CIWEM Chartered Institution of Water and Environmental Management

Policy Position Statement

Bulk water transfers

Purpose

This Policy Position Statement (PPS) outlines issues relating to the development of new bulk water transfers in England and Wales. It should be read in conjunction with CIWEM's PPSs on Planning Water Resources for England and Wales and Water Quality Implications of Transferring Treated Water Supplies.

In this PPS a bulk transfer is taken to mean one of five Mega litres per day (5Ml/d) or more, of raw or treated water, between two parties and areas. This may be on a long term continuous basis or on an intermittent or temporary basis.

CIWEM considers:

1. More strategic transfers will be required as the likelihood of shortages increases with climate change, population growth and increasing environmental protection standards.
2. The capacity of potential supply from new water supply licensees might be limited, especially in critical drought periods.
3. An important aspect of inter basin bulk water transfers is the assessment of the risk of mixing water of one quality into a river of a different quality and the potential for alien species and parasites to be inadvertently transferred between river basins.
4. Any additional costs arising from water quality implications will need to be reflected in water company business plans and in discussions with Ofwat regarding the price setting process.

CIWEM calls for:

5. Defra, the Environment Agency/Natural Resources Wales and water companies to investigate the likely market for water resource interconnections. This should include the range and attributes of potential buyers and sellers of surplus water resources under likely future drought events, including long duration droughts of three or more years.
6. More flexible and efficient use of bulk water resources through optimally connected water supply systems.
7. Defra, the Environment Agency/Natural Resources Wales and water companies to analyse the critical water links needed to support transfers of water during serious water shortages.

8. Increased trading of bulk water supplies through improved connectivity of existing water supply systems and the promotion of financial incentives that makes water trading attractive to different categories of water users.
9. The water industry to develop a resilience standard to underpin guarantees of reliability in drought of bulk water transfers between sellers and buyers.
10. The water industry to research whether there are significant environmental, operational and technical barriers to bulk water transfers through the existing river and canal system.

CIWEM is the leading independent Chartered professional body for water and environmental professionals, promoting excellence within the sector.

Context

Bulk water transfers may be described as engineered schemes designed to move water between water resource zones either within the same company or between companies or a third party. A transfer may take place via piped network links (of raw or treated water) or utilise river, canal or natural transfers.

Continuous transfers typically provide water from an area with surplus resources to one where resources are either limited or persistently expensive. Temporary transfers may be used to provide extra resources in times of drought, subject to the availability of surplus and transfer capacity. As such bulk water transfers are features of statutory long term Water Resources Management Plans and short term Drought Management Plans.

Bulk water transfers are not a new phenomenon but few new inter-company links have been promoted since privatisation. More strategic transfers will be required as the likelihood of shortages increases with climate change, population growth and increasing environmental protection standards. Greater sharing of resources is likely to be required in the south east, alongside careful consideration of parties' rights to shared resources.

The need for sharing water resources is not limited to public water supply alone. Many catchments are considered by the Environment Agency/Natural Resources Wales to be over-licensed or over-abstracted, and a possible solution (if cost-beneficial) would be to promote bulk water transfers from elsewhere, for a range of beneficiaries including the environment itself.

There are resource and environmental impact issues associated with new, medium to large scale, bulk water transfers.

Water Act 2014 and the limits of transfer capacity

Following the Water Acti (2014), new water supply licensees may have a role in promoting future bulk water transfers. This could include new participants such as farmers with reservoirs and "spare" resources that could be traded via water transfer agreements. The Act offers the opportunity to promote flexible bulk water transfer co-operative ventures. For example, small

scale reservoirs could be part of a package of measures that new entrants could consider within existing networks.

The concept of bulk water transfers to augment freshwater resources is not new. However, the contention is that improved interconnection between and within water companies and third parties on a relatively local scale could be balanced against the need for new water sources or infrastructure.

The multi-purpose use of agricultural reservoirs has been suggested initially for novel bulk water transfers; it is possible that such reservoirs could be enhanced in the future for beneficial water transfers. Agricultural reservoirs of around 400,000m3 capacity can be built in two years compared with the 15-20 years required to build public water supply reservoirs of about 30-50 million m3 capacity.

This route is potentially much quicker than building new public water supply reservoirs, but the issues associated with small reservoirs such as evaporation losses, water quality problems, safety issues and (critically) financing are such that these should be considered on a case-by-case basis. If agricultural reservoirs are built for irrigation, then it is likely that the reservoirs would be half full into the second year of a multi-season drought, with a resource constraint on water availability for bulk transfers.

The capacity of potential supply from new water supply licensees might be limited, especially in critical drought periods.

Environmental impacts

The environmental impacts of bulk water transfers would be different for open channel transfer or pipeline transfer. A concern is that without proper precautions, alien fish species (such as zander) and parasites can be inadvertently transferred between river basins.

