

RD 03/02

**TO THE REGULATORY DIRECTORS OF ALL
WATER AND SEWERAGE COMPANIES AND
WATER COMPANIES**

8 March 2002

Dear Regulatory Director

OFWAT SECURITY OF SUPPLY INDEX

In RD 23/01 we invited views on our proposals for a Security of Supply Index to be collected in the 2002 June Return. Here we summarise your responses and our conclusions.

Most respondents welcomed the Security of Supply Index and supported the need for a replacement of the DG1 measure of water resources availability. There were some specific concerns about the methodology for calculating the index and how we intend to use it. These are addressed in turn below.

At present we do not propose to alter the way in which the Index is calculated. But we would not rule out future refinements of elements of the calculation. We intend to publish the Index with commentary on each company in the *Leakage and the efficient use of water* report in September 2002. The index will be used to flag up areas where detailed analysis or further work is required. Eventually we intend to use the index to assess progress in delivering the security of supply outputs funded in your price limits. The index will not be an element of the Overall Performance Assessment for the 2004 Periodic Review.

Index score

Some respondents felt that the proposed index was too complex and that it would not be meaningful to customers. Various alternative methods of scaling the index were suggested. But we think that our approach differentiates sufficiently between the range of security of supply positions, and that a maximum score of 100 is simple to understand. The index is an indicator, not a measurement, and we will explain how to interpret the score when it is published. .../...

Submission of the index with JR02

Responses on the issue of submitting the security of supply index with JR02 were mixed. Respondents were generally willing to supply the index along with JR02, although a few argued that it imposes a significant regulatory burden on companies.

We acknowledge the additional burden that the index places on companies. But feel that it is not too onerous, as most of the information we are requesting is already reported by companies. The extra work required mainly relates to performing the calculations and providing commentary.

Use of a reference level

Some respondents were concerned about the requirement for the use of a reference level arguing that it is inappropriate. One suggested that the reference level implied that we would seek to ensure in future that companies plan to a common level of service. This is not our intention, although we think that all companies should be able to justify the level of service they deliver.

We recognise that companies' supply systems differ and that it may not always be possible for them to calculate yields precisely to meet the defined reference level of service due to differing hydrological characteristics. If this is the case, we ask companies to estimate yields as closely in line with the reference level as possible, setting out their assumptions.

We still think that reporting against a reference level of service is important. This will allow comparisons of security of supply positions to be made on a more consistent basis.

Use of headroom

Respondents have indicated that we should specify the headroom methodology which companies' should use in order to calculate the headroom figures to ensure consistency across the industry.

We do not believe that we should specify a methodology for calculating headroom. This is one of the steps that you carry out when preparing your water resource plans, based on your understanding of the supply / demand balance and the uncertainties that affect it. We will assess whether you have a deficit against your own estimate of target headroom.

We expect you to demonstrate best practice in estimating headroom requirements both for water resource planning and for the purpose of the security of supply index. You should explain the underlying assumptions of the methodology used. You should also state clearly any changes to assumptions or the methodology since that used for demand forecasting purposes in your water resource plans or business plans.

.../...

Dry year adjustment

Respondents expressed concern about the requirement to adjust the recorded distribution input onto a dry year basis. We acknowledge that this is not straight forward, and have attempted to clarify our guidance. We think it is necessary to make a dry year adjustment for the index to reflect security of supply during a dry year.

Critical Period Scenario

A few respondents suggested that critical period scenario rather than the dry year annual average scenario should be used. We recognise that critical periods are important for security of supply. We would be interested to see the results of using an approach based on these in addition to the dry year scenario. But at this stage we are not asking you to report the index on this basis.

Guidance from Ofwat

Amended guidance on the calculation of the security of supply index is set out in the attached annex A, with a summary of responses provided in annex B. The information capture system for the index has been supplied separately with that for the June Return 2002.

