Submission to the Department of the Environment, Community and Local Government on the Establishment of a Public Water Utility and the Future Funding of Water Services

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1. Introduction

Before deciding on the optimal approach to providing water services in Ireland (drinking water supply and wastewater treatment) it is useful to consider the objectives that should be met.

Drinking water should be of the highest quality in order to safeguard public health and also to ensure that key production sectors can operate in Ireland (e.g. the food and drinks sector). Related to this is the need to protect the environment and to achieve a high ecological status which supports the tourism sector. Apart from impacting on public health and industry, maintaining high environmental standards particularly in relation to wastewater treatment, reduces the cost of drinking water treatment.

Water should be produced efficiently; that is, it should be produced at least cost given the standards that have to be achieved. Likewise the cost of wastewater treatment should be at least cost given the standards that need to be achieved. Such production efficiencies benefit both households and businesses through lower charges and hence improve competitiveness.

Apart from an efficient supply of water services security of supply (short-run and long-run) is of significant importance, as interruptions can be costly to business, and indeed might deter some businesses to locate in Ireland. Disruptions are also very inconvenient to the general public.

Given that drinking water is a scarce resource and one that is provided at significant cost, water should be used efficiently i.e. should not be wasted. Excessive water demand results in increased infrastructure requirements and thus costs.

The status quo appears to be at odds with at least some of these objectives.

[1] We would like to thank Seán Lyons for helpful comments on the submission.

The production of drinking water in Ireland is characterised by a high level of fragmentation. While there are 34 water service authorities, there are over 2000 separate public and group water scheme supplies. This implies that scale economies and other efficiencies are not captured resulting in higher costs. A significant portion (over 40%) of treated water is unaccounted for i.e. is lost through leakage which implies a higher cost per unit 'at the tap'.

Currently, few consumers face incentives to ensure that they use water efficiently, given that almost all households do not pay directly for water (some members of group water schemes are paying for water and have had meters installed). While businesses face water charges, these do not seem to reflect the cost of production or scarcity. The variation is very large in that the price of water in Wicklow (€3.04 per m^3) is over double that in Kildare (€1.49 per m^3) yet both counties receive some of their water from the same source (Liffey). Dublin City, Fingal and South Dublin, which also receive water from the Liffey, have very low costs for water too. The price differences across counties indicate that there are significant differences in costs of providing water and given that the price for water from the same source differs significantly, this indicates that there is a degree of cross subsidisation within local authorities.

While drinking water in Ireland is generally safe and of high quality, a number of exceedances are recorded every year and some of these are highly persistent or dangerous, threatening public health (e.g. the 2007 cryptosporidium outbreak in Galway)[2].

Finally, there are a range of concerns about the security of supply in the short- and long-run. For example extreme weather events (e.g. the cold winter of 2010/11) have resulted in significant disruption of supplies. Changed weather patterns in response to global warming and changed demand through the pattern of population growth could compromise the ability to meet water demand in the medium to long-run[3].

Given the shortcomings identified above, there is a need for significant investment in water services. However, funding the necessary environmental investment in the future will be a much greater challenge and involve greater cost than was envisaged even three or four years ago because of the effects of the current economic crisis on the cost of capital. This applies in the case of investment in renewable electricity but it also applies to the sphere of drinking water supply and wastewater treatment.

If serious progress is to be made on tackling the shortcomings of the public water and wastewater services it is vital to consider how the necessary investment can be funded at least cost; otherwise the investment may not happen or may be delayed. The establishment

[2] The Environmental Protection Agency in its report on Drinking Water Quality in Ireland 2010 showed that while the incidence of E-coli is falling consistently and that the incidence in larger supplies is similar to that in other comparable countries, but that compliance on trihalomethanes needs improving and this is related to the absence of adequate treatment.

[3] In the short-run localised issues may arise but it is likely that these can be dealt with through effective demand management.

of Irish Water can yield improvements in the supply of water and waste water treatment services. Such a utility should mirror the responsibilities of ESB and Eirgrid for the electricity network and BGE for the gas network. To allow such a utility to work, just as in the case of electricity or gas, it would need its own independent income stream from user charges. It would also need an initial equity investment by its owner – the people of Ireland. Once such an income stream were established, guaranteed, and regulated by an independent regulatory authority, it could then borrow independently of the state, just as happens with the energy utilities. This would free the funding of investment to tackle water pollution from the currently very tight constraints on public funding. (It would also reduce government borrowing and the national debt as conventionally defined.)

