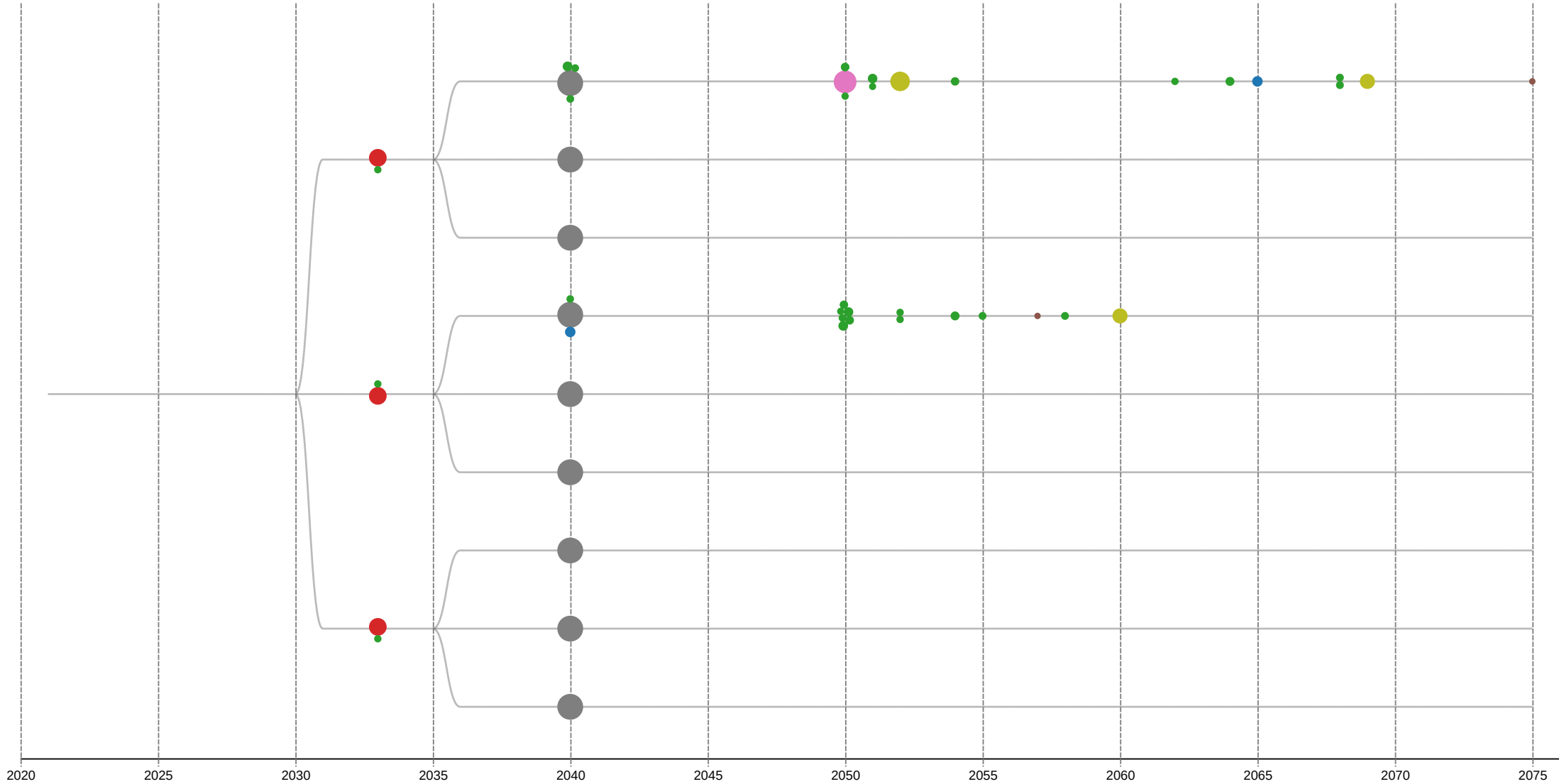
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	14.28	15.21	16.98	14.23	15.21	16.79	15.71	17.89	20.35	
A3: Operational complexity and flexibility	6.15	6.64	7.47	6.43	6.70	7.52	6.94	7.96	9.14	
A4: WRZ connectivity	8.05	8.53	9.48	7.72	8.49	9.23	8.74	9.90	11.18	
A7: Customer relations support engagement with demand management	0.07	0.03	0.03	0.08	0.03	0.03	0.03	0.03	0.03	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.64	19.90	22.05	19.64	19.95	22.05	20.69	23.49	26.62	
E1: Scaleability and modularity of proposed changes	8.95	9.47	10.58	9.02	9.55	10.63	9.82	11.28	12.86	
E2: Intervention lead times	4.18	4.00	4.39	4.06	4.01	4.32	4.23	4.66	5.17	
E3: Reliance on external bodies to deliver changes	6.13	6.34	7.08	6.22	6.39	7.10	6.63	7.55	8.59	
E5: Collaborative land management	0.39	0.08	0.00	0.35	0.00	0.00	0.00	0.00	0.00	

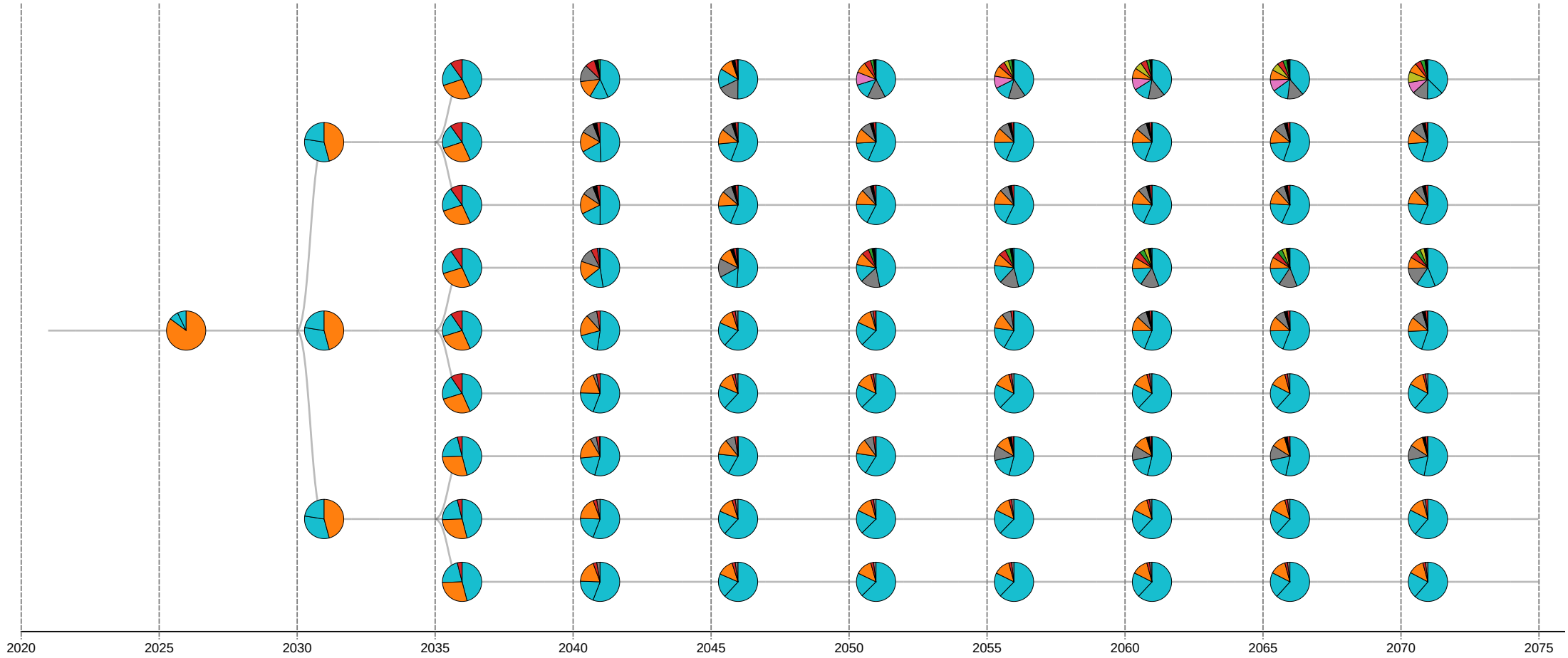
Option Selection (Thames Water)



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

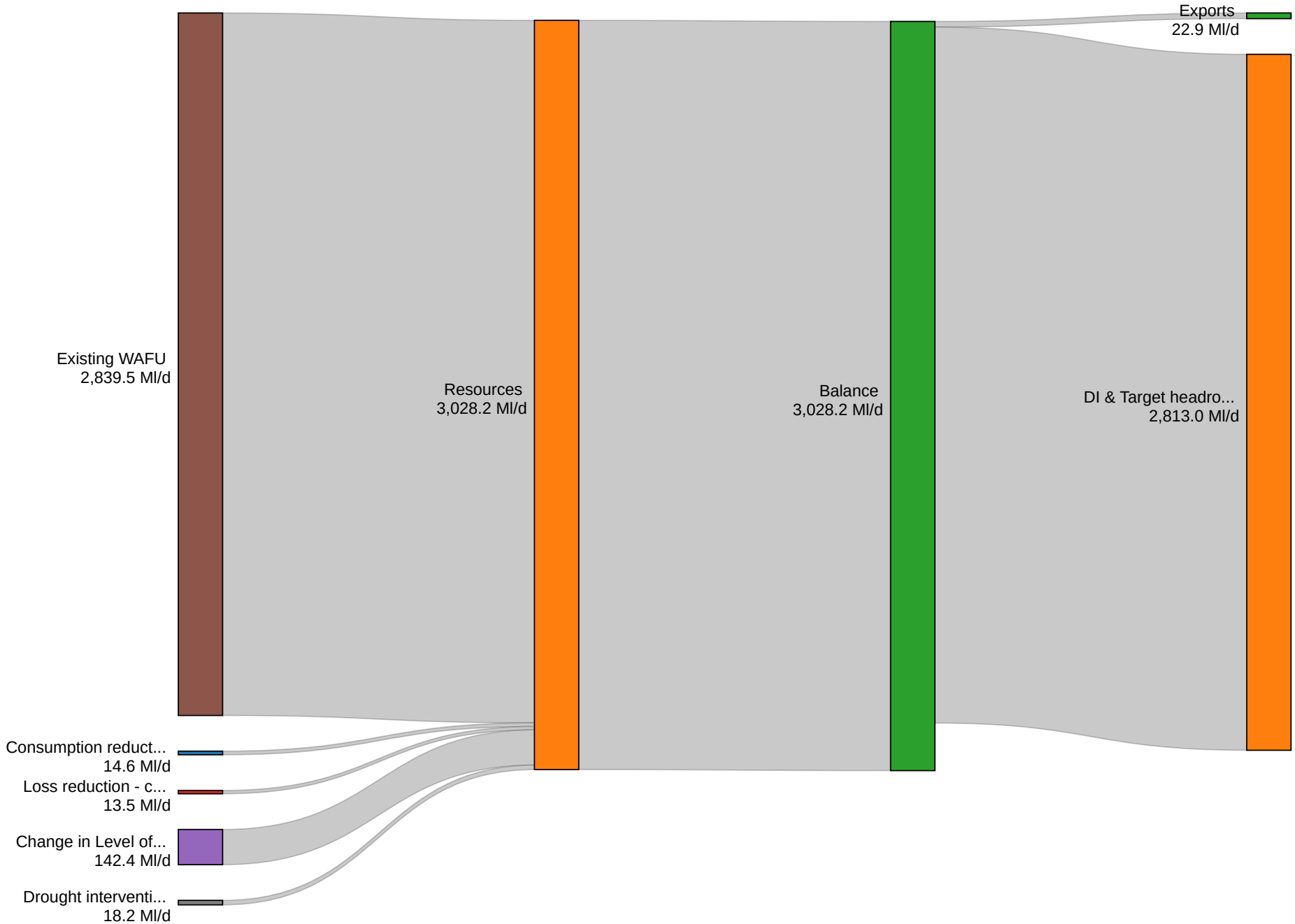
Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.

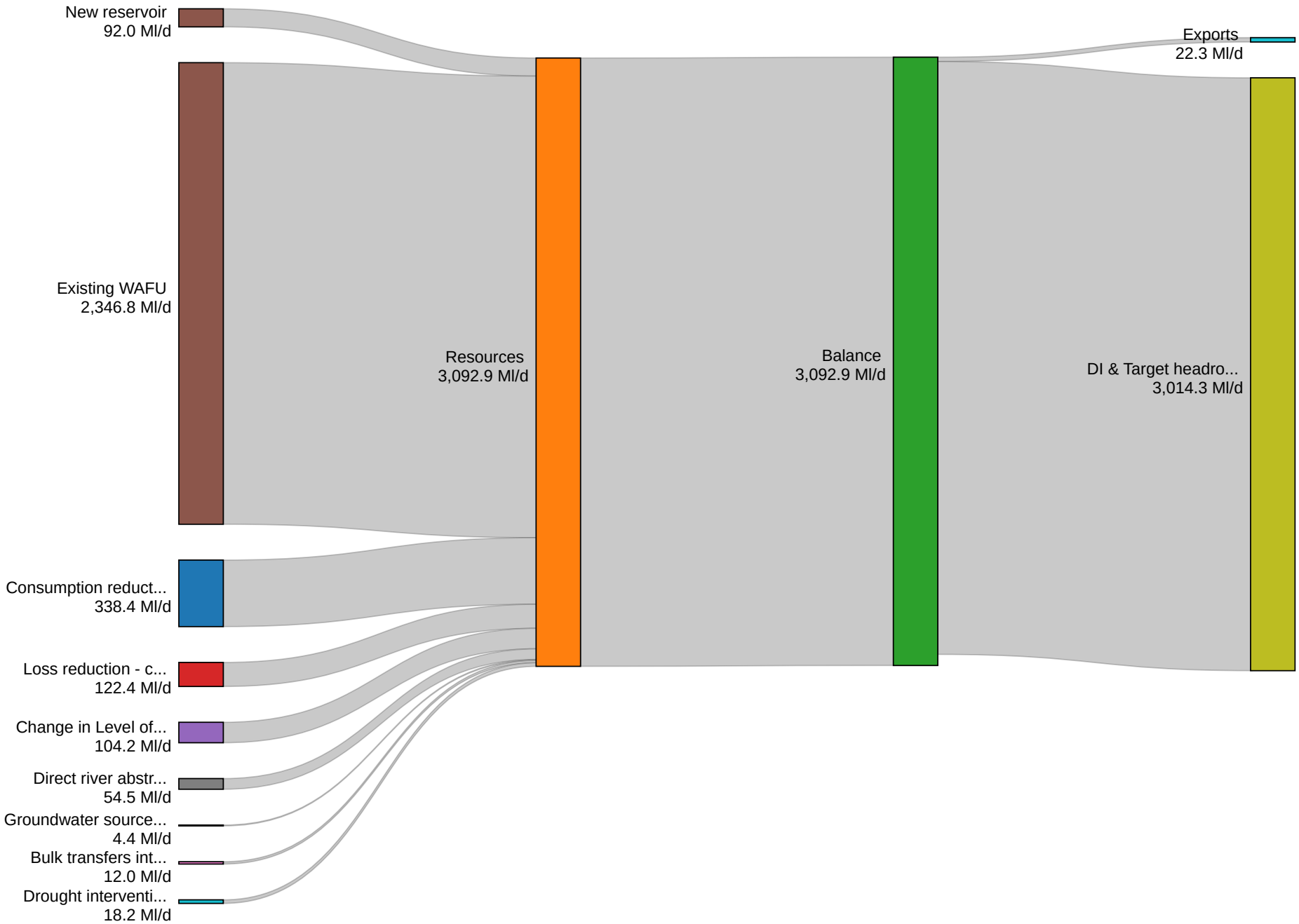


- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

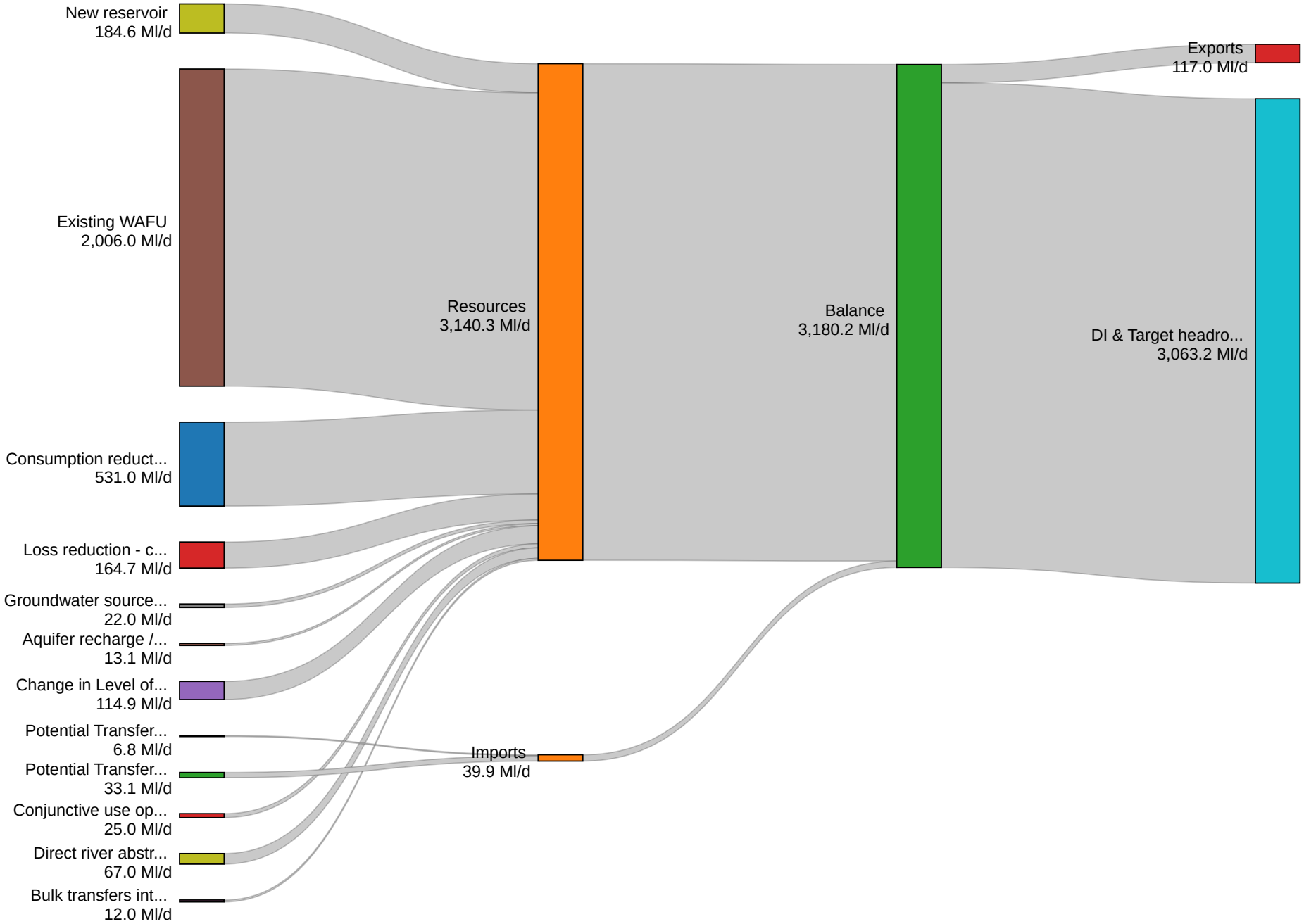
Situation 4 - 2026 (Thames Water)



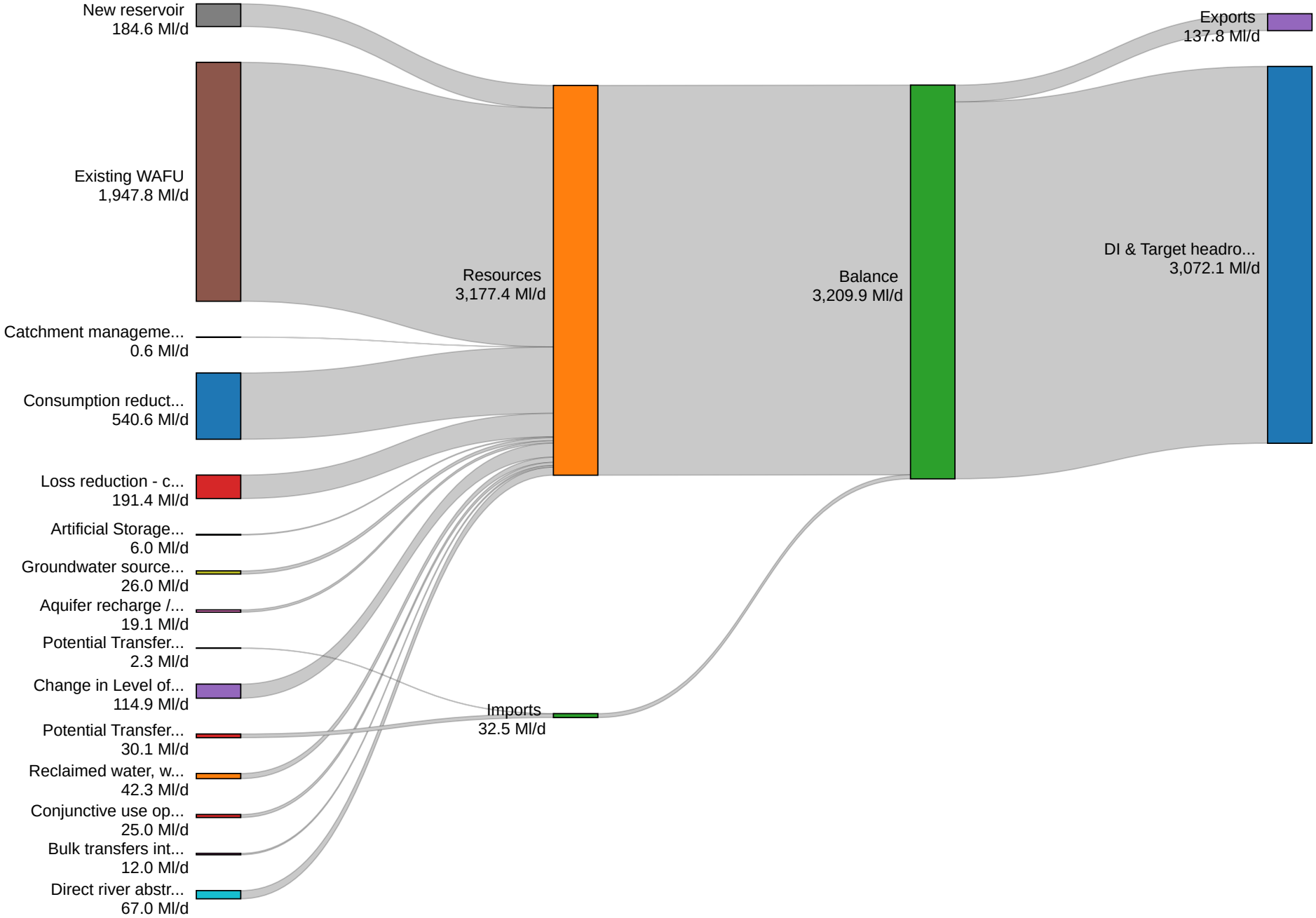
Situation 4 - 2040 (Thames Water)



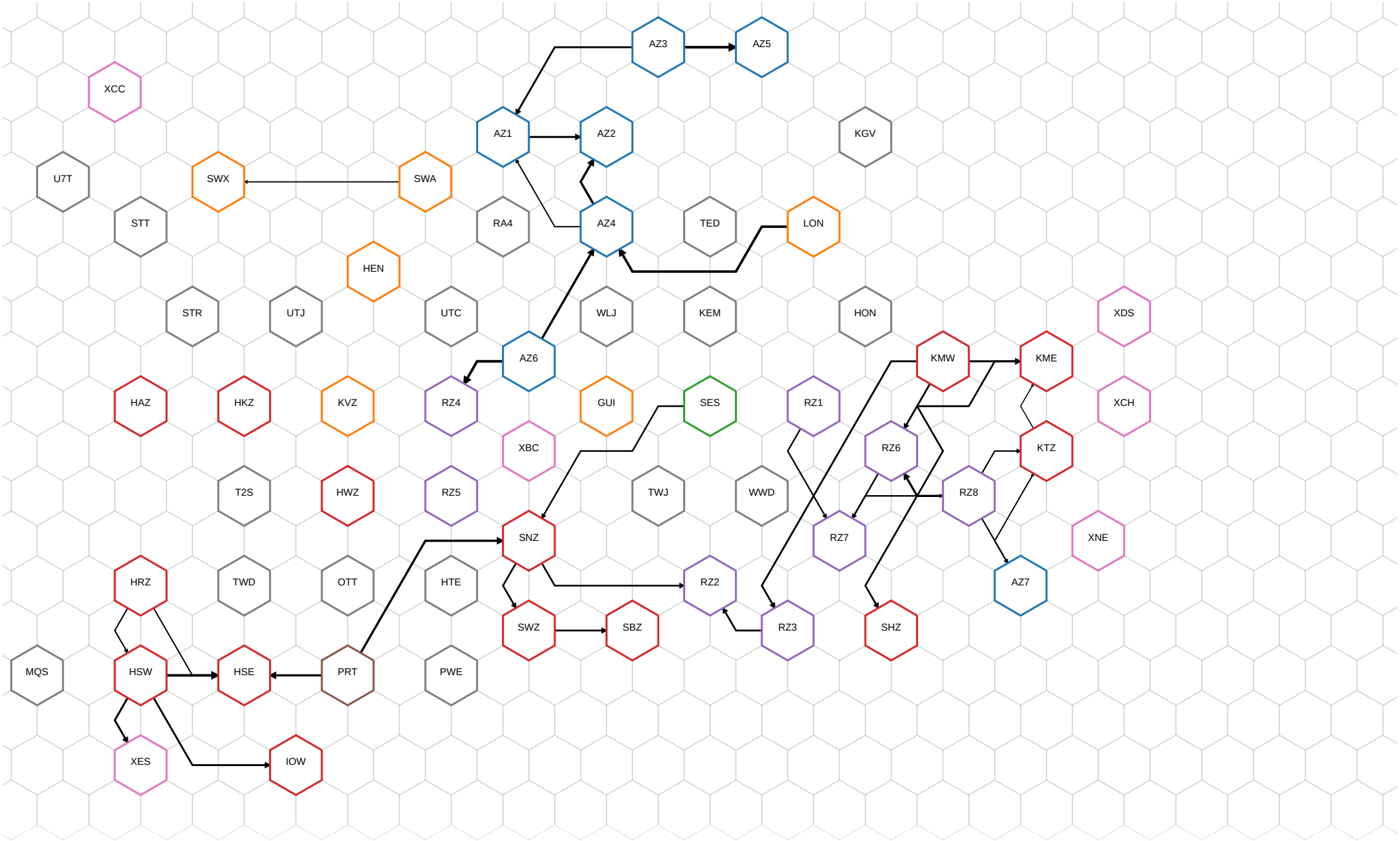
Situation 4 - 2050 (Thames Water)



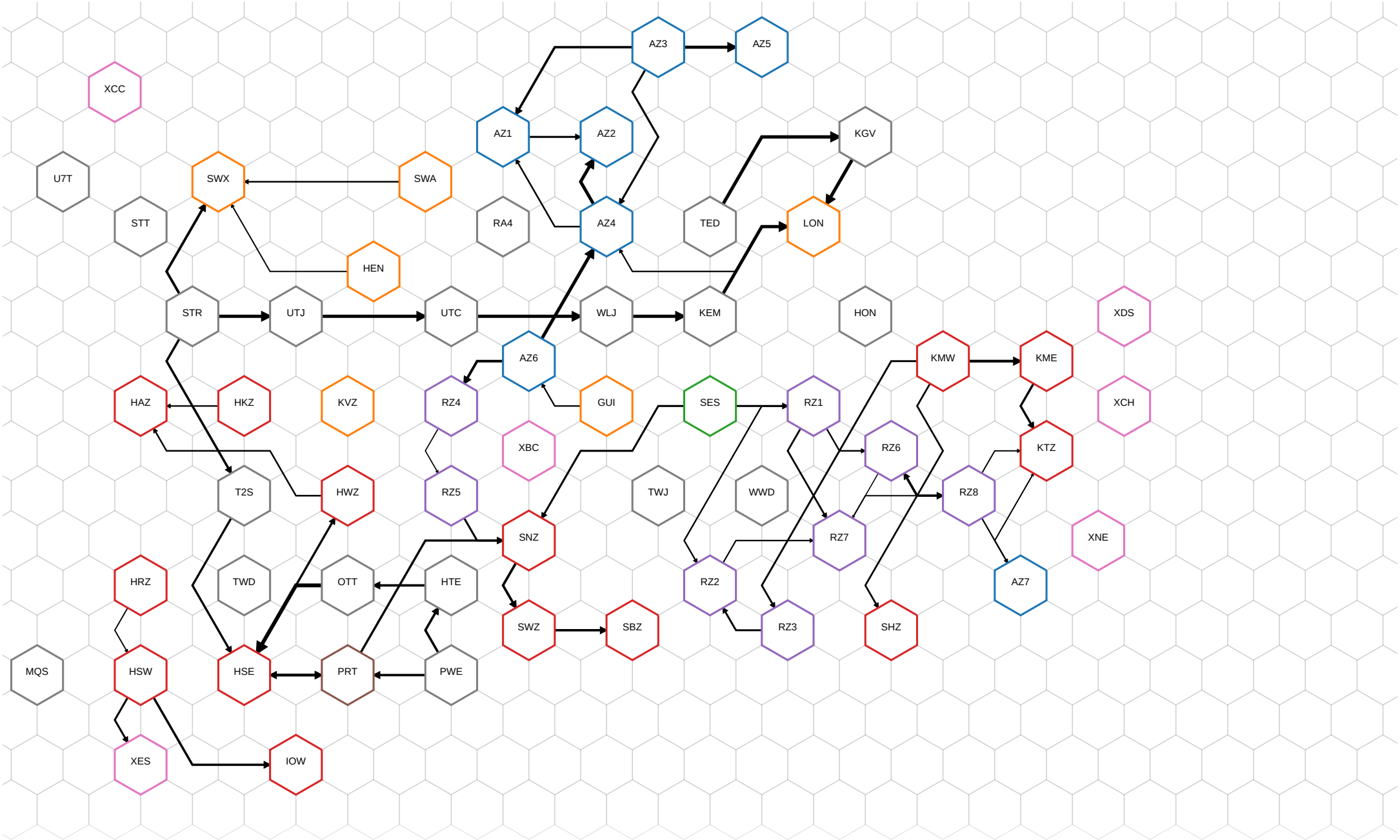
Situation 4 - 2075 (Thames Water)



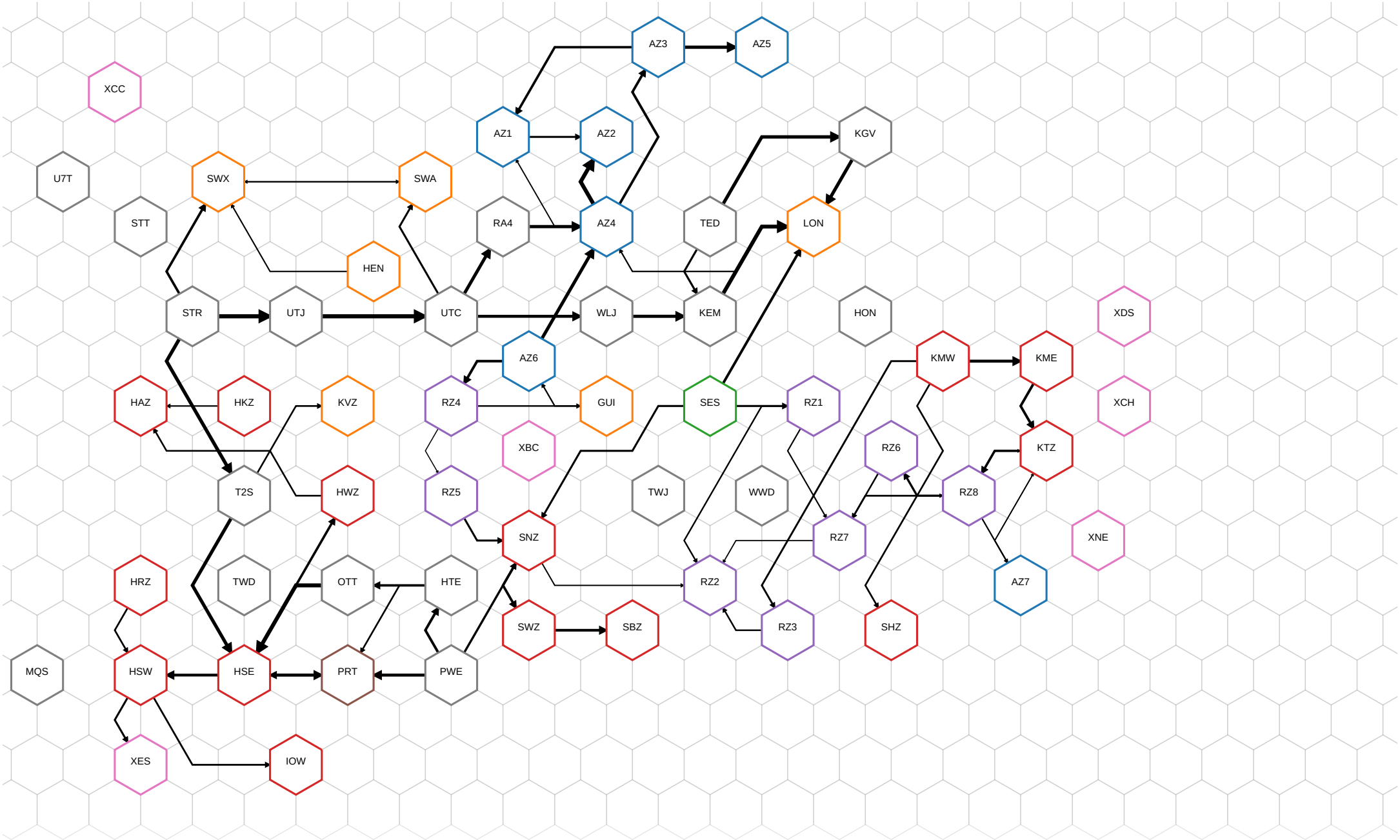
Situation 4 - 2026



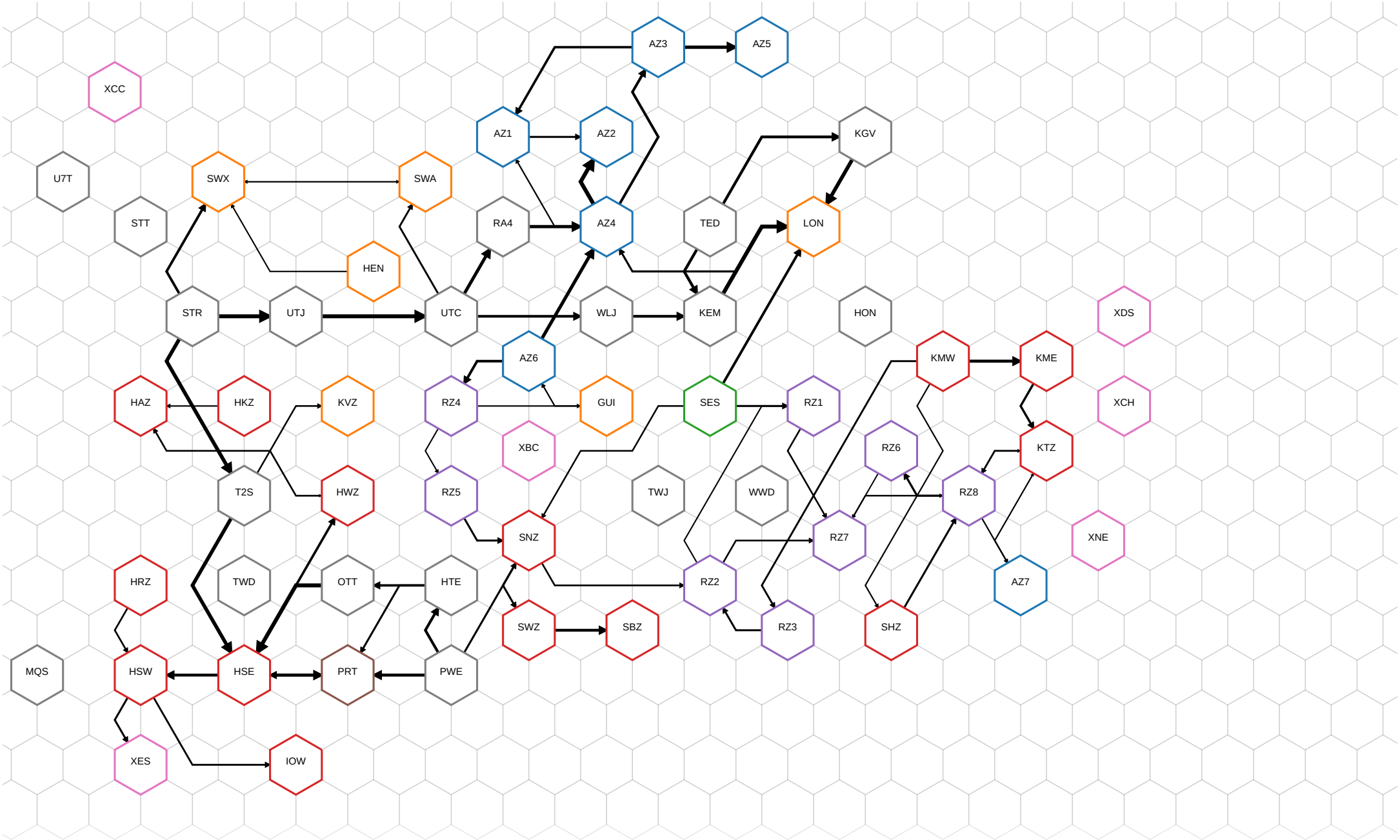
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

RESILIENCE + SESRO 75

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-only-guc100-only-sesro75-only-t2a50-2075-resilience-07_50-v3
Description	Resilience run with hybrid-c+2 government interventions including only GUC 100 Ml/d, SESRO 75 Mm3 and 50 Ml/d T2A transfer. Constrained to 7.5% improvement in worst BVP metrics from "st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-only-sesro150-2075".
Created at	24/07/2023, 18:07:05
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2-only-guc100-only-sesro75-only-t2a50
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets. Exclude all GUC variants except 100. Exclude all SESRO variants except 75. Excludes T2A 100 Ml/d transfer (i.e. only 50 Ml/d).
Optimised discount rate	STPR

Metrics

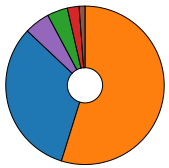
Net present value (Cost)

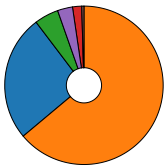
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	21,001	17,612	16,899	19,486	17,498	16,683	17,830	16,971	16,255	(£m)
Cost w/o deficit (STPR)	21,001	17,612	16,899	19,486	17,498	16,683	17,830	16,971	16,255	(£m)
Cost w/ deficit (IGEQ)	32,314	25,830	24,529	29,406	25,634	24,178	26,324	24,712	23,420	(£m)
Cost w/o deficit (IGEQ)	32,314	25,830	24,529	29,406	25,634	24,178	26,324	24,712	23,420	(£m)
Cost w/ deficit (LTDR)	23,182	19,231	18,409	21,415	19,102	18,167	19,497	18,501	17,677	(£m)
Cost w/o deficit (LTDR)	23,182	19,231	18,409	21,415	19,102	18,167	19,497	18,501	17,677	(£m)

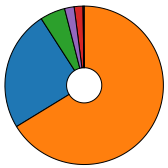
Cost breakdown (STPR)

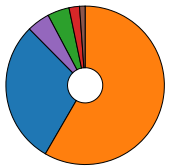
Select Company: Total

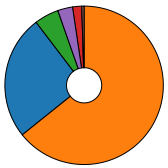
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	6,770	4,540	4,161	5,694	4,446	3,968	4,613	4,164	3,719	(£m)
Fixed opex	11,508	11,255	11,200	11,373	11,242	11,182	11,253	11,201	11,139	(£m)
Fixed operational carbon	883	869	867	873	870	870	871	867	865	(£m)
Embedded carbon	504	329	304	417	326	296	346	308	280	(£m)
Variable opex	1,087	540	328	909	531	316	645	391	232	(£m)
Variable carbon opex	248	79	39	220	84	50	101	41	18	(£m)

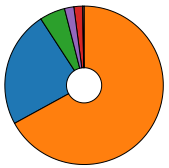
situation1 

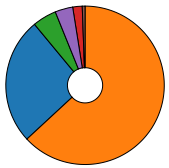
situation2 

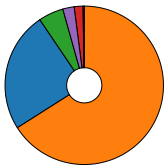
situation3 

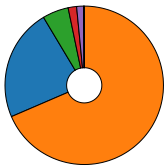
situation4 

situation5 

situation6 

situation7 

situation8 

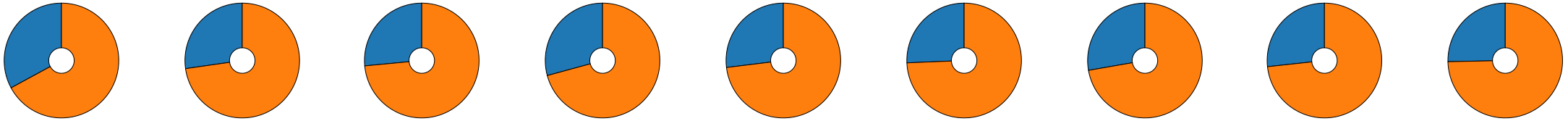
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,279,871	2,015,945	1,845,393	2,640,772	1,995,841	1,796,997	2,138,486	1,872,376	1,689,568	(tonnes)
Operational emissions	6,687,893	5,377,910	5,119,710	6,394,439	5,410,750	5,208,583	5,567,094	5,134,761	4,980,347	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

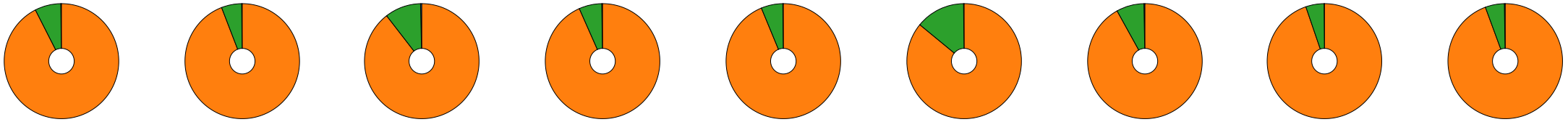


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	50	22	17	47	19	8	40	9	8	(GWh)
Grid	22,993	11,307	4,427	19,227	10,940	3,861	13,158	7,957	2,895	(GWh)
Renewable	1,819	683	502	1,323	713	625	1,115	433	165	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	70,734.00	65,147.00	63,735.00	68,804.00	64,604.00	63,066.00	65,358.00	63,168.00	62,081.00	
SEA environmental disbenefit	117,299.00	83,299.00	73,949.00	103,751.00	79,291.00	72,255.00	83,286.00	69,866.00	60,585.00	
Natural capital	85,292,129.19	81,312,296.24	84,076,782.28	79,274,686.48	81,311,825.18	84,123,659.99	80,969,354.72	81,744,834.08	84,646,650.22	
Bio-diversity net gain	−187,136.00	−121,313.00	−97,702.00	−170,302.00	−116,647.00	−89,868.00	−119,469.00	−92,367.00	−62,817.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	34,423.00	32,205.00	31,534.00	33,525.00	31,901.00	31,355.00	31,937.00	31,052.00	30,531.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	28.29	28.19	30.02	28.27	28.18	30.07	28.93	31.98	35.54	
R1: Uncertainty of option supply/demand benefit	5.85	5.20	5.51	5.78	5.17	5.51	5.48	5.94	6.57	
R3: Risk of service failure due to other physical hazards	6.62	6.85	7.57	6.71	6.85	7.58	7.10	8.04	9.16	
R4: Availability of additional headroom	6.49	6.80	7.02	6.58	6.82	7.03	7.14	7.49	7.73	
R5: Catchment/raw water quality risks (incl. climate change)	3.96	3.77	4.25	3.70	3.79	4.27	3.91	4.50	5.20	
R6: Capacity of catchment services	0.31	0.31	0.00	0.31	0.31	0.00	0.00	0.00	0.00	
R7: Risk of service failure to other exceptional events	4.94	5.14	5.66	5.07	5.12	5.68	5.31	6.00	6.87	
R8: Soil health	0.11	0.11	0.00	0.11	0.11	0.00	0.00	0.00	0.00	

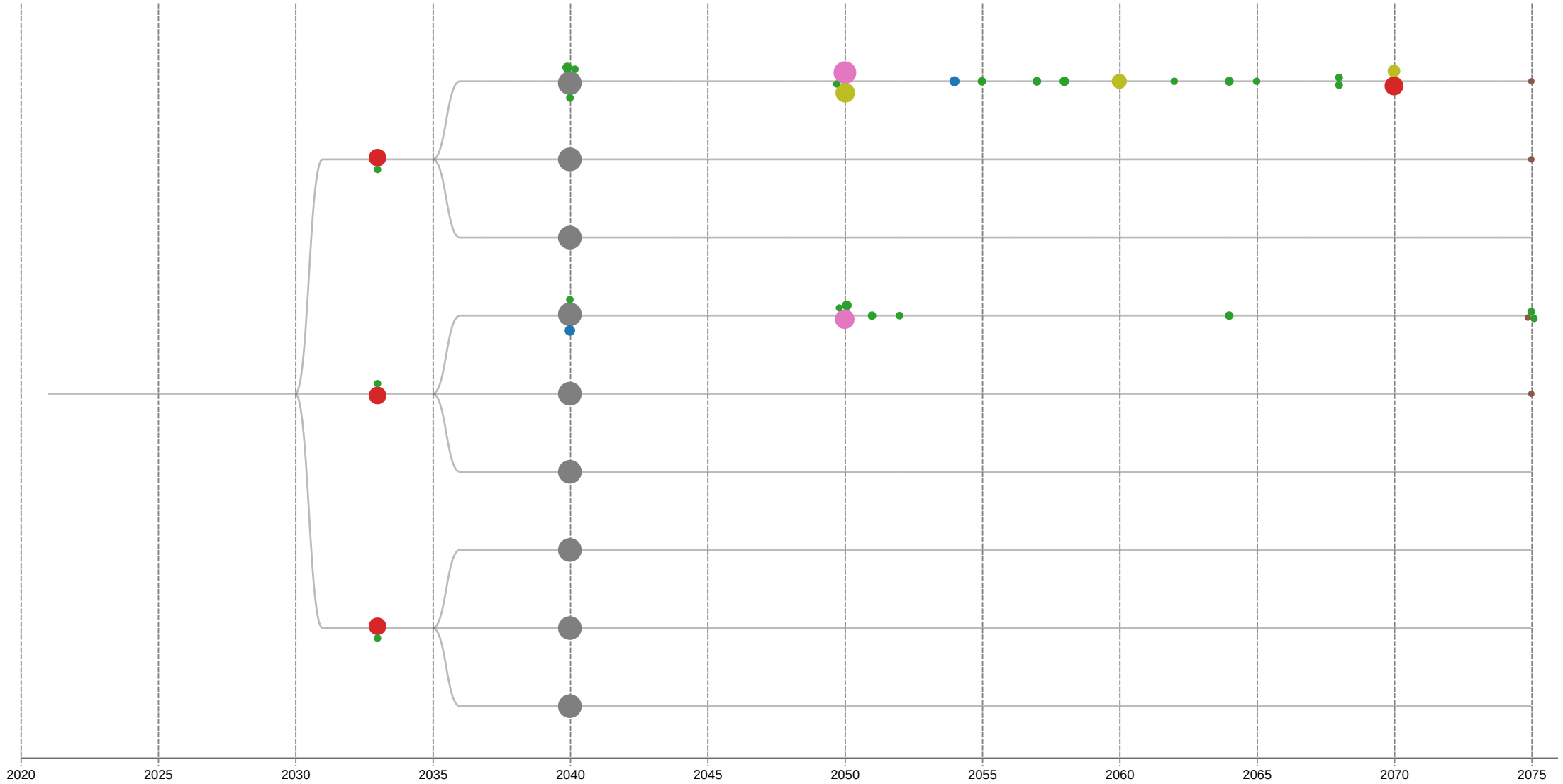
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	14.32	15.21	16.78	14.27	15.20	16.60	15.55	17.69	20.12	
A3: Operational complexity and flexibility	6.09	6.56	7.28	6.31	6.58	7.34	6.78	7.76	8.91	
A4: WRZ connectivity	8.11	8.51	9.47	7.84	8.49	9.23	8.74	9.90	11.18	
A7: Customer relations support engagement with demand management	0.12	0.13	0.03	0.12	0.13	0.03	0.03	0.03	0.03	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.91	20.42	21.82	19.91	20.41	21.86	20.52	23.29	26.39	
E1: Scaleability and modularity of proposed changes	8.97	9.48	10.46	9.07	9.52	10.53	9.74	11.18	12.74	
E2: Intervention lead times	4.30	4.09	4.34	4.11	4.04	4.27	4.19	4.61	5.11	
E3: Reliance on external bodies to deliver changes	6.19	6.40	7.02	6.27	6.40	7.06	6.59	7.50	8.53	
E5: Collaborative land management	0.46	0.46	0.00	0.46	0.46	0.00	0.00	0.00	0.00	

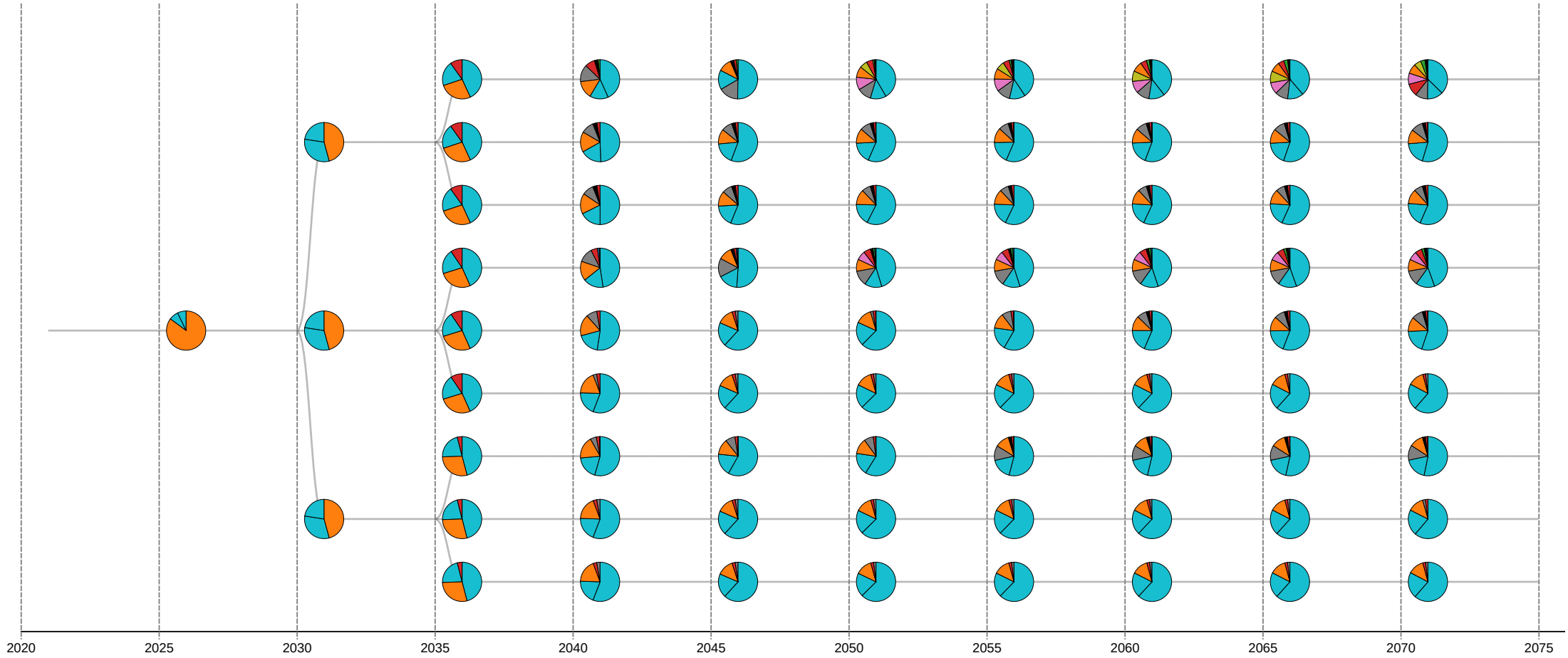
Option Selection (Thames Water)



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

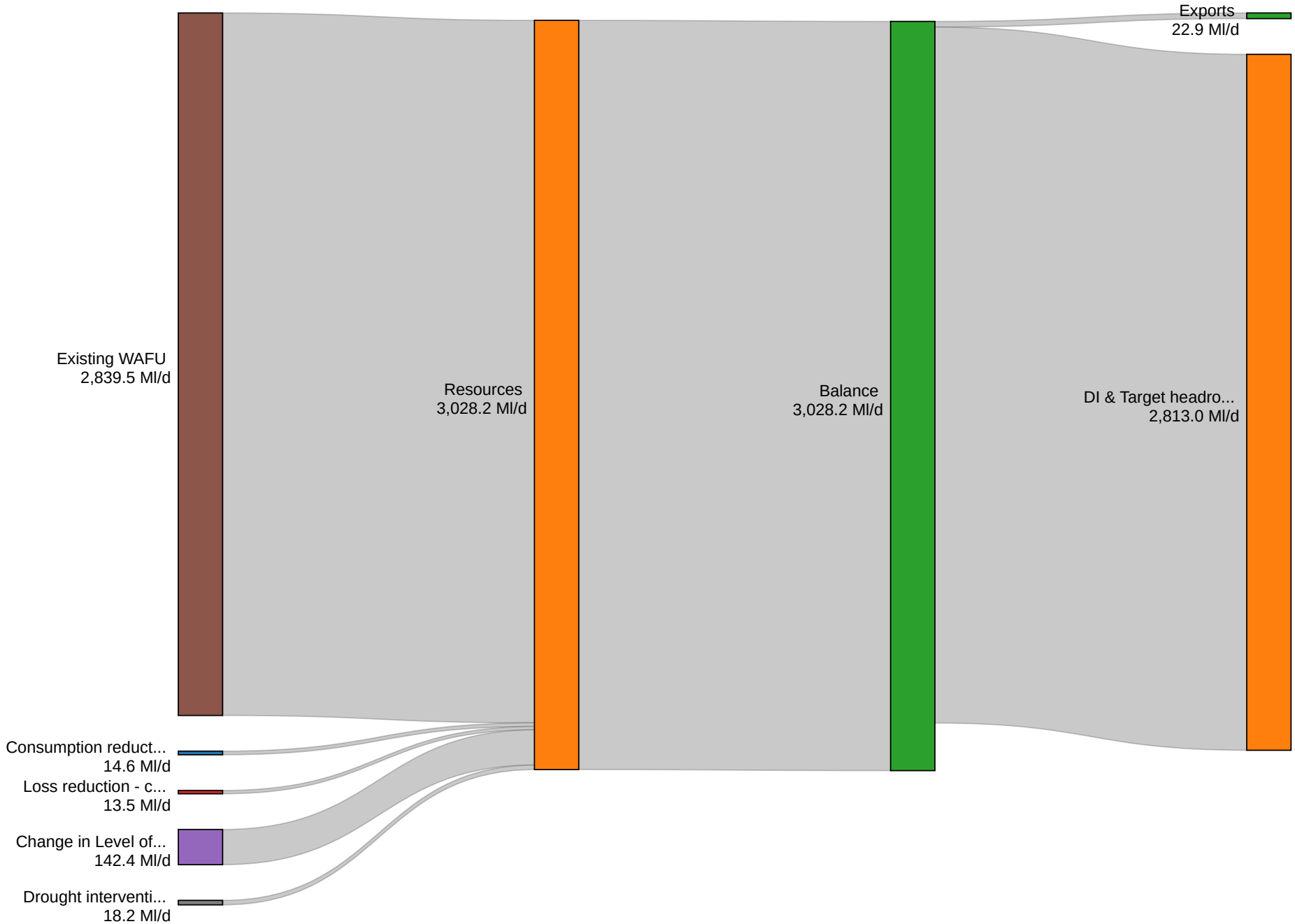
Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.