Yours sincerely

Bill Emery
Director of Costs and Performance
and Chief Engineer

ANNEX A: CALCULATION OF OFWAT SECURITY OF SUPPLY INDEX FOR TABLE 10 OF THE JUNE RETURN

The role of headroom

In their 1999 water resource plans and strategic business plans, companies used a common concept of supply 'headroom' for the first time. Headroom is the difference between the amount of water a company has available to supply under specified planning conditions, and its distribution input under those specified conditions. Companies commonly use dry year annual average daily demand in preparing water resource plans, but also may calculate headroom on a critical (or 'peak') period planning scenario. As part of their plans, companies estimated the amount of 'target headroom' they would need in each of their resource zones to cope with future uncertainties surrounding supply and demand. To estimate this many companies used the *Converting uncertainty into headroom* methodology developed by UKWIR.

Given this, the proposed security of supply index seeks to capture by resource zone:

- the magnitude of any deficit in headroom against the company's estimate of target headroom; and
- the proportion of customers exposed to a headroom deficit.

The security of supply index

We will monitor your security of supply in the June Returns. The index should highlight companies whose security of supply falls short of planned levels of service, or a reference level of service. It should not allow surpluses in one part of a company's area to counter-balance deficits elsewhere.

Water Resource Zones

Because you plan headroom on a water resource zone basis we cannot simply use the difference between total distribution input and company wide water available for use (WAFU). To provide a complete understanding of security of supply across a company's area, the index will be based on the proportion of that company's population in zones in headroom deficit and the size of that deficit. Water resource zones are defined in the Environment Agency's 1999 Water Resources Planning Guidelines as:

The largest possible zone in which all resources, including external transfers, can be shared and hence the zone in which all customers experience the same risk of supply failure from a resource shortfall.

Dry year demand

For water resource planning purposes, headroom is the difference between WAFU and distribution input in a specified planning scenario. You should report the security of supply index by applying an appropriate dry year

adjustment factor to the recorded distribution input for the report year. You should use an annual average WAFU figure i.e. the same as that reported in your water resource plan updates.

You should base the dry year adjustment on a combination of:

- the relationship between normal and dry year distribution input forecasts assumed in your water resource plans
- any difference between the report year conditions and those that underly your normal year distribution input forecast

You should set out the basis for the dry year adjustment that you have used by providing in your commentary:

- the ratio of dry year distribution input to normal year distribution input in your water resource plan for the report year
- the dry year adjustment ratio applied to out-turn distribution input for calculating the index

You should explain any difference between these ratios.

We will adopt the definition of dry year annual average demand used by the Environment Agency in its 1999 Water Resources Planning Guidelines. That is:

The level of demand which is just equal to the maximum annual average which can be met without the introduction of demand restrictions at any time during the year. The dry year demand should be expressed as the total demand in the year divided by the number of days in the year.

We would expect your dry year demand to be greater than normal year demand. A constraint should be applied such that the dry year-adjusted distribution input cannot be lower than the pre-Maximum Likelihood Estimate (MLE) out-turn distribution input as reported in table 10 of your June Return.

Levels of service

The levels of service that you adopt will affect your available supplies. For example, it is possible that a company that plans on the basis of 'no hosepipe bans' could reduce or remove a headroom deficit if it were to plan on the basis of, say, 'hosepipe bans no more than 1 year in 10'. Therefore we propose to collect two indices through the June Returns:

- a security of supply index using your chosen levels of service
- a security of supply index using a defined reference level of service

A common reference level of service will allow us to compare security of supply between companies using consistent planning assumptions. A similar exercise was carried out by the Environment Agency in the 1997

Reassessment of Water Company Yields. We propose that you calculate WAFU for the same reference levels of service as used in that 1997 exercise. This means that you will already have calculated deployable output from most sources on this basis. If you are not able to precisely replicate the reference level of service, you should estimate yields as closely in line with the reference level of service as possible. You should set out any assumptions clearly in your commentary.

The reference scenario given in the *1997 Reassessment of Water Company Yields* was:

1 in 10 years: 5% demand reduction applied at any time of year for a minimum of 3 months and a maximum of 12 months.

