*Confidential*


# Comparative Analysis of Institutional Forms in Water Services for Proposed New Zealand Reforms

## Draft Report to Local Government New Zealand

**September 2020**

# Acronyms and Abbreviations

| | |
|---|---|
| ACUA | Departmental Water and Sewerage Companies (*Empresas Departamentales de Acueducto y Alcantarillado*) |
| Capex | Capital Expenditure |
| CAR | Autonomous Regional Corporations (*Corporaciones Autonomas Regionales*) |
| CRA | The Potable Water and Basic Sanitation Regulation Commission (*Comisión de Regulación de Agua Potable y Saneamiento Básico*) |
| DNP | The National Planning Department (*Departamento Nacional de Planeación*) |
| DWI | Drinking Water Inspectorate |
| ESP | Corporate Subsidiary for Water Services (*Empresas de Servicios Públicos*) |
| INSFOPAL | Central Government Agency (*Instituto de Fomento Municipal*) |
| LGNZ | Local Government New Zealand |
| MVCT | Housing and Territory Ministry (*Ministerio de Vivienda, Ciudad y Territorio*) |
| Ofwat | The economic regulator of the water sector in England and Wales |
| PBSR | Public Sector Borrowing Requirements |
| RWA | Regional Water Authority |
| SSPD | Superintendancy of Domiciliary Public Utilities (*Superintendenica de Servicios Sanitarios*) |
| Taumata Arowai | Water Services Regulator |
| WASA | District of Columbia Water and Sewer Authority |

# Table of Contents



# Tables

# Figures

# Executive Summary

The Government is proposing institutional reform to improve water services across New Zealand. A new drinking water regulator has already been created–Taumata Arowai. Water services in New Zealand are currently owned and operated by the 67 local government territorial authorities (councils) with a small minority of exceptions.

The proposed institutional reform is the Government response to the 2017 Inquiry into Havelock North Drinking Water. This inquiry investigated operational failures in water abstraction and delivery in Havelock North which caused up to four deaths and 5,000 cases of serious illness.

A range of problems have been identified within the New Zealand water sector. These include poor environmental outcomes from effluent and stormwater run-off and risk of failures of decaying infrastructure. The underlying causes include a lack of finance for new infrastructure and maintenance and providers that lack specialised management and technical personnel and systems.

In mid-2020, the Government invited councils to opt-in to a funding package of $761 million to join a reform process. The reform process has focussed on a particular reform model. The proposed model involves the amalgamation of council-owned water services into a smaller number of regional publicly-owned entities, along with a package of interventions to improve regulation and financing of the water sector. The intention of the proposed reform is to realise significant economic, public health, environmental, and other benefits over the medium to long term.

The reform process is being led by a Joint Steering Committee of officials, advisors, and stakeholders, including the Department of Internal Affairs, Local Government New Zealand (LGNZ), Society of Local Government Managers, Taumata Arowai, and Treasury.

**Need for a robust policy development process**

Robust reform processes require the following steps: diagnose the problem; state the reform objectives; consider a range of reform options; evaluate and consult on the options; select the option most likely to achieve the objectives. Evaluation of the options is best done with an agreed set of evaluation criteria. Consultation is crucial, as successful implementation typically depends on the cooperation of stakeholders.

LGNZ is contributing to this policy process. The paper Parameters for Evaluating Aggregated Water Service Delivery Models dated 22 July 2020 offered a clear objective statement and suggested criteria to be used in evaluating reform options. The paper Analysing Economies of Scale in New Zealand Water Services dated September 2020 examined the extent to which economies of scale—one of the stated driver of reform—could be achieved in New Zealand. The current paper extends LGNZ's contribution to the policy processes by offering four reform options and evaluating them against the reform outcomes identified in Evaluating Aggregated Water Service Delivery Models and the institutional effectiveness criteria proposed earlier. Each of the options is described in general terms and explored by examing the international evidence on what a reform of this type has achieved elsewhere. This analysis draws on and complements other contributions to the process, including: Frontier

Economics (2019) review of reforms in Australia (Tasmania and Victoria), United Kingdom (England, Wales and Scotland), Republic of Ireland, and New Zealand (Auckland and Wellington); and Martin Jenkins (2020) review of Scottish Water, regional Victoria, Welsh Water (Glas Cymru), Watercare Auckland, and the Ontario Clean Water Agency.

**Four institutional models and reform episodes**

Table 0.1 sets out the four institutional models, summarising each one's relevance to New Zealand, and the reform episode involving that model presented in this report.

**Table 0.1: Institutional Models and Relevance for New Zealand**

| Institutional Model | Relevance to New Zealand | Reform studied |
|---|---|---|
| Local government responsibility | The status quo model in New Zealand. Widely used around the world. Reforms of regulation, governance, and finance that strengthen existing service providers which remain the local government's responsibility should be considered. | Colombia reform of local government responsibility for water services in the 1990s, involving the creation of independent regulator, governance reform, and improved financing mechanisms |
| Regional publicly-owned corporations | The Government's proposed model. | England and Wales amalgamations to create Regional Water Authorities in 1973 |
| Regional privately-owned corporation | Investor-owned model is standard for network service providers around the world (in New Zealand, electricity network utilities follow this model). In England, it was privatization with regulation, not simply regional amalgamation, that delivered the greatest benefits. | English privatisation of Regional Water Authorities in 1989 |
| Local government delegation of service provision to third-party provider | Utilises highly specialised and skilled water service companies to provide asset management sophistication and assist with financing. Widely used in the European Union and elsewhere. | Papakura, New Zealand reform to delegate water services to a third-party provider under a concession contract in 1997 |

Details on these options are provided in section 2.

**Extent to which the reform episodes achieved desired outcome**

All four reform cases sought similar outcomes to New Zealand: assurance of drinking water quality, improved environmental outcomes; increased efficiency; ability to finance investment; and service and affordability for customers. Table 0.2 summarises

the extent to which these goals were achieved, the impact on local government, in each reform episode.

## Table 0.2: Reform Episodes Assessed Against Desired Outcomes

| | Colombia (1990s–present): Local Government-Owned and Operated | England and Wales (1973–1989): Regional Publicly-Owned Corporations | England and Wales (1989–present): Regional Private Sector Company | Papakura (1997–present): Local Government Delegation of Service Provision to 3rd Party |
|---|---|---|---|---|
| **Drinking Water Outcomes** | Drinking water quality improved. Challenges in rural areas remain. | Persistent failure to meet quality standards over the 1970s and 1980s. | Water quality standards improved – between 1994 to 2003, breaches of water quality declined by 86 percent. | Papakura's drinking water has consistently met drinking safety standards. |
| **Environmental Outcomes** | Treatment of wastewater improved significantly, though more is needed. | Pollution continued in river and coastal waters post reform. Significant failures to meet discharge standards. | Environmental (bathing) waters meeting standard increased from 78 percent in 1990 to 99 percent now. | The concessionaire has met the environmental management conditions set in its contract. |
| **Cost and Efficiency outcomes** | Capital expenditure increased. Tariffs now approximate cost recovery. | Initial fall in capital investment in 1970s, followed by reversion to pre-reform level in 1980s. Rate of return targets achieved through job cuts in 1980s. | Productivity and capital investment increased. £50 billion invested in infrastructure in water assets. | Papakura's water and wastewater charges are lower than in other parts of Auckland. |
| **Financial Outcomes** | Reforms have created many methods for water utilities to access finance. | Struggled to access finance due to fiscal limits. Resorted to financing capex directly from users charges. | Unlimited access to debt and equity provided by capital markets. | Financing of local network expansion is wholly provided by developers (not partially provided by the local authority unlike other partis of Auckland). |
| **Customer Outcomes** | Access to drinking water and sanitation increased. Bills rose but remain affordable. | Bills held constant in real terms during the 1970s, but increased in real terms throughout the 1980s. | Bills rose 42 percent in the 20 years after privatisation to help fund asset investment. | Customer satisfaction reached 97 percent in 2019. Charges remain below Auckland's average. |
| **Local Govt Impacts** | Municipalities retain the power to appoint board members to water utilities, promoting accountability to customers and coordination in local planning. | Despite initial promises, local government lost any ability to appoint board members in 1983. The assets were later sold but the proceeds were not given to the local authorities. | Privatisation did not result in any further impacts on local governments, which lost governance and ownership rights in the earlier amalgamation. | Auckland Council retains ownership of water assets. Local government's autonomy is constrained by the terms of the contract. |

The reform episodes illustrate the strengths and weaknesses of each model. A theme that cuts across is the value of effective external regulation. In Colombia, regulation contributed to significant improvements within a local-authority controlled setting. In contrast, in England and Wales, amalgamation without external regulation failed to deliver most of the benefits sought.

Finance is another cross-cutting theme. The 1973 amalgamations in England failed to improve access to finance because borrowings of Regional Water Authorities (RWAs) consolidated into the public sector borrowing requirement (PSBR). Government limits on borrowing eventually starved the RWAs of finance, forcing them to push up user charges to pay directly for the capital expenditure needed. Privatization took the water sector off the government's books, enabling unconstrained access to finance, (though with higher tariffs). In Colombia, the reforms boosted national government's contribution to financing the sector, through an improved system of inter-governmental fiscal transfers, and the use of a development finance entity (FINDETER). These fiscal measures were successful in crowding in substantial commercial finance.

The Papakura case shows how delegation to a specialised third-party company provided high drinking water and environmental standards and lower than average charges. This option is already available to local governments in New Zealand (under section 136 Local Government Act 2002).

More details on the reform episodes are provided in section 3.

**Assessment of institutional models against indicators of effectiveness**

A handful of reform cases does not provide enough data to confidently choose the most appropriate model. A complementary approach is to assess institutional models against criteria of institutional effectiveness, developed from economic and management theory, for the case at hand.

Table 0.3 below offers a summary assessment of each of the models against criteria developed in the first paper—the likelihood that a model will achieve: economies of scale and scope; accountability to customers; competence of management and operations; ability to access finance; and strong, aligned incentives. An indicative color-coding is offered: green indicates that good performance could be expected on this indicator; salmon represents there is a risk; and light red is used where theory suggests the model is not well suited to promoting this aspect of institutional effectiveness.

In New Zealand, economies of scale achievable through institutional reform will be mostly in management and procurement (not infrastructure).[1] Three models: regional public corporations; regional private companies; and delegation to a third-party provider, are better suited to enabling such economies than a purely local government system. Against this must be set the economies of scope that local governments achieve. It should also be noted that local governments may cooperate to achieve

[1] Castalia (2020), Analysing Economies of Scale in New Zealand Water Services: Report to Local Government New Zealand

economies of scale, as happened in England before 1973; as is common in Colombia; and as the local authorities in the Wellington region have done.

