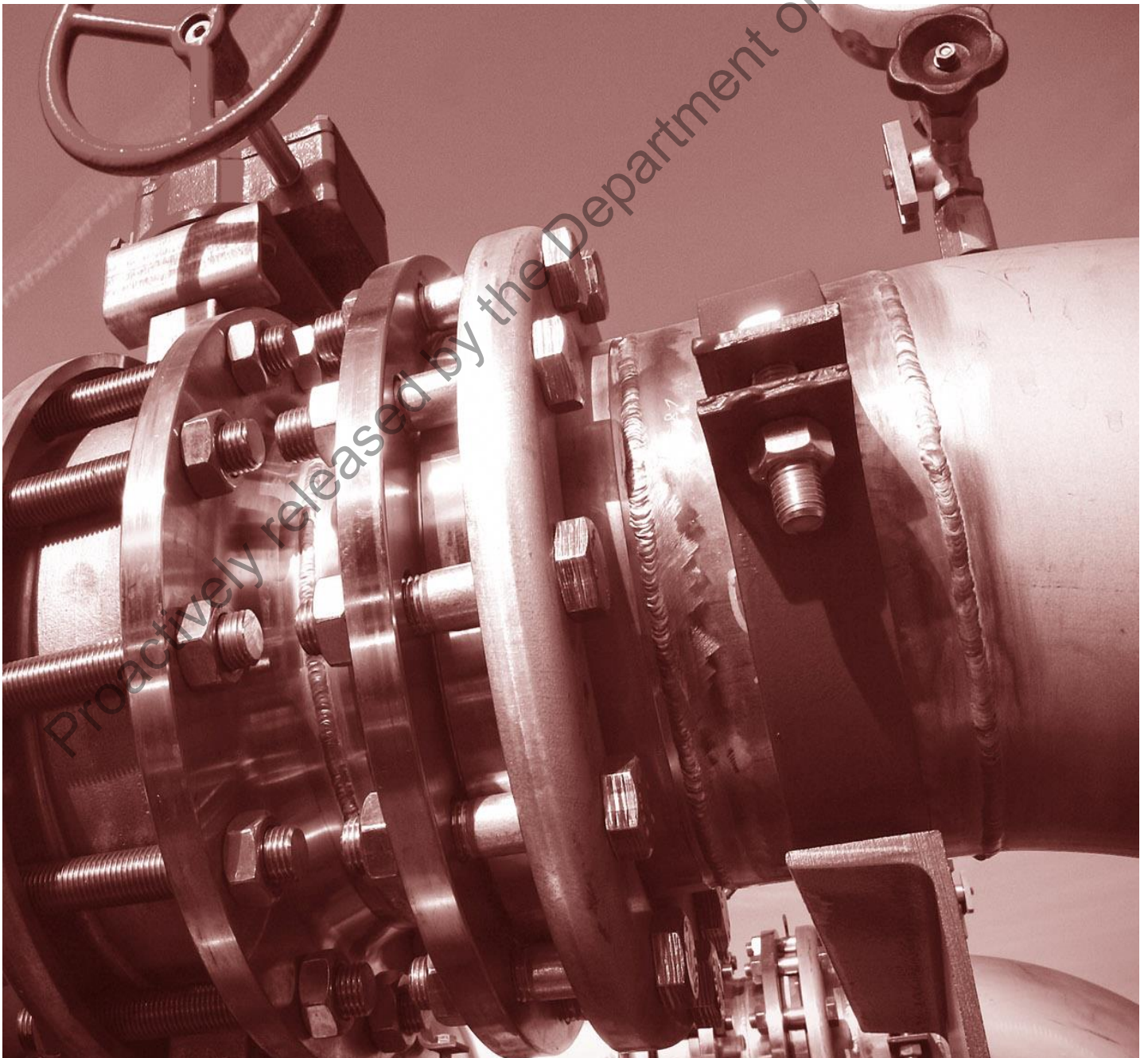


# REVIEW OF EXPERIENCE WITH AGGREGATION IN THE WATER SECTOR

REPORT FOR THE DEPARTMENT OF INTERNAL AFFAIRS

26 JUNE 2019



---

Proactively released by the Department of Internal Affairs

---

# CONTENTS

<b>Executive summary</b>	<b>iv</b>
Overview of reforms in selected jurisdictions	iv
Summary of key outcomes	vi
Costs and efficiencies	vi
Customer outcomes	vii
Financial outcomes	vii
Drinking water quality and environmental outcomes	viii
Impacts on local government	viii
Key factors affecting outcomes	ix
Aggregation/structural reform	ix
Complementary regulatory and pricing reforms	ix
External factors	x
A combination of regulation and aggregation has driven benefits	x
What are the implications for water reform in New Zealand?	x
<b>1 About this report</b>	<b>1</b>
1.1 Contextual background	1
1.2 Purpose and scope of this report	1
1.3 Approach to this study	2
1.4 Structure of this report	2
<b>2 Overview of reforms in selected jurisdictions</b>	<b>4</b>
2.1 Overview	4
2.2 What were the key drivers of reform?	4
2.3 What models of aggregation/service delivery were adopted?	10
2.4 How was aggregation staged?	11
2.5 What other reforms were implemented?	17
<b>3 Costs and efficiencies</b>	<b>22</b>
3.1 Introduction	22
3.2 Aggregate costs	22
3.3 Productivity and efficiency	25
3.4 Management initiatives to improve efficiency	28

3.5	Evidence of economies of scale	29
<b>4</b>	<b>Customer outcomes</b>	<b>33</b>
4.1	Impacts on customer bills	33
4.2	Service standards	38
4.3	Impacts on customers in rural and regional urban areas	43
4.4	Overall customer satisfaction and perceptions	44
<b>5</b>	<b>Financial outcomes</b>	<b>46</b>
5.1	Ability to fund investment	46
5.2	Financial viability	46
<b>6</b>	<b>Drinking water quality and environmental outcomes</b>	<b>51</b>
6.1	Drinking water quality	51
6.2	Environmental outcomes	55
<b>7</b>	<b>Impact on local government</b>	<b>58</b>
7.1	Impacts on local government finances	58
7.2	Loss of control of local services	59
7.3	Loss of economies of scope with other council functions	60
<b>8</b>	<b>Sources and drivers of costs and benefits</b>	<b>61</b>
8.1	Aggregation/structural reform	61
8.2	Complementary regulatory and pricing reforms	62
8.3	External factors	62
8.4	Conclusion	62

## Tables

<b>Table 1:</b> Summary of key features of aggregation that occurred in different jurisdictions	13
<b>Table 2:</b> Water Prices for Watercare, before and after aggregation	36
<b>Table 3:</b> Overall performance assessment indicators	42
<b>Table 4:</b> Water quality compliance metrics: Irish Water	53
<b>Table 5:</b> Incidents with potential impacts on environmental and/or human health	56