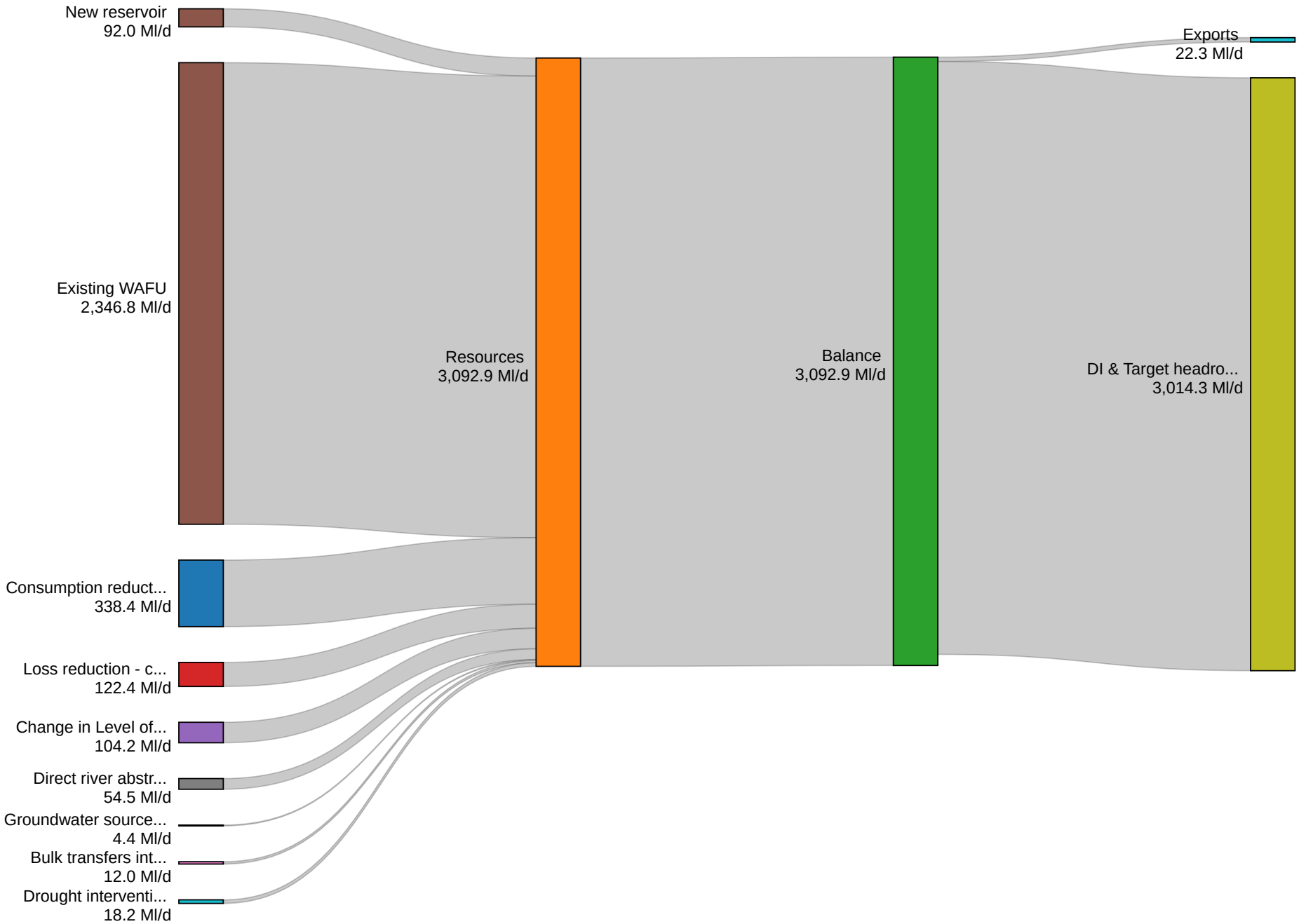


- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

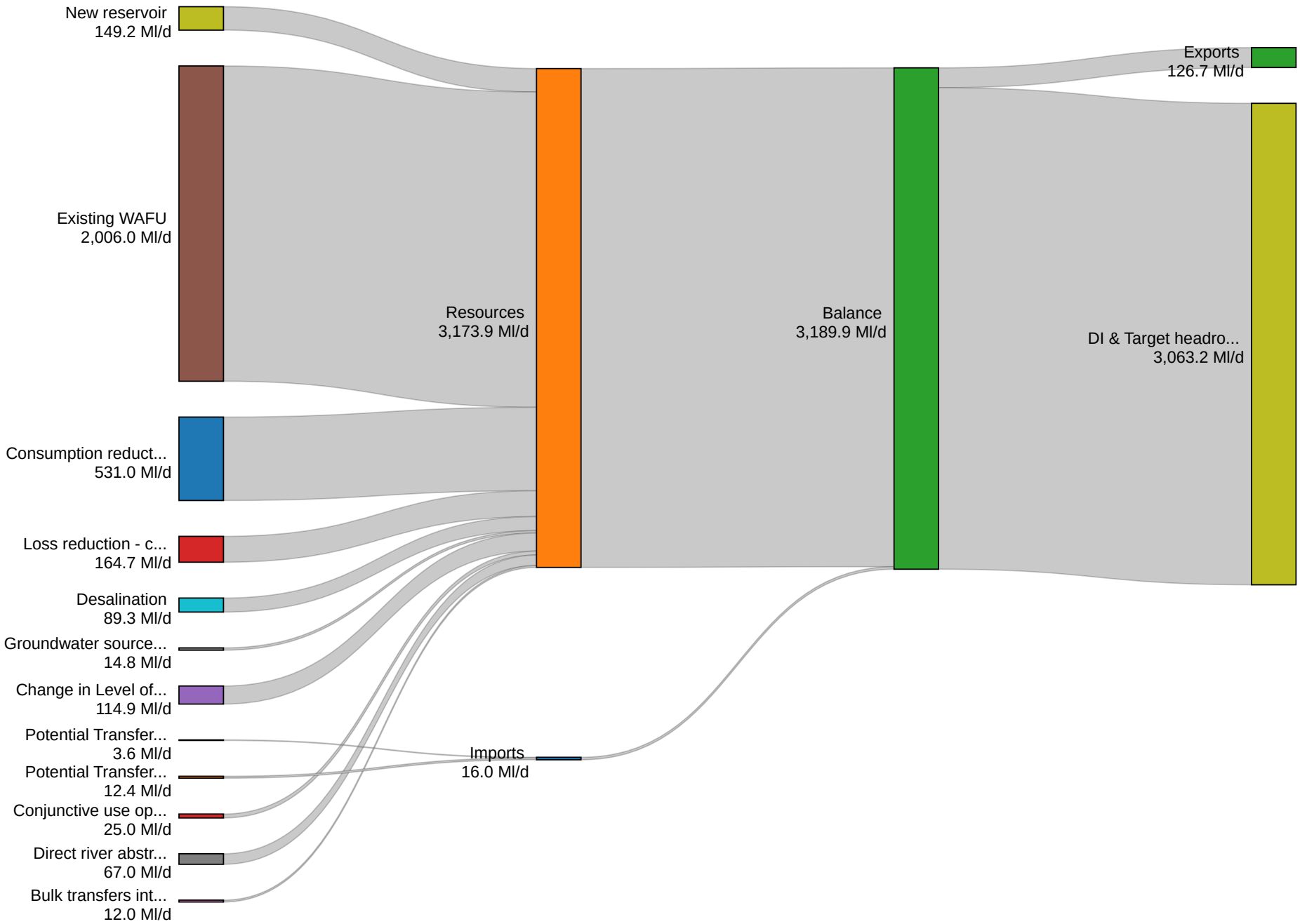
Situation 4 - 2026 (Thames Water)



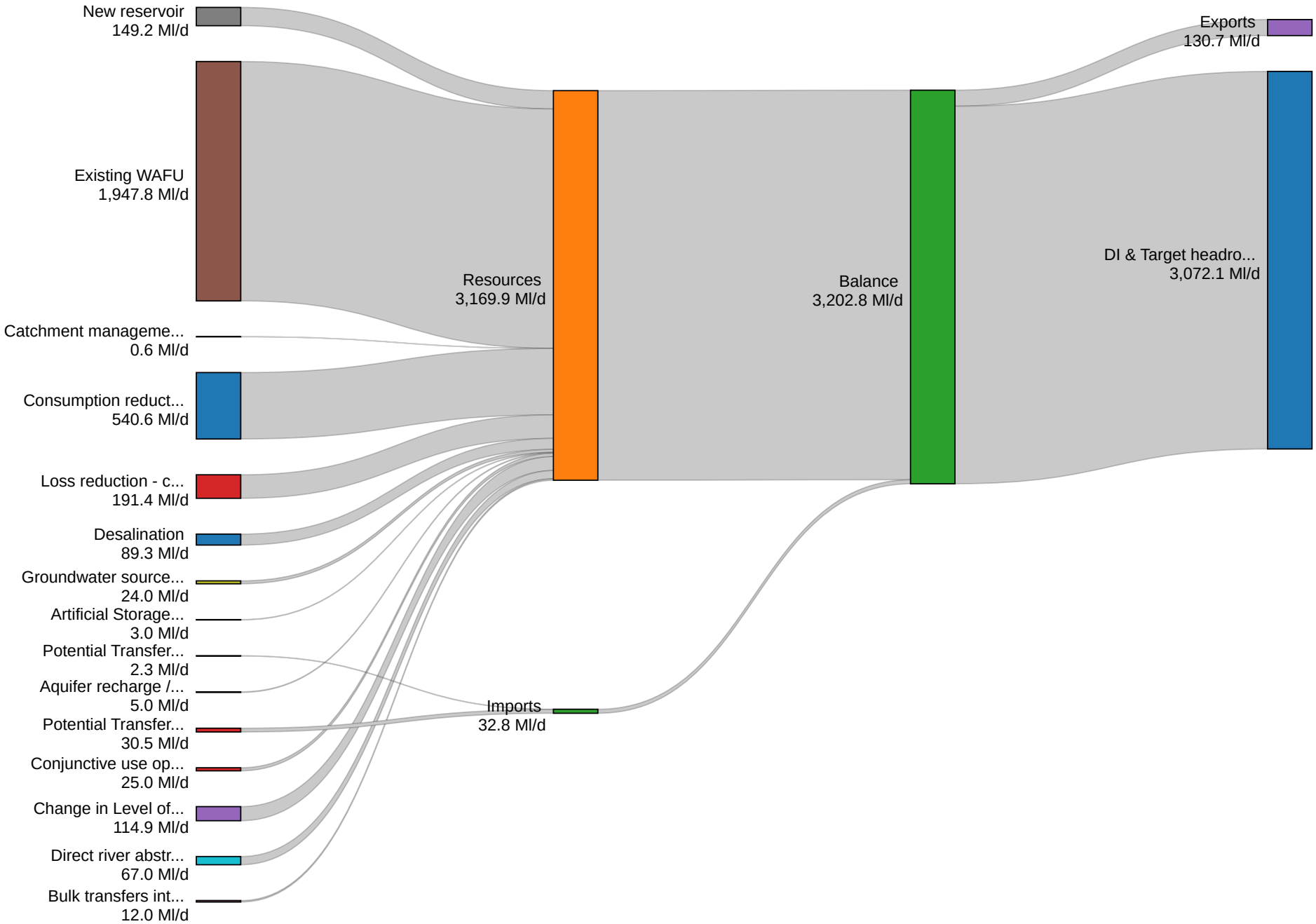
Situation 4 - 2040 (Thames Water)



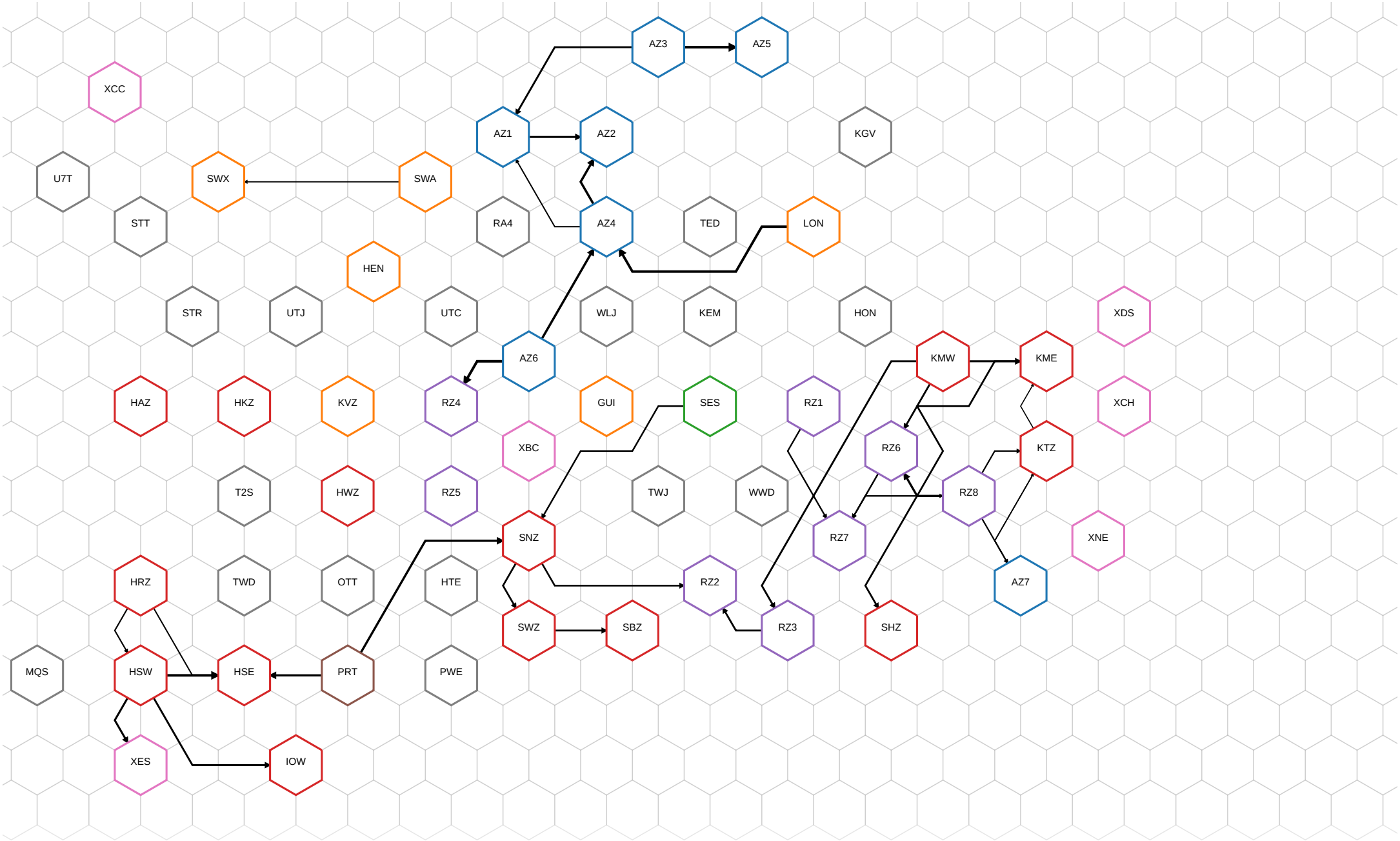
Situation 4 - 2050 (Thames Water)



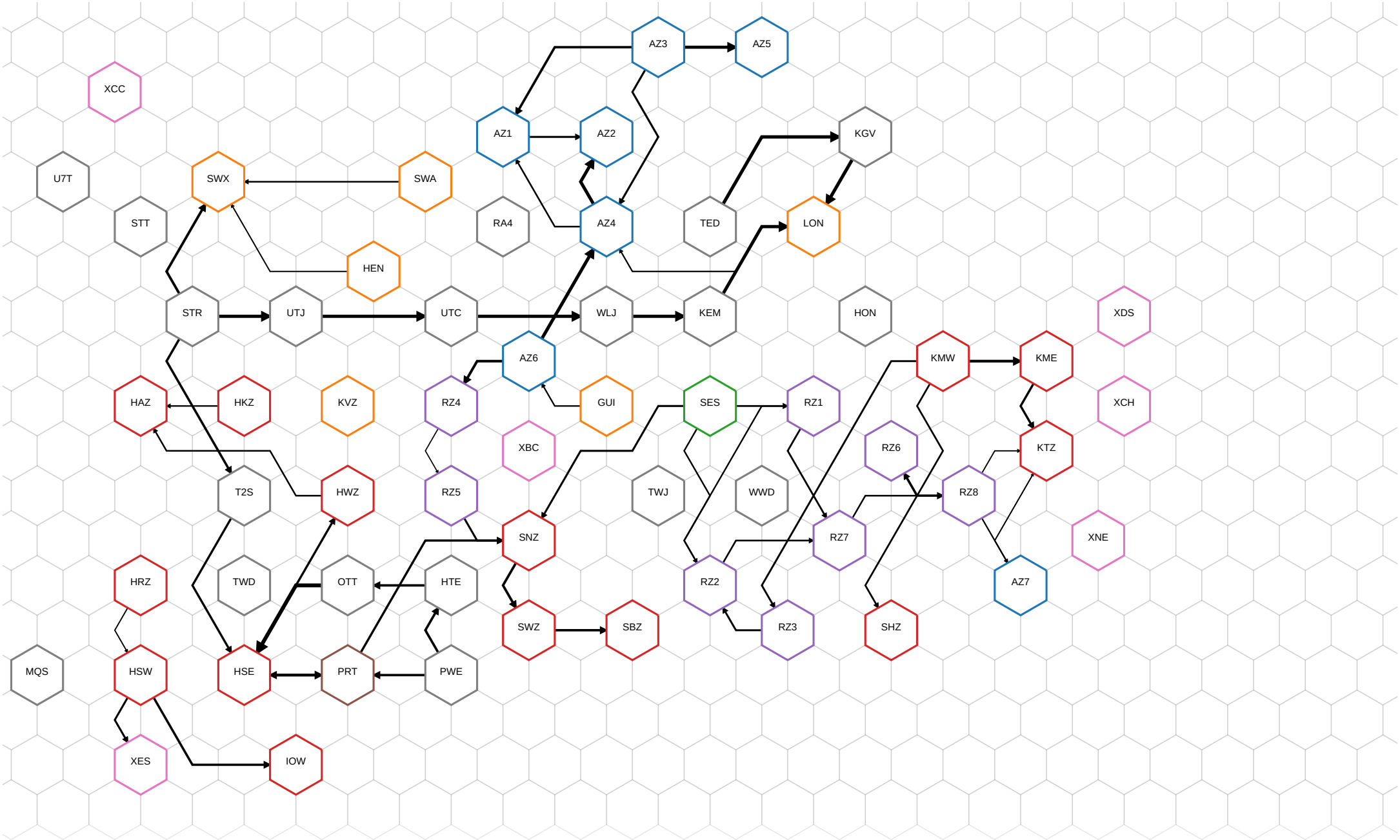
Situation 4 - 2075 (Thames Water)



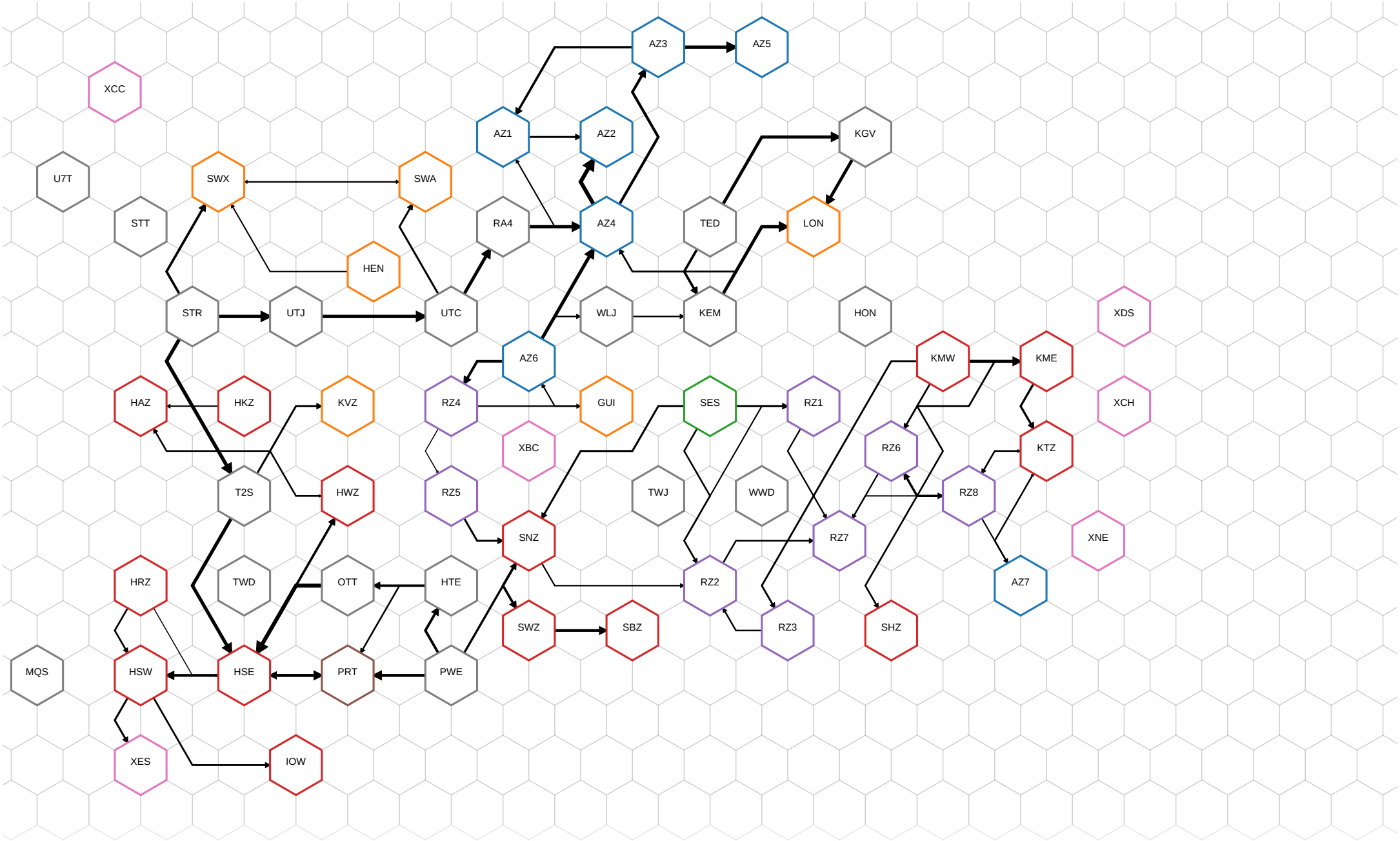
Situation 4 - 2026



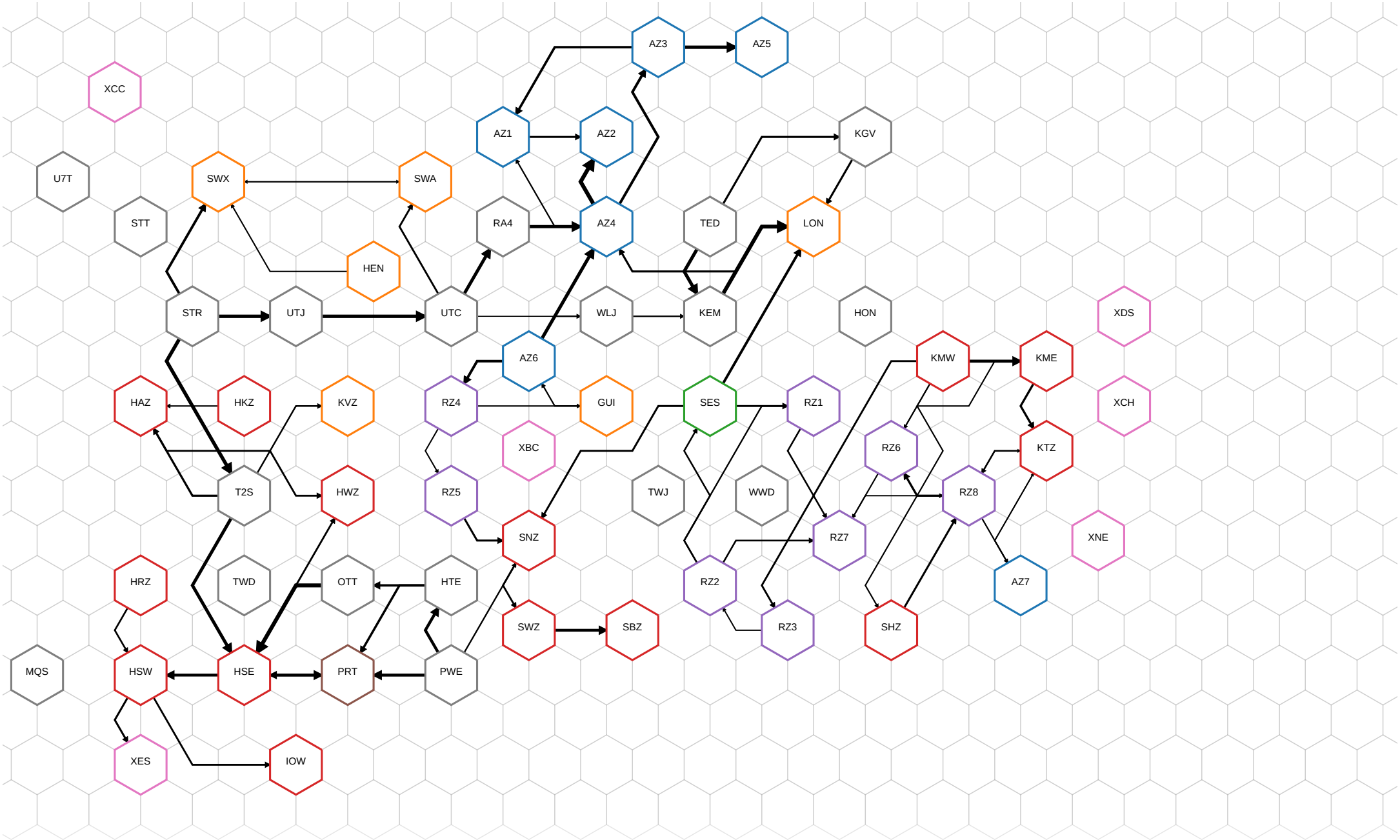
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

E&S + SESRO 150

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-only-guc100-only-sesro150-only-t2a50-2075-envsoc-07_50-v3
Description	Resilience run with hybrid-c+2 government interventions including only GUC 100 Ml/d, SESRO 150 Mm3 and 50 Ml/d T2A transfer. Constrained to 7.5% improvement in worst BVP metrics from "st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-only-sesro150-2075".
Created at	24/07/2023, 10:07:30
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2-only-guc100-only-sesro150-only-t2a50
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets. Exclude all GUC variants except 100. Exclude all SESRO variants except 150. Excludes T2A 100 Ml/d transfer (i.e. only 50 Ml/d).
Optimised discount rate	STPR

Metrics

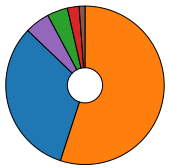
Net present value (Cost)

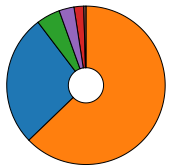
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	20,814	17,919	17,166	19,341	17,810	17,001	18,168	17,306	16,569	(£m)
Cost w/o deficit (STPR)	20,814	17,919	17,166	19,341	17,810	17,001	18,168	17,306	16,569	(£m)
Cost w/ deficit (IGEQ)	31,757	26,296	24,931	28,968	26,109	24,664	26,861	25,237	23,904	(£m)
Cost w/o deficit (IGEQ)	31,757	26,296	24,931	28,968	26,109	24,664	26,861	25,237	23,904	(£m)
Cost w/ deficit (LTDR)	22,933	19,569	18,702	21,220	19,445	18,517	19,873	18,872	18,024	(£m)
Cost w/o deficit (LTDR)	22,933	19,569	18,702	21,220	19,445	18,517	19,873	18,872	18,024	(£m)

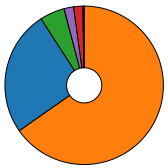
Cost breakdown (STPR)

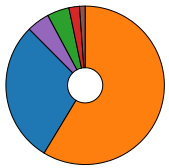
Select Company: Total

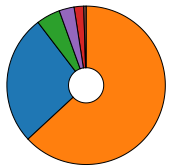
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	6,692	4,813	4,394	5,589	4,721	4,254	4,908	4,461	4,001	(£m)
Fixed opex	11,449	11,254	11,201	11,343	11,240	11,185	11,256	11,204	11,143	(£m)
Fixed operational carbon	880	870	870	877	870	869	872	867	866	(£m)
Embedded carbon	496	355	328	418	351	321	372	333	305	(£m)
Variable opex	1,052	546	330	896	543	321	658	399	237	(£m)
Variable carbon opex	246	81	43	218	85	50	103	41	18	(£m)

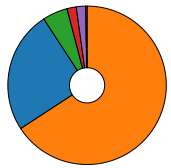
situation1 

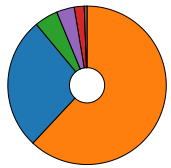
situation2 

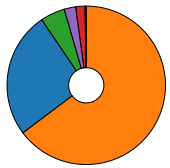
situation3 

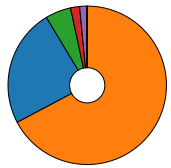
situation4 

situation5 

situation6 

situation7 

situation8 

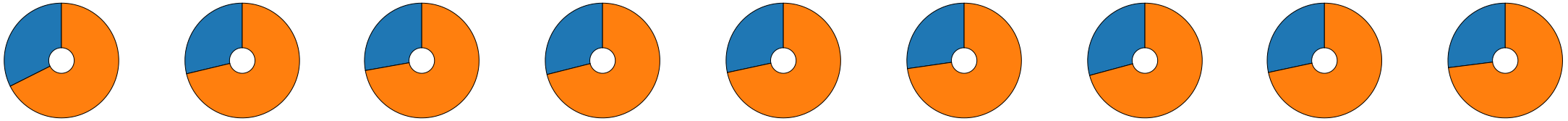
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,177,489	2,175,644	1,989,192	2,606,725	2,146,438	1,951,758	2,300,916	2,033,407	1,841,877	(tonnes)
Operational emissions	6,632,165	5,398,288	5,166,400	6,403,810	5,420,650	5,205,327	5,581,748	5,140,840	4,980,394	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

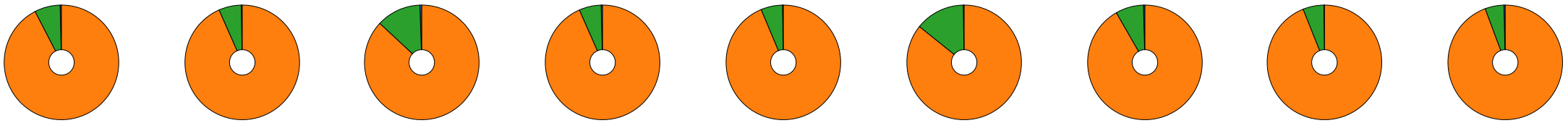


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	95	34	26	83	29	12	60	13	12	(GWh)
Grid	22,703	11,119	4,288	18,961	10,949	3,843	13,100	7,773	2,924	(GWh)
Renewable	1,770	754	619	1,260	709	627	1,126	489	165	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	65,793.00	65,338.00	65,338.00	67,145.00	65,338.00	65,338.00	66,432.00	65,338.00	65,338.00	
SEA environmental disbenefit	105,001.00	77,866.00	71,561.00	97,667.00	78,037.00	72,116.00	82,937.00	69,735.00	62,343.00	
Natural capital	82,142,067.61	81,089,554.71	81,291,515.92	82,733,279.75	81,001,253.86	81,292,203.31	81,649,133.93	81,352,100.21	81,684,832.54	
Bio-diversity net gain	−202,516.00	−141,163.00	−118,749.00	−202,283.00	−147,661.00	−119,605.00	−150,502.00	−125,320.00	−101,850.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	36,521.00	35,088.00	34,763.00	36,399.00	35,202.00	34,918.00	35,384.00	34,597.00	34,168.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	29.17	29.68	32.41	28.49	29.76	32.60	31.12	34.66	38.52	
R1: Uncertainty of option supply/demand benefit	6.11	5.57	6.02	5.68	5.55	6.06	5.94	6.53	7.20	
R3: Risk of service failure due to other physical hazards	7.00	7.36	8.22	6.94	7.39	8.27	7.68	8.77	9.98	
R4: Availability of additional headroom	6.60	6.95	7.16	6.68	6.97	7.18	7.29	7.65	7.89	
R5: Catchment/raw water quality risks (incl. climate change)	4.08	4.15	4.69	3.81	4.18	4.72	4.31	4.98	5.76	
R6: Capacity of catchment services	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01	
R7: Risk of service failure to other exceptional events	5.37	5.64	6.31	5.38	5.67	6.36	5.90	6.72	7.69	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

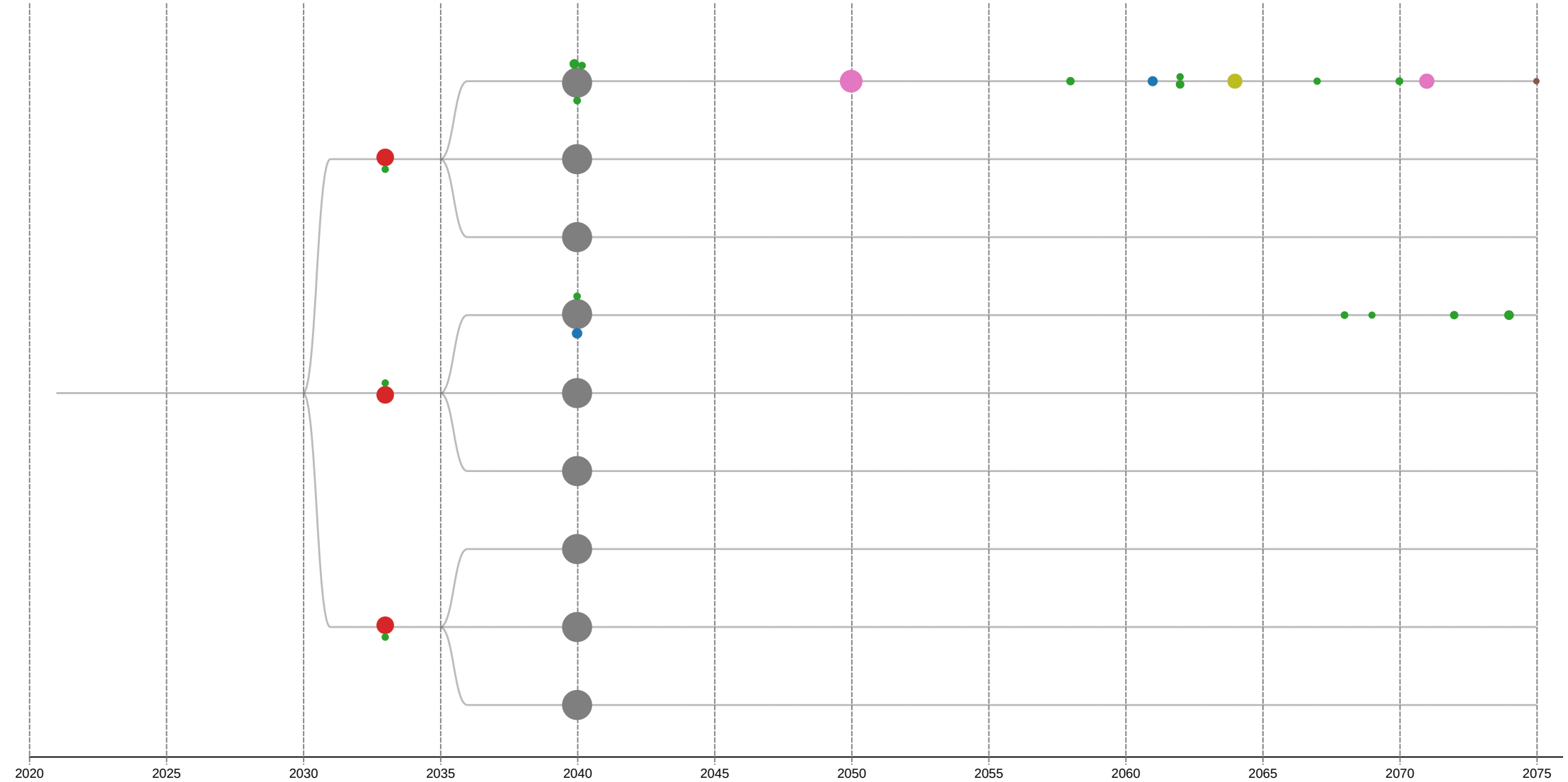
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	14.00	15.61	17.44	14.14	15.67	17.31	16.17	18.45	21.00	
A3: Operational complexity and flexibility	6.54	7.07	7.94	6.63	7.12	8.02	7.38	8.48	9.73	
A4: WRZ connectivity	7.42	8.52	9.47	7.48	8.52	9.26	8.77	9.94	11.23	
A7: Customer relations support engagement with demand management	0.04	0.03	0.03	0.02	0.03	0.03	0.03	0.03	0.03	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.15	19.94	22.08	18.70	20.03	22.18	20.76	23.65	26.72	
E1: Scaleability and modularity of proposed changes	8.80	9.38	10.41	8.68	9.43	10.52	9.71	11.17	12.68	
E2: Intervention lead times	4.13	4.09	4.48	3.91	4.11	4.42	4.32	4.78	5.31	
E3: Reliance on external bodies to deliver changes	6.21	6.46	7.17	6.11	6.48	7.23	6.73	7.69	8.72	
E5: Collaborative land management	0.01	0.01	0.01	0.00	0.01	0.01	0.00	0.01	0.01	

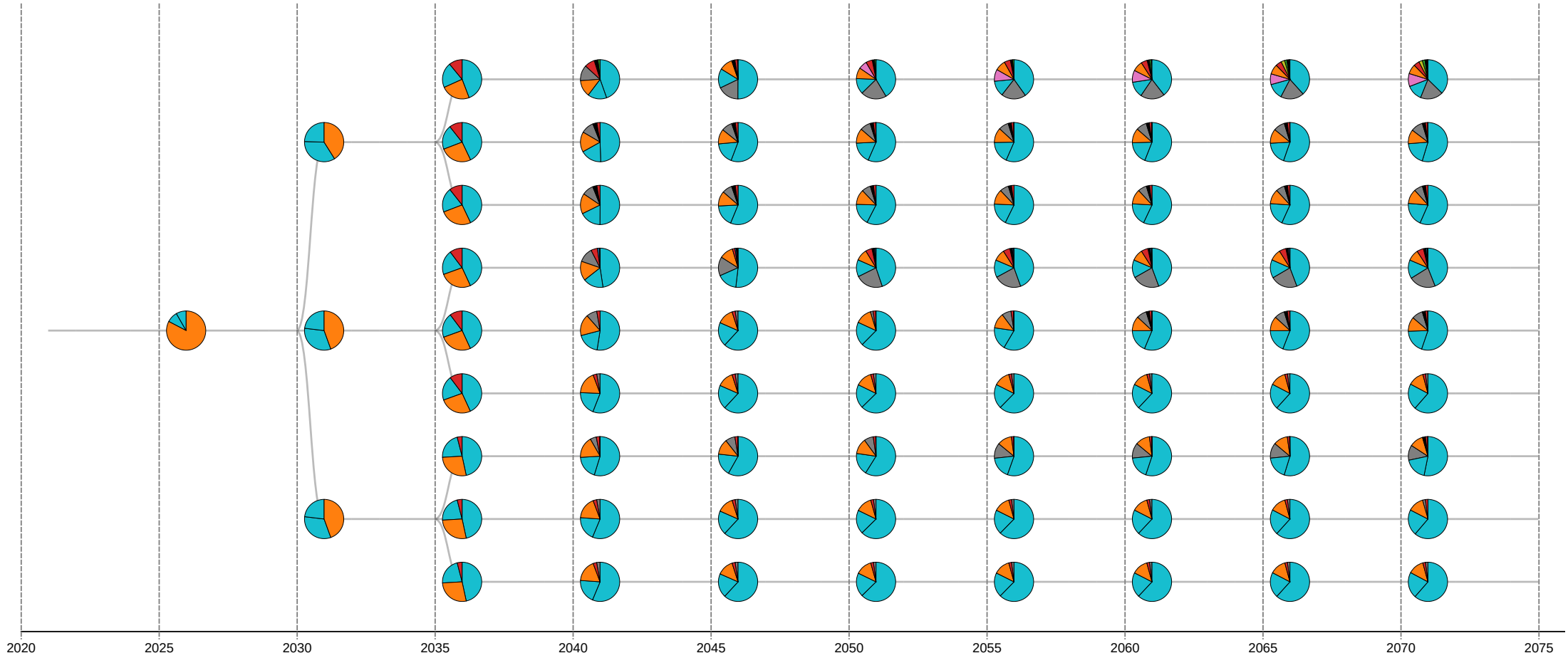
Option Selection (Thames Water)



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.



- Transfer
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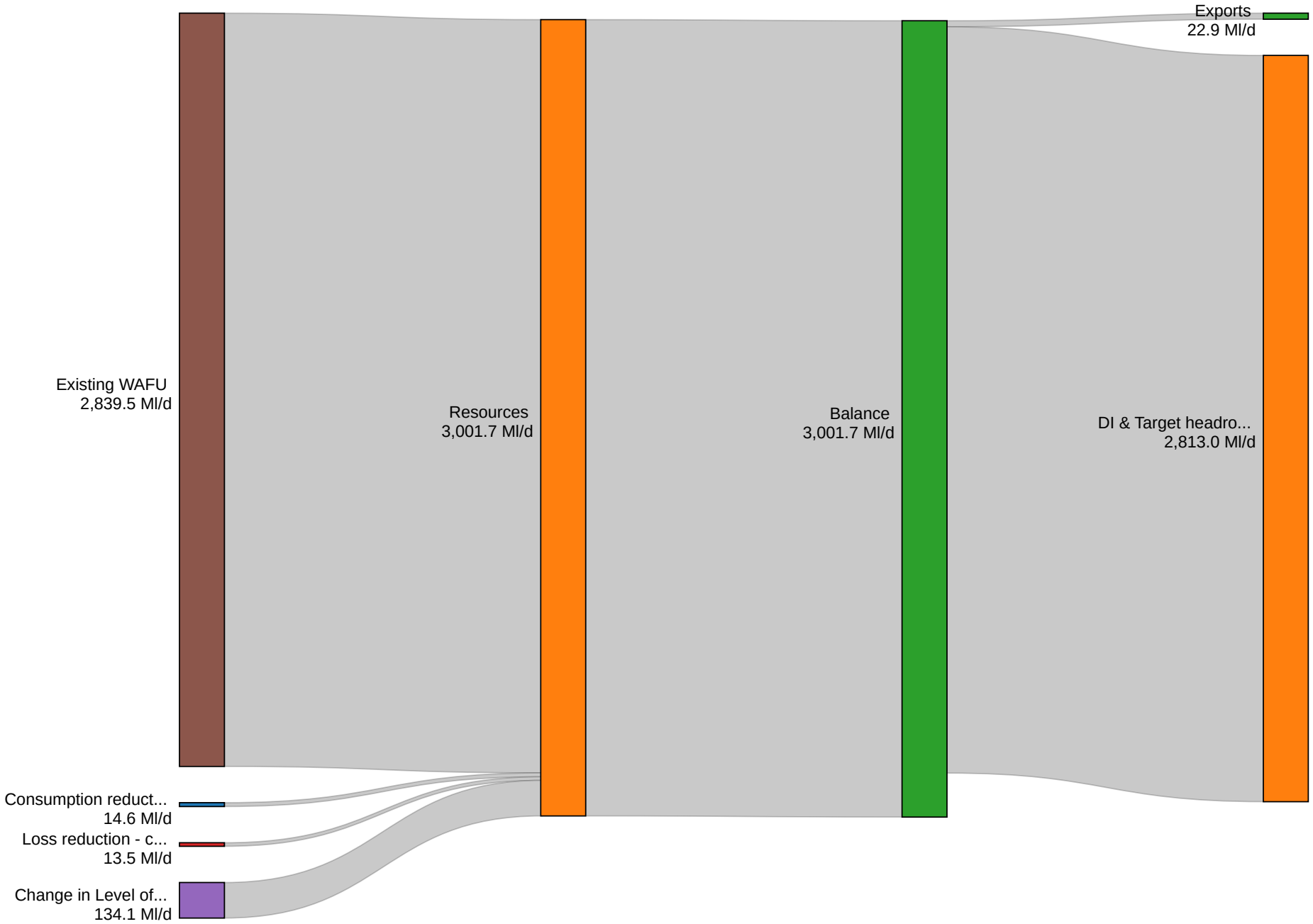
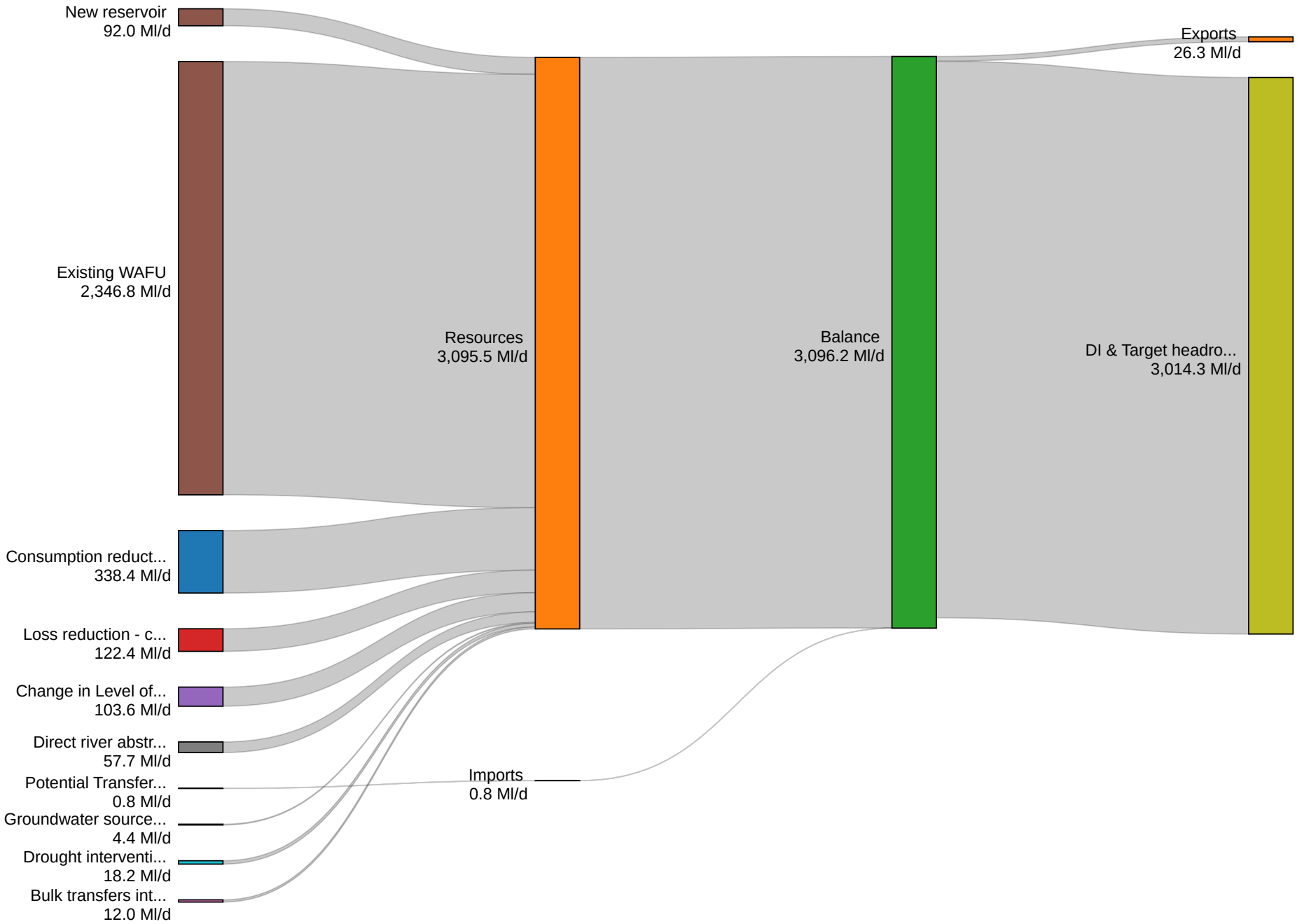
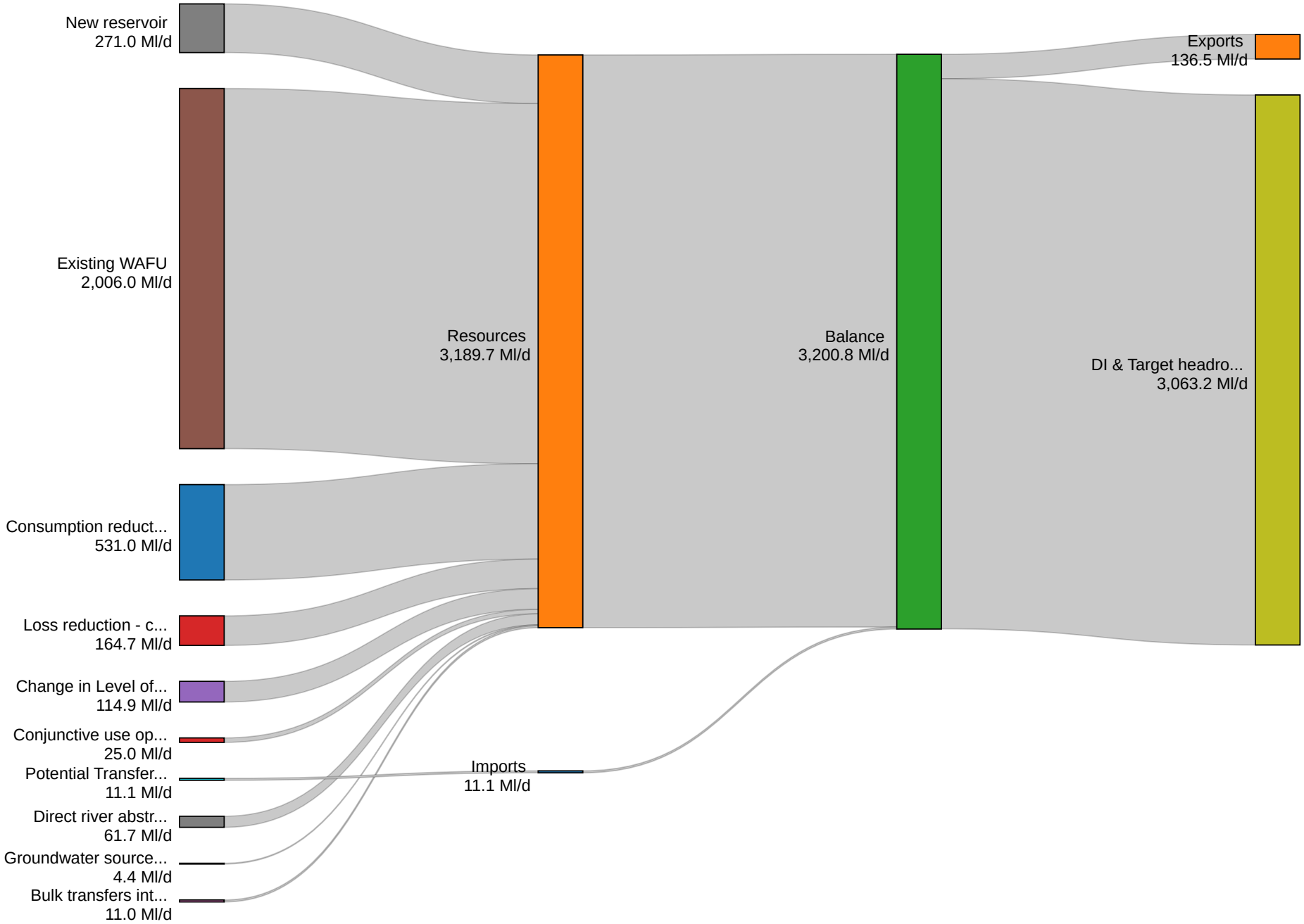
Situation 4 - 2026 (Thames Water)