**Table 0.3: Institutional Models Assessed Against Indicators of Effectiveness**

| | Local Government Responsibility | Regional Publicly-Owned Company | Regional Private Sector Company | Delegation of Service to a Third-Party Provider |
|---|---|---|---|---|
| **Economies of Scale** | Does not facilitate economies of scale. | Can achieve economies in management and procurement. | Can achieve economies in management and procurement. | Economies of scale may be available where third-party provider can operate over multiple concessions. |
| **Economies of Scope** | Can result in economies of scope with other council activities. | If the regional corporation is limited to the Three Waters, there can be no economies of scope. | If the regional company is limited to the Three Waters, there can be no economies of scope. | Economies of scope available where the provider can offer other utility services. |
| **Accountability to Customers** | Elected officials accountable to voters. Water issues can be election issues. | National regulation and governance can promote good service, but the system is not directly accountable to customers as water issues will seldom determine national elections. | National regulation and governance can promote good service, but the system is not directly accountable to customers, as water issues will seldom determine national elections. | Municipal decision-makers still directly accountable to customers, but responsiveness may be constrained by term and duration of contract. |
| **Competence of Management and Operations** | May be hampered by insufficient scale of operations and limits on ability to pay for specialised skills, in the smaller service providers. | Greater scale should make it easier to afford the required specialised skills and systems. Risk of public sector limits on pay and incentives remain. | Can achieve scale needed. No artificial limits on pay or incentives. | Accesses world-class management systems, and IP. Achieves required scale across multiple operations. No limits on pay or incentives. Global career prospects. |
| **Ability to Access Finance** | Access to finance constrained for small services and those whose parent government is close to its borrowing capacity. | Can access finance if creditworthy and borrowing do not require national government guarantee or consolidate into public sector debt. | Ready access to commercial debt and equity. | Ready access to commercial debt and equity. |

| | | | | |
|---|---|---|---|---|
| **Incentive Alignment** | Elected officials directly accountable. However, public sector constraints may limit ability to transmit incentives through the organisation. | Highly dependent on governance and ability to create incentive contract with management team and staff. | Incentives are aligned, provided that economic regulation is effective. | Incentives are aligned, provided good contractual design. |
| **Adaptability to Change** | High adaptation potential as local governments have freedom to try new approaches in response to local conditions | Tends to be inflexible. | Can be flexible to the extent allowed by the regulatory framework. | Can be adaptable where contract is well-designed. Concessionaire is incentivised to use new technology where cost savings are possible. |

Direct customer accountability is provided by the local government model. This often needs to be supported by institutions such as effective economic and quality regulation where local government lacks incentives to act in the long-term interests of customers (for example future generations). Without these supportive policies, a democratic deficit can emerge. When water service is a problem in a community, and local government is responsible, the matter often becomes an election issue. Customers are empowered to change their water service arrangements at the ballot box. Where service is delegated to a third- party provider, the local authority decision-makers are still accountable through the ballot box, but their ability to respond may be limited by the terms and duration of the contract. The regional corporations typically involve central government control through national regulation (and governance in the case of a public corporation). If central government makes good decisions, customer interests will be served. However, direct accountability to consumers is weak, since it is unlikely that national elections will turn on water service matters.

Access to finance is difficult for small local authority water services and for those whose parent government is close to its debt ceiling. Regional corporations offer the possibility to do better, largely because of their greater scale. However, if the regional corporations' borrowings are counted as part of either national or local government debt, fiscal constraints may cut off access to finance, as happened to the Regional Water Authorities in England and Wales. Regional private companies, and concession contracts with third-parties, offer access to finance limited only by the ability of operating cashflows to pay back loans and provide dividends.

Aligning incentives throughout an organisation is key to performance. Proven models of regulation and concession contract design exist to harness the profit motive of a private company to the public benefit. When profits are maximised by maximising public benefits, the board and management of the companies can use private sector management techniques to align incentives through the organisation. Alignment of incentives in public sector organisations is more difficult. There is no single metric of performance, and often greater difficulties in offering financial rewards for good performance. Between the publicly-owned models, the direct accountability of elected officials for water sector performance assists in aligning incentives. In contrast, regional public water companies may suffer from having neither a clear financial goal nor clear democratic accountability, making it harder to measure performance and align management and staff incentives.

Adaptability to change and new information is desirable to ensure that service delivery remains optimal over time. Customer quality and price preferences and society's tolerance of environmental outcomes can change. Technology changes leads to improvements in services or major changes in how and at what scale services should be delivered. Local governments tend to be closer to local conditions so can adapt as these change. Regional models can adapt, to the extent the regulatory model allows (for example, Ofwat can allow mergers of water providers). Profit motives can incentivise third party providers to adapt to change in some cases where cost savings are possible.

# 1 Introduction

The Government is reforming the water sector in response to an Inquiry[2] and problems with management and technical capability in the delivery of water services in New Zealand. The Government is considering a range of proposals to improve water sector outcomes. This paper focuses on the proposal to amalgamate local water services into regional publicly owned companies. This option has been presented to stakeholders and in public as the preferred initial option.[3]

This paper is a contribution to the policy development process. It goes beyond the set of options analysed by the Government so far, presenting four major institutional forms used in the delivery of water services (section 2).

We assess reform episodes of water services around the world using case studies. The case studies describe the pre-reform situation, the institutional reform process, and then the impact that reform had on key water outcomes. This is a before and after reform comparison of water service outcomes (section 3).

We then assess the institutional options against indicators of institutional effectiveness earlier submitted to the Joint Three Waters Steering Committee Secretariat. These are based on standard management and institutional theory (section 4). Finally, we briefly conclude the results of the analysis (section 5).

[2] The Government Inquiry into the Havelock North Drinking-water Outbreak

[3] Department of Internal Affairs (2020), Three Waters Reform Programme: A proposal to transform the delivery of three waters services. Retrieved from: https://www.dia.govt.nz/diawebsite.nsf/Files/Three-waters-reform-programme/$file/Slide-pack-from-July-Aug-2020-workshops.pdf

# 2 Institutional Models Relevant to New Zealand Water Sector Reform

We have selected four major institutional models of water services for this report. In this section, we put forward these models as potential options for New Zealand. We chose these four models because they are successful internationally and relevant to the New Zealand policy reform process.

## 2.1 Local Government Responsibility

Local government responsibility for water services is a relevant option for New Zealand's policy reform process because it could be retained with some improvements. It is also a very common model around the world. In any policy reform process, it is important to consider whether the status quo can be improved, rather than wholesale institutional reorganisation reforms, which tend to be disruptive, costly, and can lead to unintended consequences.

The model has been used in England (prior to 1973), Scotland (prior to 1994), and is still the dominant model in many countries including the United States, France, Germany, and many other countries. The wide use of the model suggests that many jurisdictions, with which New Zealand compares itself, consider that the local government model meets public policy objectives.

The model involves the local or municipal government owning the assets and managing operations of the water services directly. Management of the water services is typically carried out by salaried employees. In many cases, a wholly-owned subsidiary company of the local government is used. Varying proportions of specialist services may be contracted out (outsourcing). Funding of the water services can come from tariffs for services, or property taxes, or both.

Financing of the water services is generally provided with a combination of "pay as you go" tax revenue financing and longer-term debt finance. Debt can be general obligations debt—that is, bonds backed by the general credit and taxing power of the local government entity. In some cases, municipalities issue revenue bonds, that is, bonds secured by a stream of revenues (typically tariffs) to the water service provider. Revenue bonds are commonly used by publicly-owned utilities in the United States.

The local government elected members typically hold the management of the water service to account. In some cases, a dedicated water subsidiary company is used with its own board that oversees management. Local government elections enable voters to hold those charged with governance of the water subsidiary company to account.

## 2.2 Regional Publicly-Owned Companies

Regional publicly-owned companies have been used in several countries where water utilities have been formed by the amalgamation of municipal or other utilities.

This model was used in England and Wales between 1973 and 1989. It was used in Scotland from 1967 to 1973 with 13 regional boards and from 1973 to 2002 with three regional boards. Tasmania used this model from 2008 to 2013. It is used in regional Victoria, Australia, parts of the Philippines, and by Watercare (prior to the Auckland

Council being formed, at which point it strictly speaking became the local government's responsibility).

The regional publicly owned corporation model is proposed by the Government as a key driver for improving New Zealand's water services.

Under this model, a public corporation owns and operates water services for a region of multiple local government entities. The corporate form may be a company law company, statutory corporation, or a specific corporate form (as in Texas or the Philippines).

Water assets are owned by the corporation, separate from the relevant local, federal, or national government balance sheet. However, in some cases, the corporation may be consolidated into the owner. The corporation is typically managed by an executive team accountable to a board. The board is typically appointed by some level of government (either municipal, state, or national level).

The regional corporation model is funded through tariffs for services or charges based on property value or both. Financing is sourced from the government (as with Scottish Water, Irish Water, and TasWater), banks, or capital markets.

## 2.3 Regional Private Sector Company

Private investor-owned and regulated utility companies are common around the world. The regional private sector company is used in England. The model involves private ownership of water assets and networks for profit. In England, the nine private regional water companies are subjected to economic regulation by Ofwat.

The regional private sector is relevant because Fronter Economics evaluated it in their report for the New Zealand review process. That report discussed useful lessons for New Zealand from the English regional private sector company model. However, it is important when analysing the English water companies to fully disentangle the effects of amalgamation (in 1973) from privatisation and regulation (in 1989). Many electricity distribution networks, including in New Zealand, are investor-owned.

Private provision of water services involves a private, for-profit company that owns the water network, production, and treatment assets and provides services to customers. Water services are generally natural monopolies. Private, for-profit, natural monopolies are usually regulated to avoid excessive returns by overcharging or lowering the quality of service.

## 2.4 Local Government Delegation of Service Provision to Third-Party Provider

Delegation of service provision to a third-party provider is a common model for water services around the world and is relevant for New Zealand.

The model has been successfully used for over 200 years in many civil law countries and in some common law countries. Concessions are common in France, Spain, and Portugal as well as countries with similar legal traditions such as Brazil, Philippines, and Colombia. In France, 75 percent of water and 50 percent of sanitation services are

provided by third-party providers, primarily by two of the world's largest water services firms, Veolia Water and Suez Environment.[4]

The model is relevant to New Zealand because it offers one way to improve the specialist skills and asset management expertise available to water services here. Many participants in the New Zealand policy reform discussion recognise that asset management sophistication and specialist skills are lacking in many New Zealand water service providers. The Havelock North Inquiry concluded that attracting skilled staff was difficult for some water providers and contributed to poor water quality outcomes across the country.

The model is also relevant because there is precedent for its use in New Zealand in Papakura. Outcomes on a range of measures appear to have been positive.

The model involves the local government tendering a concession contract to a private operator. The operator is called a concessionaire. The concessionaire is responsible for investing in the improvement and maintenance of infrastructure, and in return it receives payment through user fees or tariffs. At the end of the concession period (usually 15 to 30 years in the water sector), the assets return to public ownership.[5]

[4] International Office for Water (2009), Organization of Water Management in France, p. 29.

[5] See further, Cesar A Guimaraes Pereira (2014), Public-Private Partnerships (PPPs) and Concessions of Public Services in Brazil.