A critical aspect of inter basin bulk water transfers is the assessment of the implications of mixing water of one quality into a river of a different quality. In particular lowland rivers often carry agricultural chemicals. The European Water Framework Directiveii (WFD) stipulates that there should be no deterioration in water quality status, meaning that a river in good status must not become one in poor status as a result of the transfer. In addition, Article 7.3 of the WFD requires no deterioration below the 2007-08 baseline in Drinking Water Protection Areas. Compliance with the Directive is a key consideration, and mitigation measures are likely to increase bulk water transfer costs in some circumstances.

Monetising the environmental costs of a transfer alongside its benefits should be carried out but there is an inherent difficultly in this. Any additional costs arising from water quality implications will need to be reflected in water company business plans and in discussions with Ofwat regarding the price setting process. For potable water supplies, a Drinking Water Inspectorate risk assessment must be carried out for all potentially polluting substances1.

[1] See also CIWEM. 2014. Water Quality Implications of Transferring Treated Water Supplies

Key Issues

Ability to cope with drought

CIWEM calls for Defra, the Environment Agency/Natural Resources Wales and water companies to investigate the likely market for water resource interconnections. This should include the range and attributes of potential buyers and sellers of surplus water resources under likely future drought events, including long duration droughts of three or more years.

The UK's temperate climate has a variable weather pattern with frequent rain and very dry spells being possible at any time of year. It is possible that this variability may increase through climate change, and that the pattern, depth and duration of droughts could be different to those of the past.

Drought is seldom uniform, with groundwater mainly affected by dry winters, and surface water sources, particularly small reservoirs, often affected by dry summers. Whilst the majority of public water supply systems in England and Wales are designed to cope with single season droughts across a range of scenarios, ensuring security of water supplies through multi-season droughts requires careful management and planning[2].

Growing demand for water, combined with reduced availability due to climate change and environmental protection needs in coming years could make water transfer schemes more attractive and economically viable.

A need for a bulk water transfer would arise if there is base load or peak demand period shortfall in resources to meet a buyer's water demands, and there are spare resources from a seller to satisfy this need.

Third party suppliers of wholesale or bulk water to water companies may find it difficult to meet the associated commercial agreements alongside their own needs. For example, the Canal and River Trust has a duty to meet its commercial agreements with water companies whilst maintaining navigation for stakeholders. Water companies may require greater levels of security to ensure the water is available at the time it is needed and would be expected to pay accordingly for this level of reliability. Ultimately, it could be argued that in times of exceptional shortage of rain (droughts exceeding worst historic or modelled events) more dramatic measures would be required to maintain supplies for basic public sanitation and human health.

As additional water supplies are not frequently required, it may be less economically viable for new entrants to provide the transfer. Water companies may be able to manage these issues by purchasing farmland with reservoirs and selling part of it back to farmers, enabling agricultural needs, river regulation, and water transfers to be better co-ordinated.

A number of river basins in England and Wales are already heavily exploited. Yet there may be good scope for inter-basin transfers of water from river basins with surplus of resources water to river basins in deficit. This can be particularly effective where it is possible to transfer water

[2] Especially if we are to cope with long duration events of the type experienced in the UK in the past (e.g. 1880s, 1910s and 1920s) and those experienced in other countries in recent years (e.g. Australia)

from close to the tidal limit into the upper reaches of another river basin. These possibilities should be investigated to develop a better understanding of the range and attributes of water resources interconnection options and the characteristics and needs of potential buyers and sellers of surplus water resources.

Connections and critical links

CIWEM calls for more flexible and efficient use of bulk water resources through optimally connected water supply systems.

Contemporary discussions of bulk water transfers often include that of a national water grid of continuous or inter-connected pipelines, rivers and canals taking water from north to south and west to east. There is a significant and growing consensus amongst water resources and engineering specialists that a national water grid is not justified on economic or environmental groundsiii.

Relatively short distance, smaller scale transfers which allow resource "bumping" or substitution of water from alternative sources would have the potential to improve the supply-demand balance position of resource zones and improve resilience to droughts.

There is a need to determine whether a minimal set of critical regional links could support transfers of water between areas of future surplus and deficit with sufficient flexibility to deal with uncertainties in future drought impacts. The analysis would need to consider where, how often and how long droughts might occur, and also where surplus might then exist elsewhere. It should also include a full consideration of the unavoidable uncertainties of the analysis. If there is a resulting net benefit this could enable a flexible knock-on network able to meet critical national needs for water supply.

CIWEM calls for Defra, the Environment Agency/Natural Resources Wales and water companies to analyse the critical water links needed to support transfers of water during serious water shortages.

It is difficult to guarantee that freshwater will always be available for transfer in a critical drought event unless the resource is being supplied by a desalination plant dependent on abundant saline water resources.

Changes to future water availability from the distributed impact of climate change remains uncertain. The Environment Agency's Case for Change reportiv highlights the increasing and competing pressures faced by the water environment, including changing weather patterns, increasing consumer demand and changing lifestyles. These changes will require greater flexibility and improved interconnection within and between water companies on a relatively local scale.

