Draft Determination Representations

WSH.DD.CE.8

Tywyn Aberdyfi – Supply Demand Balance

30 August 2019

Tywyn Aberdyfi – Supply Demand Balance

1. Introduction

In our IAP response, *Ref B2.19.WSH.CE.A1, Enhancements to supply demand balance IAP response*, we noted in Section 5 that the utilisation of our Tywyn Aberdyfi new abstraction as presented in our WRMP19 was as below;

Scheme	Yield	Cost	Unit cost £m/Ml/d
Afon Dysynni new abstraction	1.45 Ml/d	£6.4m	4.4

We also noted in the text that the full yield of the solution was 3.2 Ml/d to allow future inter zonal transfers. Our work to understand the resilience of the Afon Fathew source, in relation to the new common resilience obligation, demonstrates that we are not currently resilient to a 1:200 year type of drought across the zone and that around 2Ml/d of water will be needed in the short term and 3Ml/d in the longer term to meet the zonal deficit against this measure. This means the need has changed but the selected solution is the right one.

2. Supply demand balance under extreme drought

For AMP7 water companies have a new obligation to ensure resilience to at least a 1:200 year drought event. We have undertaken stochastic river flow analysis of our Tywyn sources to test them against more extreme drought events. Full details of this work are provided in the 'Drought Vulnerability Framework' report (Atkins, March 2019), but the key conclusion is that our deployable output is significantly lower when tested against worst events in our relatively short historic records. Figure 1 shows a summary graph form this analysis indicating that the Afon Fathew can only supply around 0.9 Ml/d under a 1:200 year extreme drought.

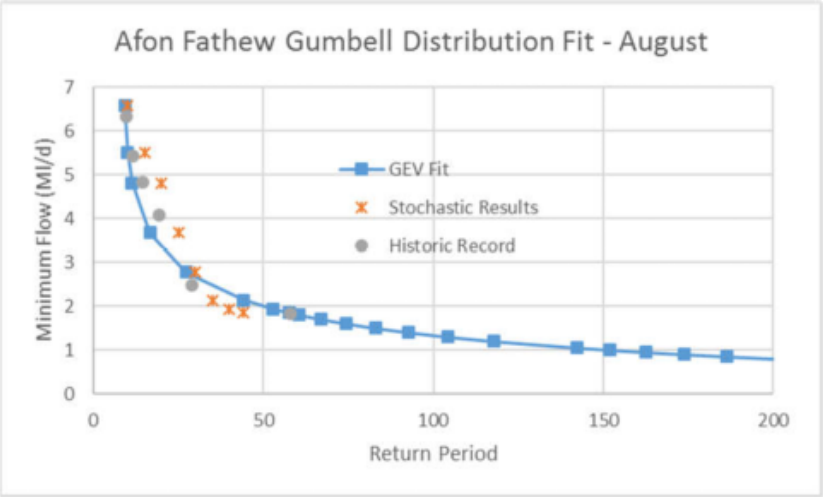

Figure 1 – Extreme Value Analysis on the Afon Fathew

The supply against demand balance for the zone is given in Figure 2, this comparing our supply capability during a worst historic drought and the new equivalent under 1:200 year drought conditions. The balances are given for both critical period and average annual scenarios. Based on these calculated deficits the crucial Critical Period benefit from the Afon

Dysynni scheme will be an 2.1Ml/d (short term to 2024/25) to 3.0Ml/d (long term to 2049/50). The average annual benefits of the scheme are also given in the table.