# 3 Assessing Institutional Reform Episodes Against Desired Outcomes

We evaluate four reform episodes to see if the change to the particular institutional models achieved the outcomes that are sought in New Zealand.

The four case studies cover the following reform episodes:

- **Colombia**, where local government responsibility was reformed in the 1990s and the many local government owned and operated water service entities were subjected to a re-designed regulatory regime
- **England and Wales**, where in 1973 a large number of water undertakings and entities were amalgamated into 10 Regional Water Authorities (RWAs)
- **England**, where from 1989 the RWAs were privatised into regional private companies and subjected to price and quality regulation, and improved drinking water and environmental regulation
- **Papakura**, where in 1997 the District Council delegated the management and operation of its water services to a third-party private provider.

We identify episodes where the institutional form of water services changed and assess (where possible) the impact that reform had on key water outcomes identified by the Government. This is a before and after reform comparison of water service outcomes. A visual representation of our approach is contained in Figure 3.1.

**Figure 3.1: Castalia's Approach to Analysing Impact of Changes in Water Services Institutional Models**


## 3.1 Colombia Reform of Local Government Responsibility for the Water Sector

In the 1990s, Colombia reformed its water sector. This was part of a wider decentralisation process. The reforms codified local government ownership of water services and introduced regulatory and policy reform.

There are other jurisdictions with local government responsibility for water services (such as the United States) that might have more in common with New Zealand. However, despite being an emerging market economy, Colombia is an illustrative case study in water reform. Colombia instituted the reforms to bring in independent regulation, financing, and governance reforms while strengthening the role of local government in water service provision. The centralisation of control and funding of

water services in the lead up to the reforms has similarities to the proposed amalgamations in New Zealand.

**Pre-reform situation in Colombia's water sector**

Prior to the 1990s, most of the country's water services were directly managed by the central government agency Instituto de Fomento Municipal (INSFOPAL). INSFOPAL was established in 1950 to finance and carry out water, sanitation, and public waste management projects and support municipal water services. The relative weakness of the municipal utilities meant that by the 1960s, INSFOPAL would directly operate the water services for most areas around the country.

In 1974, water departmental companies (ACUAs) were established to run municipal water services as direct branches of INSFOPAL.

Only the large cities such as Bogotá, Medellin, and Cali had water services independent of INSFOPAL.

By the late 1980s, acute problems had developed across the sector:

- Smaller municipalities had poor water service quality and coverage.
- Water services were badly governed. ACUA management was often driven by political, rather than technical and administrative considerations.
- Water services were inefficient. Water metering was poor, and unaccounted for water was high.
- Many water services were financially unsustainable. Political incentives kept tariffs too low, which led to inadequate cost recovery.
- Investment levels were low.

**Colombia's 1990s reforms introduced a comprehensive regulatory regime, requirement for corporatisation, and strengthened the local government role**

The reforms of the sector dissolved INSFOPAL in 1987 and codified that the responsibility for water services should sit with municipalities. However, at the same time, the central government recognised that many of the municipalities were failing to deliver adequate services under the prior regime. Therefore, a different approach was necessary.

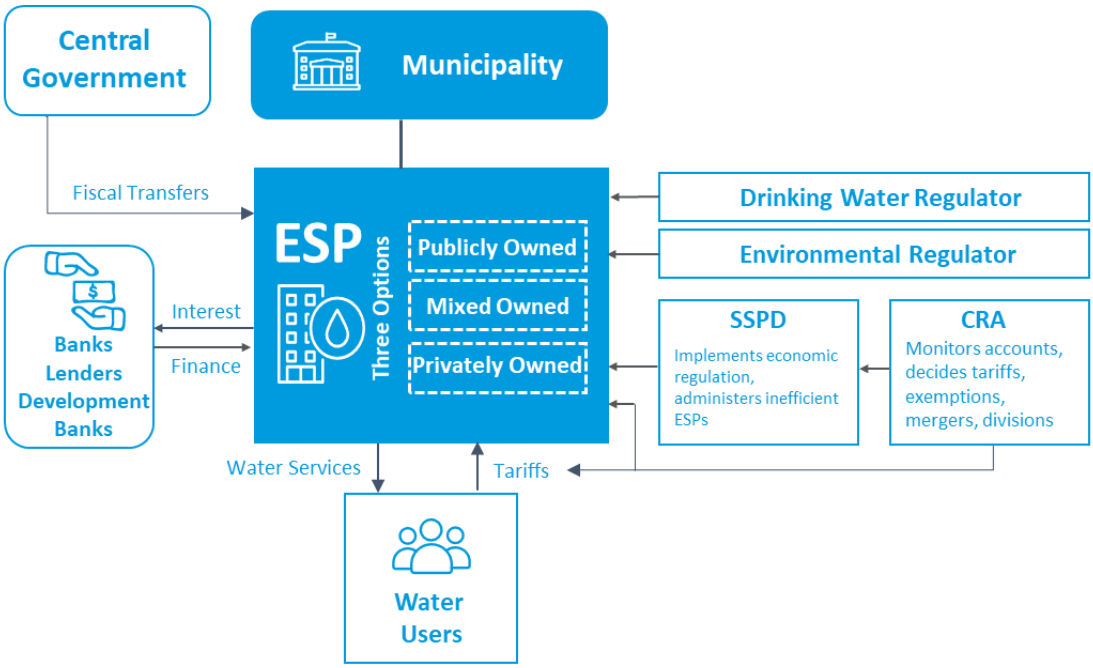
The government permitted corporatisation. Municipalities (with very few exceptions) were required to utilise a corporate subsidiary (the Empresas de Servicios Públicos or ESP corporate form) to provide water services. The ESP form introduced flexibility. Municipalities could retain municipal ownership, contract with a private ESP for services, or partially privatise (retaining some shareholding). The ESPs can access private finance (equity and debt).

A new regulatory framework was also introduced. A dedicated economic regulator called the Commission for the Regulation of Water Supply and Sanitation (CRA) had responsibility to monitor the efficiency of water services. It could enforce mergers, divisions, and step in and administer water providers if necessary. The CRA was also made responsible for administering a new tariff methodology which set tariffs to recover costs plus a return on capital. This methodology was a mechanistic formula which relied on financial information provided by water providers. Some flexibility was

also incorporated into the regime whereby municipalities could apply to the CRA for tariff modifications.

A new regulatory agency tasked with implementing and monitoring compliance with the economic regulations set by the CRA was also introduced—the Superintendency of Domiciliary Public Utilities (SSPD). It was given powers to inspect water services, monitor performance and implement specific corrective measures set by the CRA, and directly administer and liquidate poor performing water providers. New drinking water quality and environmental regulators were also introduced.

**Figure 3.2: Illustration of Water Sector Regulators in Colombia**




**Colombia's reforms successfully improved water sector outcomes**

Colombia's regulatory reforms led to improvements across its water sector: water coverage and quality improved, and providers financial position greatly improved compared to the pre-reform period.

*Access to services greatly increased following the reforms*

Overall, access to water has increased in Colombia since the reforms.[6] Also, overall, water services are available with a higher quality of service.

Since the year 2000, basic assess to drinking water has improved from 90.0 percent to 97.3 percent of the population. Over the same period, access to sanitation increased from 71.6 percent to 89.6 percent.[7] Of those with access to water and sanitation services, average continuity of service ranged between 95 and 98 percent.

[6] Machado and Vesga (2016), Water and Sanitation Sector: A Colombian Overview.

[7] WHO UNICEF Joint Monitoring Programme for Water Supply, Sanitation and Hygiene (2019), Estimates on the use of water, sanitation and hygiene in Colombia.

*Drinking water quality and environmental outcomes*

Drinking water quality improved in many parts of Colombia in the 1990s compared to the period before the reforms.[8] There are still water quality issues in some rural municipalities.

In the 2000s, attention shifted to the wastewater sector, leading to improvements there too. New wastewater treatment plants were built following the reforms. The vast majority of wastewater was historically not treated, and existing treatment plants did not operate efficiently. In 2000, the Ministry of Development estimated that Colombia's treatment plants treated less than 1 percent of total urban wastewater. This has significantly improved to 41 percent in 2018.

*Investment and financial performance*

Investment in water assets increased considerably following the 1990s reforms, tripling across small-tier municipalities. There were three major reasons for this.

- The reformed regulatory regime required tariffs to reflect costs (plus a cost of capital) which enabled utilities to recover adequate income
- Government support was made available, including intergovernmental fiscal transfers to municipalities and funding from a national development bank (which also accesses international development funding) called FINDETER[9]
- Utilities gained greater access to commercial finance. Guaranteed fiscal transfers from the national government improved the credit rating of the utilities, and mechanisms (such as pooled water bonds) were introduced to help finance smaller utilities.

*Access to reliable financing*

Colombian water utilities have access to a wide range of sources to finance their investments. This is due to the reforms which introduced guaranteed transfers for water providers, and special financing mechanisms Colombia introduced to assist smaller water providers.

Domestic banks are the primary source of finance: between 2009 and 2019, bank loans represented 61.3 percent of sector debt. Some of the larger ESPs have tapped into capital markets as an alternative to the banking system. For example, *Empresa de Acueducto y Alcantarillado de* Bogotá, the ESP that services the city of Bogotá, has issued over US$1.1 billion worth of bonds since 2001.

Smaller providers have encountered difficulty accessing capital markets directly. However, Colombia subsequently introduced a range of measures to assist them. These include a trust consortium that organises investment and finance for multiple

[8] Andres et al (2010), Charting a New Course: Structural Reforms in Colombia's Water Supply and Sanitation Sector, World Bank PPIAF p. 122.

[9] FINDETER provides wholesale finance and risk-mnagement products to commercial banks, encouraging them to lend to water utilities and other sectors of national importance.

municipalities and a pooled water bond scheme that enables smaller municipalities to access capital markets.

Colombia also made use of some development financing from organisations such as the World Bank. However, development finance now makes up only a small proportion of the total financing mix for the water sector.

*Local government control of water services*

The ESP model has enabled municipalities to retain considerable control and flexibility over water services. Control is important to hold the ESPs accountable to the interests of voters and customers. Municipalities exercise control over the private ESPs through contracts. Publicly owned ESPs (and mixed ownership ESPs) can be controlled via board member appointments. These appointments can be politicised: ESP boards tend to change when the municipal government changes. This also has benefits because water service providers are responsive to customer demands and priorities as expressed through the political process.

The SSPD has a monitoring enforcement role to ensure compliance with rules set by the CRA. The SSPD can step in as a monitor or manager in case of persistent underperformance.

The Colombian model also enables flexibility for bottom-up mergers where municipalities voluntarily wish to regionalise services. Top-down mergers are also possible where the CRA compels a regional merger that would reduce cost of service.

## 3.2 Creation of Regional Water Authorities in England and Wales

In 1973, England and Wales amalgamated numerous municipal and other water service providers into 10 Regional Water Authorities (RWAs). This resulted in poor outcomes.