Trading agreements and financing

CIWEM calls for increased trading of bulk water supplies through improved connectivity of existing water supply systems and the promotion of financial incentives that makes water trading attractive to different categories of water users (continuous and temporary demand).

Water companies are required to have contingency arrangements for the continuous supply of water through statutory drought management plans.

Significant water transfers are likely to meet with financing difficulties due to the size of schemes involved, particularly if they are multi-purpose and multi-functional, and with the potential to provide benefit to multiple companies. In this case consideration could be given to financing by a national body, backed by the Government.

The mapping of potential donors and receivers should be developed by stakeholders including the regulators to encourage better sharing of water resources. This could also identify area clusters of opportunities for bulk water transfers. Some water companies can create surplus resources for bulk water transfers more cheaply than others and this may influence the cost of water transfers between potential trading partners. For example, the presence of treatment and distribution infrastructure, would allow the transfer of surplus resource without major new investment much easier to establish.

The Water Resources in the South East Group (WRSE), a partnership of six water companies and regulators have identified that greater sharing of water resources between companies in the region could generate savings of over £500 million by 2035v. A similar initiative, the Water Resources in East Anglia (WREA) is now looking into transfer opportunities in eastern England. The regulator Ofwat estimates that savings from improved interconnections across England and Wales could be as high as £960 million over the lifetime of the assetsvi.

Bulk water transfer trading agreements would require a formal appraisal expressed as a business "due diligence", for endorsement by the trading parties. So, any due diligence barrier must be overcome in the promotion of strategic water transfers. There is a need to develop an inventory of this and other barriers, as well as the associated risks. Mitigation of these risks and barriers could raise the cost of strategic bulk water transfers significantly.

It is possible for agreements to be fixed on a critical event basis. If one of the benefits is lower prices for customers for the donor in non-drought years, it might gain support of customers and Ofwat, the economic regulator. However, it is important to note that some abstractors may require temporary bulk water transfers to meet real-time demand, especially those with limited storage capacity. Other abstractors may require transfers to allow pumped refill of reservoirs over winter months following prolonged summer demands or reduced autumn inflows. The funding and planning of schemes, most notably those which are temporary, may not be possible within the five year Asset Management Planning cycles.

CIWEM calls for the water industry to develop a resilience standard to underpin guarantees of reliability in drought of bulk water transfers between sellers and buyers

Different levels of service at each side of a transfer arrangement would make it difficult to guarantee availability of spare resources in a drought covering a wide area. The coincidence of droughts would also be a potential barrier to the development of reliance on transfers where the yield cannot be guaranteed under all conditions.

The lack of a commonly agreed set of levels of service performance measures across water companies creates further difficulties. Clear communication between parties on agreed trigger levels for the implementation of bulk transfers is important, but this is reliant upon confidence in modelling and drought forecasts that demonstrate the feasibility and timing of transfers.

It could be argued that the "donor" catchment should not be supporting the "recipient" catchment in times of drought, if this is to prevent the customers in the recipient catchment from experiencing water demand restrictions. On the other hand, it is precisely the need for

security of supply under conditions of shortage that drives the value that buyers will place on a transfer, and hence the price that they will be willing to pay. If security of supply in droughts of a defined character cannot be provided by a seller, the price will fall, perhaps to one of no sale. Control and certainty are deep-seated considerations in the psyche of water users (and particularly of water companies).

Operational and technical barriers

CIWEM calls for the water industry to research whether there are significant environmental, operational and technical barriers to water transfers through the existing river and canal system.

In particular this should look at those that are separate from the current water supply systems, with the potential to be connected in a beneficial way, between the donor and recipient of new bulk water transfers. The impact of bulk water transfers on water quantity, water quality and the needs of ecological receptors in the water environment can be mitigated at a cost. An improved understanding of these impacts, through research, is important for the development of cost effective mitigation strategies.

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Note: CIWEM Policy Position Statements (PPS) represents the Institution's views on issues at a particular point in time. It is accepted that situations change as research provides new evidence. It should be understood, therefore, that CIWEM PPS's are under constant review and that previously held views may alter and lead to revised PPS's. PPSs are produced as a consensus report and do not represent the view of individual members of CIWEM.

Further reading and references

CIWEM. 2014. Water Quality Implications of Transferring Treated Water Supplies http://www.ciwem.org/policy-and-international/policy-position-statements

CH2M HILL. 2013. Water Resources Management Plans – Preparing for the Future. A report prepared for the Environment Agency.

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i Water Act 2014 c21. http://www.legislation.gov.uk/ukpga/2014/21/contents/enacted

ii European Commission. 2000. Directive 2000/60/EC of the European Parliament and of the Council establishing a framework for the Community action in the field of water policy

iii Institution of Civil Engineers. 2012. State of the Nation: Water.

iv Environment Agency and Ofwat. 2011. The case for change – reforming water abstraction management in England. http://www.ofwat.gov.uk/future/markets/waterrights/pap_pos20111205abstraction.pdf

v Defra, 2011. Water for Life. ISBN 9780101823029. HMSO. Report No CM8230.

vi *Ibid*