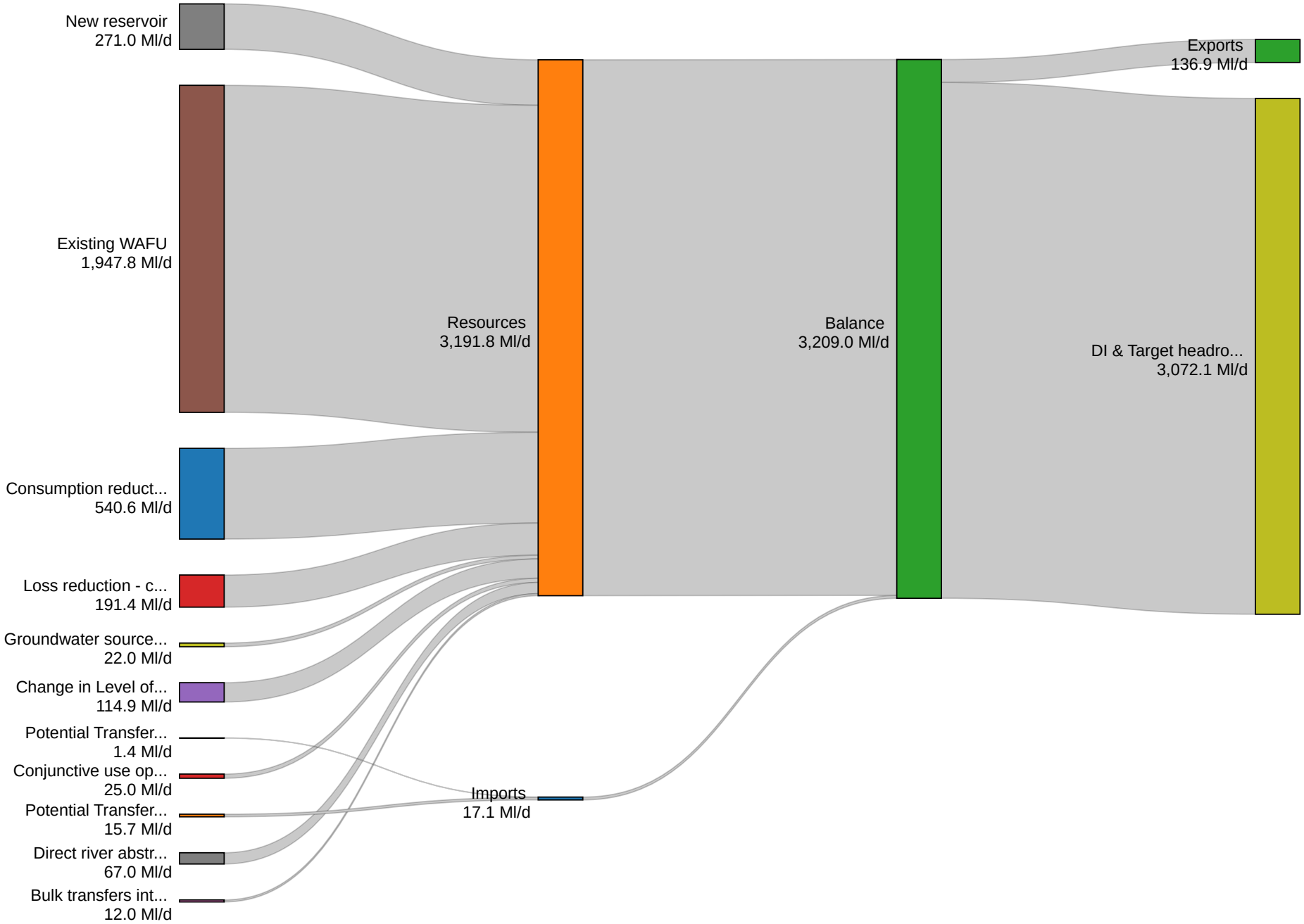
Situation 4 - 2040 (Thames Water)



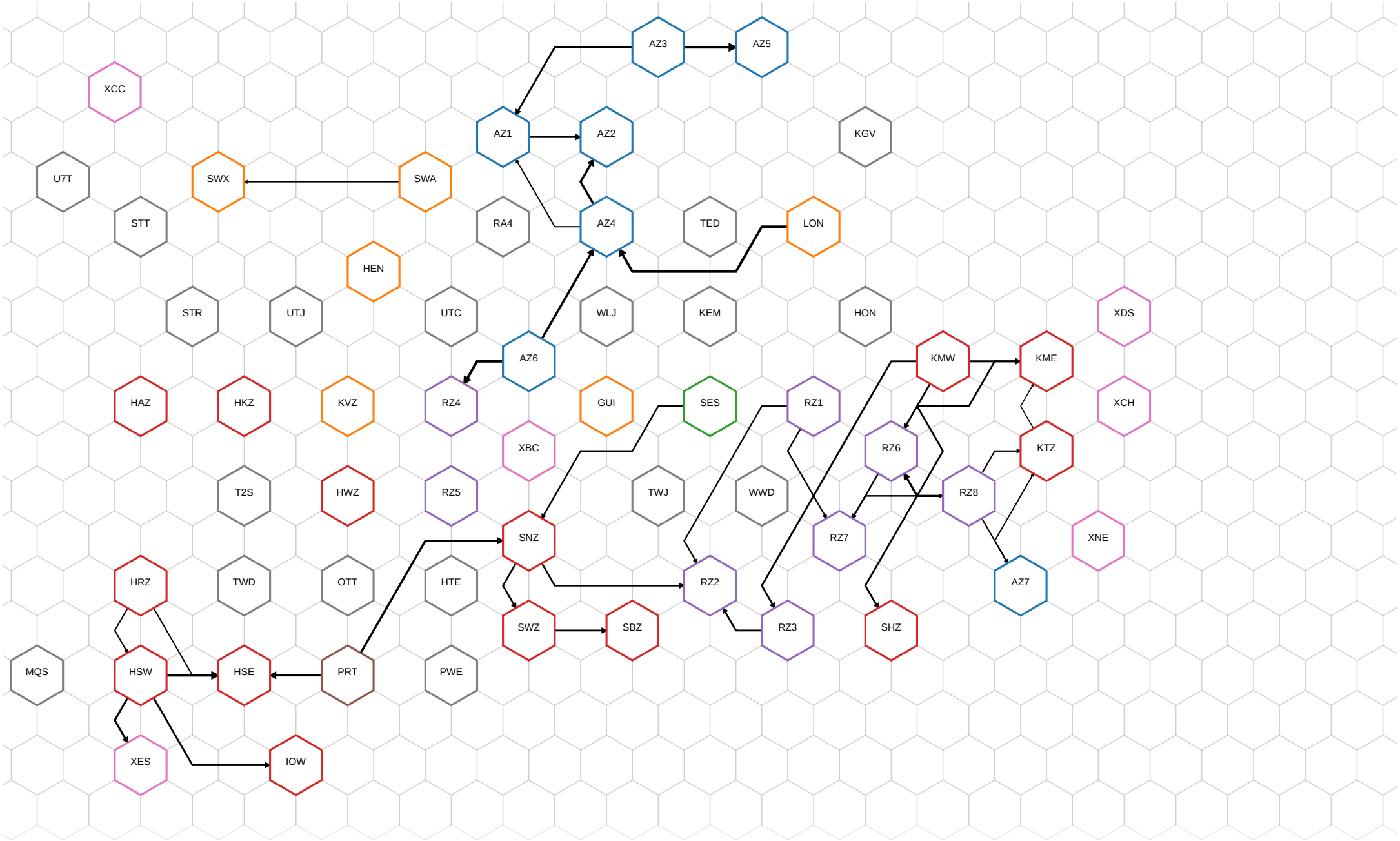
Situation 4 - 2050 (Thames Water)



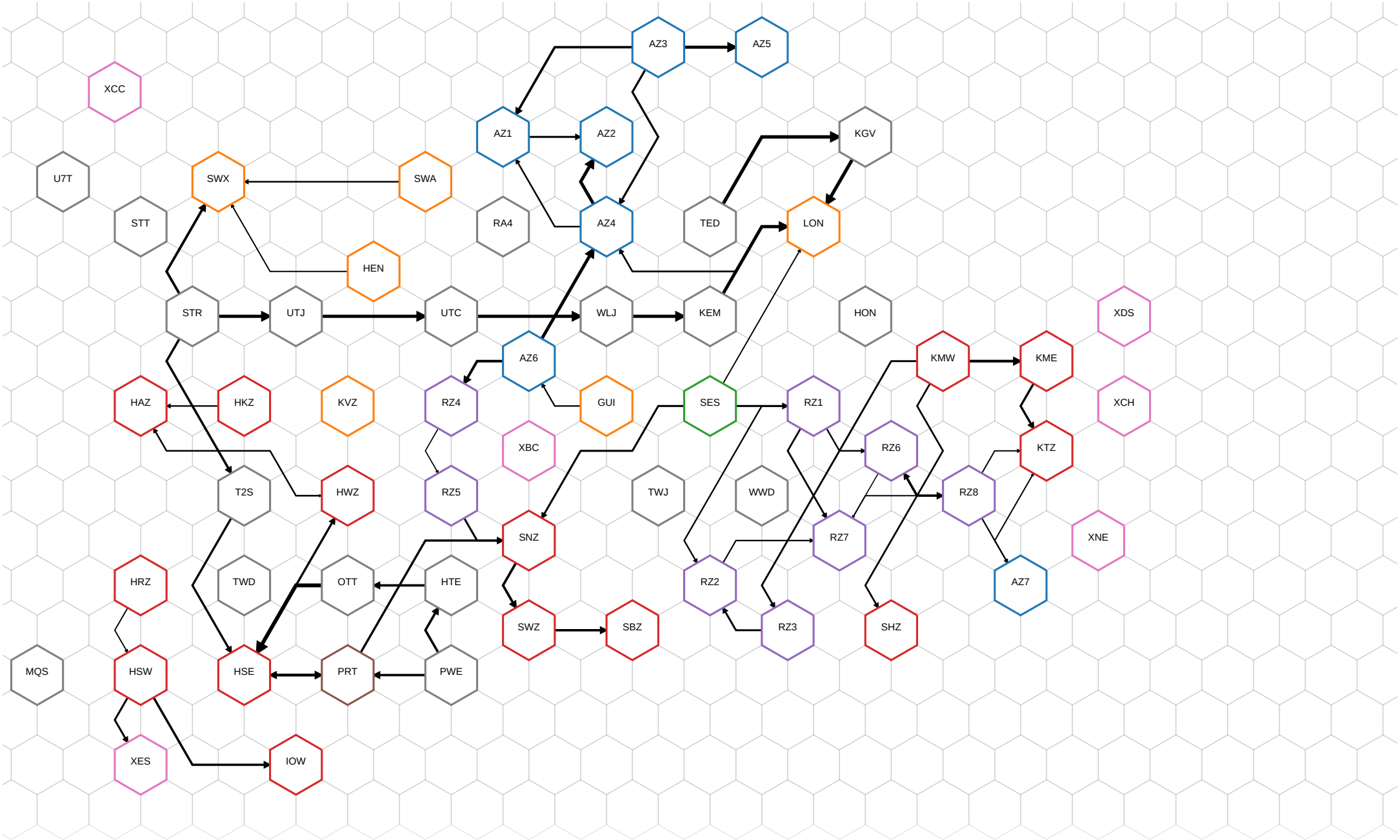
Situation 4 - 2075 (Thames Water)



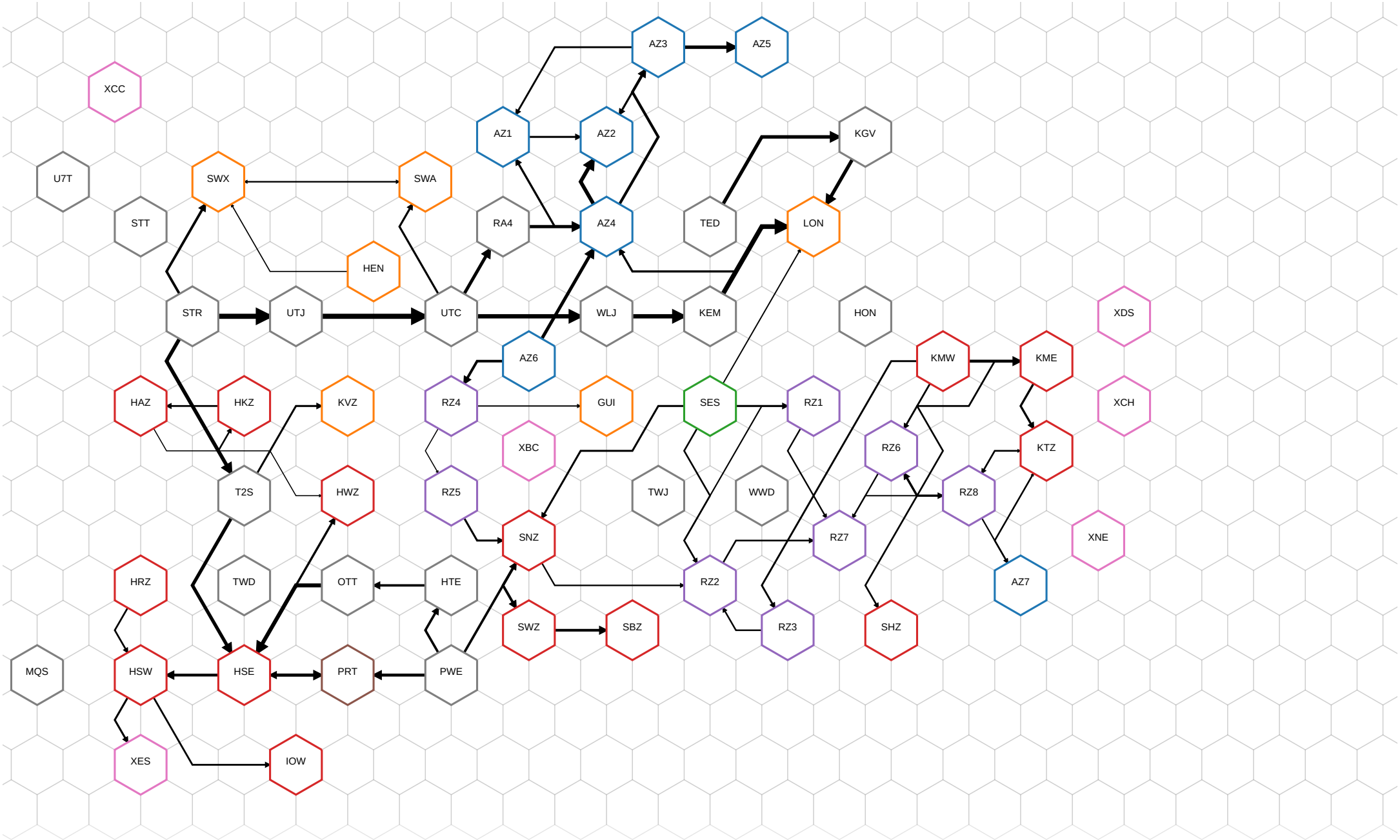
Situation 4 - 2026



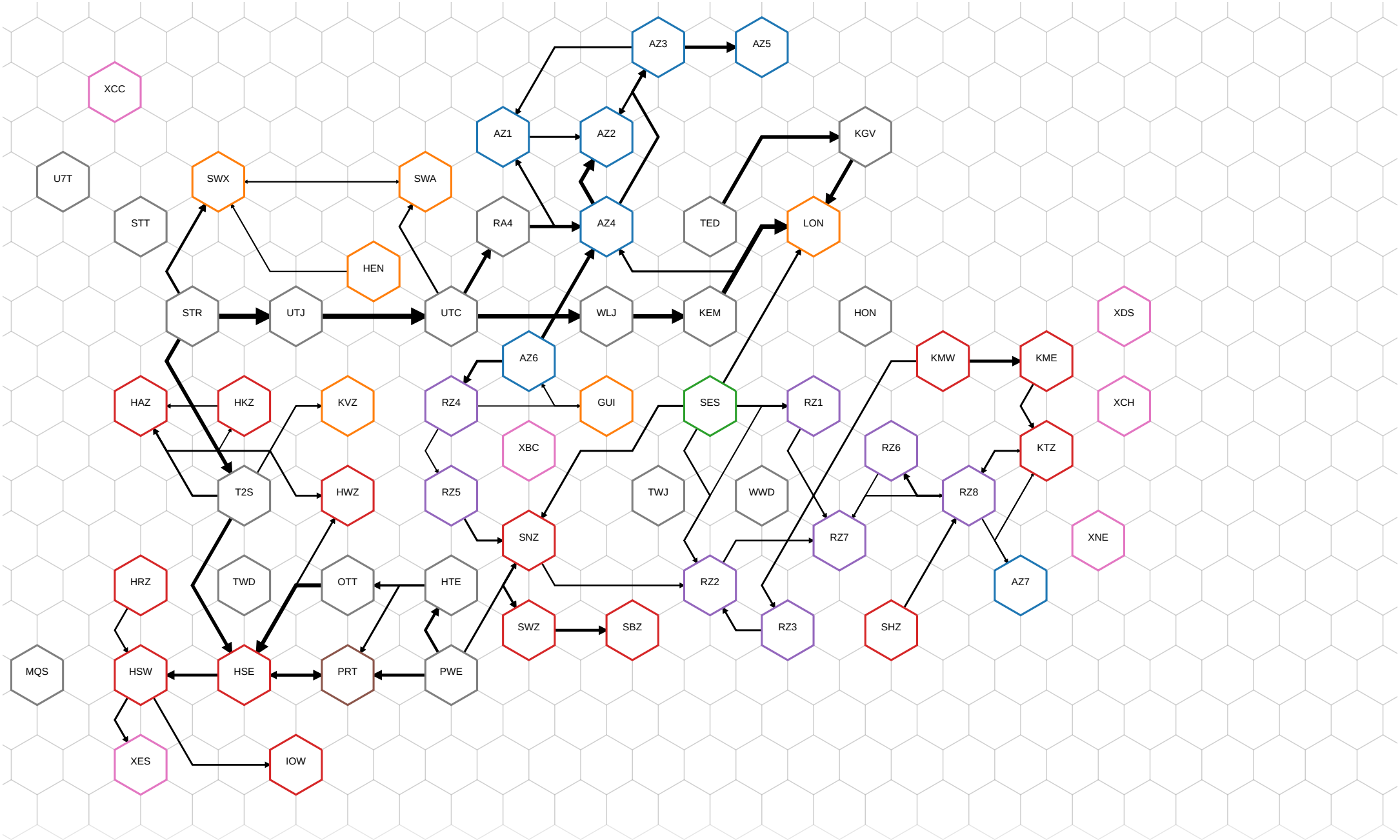
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

E&S + SESRO 125

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-only-guc100-only-sesro125-only-t2a50-2075-envsoc-07_50-v3
Description	Resilience run with hybrid-c+2 government interventions including only GUC 100 Ml/d, SESRO 125 Mm3 and 50 Ml/d T2A transfer. Constrained to 7.5% improvement in worst BVP metrics from "st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-only-sesro150-2075".
Created at	24/07/2023, 10:07:19
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2-only-guc100-only-sesro125-only-t2a50
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets. Exclude all GUC variants except 100. Exclude all SESRO variants except 125. Excludes T2A 100 Ml/d transfer (i.e. only 50 Ml/d).
Optimised discount rate	STPR

Metrics

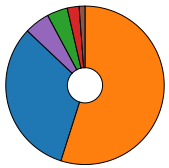
Net present value (Cost)

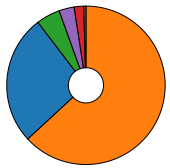
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	20,874	17,823	17,092	19,357	17,762	16,929	18,072	17,214	16,490	(£m)
Cost w/o deficit (STPR)	20,874	17,823	17,092	19,357	17,762	16,929	18,072	17,214	16,490	(£m)
Cost w/ deficit (IGEQ)	31,900	26,133	24,819	29,036	26,040	24,548	26,688	25,079	23,772	(£m)
Cost w/o deficit (IGEQ)	31,900	26,133	24,819	29,036	26,040	24,548	26,688	25,079	23,772	(£m)
Cost w/ deficit (LTDR)	23,008	19,460	18,621	21,245	19,393	18,437	19,763	18,768	17,935	(£m)
Cost w/o deficit (LTDR)	23,008	19,460	18,621	21,245	19,393	18,437	19,763	18,768	17,935	(£m)

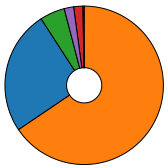
Cost breakdown (STPR)

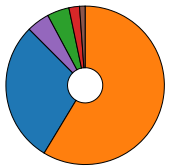
Select Company: Total

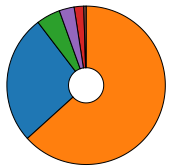
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	6,710	4,725	4,331	5,589	4,677	4,187	4,822	4,378	3,928	(£m)
Fixed opex	11,460	11,250	11,201	11,353	11,242	11,186	11,254	11,201	11,142	(£m)
Fixed operational carbon	882	869	868	877	869	869	871	866	866	(£m)
Embedded carbon	505	349	324	419	348	317	365	327	299	(£m)
Variable opex	1,070	549	328	901	541	321	657	401	237	(£m)
Variable carbon opex	247	81	40	218	84	50	102	41	18	(£m)

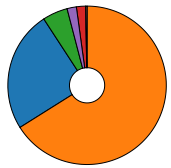
situation1 

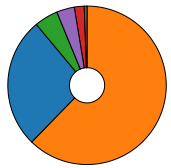
situation2 

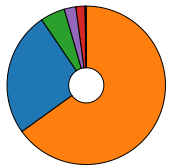
situation3 

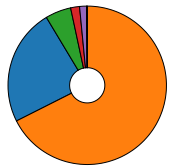
situation4 

situation5 

situation6 

situation7 

situation8 

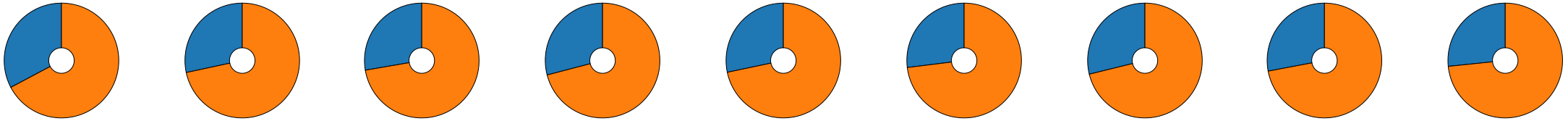
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,243,577	2,132,351	1,968,928	2,624,079	2,134,813	1,920,726	2,258,701	1,991,846	1,807,758	(tonnes)
Operational emissions	6,659,090	5,385,619	5,135,836	6,405,104	5,409,152	5,204,742	5,573,860	5,128,607	4,980,417	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

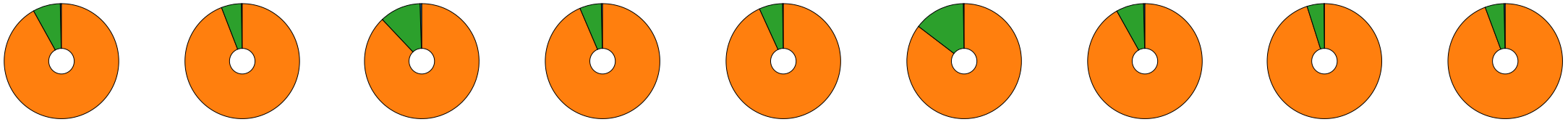


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	85	32	25	75	26	11	57	12	11	(GWh)
Grid	22,846	11,364	4,288	19,294	10,782	3,836	13,207	8,075	2,916	(GWh)
Renewable	1,923	680	565	1,255	765	648	1,115	404	165	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	65,339.00	65,338.00	65,338.00	68,499.00	65,338.00	65,338.00	66,000.00	65,344.00	65,338.00	
SEA environmental disbenefit	105,000.00	79,027.00	72,961.00	100,368.00	77,199.00	71,243.00	82,439.00	69,834.00	62,656.00	
Natural capital	83,835,542.88	81,616,396.29	81,908,760.45	81,460,112.05	81,621,202.77	81,908,239.81	81,278,392.35	81,916,515.81	82,352,035.42	
Bio-diversity net gain	−199,196.00	−140,381.00	−118,110.00	−187,095.00	−139,264.00	−109,641.00	−142,348.00	−121,885.00	−90,133.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	36,352.00	35,079.00	34,808.00	36,566.00	35,136.00	34,772.00	35,339.00	34,608.00	34,319.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	28.78	28.81	31.52	28.10	29.09	31.75	30.35	33.65	37.48	
R1: Uncertainty of option supply/demand benefit	6.07	5.35	5.82	5.62	5.44	5.89	5.77	6.29	6.98	
R3: Risk of service failure due to other physical hazards	6.89	7.13	7.98	6.82	7.21	8.04	7.48	8.49	9.69	
R4: Availability of additional headroom	6.55	6.89	7.10	6.64	6.92	7.13	7.24	7.60	7.84	
R5: Catchment/raw water quality risks (incl. climate change)	4.02	4.01	4.54	3.75	4.03	4.56	4.17	4.81	5.56	
R6: Capacity of catchment services	0.01	0.01	0.01	0.01	0.00	0.01	0.00	0.01	0.01	
R7: Risk of service failure to other exceptional events	5.24	5.42	6.08	5.27	5.47	6.13	5.69	6.46	7.40	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

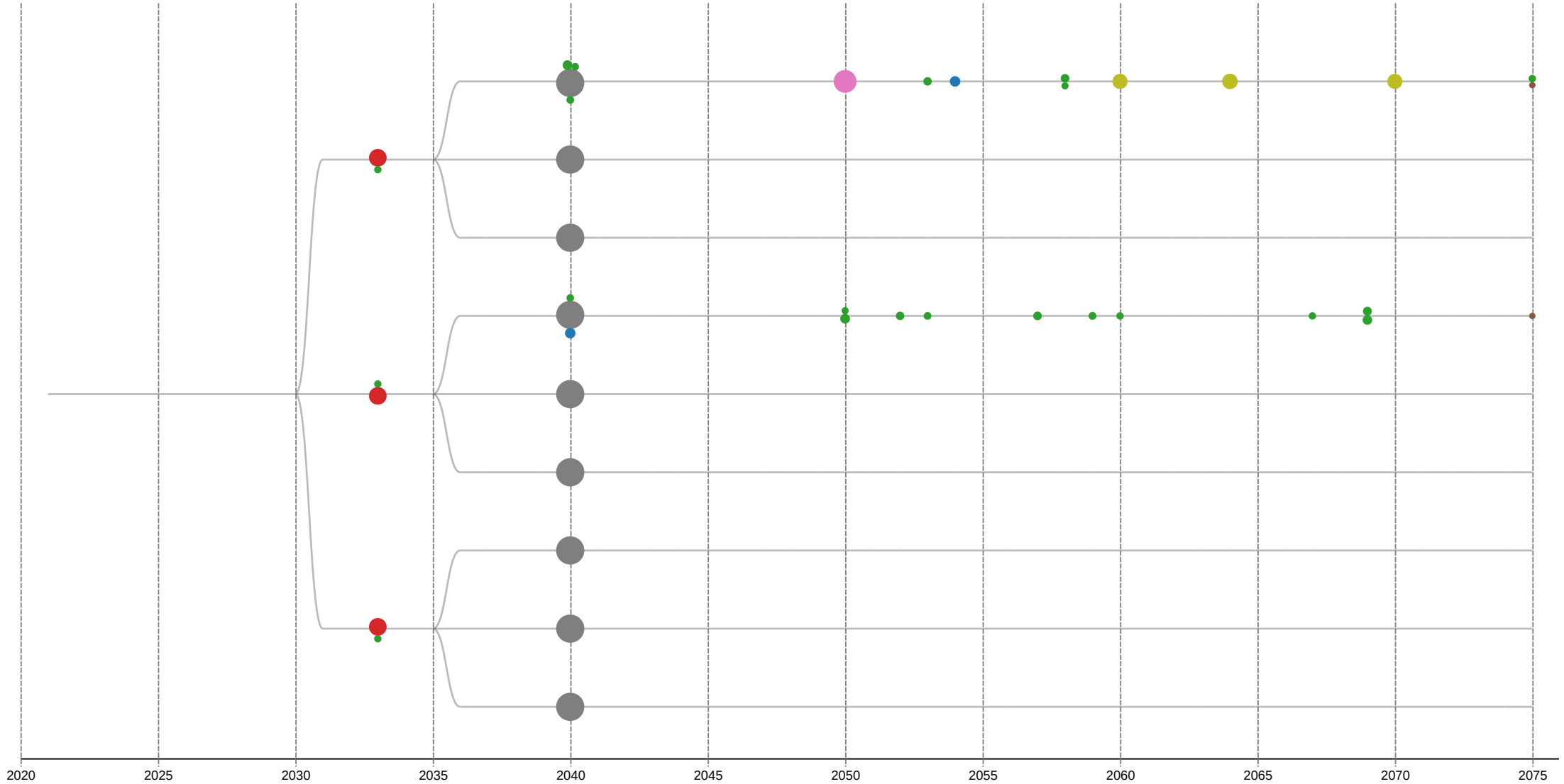
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	13.86	15.40	17.23	14.02	15.48	17.07	15.97	18.19	20.71	
A3: Operational complexity and flexibility	6.40	6.85	7.70	6.52	6.93	7.78	7.16	8.22	9.44	
A4: WRZ connectivity	7.43	8.52	9.50	7.46	8.52	9.26	8.78	9.94	11.23	
A7: Customer relations support engagement with demand management	0.04	0.03	0.03	0.04	0.03	0.03	0.03	0.03	0.03	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.20	19.70	21.86	18.80	19.93	22.00	20.60	23.37	26.50	
E1: Scaleability and modularity of proposed changes	8.82	9.28	10.34	8.72	9.41	10.46	9.65	11.07	12.61	
E2: Intervention lead times	4.14	4.03	4.41	3.93	4.06	4.37	4.28	4.71	5.24	
E3: Reliance on external bodies to deliver changes	6.22	6.37	7.10	6.14	6.45	7.17	6.67	7.59	8.65	
E5: Collaborative land management	0.02	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	

Option Selection (Thames Water)



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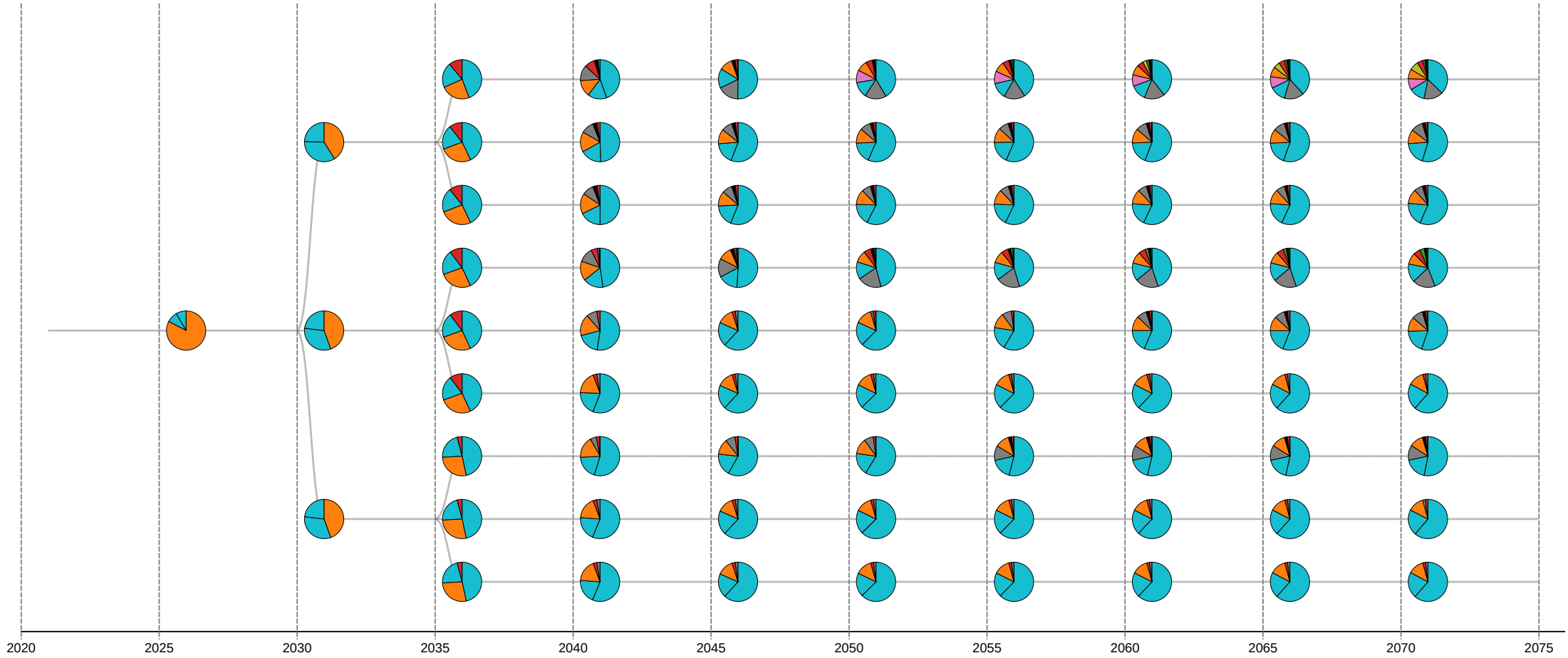
Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.



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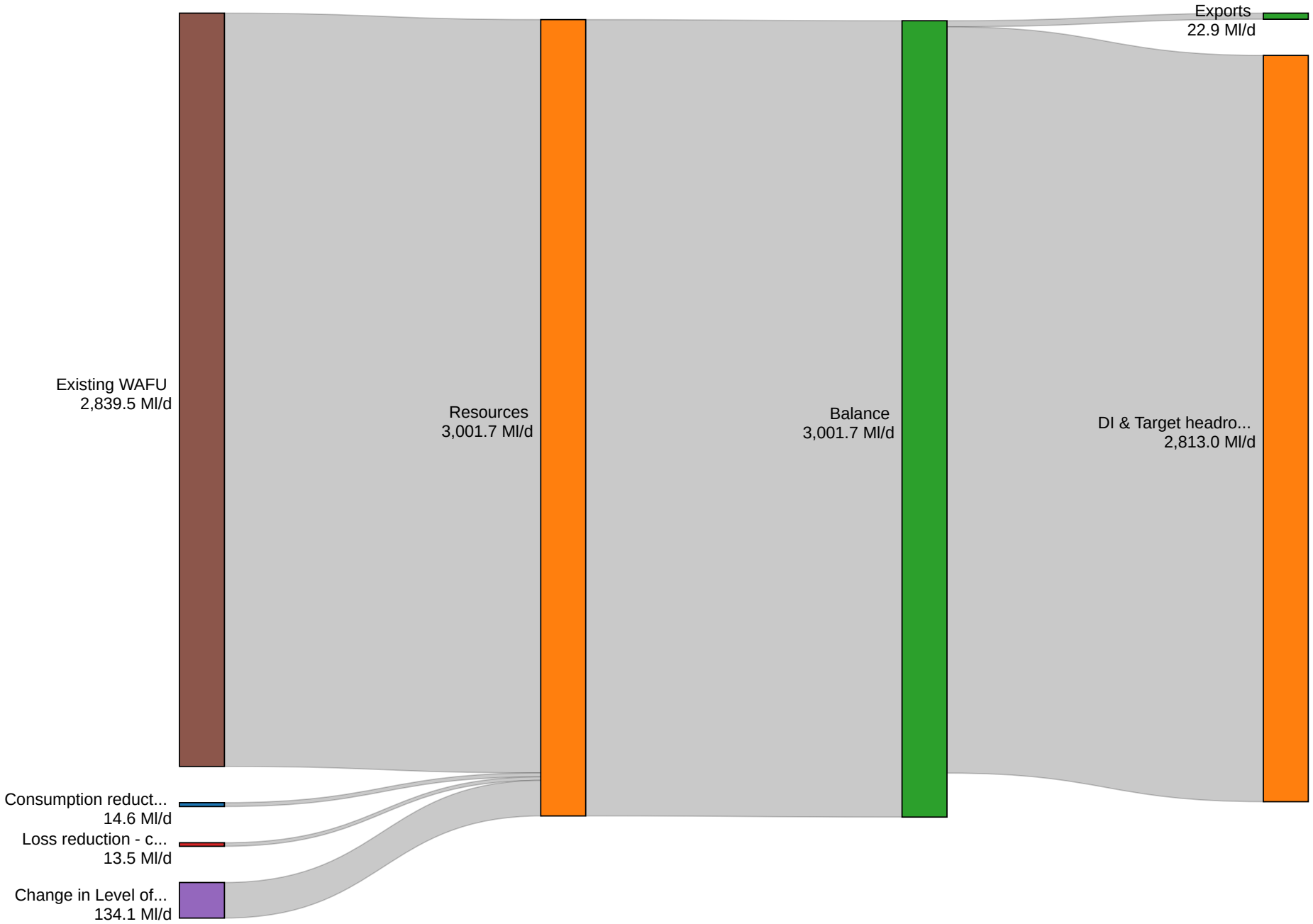
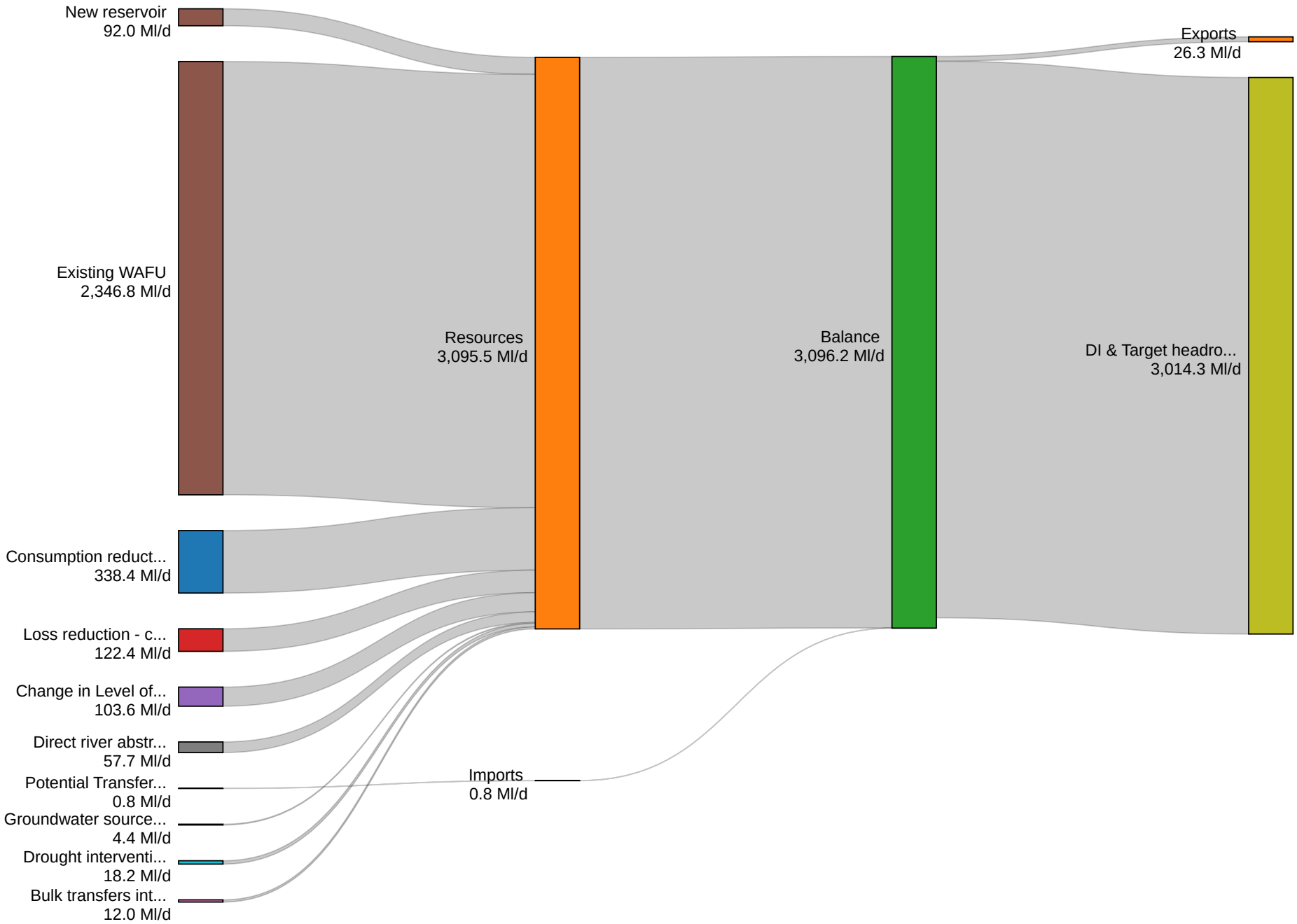
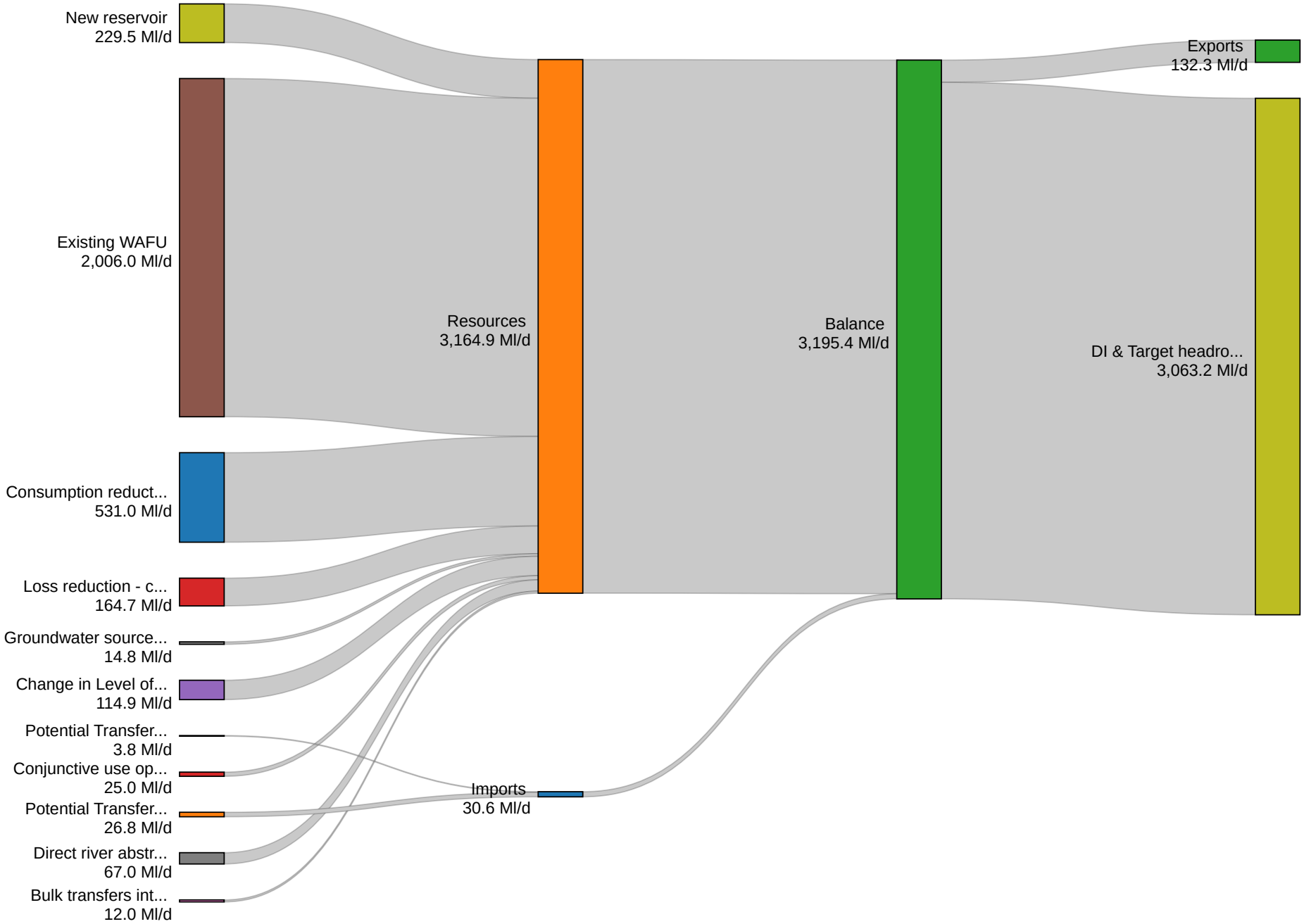
Situation 4 - 2026 (Thames Water)



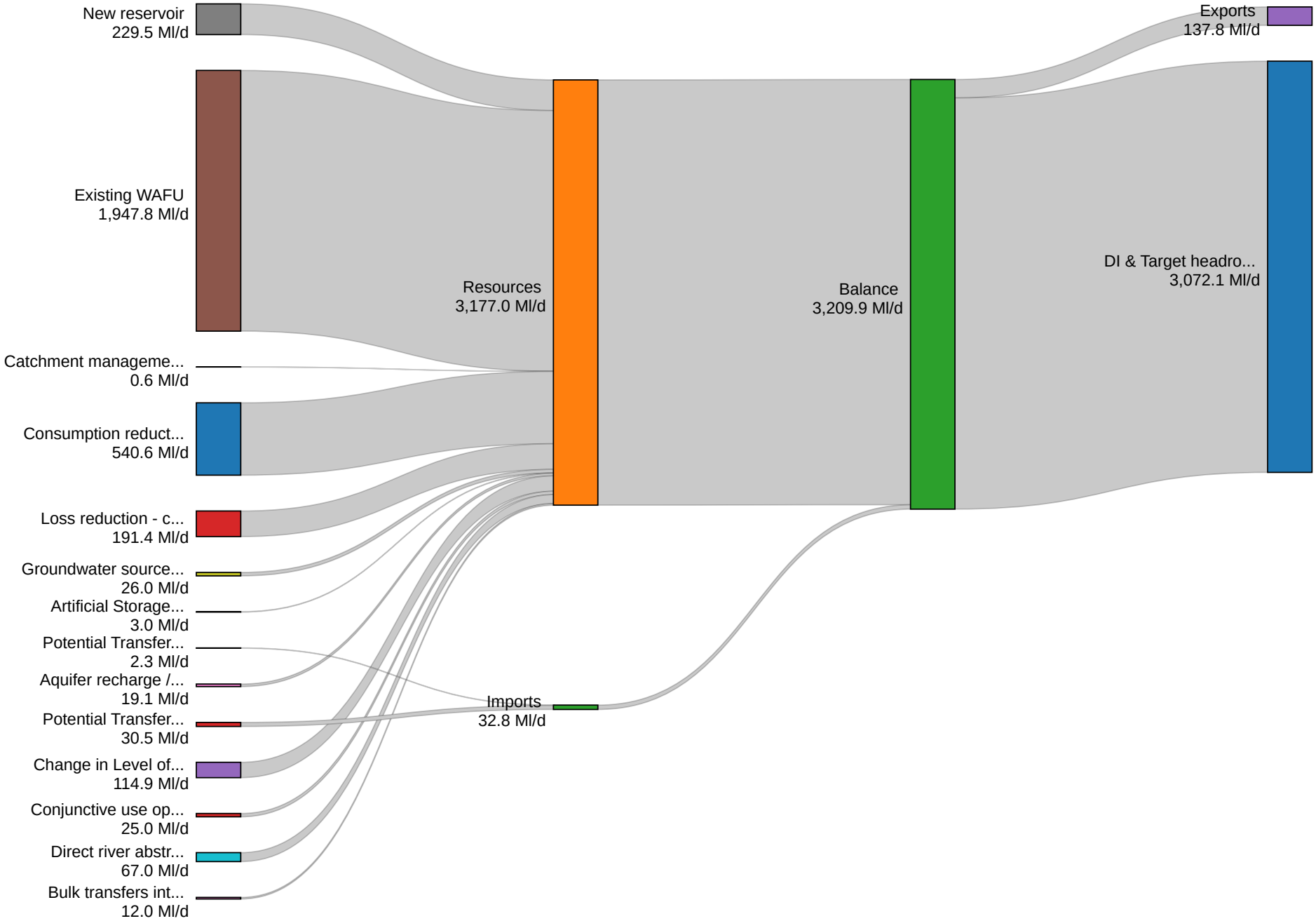
Situation 4 - 2040 (Thames Water)



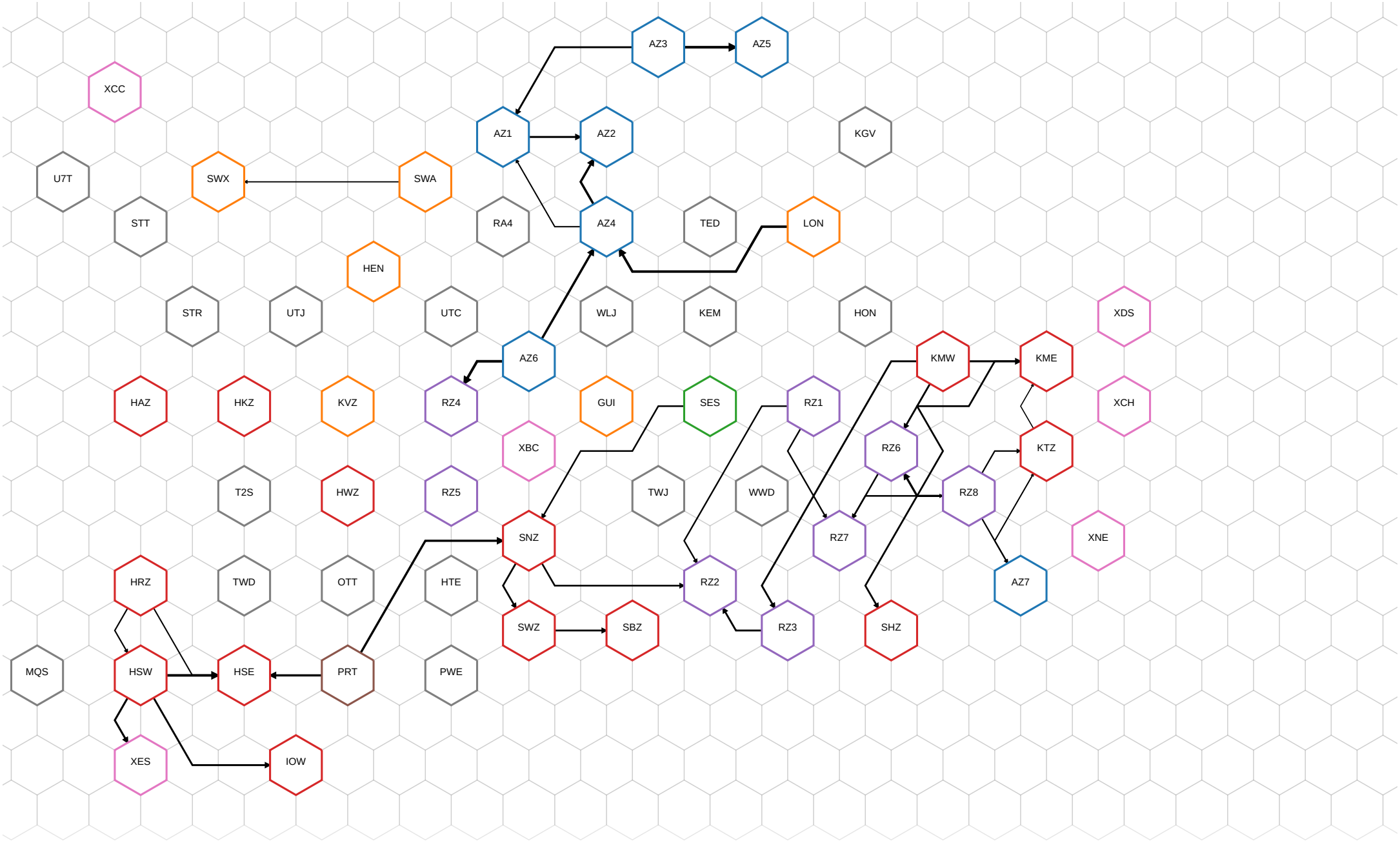
Situation 4 - 2050 (Thames Water)



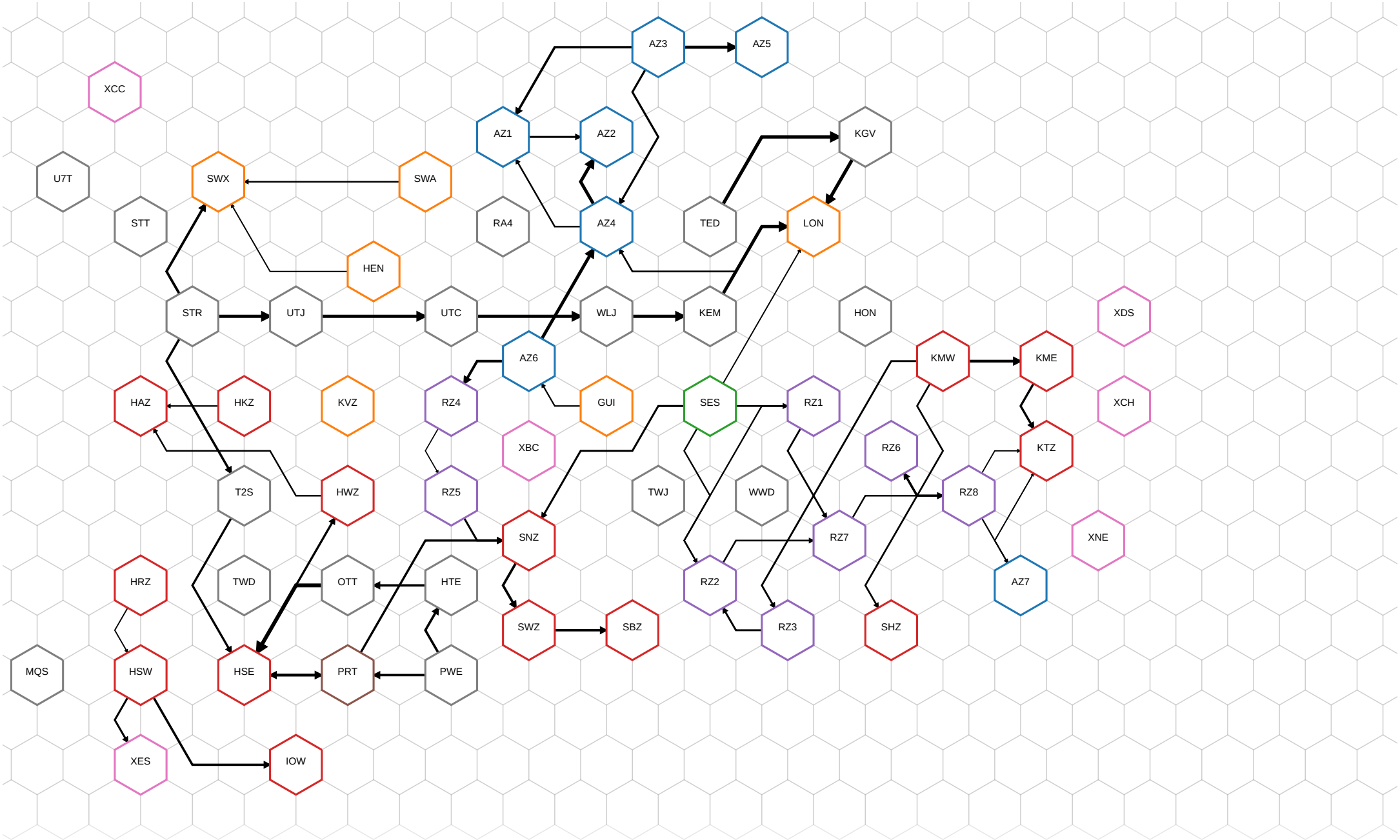
Situation 4 - 2075 (Thames Water)