This case study focusses on the 1973 period of reform because this was the major period of amalgamation in England (and Wales). Frontier Economics' report covered the performance of English water utilities but combined the effects of privatisation (which occurred in 1989) with amalgamation (which occurred 16 years earlier). By separating the amalgamation reform episode, it is possible to more clearly see the results of an amalgamation similar to the amalgamation proposed for New Zealand (noting that amalgamation is within a package of interventions currently considered), and to distinguish those results from the results of privatisation and regulation.

**Before 1973 a diverse range of entities provided water services**

Prior to the reform, there were 157 water undertakings and 1,398 sewage and sewage disposal authorities as well as 29 river authorities. England and Wales also had 33 private water supply companies (called Statutory Water Companies) that had their origin in the nineteenth century and were created under private Acts of Parliament. Most of the water services were provided directly by local authorities or through joint undertakings and boards[10].

[10] These joint undertakings and boards were mostly the result of early corporatizations and mergers of municipal water utilities, generally undertaken voluntarily through cooperation between adjacent local governments.

A number of Government working parties found that the industry structure of a large number and size of water service entities was incapable of meeting future water demand and address the problem of pollution control.[11] Prior to reform, the budgets of local government-owned water service entities were not ring-fenced. Local authorities could determine whether to use income from water services for any of the local government's capital and operating expenditure needs.[12]

Policy proposals at the time considered that a smaller number of entities that could integrate the management of water resources through more centralised decision-making was needed:

> *The government considered that integrated water resource management could be best achieved by a total of between six and fifteen vertically integrated regional monopolies, providing all the required services to their customers, from extraction of raw water, delivery of processed water, to collection, treatment and discharge of wastewater and management of the quality and quantity of water resources. The discussion document outlined the boundaries of between seven and 13 possible water authorities.*[13]

**Reform to regional publicly-owned corporations integrating all three water functions along river basin boundaries with centralised control**

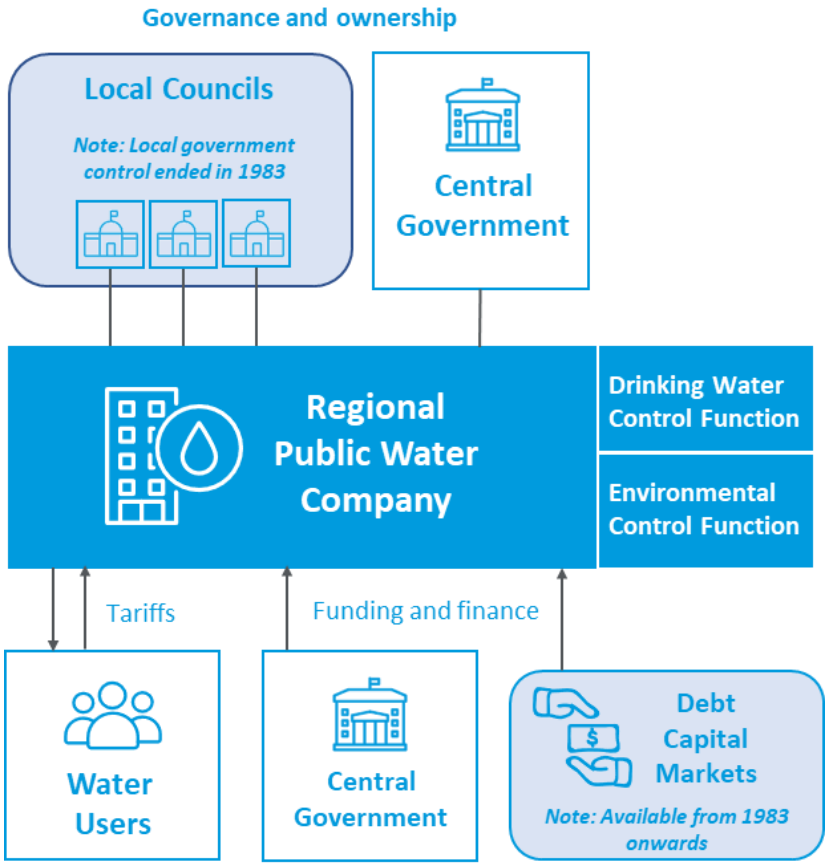
Following the policy review process, the government enacted the Water Act 1973. This created 10 new Regional Water Authorities (RWAs), composed of local authority-owned and joint undertaking water service entities. The Statutory Water Companies remained as private entities. The RWAs were controlled in their investment, planning, and coordination by the central government. Figure 3.3 illustrates the RWA model.

[11] Ofwat (2006), The Development of the Water Industry in England and Wales, p. 11

[12] Ofwat (2006), The Development of the Water Industry in England and Wales, p. 16

[13] Ofwat (2006), The Development of the Water Industry in England and Wales, p. 13.

**Figure 3.3: Regional Water Authorities in England and Wales**




The RWAs boundaries mostly aligned with the 10 major river basins of England and Wales. The RWA boards were initially composed of a majority of directors appointed by the constituent local authorities. The central government appointed the Chairs.

RWAs had to set water charges on a cost-recovery basis and had to meet modest return on capital targets set by central government. The RWAs raised capital for investment by borrowing from central government. The RWA's borrowing was consolidated into the central government's balance sheet, in the UK this was called the public sector borrowing requirement (PSBR).

The 1973 Act created a new Central Water Policy Planning Unit that coordinated planning for water resources, water quality, pollution prevention, and carried out research. The central government held the right to review and approve investment and operating plans and programmes. Central government also held the power to give environmental consents to the RWAs for discharges of effluent and for major investment projects.

The RWAs took on responsibility for pollution monitoring and enforcement control previously held by 29 river control authorities. The RWAs were also responsible for managing and controlling their own discharges from wastewater facilities. When the UK joined the European Community in 1973, it had to enact legislation to implement European Community directives on water quality and environmental standards. The Control of Pollution Act 1974 enacted the directives and treated pollution and waste together as a unified concept and covered waste on land, the pollution of water, noise,

and pollution of the atmosphere.[14] However, these rules were not actually made binding until 1985.

In the late 1970s, a range of problems manifested in RWAs, including poor environmental outcomes and barriers to necessary investment.

In response, in 1983, central government enacted a range of changes that reduced the role of local government and centralised control. From 1983, the right to appoint directors to RWAs was taken from local authorities and vested completely in central government. The central government believed that smaller, executive type boards would improve efficiency. Consumer Consultative Committees were introduced to provide some representation of water users.

The 1983 changes attempted to make RWAs operate in a more commercial manner.[15] The government tried to introduce long-run marginal cost pricing for tariffs. During the 1980s tariffs increased, and investment rose. However, the tariffs did not rise enough to reflect the long-run marginal costs of supplying water services.[16] This was in part due to the government reining tariffs back.[17] RWAs were permitted to borrow directly from private capital markets after 1983, as well as from central government (which was consolidated into the PSBR), however, financing overall fell after 1983.

**Performance of the reformed RWAs was poor across a range of outcomes**

The RWA performed poorly. Drinking water and environmental outcomes did not improve. Investment could not be funded from revenues. Access to finance was constrained. Customer outcomes were poor and local government was ultimately disenfranchised in its oversight of water services.

*Drinking water quality and environmental outcomes*

Drinking water quality was poor following the reform to RWAs. The quality decline was due to the failure to maintain and invest adequately. For example, poor water quality, low pressure and interruptions, and high levels of corrosion were reported in 1986 in a review by the National Economic Development Office.[18] Water quality failed to meet European Commission Drinking Water Quality Directive standards throughout the 1970s and 1980s.

Environmental outcomes worsened. A 1985 river quality survey confirmed an obvious effect on water quality of the underinvestment.[19] Coastal waters were also polluted. Only 67 percent of coastal bathing waters met European Community's bacteriological standard. By 1988, 20 percent of all major sewerage works were failing their discharge standards. Significant new investment to clean up wastewater was necessary at that stage.[20]

[14] Ofwat (2006), The Development of the Water Industry in England and Wales, p. 20

[15] Ofwat (2006), The Development of the Water Industry in England and Wales, p. 27

[16] Parker (2012), The Official History of Privatisation, Vol. II: Popular Capitalism, 1987-97 p. 165

[17] Parker (2012), The Official History of Privatisation, Vol. II: Popular Capitalism, 1987-97 p. 165

[18] Ofwat (2006), The Development of the Water Industry in England and Wales, p. 22

[19] Parker (2012), The Official History of Privatisation, Vol. II: Popular Capitalism, 1987-97 p. 165

[20] Parker (2012), The Official History of Privatisation, Vol. II: Popular Capitalism, 1987-97 p. 165

*Investment and financial performance*

RWAs were underfunded for the cost of services and the level of investment required. User charges were too low and government funding was insufficient.

The central government required RWAs to keep bills in line with inflation for the initial years of the RWA reforms. The central government also encouraged the water authorities to address social welfare issues in its pricing policies. Bills were averaged across all customers within an authority's region of supply, resulting in cross-subsidies between urban (relatively cheaper) and rural (relatively more expensive) customers.

Bills were levied based on property values, rather than linked to consumption. Water meters were not widespread. Following the 1983 reform the RWAs were able to increase water charges at a rate higher than the retail price index and borrow more.

*Access to reliable financing*

The central government constrained the investment programmes of RWAs. The RWAs had inherited debt totalling £22 billion (in current prices)[21] and had continuing capital investment requirements. The RWAs were financed (exclusively until 1983) from the central government balance sheet—the PSBR. The 1970s were a period of government deficits and therefore, the government constrained maximum annual capex and placed limits on the amount to be allocated to reserves.

The UK government (through the Secretary of State for the Environment) monitored performance and had to set rate of return targets, which mostly averaged around 1-2 percent per annum

For a brief period in the early 1980s the boards over-achieved financial targets, which came about through streamlining and job cuts (20 percent reduction staff was achieved).[22] This occurred in part because of the 1983 Water Act reforms which permitted RWAs to access private capital markets.

The period of underinvestment up to 1983 was followed by an attempt to increase capital expenditure. Between 1979/80 and 1986/87 there was a 30 percent increase in the level of capital expenditure in the sector. Although the 1983 reforms did enable some increase in investment, it was still inadequate. The Government frequently cut borrowing through changes to the RWAs external financing limits.[23] UK Treasury rules effectively blocked the RWAs from accessing commercial finance during the 1980s as well. In order to avoid impacting the government balance sheet, RWAs were forced to fund themselves entirely from tariffs on a pay-as-you-go basis. This led to excessive increases in prices and loss of intergenerational equity.[24]

*Local government control of water services*

The initial reform in 1973 that formed RWAs provided for local government appointees to hold a majority on RWA boards. Local governments were promised governance input in order to secure agreement to consolidate the water sector. The

[21] Ofwat (2006), The Development of the Water Industry in England and Wales, p. 22

[22] Parker (2012), The Official History of Privatisation, Vol. II: Popular Capitalism, 1987-97 p. 166

[23] Parker (2012), The Official History of Privatisation, Vol. II: Popular Capitalism, 1987-97 p. 165

[24] Parker (2012), The Official History of Privatisation, Vol. II: Popular Capitalism, 1987-97 p. 169

Water Act 1983 changes severed any connection between local government and the RWAs.

