



South Staffs Water

# Customer Challenge Group

Briefing Note 1:

## **Water Resource Planning**



## 1. Legislative Requirements

Water companies are required by law to draw up, consult on and adopt a water resources management plan (WRMP) which sets out how they will manage resources in order to meet the requirements of the Water Industry Act 1991. The next WRMP will cover the period 2015 to 2040 and will take into account factors such as population growth and climate change. The Plan is subject to annual review and companies have to write a new plan where circumstances change or the Secretary of State for Defra requires them to. A new plan must be prepared every five years.

## 2. The Supply Demand Balance

A WRMP includes a forecast of the demand for water against the forecast of the amount of water available for use (WAFU). There is a buffer called 'headroom' added to demand which accounts for uncertainty in

the various elements of the forecasts. If:

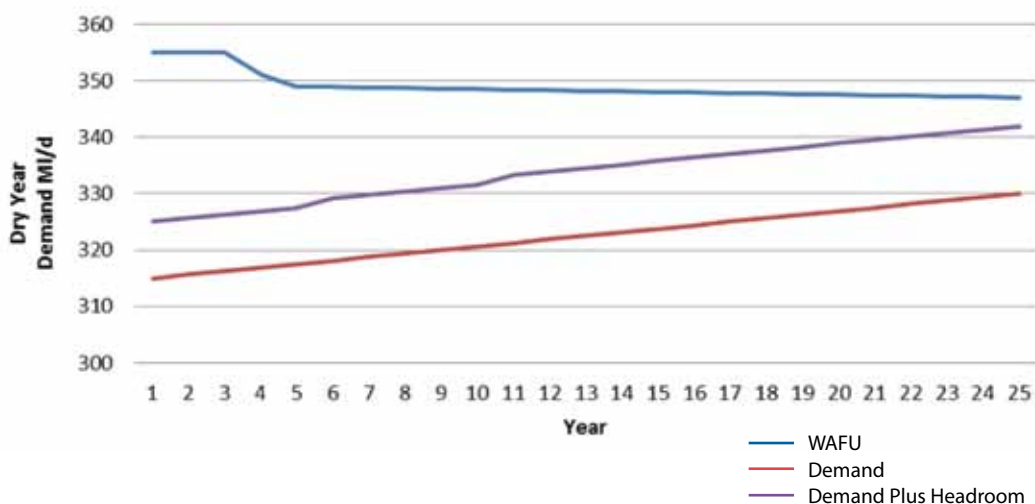
- Water available remains at or above the level of forecast demand plus headroom - supply/demand level is **balanced** or in **surplus**.
- Water available drops below the level of forecast demand plus headroom -supply/demand balance is in **deficit**.

If there is a deficit, options must be identified to return to balance. These might include demand management measures, such as metering and water efficiency, leakage reduction and resource development.

The impact of climate change on both the demand for, and availability of, water in the future is also considered.

An example of a supply demand balance is shown in Chart 1, below.

**Chart 1: Example Supply Demand Balance Showing No Deficit**



### 3. Demand Side Components

The demand for water is broken down into the main water using categories which are:

- Unmeasured households
- Measured households
- Unmeasured non-households
- Measured non-households
- Leakage
- Miscellaneous components

In order to forecast future water use for households we use population forecasts and housing growth figures. We then determine how many people and how many properties will be in the unmeasured (rateable value charge) and the measured (metered charge) categories.

Domestic water use is forecast on the basis of per capita consumption (PCC) which is made up of key activities including:

- Washing clothes
- Personal bathing
- Toilet flushing

We also consider:

- Forecasts on future ownership rates of water using appliances, such as power showers, automatic washing machines, dishwashers
- Predicted changes in the volumes of water used by these appliances
- The forecast frequency of use, such as six times a day for toilet flushing, once a day for showering.

PCC is then multiplied by the number of people to give the total demand for water. Different PCC figures are derived for unmeasured households and measured households. Measured households are further broken down into the type of measured household i.e a new property, a property that has opted to have a meter fitted or a property that has had a meter installed as a result of a change of occupier.

Future water demand by non-households is forecast using analysis of trends in consumption in different sectors, such as brewing, metal manufacturing, food and drink, and the relationship with inflation and other economic indicators.

Leakage forecasts are based on the assessment of the Sustainable Economic Level of Leakage (SELL). For more information on this, see the CCG briefing note 'Leakage', page 5.

There are small miscellaneous categories of water use, such as water we use in the distribution system and water which is taken via illegal connections, which must also be accounted for in the demand forecasts.

The impact of predicted climate change on demand is also added to demand forecasts.

## 4. Supply Side Components

'Deployable output' is a building block in determining water supplies available for use by a company.