	Dry Year Annual Average - Worst historic					Dry Year Annual Average - 1:200				
	2020-21	2024-25	2029-30	2039-40	2049-50	2020-21	2024-25	2029-30	2039-40	2049-50
Deployable Output	1.25	1.25	1.25	1.25	1.25	0.60	0.60	0.60	0.60	0.60
Reduction in DO due to CC	0.13	0.25	0.41	0.50	0.58	0.13	0.25	0.41	0.50	0.58
Outage	0.04	0.03	0.03	0.03	0.02	0.04	0.03	0.03	0.03	0.02
Losses	0.11	0.11	0.10	0.10	0.09	0.11	0.11	0.10	0.10	0.09
Water Available For Use	0.97	0.85	0.71	0.62	0.55	0.32	0.20	0.06	-0.03	-0.10
Demand Forecast	1.29	1.23	1.19	1.06	0.94	1.29	1.23	1.19	1.06	0.94
Available Headroom	-0.32	-0.38	-0.49	-0.44	-0.40	-0.97	-1.03	-1.14	-1.09	-1.05
Target headroom	0.27	0.51	0.78	0.91	1.03	0.27	0.51	0.78	0.91	1.03
SDB	**-0.60**	**-0.89**	**-1.27**	**-1.36**	**-1.43**	**-1.25**	**-1.54**	**-1.91**	**-2.01**	**-2.08**

	Dry Year Critical Period - Worst historic					Dry Year Critical Period - 1:200				
	2020-21	2024-25	2029-30	2039-40	2049-50	2020-21	2024-25	2029-30	2039-40	2049-50
Deployable Output	1.92	1.92	1.92	1.92	1.92	0.92	0.92	0.92	0.92	0.92
Reduction in DO due to CC	0.19	0.39	0.63	0.78	0.90	0.19	0.39	0.63	0.78	0.90
Outage	0.06	0.05	0.04	0.04	0.03	0.06	0.05	0.04	0.04	0.03
Losses	0.14	0.13	0.12	0.11	0.11	0.14	0.13	0.12	0.11	0.11
Water Available For Use	1.52	1.35	1.12	0.99	0.88	0.53	0.35	0.12	-0.01	-0.12
Demand Forecast	1.72	1.63	1.59	1.41	1.25	1.72	1.63	1.59	1.41	1.25
Available Headroom	-0.19	-0.29	-0.46	-0.42	-0.38	-1.19	-1.29	-1.46	-1.42	-1.38
Target headroom	0.42	0.78	1.20	1.40	1.59	0.42	0.78	1.20	1.40	1.59
SDB	**-0.61**	**-1.07**	**-1.66**	**-1.83**	**-1.96**	**-1.61**	**-2.07**	**-2.66**	**-2.83**	**-2.96**

Figure 2 S/D Balances for the Tywyn WRZ

The findings of our resilience work support our view that the existing sources are extremely prone to dry weather, and that it is valid to include for a relatively high level of headroom allowance in this zone. The uncertainties around climate change and its effects upon future drought events means there is a significant risk that the 0.9Ml/d supply from the Fathew could dry up under climate change or extreme droughts of a 1:500 year return period. Our headroom provision has been calculated in line with Regulatory Best Practice (UKWIR, 2002).

3. Change required for Final determination

As presented in our FWRMP19, the Afon Dysynni scheme is both the least cost and best value option to resolve the short and long term supply demand imbalance. The remote nature of the zone means water transfers are not cost effective whilst demand management options are limited as a large bulk of the peak demand is driven by tourism.

The scale of demand during a peak period is such that in a 1:200 year drought we will need an additional 2.1Ml/d to maintain customer supplies in the short term and 3.0Ml/d in the long term when tested under severe drought conditions. The Afon Dysynni scheme will allow us to meet the full range of customer demand across all scenarios.

The modelled allowance for the Tywyn Aberdyfi scheme should reflect the latest supply demand balance data, and recognise the full 2.96 Ml/d benefit delivered by the scheme and required in a 1:200 year drought. An additional allowance of £2.4m should be provided for in the Final Determination.

In summary:

	FD Scheme Benefit (Ml/d)	Expenditure to be allowed in FD £m (@ industry unit cost £1.2m per Ml/d)	DD Scheme Benefit (Ml/d)	Allowed expenditure in DD £m (@ industry unit cost £1.2m per Ml/d)	Gap to DD £m
FWRMP19 short term utilised benefit	2.07	2.5	1.00	1.2	1.3
FWRMP19 long term additional utilised benefit	0.89	1.1	0.45	0.0	1.1
FWRMP19 proposed scheme	2.96	3.6	1.45	1.2	2.4