

Regulation,  
Regulators, and  
the Crisis of Law  
and Government

# Water Rights and Water Trading in England and Wales

Policy Brief

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The Foundation for Law, Justice and Society

### **Regulation, Regulators, and the Crisis of Law and Government**

This programme examines the regulatory system in the wake of the global financial crisis, assessing its current weaknesses, the role of legislative and judicial bodies, and identifying measures for future reform of both markets and regulatory regimes. It aims to shed light on the recent failures of regulators, often captive of the very industries they are meant to regulate, and examine ways to improve the accountability and effectiveness of the regulatory system.



# Executive Summary

- This policy brief discusses the role of 'rights' in water use and water trade in the context of climate change. Abstraction rights and their ownership are related to water 'commons' and traditional riparian rights. When the demand for water (including water for the environment) exceeds the available supply in some regions, there is a need to encourage trade both in water licence rights and in bulk water.
- This position has been reached in England and Wales and the problems are likely to increase in coming years and decades. The policy brief presents the implications of this for the definition and operation of property rights in water, including options for abstraction licence reform.
- The policy brief concludes with a discussion of a model which redefines water abstraction rights in terms of percentage shares of available water rather than in physical units.
- The 'water shares' approach to water pricing and trade has become arguably the leading option for abstraction reform. An abstraction mechanism of this type can make a major contribution to commodifying the use of water while ensuring sufficient water for 'the environment'. By providing secure property rights and ensuring that trade reflects security, water rights and water trading are not just reconciled but can reinforce one another.

# Water Rights And Water Trading In England And Wales

## Introduction

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Other than moral philosophers, the people who take 'rights' most seriously are lawyers and economists. For legal purposes, rights must be defined and enforceable, while for economists, clear, secure, and enforceable property rights are crucial for the effective operation of markets. In particular, they are essential for the viability of contracts, especially long-term contracts. Such contracts are particularly important for infrastructure and resource industries — of which water is a classic example.

Contracts are at the heart of economic activity. Most commercial trading is carried out under contracts and spot market transactions make up only a small proportion of sales, especially of business-to-business sales. For instance, the share of spot markets in coal and natural gas trading has always been very low (around 10 per cent or so) and still remains so. Even for crude oil, where the share of spot trades has been increasing steadily in recent decades, the share of contract-based trade was still over 50 per cent in 2007.<sup>1</sup> To sustain the ten-year, twenty-year, or longer contracts that one observes in infrastructure industries requires secure property rights for sellers and buyers so that the long-lived associated investments can be securely financed at an affordable cost of capital. This has been a major theme in the New Institutional Economics, which has explored in detail the requirements for efficient contracts in commercial relationships and the associated sunk investments.

## Water trading and rights

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One important point to note in the context of water is that secure property rights do not necessarily require individual ownership. As Elinor Ostrom has emphasized, collective ownership of a resource can work very effectively. An example of

this is in New Zealand fishery rights, where fishermen collectively own shares in the main offshore fishery resource pools, shares that can be traded between themselves or with others.

For water, 'rights' issues occur in various guises. The most obvious concern retail consumers, particularly households and farmers, where major questions arise on whether and how far access to water is (or can be) maintained securely, how the quality of water supplied can be maintained, its terms of sale, and so on. A particular issue for households is whether they are liable to be cut off for not paying their water bills. Whilst these are an important consideration, the focus of this brief will be the role of property rights in water trading.

Water trade primarily relates to wholesale water markets in which water companies and others buy and sell bulk water. Such trades are of two main types:

- (i) trade in abstraction licences (typically within a catchment area or river basin); and
- (ii) physical trade in bulk water, mainly raw water but also some treated water.

But what property rights underpin this trade? In the first instance, abstraction rights are granted by abstraction licences, which are issued by government agencies — in Britain, by the Environment Agency (including the Scottish and Welsh environment agencies). Abstraction rights, owned by water companies and others, allow wholesale and retail sales of water based on Ofwat and WICS supply licences.