1 in 40 years: further 5% demand restriction, and drought orders/permits to authorise additional abstraction or reduce compensation discharges or prescribed flows, again for a minimum of 3 months and a maximum of 12 months

The deployable output is the constant rate of supply which can be sustained throughout the simulation (the value before the 5% and 10% demand restrictions are applied).

Deriving the index

You will need to follow a series of steps to calculate the index. These are set out below.

Step 1

Take the distribution input, available headroom and target headroom figures for each water resource zone as reported in the annual water resource plan (WRP) updates. Water available for use (WAFU) as reported in the WRP updates does not include bulk imports and exports. In order to meet Ofwat's definition of WAFU, you should add in the available bulk imports and deduct the bulk exports for each zone.

Bulk imports and exports should be based on a dry year and be consistent with those assumed in your water resource plans. We would expect these to be the maximum amounts that you may request under your contract or be obliged to supply.

Available headroom will therefore be calculated as the sum of column (2) and column (3), minus column (4) and minus column (5).

	1	2	3	4	5	6	7	8
Company Name	Water Resource Zone	WAFU - EA definition (MI/d)	Bulk Imports (MI/d)	Bulk Exports (MI/d)	Dry Year Distribution Input (MI/d)	Available Headroom (MI/d)	Target Headroom (MI/d)	Surplus/ Deficit (MI/d)
Water Co	Zone A	300.00	70.00	50.00	325.00	-5.00	40.00	-45.00
	Zone B	200.00	40.00	50.00	180.00	10.00	15.00	-5.00
	Zone C	70.00	1.00	5.00	50.00	16.00	10.00	6.00
	Company Total							

Step 2

The proposed index is based on the difference between the available headroom [column (6)] and the target headroom [column (7)] in each zone. This 'surplus/deficit' [column (8)] is then expressed in column (9) as a percentage of the sum of dry year distribution input and target headroom.

	1	6	7	8	9
Company Name	Water Resource Zone	Available Headroom (MI/d)	Target Headroom (MI/d)	Surplus/Deficit (MI/d)	% Surplus/Deficit
Water Co	Zone A	-5.00	40.00	-45.00	-12%
	Zone B	10.00	15.00	-5.00	-3%
	Zone C	16.00	10.00	6.00	10%
	Company Total				

This, therefore, gives a measure of the size of the deficit/surplus in relation to the demand that you actually expect to meet during a dry year plus the headroom you believe is necessary. You should calculate the deficit/surplus for dry year annual average daily demand.

Step 3

Take the population figures for each zone [column (10)]. The population in each zone with a headroom deficit is expressed in column (11) as a percentage of the company total population. Where the zone is not in deficit, zero should be entered in column (11).

	1	10	11
Company Name	Water Resource Zone	Zonal Population (000)	% of Total Population with Headroom Deficit
Water Co	Zone A	2,100	58%
	Zone B	1,150	32%
	Zone C	350	0%
	Company Total	3,600	

Step 4

You should then derive zonal scores in column (12) by multiplying column (11) by the square of the deficit in column (9) for each zone. This means that the index is a function of the square of the deficit, so that large deficits affecting small zones weigh in the overall index. You should then multiply the product for each zone by 100, and sum to produce the overall company score.

	1	12
	Water Resource Zone	Zonal Index (% deficit ² x % population affected x 100)
Company Name		
Water Co	Zone A	0.89
	Zone B	0.02
	Zone C	0.00
	Company Total	0.91

Step 5

The final company wide security of supply index is then calculated as:

$$(1 - \text{overall total company score in column 12}) \times 100$$

The resulting score should be rounded down to the nearest whole number.

Company Name	Security of Supply Index Score
Water Co	9

A company with all zones at or above target headroom will achieve a maximum score of 100. Negative scores are possible for companies with significant security of supply problems.

ANNEX B: SUMMARY OF COMMENTS RECEIVED ON RD23/01

We issued guidance on the proposed security of supply index on 20 December 2001 asking for comments by 1 February 2002. We received 26 responses (21 from water and sewerage and water only companies). The following is a summary of the main issues raised.

