

Agenda

Advancing economics in business

Cleaning up our act: what now for the Water Framework Directive?

The Water Framework Directive represents a significant piece of EU legislation for the water sector across Europe. With a deadline of 2015 by which to achieve the ecological standards set, and with another periodic review on the horizon in England and Wales, what are the challenges that the industry faces in implementing the Directive?

With the beginning of the 2009 periodic review of water charges (PR09) in England and Wales imminent, one of the key questions to be considered is the extent to which the standards required by the Water Framework Directive (WFD)—the EU Directive regulating various improvements in water quality—will impact on companies' investment programmes and customers' bills. At PR04, 46% of the increase in the average household bill was due to environmental improvements.¹ However, much of this did not relate to the WFD. Ofwat, the industry regulator in England and Wales, has given away little where future price controls are concerned, stating that it was 'not in a position to assess how significant the programme of environmental improvements for water companies will be in the period beyond 2010', but that it expected the WFD to be one of the main statutory drivers for work on the water environment by 2010.² With concerns about vulnerable customers, bad debt levels in the industry and financeability constraints, how will the various stakeholders address these issues in the face of pressure to achieve the standards set by the Directive by the 2015 deadline?

This article reviews the objectives and challenges of the WFD. It presents evidence on the costs and benefits of implementation and discusses some of the key difficulties policymakers may face in eliciting robust benefit assessments. It also provides insight into stakeholder perspectives at PR09.

What is the WFD?

The WFD is the most substantial piece of EU water legislation to date. It was passed in 2000 and transposed into national law in 2003, and applies to all surface freshwater bodies (including lakes, streams and rivers), groundwaters, groundwater-dependent ecosystems,

estuaries and coastal waters up to one mile out. Its key objective is to protect aquatic ecology, unique and valuable habitats, drinking water resources and bathing water. Standards are to be achieved by 2015, with 2027 as the final deadline for achieving objectives.

By setting an ecological standard—defined somewhat loosely as achieving 'good status'—the WFD goes beyond previous environmental legislation, which specified chemical or physical standards.

What are the main challenges of the WFD?

While the WFD provides a robust framework for the achievement of environmental objectives, it also presents a number of challenges. These include uncertainty as to what the 'good ecological status' standard actually means; difficulty in assessing the benefits, costs and effectiveness of different measures; and ambiguity about when the objectives must be met.³

As discussed above, one of the key differences between the WFD and previous water-related environmental legislation is that it establishes ecological rather than chemical or physical standards. While this is a more rounded framework for environmental quality (eg, by looking at the condition of water body inhabitants), its multi-dimensional nature poses a challenge. Many factors affect ecological status and the interactions between these factors are complex, and environmental aspiration arguably outstrips current scientific understanding of all the underlying processes. Furthermore, changes in key variables such as water levels affect ecological status by altering concentration levels. Therefore, while the ecological standard of healthy water body inhabitants is clear, what has to be done to achieve this status in the multitude of water

bodies across the UK (and indeed Continental Europe) remains a big unknown.

Add to this context of uncertain requirements the need to undertake economic analysis and assess costs and benefits, and the water becomes even murkier. Without knowing what measures will be required to achieve good ecological status, it is extremely difficult to cost these measures, let alone compare the costs of different packages of measures (cost-effectiveness analysis). Given the various interdependencies in the aquatic environment, different measures will have different effects: obtaining a common unit of measurement with which to compare the cost-effectiveness of schemes is therefore complicated.

Finally, the timeframe for achieving the Directive is ambiguous. It requires that environmental objectives be 'met' by 2015, while citing 2027 as the 'final deadline' for meeting objectives. While it seems that the Department for Environment, Food and Rural Affairs (Defra) is interpreting 2015 as the hard deadline, it is increasingly acknowledged that achievement of the WFD objectives by 2015 is unlikely.⁴

Costs, benefits and disproportionality

Since there is no market for the environmental improvements associated with the WFD, achieving the efficient level of improvements (where private and social benefits and costs are equated at the margin) depends on policymakers comparing the costs and benefits of achievement, before prescribing or incentivising an appropriate course of action. While the methodological approaches to undertaking cost-benefit analysis (CBA) are well understood in the literature, their application can be difficult.⁵ Defra published its latest attempt at assessment earlier this year, and provides a disaggregated regulatory impact assessment of the costs and benefits of various aspects of the WFD.⁶ Its current *aggregated* assessment, available on its website, is that the estimated costs of WFD implementation are between £450m and £630m, with estimated benefits of around £560m per annum for the UK.⁷ Given the challenges of assessment, these estimates are subject to substantial uncertainty. The latest attempt suggests that implementation of large parts of the WFD should be undertaken, but it does raise the possibility that costs may be disproportionately large compared with the point estimate of the benefits.⁸ The Directive does allow for derogations from its objectives where it can be shown that such disproportionality exists. However, exactly how disproportionality is to be interpreted still needs to be agreed at the European level.