A new water utility, with well defined objectives, should be able to deliver the necessary investment and maintenance of the water infrastructure at much lower cost than the current plethora of local authorities that have responsibilities in the area. Running costs should be reduced through a reduction in employment and an increase in productivity. Such productivity gains have been realised elsewhere where independent utilities have clear responsibility for water services. Even more important, the independence of the utility from current constraints should allow the essential objective of cleaning up our environment to be achieved more rapidly and at lower cost than will happen if we maintain the current approach to tackling the problem.

Finally, the establishment of a water utility on a standalone basis will have a significant impact on the government accounts. While it will not have an immediate impact on the government's underlying balance sheet it should see a significant reduction in the national debt as conventionally measured and it should also reduce government borrowing.

2. The Rationale for a New Water Utility

Under current circumstances a key economic justification for establishing a water utility to manage Ireland's water resources is that it will ensure a more cost-efficient delivery of water and sewerage services to households and the wider economy over the coming decades. The potential savings in operating costs and the prospects of a more efficient investment strategy are the key potential gains for the Irish economy from such a project. Realising these gains should play a key role in determining the structure and staffing of the new utility.

However, the establishment of a self-financing water utility holds out the prospects of some other potentially beneficial effects. Not least, it could allow a reduction in the headline Irish national debt by around 2 percentage points of GDP, even if it had no net effect on the underlying national balance sheet. While the national balance sheet would be unchanged, the wide attention given to the headline gross debt figure means that this reduction could

have some indirect benefits for the state. It would also see a reduction in measured government expenditure and the borrowing requirement while still seeing the same (or possibly greater) investment.

Under Irish and EU government accounting rules, for a water utility (or other utility) to be classified as a separate commercial entity outside the state it must, inter alia, have a revenue stream which covers all of its costs and that revenue stream must be directly under the control of the firm. For example, subject to regulatory approval, the ESB sets electricity charges so as to fully cover its long run costs. Similarly a water utility would need to set a charge which covered all of its costs, both operating costs and capital costs. Provided its revenue raising powers were legally guaranteed (and other requirements met) then the debt of the utility would no longer be classified as part of the national debt and its charges, expenditure, new borrowing and new investment would not be part of the government accounts.

Ownership is not an issue in determining whether under government accounting rules a utility is within the government sector or has an independent existence as a commercial company. The key to its national accounting status is the independence of its management of government, in particular in the independence of its funding.

Moving from the current position, where the water industry is fully integrated into the government sector to a fully independent existence as a commercial (state-owned) utility will be a complicated process[4].

Firstly a company will need to be set up within the state sector to take over the functions currently operated by local authorities.

Water charges will need to be implemented for companies and households at a level that will fully fund this company for the foreseeable future.

Finally the new utility that is capitalised by the state (and owned by the state) will need to be established. This utility will then buy the water company from the state. At that point the purchase price can be used to reduce the national debt.

2.1 An Illustrative Example

The implications of alternative institutional models are most readily understood using an illustrative example, which is set out in this section. While the example attempts to use realistic figures, the results should only be taken as indicative as more precise calculations are needed for decision making.

[4] Private group water schemes, which supply drinking water to approximately 3% of households but which generally do not provide waste water treatment, are not considered here.

To start with it is important to keep in mind that the cost of water and wastewater services under the current institutional model is not trivial, amounting to €1.2 billion in 2010, with operational expenditure (OPEX) accounting for €715 million and capital expenditure (CAPEX) accounting for just over €500 million. Some revenue is raised through direct charges to businesses which in 2010 amounted to an income of €230 million. On the basis of some plausible assumptions the cost per household in 2010 was just over €650[5].

In the ESRI databank the value of the state assets in water and sewerage is generated by cumulating the past investment by the state in this sector for the last 50 years. A rate of depreciation is assumed and applied to the value of the assets in the previous year. In the databank the rate applied is 1% a year. This is almost certainly significantly lower than reality, especially taking account of investment in modern treatment plants etc. Nonetheless, the resulting capital stock supplies an upper bound for the value of the assets – in this case almost €14 billion at the end of 2010. As an illustration, at current prices the total investment in the sector over the last decade was over €7 billion.