## Figures

<b>Figure 1:</b> Combined capital expenditure – Water Industry in England and Wales	23
<b>Figure 2:</b> Cumulative TFP growth, 1993-2017	27
<b>Figure 3:</b> Average Annual bills for combined water and sewerage services	34
<b>Figure 4:</b> Average Household bills for 230kl consumption – metropolitan water	35
<b>Figure 5:</b> Average Household Annual Bill 2015/16 – Medium Australian Utilities	36
<b>Figure 6:</b> How much Scottish Water customers saved on their bills	37
<b>Figure 7:</b> Average duration of interruptions (medium and large regional water utilities in Australia)	39
<b>Figure 8:</b> Total complaints (water and sewerage) per 1,000 customers	40
<b>Figure 9:</b> Bacteriological Compliance of Water Supplies in Tasmania	52
<b>Figure 10:</b> Water supplies on Remedial Action List - Ireland	53
<b>Figure 11:</b> Drinking water quality, 1994-2017	54
<b>Figure 12:</b> Compliance by TasWater against discharge to waters regulator limits	56

## Boxes

<b>Box 1:</b> Water industry performance in Tasmania pre-reform	5
<b>Box 2:</b> Approach to establishing Taswater	15
<b>Box 3:</b> Approach to establishing Scottish Water	16
<b>Box 4:</b> Approach to establishing Irish Water	17
<b>Box 5:</b> Economic studies of economies of scale and scope in the urban water industry	31
<b>Box 6:</b> Welsh Water	48
<b>Box 7:</b> The link between user charges and capacity to finance investments	50

# EXECUTIVE SUMMARY

The Department of Internal Affairs (DIA) is currently conducting a cross-agency policy review of the water sector in New Zealand (the *Three Waters Review*). One key issue for the review is the potential merit of aggregation of the current large number of relatively small-scale suppliers operated by local councils across New Zealand in order to provide water, wastewater and stormwater services more effectively and efficiently.

To inform this policy question, we have been asked by DIA to survey the real-world experience and outcomes of aggregation and related reforms in the water sector where aggregation and related governance and regulatory reforms have been implemented in a number of jurisdictions. The jurisdictions we have been asked to investigate include Australia (Tasmania and Victoria); Great Britain (England, Wales and Scotland); the Republic of Ireland; and New Zealand (Auckland and Wellington). These jurisdictions were identified by DIA as being most relevant to New Zealand (e.g. all involved aggregation of local government water functions). This report distils our key findings on the outcomes and experience of aggregation in these jurisdictions.