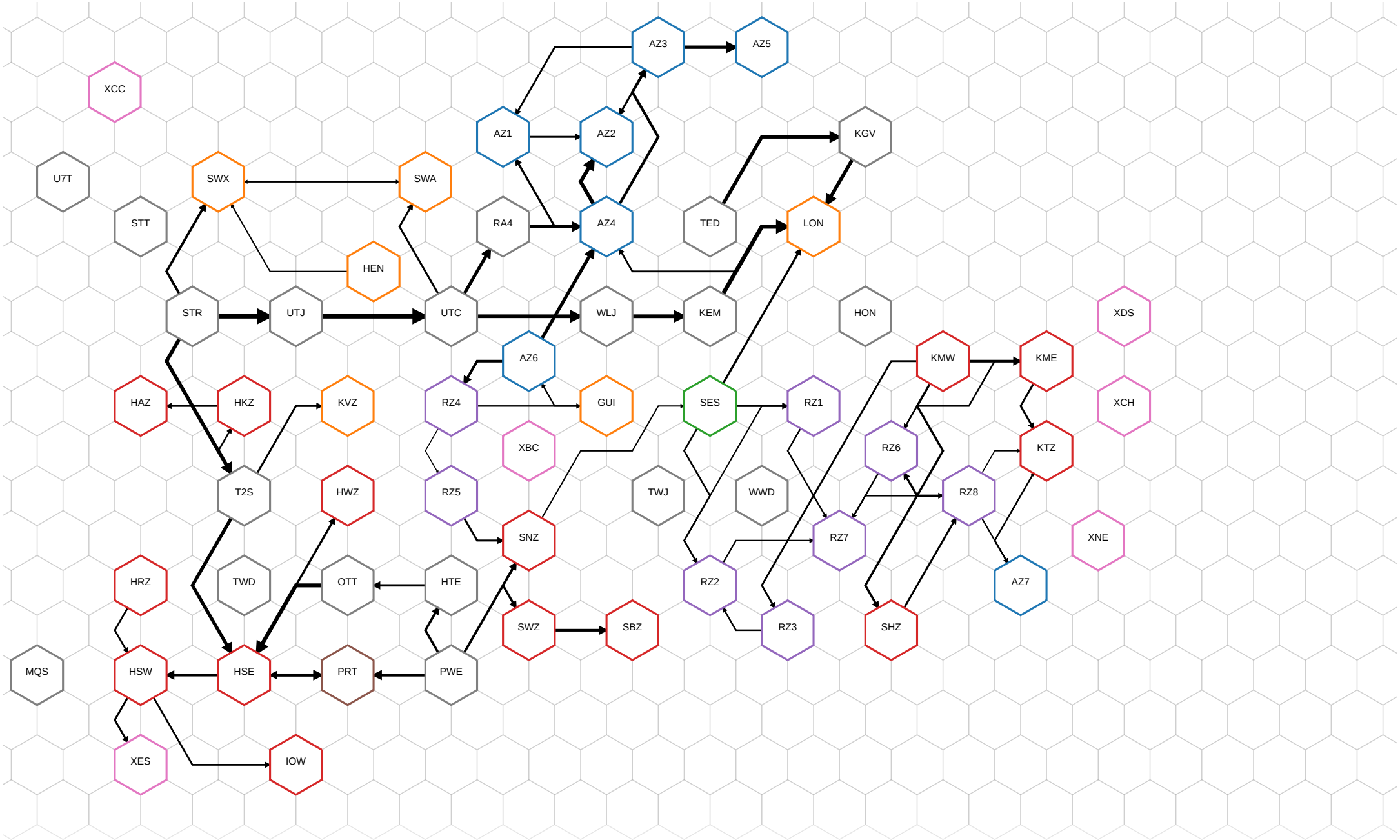
Situation 4 - 2026



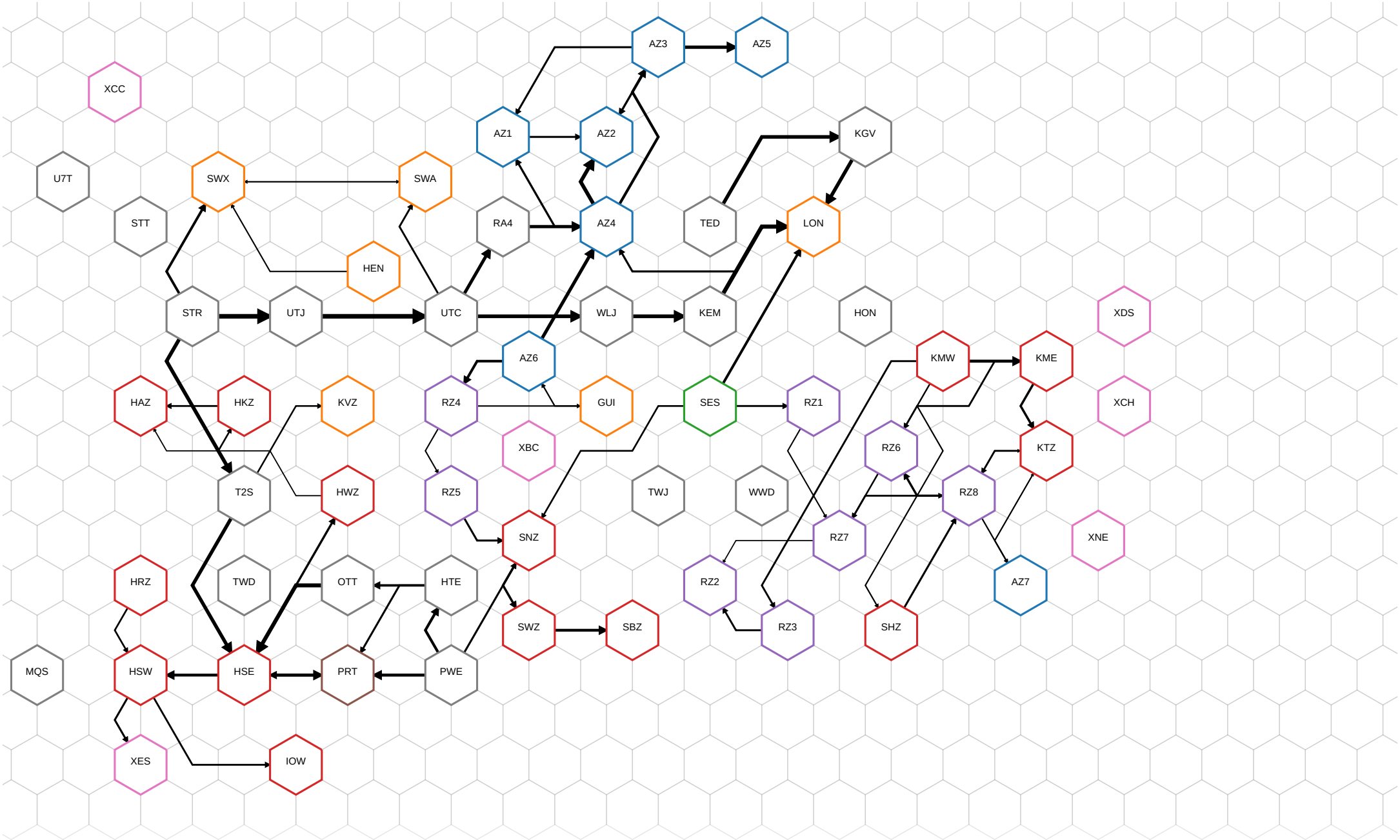
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

E&S + SESRO 100

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-only-guc100-only-sesro100-only-t2a50-2075-envsoc-07_50-v3
Description	Environmental-social run with hybrid-c+2 government interventions including only GUC 100 Ml/d, SESRO 100 Mm3 and 50 Ml/d T2A transfer. Constrained to 7.5% improvement in worst BVP metrics from "st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-only-sesro150-2075".
Created at	24/07/2023, 10:06:42
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2-only-guc100-only-sesro100-only-t2a50
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets. Exclude all GUC variants except 100. Exclude all SESRO variants except 100. Excludes T2A 100 Ml/d transfer (i.e. only 50 Ml/d).
Optimised discount rate	STPR

Metrics

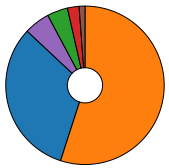
Net present value (Cost)

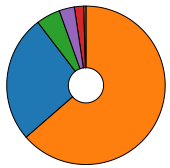
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	20,864	17,687	16,959	19,420	17,595	16,786	17,935	17,076	16,354	(£m)
Cost w/o deficit (STPR)	20,864	17,687	16,959	19,420	17,595	16,786	17,935	17,076	16,354	(£m)
Cost w/ deficit (IGEQ)	31,946	25,940	24,619	29,212	25,783	24,338	26,493	24,880	23,578	(£m)
Cost w/o deficit (IGEQ)	31,946	25,940	24,619	29,212	25,783	24,338	26,493	24,880	23,578	(£m)
Cost w/ deficit (LTDR)	23,007	19,313	18,475	21,328	19,209	18,281	19,615	18,617	17,788	(£m)
Cost w/o deficit (LTDR)	23,007	19,313	18,475	21,328	19,209	18,281	19,615	18,617	17,788	(£m)

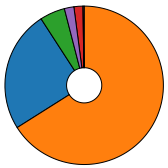
Cost breakdown (STPR)

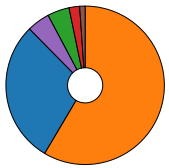
Select Company: Total

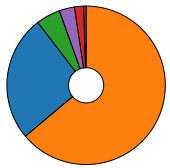
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	6,676	4,603	4,208	5,650	4,525	4,057	4,698	4,250	3,803	(£m)
Fixed opex	11,472	11,250	11,200	11,364	11,238	11,183	11,253	11,200	11,141	(£m)
Fixed operational carbon	884	869	870	873	870	869	872	867	866	(£m)
Embedded carbon	494	337	312	419	334	305	354	316	288	(£m)
Variable opex	1,090	547	328	899	544	322	657	401	238	(£m)
Variable carbon opex	248	81	41	215	85	50	101	41	18	(£m)

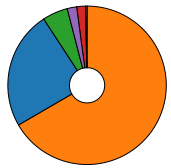
situation1 

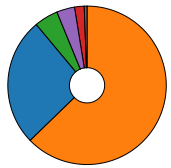
situation2 

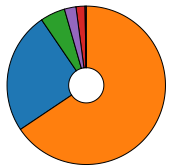
situation3 

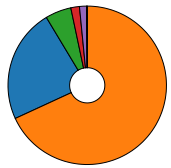
situation4 

situation5 

situation6 

situation7 

situation8 

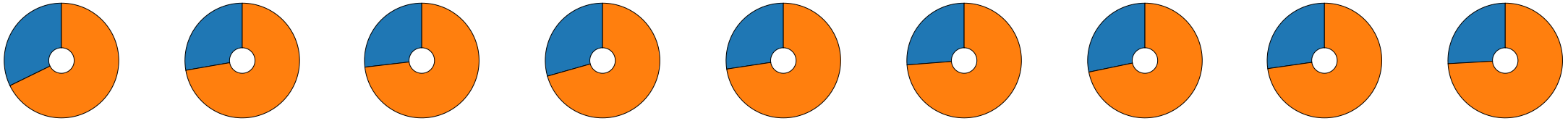
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,182,814	2,066,450	1,891,910	2,643,463	2,044,352	1,849,505	2,192,923	1,924,767	1,739,491	(tonnes)
Operational emissions	6,694,219	5,385,695	5,154,533	6,351,372	5,420,701	5,205,178	5,572,613	5,134,828	4,980,414	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

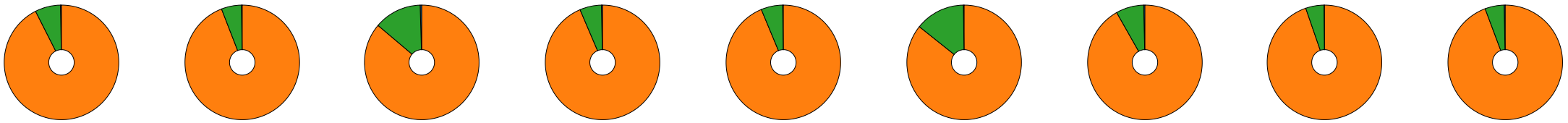


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	72	29	23	67	24	10	52	11	10	(GWh)
Grid	23,079	11,351	4,210	19,239	10,932	3,830	13,140	7,974	2,911	(GWh)
Renewable	1,791	682	654	1,254	708	629	1,123	434	167	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	65,431.00	65,340.00	65,338.00	68,366.00	65,338.00	65,338.00	66,202.00	65,341.00	65,338.00	
SEA environmental disbenefit	105,000.00	78,682.00	71,799.00	102,821.00	77,534.00	71,718.00	81,607.00	69,455.00	63,020.00	
Natural capital	84,678,170.78	80,975,500.48	82,723,781.46	80,973,682.61	81,986,303.37	82,766,846.92	82,090,032.34	82,841,247.44	83,081,120.43	
Bio-diversity net gain	−181,604.00	−128,800.00	−97,573.00	−182,790.00	−126,977.00	−98,367.00	−130,600.00	−103,195.00	−77,522.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	36,254.00	35,009.00	34,801.00	36,675.00	35,129.00	34,809.00	35,297.00	34,584.00	34,371.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	28.05	27.95	30.66	27.11	28.13	30.76	29.48	32.63	36.28	
R1: Uncertainty of option supply/demand benefit	5.90	5.17	5.69	5.31	5.22	5.69	5.60	6.08	6.73	
R3: Risk of service failure due to other physical hazards	6.67	6.89	7.74	6.53	6.95	7.77	7.24	8.21	9.37	
R4: Availability of additional headroom	6.51	6.83	7.04	6.59	6.86	7.07	7.17	7.53	7.77	
R5: Catchment/raw water quality risks (incl. climate change)	3.98	3.85	4.35	3.72	3.88	4.38	4.01	4.62	5.34	
R6: Capacity of catchment services	0.01	0.01	0.01	0.01	0.01	0.01	0.00	0.01	0.01	
R7: Risk of service failure to other exceptional events	4.98	5.19	5.83	4.94	5.23	5.86	5.46	6.18	7.07	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

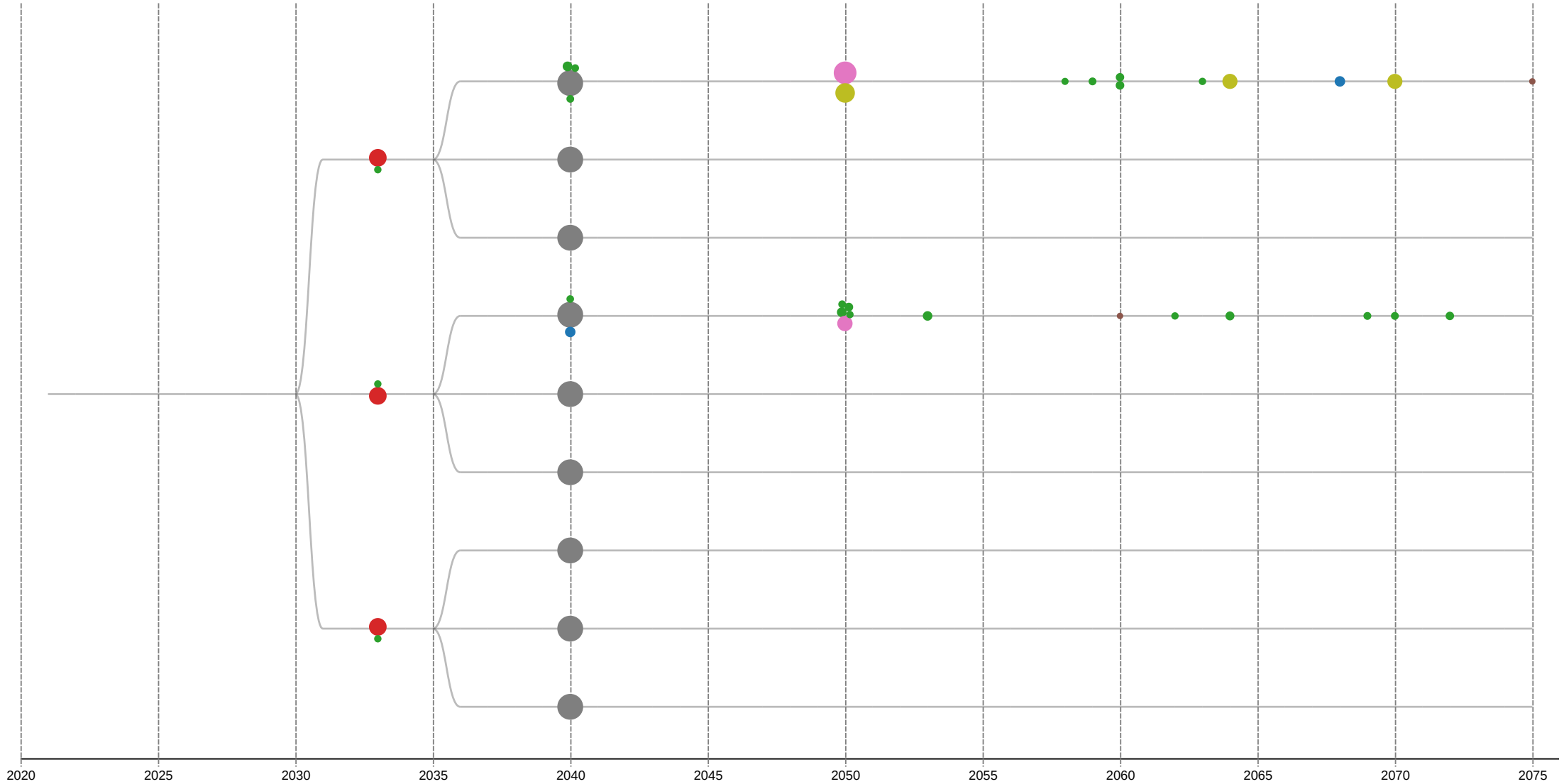
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	13.63	15.21	16.95	13.72	15.24	16.80	15.73	17.91	20.39	
A3: Operational complexity and flexibility	6.15	6.62	7.45	6.19	6.68	7.51	6.93	7.93	9.11	
A4: WRZ connectivity	7.44	8.56	9.47	7.50	8.54	9.26	8.78	9.94	11.23	
A7: Customer relations support engagement with demand management	0.04	0.03	0.03	0.04	0.03	0.03	0.03	0.03	0.05	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.23	19.73	21.98	18.68	19.91	22.04	20.64	23.43	26.55	
E1: Scaleability and modularity of proposed changes	8.96	9.44	10.56	8.80	9.53	10.63	9.81	11.26	12.83	
E2: Intervention lead times	4.12	3.97	4.35	3.88	4.00	4.30	4.22	4.64	5.15	
E3: Reliance on external bodies to deliver changes	6.14	6.32	7.06	5.99	6.37	7.10	6.61	7.52	8.56	
E5: Collaborative land management	0.02	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	

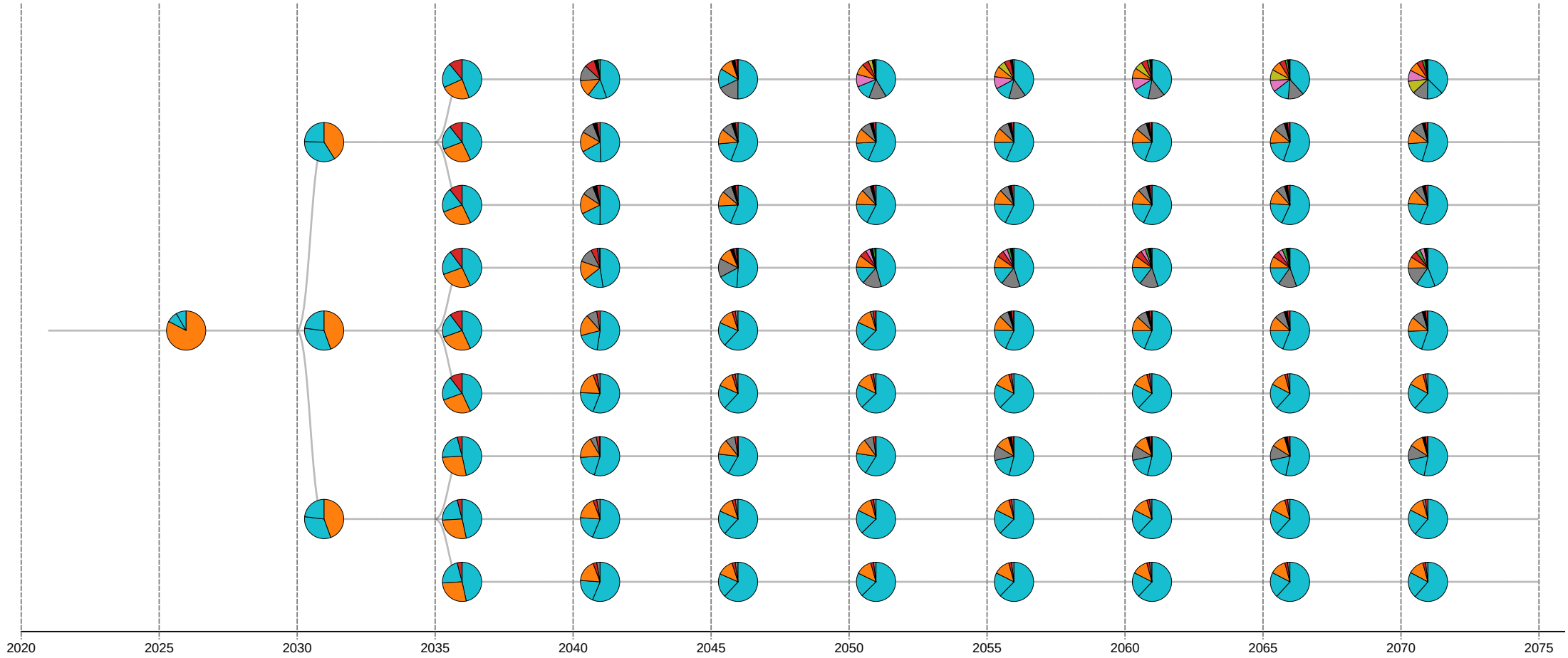
Option Selection (Thames Water)



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

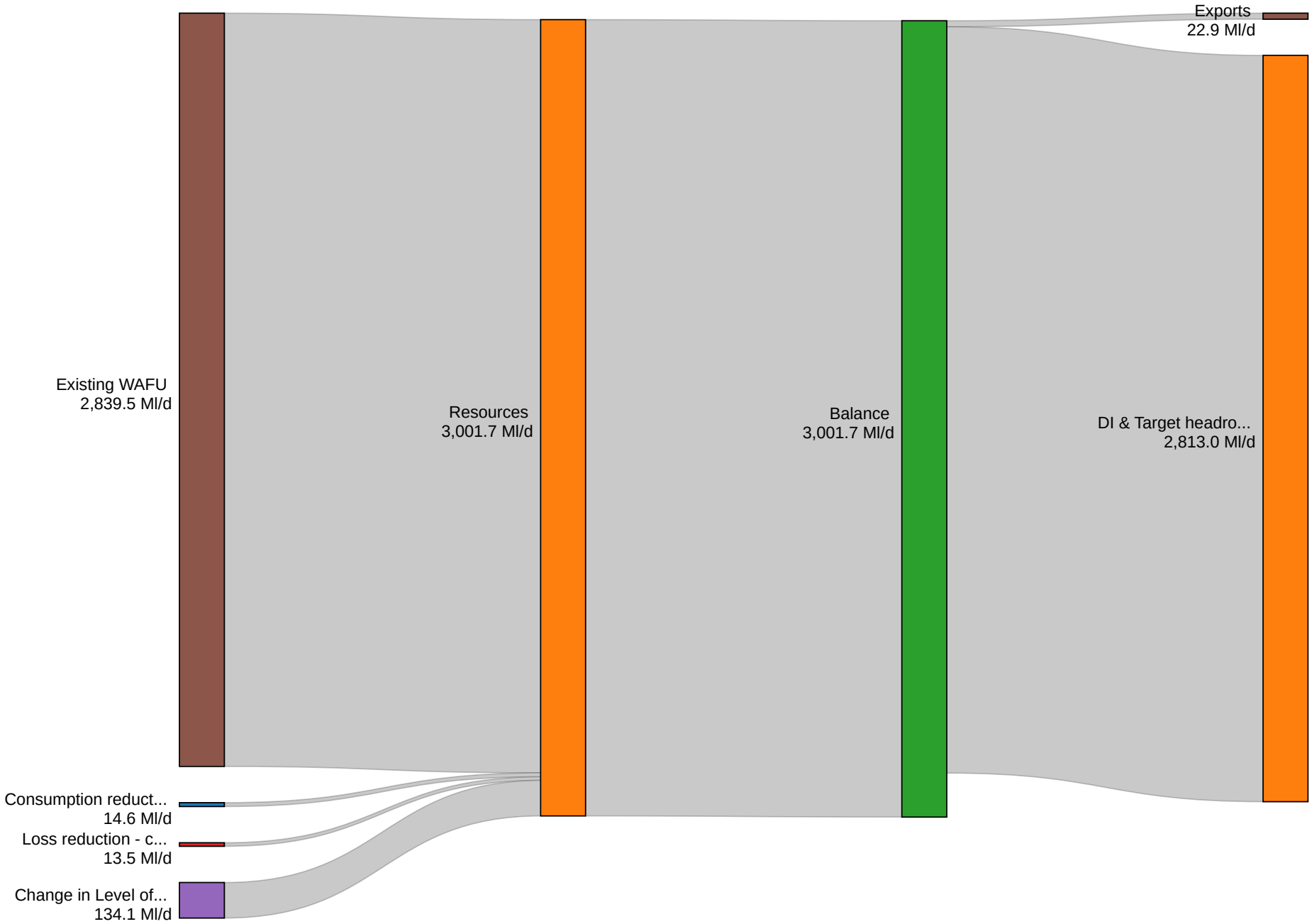
Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.

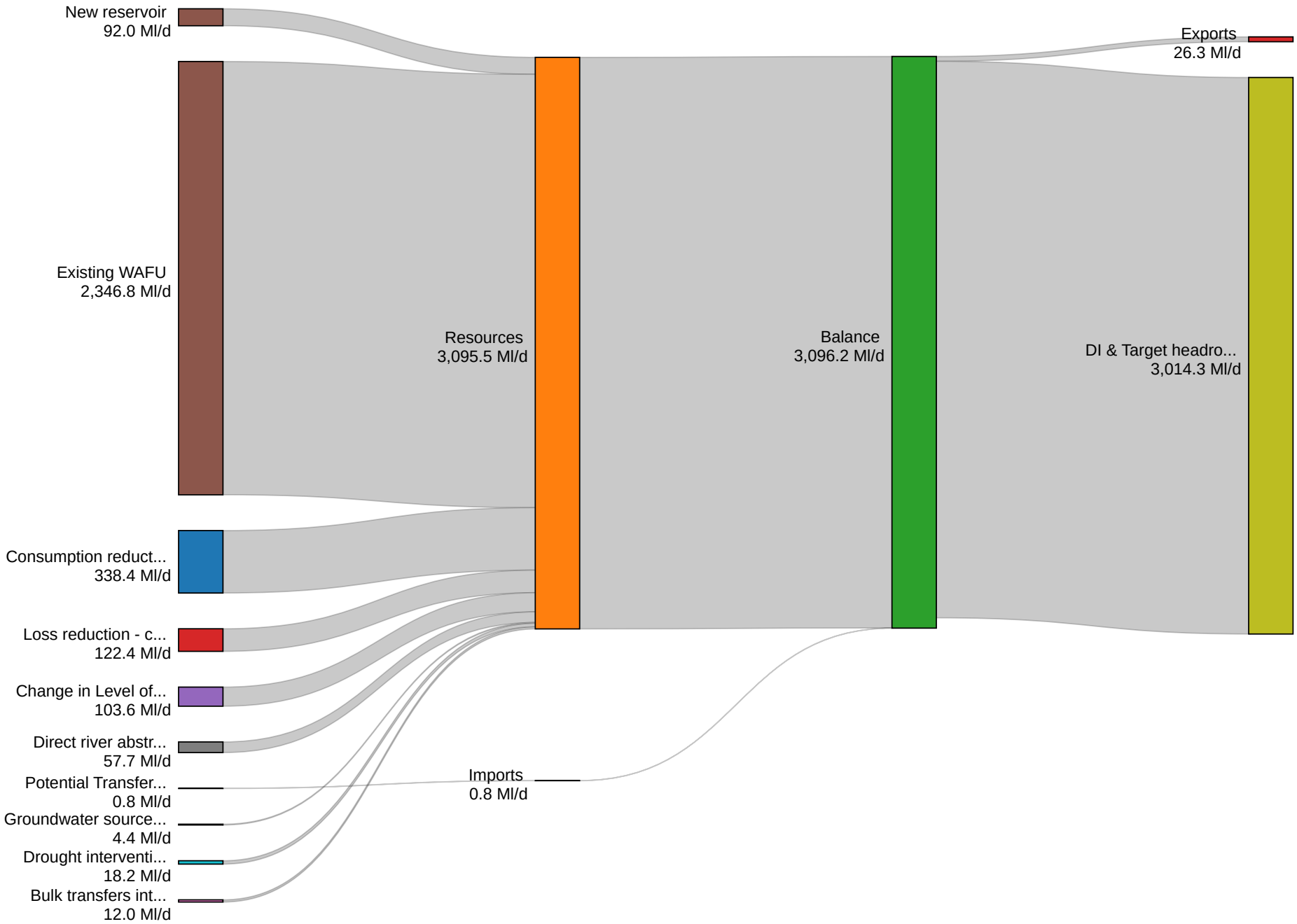


- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

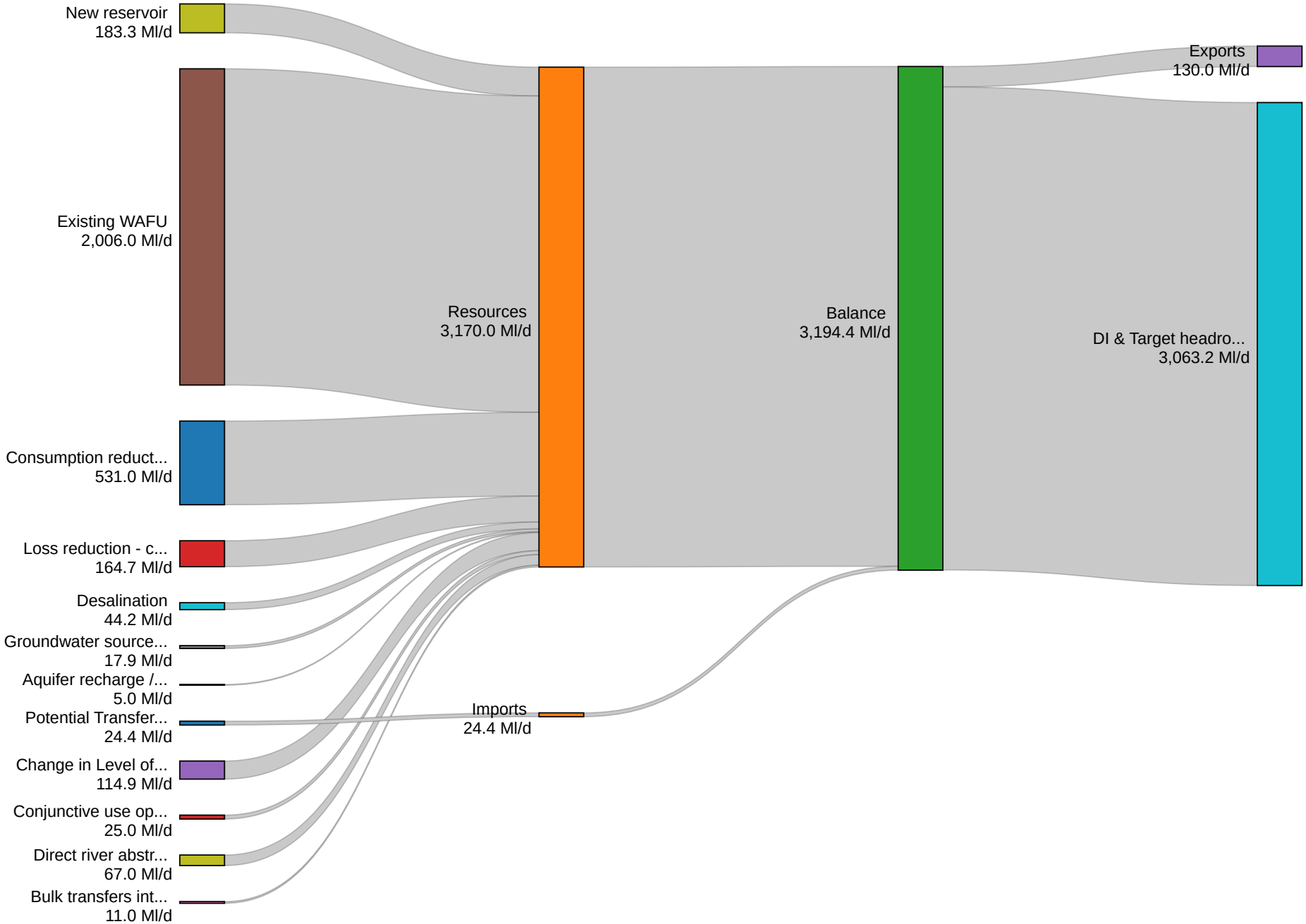
Situation 4 - 2026 (Thames Water)



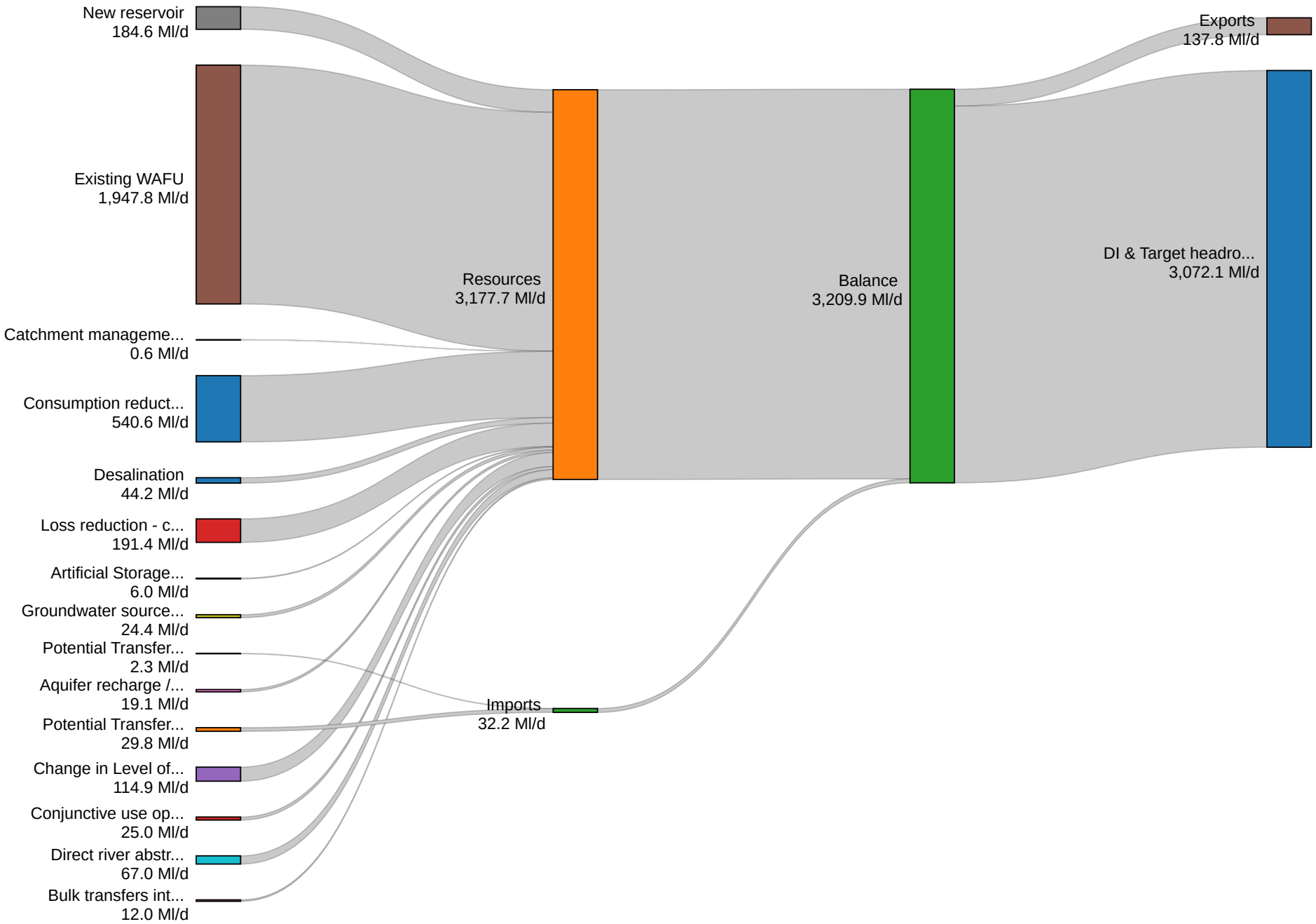
Situation 4 - 2040 (Thames Water)



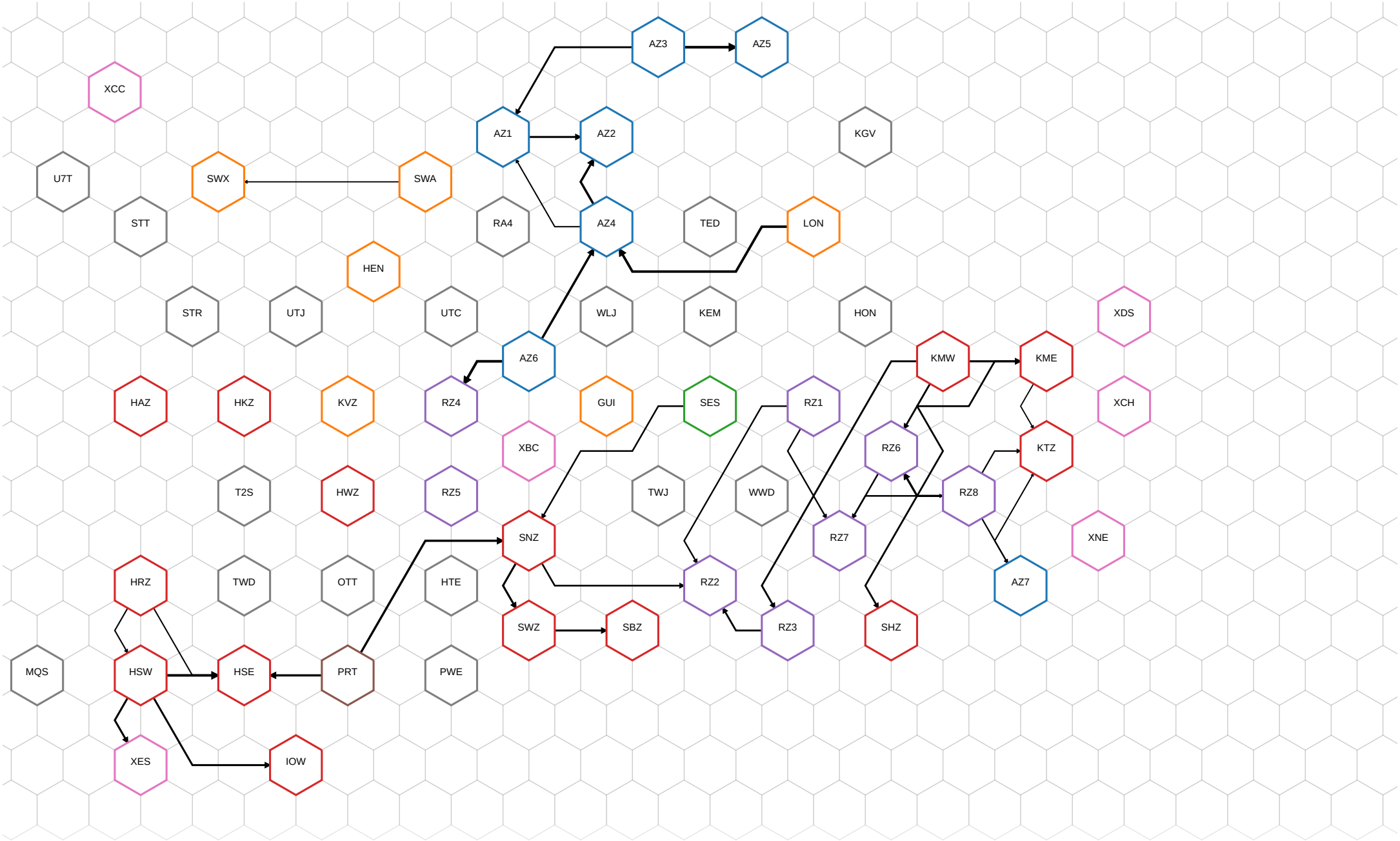
Situation 4 - 2050 (Thames Water)



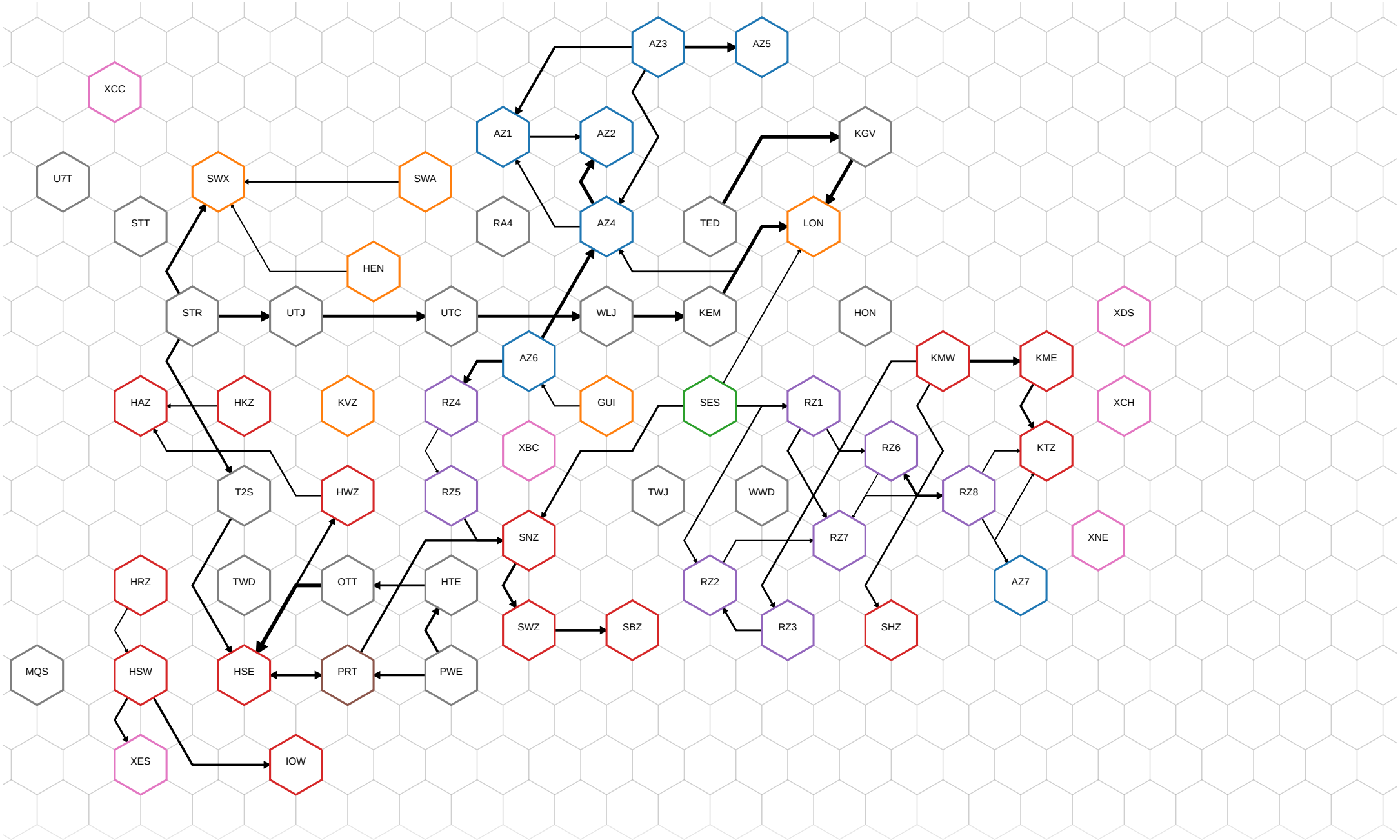
Situation 4 - 2075 (Thames Water)



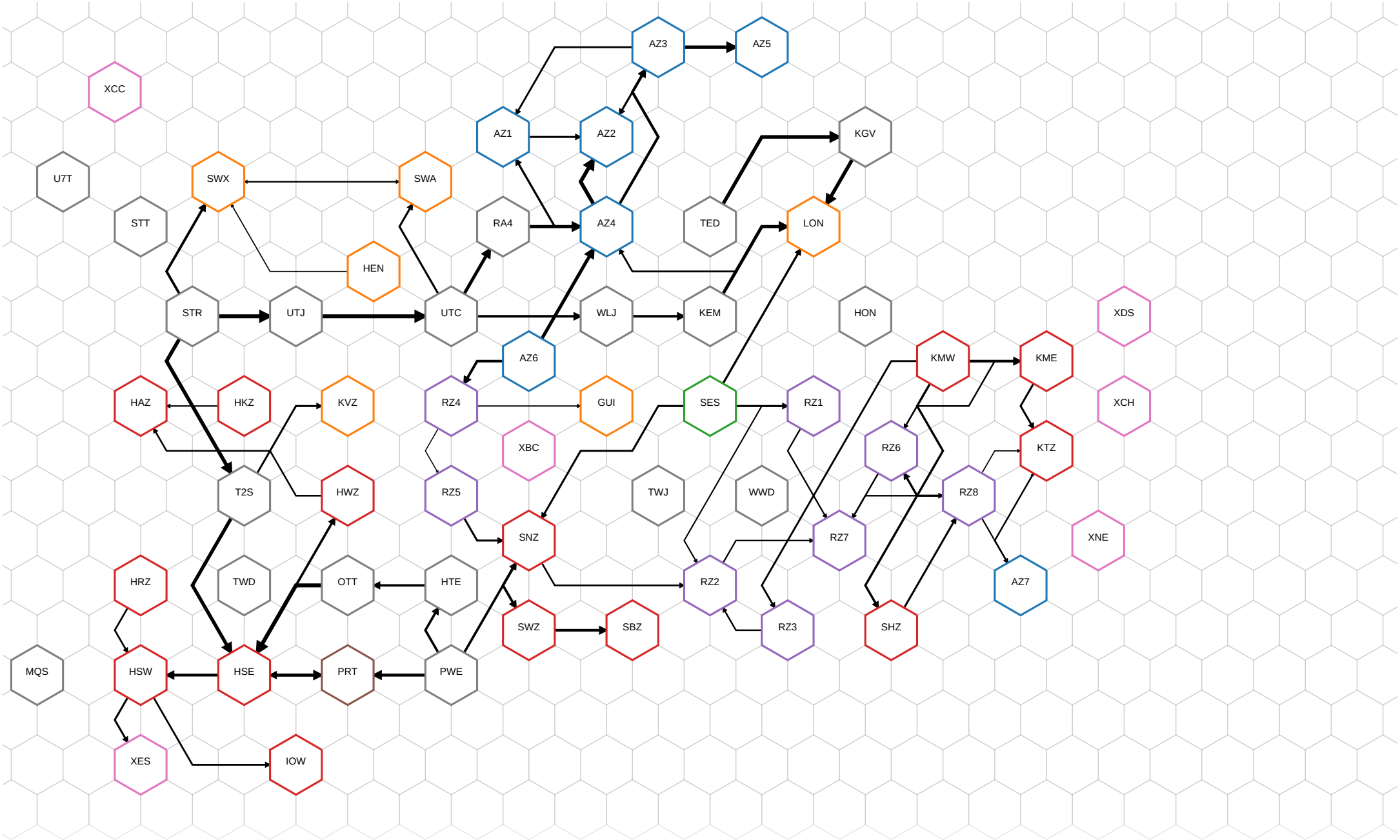
Situation 4 - 2026



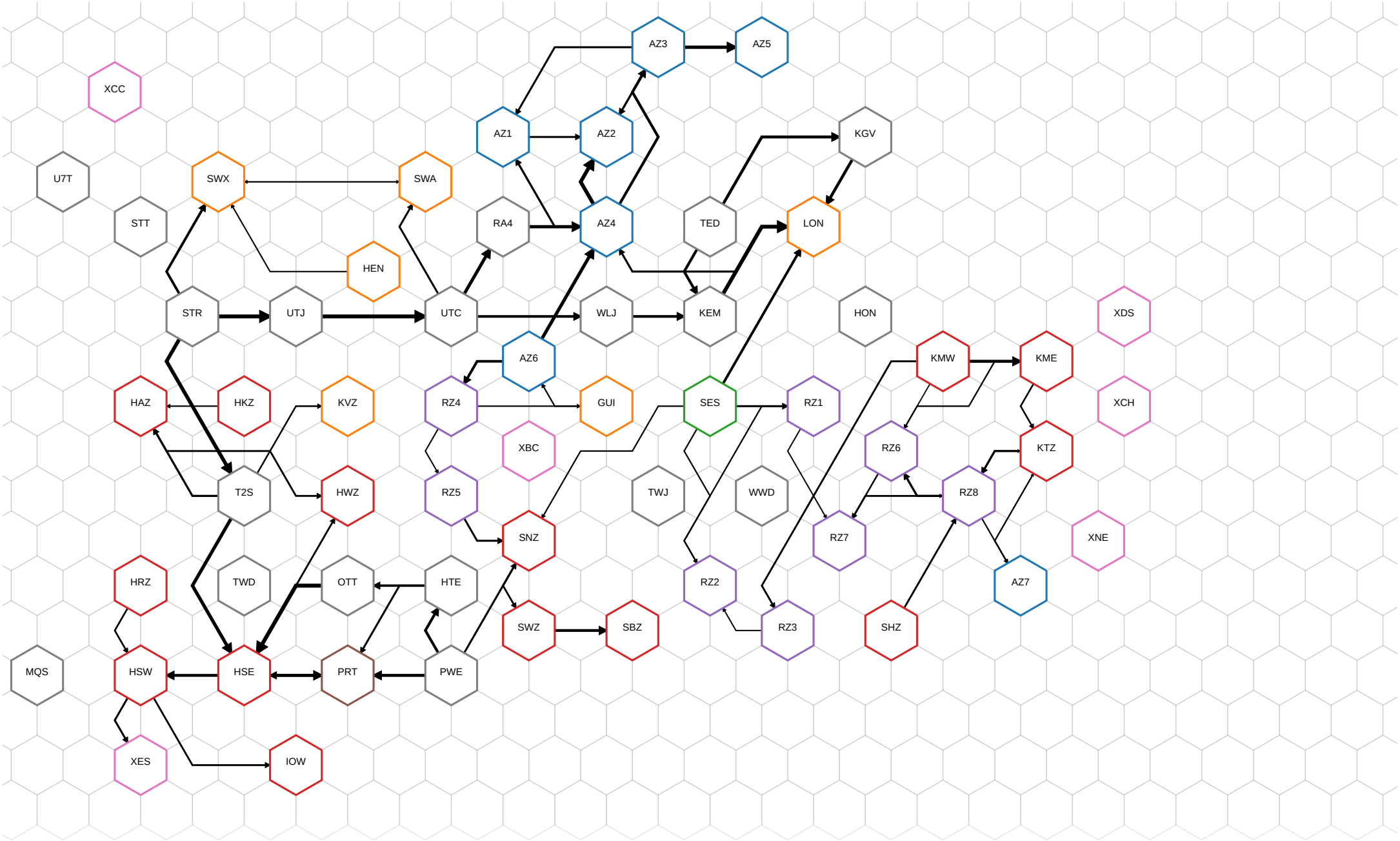
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

E&S + SESRO 75

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-only-guc100-only-sesro75-only-t2a50-2075-envsoc-07_50-v3
Description	Environmental-social run with hybrid-c+2 government interventions including only GUC 100 Ml/d, SESRO 75 Mm3 and 50 Ml/d T2A transfer. Constrained to 7.5% improvement in worst BVP metrics from "st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-only-sesro150-2075".
Created at	24/07/2023, 20:01:59
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2-only-guc100-only-sesro75-only-t2a50
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets. Exclude all GUC variants except 100. Exclude all SESRO variants except 75. Excludes T2A 100 Ml/d transfer (i.e. only 50 Ml/d).
Optimised discount rate	STPR

Metrics

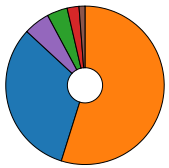
Net present value (Cost)

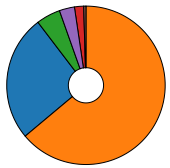
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	21,012	17,603	16,880	19,419	17,518	16,712	17,852	16,994	16,278	(£m)
Cost w/o deficit (STPR)	21,012	17,603	16,880	19,419	17,518	16,712	17,852	16,994	16,278	(£m)
Cost w/ deficit (IGEQ)	32,280	25,804	24,503	29,227	25,658	24,221	26,358	24,747	23,455	(£m)
Cost w/o deficit (IGEQ)	32,280	25,804	24,503	29,227	25,658	24,221	26,358	24,747	23,455	(£m)
Cost w/ deficit (LTDR)	23,188	19,219	18,389	21,330	19,122	18,199	19,522	18,526	17,702	(£m)
Cost w/o deficit (LTDR)	23,188	19,219	18,389	21,330	19,122	18,199	19,522	18,526	17,702	(£m)

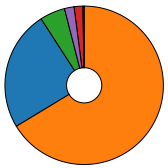
Cost breakdown (STPR)

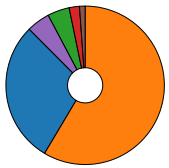
Select Company: Total

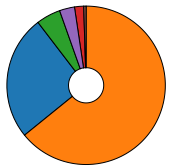
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	6,735	4,531	4,140	5,630	4,458	3,991	4,628	4,180	3,736	(£m)
Fixed opex	11,520	11,250	11,198	11,369	11,240	11,182	11,253	11,201	11,140	(£m)
Fixed operational carbon	884	869	868	873	870	869	871	867	865	(£m)
Embedded carbon	507	330	306	408	327	298	347	308	281	(£m)
Variable opex	1,112	544	328	918	538	321	652	397	237	(£m)
Variable carbon opex	254	81	40	221	85	50	102	41	18	(£m)

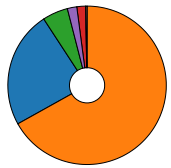
situation1 

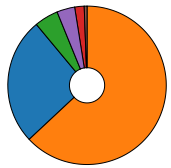
situation2 

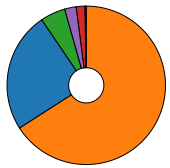
situation3 

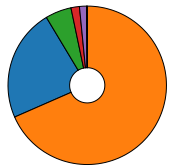
situation4 

situation5 

situation6 

situation7 

situation8 

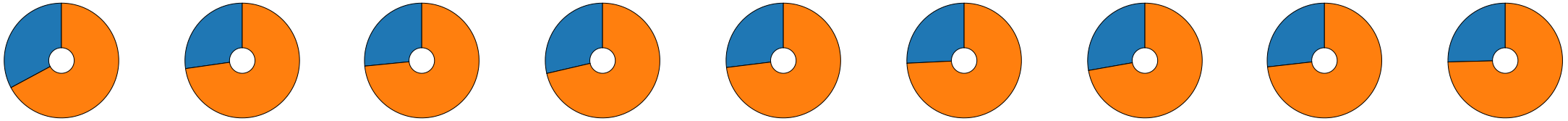
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,290,515	2,017,956	1,857,696	2,565,735	1,999,203	1,806,412	2,144,293	1,878,627	1,695,819	(tonnes)
Operational emissions	6,729,412	5,385,630	5,135,698	6,397,304	5,418,672	5,205,358	5,573,856	5,134,826	4,980,413	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