Another measure of the possible value of the assets is the case of Northern Ireland Water. In 2011 its assets were worth £2 billion. Converting to euro and rescaling for the larger population in Ireland this would suggest a valuation on a comparable basis of €6 billion.

In the example set out below we have reduced this valuation and assumed, for illustrative purposes, that the assets are sold to the state owned utility for €5 billion. We then assume that this purchase is funded by an injection of equity by the state of 40% of the capital of the utility - €2 billion. It is assumed that the rest of the capital is borrowed from world financial markets. Obviously it will be a number of years before such a recapitalisation could be possible, assuming that Ireland, in the meantime, successfully returns to the capital markets. This would reduce the national debt by €3 billion – approximately 2% of GDP (the €2 billion equity would obviously have to be funded by government borrowing). In the case of Northern Ireland Water, government equity accounted for 41% of its capital in 2011 – roughly the same as assumed here for the Irish utility.

[5] In 2011 the population was 4,581,269 (CSO Census of Population 2011 Preliminary Results). Given that household numbers are not available from Census 2011 yet, these have to be projected. A simple way to accomplish this is to first project the average household size for 2011 and to divide the population by this number. Using past trends in the household size and taking the average household size of 2006 as a basis yields a projected average household size is 2.69 for 2011. It is also assumed that the proportion of households that are not connected to either a water mains or public group scheme system stays fixed at the level of 2006 (13% according to CSO Census 2006) and that these are not contributing to the cost (in practice this is not strictly correct) so that the number of households is adjusted accordingly. On the basis of those calculations there were just over 1.7 million households in 2011, and of those 1.48 million were connected to public water supplies. Netting off the €230 million from the €1.2 billion and dividing by the number of households yields €650. The numbers are easy to adjust to variations in the underlying data and assumptions. A larger household size implies fewer households resulting in higher costs per household and vice versa.

In addition, it is assumed that for the next decade the utility needs to invest €600 million a year in new infrastructure. Subject to regulatory approval, the new utility would have the freedom to choose the appropriate phasing of investment independent of the economic cycle. It would, of course have to set its charges to customers so that the investment stream was adequately funded. It is assumed that the new investment would be financed partly by debt and partly from revenue, such as to ensure that the debt equity ratio remained stable over time.

As compared to a fully government sector operation this mean that the investment could possibly end up being somewhat higher than under current arrangements (if the regulator felt it appropriate) while there would be no effect on government borrowing of funding the investment. At present, with investment running at around €600 million a year this expenditure is accounting for around 0.4% of GDP.

The operating expenses of the utility would also have to be fully covered by charges to customers. Currently operating expenses are running at over €700 million a year. Controlling for size this is very similar to the expenses of Northern Ireland Water. However, the Northern Ireland authority for Utility Regulation has estimated that there is substantial inefficiency in that company and that its operating expenses should be significantly lower. In a study of the fragmented Italian water system di Cosmo (2011) has found that there are substantial opportunities to cut costs in that country[6]. Here we are assuming that, through establishing the utility as a new streamlined company, the operating costs can be reduced to €550 million a year.

On the basis of these illustrative figures for the initial capital stock, the operating costs and assumed investment programme, we estimate that the utility would require a revenue stream of almost €1 billion a year. This would ensure that the profitability of the company would be sufficient to maintain the share of equity in total capital at 40% or more on an ongoing basis while undertaking the necessary investment.

Currently the company sector pays about €230 million in water charges whereas most urban households do not pay anything towards the cost of their water[7]. Many rural households do pay for the cost of their water if they are part of private group water schemes. To fund the utility the revenue could be raised in different ways. In line with the Water Framework Directive charges should reflect the full cost and there should be no cross subsidisation of either companies by households or vice versa.

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[6] See di Cosmo, V. (2011) "Is the Cost Pass-through Fair for the Italian Water Sector", in S. Bogdanovic, (ed.), *Water Policy and Law in the Mediterranean, An Evolving Nexus*. European University Institute, Robert Schuman Centre for Advanced Studies, Mediterranean Programme and the Faculty of Sciences of the University of Novi Sad, in collaboration with UNESCO Water Programme.