General

Respondents generally welcomed the index and supported the need for replacement of DG1. Five companies stated that Ofwat's examination of security of supply is a positive step forward. Three companies felt that the index is at present too complex, likely to result in inconsistent results and not be meaningful to customers.

We have not fundamentally changed the mechanics of the index calculation. The complexity of the index is required to differentiate adequately between security of supply positions.

Submit index with June Return 2002

Responses on this issue were mixed. Four companies stated a willingness to supply the index with JR02 data. However, others argued that the index will impose a significant regulatory burden on the companies, with two arguing that Ofwat has not given sufficient notice for submission of the index with JR02. One company suggested that the index should be submitted with water resource plan updates.

We have not altered our position on the requirement for companies to submit the index with JR02. The majority of the data that supports the calculation of the index is already available to the companies.

Use of a reference level

Seven companies were concerned about the requirement to calculate the index to both a planned and a reference level of service. One pointed out that in some cases, it might be appropriate for the reference level to not be achieved. Another claimed that using the reference level might force companies to reduce the service level they offer to customers to comply with this requirement.

We recognise that the reference level of service may not always be appropriate. However, for comparative and reference purposes, we will ask companies to estimate yields as closely in line with the reference level as possible. We do not intend to force a company to reduce or improve the levels of service it offers if they differ from the reference level.

Use of headroom

One company argued that it would not be right to penalise companies unless headroom is significantly less than that agreed with the Environment Agency. Others claimed that the use of actual demand to determine dry year demand is technically flawed as actual demand is influenced by weather conditions. A few argued that Ofwat should clarify the methods needed to derive factors such as target and available headroom, ensuring the definitions match the Environment Agency's.

We have not advocated a single methodology that companies should use to calculate headroom, but the methodology should be consistent with the one used to prepare water resource plans for the Environment Agency.

We have clarified our guidance to enable companies to adjust actual distribution input to take account of influences such as weather conditions before determining dry year distribution input.

Dry year adjustment

Three respondents argued that using actual demand and adjusting it by a dry year adjustment factor is technically flawed approach. Two suggested that critical period scenarios should be used rather than the dry year average, with one arguing that it is necessary to calculate the index for specific critical conditions that are relevant for the resource area concerned.

Companies commented that the dry year adjustment could be subjective and a little more guidance may be appropriate. Two claimed that an agreed methodology on calculating the dry year adjustment is necessary to enable comparisons to be made.

We have clarified our guidance to enable companies to adjust actual distribution input to take account of influences such as weather conditions before determining dry year distribution input. We will consider how an index based on critical period scenarios could be used in future. We do not think that it is for us to set out a standard methodology for calculating the dry year adjustment. But companies should use a methodology consistent with that used in their water resource plans.

Index Score

One company was particularly concerned about the interpretation of an index score of less than 100, stating that it would be incorrect to assume such a company was not meeting its performance target. It went on to point out that the Environment Agency may approve a company's water resource plans even if it has a score of less than 100. Such a company should not be penalised based on its index score. Others argued that the existing index is not useful as there is no range, and should be defined within upper and lower bounds, for instance between 0 and 100. Two companies suggested that it would be more useful if the index could be split to a regional level and used,

for instance, to identify underlying regional resource problems based on Environment Agency regions. One suggested that a cost per index could be used as a funding mechanism.

We will explain what the index scores represent and how to interpret them when we publish this data. We intend to use the score to assess the delivery of supply / demand balance outputs. The index will not form part of the overall performance assessment at the 2004 periodic review. The index is intended to help us better understand and summarise companies' supply / demand balance positions, not to determine funding requirements. It will provide a more consistent framework for monitoring security of supply across the industry. It will also be used to identify where further analysis, such as at a regional level, is required.

Other

One company felt that we need a standard methodology for calculating the individual components of index. Two companies requested further guidance on the definition of water resource zones, as this would affect the index. One respondent asked when is the water available for use snapshot should be taken, and another whether bulk imports and exports should be based on actual figures.

We have not advocated a standard methodology for calculating components of the index. Generally, the methodology employed should be consistent with that used when companies produced their water resource plans. Guidance on the other matters raised has been provided in Annex A of this letter.