The most interesting question in this area concerns ownership of (a) the 'original' water (e.g., rivers, underground aquifers, etc.); and (b) the extracted water to which the abstraction licences refer — and how these two relate to one another. Traditionally,

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water has been treated as a 'commons' good like air or fisheries in international waters. However, this breaks down when there is excess demand for the resource, as is well known from the literature on the 'tragedy of the commons'. For water supply, the issue arises when there is insufficient water to meet both human demand (at the ruling set of prices) and to sustain the environment. As will be discussed further below, this problem has arisen to a significant degree in Australia, California, and other drought-prone jurisdictions. It has already become an important issue in the UK, particularly in the South and South East England, and the problems are expected to increase significantly in coming years, particularly towards 2050.

In most legal systems, including English law, the ownership of the water to which the abstraction licences apply depends on whether it is river water or underground water. For flowing water (e.g., rivers), nobody owns the water in them — it is a commons resource. Instead, *riparian rights* (reasonable use rights) apply. These are typically associated with land ownership on the river bank and were developed as a legal framework for fishing rights management, water use on the land bordering the river, and similar. At the opposite end of the spectrum, where there is an underground water source on a single property, the water is owned by the landowner. (Note that this is different from hydrocarbon resources like gas and oil which, in the UK, are owned by the state.) Abstraction rights are grafted onto these more fundamental water ownership rights, for example, by 'grandfathering'.

### Climate change and water scarcity

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Prospective water scarcity is becoming a significant problem in England and Wales. In 2008, the Environment Agency reported that out of 119 water catchments in England, 18 per cent of management units were over-licensed and 15 per cent were over-abstracted. Most of these were in South East England, with a few in the South and the Midlands. More recently, the Environment Agency's 2011 projections report that, not only are current levels of abstraction harming some nature conservation sites and the ecological health of catchments, but that the number and distribution of catchments facing unmet demand could increase significantly by 2050.

As a result of climate change, population movements, and other factors, catchments across Wales, South West England, and Northern England could face significant unmet demand, as could South East and Eastern England. Perhaps most importantly, the outlook is highly uncertain, with a wide range of possible water demand–supply scenarios both nationally and across the regions.

The combination of lower supply, regional changes in demand, and major uncertainties bring out the very sizable potential benefits of increasing water trade. In England and Wales, trade in bulk water is currently much more important than trade in licences (unlike Australia and the Western US states). Traded bulk water accounts for around 4 to 5 per cent of delivered water in England and Wales, but around 8 per cent in the South East. Those figures have been stable for many years. Of this traded water, around three-quarters is in raw water (e.g., water transported from the Elan Valley to Birmingham). However, in South East England, almost two-thirds of traded water is in treated water.

For England and Wales, increased trade in bulk water as well as in water licences will be important in responding to the challenges and uncertainties of climate change. This, of course, raises many issues (like interconnection) that go beyond water rights, but the discussion that follows will focus on the relationship between higher trade and better defined property rights in water.<sup>2</sup> However, the basic point remains. To reconcile the demand for water for human use and for the environment with available supplies is likely to require a considerable increase in water trade within and between regions — particularly given the greater degree of weather variability and the uncertainty this brings.

Where there is significant excess demand, some form of rationing is required. In principle, that can be done *either* by quantity rationing *or* by pricing, for example, in a market framework *or* by some combination of quantity and price regulation. For instance, in the water context, price signals can be used to handle water scarcity for most periods unless and until severe drought conditions arise which require quantity controls to allocate between essential uses.

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For England and Wales (as in Australia and elsewhere), all the recent reform proposals have relied primarily on price-based methods of handling growing water availability problems — not least to encourage trade and water resilience. The main tool advocated from the Cave Review onwards and reflected in the Department for Environment, Food and Rural Affairs 2011 Water White Paper is the development of scarcity-based abstraction prices. However, to make these practical would require major reforms to the abstraction licensing system to create well-defined and secure water property rights.

### Scarcity-based water abstraction pricing

There are a number of possibilities for how scarcity-based abstraction prices might be introduced. One option is to charge abstraction prices in areas of relative water shortage; another option (the main competitor to a simple pricing option) is to redefine abstraction licences in terms of *percentage shares* of available water and to allow trade in those shares.