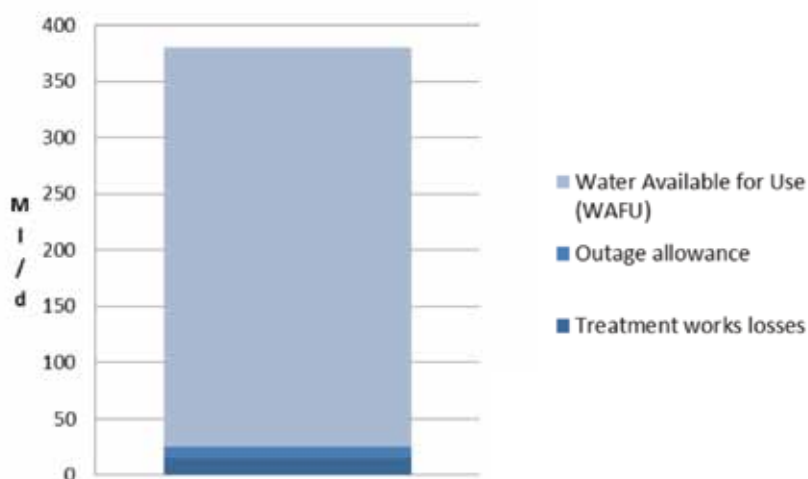
We have a water resources model that is used to estimate the overall deployable output i.e. the combination of water that can be reliably taken from both surface and groundwater sources to meet demand.

The deployable output for each groundwater source licensed to us is assessed using standard water industry calculations. For surface water sources (Blithfield and the River Sever) water flow records and control rules are used and the model determines the amount of water that can be used by the whole supply system. Water is used during the treatment processes at some sources (treatment works losses) and this water is deducted from deployable output.

The deployable output derived from the model assumes that all sources are available to be used at all times. However, at any point in time there may be sources which are unavailable due to planned work, for example replacement of old assets and unplanned events, such as pump failure. The amount of water which is not available is modelled using real data relating to historic planned and unplanned events and is called 'outage allowance.'

The impact of climate change on deployable output is also taken into consideration. Chart 2, below, shows the relationship between deployable output, treatment works losses, outage allowance and the final WAFU figure. It is WAFU which is compared to forecast demand plus headroom to determine the supply demand balance.

**Chart 2: Deployable Output and Water Available For Use**



## 5. Headroom

'Headroom' is the term used to refer to the margin between water supply and demand.

- **Target Headroom** is defined as the minimum buffer that a prudent water company should introduce into the annual supply-demand balance to ensure that their chosen level of service can be achieved. It is the margin between WAFU and demand required for planning purposes to cater for uncertainties (except for those due to outages) in the overall supply-demand balance. Target headroom is usually added to demand and this total is then compared to WAFU to determine whether there is a deficit in the supply demand balance.
- **Available Headroom** is the actual difference between WAFU and demand at any given point in time.

The scale of the headroom buffer should balance the costs and risks to customers and the environment of a low headroom allowance against those of a high headroom allowance. Water companies are expected to accept a higher level of risk in future than at present. This is because uncertainties for which headroom allows, such as vulnerable surface water licences on the supply side and uncertainty of climate change on demand, will become smaller over time.

## 6. Other Influences on The Supply/Demand Balance

There are a number of activities which can affect the amount of water available to meet demand. For example, there may be:

- refurbishment or replacement of treatment plant which may reduce treatment works losses
- redrilling of borehole sources which may increase output

These activities will be closely linked to capital maintenance strategies.

Sustainability reductions required as part of the National Environment Programme (NEP) may reduce the amount of water available and climate change impact assessments are likely to reduce the amount of water available in future. For more on NEP see CCG briefing note 'National Environment Programme'.

All proposed and forecast changes to deployable output and water available for use are incorporated into the baseline supply demand forecast in order to determine whether there is a deficit within the planning period.

## 7. Options

In the event of a supply/demand deficit a water company must identify the most cost effective solution to close the deficit and bring supply and demand back into balance. A full range of options from the supply side and the demand side must be considered and appraised in terms of feasibility, financial cost and environmental cost.

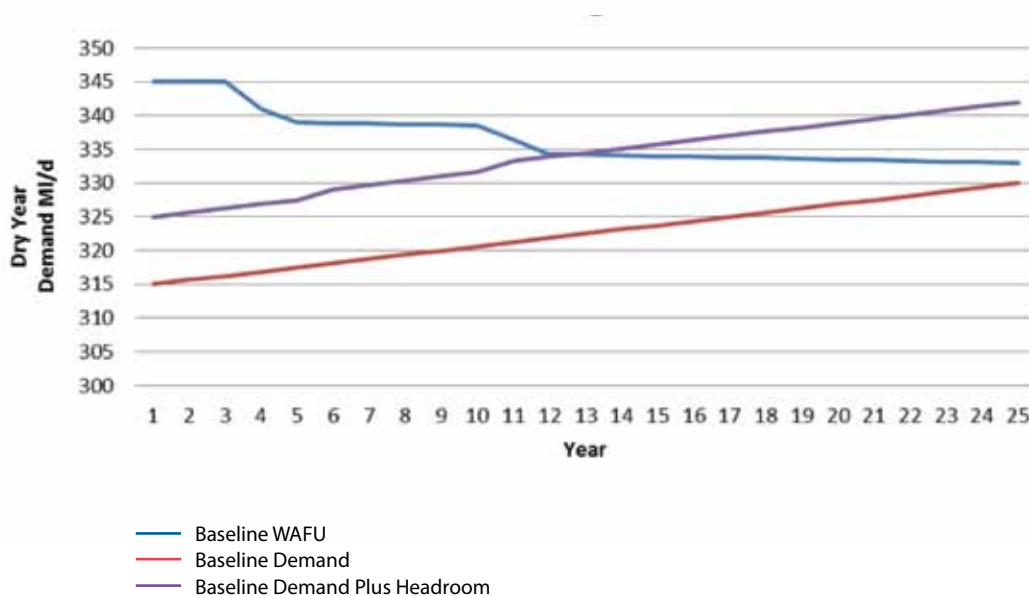
Typically the range of options will include:

- leakage reduction
- additional water efficiency
- increased metering
- development of new sources
- reduction in treatment works losses

The most cost effective solution to a deficit may not be implementation of just one option, it may be a combination of options which provides flexibility in terms of timing, delivery and output.

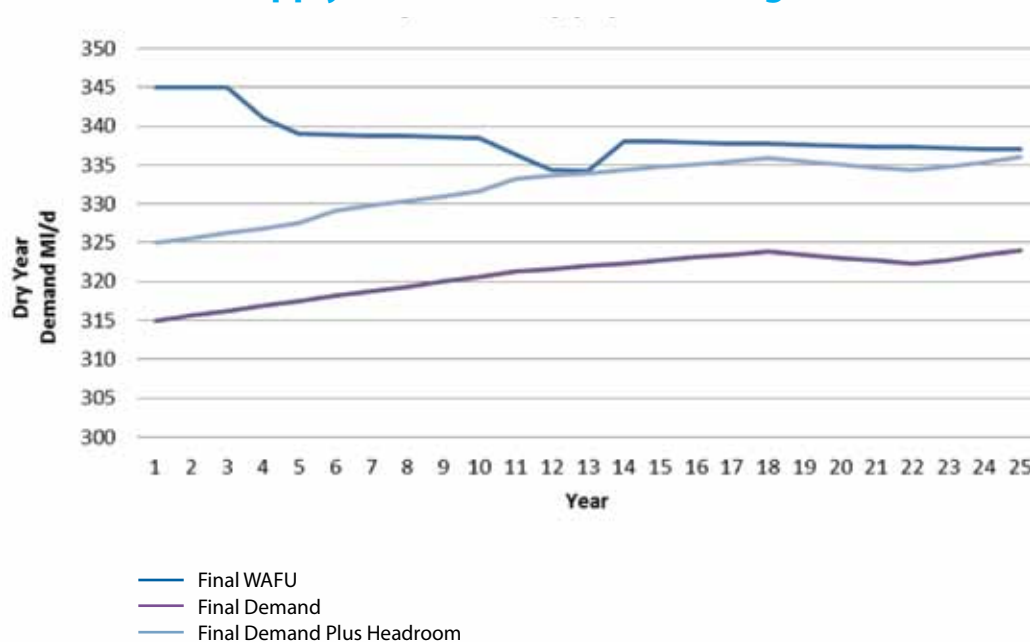
An example of a baseline supply demand balance with a deficit is shown in Chart 3, below. The deficit in year 12 may be caused for example by a reduction WAFU driven by the NEP.

**Chart 3: Baseline Supply Demand Balance Showing Deficit**



The following chart shows how the supply demand deficit may be addressed by a combination of the introduction of a new source of water in year 13 and demand management in year 18.

**Chart 4: Final Supply Demand Balance Showing No Deficit**



## Glossary

**ALC** – Active Leakage Control.

**AMP6** – Asset management plan for the 6th period since privatisation: 2015-20.

**CRoW** – Countryside and Rights of Way Act (2000).

**Defra** – Department for Environment, Food and Rural Affairs

**Deployable output** – The amount of water available to us to supply to customers.

**DMA** – District Metered Areas.

**dWRMP** – Draft Water Resources Management Plan.

**EA** – Environment Agency.

**ELL** – Economic Level of Leakage.

**FBP** – Final Business Plan.

**fWRMP** – Final Water Resources Management Plan.

**Headroom** – An amount of water added to allow for uncertainty in various elements of supply/demand forecasts.

**HWBD** – Habitats and Wild Birds Directive.

**Measured charges** – Water bills charged by way of water registered through a meter.

**MI/d** – Million litres per day.

**NEP** – National Environment Programme.

**Ofwat** – Water Services Regulation Authority.

**PCC** – Per Capita Consumption.

**PR14** – Price review undertaken in 2014 for 2015-20 period.

**RBMP** – River Basin Management Plan.

**SAC** – Special Areas of Conservation.

**SELL** – Sustainable Economic Level of Leakage.

**SPA** – Special Protection Area.

**SSSI** – Site of Special Scientific Interest.

**TUB** – Temporary Use Ban.

**Unmeasured charges** – Water bills charged by way of rateable value.

**Volumetric charge** – Same as measured charge.

**WAFU** – Water Available For Use.

**WFD** – Water Framework Directive.

**WIA** – Water Industry Act (1991).

**WRA** – Water Resources Act (1991).

**WRMP** – Water Resources Management Plan.



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