Water Resources Management Plan

Summary Report
April 2014

Dŵr Cymru Welsh Water
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Our Vision is to earn the trust of our customers every day.

To achieve this trust, one of our most important functions we have is to maintain safe and reliable supplies of drinking water to our customers. We do this by looking ahead to gauge the effects of climate change and the likely future demands of our domestic and business customers alike, whilst balancing these against the water available for supply, even in the driest years. In recognition of how important this is for our customers, we publish a Water Resources Management Plan (WRMP) every 5 years.

Welsh water has a unique relationship with its customers as it is owned by Glas Cymru, a single purpose, ‘not for profit’ company: there are no shareholders and any profits which arise are reinvested back into the business on behalf of our customers, or returned as customer dividend. It is therefore important to us that our stakeholders and customers are involved in the key decisions affecting how we deliver a safe, reliable and affordable supply of water.

We have therefore taken full account of our customers and stakeholders views through consultation, in the development of our latest water resources management plan and associated investment needs.

Tony Harrington
Director of Environment
Dŵr Cymru Welsh Water
1 Introduction

1.1 Summary Non-Technical Report

One of our most important responsibilities, under the Water Industry Act 1991, is to ensure that we can always meet the reasonable water needs of our customers. DCWW has published its Final Water Resources Management Plan 2014, (the ‘Plan’), as directed by Welsh Government.

The Plan covers a 25 year period, from 2015 to 2040 (also termed the ‘planning period’) and considers what needs to be done to ensure a sustainable and affordable balance between the amount of water we take from the environment and the amount of water we need for our daily lives. This approach ensures that we consider water availability for both today’s customers and for future generations, and that any water restrictions imposed (e.g. as a result of water shortages or drought) are kept to a minimum.

The Plan is very detailed and is supported by numerous technical appendices that are required by our regulators and Government to substantiate its findings. The Plan is available on our website should you wish to find out more of the detail (www.dwrcymru.com).

This document is our ‘Summary Report’ of the Plan, and provides the key information contained within our Plan at a level which is more accessible to the interested layperson.

1.2 Dŵr Cymru Welsh Water

Welsh Water is a statutory water and sewerage undertaker covering most of Wales and parts of England, including the majority of Herefordshire. We are the sixth largest of the ten regulated water and sewerage companies in England and Wales.

We are responsible for providing over 3 million people with a continuous supply of high quality drinking water and for taking away and properly disposing of the associated wastewater. We also have over 110,000 business customers, so our services are essential in supporting the economy in our supply area. In total, we deliver more than 800 million litres of drinking water every day.

We are owned by Glas Cymru, a single purpose, ‘not-for-profit’ company; there are no shareholders and any profits are reinvested back into the business or returned as a customer dividend. This is a unique business model in the water industry and, with our focus on cost and customer service, helps us to earn the trust of our customers.

1.3 Why we prepare the Water Resource Management Plan

The Water Act 2003 introduced a statutory requirement to produce a Plan every 5 years setting out how we will manage and develop our available water resource.
The specific requirements of how a Plan must look and what it must contain are provided within the Water Resource Planning Guidelines which are set out jointly by DEFRA, Welsh Government and our regulators (Natural Resources Wales, the Environment Agency and Ofwat).

1.4 Consultation

As part of our planning process, we have contacted more than 60 stakeholders and regulators requesting their input. Over a hundred points were made within the 13 representations we received.

We have undertaken engagement with customers through our ‘Your Company, Your Say (YCYS)’ business plan process. YCYS was a high level, non technical consultation aimed to engage and promote discussion with as many of our customers as possible, covering all parts of our business investment plans for 2015 – 2020. Water resource information was included, as well as an outline of our water resource strategy.

Additionally, a customer challenge group (CCG) was set up to help gain a view on preferences with respect to water resource options.

Overall, the customer engagement survey results confirmed that a least cost approach is required in the Plan, when identifying solutions to address forecast difficulties in supplying water to meet demand. Our Plan adopts this approach, and is founded on providing the most cost beneficial options that can deliver sufficient water or savings in water use, to address a water deficit.