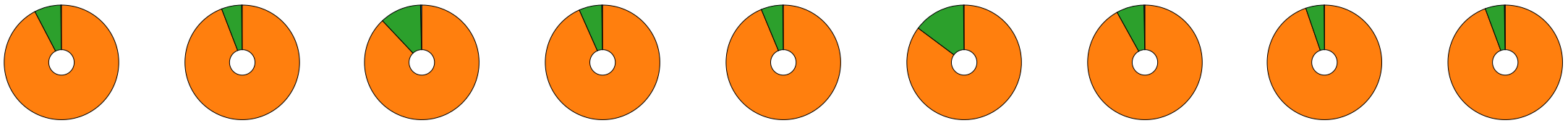


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	50	22	17	47	19	8	40	9	8	(GWh)
Grid	23,376	11,331	4,268	19,193	10,950	3,818	13,167	7,960	2,898	(GWh)
Renewable	1,890	682	566	1,319	714	656	1,116	434	167	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	65,340.00	65,338.00	65,338.00	67,451.00	65,342.00	65,338.00	66,593.00	65,338.00	65,338.00	
SEA environmental disbenefit	105,002.00	78,799.00	72,621.00	100,922.00	77,140.00	71,144.00	82,144.00	69,285.00	62,714.00	
Natural capital	85,381,384.55	81,299,191.00	84,168,235.82	80,977,882.39	81,300,270.85	84,118,577.59	80,960,554.49	81,730,201.86	84,538,567.52	
Bio-diversity net gain	−172,843.00	−117,352.00	−92,308.00	−167,101.00	−116,087.00	−87,544.00	−119,302.00	−92,300.00	−66,710.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	36,356.00	35,141.00	34,820.00	36,593.00	35,159.00	34,801.00	35,367.00	34,608.00	34,361.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	27.80	27.34	29.88	26.73	27.53	30.07	28.86	31.90	35.45	
R1: Uncertainty of option supply/demand benefit	5.86	5.05	5.49	5.28	5.10	5.54	5.47	5.93	6.56	
R3: Risk of service failure due to other physical hazards	6.60	6.73	7.53	6.40	6.78	7.58	7.08	8.01	9.13	
R4: Availability of additional headroom	6.47	6.79	7.00	6.57	6.82	7.03	7.13	7.49	7.73	
R5: Catchment/raw water quality risks (incl. climate change)	3.94	3.74	4.23	3.70	3.77	4.25	3.89	4.48	5.18	
R6: Capacity of catchment services	0.01	0.01	0.01	0.01	0.00	0.01	0.00	0.01	0.01	
R7: Risk of service failure to other exceptional events	4.92	5.03	5.63	4.77	5.06	5.67	5.29	5.98	6.84	
R8: Soil health	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	

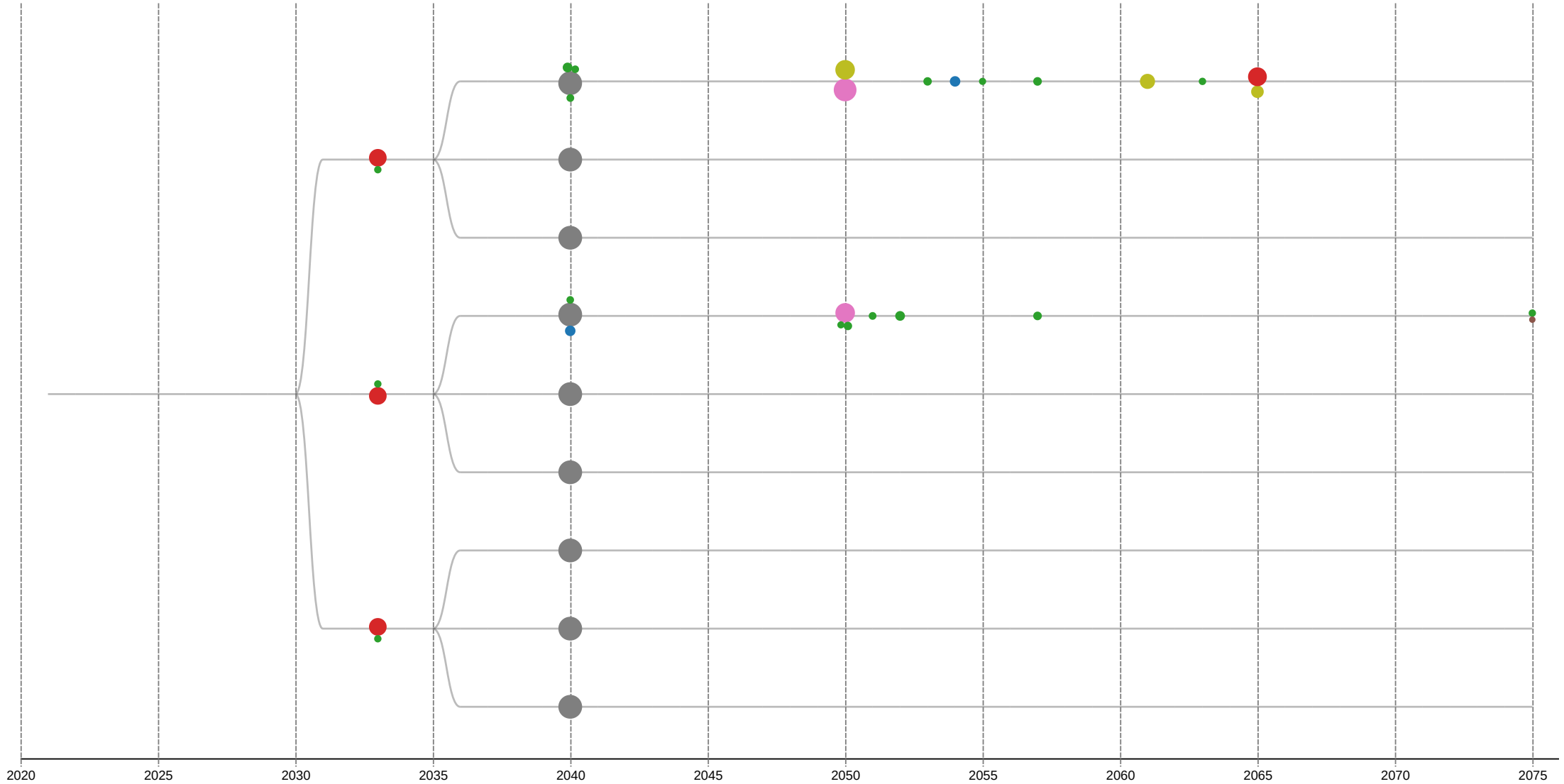
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	13.52	15.00	16.77	13.57	15.07	16.62	15.56	17.71	20.15	
A3: Operational complexity and flexibility	6.06	6.45	7.25	6.02	6.52	7.32	6.76	7.74	8.88	
A4: WRZ connectivity	7.44	8.52	9.49	7.51	8.53	9.26	8.77	9.94	11.23	
A7: Customer relations support engagement with demand management	0.02	0.03	0.03	0.04	0.03	0.03	0.03	0.03	0.03	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.29	19.57	21.72	18.59	19.75	21.85	20.48	23.23	26.32	
E1: Scaleability and modularity of proposed changes	8.93	9.35	10.42	8.76	9.45	10.54	9.72	11.16	12.71	
E2: Intervention lead times	4.18	3.93	4.30	3.85	3.96	4.25	4.18	4.59	5.10	
E3: Reliance on external bodies to deliver changes	6.17	6.27	6.99	5.96	6.33	7.05	6.57	7.47	8.51	
E5: Collaborative land management	0.01	0.01	0.01	0.02	0.01	0.01	0.01	0.01	0.01	

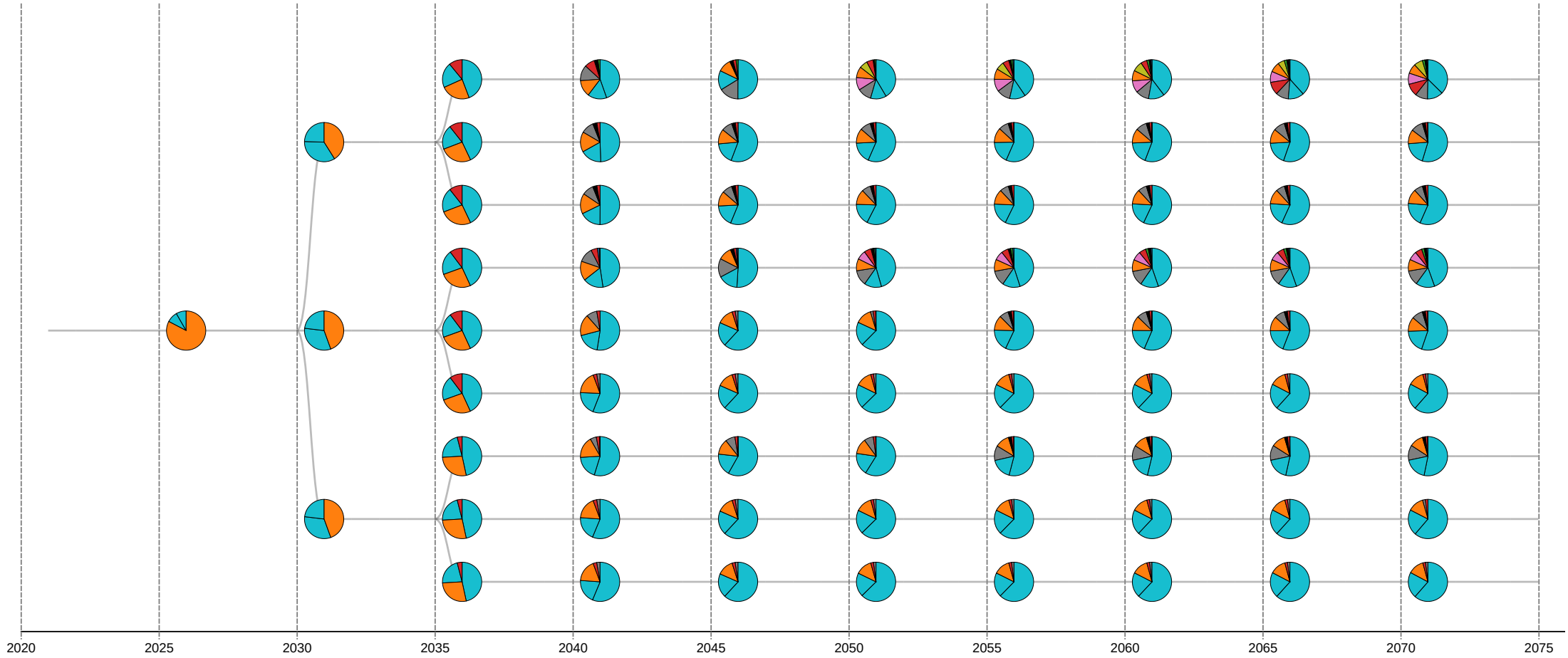
Option Selection (Thames Water)



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

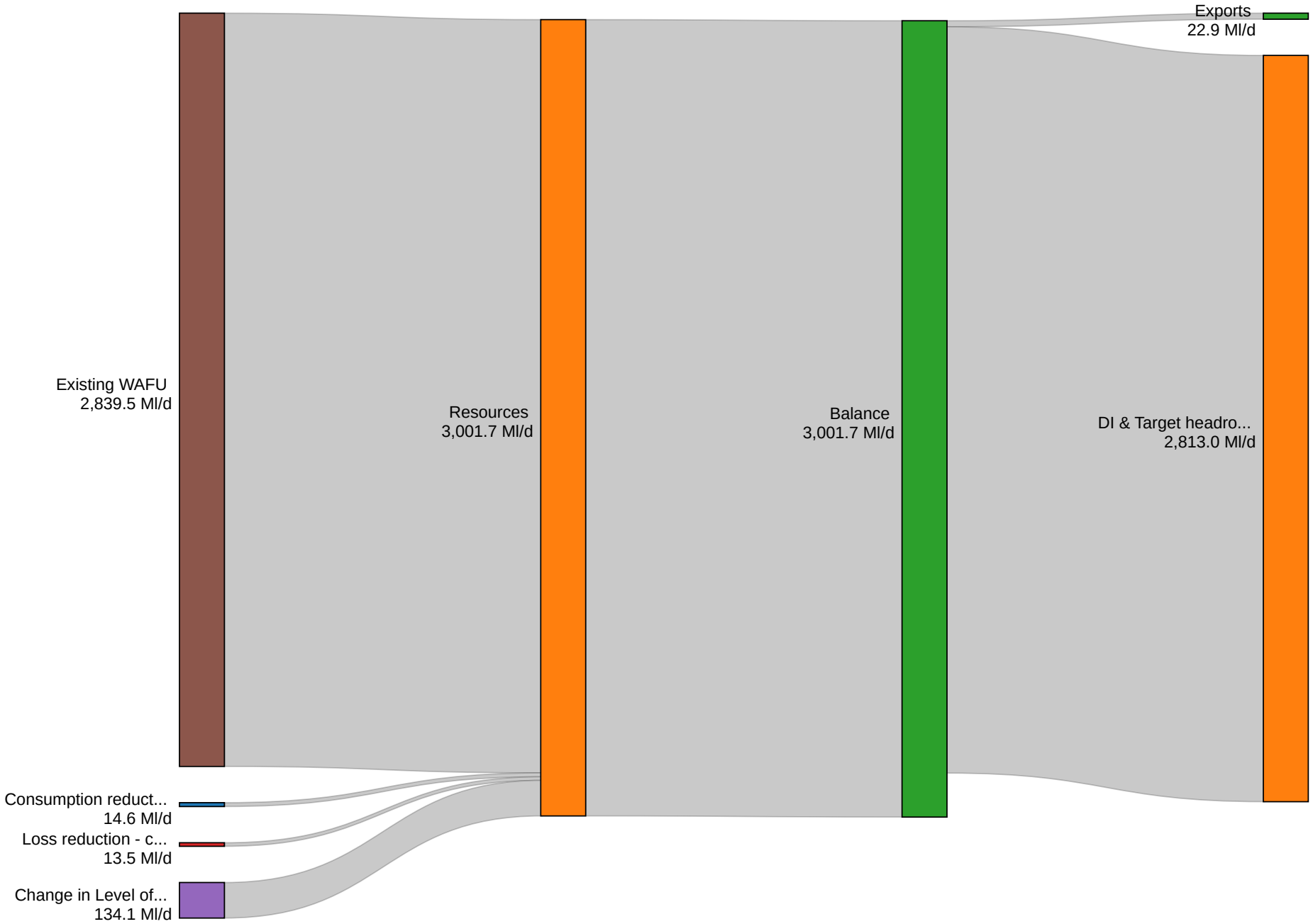
Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.

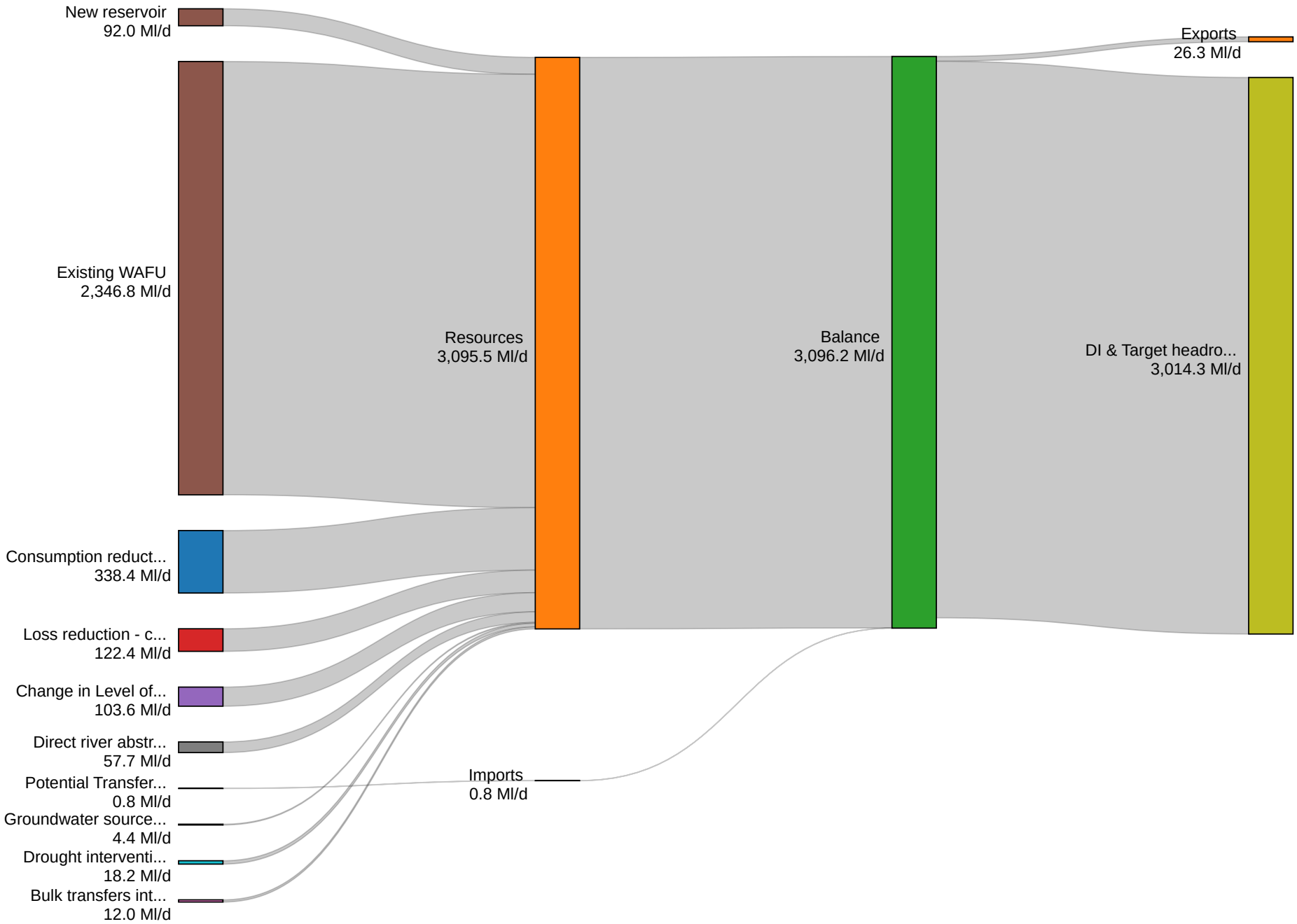


- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

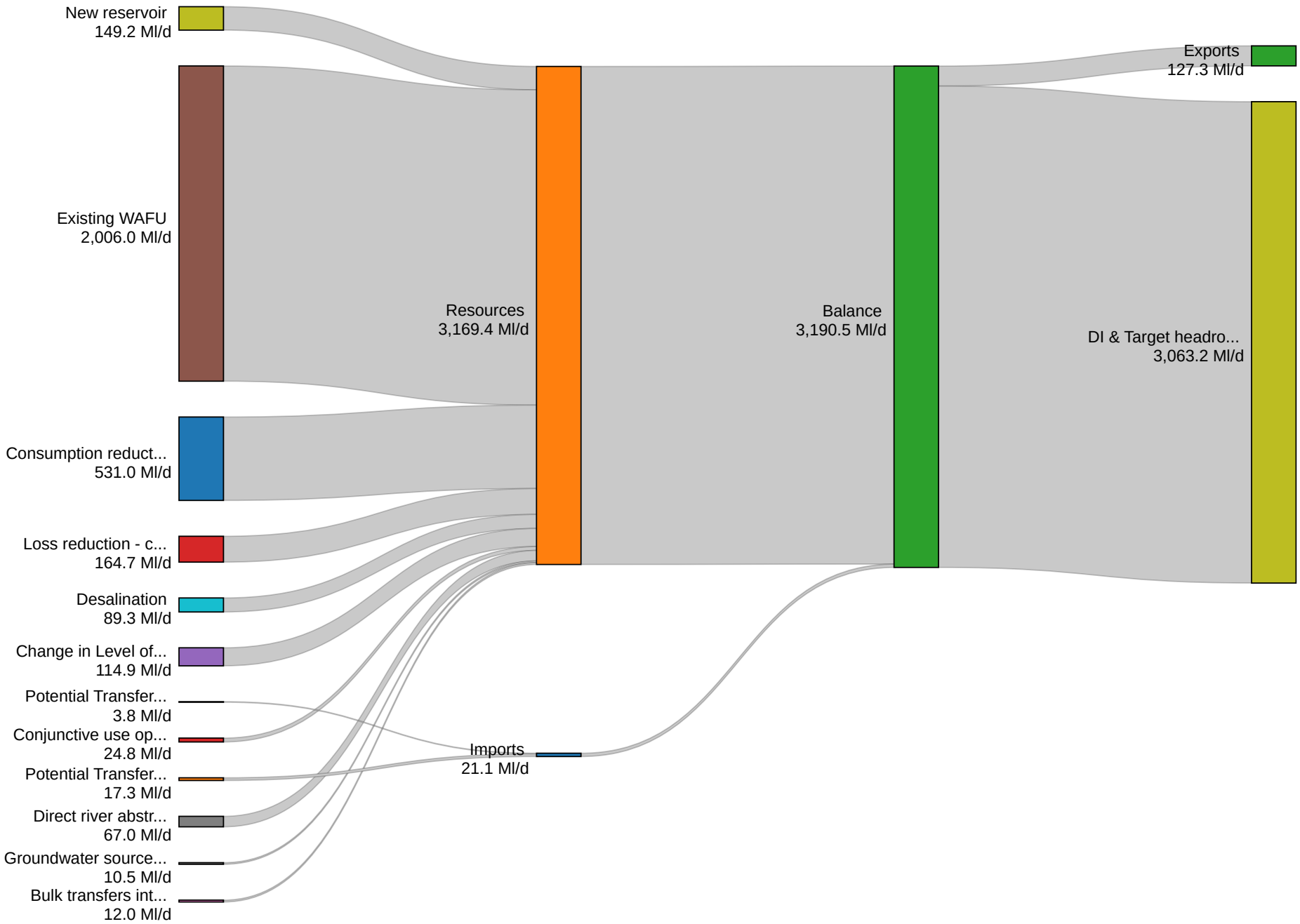
Situation 4 - 2026 (Thames Water)



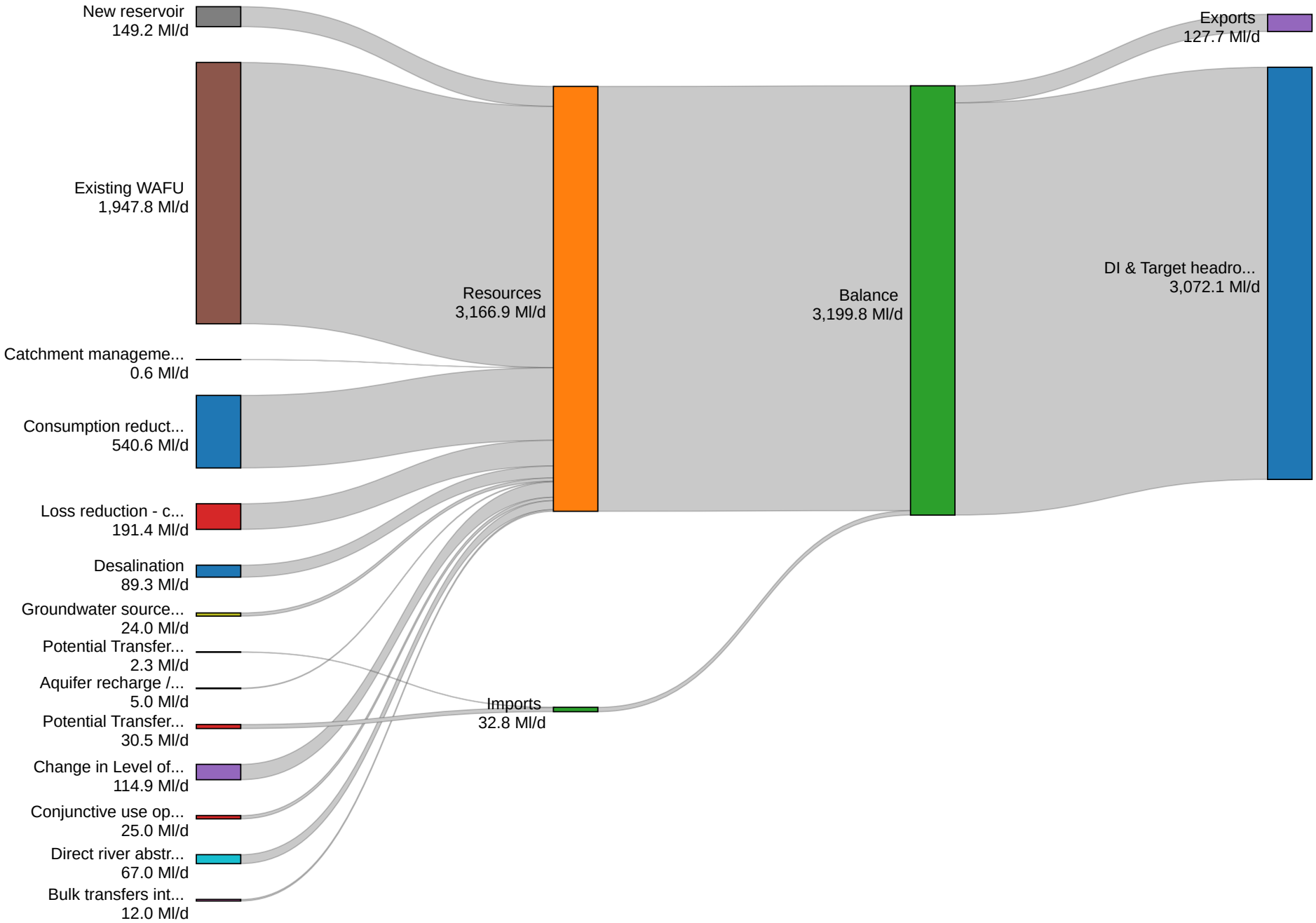
Situation 4 - 2040 (Thames Water)



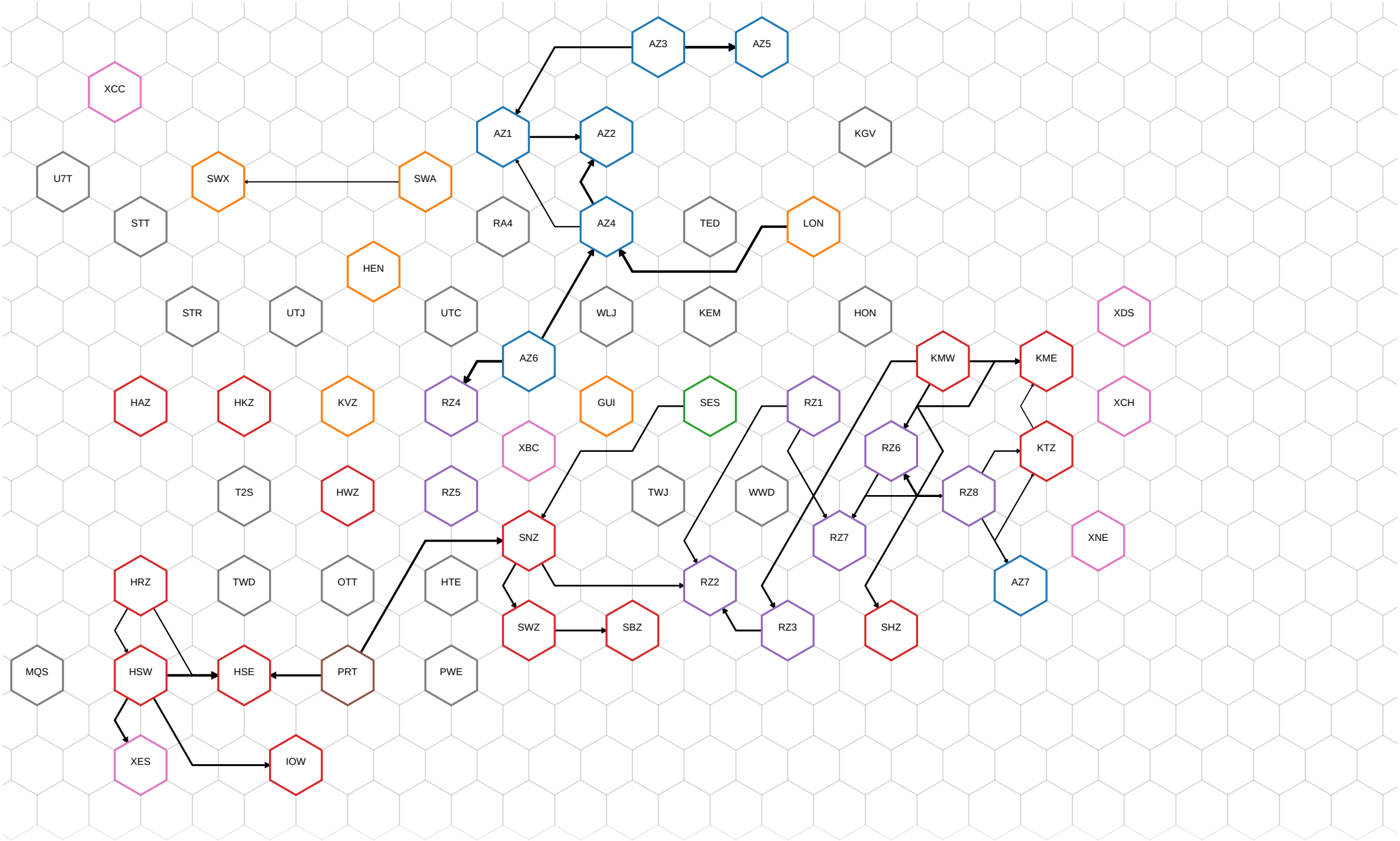
Situation 4 - 2050 (Thames Water)



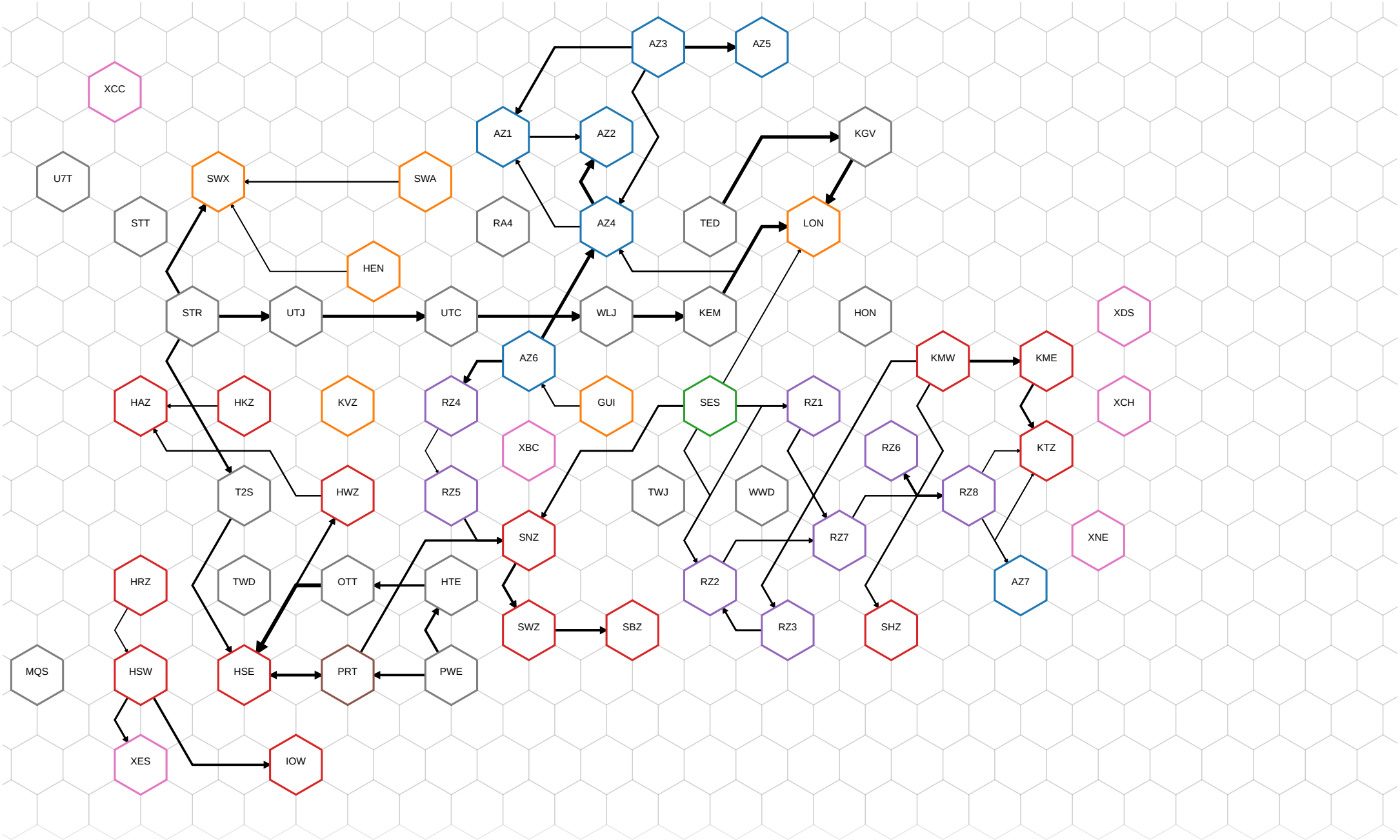
Situation 4 - 2075 (Thames Water)



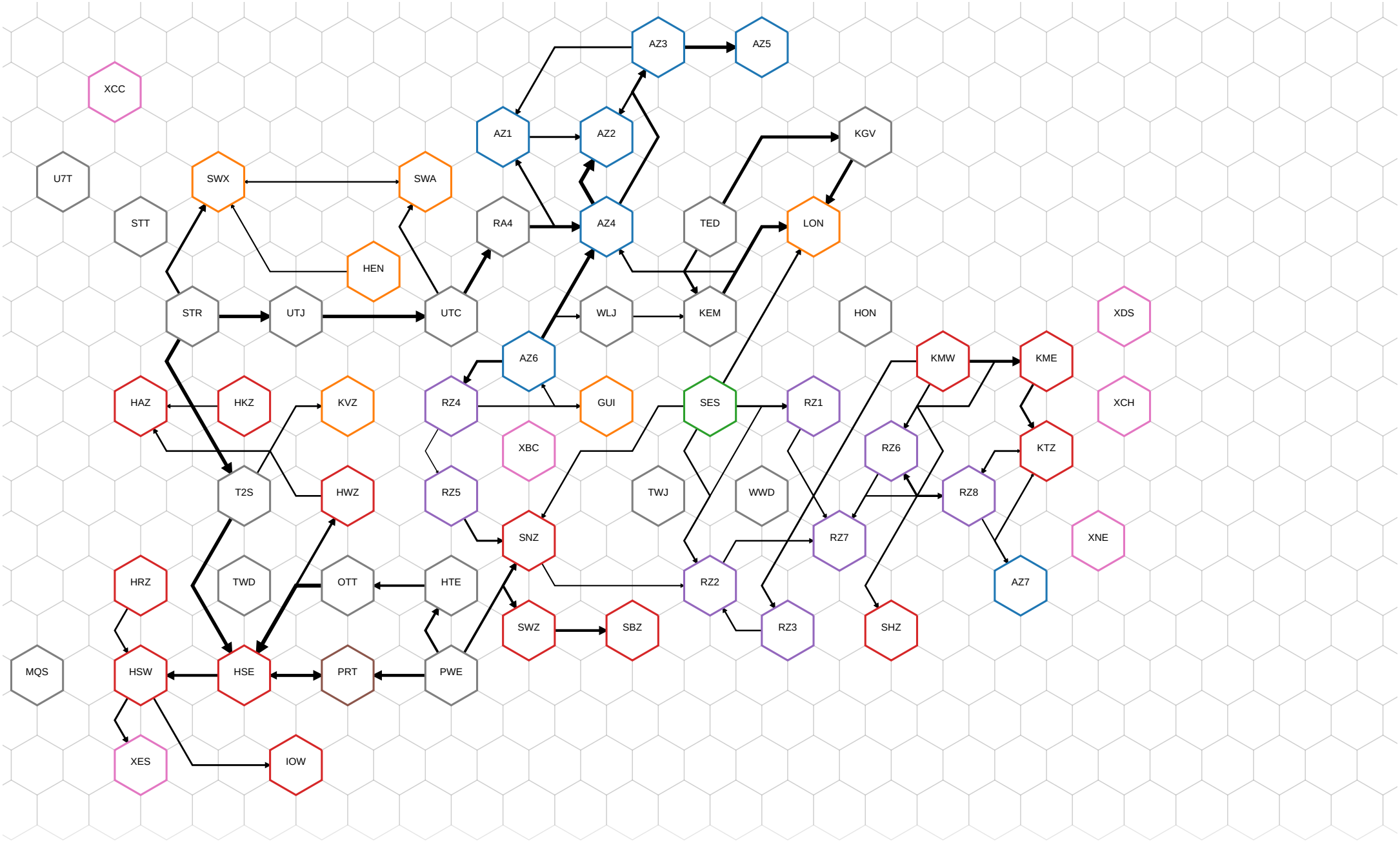
Situation 4 - 2026



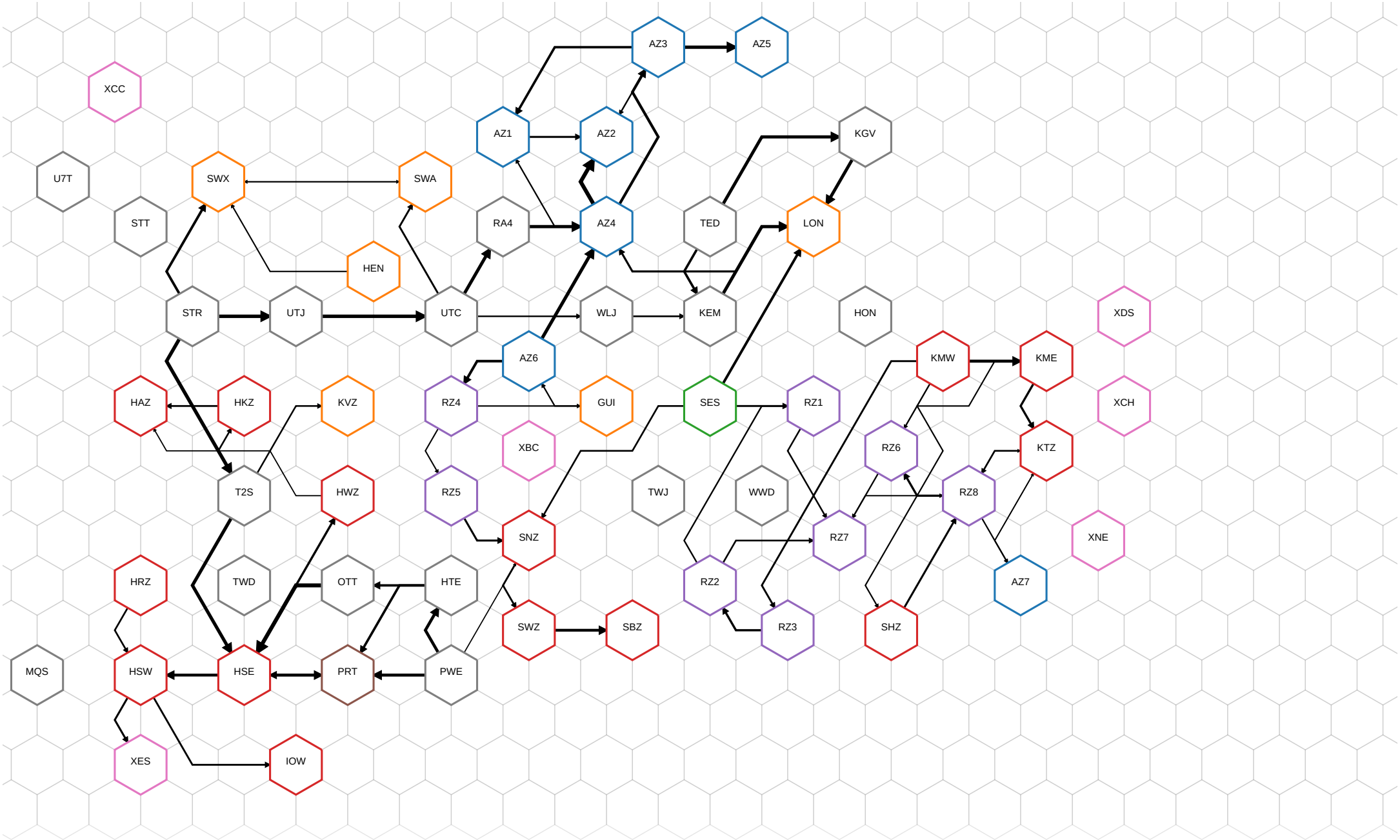
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

GENERAL BVP + SESRO 150

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-only-guc100-only-sesro150-only-t2a50-2075-bvp-07_50-v3
Description	BVP run with hybrid-c+2 government interventions including only GUC 100 Ml/d, SESRO 150 Mm3 and 50 Ml/d T2A transfer. Constrained to 7.5% improvement in worst BVP metrics from "st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-only-sesro150-2075".
Created at	17/07/2023, 10:43:04
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2-only-guc100-only-sesro150-only-t2a50
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets. Exclude all GUC variants except 100. Exclude all SESRO variants except 150. Excludes T2A 100 Ml/d transfer (i.e. only 50 Ml/d).
Optimised discount rate	STPR

Metrics

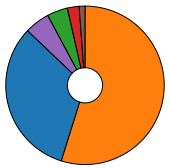
Net present value (Cost)

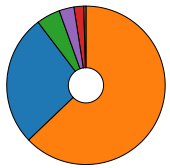
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	20,892	17,901	17,157	19,350	17,785	16,969	18,132	17,260	16,540	(£m)
Cost w/o deficit (STPR)	20,892	17,901	17,157	19,350	17,785	16,969	18,132	17,260	16,540	(£m)
Cost w/ deficit (IGEQ)	31,925	26,259	24,922	29,005	26,070	24,614	26,799	25,158	23,858	(£m)
Cost w/o deficit (IGEQ)	31,925	26,259	24,922	29,005	26,070	24,614	26,799	25,158	23,858	(£m)
Cost w/ deficit (LTDR)	23,027	19,547	18,693	21,234	19,417	18,481	19,833	18,820	17,991	(£m)
Cost w/o deficit (LTDR)	23,027	19,547	18,693	21,234	19,417	18,481	19,833	18,820	17,991	(£m)

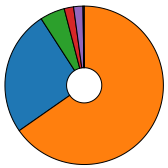
Cost breakdown (STPR)

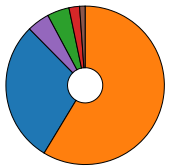
Select Company: Total

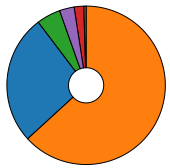
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	6,743	4,800	4,390	5,602	4,710	4,231	4,884	4,425	3,978	(£m)
Fixed opex	11,455	11,252	11,202	11,350	11,240	11,185	11,255	11,202	11,143	(£m)
Fixed operational carbon	883	868	870	877	869	869	872	867	866	(£m)
Embedded carbon	501	358	328	418	351	320	370	331	304	(£m)
Variable opex	1,064	542	326	887	532	314	651	394	232	(£m)
Variable carbon opex	246	80	41	216	82	49	101	41	18	(£m)

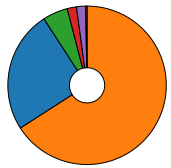
situation1 

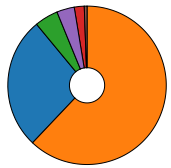
situation2 

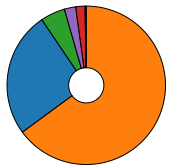
situation3 

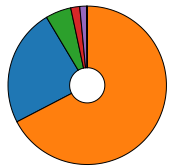
situation4 

situation5 

situation6 

situation7 

situation8 

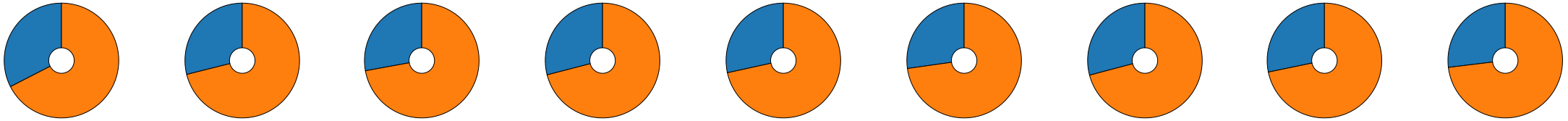
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,216,648	2,188,141	1,991,719	2,615,317	2,144,739	1,944,877	2,288,747	2,020,153	1,834,877	(tonnes)
Operational emissions	6,672,858	5,381,837	5,154,600	6,394,043	5,397,921	5,197,197	5,570,947	5,133,909	4,980,387	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

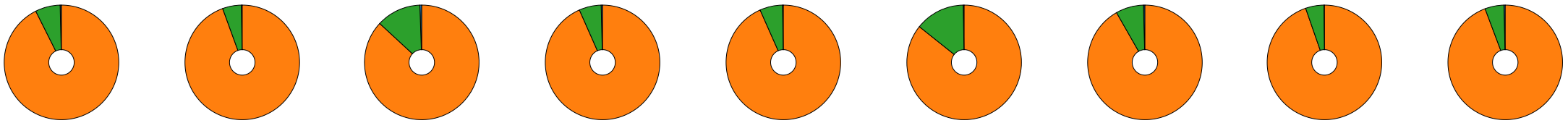


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	95	34	26	83	28	12	61	13	12	(GWh)
Grid	23,293	11,889	4,224	19,011	10,780	3,835	13,137	7,947	2,923	(GWh)
Renewable	1,766	666	612	1,266	739	628	1,121	434	166	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	66,289.00	65,338.00	65,338.00	67,729.00	65,342.00	65,338.00	66,448.00	65,338.00	65,338.00	
SEA environmental disbenefit	105,001.00	77,756.00	71,871.00	99,854.00	77,689.00	71,562.00	83,668.00	69,306.00	61,857.00	
Natural capital	81,881,669.28	81,056,040.50	81,282,170.47	81,736,582.33	81,001,854.90	81,293,410.46	81,593,235.02	81,366,172.77	81,714,775.55	
Bio-diversity net gain	−200,794.00	−140,626.00	−122,030.00	−202,165.00	−147,460.00	−119,032.00	−151,415.00	−123,870.00	−98,977.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	36,487.00	35,040.00	34,774.00	36,629.00	35,069.00	34,760.00	35,308.00	34,520.00	34,095.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	29.73	29.63	32.47	29.41	29.90	32.68	31.20	34.65	38.61	
R1: Uncertainty of option supply/demand benefit	6.17	5.51	6.02	5.88	5.59	6.07	5.94	6.49	7.21	
R3: Risk of service failure due to other physical hazards	7.02	7.35	8.24	7.08	7.43	8.29	7.71	8.76	10.01	
R4: Availability of additional headroom	6.61	6.95	7.16	6.69	6.98	7.19	7.30	7.66	7.90	
R5: Catchment/raw water quality risks (incl. climate change)	4.13	4.17	4.71	3.83	4.20	4.74	4.33	5.00	5.78	
R6: Capacity of catchment services	0.30	0.01	0.01	0.31	0.00	0.01	0.00	0.01	0.01	
R7: Risk of service failure to other exceptional events	5.39	5.65	6.33	5.51	5.70	6.38	5.92	6.73	7.71	
R8: Soil health	0.11	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	

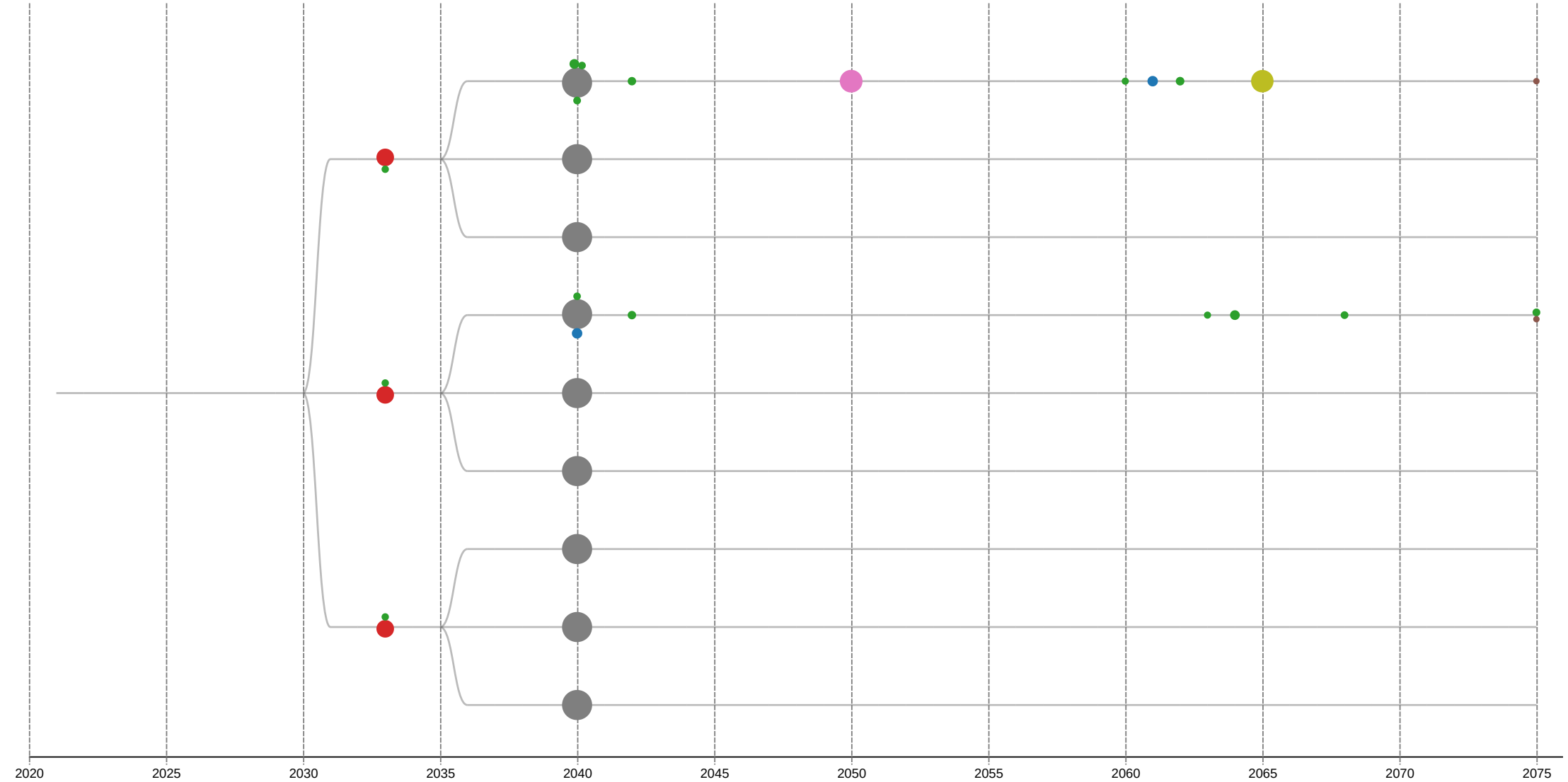
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	14.32	15.56	17.45	14.35	15.64	17.26	16.16	18.39	20.94	
A3: Operational complexity and flexibility	6.56	7.08	7.96	6.74	7.15	8.04	7.39	8.49	9.76	
A4: WRZ connectivity	7.65	8.46	9.46	7.47	8.46	9.19	8.74	9.87	11.15	
A7: Customer relations support engagement with demand management	0.11	0.03	0.03	0.14	0.03	0.03	0.03	0.03	0.03	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.65	19.86	22.12	19.63	20.12	22.24	20.81	23.64	26.79	
E1: Scaleability and modularity of proposed changes	8.85	9.35	10.43	8.82	9.47	10.54	9.72	11.16	12.71	
E2: Intervention lead times	4.11	4.05	4.49	4.10	4.11	4.44	4.34	4.79	5.33	
E3: Reliance on external bodies to deliver changes	6.25	6.45	7.19	6.25	6.52	7.25	6.75	7.68	8.75	
E5: Collaborative land management	0.44	0.01	0.01	0.46	0.01	0.01	0.00	0.01	0.01	

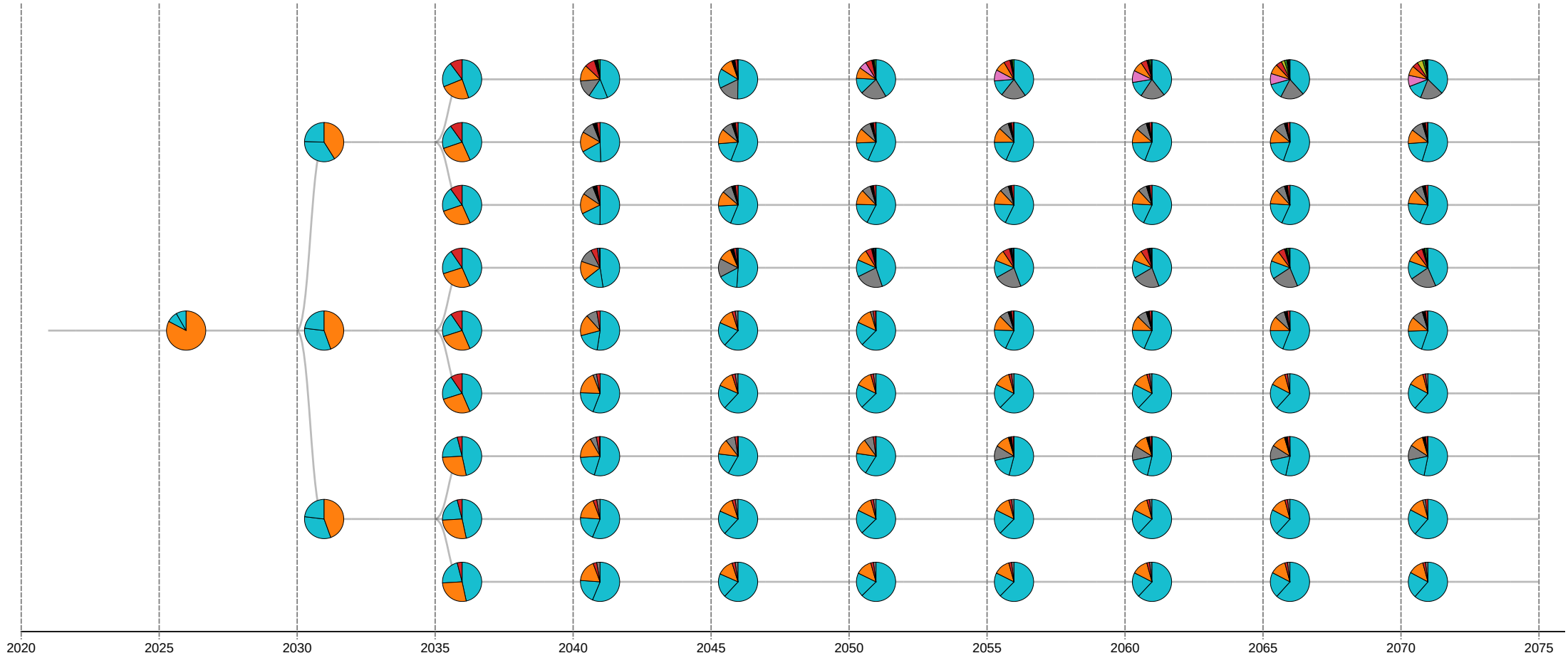
Option Selection (Thames Water)



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.