Local government reacted angrily to the loss of governance and oversight and the water assets. Water assets worth billions of dollars were transferred to the RWAs without compensation. There was an attempted concession during the passage of the 1983 Water Act to allow a minority of board members to be appointed by local government. However, this was removed by central government and and local government played no part in RWA governance or management after 1983.[25] The later privatisation and on-selling to investors, resulting in proceeds to the national government and the local governments getting nothing.

## 3.3 England Privatisation and Regulation of Water Sector to Regional Private Companies

Given what had emerged as the impossibility of the RWAs funding the necessary environmental and drinking water improvements without threating achievement of the government's deficit-reduction goals, it was decided to privatise the RWA's service provision functions to enable them to access the capital they needed. The 10 RWAs were privatised in 1989 into investor-owned and independently regulated water companies. The UK government wanted to introduce private capital and improve the performance by introducing a profit incentive (subject to regulation). The reforms improved outcomes across a range of measures.

**Reform to private regional company introduced new regulators and enabled easier access to capital for investment**

The 1989 privatisation turned all 10 RWAs into investor-owned companies, listed on the London Stock Exchange. The floatation proceeds were used to pay the government for the assets of the RWAs (for £7.6 billion). The £4.9 billion of debts of the RWAs were assumed by the government. The government also made a cash injection to the companies of £1.5 billion (all 1989 prices).[26]

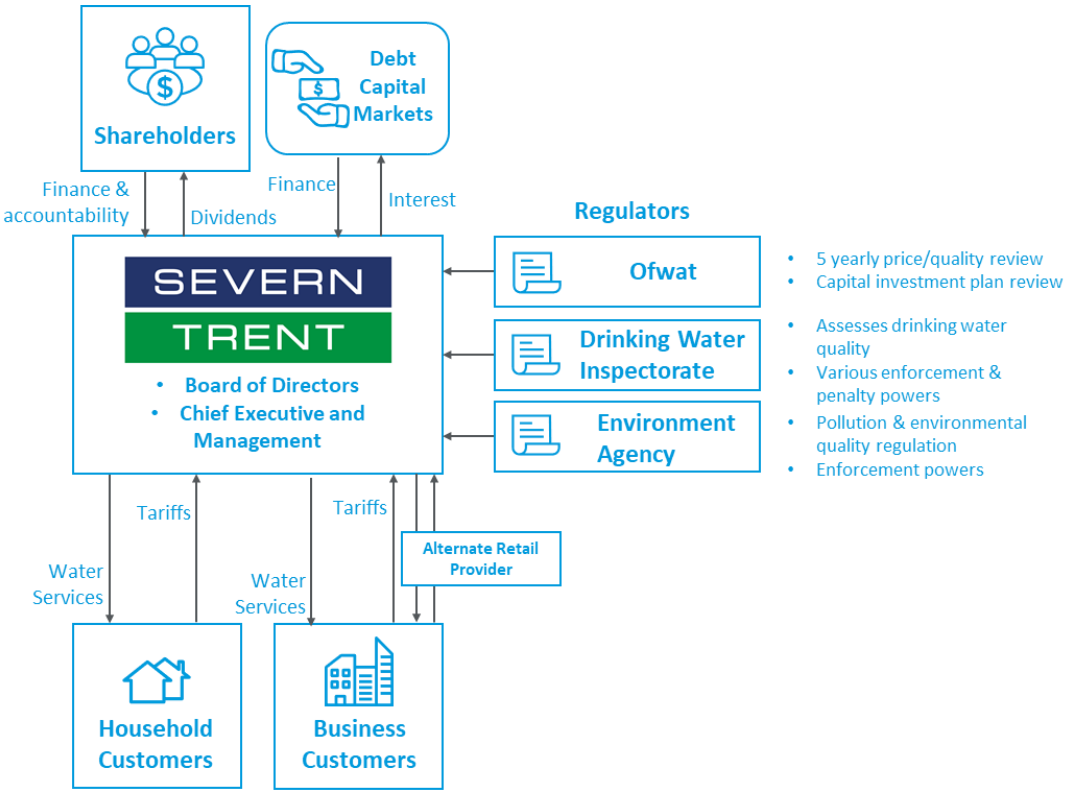
The government created new regulators. The Water Services Regulation Authority or Ofwat was established to regulate prices and quality. The Drinking Water Inspectorate (DWI) was created in 1990 to regulate drinking water quality. The National Rivers Authority (now Environment Agency in England) was made responsible for environmental pollution, flood management, freshwater fisheries monitoring, water resource management, and conservation of the natural environment.

The newly privatised regional companies could access debt capital markets for finance. The companies could also increase charges within a price cap set at the rate of inflation plus a "K-Factor". The K-factor provided the real-terms tariff increases needed to finance the companies' capital expenditure programmes (after considering projected operating efficiencies). The first price caps were set by the government at privatisation. Subsequently, Ofwat reset the price caps every 5 years.

[25] Parker (2012), The Official History of Privatisation, Vol. II: Popular Capitalism, 1987-97 pp. 164-166

[26] Ofwat (2016), The Development of the Water Industry in England and Wales, p. 22

**Figure 3.4: Illustration of Institutional Settings for Regional Private Sector Company (Severn Trent example)**




**Private regional company model resulted in mostly improved outcomes**

We describe the outcomes in the years following privatisation as follows.

*Drinking water quality and environmental outcomes*

Drinking water quality across England and Wales improved significantly post privatisation. The DWI noted an improvement in compliance with drinking water quality standards across the 1990s. The number of breaches of water quality rules declined by 86 percent from 1994-2003.[27] Compliance with drinking water standards reached 99.88 percent in 2002.[28]

Overall, English water utilities steadily improved on their delivery of customer outcomes after privatisation. Ofwat measures 17 indicators weighted by importance for customers, such as rate of leakages, low pressure, wastewater compliance, and responsiveness to complaints. Ofwat noted a constant improvement in the initial years after privatisation. Scores have stabilised around the top end of the scale.[29]

Environmental outcomes improved markedly following privatisation in England. This was a consequence of improved investment and better regulatory setting, monitoring, and enforcement. Wastewater treatment and disposal performance improved leading

[27] Ofwat (2016), The Development of the Water Industry in England and Wales, p. 78.

[28] Ofwat (2016), The Development of the Water Industry in England and Wales, p. 78.

[29] Frontier Economics (2019), Review of Experience with Aggregation in the Water Sector: Report for DIA, pp. 40-43.

to significant improvement in bathing water[30] quality. Seventy eight percent of 'bathing waters' met minimum standards in 1990 and this has risen to 99 percent currently.

*Investment and financial performance*

The privatised water companies increased capital investment in the years immediately following privatisation, and improved productivity. Around £50 billion was invested in new assets and rehabilitation and renewal of existing assets. After the initial uplift, greater proportions of this capital expenditure went on service quality improvements, with smaller increases in general capital maintenance. The private companies then sustained higher levels of capital expenditure than prior to privatisation until the mid-2000s.[31]

English water businesses outperformed the Ofwat operating expenditure efficiencies significantly in the 1990s after privatisation. The efficiency gains subsequently levelled off.

*Access to reliable financing*

Since privatisation in 1989, the private sector companies have financed their own investments in water assets. The private sector companies have been successful at financing their investments:

- The privatised water companies (including the smaller ones) have been successful in accessing bond markets.
- By 2004, total net debt of the industry was £20.8 billion, equivalent to a gearing level of 60 percent.
- Severn Trent, for example, has a net gearing ratio of 88 percent and a Standard and Poor's rating of BBB+.

The companies' shares have generally performed well since flotation. A minority of the private England and Wales water companies raised additional equity capital to finance expenditure. United Utilities, for example, completed a fully subscribed rights issue of £1 billion in 2003.

*Access to services and customer outcomes*

Customer bills increased after privatisation. Average household bills were 42 percent higher in real terms 20 years after privatisation.[32] However, most sources (including the UK government's *Official History*) acknowledge that the UK government (which controlled the predecessor RWAs) had underinvested in water services and kept charges too low. Overall, customer services improved, as evidenced by Ofwat's reporting on service quality measures.[33]

[30] This is the UK term for what is known as the water quality levels for swimming in New Zealand.

[31] Frontier Economics (2019), Review of Experience with Aggregation in the Water Sector: Report for DIA, p. 26.

[32] Frontier Economics (2019), Review of Experience with Aggregation in the Water Sector: Report for DIA

[33] Frontier Economics (2019), Review of Experience with Aggregation in the Water Sector: Report for DIA, p. 24.

*Local government control of water services*

The privatised water companies had no direct impact on UK local government functions. As noted above, this is because the formation of the 10 regional water boards preceded the privatisation by 17 years and any local government involvement ended in 1983.

However, at the time of privatisation, some local authorities contemplated legal action to "recover their assets". This followed resentment from the Water Act 1983 reforms that effectively took any oversight and decision-making powers for water services for the Regional Water Authorities off local government.[34]

## 3.4 Papakura Local Government Delegation of Water Services to Third-Party Private Provider

In 1997, the then Papakura District Council delegated its water services to a third-party provider via a concession contract. The Papakura concession is still in place today and it has resulted in positive investment and customer outcomes.

**Papakura District Council sought to improve the cost effectiveness of water services prior to 1997**

Prior to 1997, water and wastewater services were provided directly by Papakura District Council. This meant the Council was responsible for managing and operating these services, including financing and investment in water infrastructure.

In 1996/97 (the financial year prior to the concession), water supply accounted for NZ$2.9 million, and sewerage accounted for NZ$3.0 million of the Council's operating costs. These costs accounted for almost 40 percent of the Council's total operating costs (NZ$15.4 million).[35]

Unlike the other reform episodes considered in this report, such as England and Wales, and Colombia, Papakura's water services were in a reasonable state at the time of reform in 1997. Its water infrastructure assets were in median condition, and appropriate capital investment had been made in the system.[36]

The Council proactively explored delegation as part of a wider drive to use the private sector for the delivery of services. The Council's stated philosophy was to use the private sector if it could provide better and more cost-effective services.

**A concession contract for the provision of services was awarded to a specialised operator in 1997**

In 1997, the Council tendered for and then awarded a contract for services to the joint venture company United Water International Pty Limited (the concessionaire). United Water comprised French specialist water company Veolia plus Thames Water (one of the privatised English water utilities) and Australian engineering firm Kinhill Engineers. The concession has now been completely taken over by Veolia.