1.5 Structure of Report

It is structured into the following chapters:

- 1 - An Introduction which provides background information about DCWW, how we operate, and the Plan.
- 2 - Information about our water resources, including how these will be affected by climate change and environmental legislation, and the level of service we commit to delivering.
- 3 - An explanation of the process we use to compare our supply capability with the demands we expect across the 25 year planning period.
- 4 – A more detailed look at the 5 zones within which we have forecast demand will exceed supply during the planning period. The chapter explains the solutions that will be implemented.
- 5 - An assessment of the impact on bills from our future solution investments, as well as the proposed investments for the remainder of the business.
2 Water Resources

2.1 Introduction

DCWW’s supply area is split into 24 water resource zones (WRZs) as shown in the map on page 4. A WRZ is the largest area in which all water resources can be shared.

Our water is supplied from a mixture of sources including impounding reservoirs that are fed from surface water runoff, directly from rivers, and also from groundwater sources in more rural areas. The water is then taken for treatment and supplied to customers. Most of the water supplied in Wales comes from our 65 impounding reservoirs. Of these, 20 feed water into five of our major rivers – the Wye, Usk, Tywi, Eastern Cleddau and the Dee.

Over the last 20 years or so the quantity of water we supply to our customers has reduced in a ‘normal’ year from an average of over 1000 million litres per day (Ml/d) to about 800 Ml/day today, with about half of this reduction being as a result of reduced leakage and the rest due to reduced demand from heavy industry.

It rains a lot in Wales, but just 3% of rainfall is used for public water supply and the rest is left in our rivers for the environment. This is very different from other parts of the UK where as much as 50% of rainfall is taken for supply and much less left for the environment.

Whilst Wales overall receives higher rainfall than most parts of the UK, some individual areas in our region are much drier than others. Average rainfall is much lower in areas like Anglesey for example, and this is masked by the extremes of rainfall recorded in Snowdonia and the Brecon Beacons.

2.2 Maintaining Water Supplies

Maintaining water supply to customers is essential for public health and supporting the economy. We believe that rota cuts and standpipes are not acceptable forms of water restrictions, but we must also be realistic in what water restrictions may need to happen in the future as a result of extreme circumstances, such as a prolonged drought.

It would require us to invest a vast amount of money into our service to ensure that we can always maintain a water supply to our customers. This excessive cost is not what the customer wants to bear in the form of increased bills, and so we manage the level of service we can provide whilst still being affordable. This amounts to a minimum level of service or reliability we aim to deliver to our customers, of:

- Only introducing temporary bans (hosepipe bans), on average, not more than once in every 20 years; and,

- Only applying for drought orders / permits for restricting commercial water use, on average, not more than once in every 40 years.
3 The Supply Demand Balance

3.1 Introduction

It is vitally important for a water company to understand its capability to supply water and the demand for water from customers and business within its supply area. The comparison is termed the Supply Demand Balance (SDB).

Both the supply and the demand sides of this equation are comprised of a multitude of components, but in simple terms the calculation can be summarised as:

- Determining the water available for use from our resources and treatment processes (i.e. the supply side of the SDB);
- Deducting the demand placed in a dry year scenario (the demand side of the SDB); and,
- Deducting ‘target headroom’. This is the planning margin or buffer used to allow for the uncertainties in our overall assessment. We therefore do not plan to only meet demand with our supply capability but also to allow for the risks within our assessment.

If after these subtractions we still have more water available for supply, the WRZ is said to be in surplus. If, however, this leaves a negative amount of water, the WRZ is said to be in deficit.

3.2 Our supply

The amount of water that is available from the environment for water supply will reduce over the 25 year planning period. The primary drivers of change to the amount we can supply are:

- Our regulators (Natural Resources Wales) review and reduction of the amount we are able to abstract from some of our water resources as a result of the European Habitats Directive. The process of determining these reductions is called the ‘review of consents’ (RoC).
- Incorporating the possible effects that climate change may have in reducing the water resource we have available.
These two changes have the potential to reduce, or eliminate some of the surplus water we have within some of our WRZs.