The first option is problematic for a number of reasons, not least because the prices would have to be set high enough to ensure water sustainability (i.e., sufficient water to meet environmental needs such as minimum river flow requirements). In the absence of more interconnection and increased efficiency of water use, these initial prices could be very high — particularly wholesale and retail prices in water-scarce areas — unless there were a long (ten-year or more) transition. Besides these difficulties concerning how the initial prices are set and revised, there would also need to be careful design of (quantity-based) step-in rights at times of serious drought.

The simple price option also presents serious challenges in creating secure property rights, owing to the fact that, if current licence holders attempted to use a markedly higher proportion of their existing abstraction rights, the result is likely to be a considerable increase in over-abstraction. Buy-back schemes have been introduced to address this problem, but they are difficult and very slow moving. The second (abstraction shares) option does not encounter these problems, as existing abstraction licences can remain in place in perpetuity, but with redefined

rights concerning the quantity of water and the circumstances under which water can be abstracted.

A good example of the second option is the proposal by Professor Mike Young to convert water abstraction rights from *physical levels* (e.g., megalitres) into *percentage shares of available water*. These shares would apply each year to an announced level of available water in the appropriate river basin or other defined area, as declared by the relevant authority (e.g., the Environment Agency). These shares could be bought and sold (within competition policy limits) and also traded short- and long-term, as well as providing the basis for water use by abstraction rights owners (e.g., farmers).

This second option is attractive for various reasons. Firstly, the economic logic behind it is strong — it is a well-targeted approach to the problems of varying degrees of excess demand and major uncertainty. The (annual or semi-annual) announced water availabilities would be set in each area at a level sufficiently low to ensure environmental needs. Household and industrial needs would be met *either* by available local abstraction *and/or* by trade, with water companies and others having strong, direct incentives to trade water (either via licence transactions or physical water). In consequence, the resulting water prices, which include the impact of environmental obligations, emerge from observed market transactions. In consequence, they reflect regional and local supply and demand pressures rather than having to be set centrally.

Secondly, options of this type have been used in practice and found to be successful in Australia, as was the case in the southern connected river Murray system. Interestingly, it is also very similar in design to the New Zealand fishery shares example mentioned above, which has also worked very well. These fisheries have been in secular decline but with considerable (unforeseeable) year-to-year variability. Defining perpetual shares in available fisheries has provided the basis for this system and has helped stabilize and renew fish stock availability.<sup>3</sup>

Finally, this option would (if adopted) allow the continuation of existing abstraction licences, and it

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would not require buy-back of excess allocations as a precondition. Hence, it provides scarcity-based prices for existing water as a basis for trade both in licences and in bulk water, while also providing secure property rights. Available water *volumes* may change year-to-year, but this is known in advance — as should be the rules by which volumes are set. The underlying licences and the water *shares* within them do not need any time cut-off or subsequent imposed reallocation. In this way, the redefinition of water rights from physical volumes to percentage shares should allow ‘grandfathering’ of current rights without the need to renegotiate or terminate existing property rights. This should provide a strong set of incentives for efficient water trade within secure markets.

Creation of such property rights commodifies water ownership and use. Other than the marginal uses, such as river fishery and similar, the water commons is converted into a secure property right which can support (and promote) trade. This follows the example of forests, grazing land, and many other cases. Even policymaking concerning the air we breathe — the ultimate commons good — is moving in this direction, with taxes or tradable permits being applied to emissions of sulphur dioxide, nitrous oxide, and now to carbon gas emissions.

### **Market-based vs quantity-based water rationing**

Why is a market-based property rights option for water in general preferable to quantity-based rationing? The most persuasive answer is that any quantity-based allocation system would require huge amounts of information for the initial allocation of abstraction rights, with major arguments likely on the distribution of these (i.e., who should receive what volume of rights. Note that this is also true of the pure abstraction price option discussed above, which is another reason why the ‘tradable shares’ option is superior). In addition, planning solutions become increasingly less attractive as variability increases — particularly unpredictable variability which, for water availability, generates major uncertainty regarding future supplies. To this must be added the incentives and likelihood of corruption, from black markets through

to high-level bribery. Of course, plan allocations can be combined with ‘white markets’, but, in that case, we have effectively reverted to a market- and price-based model.