Theoretically, CBA methods would consider costs to be disproportionate if the ratio of costs to benefits is greater than 1—that is, if the costs of the project being considered are greater than the benefits associated with it. However, the uncertainty surrounding both benefit and cost assessments is such that ranges of each might be used rather than a central estimate. This approach may generate instances where the upper end of a cost assessment is greater than the lower end of a benefit assessment, thus appearing to subvert the straightforward theoretical interpretation of disproportionality.

The challenges of environmental benefit assessment

Costs may be easier to forecast than benefits, since many of the costs of WFD implementation will be purely financial. As the discussion on stakeholder perspectives sets out below, the benefits associated with implementing the Directive are likely to be a hotly contested issue. The range of methodological challenges inherent in environmental benefits assessment may provide ammunition for such contestation, as set out below.

The value of environmental benefits can be assessed either directly or indirectly, by looking at individuals' hypothetical behaviour in a survey setting in the former case, or by looking at markets related to environmental services in the latter. As related markets are often absent, various indirect methods have been developed, such as the contingent valuation method (where respondents are asked directly about how they value the good), or choice experiments (where these values are elicited according to the various choices respondents make between different options). Contingent choice methods can take one of two approaches:

- willingness to pay (WTP) for a particular improvement; or
- willingness to accept (WTA) a deterioration in standards.

While this appears straightforward in theory, in practice, policymakers face several challenges in applying these approaches.

- **Designing the appropriate framework for analysing survey results.**⁹ When eliciting benefit valuations, the framing of the question can induce survey response bias. Respondents may have an incentive to understate their valuation if they perceive a link between their answer and the division of costs for delivering the environmental improvement. Surveys therefore need to be carefully designed to

minimise the perception of this link, or to elicit valuations regardless of whether respondents 'game' in their answers.

- **Customers' ability to perceive benefits and make comparisons.** Respondents may have difficulties visualising the benefits, and may also have limitations in their decision-making abilities. When asking consumers how they value different benefits, policymakers and researchers face the challenge of quantifying the concept of good ecological status for consumers. As this concept is even now still rather unclear to specialists, it is likely to be equally challenging for the average member of society. Furthermore, bounded rationality of survey participants is likely to exist and the different comparisons made under the choice theory approach might not be consistent. In addition, survey participants might object to the idea of paying for environmental improvements, perceiving that they have an entitlement to a clean environment, and report a zero WTP, therefore complicating a contingent valuation approach. How respondents mentally apply a discount rate to future costs and benefits in an environmental context is also contentious.¹⁰
- **Establishing the appropriate methodology.** Clarity is needed as to whether either WTA or WTP is the appropriate method for assessing benefits in the context of the WFD. This is critical because WTA results can sometimes be an order of magnitude greater than WTP assessments.¹¹ While various reasons can be put forward for why these estimates may differ (eg, if individuals are 'loss-averse', WTA may be greater than WTP¹²), a fundamental basis for distinguishing between them concerns property rights. If it is considered that citizens have a basic right to water meeting the good ecological status standard, WTA may be the more appropriate method. Given that the 'polluter-pays' principle is enshrined in the WFD, it would appear that citizens are considered to have rights to a certain environmental standard.¹³
- **Aggregating benefits.** Undertaking benefits assessments for each scheme being considered under the WFD would be disproportionately expensive and unlikely to be feasible. Consequently, policymakers will have to engage in 'benefit transfer' in order to transfer benefits from individual studies to provide an aggregate estimate. This is complicated by the fact that valuations can differ substantially depending on variations in factors such as environmental attitudes, socio-economic characteristics, geographical area, and nature of water use (general amenity, water sports, etc).