- Transfer
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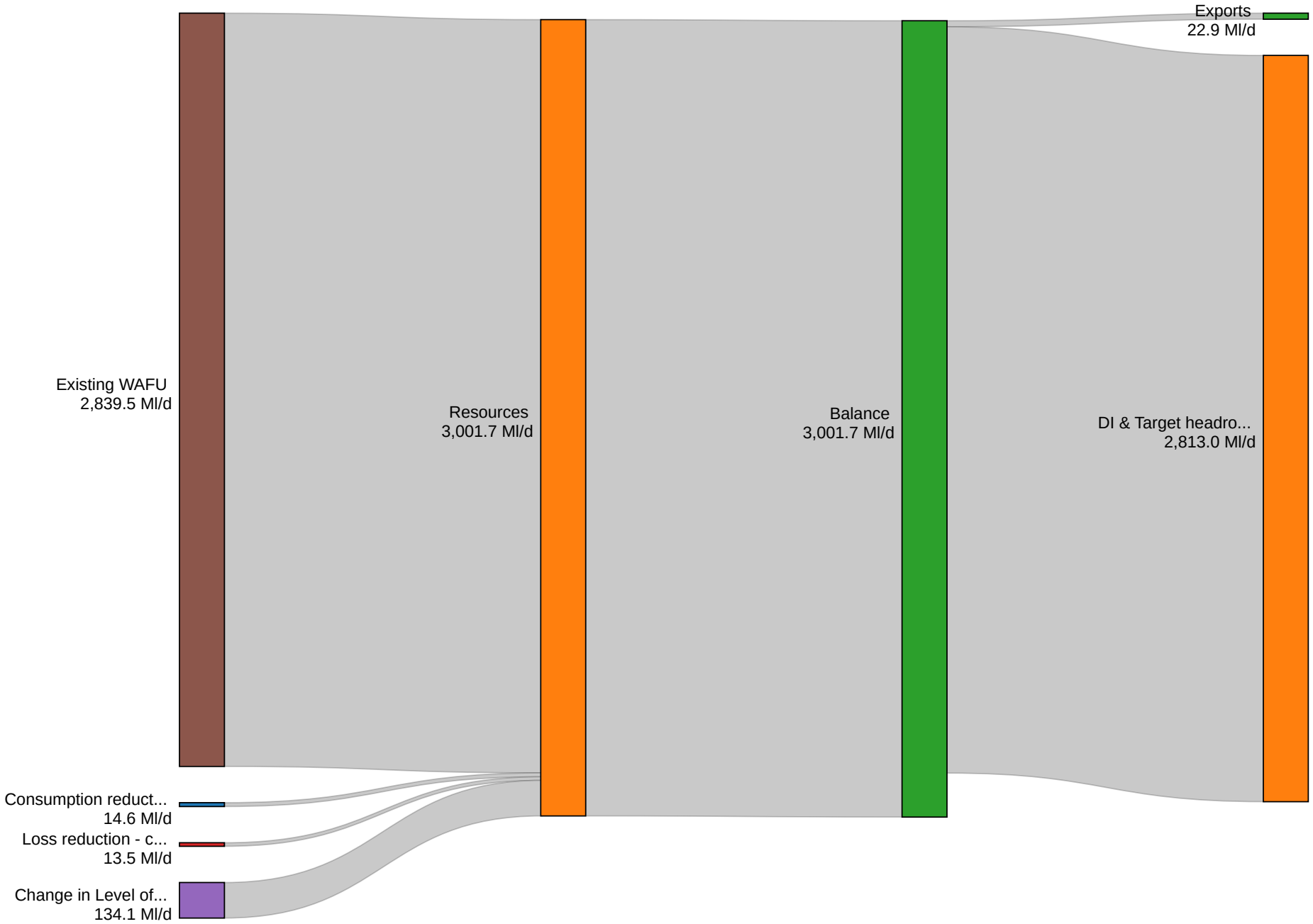
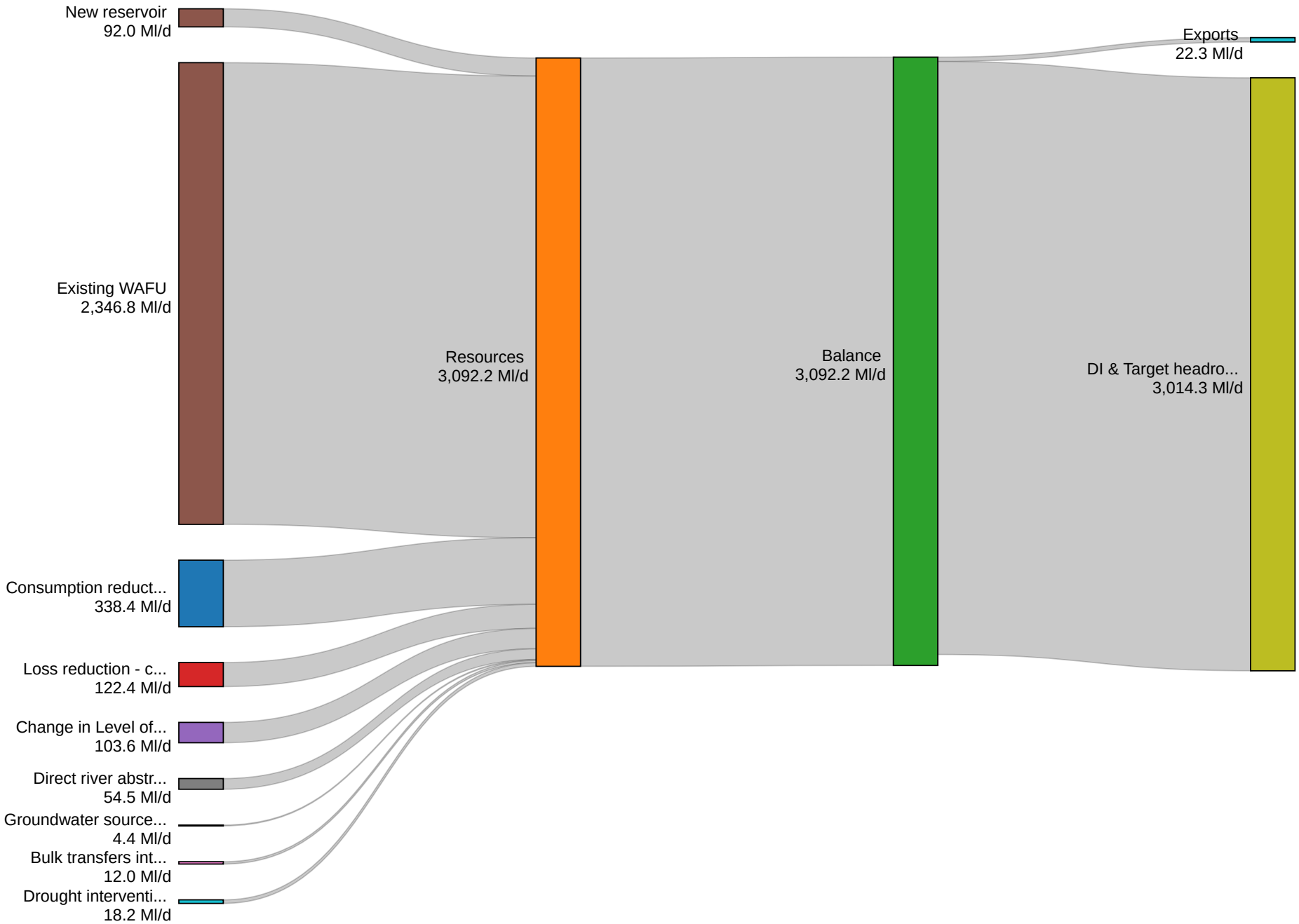
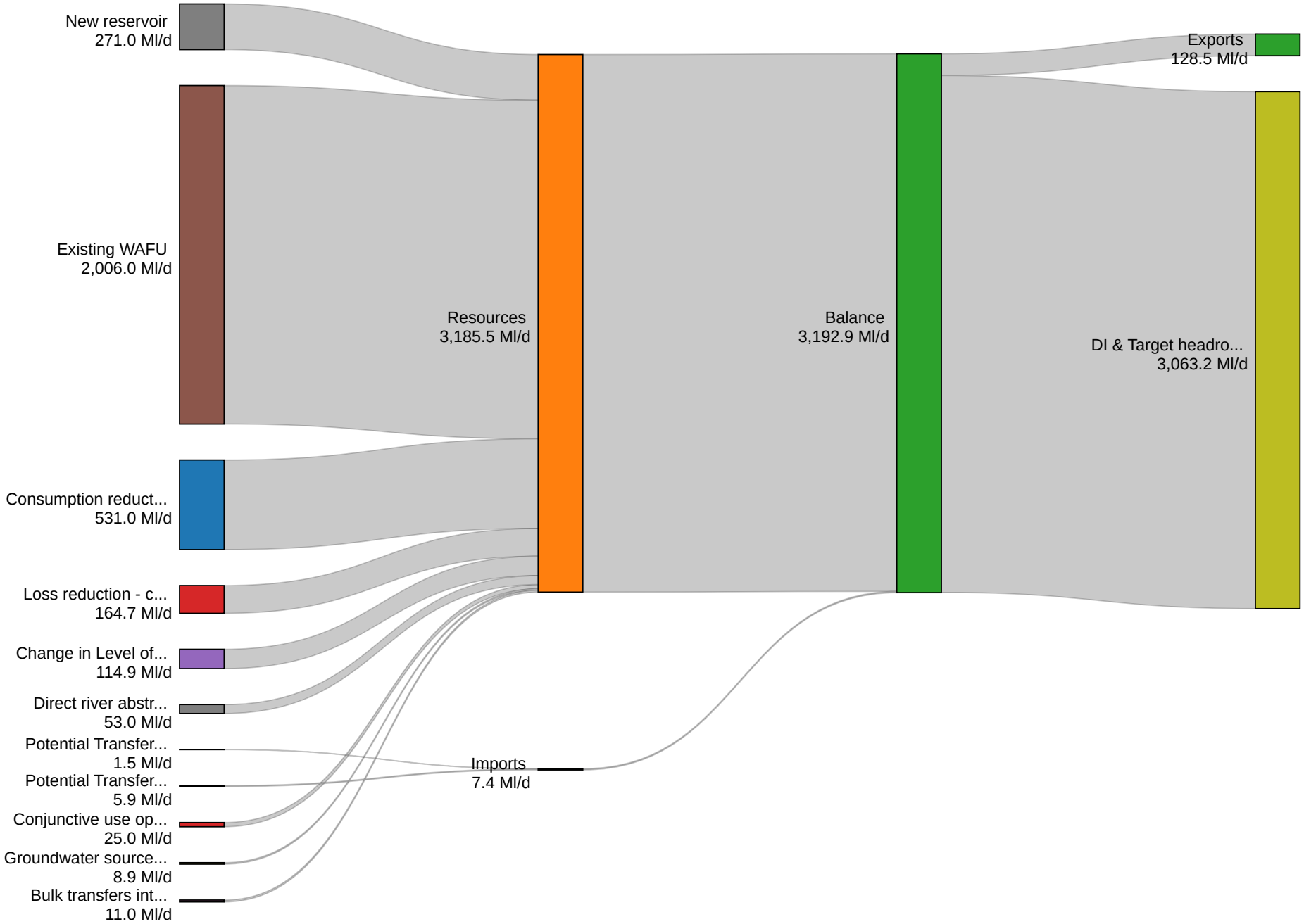
Situation 4 - 2026 (Thames Water)



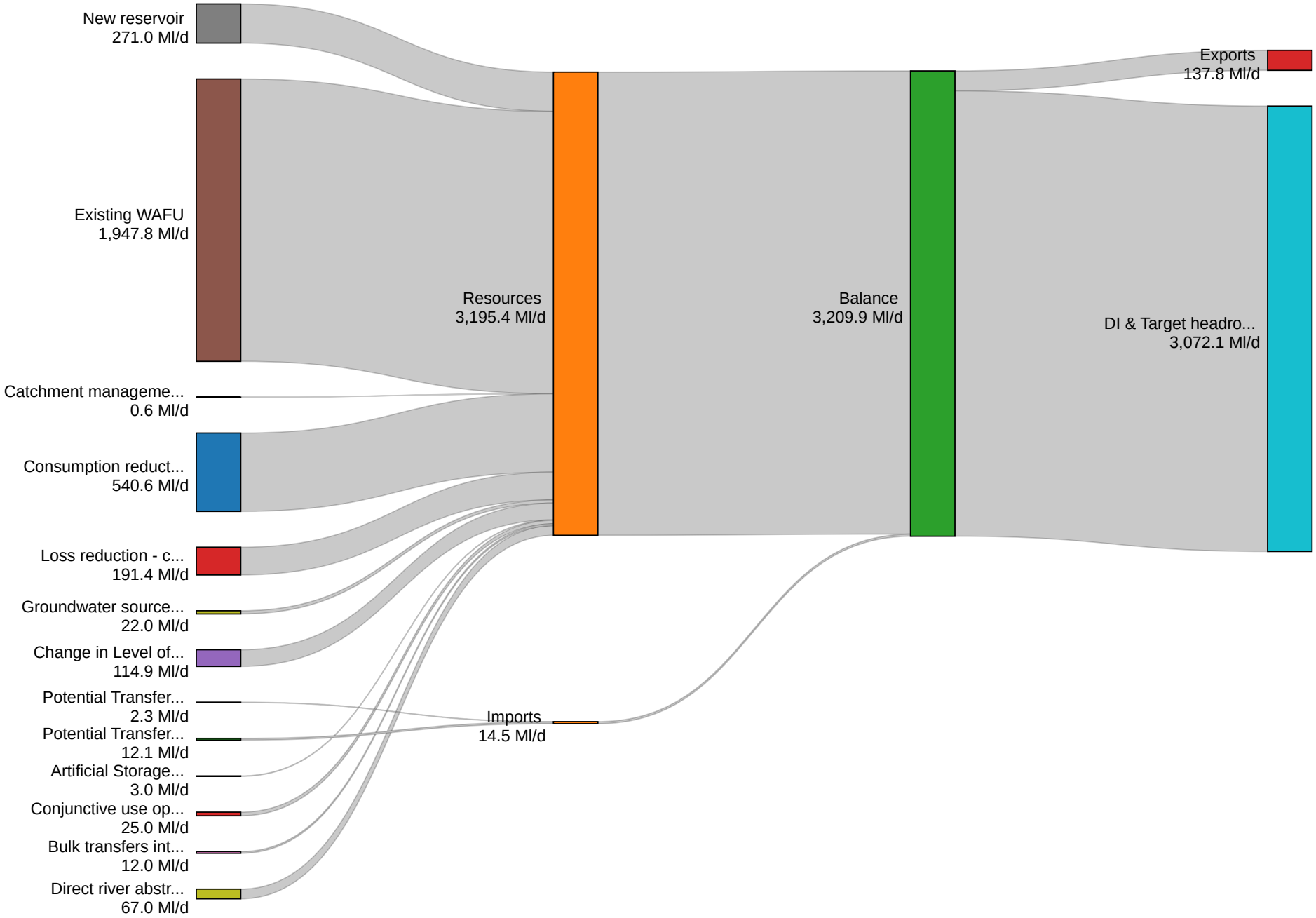
Situation 4 - 2040 (Thames Water)



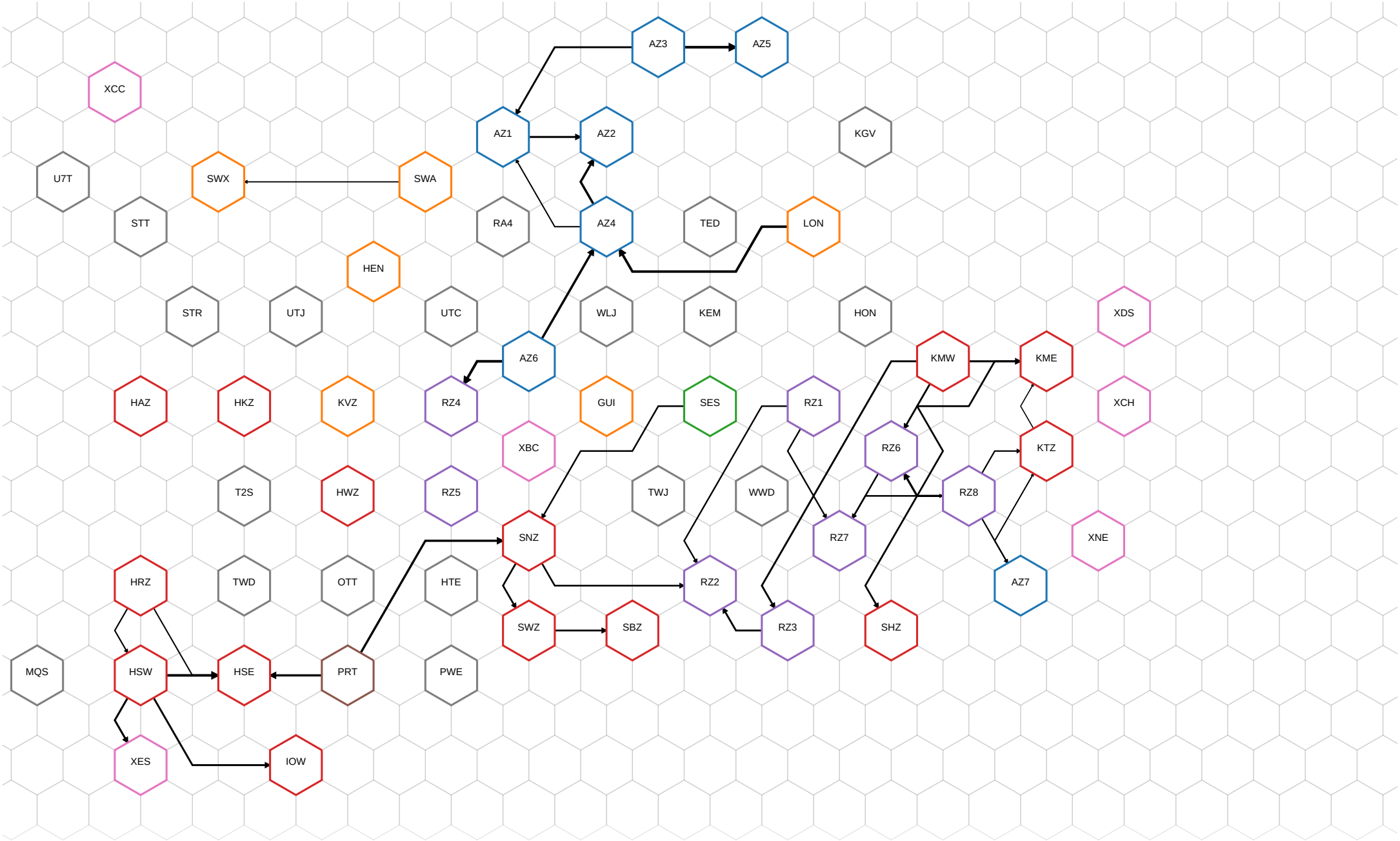
Situation 4 - 2050 (Thames Water)



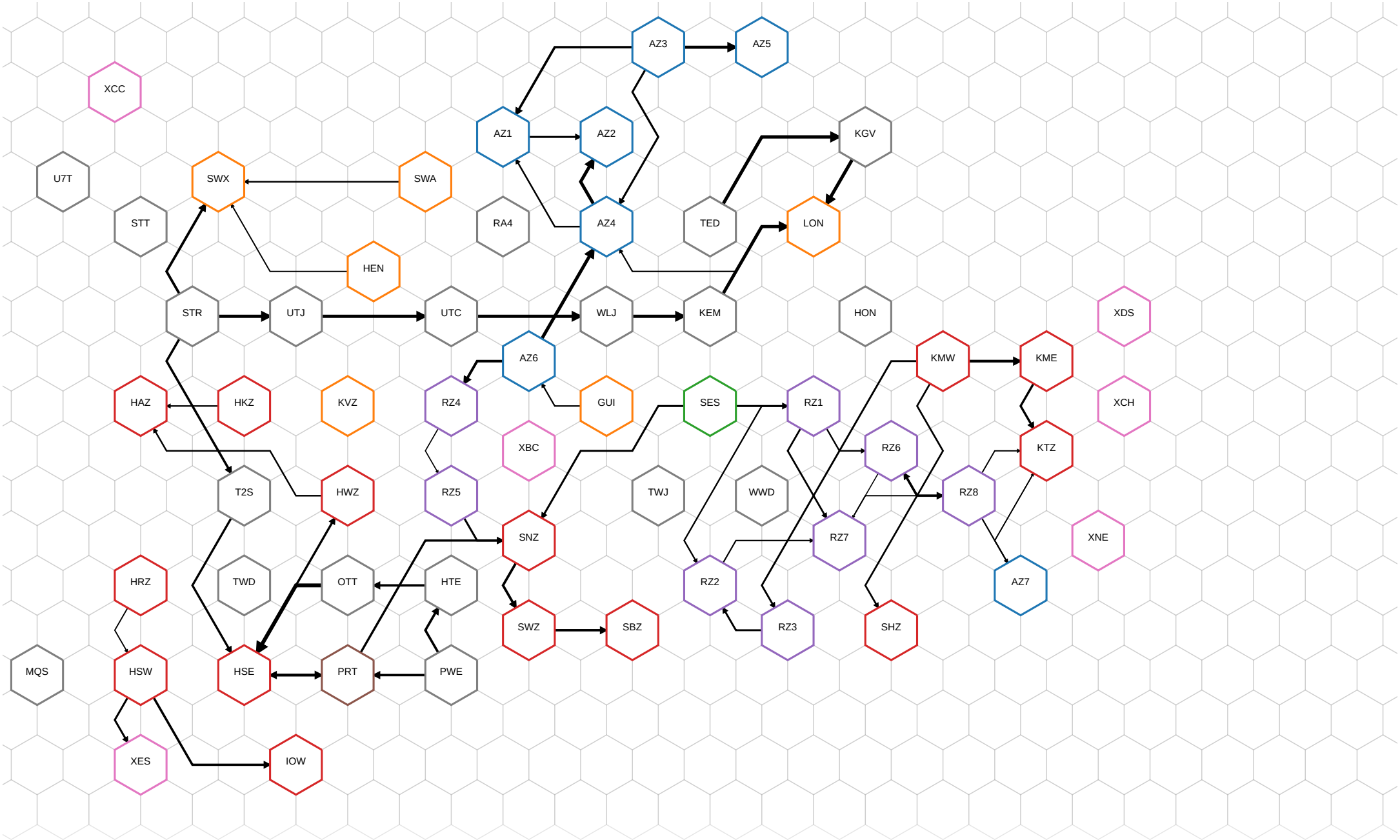
Situation 4 - 2075 (Thames Water)



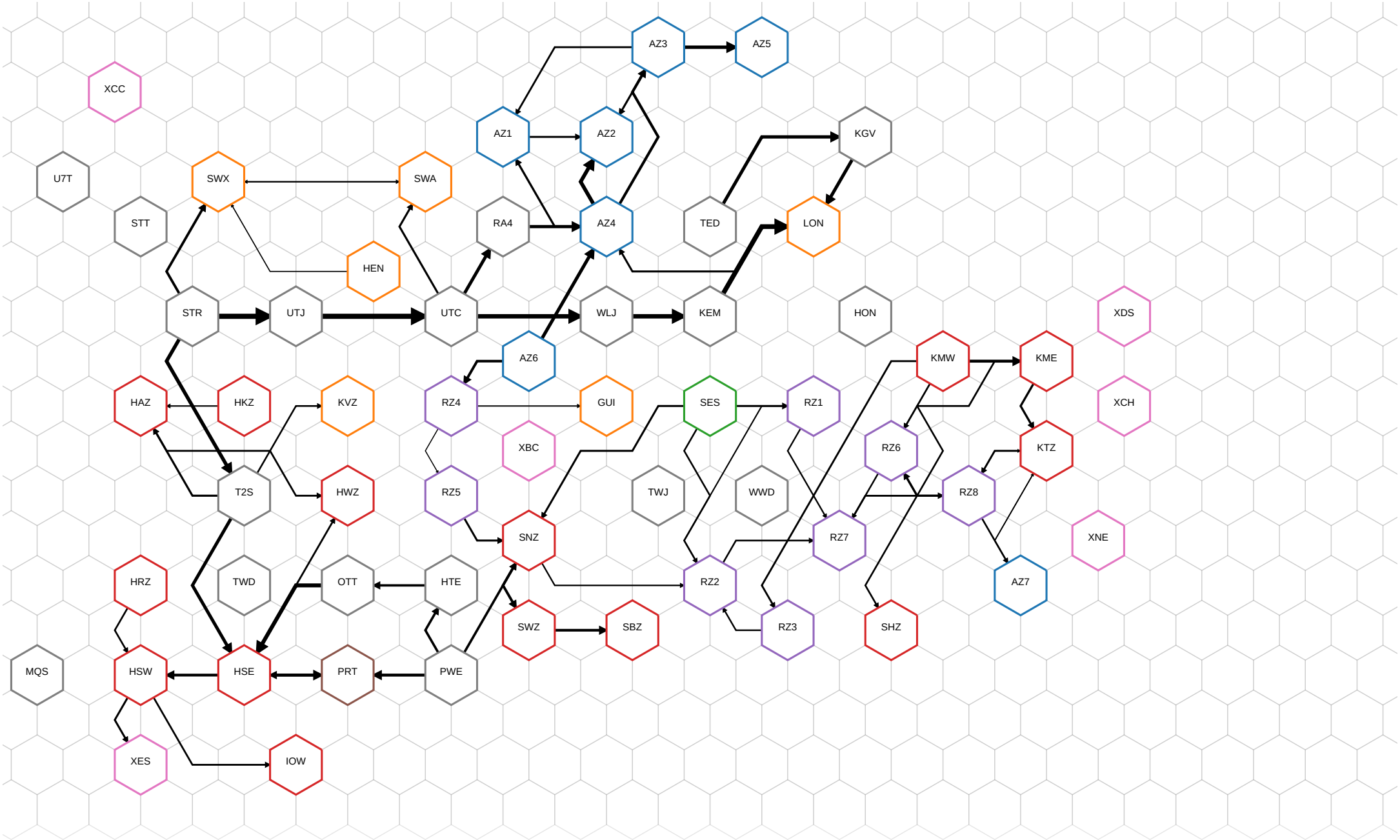
Situation 4 - 2026



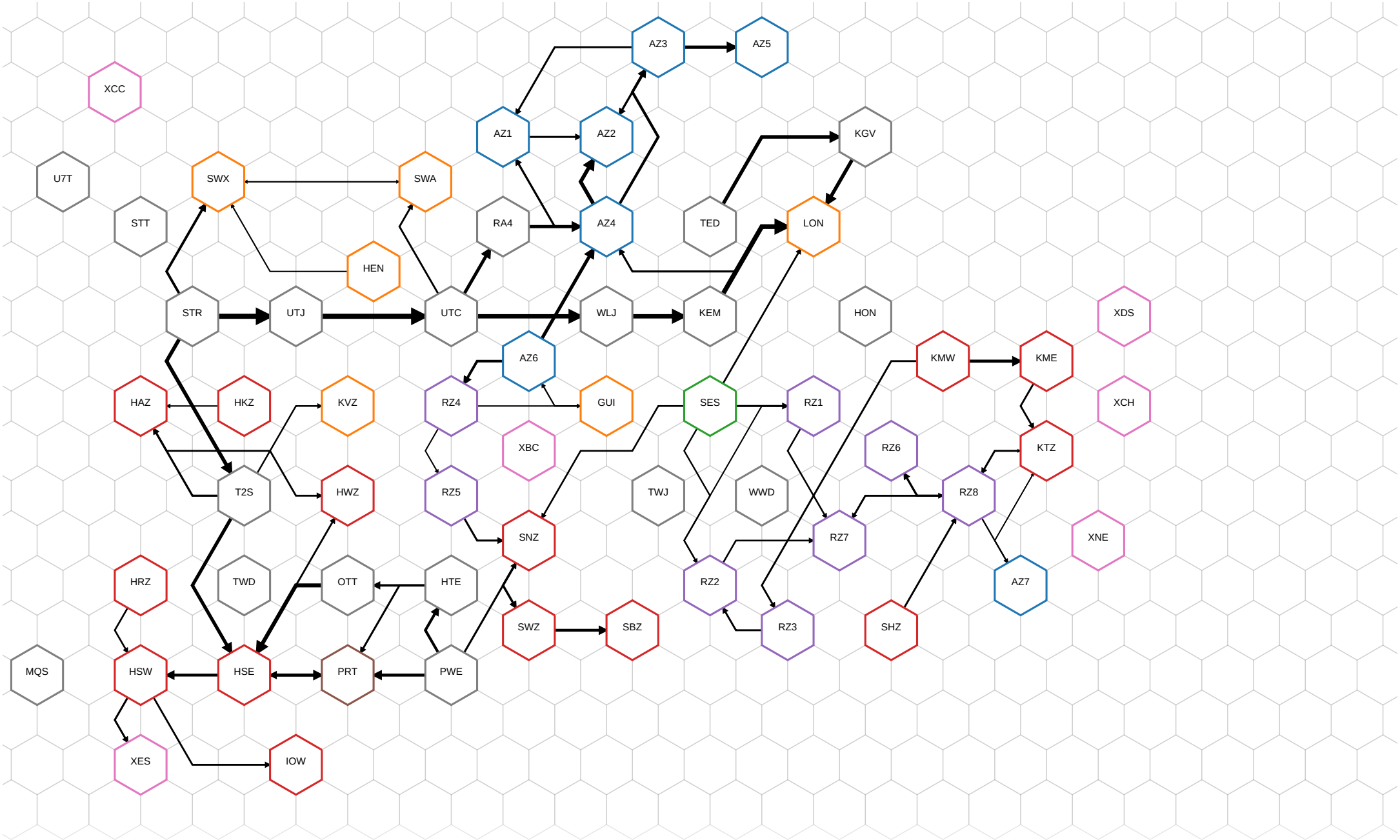
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

GENERAL BVP + SESRO 125

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-only-guc100-only-sesro125-only-t2a50-2075-bvp-07_50-v3
Description	BVP run with hybrid-c+2 government interventions including only GUC 100 Ml/d, SESRO 125 Mm3 and 50 Ml/d T2A transfer. Constrained to 7.5% improvement in worst BVP metrics from "st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-only-sesro150-2075".
Created at	17/07/2023, 20:21:47
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2-only-guc100-only-sesro125-only-t2a50
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets. Exclude all GUC variants except 100. Exclude all SESRO variants except 125. Excludes T2A 100 Ml/d transfer (i.e. only 50 Ml/d).
Optimised discount rate	STPR

Metrics

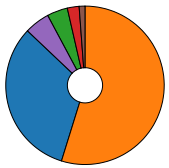
Net present value (Cost)

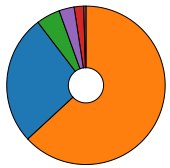
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	20,920	17,823	17,093	19,362	17,735	16,917	18,072	17,213	16,491	(£m)
Cost w/o deficit (STPR)	20,920	17,823	17,093	19,362	17,735	16,917	18,072	17,213	16,491	(£m)
Cost w/ deficit (IGEQ)	31,996	26,134	24,819	29,045	25,985	24,528	26,689	25,076	23,773	(£m)
Cost w/o deficit (IGEQ)	31,996	26,134	24,819	29,045	25,985	24,528	26,689	25,076	23,773	(£m)
Cost w/ deficit (LTDR)	23,063	19,460	18,621	21,251	19,361	18,424	19,764	18,766	17,936	(£m)
Cost w/o deficit (LTDR)	23,063	19,460	18,621	21,251	19,361	18,424	19,764	18,766	17,936	(£m)

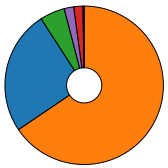
Cost breakdown (STPR)

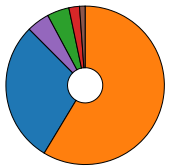
Select Company: Total

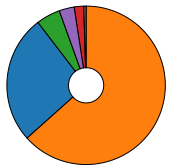
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	6,753	4,725	4,331	5,595	4,651	4,173	4,823	4,376	3,929	(£m)
Fixed opex	11,463	11,251	11,201	11,353	11,241	11,185	11,254	11,202	11,142	(£m)
Fixed operational carbon	884	869	868	877	870	870	871	867	866	(£m)
Embedded carbon	503	349	324	420	346	316	365	327	299	(£m)
Variable opex	1,070	549	328	898	543	323	657	401	237	(£m)
Variable carbon opex	247	81	40	219	85	51	102	41	18	(£m)

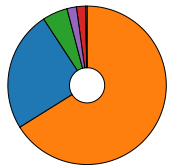
situation1 

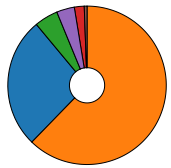
situation2 

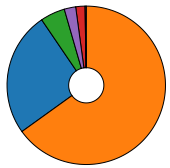
situation3 

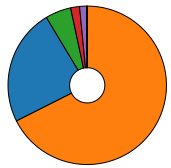
situation4 

situation5 

situation6 

situation7 

situation8 

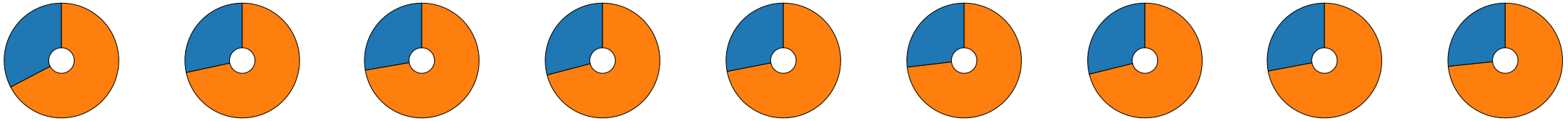
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,237,807	2,132,356	1,968,930	2,630,567	2,113,879	1,915,189	2,258,703	1,993,037	1,807,760	(tonnes)
Operational emissions	6,679,858	5,385,598	5,135,825	6,413,821	5,417,893	5,216,489	5,573,860	5,134,830	4,980,417	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

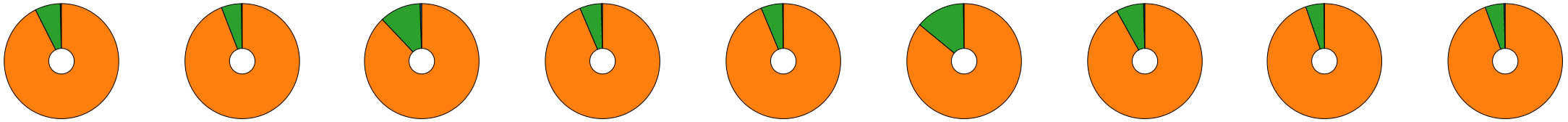


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	85	32	25	74	27	11	57	12	11	(GWh)
Grid	22,671	11,363	4,286	19,467	10,971	3,874	13,207	7,979	2,916	(GWh)
Renewable	1,747	680	565	1,264	713	625	1,115	433	165	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	65,508.00	65,338.00	65,338.00	69,341.00	65,338.00	65,338.00	66,099.00	65,338.00	65,338.00	
SEA environmental disbenefit	105,001.00	79,026.00	72,960.00	103,064.00	77,810.00	71,879.00	82,459.00	69,518.00	62,472.00	
Natural capital	83,975,599.63	81,616,396.29	81,908,760.45	81,270,674.41	81,125,975.00	81,900,192.11	81,278,392.35	82,048,039.73	82,368,763.08	
Bio-diversity net gain	−189,168.00	−140,381.00	−118,110.00	−197,535.00	−138,945.00	−113,064.00	−142,348.00	−115,346.00	−90,253.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	36,473.00	35,108.00	34,847.00	36,864.00	35,152.00	34,820.00	35,293.00	34,579.00	34,247.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	29.21	28.81	31.52	28.86	29.01	31.67	30.35	33.66	37.48	
R1: Uncertainty of option supply/demand benefit	6.07	5.35	5.82	5.76	5.40	5.85	5.77	6.29	6.98	
R3: Risk of service failure due to other physical hazards	6.90	7.13	7.98	6.92	7.18	8.02	7.48	8.49	9.69	
R4: Availability of additional headroom	6.56	6.90	7.10	6.64	6.92	7.13	7.24	7.60	7.84	
R5: Catchment/raw water quality risks (incl. climate change)	4.04	4.01	4.54	3.76	4.04	4.56	4.17	4.81	5.56	
R6: Capacity of catchment services	0.31	0.01	0.01	0.31	0.00	0.01	0.00	0.01	0.01	
R7: Risk of service failure to other exceptional events	5.23	5.42	6.08	5.36	5.47	6.12	5.69	6.46	7.40	
R8: Soil health	0.11	0.00	0.00	0.11	0.00	0.00	0.00	0.00	0.00	

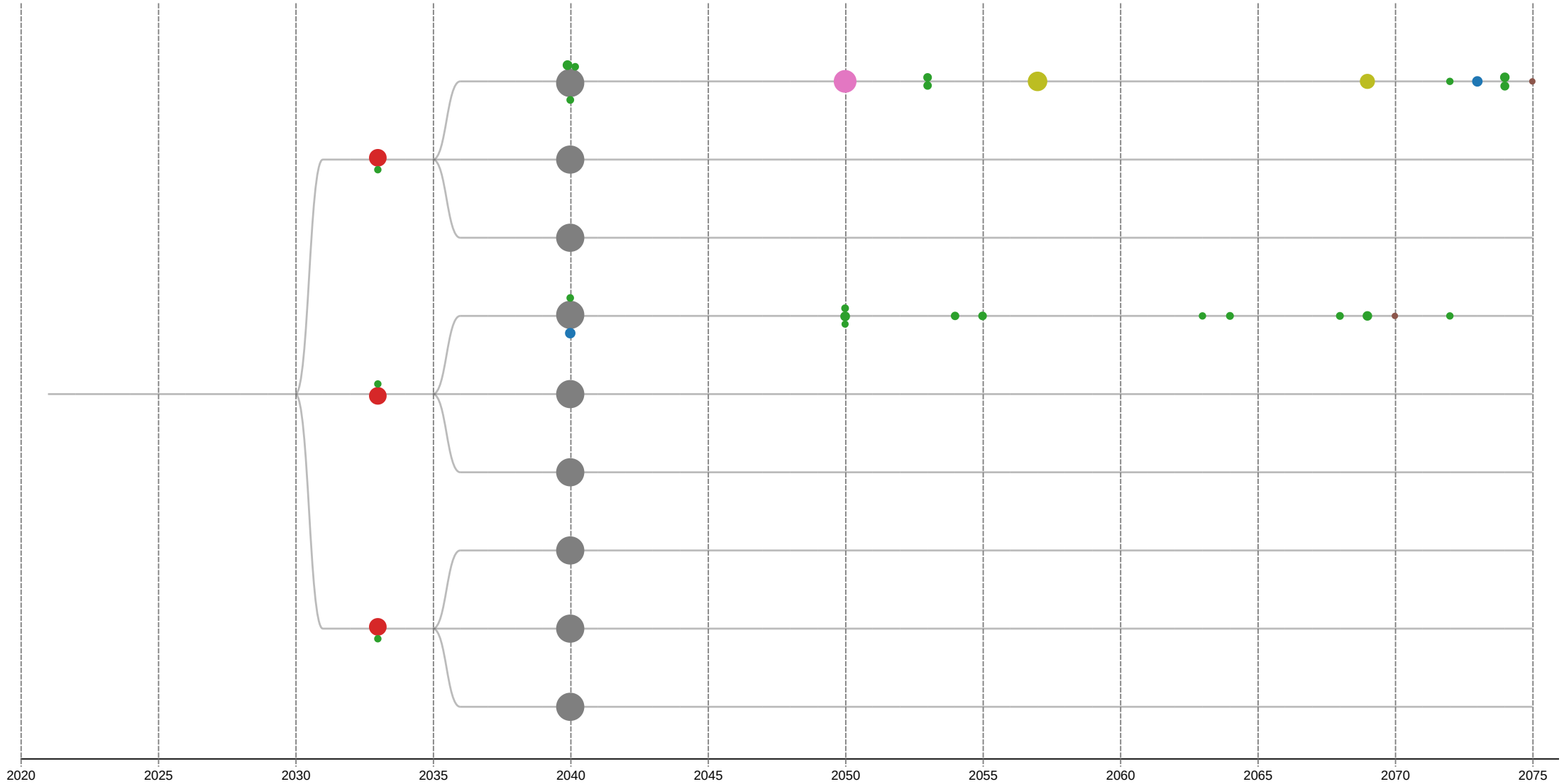
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	14.36	15.40	17.23	14.28	15.48	17.08	15.97	18.19	20.71	
A3: Operational complexity and flexibility	6.40	6.85	7.70	6.60	6.92	7.77	7.16	8.22	9.44	
A4: WRZ connectivity	7.83	8.52	9.50	7.55	8.54	9.27	8.78	9.94	11.23	
A7: Customer relations support engagement with demand management	0.13	0.03	0.03	0.13	0.03	0.03	0.03	0.03	0.03	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.65	19.70	21.86	19.63	19.88	21.96	20.60	23.39	26.50	
E1: Scaleability and modularity of proposed changes	8.83	9.28	10.34	8.82	9.38	10.43	9.65	11.07	12.61	
E2: Intervention lead times	4.14	4.03	4.41	4.12	4.06	4.37	4.28	4.71	5.24	
E3: Reliance on external bodies to deliver changes	6.22	6.37	7.10	6.23	6.43	7.15	6.67	7.60	8.65	
E5: Collaborative land management	0.46	0.01	0.01	0.46	0.01	0.01	0.00	0.01	0.01	

Option Selection (Thames Water)



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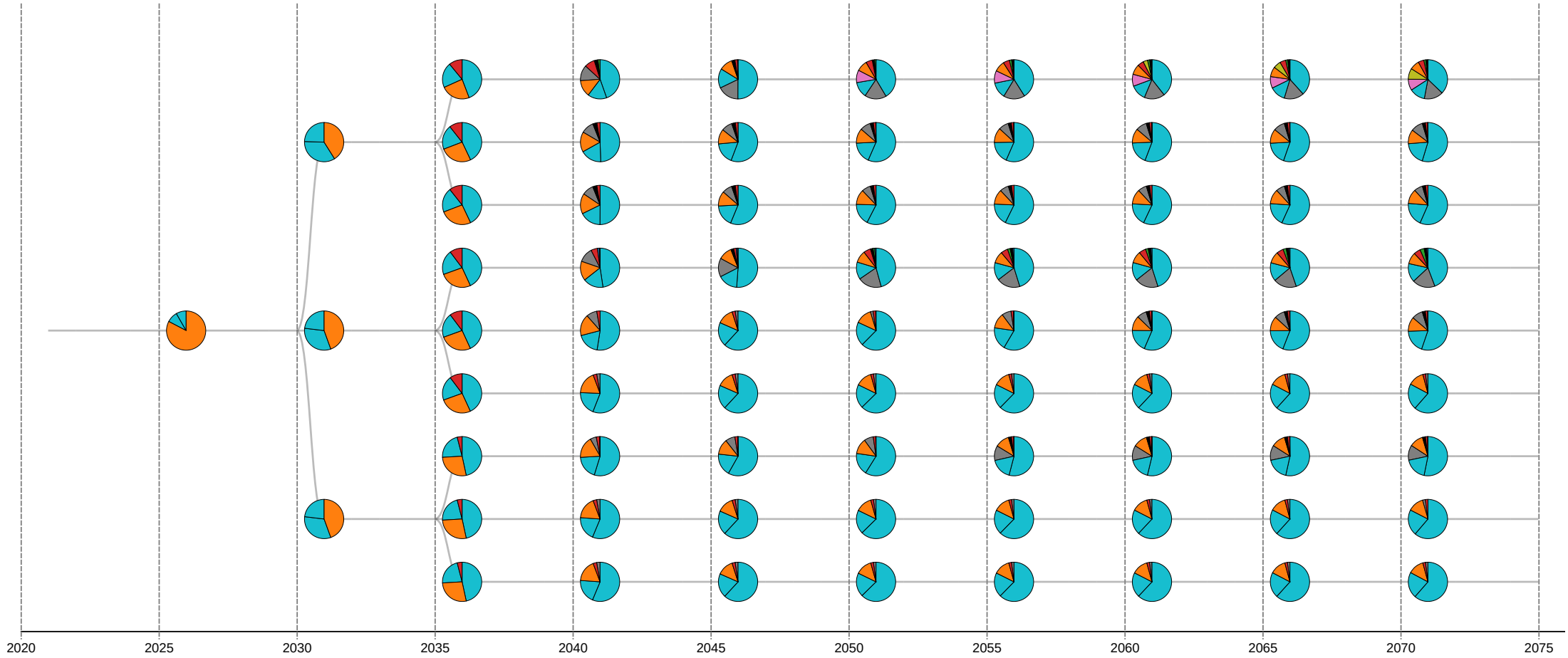
Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.



- Transfer
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- Trading
- Catchment management
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- Reservoir
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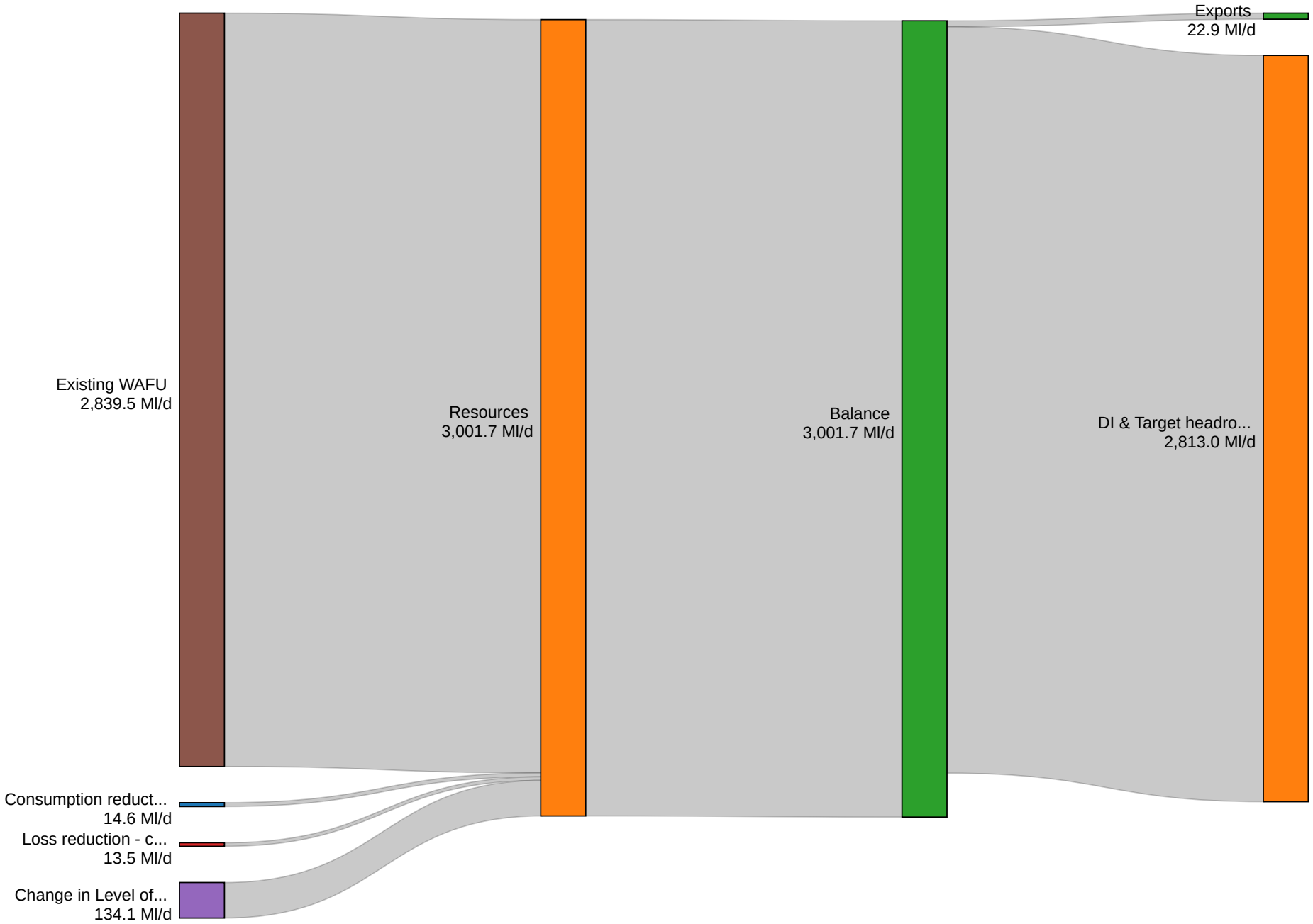
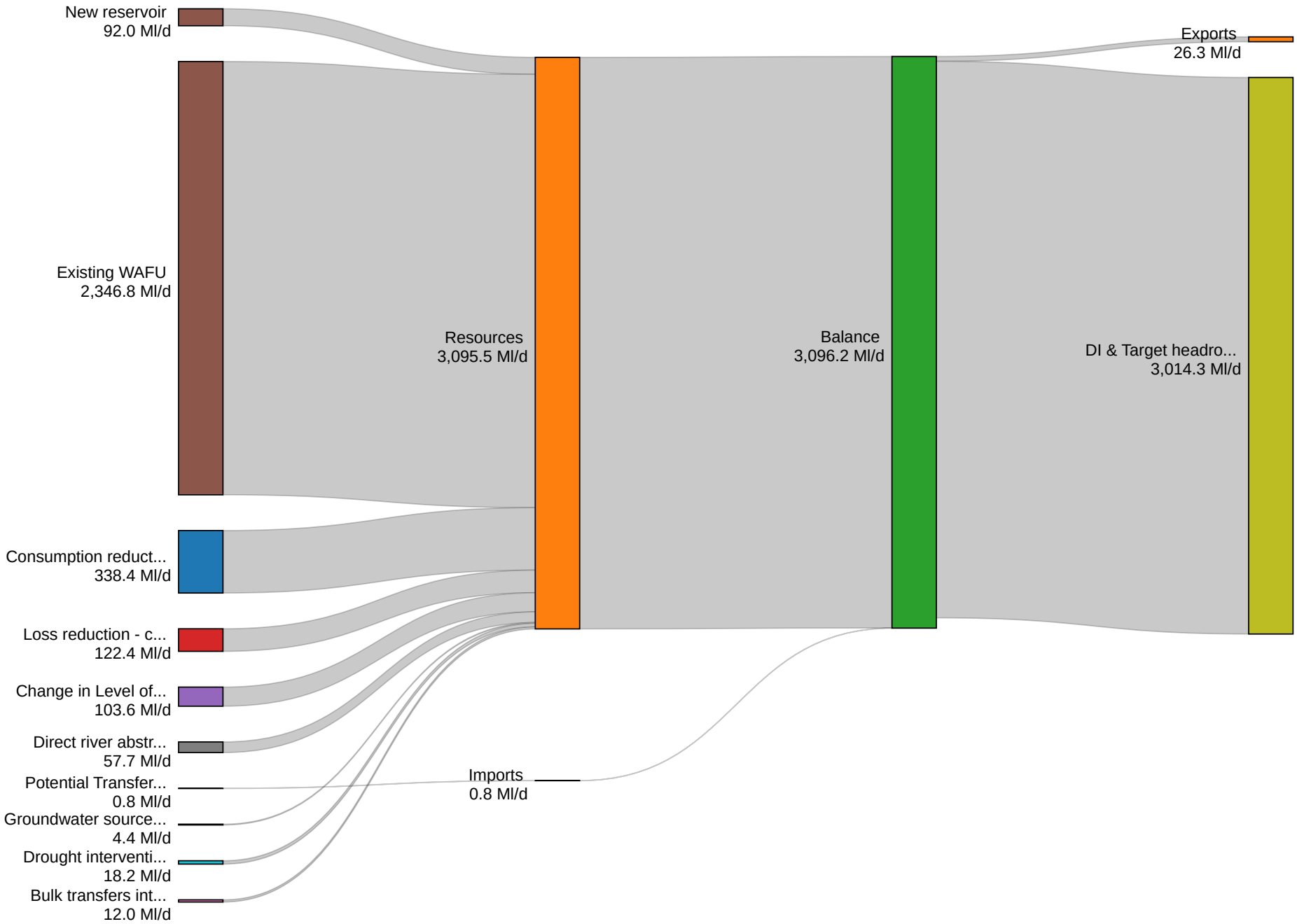
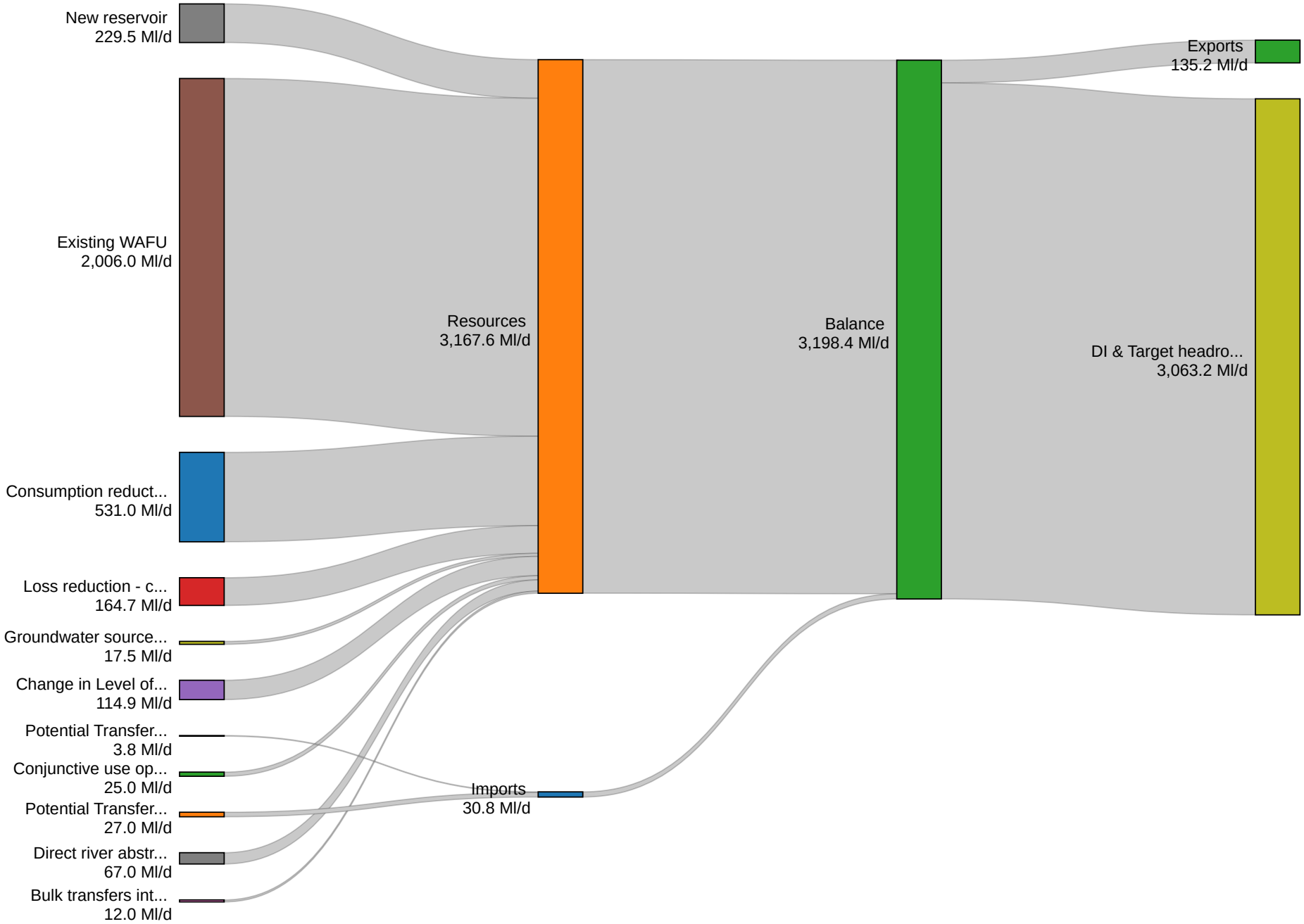
Situation 4 - 2026 (Thames Water)