Market sceptics may express concern that essential users would be priced out of the market the more that wholesale water prices reflect scarcity conditions, yet a market-based approach offers a number of benefits over a quantity-based allocation system. Firstly, scarcity-based wholesale (and retail) water prices provide strong incentives for the efficient use of water — and more importantly for the development of efficient water-using technologies, as has been the case with the development of high-efficiency irrigation equipment in Australia. Furthermore, scarcity-based water prices help reduce and/or reallocate high water use activities away from water-scarce areas. Neither of these outcomes can readily be achieved in a quantity-based allocation system.

In addition, in a market-based system, reserved allocations can be set aside for truly essential uses, so that they have a guarantee of water supply, irrespective of variations in the availability of raw water (e.g., from rainfall variability, at least outside emergency drought circumstances). Finally, a quantity-based allocation system will require periodic *reallocations*. As a consequence of this, water ownership property rights would become much more insecure, with all the associated adverse implications for trade, investment, and efficiency growth in the water industry and among water users. For all these reasons, market-based abstraction allocations based on percentage shares of available water dominate both quantity-based systems and market-based systems with scarcity-based abstraction prices for physical volumes of water.

### **Policy proposals**

Because of these advantages, the ‘water shares’ approach to water pricing and trade, as advocated by Mike Young, myself, and others,<sup>4</sup> has become arguably the leading option for abstraction reform, with secure property rights to foster trade and innovation through a form of scarcity pricing. The

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proposal is primarily intended to encourage local/regional abstraction licence trading rather than bulk water trade, but the prices set in the water licence market will provide market prices for physical inter-area trade in bulk water. This approach also provides incentives for regional water network planning and organization, regional wholesale markets, and (most importantly) interconnector investment.

In conclusion, it is clear that a redefinition of water 'rights' related to water scarcity is crucial for an effective policy towards water in England and Wales, particularly given the uncertainty caused by climate change. In this policy brief, the key underlying issues

have been discussed and a specific approach has been put forward. Abstraction licence reform of the tradable water shares type proposed effectively severs the link between water ownership and water use. Riparian rights can continue for fishing, cultivating water plants, and similar uses, but the link to irrigation and commercial uses of water is broken and the scope of water commons is thereby greatly reduced. In consequence, an abstraction mechanism of this type can make a major contribution to commodifying the use of water while ensuring sufficient water for 'the environment'. By providing secure property rights and ensuring that trade reflects security, water rights and water trading are not just reconciled but can reinforce one another.

## Notes

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- 1 See Mileva, E. and N. Siegfried (2007) 'Oil Market Structure, Network Effects and the Choice of Currency for Oil Invoicing', European Central Bank Occasional Paper No 77.
- 2 For a fuller discussion of the wider issues, see Stern, J. (2010) 'Developing Upstream Competition in the England and Wales Water Supply Industry: A New Approach', *CCRP Working Paper*, March 2010; Stern, J. and J. Mirrlees-Black (2011) 'A Framework for Valuing Water in England and Wales from 2015 Onwards' *CCRP Working Paper*, October 2011.
- 3 See Arnason, R. (2002), 'A Review of International Experience with ITQs', CEMARE Report No. 58.
- 4 See Young, M. (2012), 'Towards a Generic Framework for the Abstraction and Utilisation of Water in England and Wales', UCL Environment Institute Report 2012. See also Stern and Mirrlees-Black (op. cit., Annex A).



### The Foundation

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In recent years, he has published a number of papers on the economics of introducing competition into the England and Wales water industry.

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The logo for the Foundation for Law, Justice and Society (FLJS). It features the letters 'FLJS' in a large, bold, sans-serif font. A small '+' sign is positioned between the 'J' and 'S'. The logo is rendered in a light orange color against a dark red background.

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