Studies have found that the margin of error associated with benefit transfer can be substantial—ranging from 20% to 225% depending on the nature of the transfer undertaken.¹⁴

Reaching consensus on these issues not only requires an understanding of environmental economics (including CBA), but also of behavioural economics.

Stakeholder perspectives at PR09

If the WFD is, as Ofwat has predicted, one of the main statutory drivers for environmental improvements from 2010, and given that environmental improvements were responsible for nearly half of customers' bill increases at the last price control, the WFD is likely to be a contentious issue among stakeholders during the forthcoming review. Add to this the increasing media scrutiny of the industry, and PR09 looks set to present some challenging questions. So what are the roles of each of the key stakeholders?

Defra is responsible for the development of WFD policies and the achievement of its objectives, while the Environment Agency is the 'competent authority' responsible for implementing the Directive. The Environment Agency will propose the measures that it perceives are necessary to achieve the WFD's objectives, and Defra will confirm these, after consultation. Water companies will be required to provide estimates of the costs associated with different programmes of measures (insofar as they relate to the water industry), and Ofwat, in its role as economic regulator of the industry, will provide advice on these estimates. It will also advise on the impact on customers' bills of different levels of investment and, along with the Consumer Council for Water (CCW), will represent customer considerations. Once Defra confirms the necessary programmes of measures, water companies are responsible for implementing those that pertain to them in their relevant river basins.

The incentives on Defra and the Environment Agency are relatively straightforward. Given their direct responsibility for achievement of the WFD, and Defra's liability for a non-compliance fine, they have an incentive for a large investment programme, with maximised certainty for achievement of objectives.¹⁵ Ofwat has recognised these incentives, calling on Defra and the Environment Agency to 'incorporate a reasonable approach to risk, rather than being unduly risk averse'.¹⁶

In contrast, Ofwat and the CCW may find themselves allied in defending the water industry and its customers from bearing a disproportionate share of the WFD costs. Ofwat in particular has already sent a clear signal in its

2006 position paper on the WFD that it expects the financial burden of WFD implementation to be spread in 'a fair and proportionate way across all sectors—in line with the "polluter pays" principle'.¹⁷ Specifically, this means that it may not support the water industry undertaking investment to clean up other parties' pollution.¹⁸ While Ofwat's adherence to the polluter-pays principle is one of the factors driving this stance, other drivers are the pressure it faces to minimise bill increases at a time when the industry has been subject to scrutiny in the media, and its desire to limit large investment programmes in light of financeability constraints faced by particular companies.¹⁹

The CCW has repeatedly made reference to the importance of understanding consumers' WTP for various improvements delivered through water and sewerage charges. Furthermore, its predecessor, WaterVoice, sent a clear signal at PR04 that it 'would prefer to see a better balance between customers' priorities and investment in environmental improvements determined by the Government'.²⁰ The CCW is likely to pick up this baton and scrutinise the benefits assessment associated with the WFD environmental improvements and highlight methodological inconsistencies and equity issues arising from increased levels of investment by water companies.

Overall, stakeholder interaction at PR09 and beyond may be more adversarial than cooperative where WFD issues are concerned. It could be argued that adversarial interaction may give rise to the challenging of ideas and proposals, thereby generating methodological robustness, sound investment and environmental improvements that are valued by society. However, there is also the risk that a non-joined-up

approach to these key issues might result in unresolved disputes and slow decision-making, and thus coordination failure in adopting solutions.

What next?

Going forward, many issues need to be resolved in order for the WFD to be effectively implemented. In addition to the challenges of defining good ecological status and assessing costs, benefits and effectiveness, a working understanding of what disproportionality means in practice will have to be developed. In addition, agreement will have to be reached about where environmental property rights lie, such that a decision can be made as to the appropriate benefits assessment methodology (WTP or WTA).

Defra is due to publish its preliminary cost-effectiveness analysis this summer, and further work will follow to refine these estimates and undertake updated CBA. Meanwhile, Ofwat will release its draft methodology document for PR09, and water companies are to begin preparing their draft business plans. Defra's forthcoming staged advice on the measures necessary to achieve the WFD will be taken into account in Ofwat's price-setting process. Crucially, however, Defra's six-year river basin management process does not align with the five-year price control process, and final guidance on the required programmes of measures will not be available in time to incorporate actual requirements into price limits. The ultimate answer to the PR09 cost question may then have to be provided in a series of lower-profile interim determinations, rather than at the main price control. If so, while water customers might wonder why their bills are increasing again, if the benefits assessment is robust, improvements may be perceived as worthwhile.