[7] Importantly the PWC Report highlights that the collection rate for non-domestic water charges is only 52% i.e. the income from this source should be significantly larger.

A possible illustrative breakdown would be to assume that all companies are required to pay charges contrasting with the current situation where only half pay. Assuming that the companies brought into the net were smaller than the average, one could envisage revenue from company charges being increased to €350 million. This would leave approximately €630 million to be raised by charging households for the cost of the water that they use. On the basis of 1.48 million households this would amount to an average charge of €426, which indicates a significant saving over the current cost, with this saving accounted for by efficiency gains and the assumption that all non-domestic water charges would be collected.

Once the utility is established on a fully self-financing basis it will be very difficult to unpick the structure. If charges were reduced so that it was no longer self-financing then it would have to be reclassified into the government sector adding 2 percentage points to the debt/GDP ratio and also significantly raising the borrowing requirement.

2.2 Impact on the Government Accounts

Using the stylised example shown above, it is useful to tease out the potential impact on the government accounts, as conventionally measured, of the establishment of an independent water utility. Table 1 below shows the base case (the current situation), the case where charges are introduced with no other changes, and the situation where such an independent self-financing utility is established. In the "base case" the combined cost of water and sewerage expenditure, current and capital, come to around €1,300 million and, when the revenue from charges paid by some companies today is included, the sector added €1,070 million to government borrowing (around 0.7% of GDP).

Table 1: Impact on Government Sector Accounts of Illustrative Scenario

	Base	Full Charges	Independent Utility, including charges	
Sector:	**Government**	**Government**	**Government**	**Utility**
Income	230	980	0	980
CAPEX	600	600	0	600
OPEX	700	700	0	550
Interest			-90	150
Total € m	1070	320	-90	320
Total % of GDP	0.69	0.21	-0.06	0.21

If charges were introduced by the government, along the lines discussed above with no other change in the sector, government borrowing as a share of GDP would fall by around 0.5 percentage points. There would be no direct effect on the national debt.

In the case where a self-financing independent water utility is established the reduction in government borrowing would amount to €1,160 million, or 0.75 percentage points of GDP[8]. These savings would be made up of a reduction in current expenditure of €700 million and a reduction in capital expenditure of €600 million. Obviously there would be no revenue accruing to the government from charges – it would all accrue to the utility. Also the national debt would fall by €3 billion or around 1.9 percentage points of GDP as a result of the sale of the business to the utility. As a consequence, using the simplifying assumption of a 3% real rate of interest on government borrowing, there would also be a reduction in national debt interest. No account is taken of a possible positive effect on the interest rate paid by the government as a result of the reduction in the headline national debt and government borrowing figures.

For the water utility it is assumed that it faces a real rate of interest that is higher than that of the government: 5% compared to 3%. On the basis of this assumption, the switch to an independent water utility would see an increase in interest payments on the borrowing to fund the sector of around €60 million a year. However, to the extent that there are efficiency gains as a result of the establishment of the water utility there would be a net welfare improvement. In the illustrative example shown here it is assumed that there would be a reduction in the operating cost for the water sector of €150 million. No allowance is made for efficiency gains on investment.

While these improvements in the standard government accounts are likely to be greeted favourably by financial markets, it is important to consider the impact on the true government balance sheet. In the absence of any efficiency gains from the establishment of the utility the national balance sheet could disimprove because of potentially higher financing costs. However, with significant efficiency gains to be reaped this should more than offset any such premium for financing. As these efficiency gains represent the true benefit to society from the changes (apart from the improvement in the standard government accounts) it is very important that the structure of the new utility ensures that these efficiency gains are reaped at an early stage. While the regulator can attempt to drive such changes after the utility is established, the experience in Northern Ireland suggests that this can be difficult to achieve once a state owned utility is fully established.

If such a gain from efficiencies in operating costs (and capital costs) were realised, it could be substantially greater than any increase in financing costs, resulting in a net improvement in welfare for Irish residents. This saving would represent the true benefit to society of the establishment of a water utility.

[8] The 0.75% reduction is made up of the 0.69% that no longer arises and the return on the equity held o0.06% of GDP.