[34] Parker (2012), The Official History of Privatisation, Vol. II: Popular Capitalism, 1987-97 pp. 165

[35] Auditor General (1998), Report on Papakura District Council: Water and Wastewater Franchise, p. 15

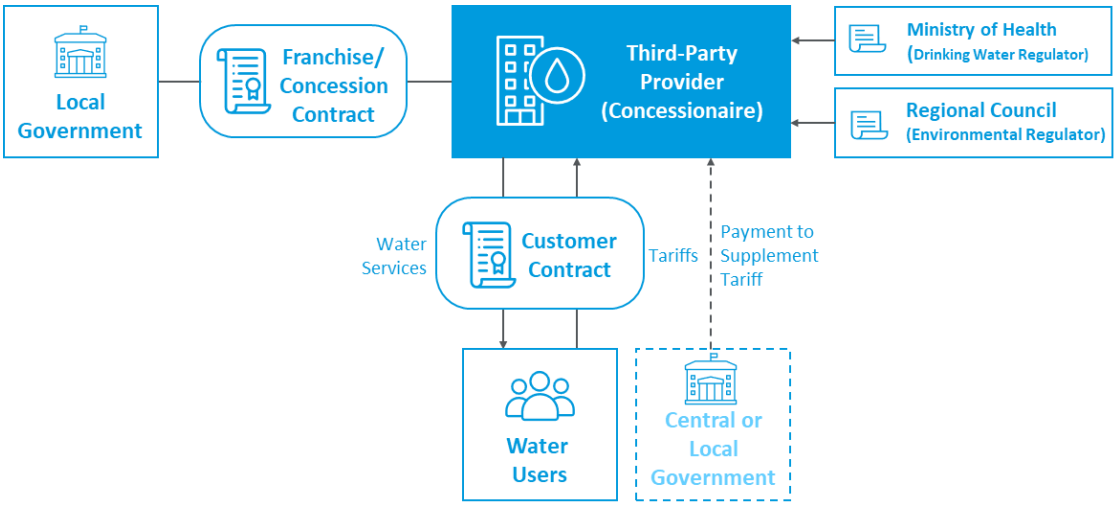
[36] Auditor General (1998), Report on Papakura District Council: Water and Wastewater Franchise, p. 46

The contract requires Veolia to maintain and operate all aspects of the water services. Veolia is responsible for keeping the asset condition better than when it began the concession. The average asset condition is measured every 5 years. Veolia finances asset renewals. All operations are carried out by Veolia (including administration and billing). It oversees additions to the water and wastewater delivery network within the Papakura district to ensure that developers meet asset condition standards. The network additions then become Veolia's responsibility to maintain and operate. When Auckland Council was created under the legislative amalgamation of six Auckland region councils, the Papakura concession remained in place.

The water and wastewater networks (that is, the assets) remain the property of the council (now Auckland Council, after the merger). The bulk water is provided to the concessionaire by Watercare. The treatment and disposal of wastewater is also carried out by Watercare at plants outside the old Papakura boundary, which is consistent with the situation pre-dating the concession. The concessionaire was required to maintain prices below the Auckland region's average. However, it had the right to pass on wholesale water charge increases and wastewater treatment costs.

The main source of income for a concessionaire is a tariff or user fee. Figure 3.5 illustrates the model.

**Figure 3.5: Illustration of Third-Party Delegation to Third-Party—Papakura Model**




**Papakura's delegation model has resulted in positive outcomes**

Papakura has enjoyed a continuation of high quality of water and wastewater services since delegation occurred in 1997.

The network has also expanded under Veolia. At the commencement of the concession, Papakura had 12,300 metered properties and 160km of water mains. Veolia now provides maintenance services over 17,000 connections and 361km of water mains plus 268km of wastewater networks.

*Drinking water quality and environmental outcomes*

Papakura's drinking water was consistently rated as safe following the appointment of a concessionaire. The drinking water regulator commended Papakura in 2004 (the

earliest that drinking water testing records are available online) for the "continued perfect bacteriological compliance record." Other councils had lower scores and continued incidents.[37]

Most wastewater for Papakura is in fact treated and disposed of by Watercare outside of the district (which was the case prior to the concession). There was no noted change in environmental performance after the reform.

*Access to services and customer outcomes*

Under Veolia's concession contract, it can recovers charges from users at fees equal to or below the Auckland average.[38] The Papakura concession has resulted in residents of the former Papakura District enjoying water and wastewater services at a price below the Auckland average.[39] In Papakura, residents seem to be satisfied with the performance of the water services. Veolia reports 97 percent customer satisfaction.[40]

*Access to reliable financing*

Papakura's delegation of water services to Veolia has extended the scope of financing somewhat. Watercare finances bulk water investment because it remains responsible for bulk water supply (and investment and maintenance) from when the concession contract was signed.

Local network investment in maintenance and renewals is made by Veolia. Network additions are financed by the developers carrying out new development. The developer must build the expansion to specifications set by Veolia. Those assets then vest with the local authority, but Veolia has responsibility (like for the rest of the network) to operate and maintain those assets. In Papakura, Veolia seeks to ensure that all of the costs are financed by the developer. In other local authority areas, the amount of financing can be less than the costs because local authorities might be incentivised to encourage (that is subsidise) building development.[41]

The advantage of this arrangement is that the local council does not have to directly finance renewals of water infrastructure or partially finance network additions.

*Local government control of water services*

The Papakura concession contract leaves the relevant local government entity with contractual monitoring duties, rather than management and operational functions

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[37] Ministry of Health (2004), Annual Review of Drinking-Water Quality In New Zealand, available at: https://www.moh.govt.nz/NoteBook/nbbooks.nsf/0/F3C43A29707C2DA84C2565D7000E0E66/$file/annual-review-of-dw-quality2004.pdf

[38] Veolia's fees and charges are published here: https://www.veolia.com/anz/sites/g/files/dvc2011/files/document/2019/06/2019%20-20%20Customer%20Charges-Domestic.pdf

[39] Veolia (June 2019), Domestic Customer Charges Papakura 2019/2020, available at: https://www.veolia.com/anz/sites/g/files/dvc2011/files/document/2019/06/2019%20-20%20Customer%20Charges-Domestic.pdf

[40] Veolia (2016), Municipal, Papakura Concession, New Zealand Auckland Council: Water Network Operations and Maintenance. Available at: https://www.veolia.com/anz/sites/g/files/dvc2011/files/document/2017/10/Municipal_-_Papakura_NZ-_Water_Network_O_M_Final_-_APPROVED_for_external_use.pdf

[41] Based on conversation with Watercare senior executive.

(and the associated costs). The council (now Auckland Council) retains ownership of the assets, including improvements to assets. Upon expiry of the concession in 2027, the assets will revert to the council (unless a further concession or extension is signed).

Benefits to local government include the franchise fee (NZ$13 million from the concessionaire upon contract award) and the reduction in costs of operating the water services.

The local government retains ultimate control over the water assets and services. In case of a serious breach of the concession agreement, local government can step back in and either appoint a new concessionaire, or take over management and operations directly.

## 3.5 Conclusion on Reform Episodes

The Colombia case study highlights that it is possible to use regulatory, governance, and financing reforms to improve drinking water quality and wastewater treatment while retaining local government responsibility for water and wastewater services.

The RWA case study shows that amalgamation into large entities and the imposition of central government control has risks. The RWAs raised finance from the central government and became part of the PSBR (deficit) which led the government to limit how much they could borrow. This left the RWAs unable to finance necessary investment. Drinking water and environmental outcomes were poor as a result. Local government was promised a governance role in exchange for ceding their assets. The local authorities were later excluded from that role. The UK government later sold the RWAs as privatised entities and kept the sales proceeds.

The privatisation of English water companies in 1989 shows that a combination of independent regulation and privatisation can deliver drinking water and environmental outcome improvements, by providing strong efficiency incentives and enabling unconstrained access to finance. Tariff increases were required to fund the new investment.

Delegation of services to a specialist provider in Papakura delivered continuous high drinking water outcomes and low bills with high levels of customer satisfaction. The council avoided costs of water provision and gained access to a highly specialised global firm. The financing of new local network infrastructure is fully provided by developers, rather than partially by councils as is the case in some areas of New Zealand.

A summary table of the impact of the reform episodes on the outcomes identified by the Government is set out below.

## Table 3.1: Scorecard Rating Ability of Institutional Options to Deliver Desired Outcomes

| | Colombia (1990s–present): Local Government-Owned and Operated | England and Wales (1973–1989): Regional Publicly-Owned Corporations | England and Wales (1989–present): Regional Private Sector Company | Papakura (1997–present): Local Government Delegation of Service Provision to 3rd Party |
|---|---|---|---|---|
| **Drinking Water Outcomes** | Drinking water quality improved. Challenges in rural areas remain. | Persistent failure to meet quality standards over the 1970s and 1980s. | Water quality standards improved – between 1994 to 2003, breaches of water quality declined by 86 percent. | Papakura's drinking water has consistently met drinking safety standards. |
| **Environmental Outcomes** | Treatment of wastewater improved significantly, though more is needed. | Pollution continued in river and coastal waters post reform. Significant failures to meet discharge standards. | Environmental (bathing) waters meeting standard increased from 78 percent in 1990 to 99 percent now. | The concessionaire has met the environmental management conditions set in its contract. |
| **Cost and Efficiency outcomes** | Capital expenditure increased. Tariffs now approximate cost recovery. | Initial fall in capital investment in 1970s, followed by reversion to pre-reform level in 1980s. Rate of return targets achieved through job cuts in 1980s. | Productivity and capital investment increased. £50 billion invested in infrastructure in water assets. | Papakura's water and wastewater charges are lower than in other parts of Auckland. |
| **Financial Outcomes** | Reforms have created many methods for water utilities to access finance. | Struggled to access finance due to fiscal limits. Resorted to financing capex directly from users charges. | Unlimited access to debt and equity provided by capital markets. | Financing of local network expansion is wholly provided by developers (not partially provided by the local authority unlike other partis of Auckland). |
| **Customer Outcomes** | Access to drinking water and sanitation increased. Bills rose but remain affordable. | Bills held constant in real terms during the 1970s, but increased in real terms throughout the 1980s. | Bills rose 42 percent in the 20 years after privatisation to help fund asset investment. | Customer satisfaction reached 97 percent in 2019. Charges remain below Auckland's average. |
| **Local Govt Impacts** | Municipalities retain the power to appoint board members to water utilities, promoting accountability to customers and coordination in local planning. | Despite initial promises, local government lost any ability to appoint board members in 1983. The assets were later sold but the proceeds were not given to the local authorities. | Privatisation did not result in any further impacts on local governments, which lost governance and ownership rights in the earlier amalgamation. | Auckland Council retains ownership of water assets. Local government's autonomy is constrained by the terms of the contract. |

# 4 Assessing Institutional Options Against Indicators of Effectiveness

This section evaluates the four institutional options against indicators of institutional effectiveness. In the preceding section we assessed reform episode case studies. Case studies provide an indication of the possible outcomes of reform. All four are highly relevant evidence for the New Zealand policy process.

While useful, case study analysis is limited. There are not enough data points to draw robust conclusions. A model may work in one place and fail in another. Every country's legal system, cultures, institutions, and economy are different. There are many confounding variables: it is hard to know if the changes in water sector performance were caused by the reform, or by other things such as changes in economic conditions, or social attitudes.