We are undertaking environmental and ecological monitoring to assess the impact of our water abstractions. This work will ensure that we understand the environment and its interactions with our needs and water operation, and that we can fairly balance the needs of the environment with those of society and the economy. At the same time we are working to ensure that our service is more resilient to potential problems of water availability, by enabling water to be moved around more easily and more reliably within our supply networks.

By completing the above work we will be in a better position to deal with the reduction in some of our water abstractions that will occur as a result of Natural Resources Wales review of our existing abstraction licences. We have therefore proposed that any reductions in our abstraction licences to meet the requirements of the European Habitats Directive, take place after April 2018, i.e. when this work is complete.

### 3.3 Our demand

Demand is forecast to reduce from now to 2040. This is based on population and property development forecasts published by the Welsh Government and the relevant local authorities, reduced leakage, and our estimates of water used by individual customers, industries and commerce. However, things change and we will be working with these organisations to ensure we have the most accurate forecasts at all times, refreshing our plans each year, so we can accommodate any changes the economy or society require.

When we develop the demand forecasts for our zones, we estimate the usage levels in a hot dry year, and for the critical period of peak use. This gives us insight as to whether we can supply water to all of our customers in the most arduous conditions, across a whole year and during the critical period.

### 3.4 Managing the supply demand balance

If our Supply Demand Balance shows that there is an adequate supply of water to meet the forecasted demand in that WRZ, we are in a position that will achieve our planned levels of service. However, if the SDB shows a deficit of water in the planning period, we need to look at options to meet this deficit.

### 3.5 Options to address a deficit

We have a number of options available to us to help with improving our ability to supply water. These options include:

- **Water Efficiency** – saving water through supporting customers to reduce their usage
- **Leakage** – reducing the losses in our system through increased investment in leakage strategy
- **Water Resource** - utilising a new source of water or increasing the water we take from an existing source.

In order to determine the best measures to implement, we compare all options on costs throughout the planning period and, in line with best practice, the environmental and social costs of all options are included in this assessment. We have optimisation modelling software that assesses all the key cost information for the options identified, and selects the solution which provides the required volume of water savings or water at the least cost.

We believe we have a cost effective Plan for our customers that also considers the environment. The chosen options are discussed in the following chapter; the majority are least cost, however if the preferred option is best value but not least cost, this preference is justified. Typically, this would be because of an increased resilience benefit that the scheme also delivers.
4 Deficit Zones

4.1 Introduction

We have identified five WRZs that fall into deficit between 2015 and 2040. The map on page 4 shows the locations of the deficits and the following subsections discuss each WRZ and what solutions will be implemented to ensure that the deficit is addressed over time.

4.2 North Eryri Ynys Môn

North Eryri Ynys Môn is forecast to be in deficit from 2024 and remain in deficit throughout the rest of the planning period.

To maintain the supply demand balance to 2040, we will deliver the least cost programme of solutions, which is to transfer water from our Cwm Dulyn water treatment works from the neighbouring WRZ to the South, to actively pursue improved leakage levels, and to carry out water efficiency work.

The following graph shows how the solutions identified will increase our supply capability to match our demand forecast.
4.3 Tywyn Aberdyfi

In Tywyn Aberdyfi, a deficit is predicted to occur post 2016.

Due to the remote nature of this WRZ, and the current limited ability to share water with neighbouring WRZ’s due to network restrictions, finding options to meet the identified deficit was more challenging. Available leakage savings are limited because of the considerable leakage reduction efforts that have already been undertaken and some water efficiency measures already being promoted.

To maintain the supply demand balance we will deliver the least cost solution, which is to transfer raw water from a new river abstraction at Afon Dysynni and transfer this water to Penybont WTW which has existing spare capacity, thus maximising the use of this existing asset. Further treatment capacity will be obtained later in the planning period at this asset to maintain the supply demand balance. There will also be additional water efficiency measures implemented.