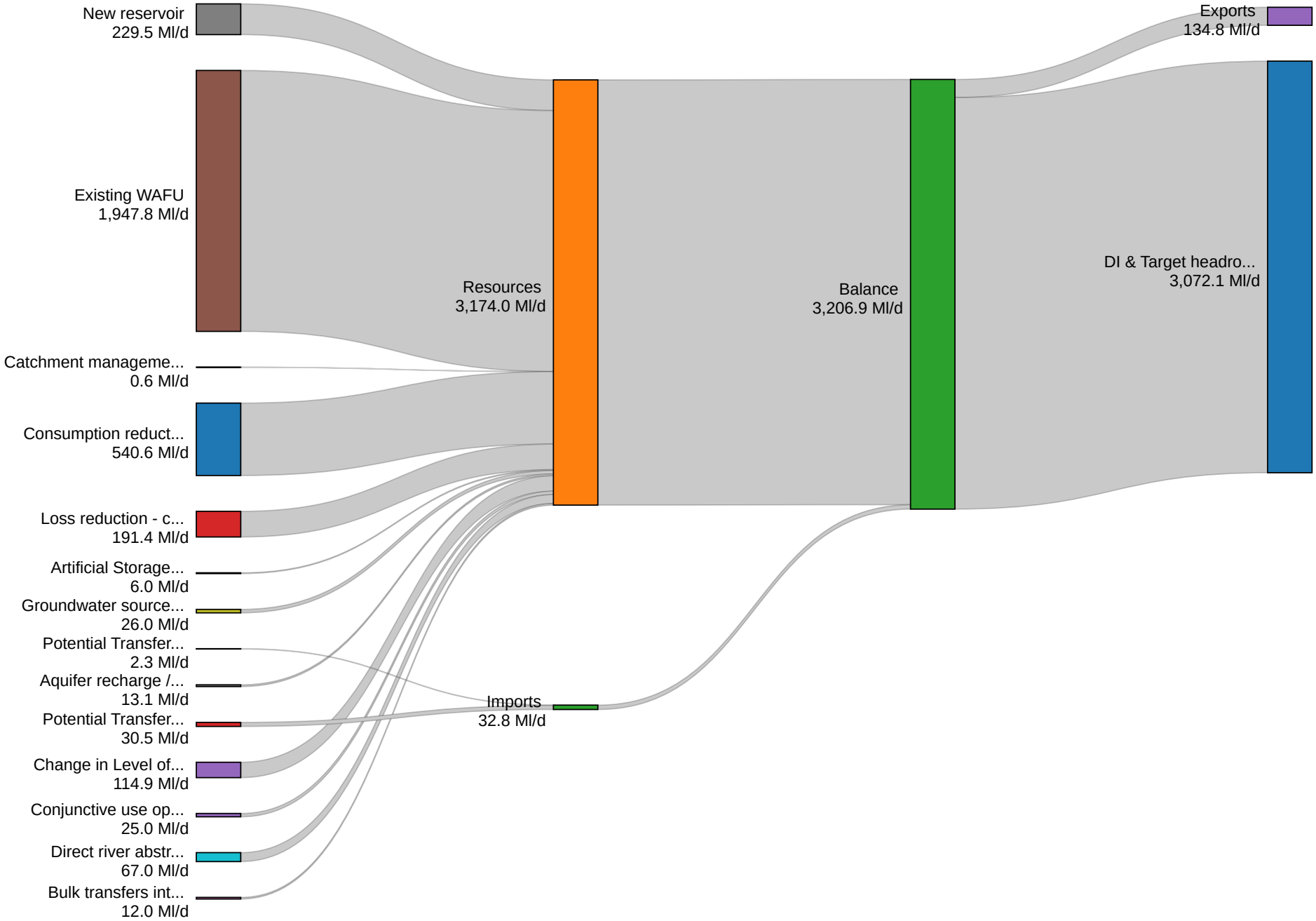
Situation 4 - 2040 (Thames Water)



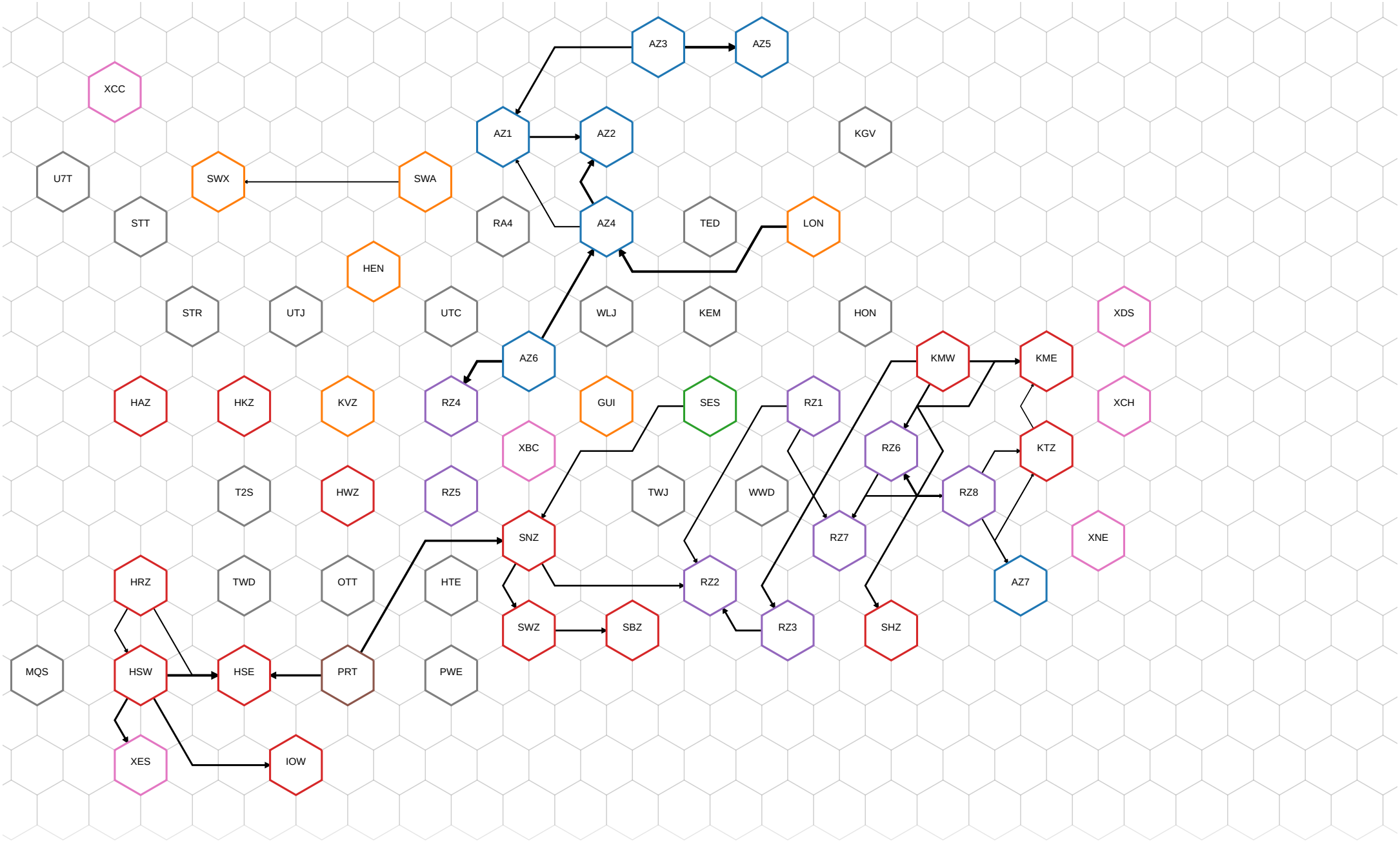
Situation 4 - 2050 (Thames Water)



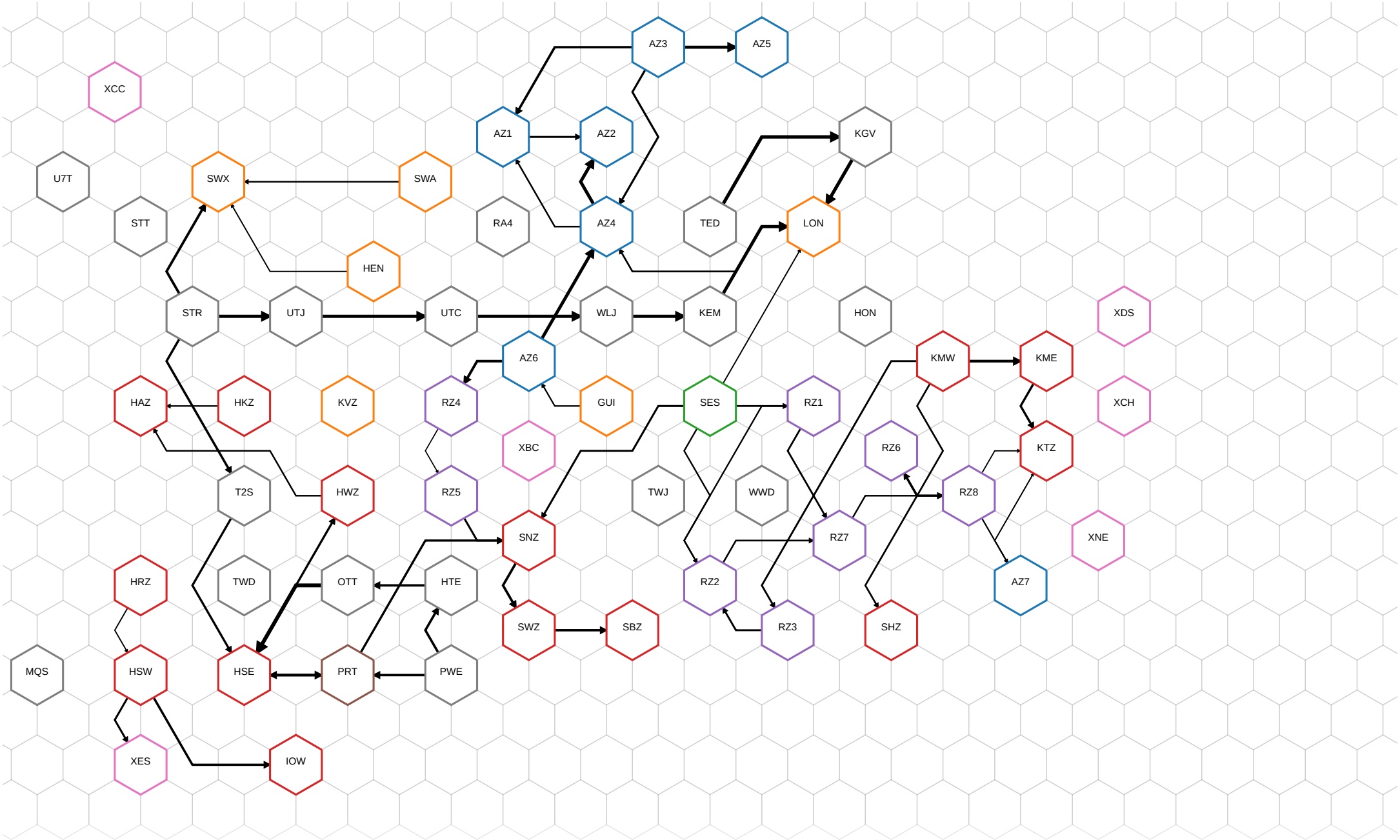
Situation 4 - 2075 (Thames Water)



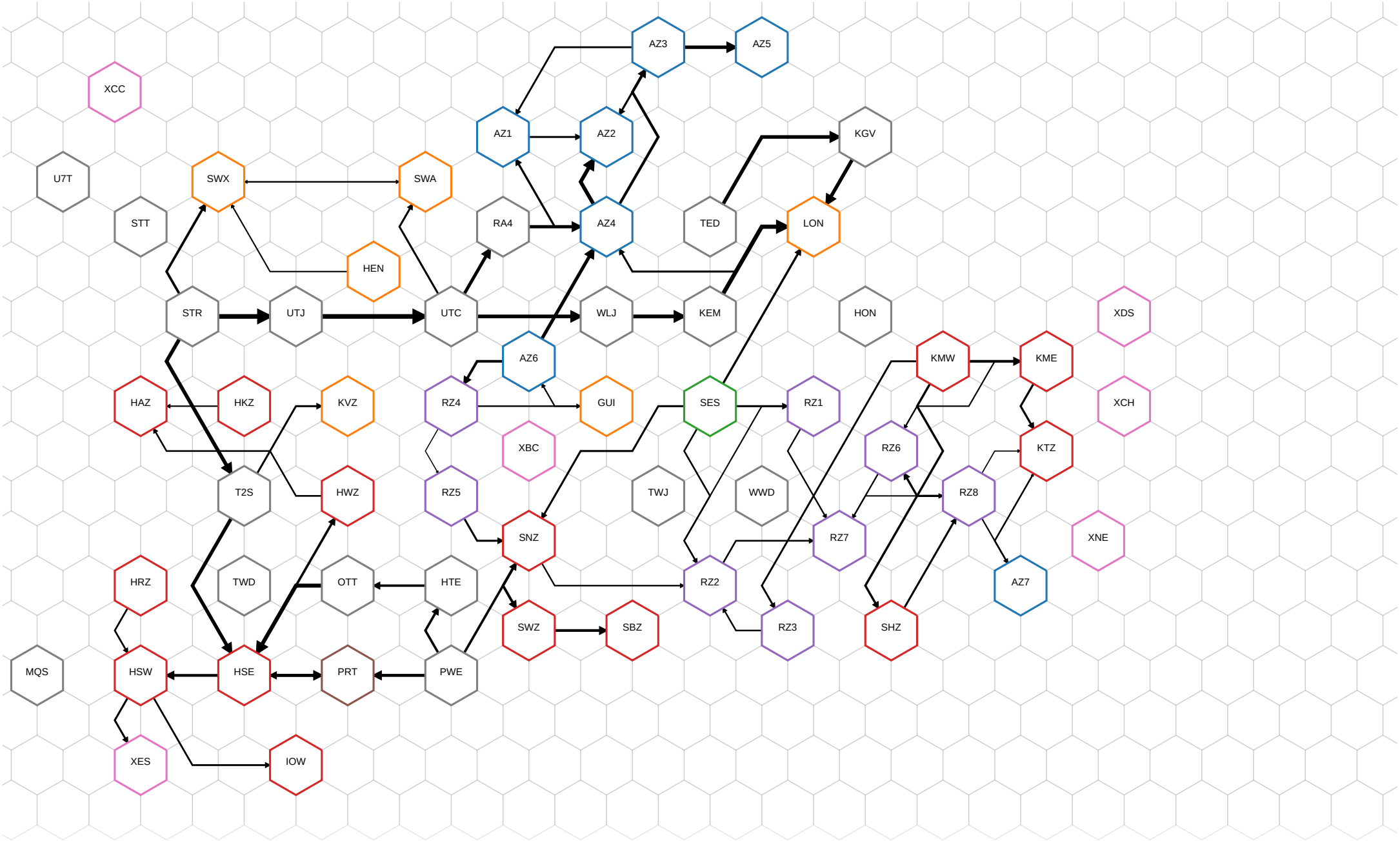
Situation 4 - 2026



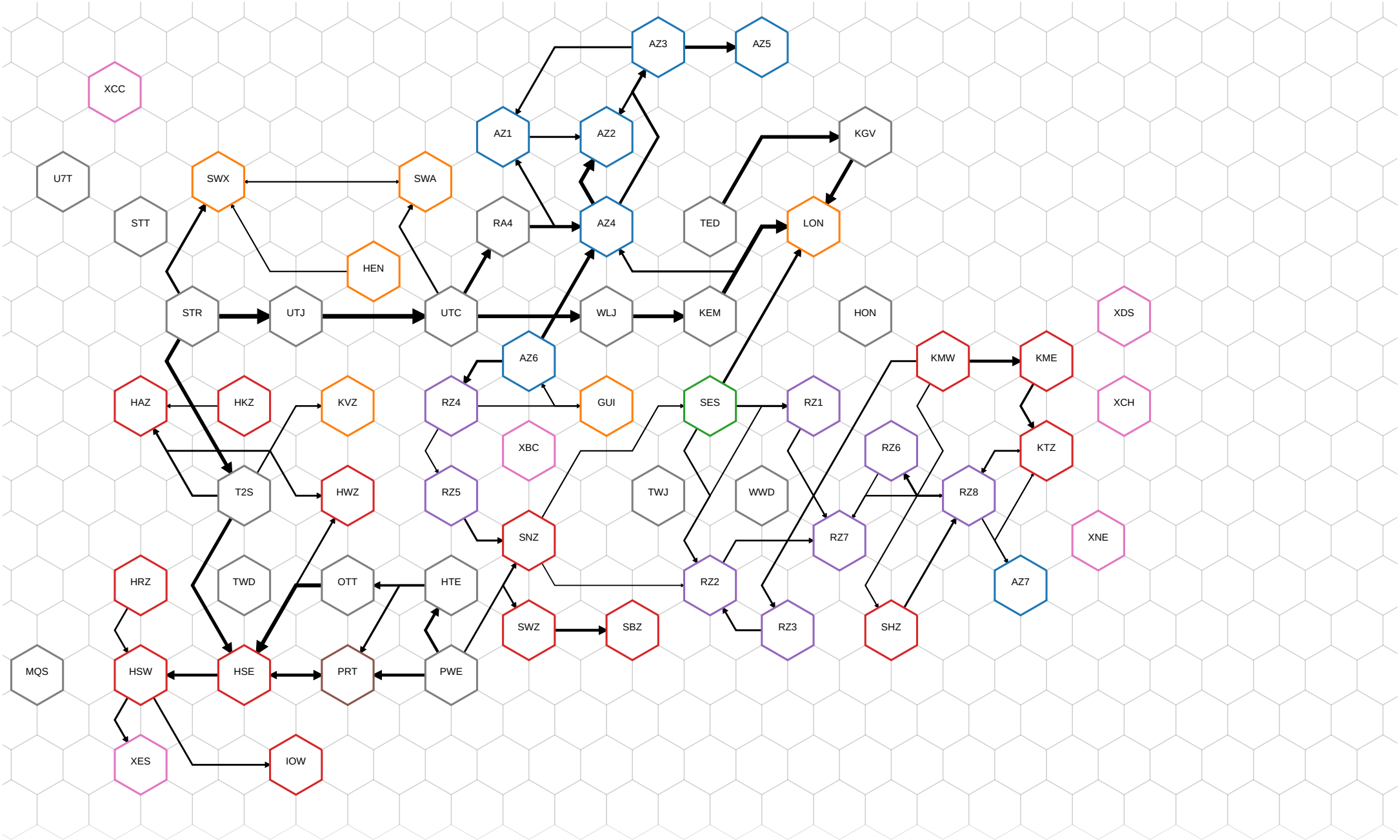
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

GENERAL BVP + SESRO 100

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-only-guc100-only-sesro100-only-t2a50-2075-bvp-07_50-v3
Description	BVP run with hybrid-c+2 government interventions including only GUC 100 Ml/d, SESRO 100 Mm3 and 50 Ml/d T2A transfer. Constrained to 7.5% improvement in worst BVP metrics from "st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-only-sesro150-2075".
Created at	17/07/2023, 21:18:00
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2-only-guc100-only-sesro100-only-t2a50
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets. Exclude all GUC variants except 100. Exclude all SESRO variants except 100. Excludes T2A 100 Ml/d transfer (i.e. only 50 Ml/d).
Optimised discount rate	STPR

Metrics

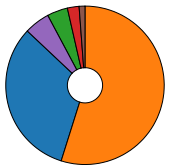
Net present value (Cost)

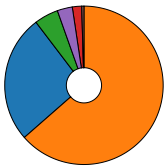
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	20,915	17,709	16,970	19,450	17,602	16,783	17,971	17,109	16,385	(£m)
Cost w/o deficit (STPR)	20,915	17,709	16,970	19,450	17,602	16,783	17,971	17,109	16,385	(£m)
Cost w/ deficit (IGEQ)	32,065	25,976	24,637	29,274	25,797	24,335	26,552	24,936	23,629	(£m)
Cost w/o deficit (IGEQ)	32,065	25,976	24,637	29,274	25,797	24,335	26,552	24,936	23,629	(£m)
Cost w/ deficit (LTDR)	23,070	19,338	18,487	21,364	19,217	18,278	19,655	18,655	17,822	(£m)
Cost w/o deficit (LTDR)	23,070	19,338	18,487	21,364	19,217	18,278	19,655	18,655	17,822	(£m)

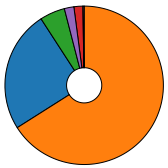
Cost breakdown (STPR)

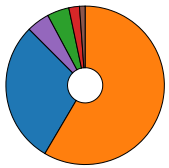
Select Company: Total

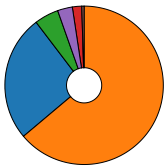
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	6,728	4,622	4,214	5,649	4,539	4,057	4,732	4,281	3,831	(£m)
Fixed opex	11,473	11,255	11,202	11,373	11,242	11,185	11,258	11,205	11,146	(£m)
Fixed operational carbon	884	869	870	877	869	869	873	868	867	(£m)
Embedded carbon	499	338	311	423	336	305	356	318	290	(£m)
Variable opex	1,083	545	329	907	533	317	651	395	233	(£m)
Variable carbon opex	248	81	43	221	84	51	101	41	18	(£m)

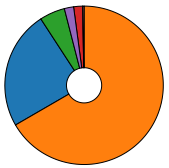
situation1 

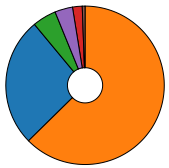
situation2 

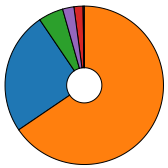
situation3 

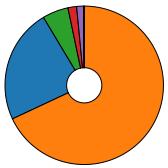
situation4 

situation5 

situation6 

situation7 

situation8 

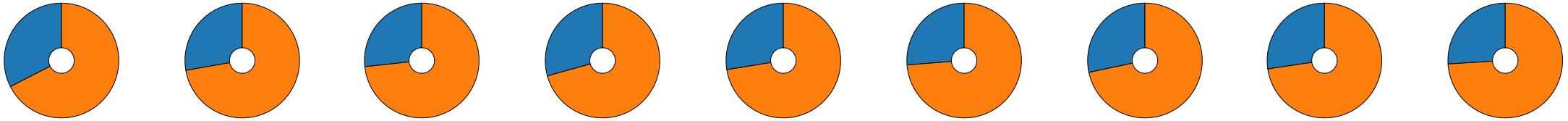
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,225,180	2,068,249	1,885,191	2,668,325	2,056,526	1,851,224	2,205,161	1,936,893	1,750,319	(tonnes)
Operational emissions	6,692,577	5,386,200	5,168,054	6,428,763	5,406,295	5,206,765	5,579,642	5,145,321	4,991,360	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

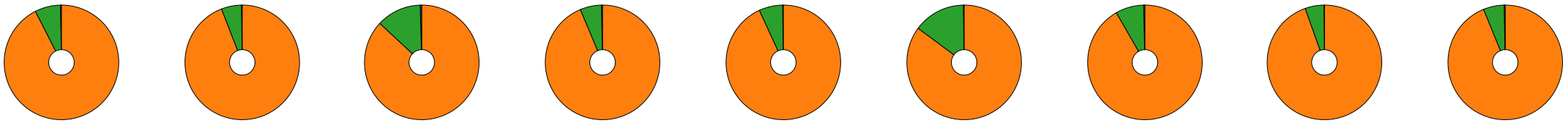


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	72	29	23	65	24	10	52	11	10	(GWh)
Grid	22,736	11,328	4,260	19,693	10,737	3,816	13,108	7,941	2,911	(GWh)
Renewable	1,772	680	619	1,263	767	656	1,135	448	181	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	65,692.00	65,338.00	65,338.00	68,993.00	65,338.00	65,338.00	65,844.00	65,338.00	65,338.00	
SEA environmental disbenefit	104,995.00	78,108.00	71,521.00	102,778.00	76,394.00	70,672.00	83,288.00	70,138.00	63,117.00	
Natural capital	84,722,539.47	80,937,505.47	82,761,460.13	80,957,004.06	80,934,392.68	82,702,729.19	82,092,115.05	82,843,616.97	83,107,764.39	
Bio-diversity net gain	−179,911.00	−122,836.00	−99,537.00	−177,610.00	−128,289.00	−99,334.00	−131,932.00	−103,677.00	−77,567.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	36,592.00	35,139.00	34,855.00	36,819.00	35,093.00	34,735.00	35,392.00	34,616.00	34,354.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	28.41	28.22	30.74	28.28	28.34	30.91	29.63	32.83	36.52	
R1: Uncertainty of option supply/demand benefit	5.88	5.20	5.67	5.64	5.27	5.71	5.62	6.12	6.78	
R3: Risk of service failure due to other physical hazards	6.67	6.92	7.76	6.75	7.01	7.81	7.28	8.27	9.43	
R4: Availability of additional headroom	6.52	6.84	7.05	6.60	6.87	7.08	7.19	7.55	7.79	
R5: Catchment/raw water quality risks (incl. climate change)	4.00	3.89	4.39	3.71	3.91	4.41	4.04	4.66	5.38	
R6: Capacity of catchment services	0.26	0.11	0.01	0.29	0.01	0.01	0.00	0.01	0.01	
R7: Risk of service failure to other exceptional events	4.98	5.22	5.86	5.17	5.27	5.89	5.49	6.23	7.14	
R8: Soil health	0.10	0.03	0.00	0.11	0.00	0.00	0.00	0.00	0.00	

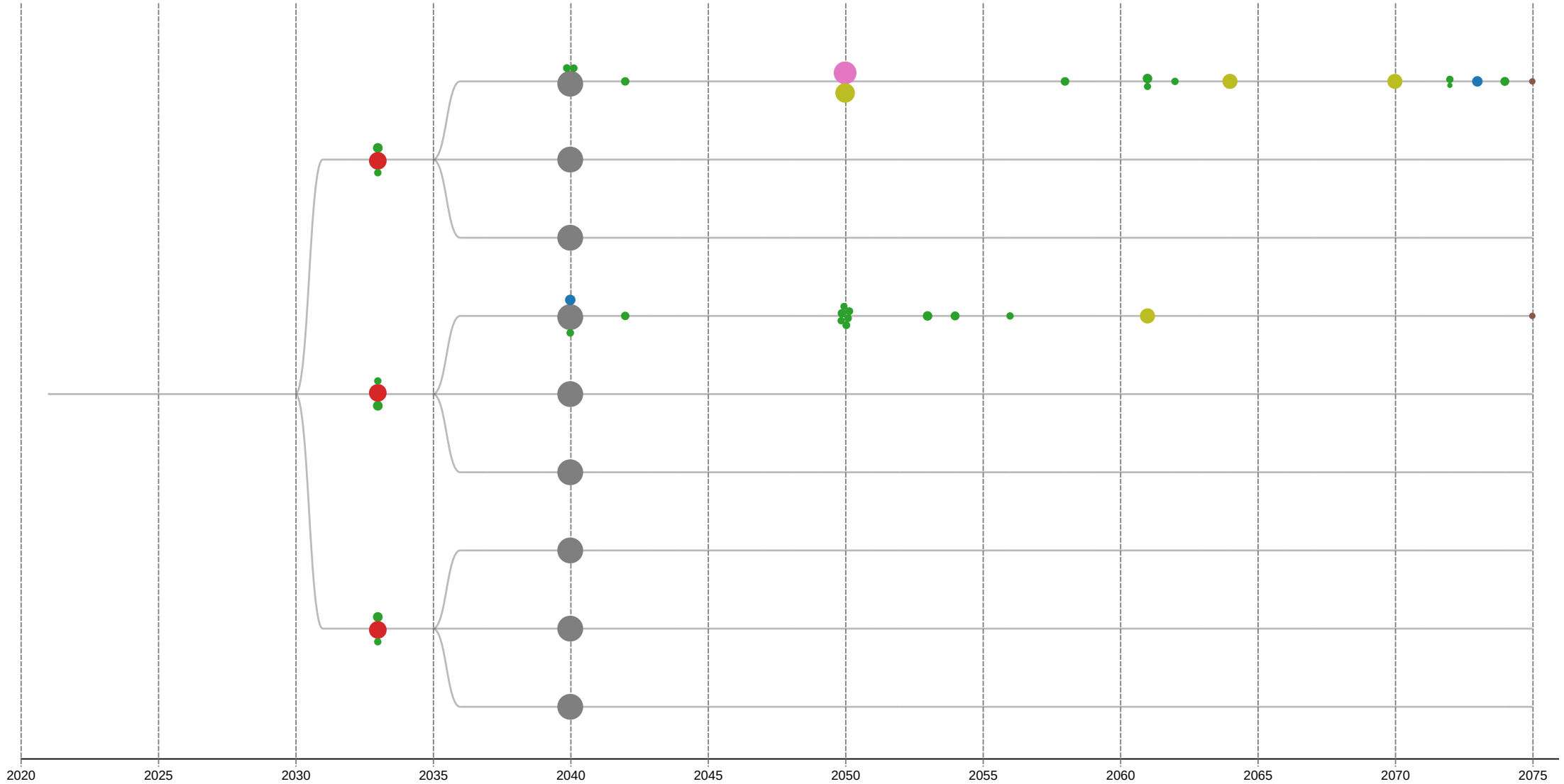
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	14.33	15.22	16.95	14.27	15.25	16.77	15.72	17.87	20.32	
A3: Operational complexity and flexibility	6.15	6.65	7.48	6.41	6.72	7.55	6.96	7.99	9.17	
A4: WRZ connectivity	8.06	8.53	9.44	7.74	8.50	9.19	8.73	9.85	11.11	
A7: Customer relations support engagement with demand management	0.12	0.03	0.03	0.11	0.03	0.03	0.03	0.03	0.03	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	19.65	19.96	22.05	19.68	20.05	22.15	20.74	23.59	26.74	
E1: Scaleability and modularity of proposed changes	8.96	9.47	10.57	9.02	9.59	10.67	9.84	11.31	12.89	
E2: Intervention lead times	4.15	4.01	4.40	4.03	4.03	4.33	4.25	4.69	5.21	
E3: Reliance on external bodies to deliver changes	6.14	6.35	7.08	6.21	6.42	7.14	6.65	7.58	8.62	
E5: Collaborative land management	0.41	0.13	0.01	0.42	0.01	0.01	0.00	0.01	0.01	

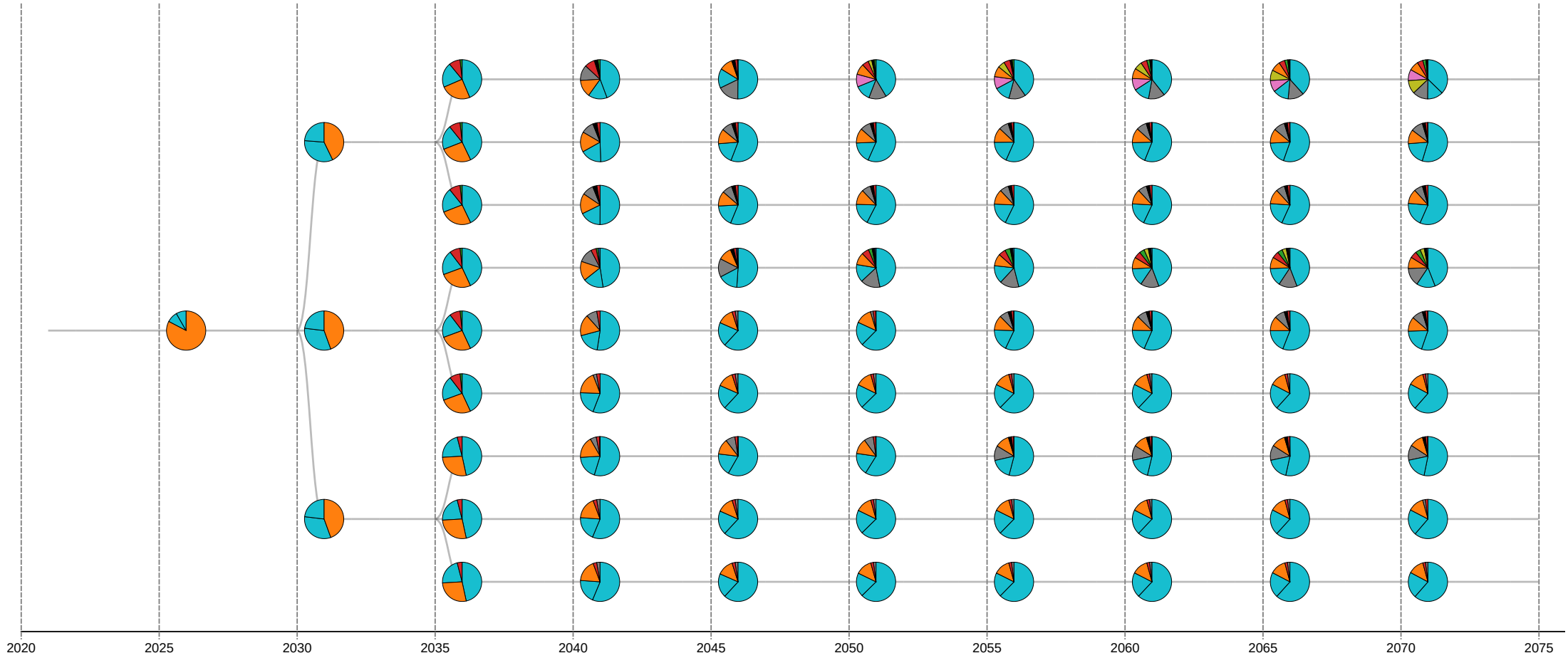
Option Selection (Thames Water)



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

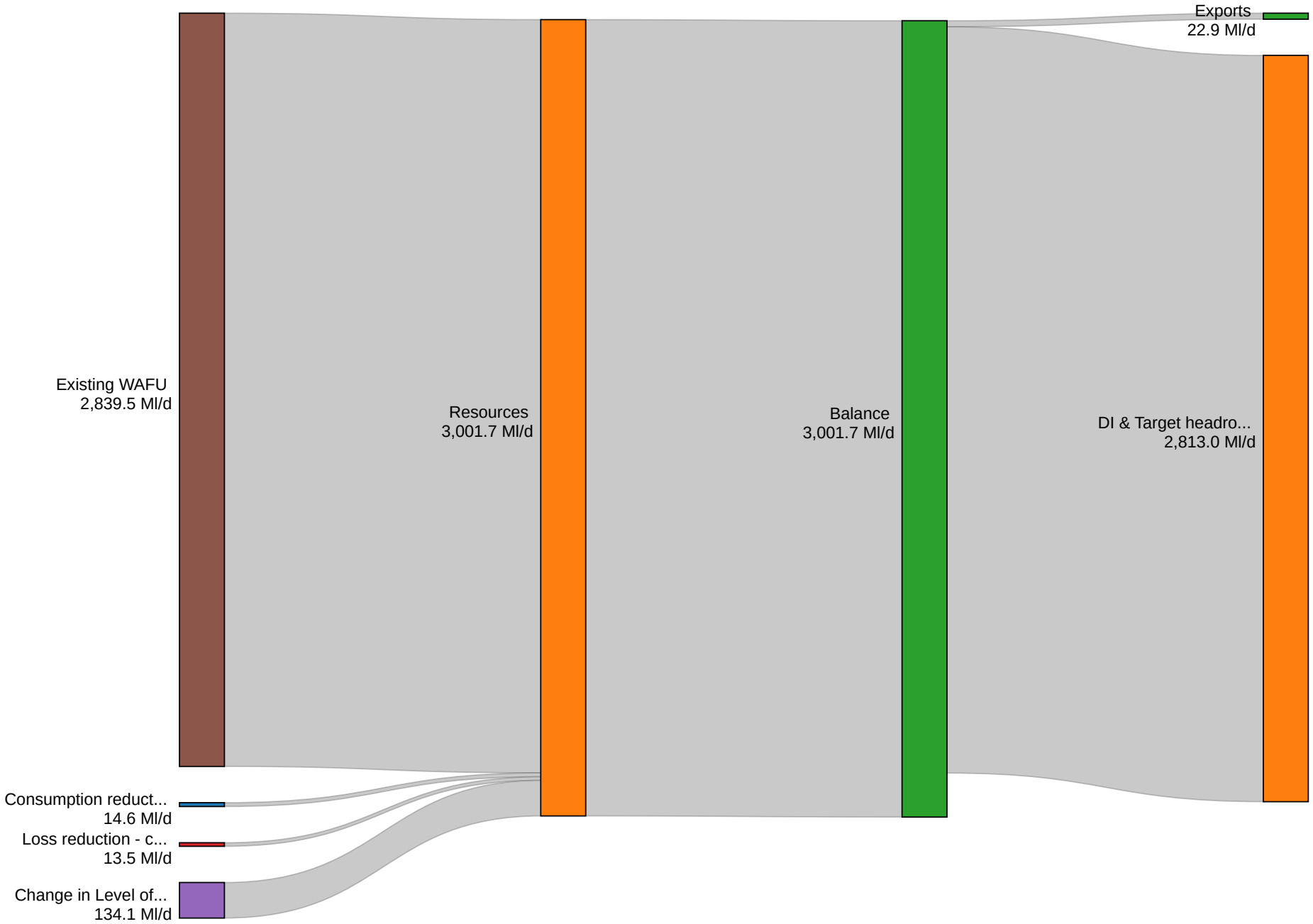
Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.

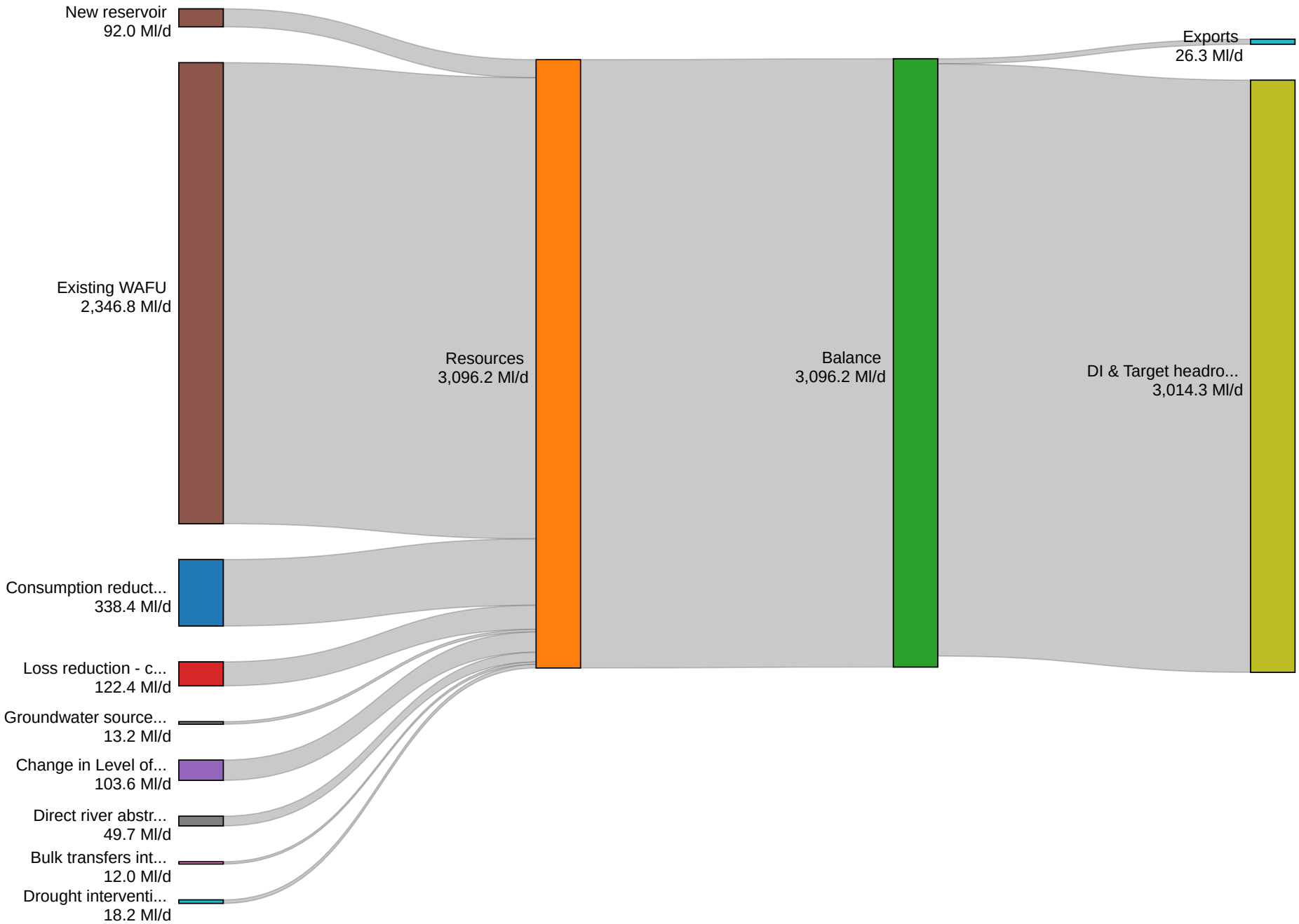


- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

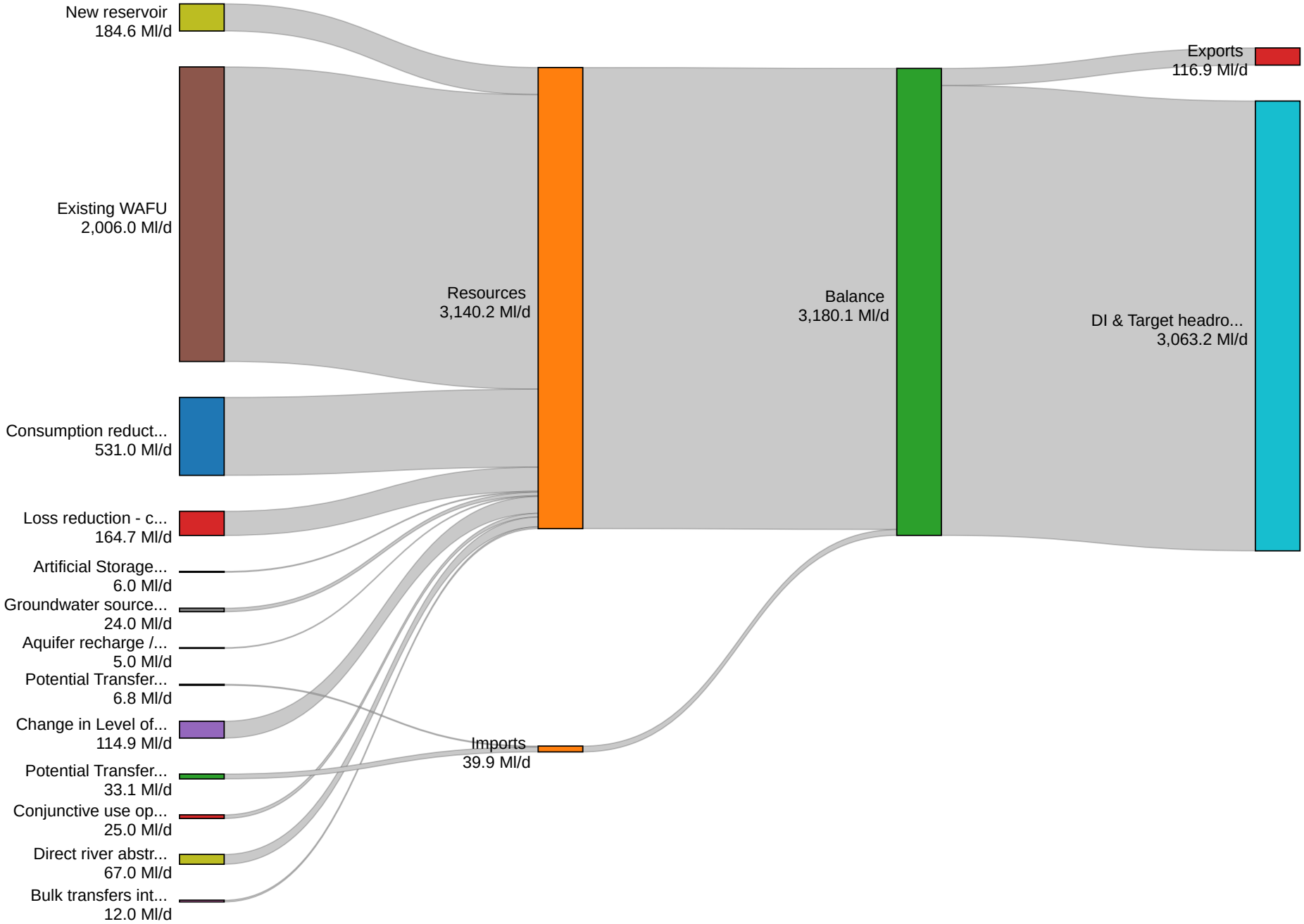
Situation 4 - 2026 (Thames Water)



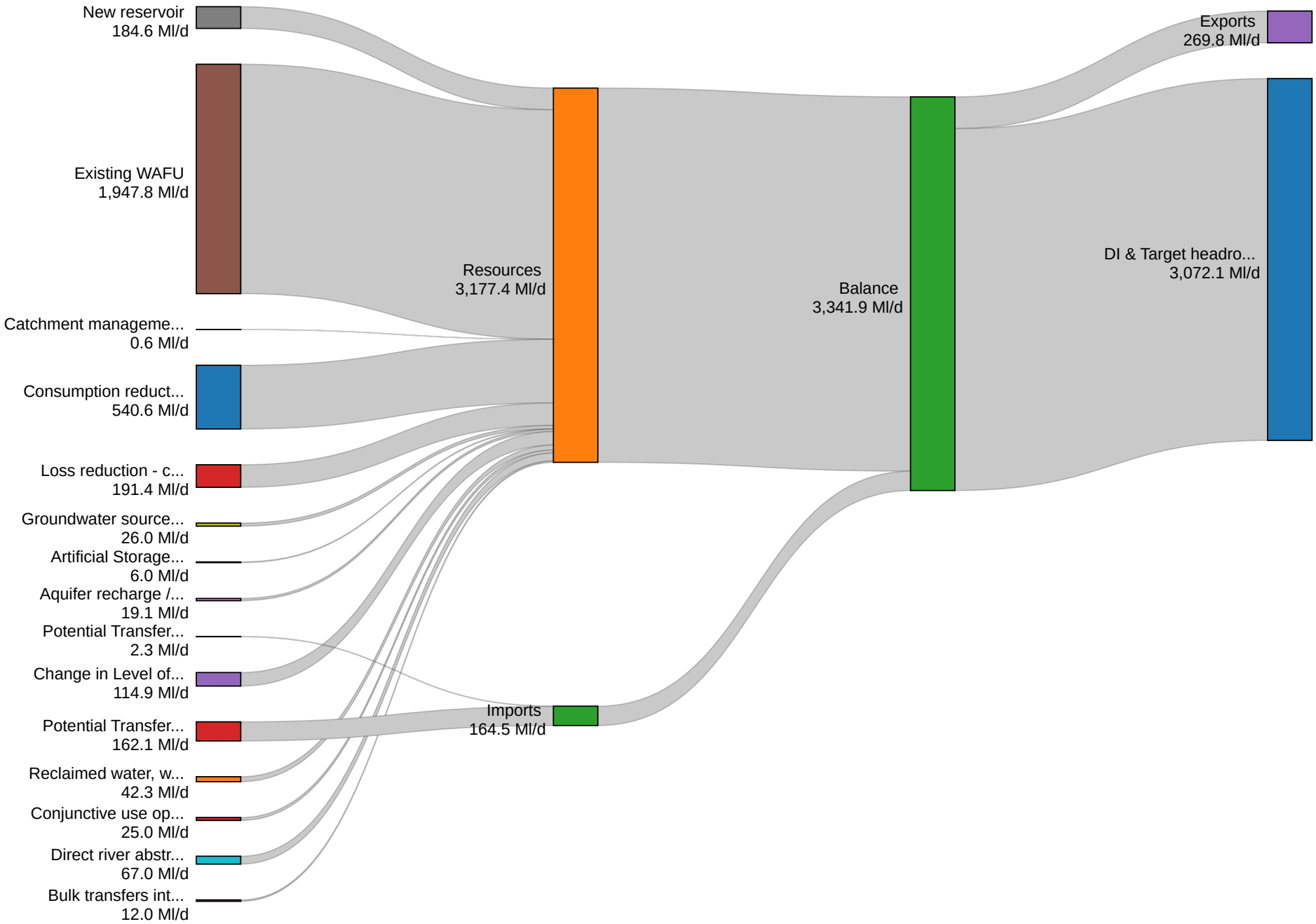
Situation 4 - 2040 (Thames Water)



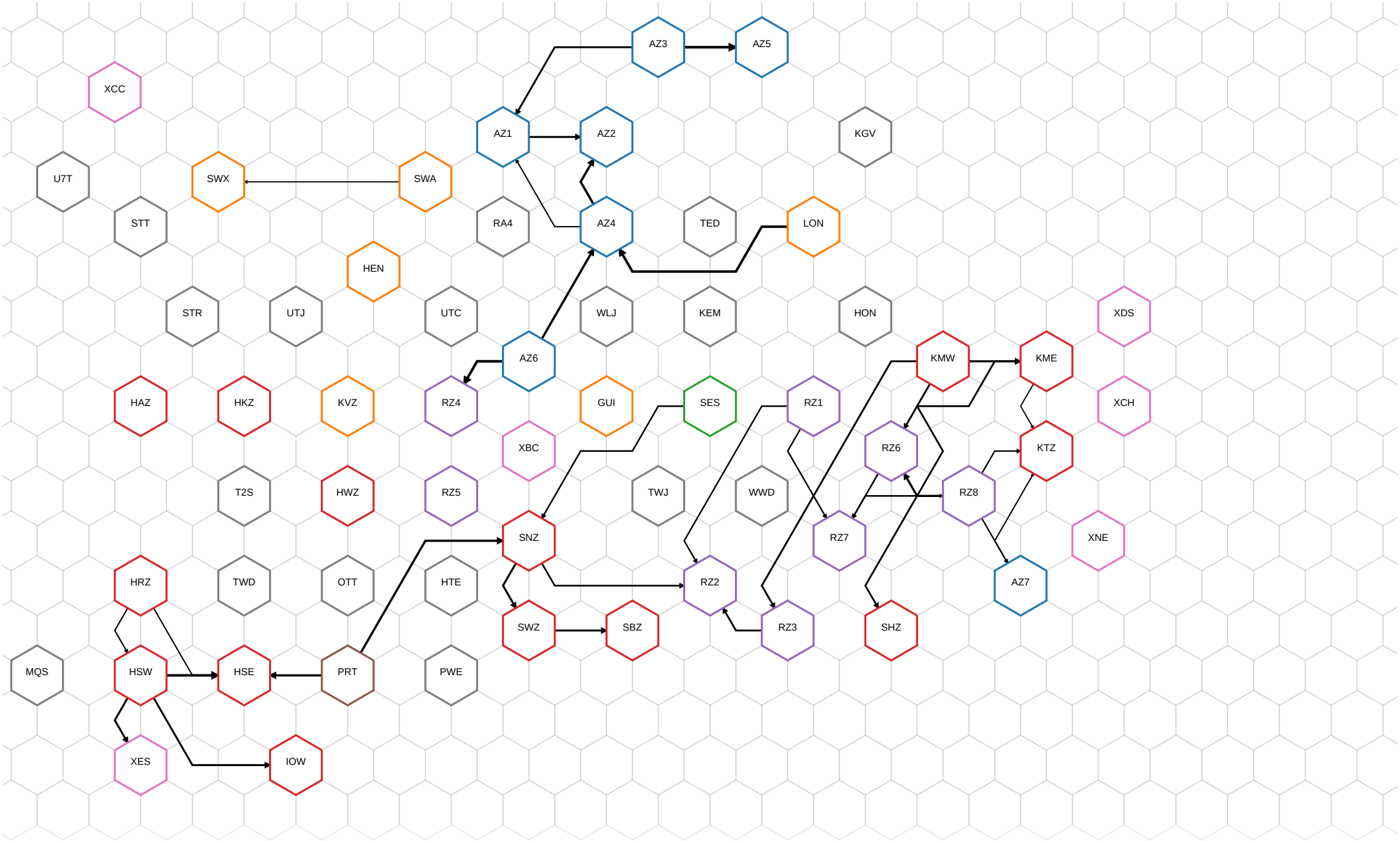
Situation 4 - 2050 (Thames Water)



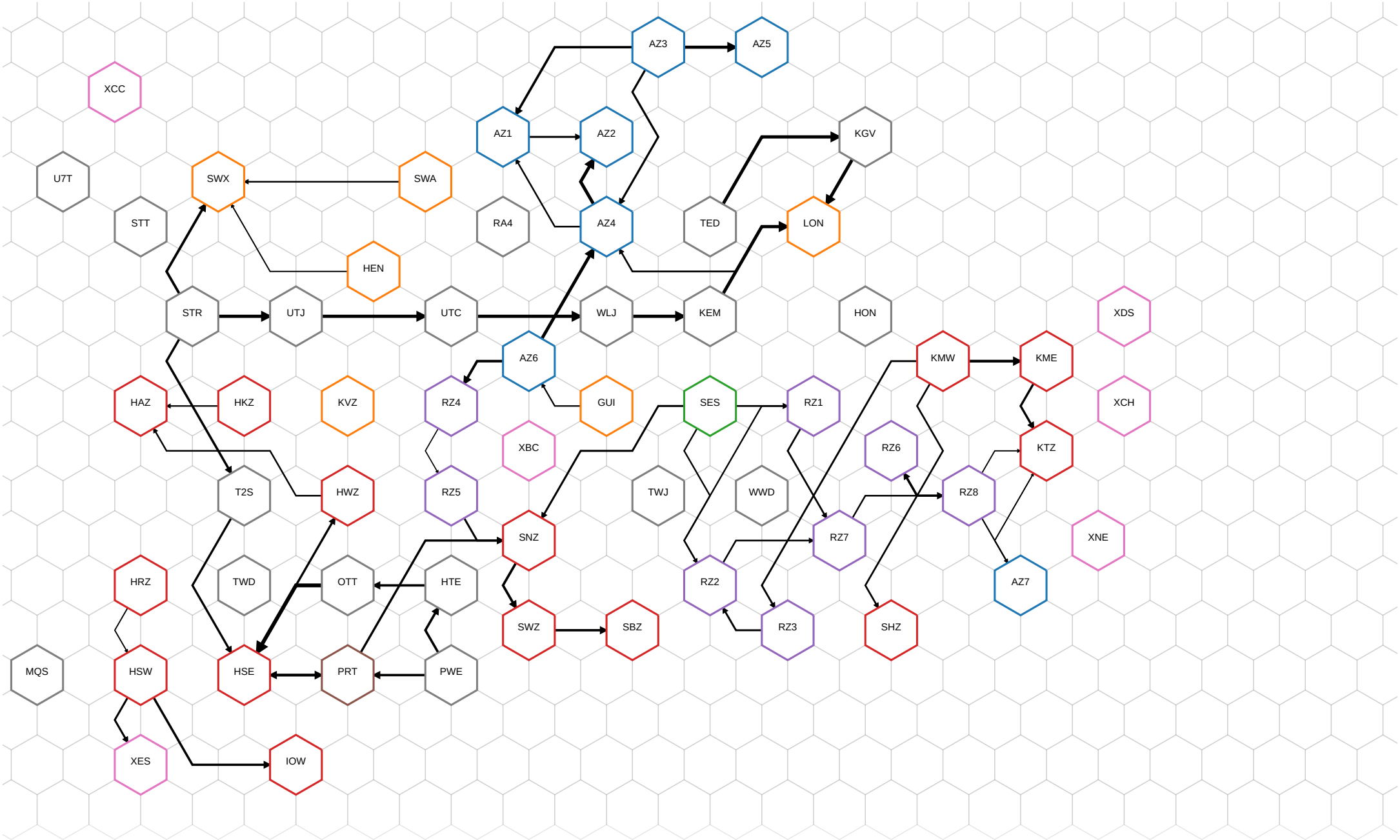
Situation 4 - 2075 (Thames Water)