3. Determinants of Efficiency Gains

While the above example illustrates the macroeconomics of a new water utility, the detailed implementation of the utility will determine the size and nature of the efficiency gains. These include decisions regarding the roll-out of metering, the level of capital investment (in pipes and treatment plants), the nature of the financing arrangements, efficiency gains in the supply of water services and reduced demand for water services.

3.1 Meters

In the above example no allowance was made for the cost of installing water meters. The current reform proposals appear to encompass universal roll out of water meters. However there are a number of issues regarding the roll-out of meters that can have a substantial impact on the net benefits of the water services reforms and these need to be assessed in a thorough cost-benefit analysis (CBA).

Water abstraction costs differ significantly across the country (e.g. Shannon basin vs. Liffey). Likewise, treatment costs are likely to differ and so are investment needs. Indeed the potential demand response to metering might enable certain investments to be deferred or even avoided e.g. Lough Derg-Dublin pipeline. In this context it is likely that the benefits and costs of meters will vary across regions. Therefore the CBA of the roll-out of water meters should be done separately for each river basin district as the benefit cost ratios are likely to vary significantly.

The demand response due to charging comprises two elements, namely leak reduction and more general demand reduction, which in turn depend on the incentives set through metering and the charging structure.

With regard to metering two aspects are particularly important. Firstly, meters are unlikely to provide the full benefit if they are read infrequently e.g. once a year since this would give the householder insufficient information on their water usage. More frequent meter reading will result in higher costs. However, it is likely that smart energy meters will be rolled out over the next few years. These include a communications module that allows for frequent remote reading of meters. The possibility of linking water meters to the communications module of the smart energy meters should be considered as this has the potential to achieve costs savings (avoid duplication and reduce meter reading costs).

Secondly, the location of the meter is important. Meters can either be located within a property or at the boundary of the property. The key difference in terms of benefit is that leaks external to a property are not immediately attributable to the householder if the

meter is located inside the property[9]. On the other hand, internal meters are more likely to be monitored by householders. The cost of the two options differs significantly.

A range of figures regarding the cost of rolling out meters have been put forward. In this respect the experience in the UK is of particular interest as different types of options have been implemented there. The Walker Review (2009) considers the cost of alternative meter installations[10]. Internal installation was found to cost between £106 and £385, and external installation in new boxes cost between £293 and £471. Using the highest (£471) and lowest (£106) number and assuming that meters are rolled out to 1.48 million households the total cost would range between less than €200 million and more than €800 million. This shows that the type and cost of installation has a very significant impact on the total cost. For this example the implication of the calculations is that the benefit of external installation would have to be more than €600 million higher than that for an internal installation in order to pass economic criteria. Therefore a cost benefit analysis should consider the costs and benefits of internal and external installation[11].

3.2 Pricing Structure and Affordability

The demand response to water charges depends crucially on the nature of the charging mechanism. A two part structure, where a free allowance is given beyond which a volumetric charge is applied is likely to result in lower benefits than a purely volumetric system. The reason for this is readily demonstrated. If the free allowance that is given exceeds the total water demanded for a household then the additional (marginal) cost of consuming an additional cubic meter of water is zero. Even if the allowance is set so as to correspond to average demand then a substantial number of households (those with below average demand) will not face a positive marginal cost i.e. they do not face an incentive to conserve water and end up paying nothing. Assuming full cost recovery in the system this implies that those who consume above the set volume will subsidise those that consume below that level. Furthermore, given that the charges will presumably be applied to properties, a free allowance implies that properties that are only occupied for short periods, such as holiday homes, will effectively be exempt from the charge.

To eliminate this issue the free allowance must be below the minimum demand for water by any household (or property). In general it is difficult to see an advantage in this two part mechanism and ideally charges should be purely volumetric. Increasing the price according to demand should be considered, which would act as a particularly strong incentive for those using well above accepted levels of water.

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[9] In practice it is nevertheless often possible to identify leaks, where sufficient district meters are installed.

[10] Anna Walker (2009) The Independent Review of Charging for Household Water and Sewerage Services. Final Report.

[11] The legal definition that leaks occurring on private property are the responsibility of the owner of that property is not a sufficient argument to dismiss the installation of internal meters as an option since such a decision should be made on the basis of the societal net benefit.