The following graph shows how the solutions identified will increase our supply capability to match our demand forecast.
4.4 Brecon Portis

The licence reductions resulting from the NRW review of consents process commence in 2015 and will push the WRZ into deficit from this year onwards. However, a reduction in demand is forecasted and will subsequently move the zone into a water surplus position into the future.

The solution selected to meet the deficit is to supplement the available flow in the river Usk with additional releases from the Usk reservoir, for abstraction at our Brecon Water Treatment Works when required. This is the least cost option to deal with the water deficit within the zone.

The following graph shows how the solution identified will increase supply capability (restoring the capability lost due to RoC) to meet the demand, and how the forecast changes in demand have created an increasing surplus from the middle and towards the end of the planning period.
4.5 Pembrokeshire

In Pembrokeshire a water resource deficit has been driven by the significant impact of the NRW ‘Review of Consents’, and the potential impacts of climate change. We are undertaking environmental study work to confirm and agree with NRW, the level of licence reductions that are required on the Eastern Cleddau.

Licence reductions are planned to take effect from April 2018. The licence reduction will limit our ability to refill our reservoirs, and in turn restrict water supply from our Preseli water treatment works.

The solutions to the forecast deficit is to transfer raw water from Llys y Fran reservoir to Preseli WTW, to import of water from the adjacent Tywi Conjunctive Use System (Tywi CUS) WRZ, to further reduce leakage across the zone and to reinstate the Milton boreholes through to 2040. The supply option locations are included on the following figure, and the subsequent graph shows how the solutions identified have created a balance between supply and demand.
This combination of schemes results in a solution which is not least-cost; however it does provide a significant benefit in terms of zonal resilience. A more detailed reasoning is provided in the Plan, along with the environmental considerations.

4.6 **SEWCUS**

In the SEWCUS WRZ, a small deficit of 0.5ML/d was identified in the final year of the planning period. This deficit is driven by the combined effect of NRW’s proposed changes to our abstraction licences on the lower reaches of the Rivers Usk and Wye (seen in the below graph as the step change in 2018), the predicted impacts of climate change, and a demand forecast that rises steadily. As a result of the identified deficit, we plan to implement additional leakage detection work towards the end of the planning period.

The following graph shows how the zone remains in surplus until the very end of the planning period, where a small deficit is resolved through implementing a leakage reduction scheme.
4.7 SEWCUS Resilience Work

The leakage scheme to resolve the 0.5 Ml/d deficit in SEWCUS is not the primary issue for water resources in this zone.

The zone is operated through balancing the use of upland reservoirs, which are more cost effective sources in the winter, and lowland river sources which are pump fed into storage reservoirs and provide a more robust source at a higher cost in the summer.

It is clear, that significant operational changes will be required during drier years once licence changes on the Wye and Usk are implemented, particularly when coupled with potential Water Framework Directive impacts. These in combination could increase current water quality, asset integrity, and deployable output risks within the SEWCUS supply system to an unacceptable level. To adequately mitigate against these it will be necessary to both complete a study to better understand this level of risk and to develop assets to increase SEWCUS water resource system resilience.
5 Impact on Customer Bills

Welsh Government have accepted the proposals contained within our Water Resources Management Plan, so the next step for us is to obtain authorisation for our investment from our financial regulator, Ofwat.

Through our consultation processes, our customers and stakeholders have communicated their expectations for how we spend our money and how we deal with any SDB deficits while maintaining affordable water bills.

Our water resource investment proposals, as contained within the business plan are:

- Our investment requirements for the solutions outlined above for each zone, as well as those required to allow any reductions in our abstraction licences. This would require circa £9m of capital investment, with an associated annual running cost of up to £0.5m.

  This investment comprises around 0.5% of the total business expenditure anticipated for 2015 – 2020, which equates to an anticipated impact on household bills of less than £3 p.a.

- A further investment of around £20m which is required to improve our water infrastructure to maintain water quality under the differing abstraction regimes, and to meet the detailed requirements of the licences. The proposed additional £20m spend for network schemes, is heavily focussed on the SEWCUS WRZ, to overcome the increased risks to water supply from the reduction of abstraction licence capability on water resources such as the Wye and Usk.