Therefore, it is necessary to evaluate the major institutional forms against a broader set of management and institutional theory. This can be done by agreeing to a set of indicators which tend to be associated with or drive high performing institutions in water and similar sectors, and then assessing institutional options using these indicators.

LGNZ proposed a set of institutional effectiveness indicators to the Joint Steering Committee's Secretariat and wider stakeholder ground including DIA, DIA's advisors, SOLGM, and other stakeholders in a note entitled Parameters for Evaluating Water Service Delivery Models dated 12 August 2020. These indicators were developed by Castalia for LGNZ to assist in measuring the fitness of various institutional reform options.

Global experience suggests that the existence of these institutional indicators leads to better performing water service providers. Absence of these indicators tends to lead to poor performing water service providers. We first present a scorecard rating of each institutional model against the indicators in Table 4.1 below. We then describe how each model performs.

**Table 4.1: Scorecard Rating Analysing Institutional Options Against Indicators**

| | Local Government Responsibility | Regional Publicly-Owned Company | Regional Private Sector Company | Delegation of Service to a Third-Party Provider |
|---|---|---|---|---|
| **Economies of Scale** | Does not facilitate economies of scale. | Can achieve economies in management and procurement. | Can achieve economies in management and procurement. | Economies of scale may be available where third-party provider can operate over multiple concessions. |
| **Economies of Scope** | Can result in economies of scope with other council activities. | If the regional corporation is limited to the Three Waters, there can be no economies of scope. | If the regional company is limited to the Three Waters, there can be no economies of scope. | Economies of scope available where the provider can offer other utility services. |
| **Accountability to Customers** | Elected officials accountable to voters. Water issues can be election issues. | National regulation and governance can promote good service, but the system is not directly accountable to customers as water issues will seldom determine national elections. | National regulation and governance can promote good service, but the system is not directly accountable to customers, as water issues will seldom determine national elections. | Municipal decision-makers still directly accountable to customers, but responsiveness may be constrained by term and duration of contract. |
| **Competence of Management and Operations** | May be hampered by insufficient scale of operations and limits on ability to pay for specialised skills, in the smaller service providers. | Greater scale should make it easier to afford the required specialised skills and systems. Risk of public sector limits on pay and incentives remain. | Can achieve scale needed. No artificial limits on pay or incentives. | Accesses world-class management systems, and IP. Achieves required scale across multiple operations. No limits on pay or incentives. Global career prospects. |
| **Ability to Access Finance** | Access to finance constrained for small services and those whose parent government is close to its borrowing capacity. | Can access finance if creditworthy and borrowing do not require national government guarantee or consolidate into public sector debt. | Ready access to commercial debt and equity. | Ready access to commercial debt and equity. |

| | | | | |
|---|---|---|---|---|
| **Incentive Alignment** | Elected officials directly accountable. However, public sector constraints may limit ability to transmit incentives through the organisation. | Highly dependent on governance and ability to create incentive contract with management team and staff. | Incentives are aligned, provided that economic regulation is effective. | Incentives are aligned, provided good contractual design. |
| **Adaptability to Change** | High adaptation potential as local governments have freedom to try new approaches in response to local conditions | Tends to be inflexible. | Can be flexible to the extent allowed by the regulatory framework. | Can be adaptable where contract is well-designed. Concessionaire is incentivised to use new technology where cost savings are possible. |

## 4.1 Local Government Responsibility

Local government responsibility can perform well against the institutional indicators. The performance depends on the design of the institutions that support local government ownership and operation.

**Economies of scale**

This model can achieve economies of scale, depending on the specific circumstances of the case. Generally, scale economies are not achievable if the area of service is small. The empirical literature suggests that within countries, utilities that deliver more water do so at lower average cost. However, the optimal size varies by country depending on a variety of factors.

In Colombia, the reformed model introduced regulatory monitoring of the local government-owned water utilities' costs. The regulator can mandate an amalgamation if costs are too high and it forms the view a merger would realise benefits, including economies of scale.

**Economies of scope**

Economies of scope can exist for local government-owned and -operated water services. For example, the water service can share services with other arms of the local government (such as corporate overheads).

**Accountability to customers**

Accountability to customers is generally high, with local government responsibility for water services. Elected councillors are responsible for the water service, and therefore can be held to account for poor performance.

However, there are systematic deficiencies that can arise from parochialism. Local authorities may miss opportunities to benefit from cooperation with neighbours. This could be driven by voter antipathy and a political incentive to avoid ceding control of water in one's own area. Moreover, water investments have very long-term payoffs. Local government can tend to favour other investments with more immediate payoffs in cases where water service revenues are intermixed with other revenues.

**Competence of management and operations**

Smaller local government entities can have difficulty paying market rates to attract and retain staff. There may be issues with more rural locations being less favourable.

The regulatory regime plays an important role in maintaining (and improving) competence levels. Where there is ineffective monitoring of outcomes against standards, operational and management competence can decline. The Havelock North Inquiry found that poor water quality monitoring by the regulator, and an under-resourced inspection regime contributed to lower performance (competence) by operational and management staff in local councils.

**Reliable access to finance**

The model does not limit access to finance of water utilities per se. However, some local authorities have difficulty efficiently financing investment. In New Zealand, the size of water utilities needs to be relatively large to access finance. The parent entity (local authority) also needs to have readiness for borrowing on its balance sheet. Some

of the larger, fast-growing councils in New Zealand have reached borrowing limits impacting the ability of water services to access finance. If balance sheet consolidation can be avoided, then this is not an issue. Many United States water services are locally owned and operated, for example, and have ready access to finance.

**Alignment of incentives**

The local government responsibility model requires effective governance and regulation to ensure that managers (and staff) have incentives to perform in the public interest.

Governance bodies that are experienced in monitoring and holding managerial performance to account, and carrying out good financial governance are important to ensure incentives are aligned. Regulatory agencies can also drive incentives of management (and staff) of local government-owned water services to act in the public interest. Regulatory agencies need to be sufficiently resourced and competent for this to work. The Havelock North Inquiry highlighted the risks of ineffective drinking water regulation.

**Adaptability to change and new information**

Local authorities have a range of options to respond to change and new information. They can merge, outsource services, delegate management, and change delivery technology in response to local demands (expressed directly) and with knowledge of local conditions. The local authorities do not need to get consensus at a national level in order to try something new. This is inherently responsive and adaptable compared to a uniform national (or large regional) system. With more entities under a local government model, there is more chance for learning in the sector through trying many things. This leads to learning what works in different situations by comparing to one local authority's water services to another. There is also more direct accountability to voters for successes (and failures).

In cases where parochial interests might prevent flexibility to change and new information, national level institutions could improve things. Effective oversight and regulation by a different part of government can incentivise or enforce adaptation, such as in Colombia where the regulator can enforce mergers that improve efficiency.

## 4.2 Regional Publicly Owned Corporation

The regional publicly owned corporation tends to perform poorly against the indicators.

**Economies of scale from the act of merger**

Water services generally face constant returns to scale. The optimal scale of a water utility varies considerably between countries, according to the empirical literature.[42] Mergers are unlikely to result in economies. Economies of scale are achieved in the (minority of) cases when fragmented physical networks can be connected and managed as a whole. This usually occurs when networks are physically proximate and usually already partially interconnected. Economies of scale may also achieve

[42] Saal et al (2013), Scale and scope economies and the efficiency vertical and horizontal configuration of the water industry: a survey of the literature

management and procurement economies, but the savings are likely to be small relative to the total costs of the fixed network assets.

**Economies of scope**

Economies of scope may arise from the act of merger where separate water services are then run by the same entity. The empirical evidence on economies of scope is mixed. Some literature suggests economies of scope might be available in the case of vertical integration of bulk water, drinking water, and wastewater, whereas others point to diseconomies.[43] The RWAs in England and Wales were created with a view to achieving scope benefits, however, water quality and environmental outcomes were poor.

The regional public company model may actually achieve diseconomies of scope compared to other models. For example, when water services are separated from local government where shared services and costs exist with other local government functions.

**Accountability to customers**

Accountability to customers of regional publicly-owned companies depends on governance and regulation mechanisms.

Regional entities have indirect accountability to customers, even if the governance and regulatory institutions are well-designed. In case of poor performance of a regional corporation, there are many layers of governance where consensus needs to be reached on the issue. Customers can raise issues that might be due to poor performance of a regulator with national-level representatives; however, water performance issues compete for the attention of elected members of parliament with many other broader socio-political matters.

In Scotland, Tasmania, and Ireland accountability is reliant on the relevant regulatory mechanism working well, as well as the national (or State in the case of TasWater) government influencing the board of the water entity to bring about change. In England and Wales, the RWAs had weak accountability to customers. Initially, local authorities had limited board appointment rights (councils could appoint a director). This meant that the interests and priorities of residents in a locality were diluted. Later, when the central government consolidated control of the RWAs under the Water Act 1983, the accountability to customers was weakened further.

**Competence of management and operations**

In order to attract good managers and operational staff and systems, it is necessary to have autonomy to set remuneration levels. Regional public companies may have less autonomy due to central government influence and therefore less discretion to hire the best managers. In cases where fewer regional public companies exist, there will be less rivalry between water utilities to attract high performing staff. Regional public companies tend to improve competence in management and operations where those charged with governance can hold management accountable.

[43] Saal et al (2013), Scale and scope economies and the efficiency vertical and horizontal configuration of the water industry: a survey of the literature

Regulatory oversight can also drive improved competence. For example, in Tasmania, the regulator reports efficiency gains due to management productivity improvements.[44] In Victoria, the regulator reports on outcomes from management and operational competence improvements which can drive improved outcomes.[45]

**Reliable access to finance**

The publicly-owned regional company model can, in principle, free the utility from external financial constraints (for example, the constraints imposed by debt limits on local or central government), provided that the tariffs recover costs. However, in practice, this model has had mixed success reliably raising adequate finance. Government appointed boards can prevent the regional company from implementing cost recovery tariffs. This was the case with the RWAs. Without tariffs that reflect costs, the utilities' own cashflow cannot support debt and service costs needed to meet capex needs.

It is an established practice (for example, the RWAs, Scottish Water, and Irish Water[46]) for the regional companies to rely on most funding coming from national or state government (or being guaranteed by national or state government). Where regional companies have borrowed independently, this can be consolidated into the national or state debt for accounting or credit rating purposes and result in the national or state government itself being credit constrained.

**Alignment of incentives**

The model is highly dependent on effective governance and a well-designed regulatory regime to ensure that the incentives of governance, management, and operations are aligned with the objectives. The same points made above, in respect of incentive alignment for managers and staff for the local government responsibility model, apply here.

**Adaptability to change and new information**

The model tends to be large and has to cover multiple jurisdictions. Usually, regional public companies are created out of contentious reform episodes. It can be difficult to keep different interest groups happy. In a range of cases, the reforms episodes which created the regional companies were not the end state for institutional structuring. Additional reforms were subsequently imposed, for example, in Scotland (three regional companies amalgamated to Scottish Water in 2002) and Tasmania (three regional Tasmanian companies operated from 2008 to 2013 then merged into TasWater).