Household charges are regressive as they do not reflect the ability to pay but are related only to consumption. One obvious solution is not to charge those who might be adversely affected e.g. pensioners or the unemployed. The impact of such concessions is likely to be non-trivial in financial terms. However, while this would help to address the distributional issues, such concessions imply that those groups that are exempt from the charges will not be incentivised to reduce their demand for water, which constitutes another cost.

A more efficient approach to dealing with the distributional implications of the water charges would be to give a cash allowance that would pay for an acceptable level of water and to let individuals decide if they will consume that quantity of water or if they prefer to consume a lower amount of water. This would ensure that they are still incentivised to consume less will be able to pay for their water[12].

3.3 The Efficiency and Cost of Providing Water Services

An important reason for amalgamating the water authorities into one company is to generate efficiency savings. These encompass staffing, administration and financing costs. The degree to which such efficiency gains are going to be achieved depends on approach taken by Irish Water and the regulatory regime.

With regard to staffing the PWC report on Irish Water shows that the current workforce in the sector is significantly larger than that needed. The transfer of staff and the terms of employment of staff and services should be at the discretion of the new company. It should not be forced to inherit legacy staffing issues. These should be left for the local authorities to resolve. Obviously a substantial number of existing staff may be needed by the new company, not least to preserve some 'local knowledge'. However, it should be encouraged to operate like BGE – contracting out the provision of services to competing private sector suppliers[13]. This will put maximum pressure on costs and will make the cost structure more transparent to any regulator.

The cost of water and waste water services into the future will depend crucially on the regulatory approach and investment needs. Detailed calculations are not possible as key data is not available publicly. However, the difference in terms of price to the household of different scenarios could easily be in the order of 10%. It is therefore important to carefully establish the regulatory framework for water service.

The relationship between the economic regulator and the environmental regulator needs to be set out explicitly. It appears that the Commission for Energy Regulation (CER) is going to take on the responsibility of the economic regulation of Irish Water. The Environmental

[12] The rationale for incentivising all consumers of water was clearly demonstrated in a paper by Ng (1984), who argued that "a dollar is a dollar irrespective of income group". He also pointed out that while water was essential for life other things like food and shelter were also essential but are subject to ordinary markets with a price system (see Ng Y-K., (1984) "Quasi-Pareto Social Improvements", *American Economic Review*, Vol.74(5), pp. 1033-1050.)

[13] For example maintenance operations are largely outsourced.

Protection Agency (EPA) will continue to be the environmental regulator. The relationship between the two and in particular potential conflicts between the two need to be carefully considered and appropriate measures need to be incorporated in legislation. Conflicts may arise for example where environmental regulations imply significant additional investment needs that would increase prices significantly.

It is also important to establish a customer charter which may include penalties for non-performance in order to provide appropriate incentives.

3.4 Regional Development

In common with other infrastructures and utilities, water services are highly location specific i.e. there is significant spatial variation in terms of the costs, capacity and quality (the issue of abstraction costs was already referred to above). As such, water services have important implications for regional development. For example the water abundance in the Shannon basin should imply a lower cost of water due to lower abstraction costs holding all else equal. As such the Shannon basin possesses a natural advantage to attract firms that are water intensive. Charging the same price for water throughout the country removes this comparative advantage and implies an implicit transfer from water abundant regions to regions where water is scarce[14]. To the extent that a common price implies a distortion of prices i.e. customers in water abundant areas will face a higher price than they should and those in water scarce regions will face prices that are too low. This issue can readily be taken account by allowing different prices for each river basin district.

4. Conclusion

The cost to tax payers of providing water services under the current fragmented institutional arrangement is significant. The sector requires significant ongoing investment which will be difficult to accommodate from public funds. Establishing a unified self financing water utility will enable the much needed investment to be put in place. This will also reduce government borrowing and improve the national debt. Importantly, the establishment of the new utility is an opportunity to achieve significant efficiency gains, which will result in lower costs to the tax payer. The size of the efficiency gains will depend on the detailed implementation plans including staffing decisions and the roll out of meters, for which should be carefully analysed.

[14] It should be noted that implicit regional transfers in Ireland are pervasive and substantial (see Morgenroth (2010) "The Regional Dimension of Taxes and Public Expenditure in Ireland". *Regional Studies*, Vol. 44(6) pp. 777-789.