The report is deliberately structured around key themes or issues of interest rather than being a comprehensive record of the history of reform in each of these jurisdictions for two reasons. Firstly, it is the lessons and themes *across* jurisdictions, rather than the detailed minutiae of reforms in particular jurisdictions, that are likely to be of most relevance and use to DIA when considering options for reforms in New Zealand. Secondly, not every jurisdiction offers relevant lessons on every issue of interest to DIA. Therefore, the main task of this report is to look across jurisdictions to identify the key lessons that may be relevant to New Zealand—recognising that the experience of reforms and industry restructuring varies from one jurisdiction to the next.

## Overview of reforms in selected jurisdictions

In the jurisdictions examined within the scope of this study, the water industry was originally comprised of a large number of local government suppliers operating within their boundaries, although the timeframes over which the structure of the industry evolved and the transitional models adopted varied somewhat across these jurisdictions.

For the majority of the jurisdictions examined, there is a high degree of commonality in the key drivers for reform. These interrelated objectives typically included to:

- Address major infrastructure investment deficits that had adversely affected the standard of services being delivered to users;
- Move the supply of water-related services to a more financially sustainable footing;
- Dramatically improve drinking water quality and environmental performance;
- Improve regional co-ordination and facilitate better long-term regional solutions; and
- Achieve economies of scale and avoid duplication of functions and cost.

The fundamental driver of reforms in many jurisdictions (Tasmania, non-metropolitan Victoria, Ireland, and England and Wales, Scotland) was a desire to address evident failures in the performance of local government suppliers in providing water and wastewater services and, in particular, failure to meet drinking water quality and environmental standards, reflecting under-investment and lack of funding associated with inadequate financial capacity.

In some jurisdictions there was also concern about the lack of adequate regional coordination and resource planning. The desire to improve efficiency and financial viability was also an important driver in many of these jurisdictions.

It is important to note that in many cases the current service delivery model was not implemented in a single step as a one-off aggregation of multiple local government suppliers. Rather, structural reform has often involved a transitional pathway, whereby aggregation has occurred progressively, in stages.

All of the jurisdictions covered in this study were subject to reform which has at some point involved the aggregation of what were previously local government owned and operated water supply activities. That said, the timeframe over which these aggregations occurred varied considerably and some are still in relatively early stages of operation (e.g. the water utilities in Tasmania and Ireland).

There are also important differences in the precise models adopted:

- In Tasmania, Ireland, Scotland and Wales the service delivery models involved the eventual establishment of a single supplier for the whole jurisdiction;
- In some cases aggregation of suppliers occurred to a regional level (e.g. England and Wales, non-metropolitan Victoria, Auckland, Wellington<sup>1</sup>);
- In one case (metropolitan Melbourne) the structural reforms involved disaggregation rather than aggregation;
- The ownership and governance arrangements varied considerably under the models adopted:
  - In Tasmania, Wellington and Auckland ownership remained with local government;
  - In Ireland and Scotland ownership now vests with national government while in Victoria water businesses are now owned by the State Government;
  - In England the water utilities were privatised;
  - In Wales Welsh Water is a not-for-profit company limited by guarantee owned by Glas Cymru and is run solely for the benefit of customers; and
  - In Wellington a shared services model (rather than a formal merger) was adopted involving establishment of a joint venture entity, which provides operational and management services for the water and wastewater networks owned by five separate councils.
- The size and precise functions undertaken by these entities varies considerably.
  - Typically, the utilities are responsible for water and wastewater services but not stormwater management, which has largely remained the responsibility of local government.
  - Notably, the water suppliers in Wellington and Tasmania service about 150,000 and 200,000 connections respectively. With the exception of non-metropolitan Victoria, the other water utilities considered in this study are considerably larger.
- An integral element of creating new entities was the establishment of new governance arrangements, with all involving the appointment of independent skills-based boards.

Typically, the structural changes to the urban water sector in the jurisdictions examined were part of a broader suite of reforms applied to the urban water sector (or more broadly to government-owned utilities) in these jurisdictions. The key related reforms included:

- The introduction of independent economic regulation to oversee the prices and services levels provided by the monopoly businesses;

---

<sup>1</sup> Note that Wellington Water's footprint does not cover the whole of the greater Wellington region.

- Environmental and drinking water quality regulation: establishment of independent regulators for these functions; and
- Pricing reforms, which typically involved moves towards full cost recovery and in some cases user pays pricing although in other cases such measures were subsequently abandoned due to community backlash. Rationalisation of diverse pre-existing tariff structures to uniform region-wide tariffs was another common initiative associated with aggregation.