## 4.3 Regional Private Sector Company

The regional private sector company performs well, however, this is highly dependent on the quality of the regulatory regime. The English regional water companies are the

[44] Frontier Economics (2019), Review of Experience with Aggregation in the Water Sector, p. 25

[45] Frontier Economics (2019), Review of Experience with Aggregation in the Water Sector, p. 25

[46] See for more information Frontier Economics (2019), Review of Experience with Aggregation in the Water Sector, p. 47-50

only example in the world of a regional private model, and the regulator Ofwat has mostly provided effective regulation.

**Economies of scale**

The situation is similar to the regional public company model. Water services generally face constant returns to scale. The optimal scale of a water utility varies considerably between countries, according to the empirical literature.[47] Mergers to create regional private sector companies are unlikely to result in economies. Economies of scale are achieved in (the minority of) cases when fragmented physical networks can be connected and managed as a whole. This usually occurs when networks are physically proximate and usually already partially interconnected. Economies of scale may also achieve management and procurement economies, but the savings are likely to be small relative to the total costs of the fixed network assets.

**Economies of scope**

Economies of scope may arise from the act of merger where separate water services are then run by the same entity. The empirical evidence on economies of scope is mixed. Some literature suggests economies of scope might be available in the case of vertical integration of bulk water, drinking water, and wastewater, whereas others point to diseconomies.[48] The literature on the private English water companies suggests that diseconomies of scope exist if quality of service is ignored, but could exist if quality is taken into account, suggesting that effective regulation may allow economies of scope to be realised.[49]

On the other hand, the regional private sector company may actually achieve diseconomies of scope compared to other models. For example, economies of scope can be lost when water services are separated from local governments where services and costs are shared with other local government functions.

**Accountability to customers**

The accountability of regional private sector companies to customers is improved by the profit motive and an effective regulatory regime. The companies are incentivised to improve services where the costs, plus a return on capital, can be recovered in tariffs. Effective regulation is needed to ensure the investments for service improvement and tariff changes are justified.

The regional private company model has indirect accountability to customers, even if the regulatory institutions are well-designed. In case of actual or perceived underperformance by Ofwat, customers can complain to Ofwat, and if dissatisfied with the response, usually need to influence national-level representatives. As noted above, however, water performance issues compete for the attention of elected members of parliament with many other broader socio-political matters.

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[47] Saal et al (2013), Scale and scope economies and the efficiency vertical and horizontal configuration of the water industry: a survey of the literature

[48] Saal et al (2013), Scale and scope economies and the efficiency vertical and horizontal configuration of the water industry: a survey of the literature

[49] Saal et al (2013), Scale and scope economies and the efficiency vertical and horizontal configuration of the water industry: a survey of the literature

Customer accountability at the English private water companies has generally been positive, when looking at the entire period since privatisation. This is attributed to effective economic regulation by Ofwat.[50] Customer outcomes have generally been positive.[51] Although Ofwat's performance has been criticised too.[52]

**Competence of management and operations**

The regional private companies in England have autonomy and usually a healthy financial position to justify the salaries of high-performing management and operational staff. Management and operational staff can identify ways to reduce costs, which directly impacts the regulated entities' profits. The nine English water companies are rivals for the best talent.

The privatisation of English water companies led to an average productivity growth rate of 2.1 percent since 1989.[53] The private company profit motive, and access to finance to hire skilled managers and operational staff, while also the incentives to reduce costs, were probably factors in this productivity improvement.

**Reliable access to finance**

Reliable access to finance for regional private companies depend on a stable regulatory system, grounded in sound economics and legal precedent as this gives investors confidence. The English water companies benefit from this stable regulatory system, and are therefore able to readily access finance on global capital markets. All had BBB (one grade above the minimum investment grade) or higher credit ratings in 2016-2018.[54]

**Alignment of incentives**

The management of the private regional water companies are incentivised to maximise profits. In a competitive market, firms are constrained from raising prices and compete to lower prices and raise quality to attract customers. The regional private water companies are monopolies, so effective regulation is needed to ensure prices are reasonable, quality is improved, and water quality or environmental outcomes are not sacrificed to increase profits.

However, incentive alignment with the public interest is dependent on the effectiveness of the regulatory regime. A notable example of the importance of an effective regulatory regime was recently highlighted in England. Between 2010 and 2017, Southern Water fraudulently reported its water testing results covering up serious wastewater pollution incidents.[55]

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[50] Frontier Economics (2019), Review of Experience with Aggregation in the Water Sector, p. 38

[51] Frontier Economics (2019), Review of Experience with Aggregation in the Water Sector, p. 42.

[52] For example, Financial Times, 15 February 2020, Ofwat faces biggest battle with water companies since privatisation, available at: https://www.ft.com/content/5da761e6-4f04-11ea-95a0-43d18ec715f5

[53] Frontier Economics (2019), Review of Experience with Aggregation in the Water Sector, p. 26.

[54] Ofwat (2019), Monitoring Financial Resilience, available at: https://www.ofwat.gov.uk/wp-content/uploads/2019/01/Monitoring-financial-resilience-2018-Report.pdf

[55] An internal investigation of Southern Water found that employees (including those at the senior management level) deliberately prevented the sampling of wastewater to check compliance with environmental permit

### Adaptability to change and new information

The English private water companies can be flexible and adapt to change within the regulatory framework set by Ofwat and the drinking water quality and environmental regulators. In some cases, private companies have merged with the historically private statutory water companies. Ofwat has a dedicated merger approvals regime.

## 4.4 Local Government Delegation of Service Provision to Third-Party Provider

The local government delegation of service provision to a third-party model scores well against the indicators. This option is dependent on the quality of the contract negotiated between the third-party provider and the local government entity. This pre-supposes some sophistication in local government (or high quality advice) in procurement, contractual negotiation and ongoing management.

### Economies of scale

Economies of scale are possible in management and specialist services (but not water network or production except in very limited circumstances) where a concessionaire is able to operate over a number of water service contracts. Procurement of equipment and network assets may also be improved from scale (volume discounts and standardisation of plant and equipment). In the case of Papakura, Veolia has the only concession contract in New Zealand, but also provides outsourced water services to a number of other councils in New Zealand. Accordingly, there may be economies of scale available to Veolia from providing services across a number of council areas.

### Economies of scope

There may be economies of scope available where service providers also provide other utility services. For example, Veolia provides waste, energy, and transport services in New Zealand.

### Accountability to customers

Customer accountability is usually provided for in the concession contract. Key price and quality metrics (or mechanisms to set these over the life of the contract) are set out in the contract. Therefore, the degree of customer accountability depends on the negotiation of the contract at the outset. Ongoing customer accountability then also depends on contractual monitoring by the local government counterparty. Customers can lobby the local government in case of complaints or performance issues. Concession contracts also provide the local government with remedies in case of major breaches. However, concession contracts are usually around 30 years. Disagreements over contract interpretation can be a barrier to realising accountability to customers.

conditions. This resulted in unpermitted and premature spills of wastewater from Southern Water's treatment works. Ofwat also found that Southern Water had dumped untreated effluent into beaches, rivers and streams. Following Ofwat's investigation in 2019, it ordered Southern Water to pay £126m in penalties for breaching its sewage treatment statutory duties. See Financial Times (2019) *Southern Water hit by £126m penalty for 'serious failures'*. Retrieved from https://www.ft.com/content/518b21fa-9711-11e9-9573-ee5cbb98ed36

**Competence of management and operations**

Concessionaires are normally appointed following competitive tenders. A number of specialised water service companies usually compete for these contracts. Tenders are won on the basis of the demonstrated competence in management and operations of the concessionaire. Concessionaires tend to be global water service companies with wide ranging experience and expertise. They will usually bring their international expertise to bear and improve competence of management and operations.

During the life of the concession contract (normally 30 years), the contractual conditions will set performance standards that incentivise competence in management and operations. However, this again depends on the terms of the contract.

**Reliable access to finance**

Concession contracts normally include provision for the concessionaire to charge tariffs for water directly to customers, or (less common) remuneration from the local government entity. Concessionaires can usually raise finance from the wider corporate group or directly from investors, secured against the revenues of the concession contract. For example, Veolia and Suez Environment raise billions of Euros a year on global capital markets to finance their operations across a range of industries, including water services.

**Alignment of incentives**

The incentives of concessionaires will depend on the terms of the contract. However, under most concessions, the operators are incentivised to provide a high-quality service for least-cost. Concessionaires are also 'repeat players' in concession contract tenders around the world. A track record of poor performance will reduce the chances of appointment in concession contract tenders. Once the tender is won, there are also various ways of designing concession contracts to incentivise performance improvements, and penalise poor performance.

**Adaptability to change and new information**

The model can be flexible and adaptable with good contract design. If well designed, Concessionaires can be incentivised to implement new and innovative ways to deliver services that lower cost. If the contract gets the balance between local government and concessionaire wrong and does not follow global PPP contract standards, then there can even be disincentives to adapt and change.

Concessionaires can also be incentivised to add new customers, since this increases profits. For high-growth places, such as many of New Zealand's cities, these incentives to adapt to change could be positive.

# 5 Conclusion

The Government is considering major reforms for the New Zealand water sector. It has identified a range of problems that exist, on the basis of some research and analysis. The reform process is considering a package of interventions including amalgamations of local government water services into regional entities. However, other reform models used internationally which did not include regional amalgamation are also relevant to New Zealand.

This paper contributes to the New Zealand policy debate. It reviews the four major options for water services. We review case studies of reform episodes where jurisdictions changed to one of the major models. These case studies have shown how important jurisdictions have tackled problems in the water sector with institutional reform, and how the reforms fared. We also reviewed all four models using the institutional indicators previously submitted by LGNZ to the water reform policy process to evaluate water services.

The analysis shows that there are strengths and weaknesses to each model. It is important to take care in this policy process in attributing benefits to just one aspect of reform. For example, when amalgamation and regulation occur together, it is not possible to be sure that improvements were primarily due to amalgamation.

Indeed, reports and analysis used to inform the policy reform process in New Zealand from Frontier Economics and Martin Jenkins focus on regional water company models. These reports attributed various positive outcomes to the combined amalgamated, privatised, and regulated entities. However, as our case study of the RWAs in England and Wales shows there were a range of policy, economic, and structural changes that contributed to this, so it is important to disentangle the various aspects of reform to determine how these contributed to the outcomes.

Careful consideration of the evidence on which type of reform are most likely to achieve desired outcomes in New Zealand is needed before choosing any particular model, for example regional publicly owned company. This paper shows that consolidation of governance and funding and financing may risk achieving the desired outcomes.

Given the wide range of needs and operating environments in New Zealand, it may make sense to allow flexibility so different regions can craft locally appropriate solutions with a broadly agreed regulatory framework and set of institutional principles. Institutional models exist where the central government sets regulatory bottom lines for funding, costs, drinking water, and environmental outcomes, but also retails the flexibility for local authorities to adapt models to local needs.

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