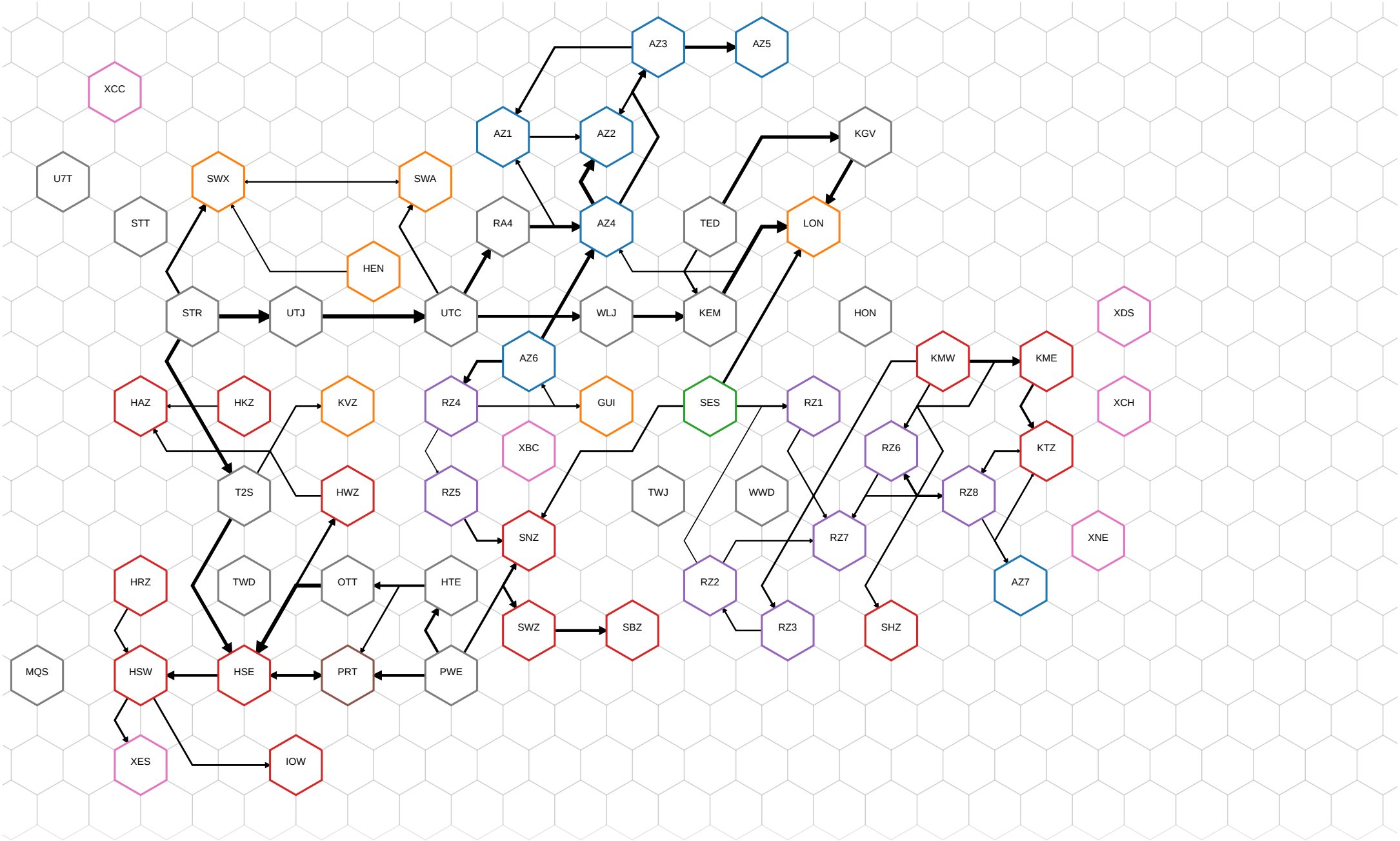
Situation 4 - 2026



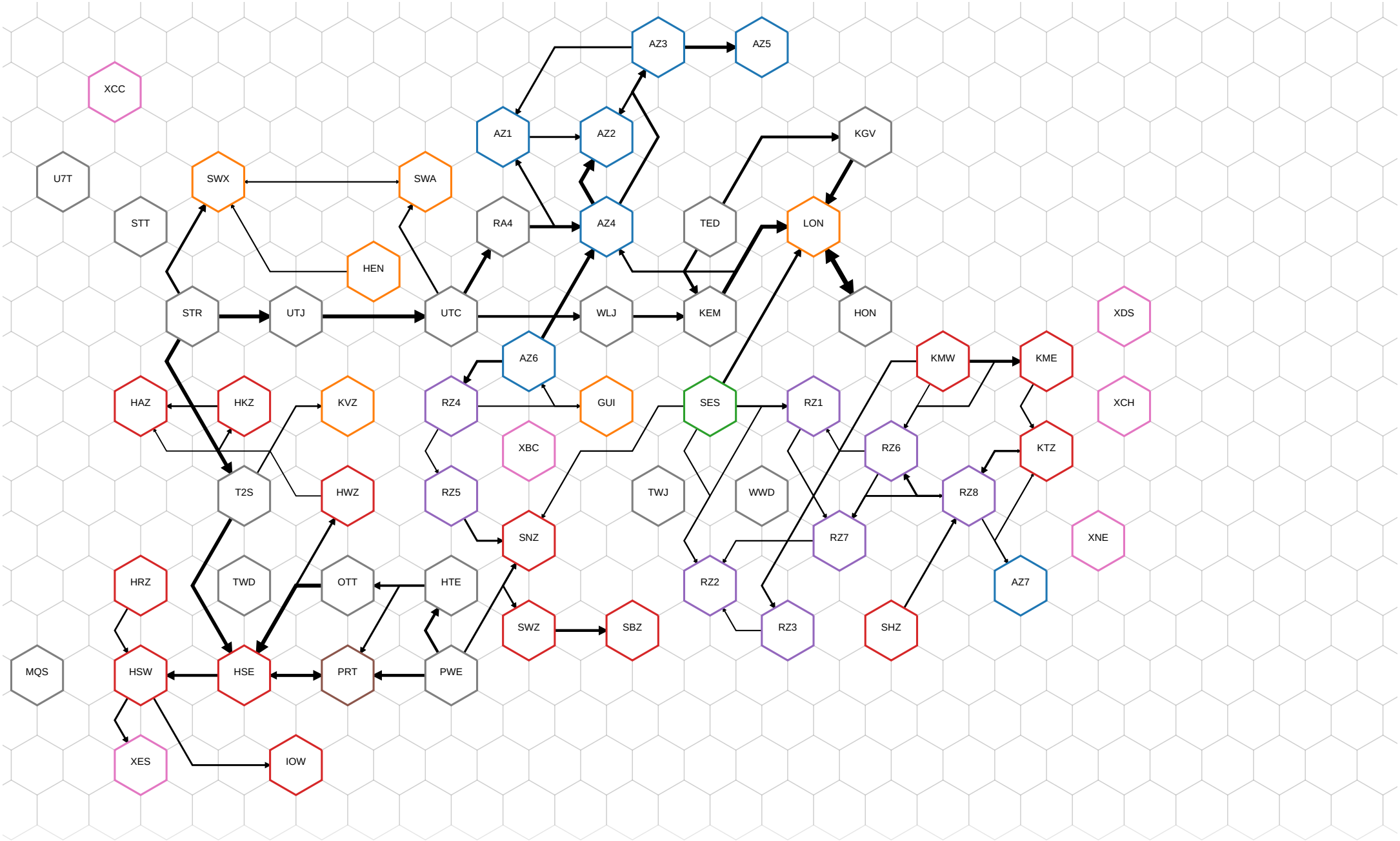
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



IVM RUN DOSSIER

GENERAL BVP + SESRO 75

IVM Summary: Thames Water

Metadata

General Settings

Name	st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-only-guc100-only-sesro75-only-t2a50-2075-bvp-07_50-v3
Description	BVP run with hybrid-c+2 government interventions including only GUC 100 Ml/d, SESRO 75 Mm3 and 50 Ml/d T2A transfer. Constrained to 7.5% improvement in worst BVP metrics from "st-hybrid-dy-w1-tree16.05-options-v61-gov-led-hybridcp2-only-sesro150-2075".
Created at	17/07/2023, 10:42:53
Tree	tree16.05: Root and branch tree 16.05: Stage 1 - Begins Hplan and LOW LCED, Stage 2 - Branches on growth (OxCam1a, Hplan and ONS18c), Stage 3 - Branches on licenced capped environmental destination, climate change and further growth scenarios (Hmax and Hmin)
Setting name	options-v61-gov-led-hybridcp2-only-guc100-only-sesro75-only-t2a50
Setting description	No emergency options. Excluding SES low, medium and high DMP baskets. Exclude all GUC variants except 100. Exclude all SESRO variants except 75. Excludes T2A 100 Ml/d transfer (i.e. only 50 Ml/d).
Optimised discount rate	STPR

Metrics

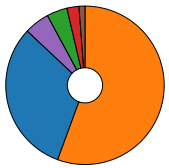
Net present value (Cost)

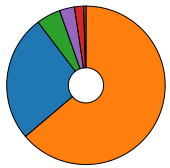
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Cost w/ deficit (STPR)	21,101	17,639	16,875	19,515	17,517	16,700	17,850	16,987	16,273	(£m)
Cost w/o deficit (STPR)	21,101	17,639	16,875	19,515	17,517	16,700	17,850	16,987	16,273	(£m)
Cost w/ deficit (IGEQ)	32,413	25,863	24,484	29,453	25,661	24,205	26,356	24,736	23,448	(£m)
Cost w/o deficit (IGEQ)	32,413	25,863	24,484	29,453	25,661	24,205	26,356	24,736	23,448	(£m)
Cost w/ deficit (LTDR)	23,286	19,259	18,382	21,447	19,122	18,186	19,520	18,518	17,697	(£m)
Cost w/o deficit (LTDR)	23,286	19,259	18,382	21,447	19,122	18,186	19,520	18,518	17,697	(£m)

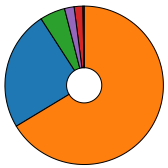
Cost breakdown (STPR)

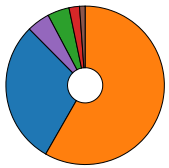
Select Company: Total

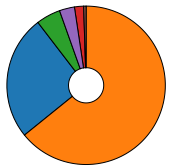
Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capex	6,631	4,562	4,134	5,716	4,451	3,977	4,626	4,175	3,731	(£m)
Fixed opex	11,731	11,256	11,198	11,374	11,243	11,182	11,253	11,201	11,139	(£m)
Fixed operational carbon	888	870	870	873	870	870	871	867	865	(£m)
Embedded carbon	518	334	303	418	327	297	347	308	281	(£m)
Variable opex	1,076	535	328	913	539	323	651	396	238	(£m)
Variable carbon opex	256	81	41	221	87	52	102	41	18	(£m)

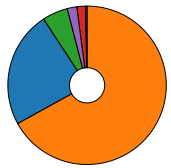
situation1 

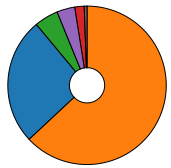
situation2 

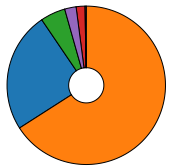
situation3 

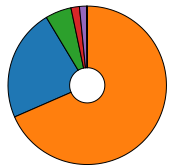
situation4 

situation5 

situation6 

situation7 

situation8 

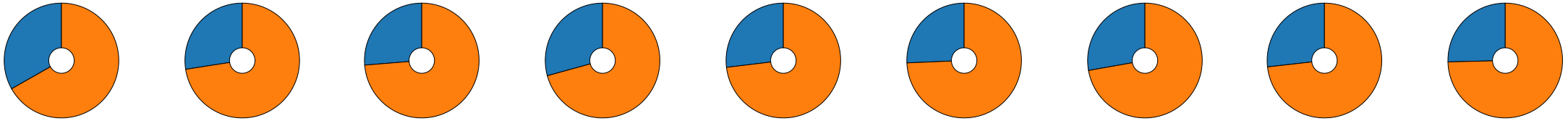
situation9 

Emissions breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Capital emissions	3,366,104	2,044,731	1,837,659	2,648,025	2,000,750	1,801,904	2,144,194	1,878,059	1,695,251	(tonnes)
Operational emissions	6,771,200	5,400,171	5,154,554	6,396,980	5,433,950	5,218,423	5,573,522	5,133,960	4,980,438	(tonnes)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9

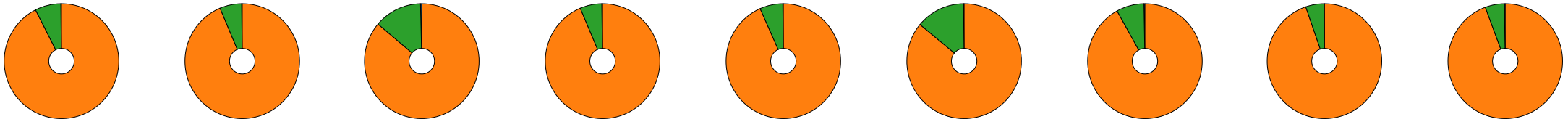


Electricity breakdown

Select Company: Total

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Generated (on site)	47	22	17	47	18	8	40	8	8	(GWh)
Grid	22,569	11,478	4,179	19,433	10,893	3,862	13,161	7,926	2,903	(GWh)
Renewable	1,775	754	654	1,273	756	621	1,116	434	167	(GWh)

situation1 situation2 situation3 situation4 situation5 situation6 situation7 situation8 situation9



Environmental

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Unit
SEA environmental benefit	65,343.00	65,349.00	65,338.00	69,107.00	65,341.00	65,338.00	66,274.00	65,338.00	65,338.00	
SEA environmental disbenefit	105,002.00	77,666.00	71,069.00	103,938.00	77,215.00	71,109.00	81,770.00	68,376.00	62,119.00	
Natural capital	83,879,644.15	81,583,929.38	84,159,232.14	81,395,991.38	81,308,138.59	84,065,680.85	80,960,605.28	81,730,493.92	84,488,676.60	
Bio-diversity net gain	−174,462.00	−103,135.00	−87,403.00	−172,543.00	−112,515.00	−90,917.00	−119,262.00	−92,070.00	−66,120.00	

Social

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Customer preference	36,523.00	35,195.00	34,767.00	36,889.00	35,254.00	34,829.00	35,293.00	34,552.00	34,333.00	

Reliability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Reliability	29.22	28.21	29.98	28.29	28.21	30.00	28.86	31.90	35.45	
R1: Uncertainty of option supply/demand benefit	6.38	5.25	5.55	5.78	5.20	5.51	5.47	5.93	6.56	
R3: Risk of service failure due to other physical hazards	7.04	6.86	7.55	6.71	6.86	7.56	7.08	8.01	9.13	
R4: Availability of additional headroom	6.41	6.80	7.00	6.57	6.82	7.02	7.13	7.49	7.73	
R5: Catchment/raw water quality risks (incl. climate change)	3.80	3.76	4.23	3.72	3.77	4.25	3.89	4.48	5.18	
R6: Capacity of catchment services	0.01	0.31	0.01	0.31	0.31	0.01	0.00	0.01	0.01	
R7: Risk of service failure to other exceptional events	5.57	5.12	5.64	5.09	5.13	5.66	5.29	5.98	6.84	
R8: Soil health	0.00	0.11	0.00	0.11	0.11	0.00	0.00	0.00	0.00	

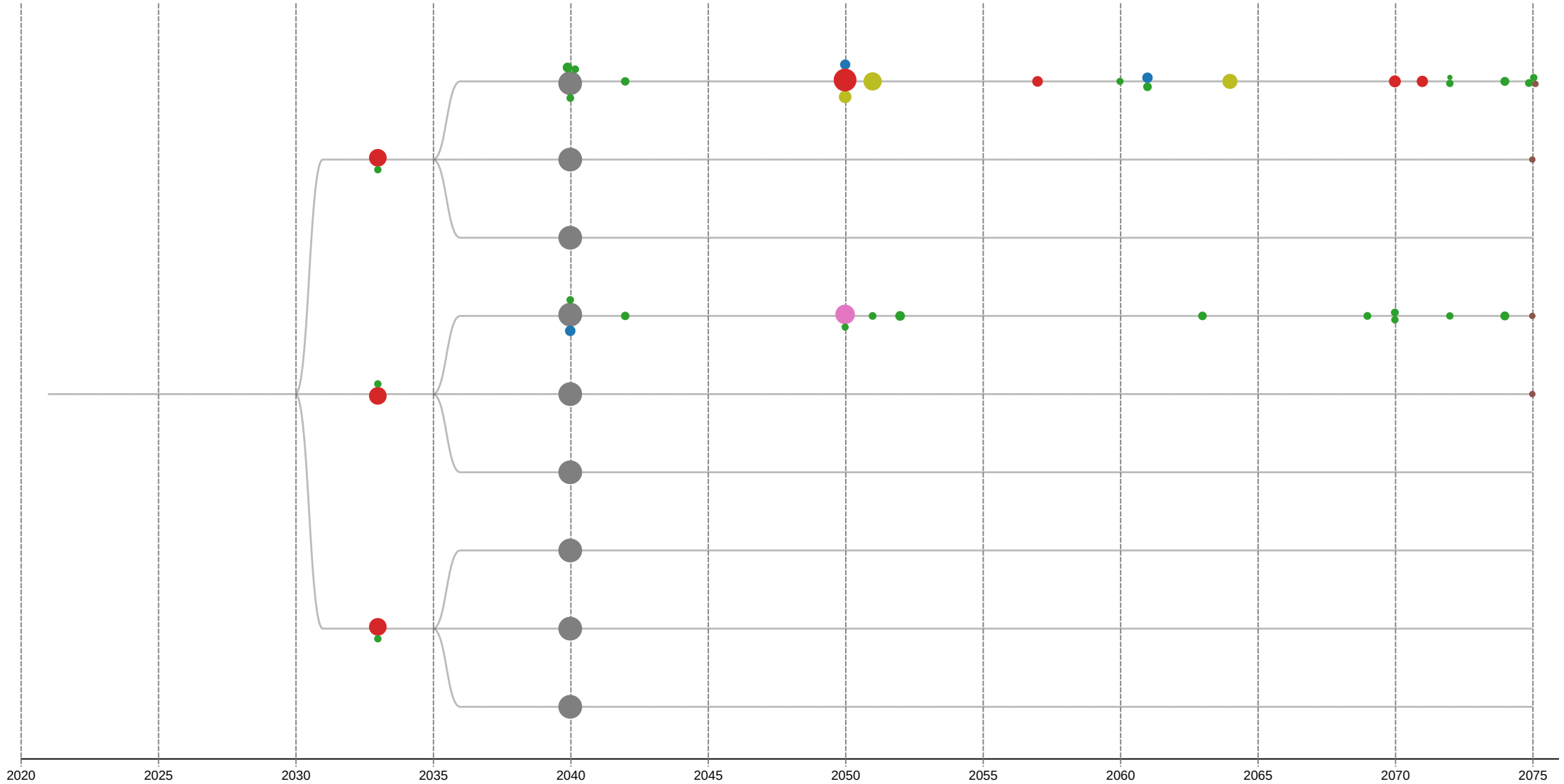
Adaptability

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Adaptability	15.17	15.15	16.74	14.28	15.19	16.58	15.56	17.68	20.13	
A3: Operational complexity and flexibility	6.57	6.55	7.26	6.33	6.58	7.32	6.76	7.74	8.88	
A4: WRZ connectivity	8.57	8.47	9.45	7.83	8.48	9.24	8.77	9.91	11.20	
A7: Customer relations support engagement with demand management	0.04	0.13	0.03	0.12	0.13	0.03	0.03	0.03	0.05	

Evolvablility

Metric	situation1	situation2	situation3	situation4	situation5	situation6	situation7	situation8	situation9	Units
Evolvability	20.55	20.38	21.79	19.97	20.45	21.82	20.48	23.23	26.33	
E1: Scaleability and modularity of proposed changes	9.44	9.50	10.47	9.07	9.53	10.51	9.72	11.16	12.71	
E2: Intervention lead times	4.46	4.02	4.30	4.17	4.06	4.26	4.18	4.59	5.10	
E3: Reliance on external bodies to deliver changes	6.63	6.40	7.02	6.28	6.41	7.04	6.57	7.47	8.50	
E5: Collaborative land management	0.02	0.46	0.01	0.46	0.46	0.01	0.01	0.01	0.01	

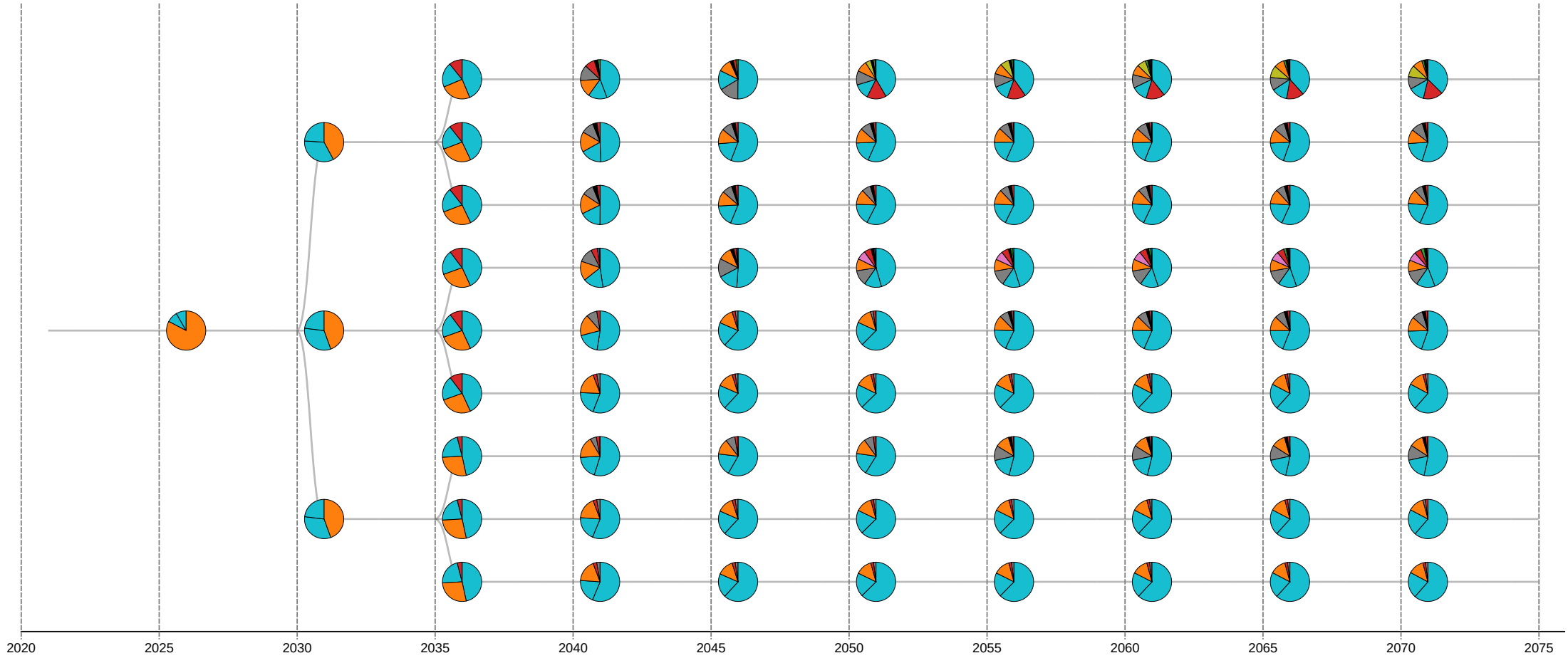
Option Selection (Thames Water)



- Transfer
- Transfer into region
- Drought intervention
- Groundwater
- Direct river abstraction
- Trading
- Catchment management
- Desalination
- Reservoir
- Reuse
- Demand management
- Leakage reduction
- Other

Utilisation (Thames Water)

Pie charts show the breakdown of option utilisation by option category.



- Transfer
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- Drought intervention
- Groundwater
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- Catchment management
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- Reservoir
- Reuse
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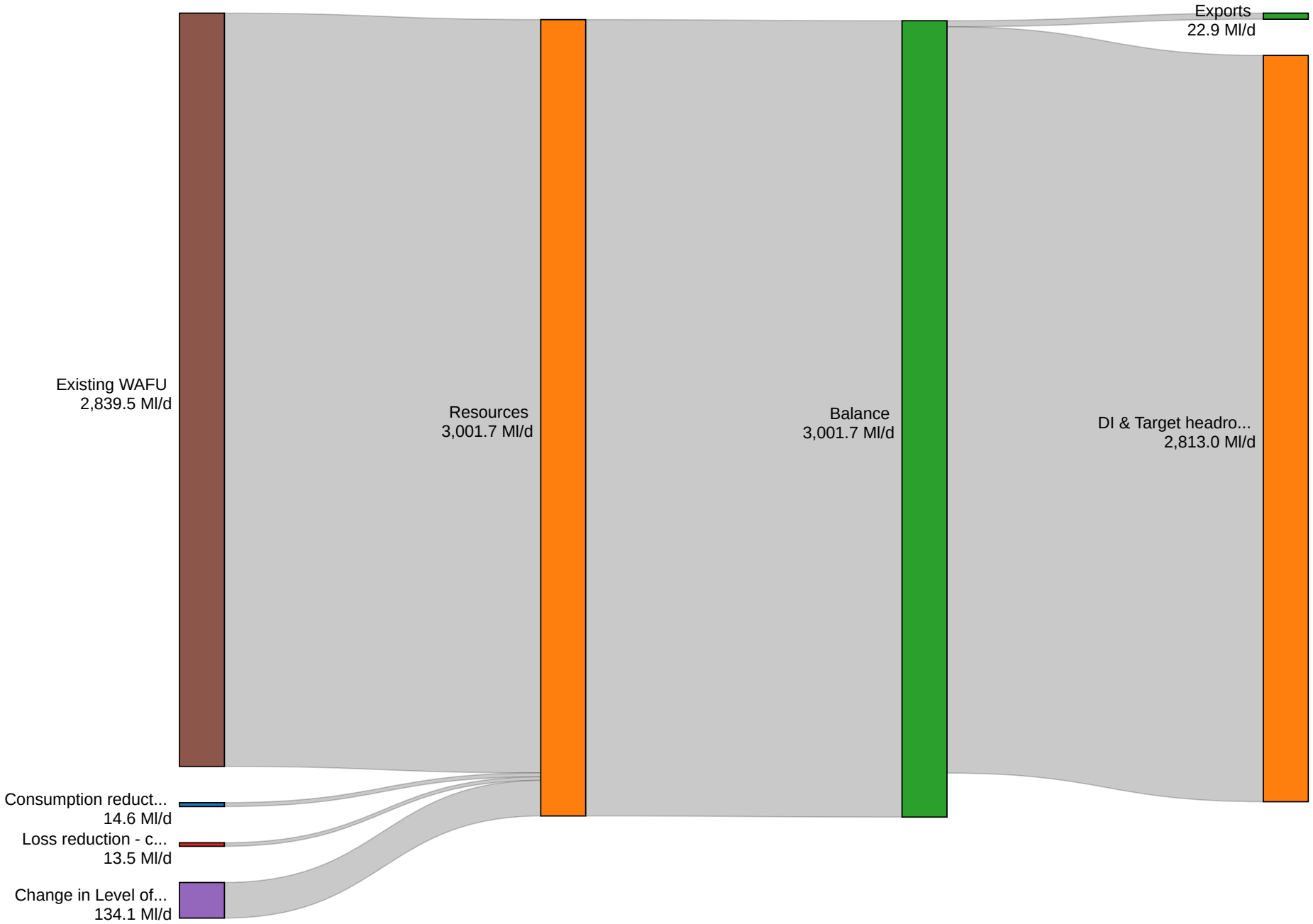
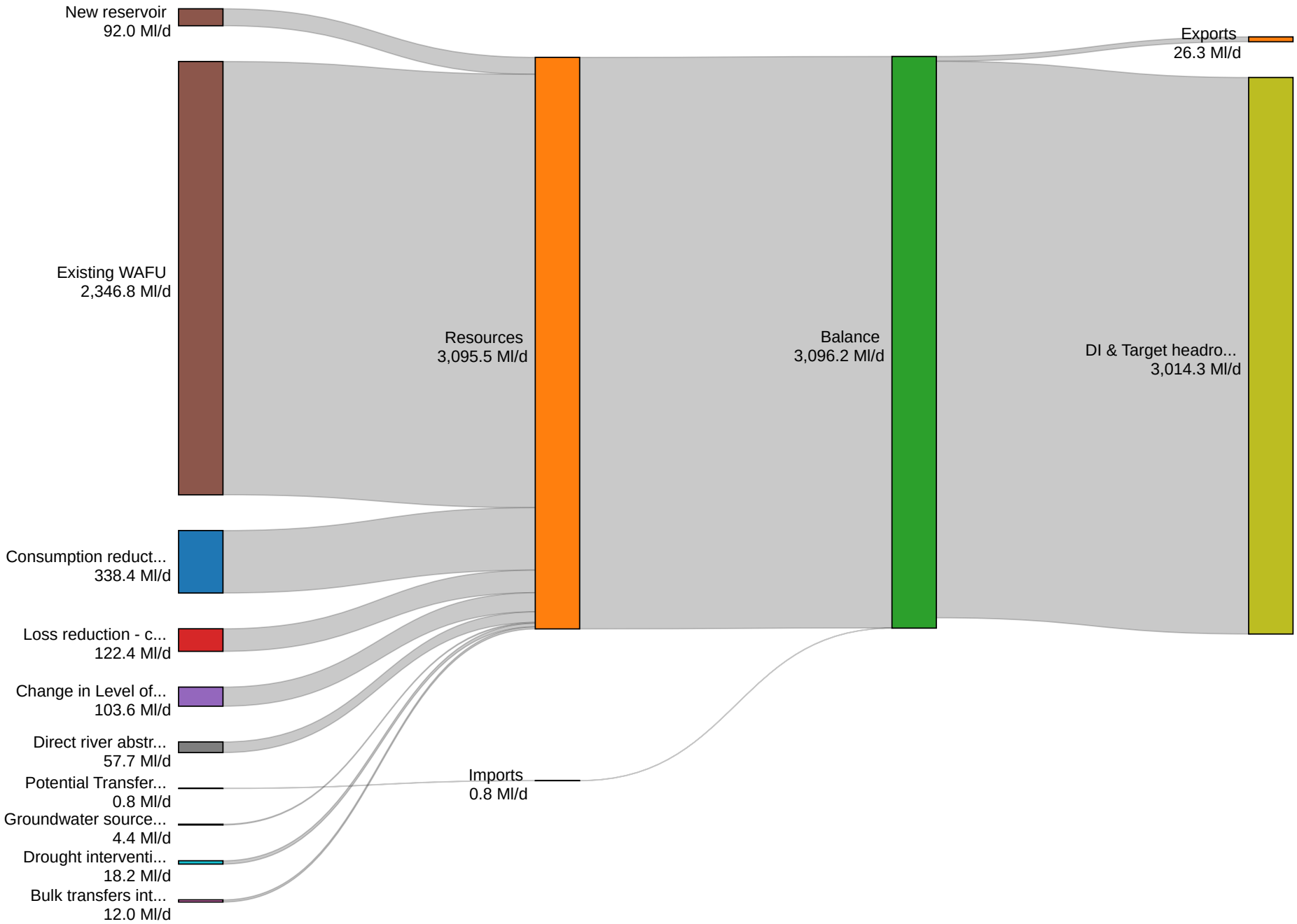
- Leakage reduction
- Other

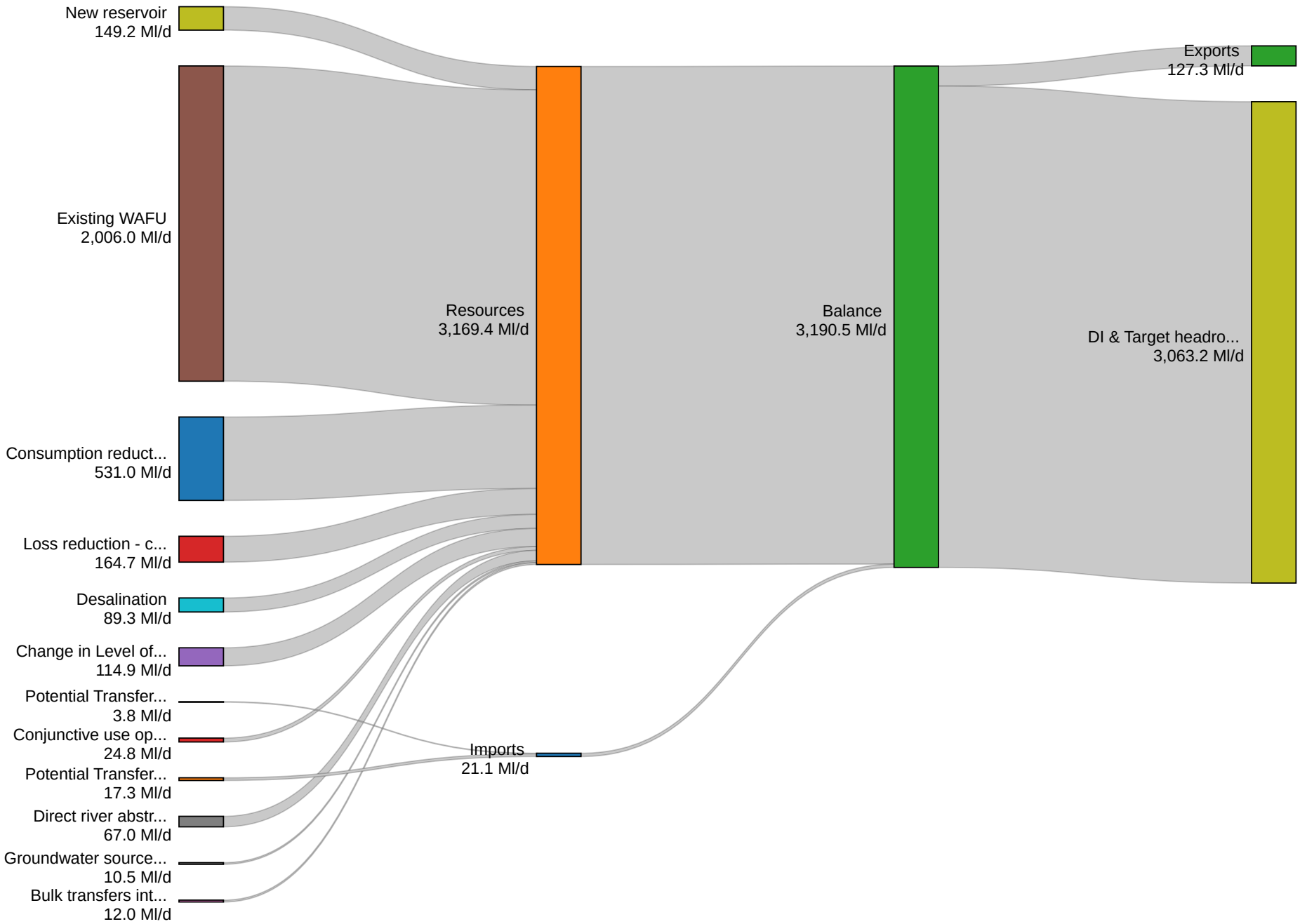
Situation 4 - 2026 (Thames Water)



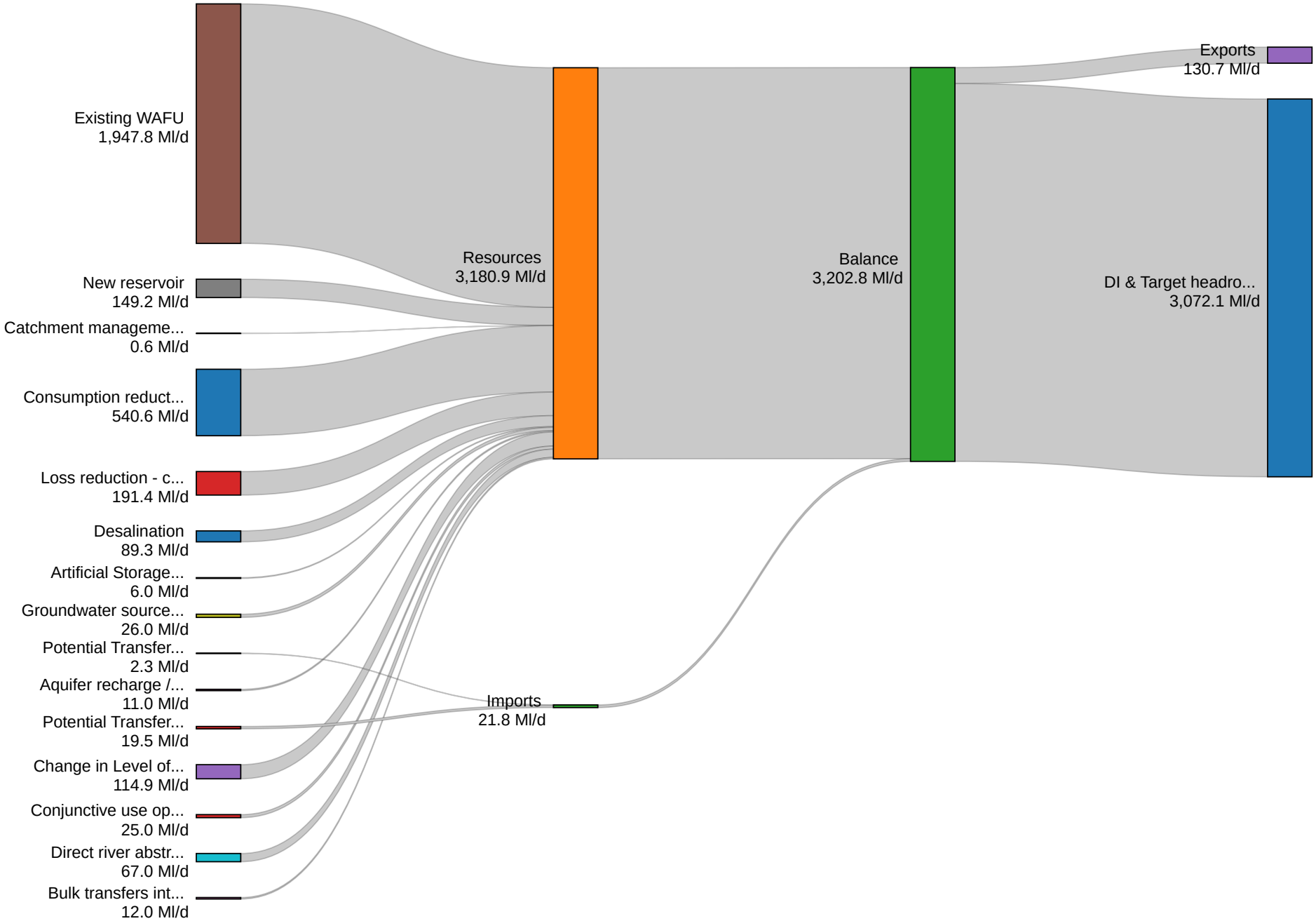
Situation 4 - 2040 (Thames Water)



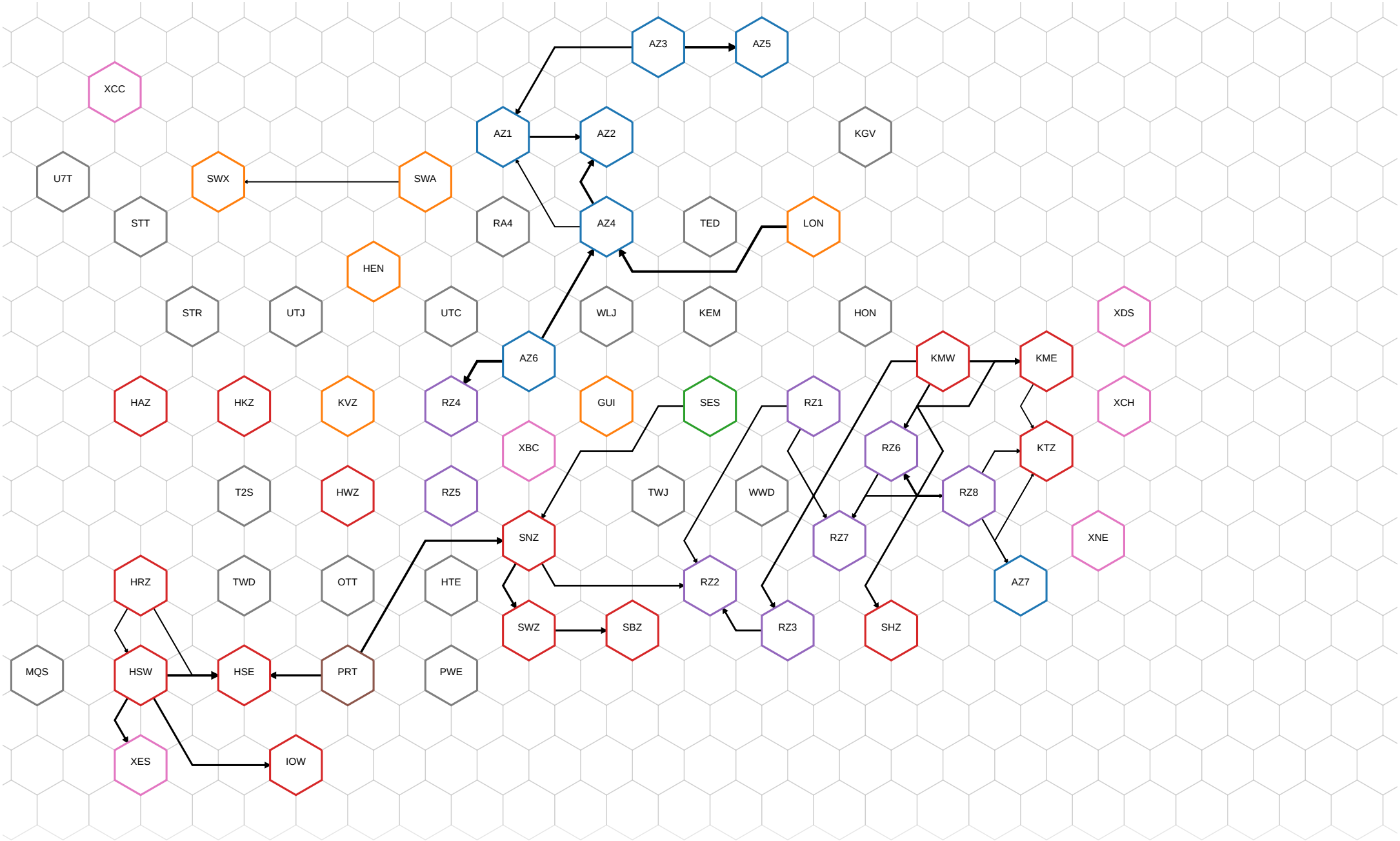
Situation 4 - 2050 (Thames Water)



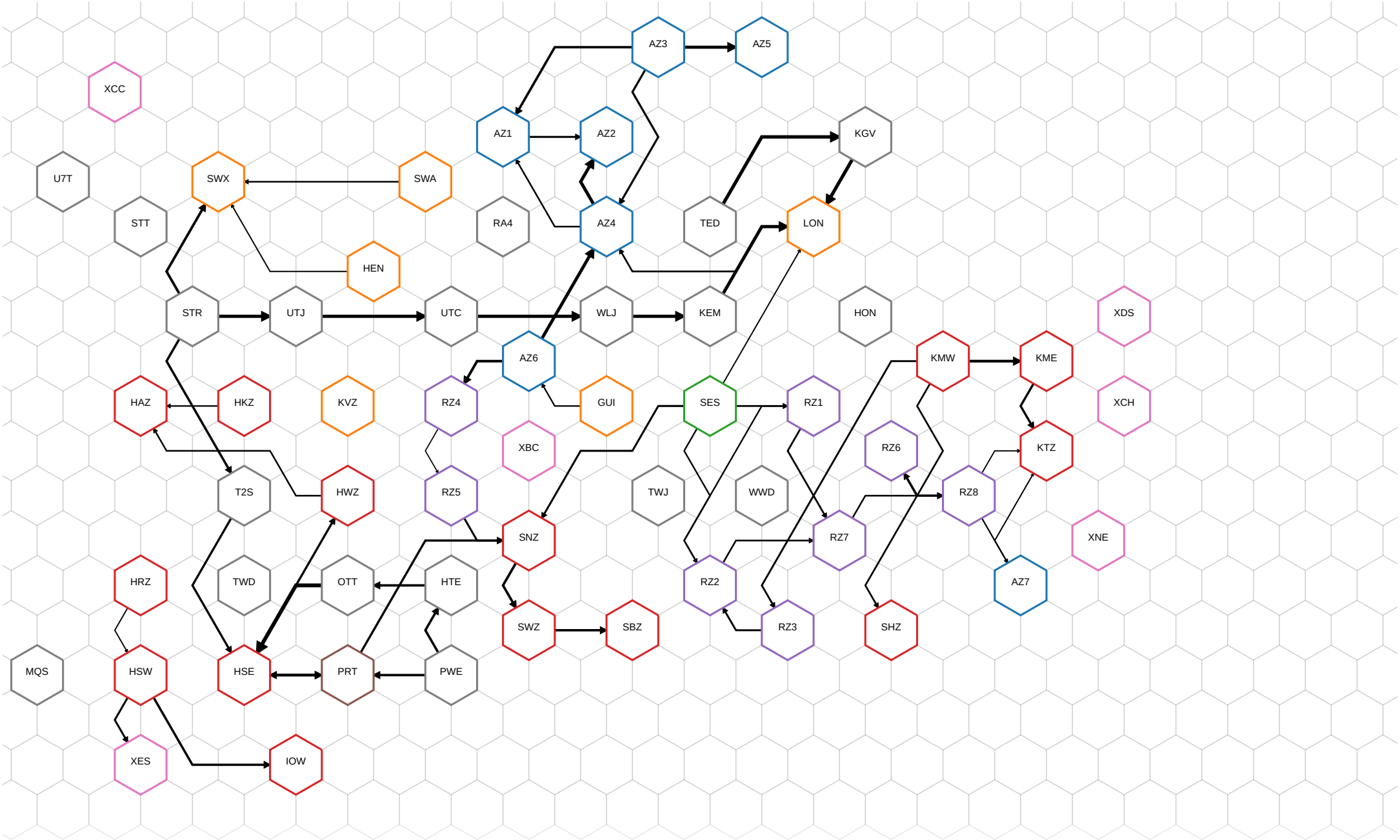
Situation 4 - 2075 (Thames Water)



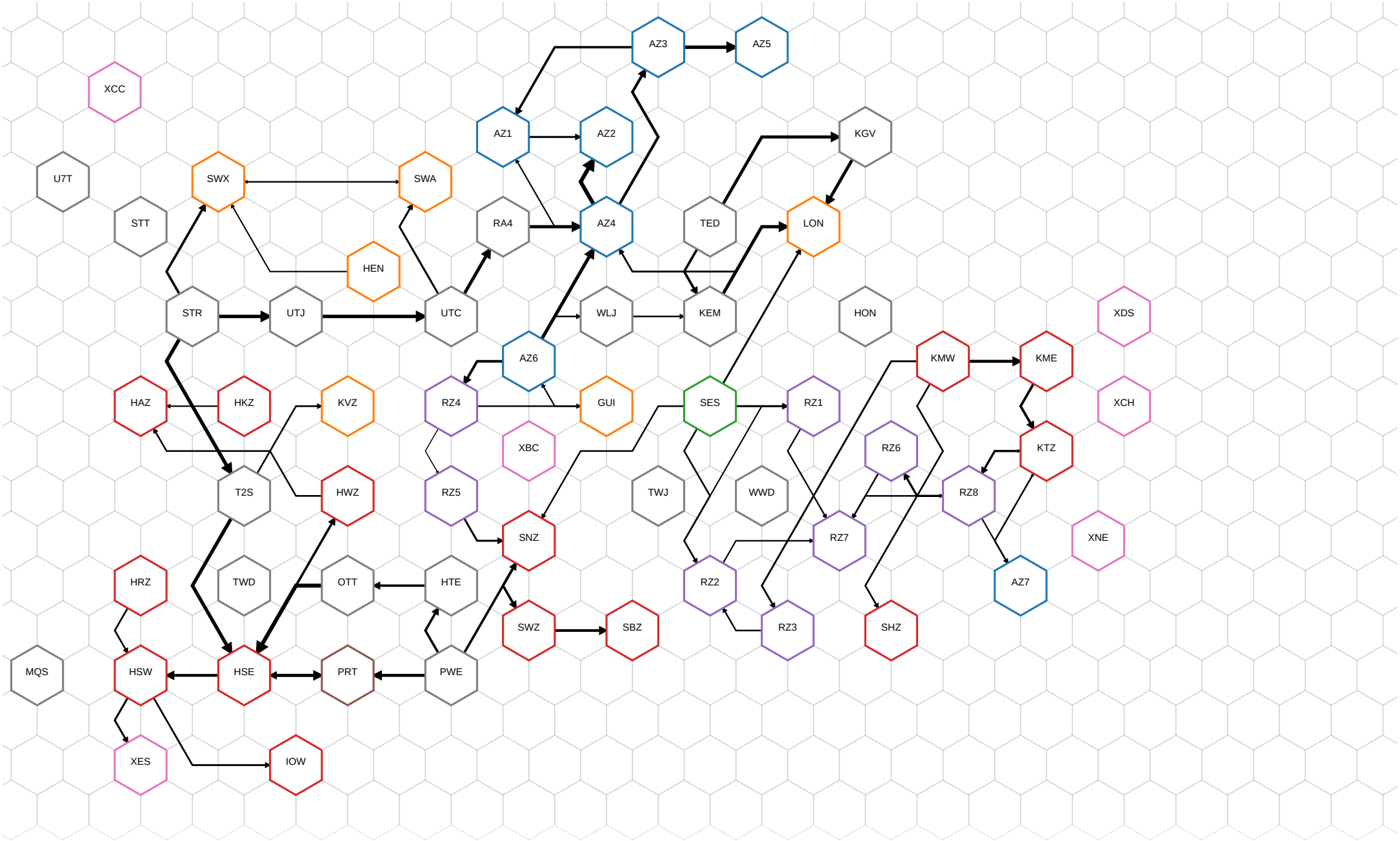
Situation 4 - 2026



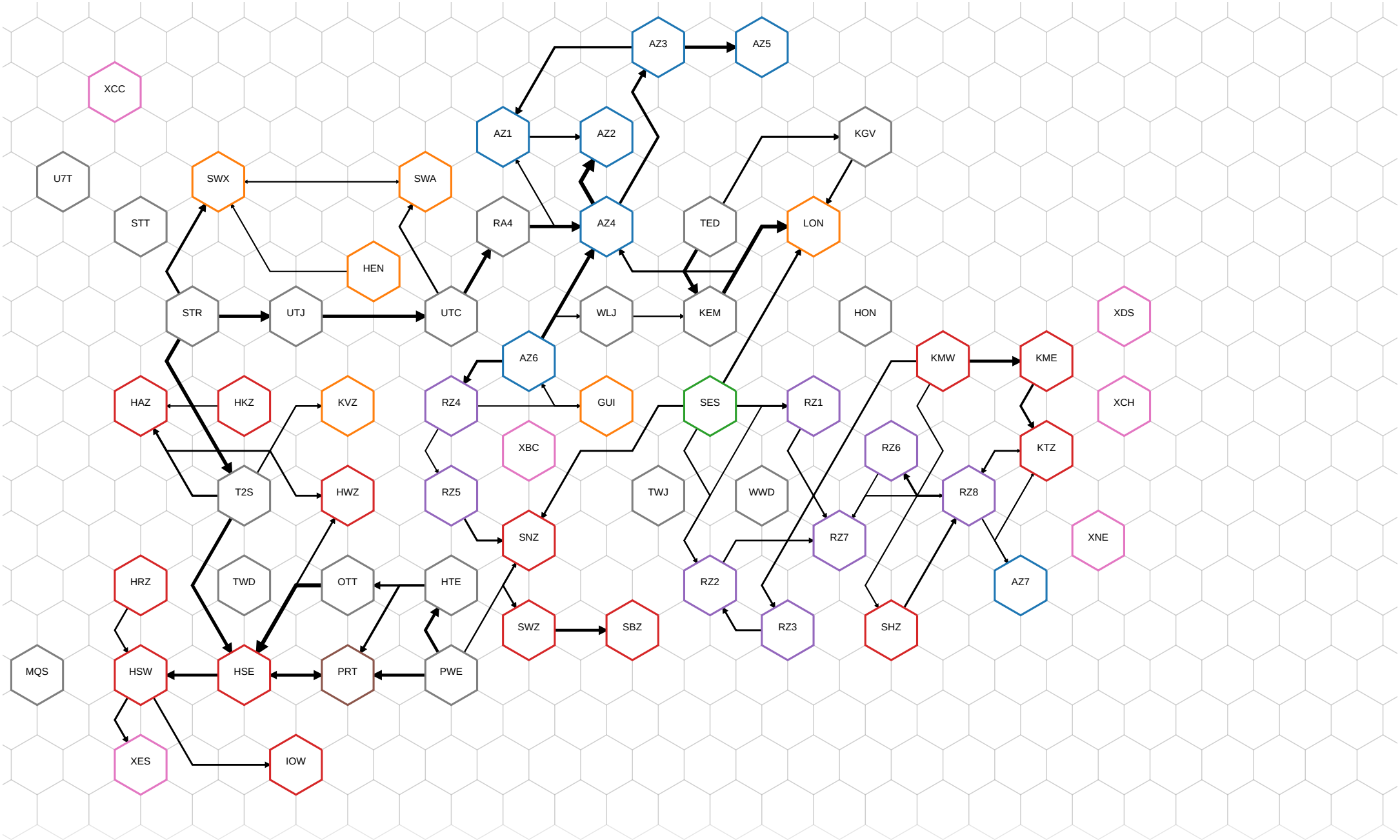
Situation 4 - 2040



Situation 4 - 2050



Situation 4 - 2075



Thames
Water