- ¹ Ofwat (2004), 'Future Water and Sewerage Charges 2005–2010: Final Determinations', December.
- ² Ibid.
- ³ The WFD also requires measures to tackle diffuse pollution, rather than just point source pollution. The monitoring problems associated with this, and the uncertainty of the outcome of policies designed to achieve improvements, may present further challenges.
- ⁴ See Defra's interpretation of the WFD timetable at: <http://www.defra.gov.uk/environment/water/wfd/pdf/wfdtimetable.pdf> for the 2015 deadline. The statement that achievement of WFD objectives by 2015 is unlikely was provided by Kevin Andrews, Defra, at the CIWEM-CMS conference on the WFD on June 26th, London.
- ⁵ CBA is distinct from cost-effectiveness analysis, which compares the costs of different measures to achieve a unit change in a particular objective.
- ⁶ Defra (2007), 'Draft Partial Regulatory Impact Assessment (RIA) on Potential Costs and Benefits Associated with New Environmental Standards and Conditions Proposed for Water Framework Directive (WFD) Implementation', March.
- ⁷ <http://www.defra.gov.uk/environment/water/wfd/faq.htm#20>.
- ⁸ There is also uncertainty about the range of assessed benefits (despite the point estimate) since previous assessments have been based on non-use benefits, thus excluding (and therefore underestimating) other sources of benefits such as the recreational use of rivers and direct consumption uses.
- ⁹ See Office of Fair Trading (2003), 'The Regulation of Licensed Taxi and Private Hire Vehicle Services in the UK', report prepared by Oxera, November. Available at www.oxera.com.
- ¹⁰ Horowitz, J. and McConnell, K. (2002), 'A Review of WTA/WTP Studies', *Journal of Environmental Economics and Management*, **44**, 426–47.
- ¹¹ Ibid.
- ¹² While not explicitly stating that individuals are loss-averse, Horowitz and McConnell (2002) refer to an example in the behavioural economics literature. Here, people provided with a mug (in a controlled experiment context) are willing to sell it for a certain price, which is almost always greater than the price that people not provided with a mug are willing to pay for one. This is because individuals have an 'endowment effect'; the emotional baggage associated with owning, and the discontent of then losing, something. Traditional economics does not take this loss aversion into account, and assumes that people do not care about 'sunk costs'. For a review, see Camerer, C.F. (2002), 'Behavioral Economics: Past, Present, Future', Carnegie-Mellon University Working Paper, draft 10/25/02.
- ¹³ Further discussion of this issue is available in National Audit Office (2003), 'Estimating the Benefits of Sewer Flooding Control', D. Pearce, July; and Pearce, D. (2003), 'The Role of Property Rights in Determining the Economic Values of Environmental Costs and Benefits', report prepared for the Environment Agency.
- ¹⁴ Brouwer, R. (2000), 'Environmental Value Transfer: State of the Art and Future Prospects', *Ecological Economics*, **32**:1.
- ¹⁵ This incentive can also manifest itself in sectors where achievement of outcomes is more certain. For example, water industry end-of-pipe solutions to agricultural diffuse pollution might be preferred to the more politically contested and uncertain policy of addressing agricultural diffuse pollution at source.
- ¹⁶ Ofwat (2006), 'Water Framework Directive: Position Paper', March.
- ¹⁷ Ibid.
- ¹⁸ At PR04, Ofwat stated that it does not perceive that levels of water industry investment will need to continue at PR04 rates in order to achieve the WFD: 'The significant investment on the control of point source pollution by the water and sewerage companies over the period 1990–2010 should mean that water customers are not expected to continue to fund new investment at the current rate beyond 2009'. Source: Ofwat (2004), op. cit.
- ¹⁹ These constraints are likely to be increasingly important as large investments are required for some companies to ensure that sufficient water resources are available in the future.
- ²⁰ See Ofwat (2004), 'Future Water and Sewerage charges 2005–2010: Draft Determinations', August.

If you have any questions regarding the issues raised in this article, please contact the editor, Derek Holt: tel +44 (0) 1865 253 000 or email d_holt@oxera.com

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