## Summary of key outcomes

This report systematically identifies the potential sources of, and distils the available evidence on, the benefits/costs from aggregation and related reforms in these jurisdictions.

The evidence presented in this report shows there were a range of costs and benefits following aggregation and related reforms to the urban water sector in the jurisdiction examined in this study. The overwhelming balance of evidence is that the reforms have in most cases achieved their objectives, although in some cases this has taken considerable time or is still in progress.

## Costs and efficiencies

In summary, the evidence suggests that aggregation does not reduce total pre-aggregation costs, at least in the short term, but this is an inevitable consequence of improving standards of services and environmental outcomes. A significant driver of reforms in a number of jurisdictions was to facilitate significant catch-up investment in infrastructure. In many cases, the required investment was very large. This does not mean that reforms of the kind pursued were costly and therefore not worth undertaking. Arguably, the significant investments undertaken as part of the reforms were necessary to restore or raise service standards, and the reforms were a means of delivering that required investment. In this regard the often-significant increases in costs following aggregation do not reflect a failure of the structural changes to the urban water sector in these jurisdictions but, rather, an inevitable consequence of improving the standards of services and environmental outcomes which were not previously being achieved.

There is also some evidence that there is typically a short-term increase in operating costs following mergers or aggregations due to the need to incur administrative and legal costs to establish the new entity, invest in new systems, pay out redundancies, etc. The magnitude of these costs can vary significantly depending on the nature and scale of the aggregation.

A key question however is whether the aggregation and related reforms have led to the provision of water and sewerage services more efficiently than they would have been provided in the absence of these reforms – i.e. whether the underlying efficiency of service provision has improved.

There is strong and consistent evidence that the structural and related reforms implemented in the jurisdictions examined in this review have led to significant improvements in productivity and efficiency.

The establishment of new entities in the jurisdictions included in this study clearly led to major transformation in the management of these businesses and the adoption of new systems and processes. It is difficult to conceive that the improved strategic management observed in these examples could have been delivered under the previous industry structures.

A number of the efficiencies achieved following aggregation can be seen as realisation of economies of scale, where average costs fall as scale increases. For example, reduction in corporate overheads, staff rationalisation and elimination of duplicated functions all constitute economies of scale. The evidence tends to suggest that in many cases moving water suppliers towards a more optimal scale can lead to significant cost efficiencies being realised. This does not imply, however, that a greater degree of



aggregation will always result in scale efficiencies. Given the relatively small size of the existing water suppliers in New Zealand, however, it would seem that concerns about potentially inefficient small scale are likely to be more relevant than concerns about inefficiently large scale.

### Customer outcomes

Key areas of interest include impacts on customer bills, service standards, and overall customer satisfaction.

For most of the jurisdictions examined, aggregation was associated with significant increases in average customer bills – but this reflects significant investments in improving customer service standards and compliance with drinking water quality and environmental regulation. In those jurisdictions where the driver for reform was more about efficiency than the roll-out of major capital programs to address previous under-investment, bills tended to fall following structural reforms

It is also important to recognise that a number of other related reforms and initiatives have served to ameliorate the impacts of large cost increases on customers' bills. Structural reform in the water sector has generally been accompanied by regulatory reform and in particular the establishment of independent economic regulation. Scrutiny by independent economic regulators has undoubtedly lowered bills compared to what they otherwise would have been absent economic regulation.

While bills have often increased following aggregation and related reforms, service standards have also generally improved over the same period, although in some cases these improvements are difficult to quantify due to the lack of a pre-reform baseline.

Another key issue of interest is how aggregation and related reforms have affected different groups of customers, and in particular customers in rural and regional urban areas which are typically higher cost to serve. A common feature of many of the aggregations in the jurisdictions examined in this study was a move to harmonise tariffs across the service area – typically involving standardisation of a wide array of pre-existing tariff structures into a common 'postage stamp' pricing regime. As a general rule, this standardisation of tariffs has tended to favour customers in more remote, higher cost areas at the expense of customers in lower-cost, more densely-settled areas. Aggregation provides the scope for funding costly works in more remote regions from a broader funding base, which may otherwise have prevented welfare-enhancing investments being made in certain communities;

Assessing how overall customer satisfaction and perceptions have been affected by aggregation and related reforms is difficult because prior to the reforms there was often no systematic collation of customers' views. This means that even where performance standards have improved, this may not necessarily translate into measures of improved customer satisfaction. One issue which appears to have negatively affected customer and broader public perceptions about reforms in a number of the jurisdictions relates to resistance to more cost-reflective pricing and in some cases the way in which these changes were communicated to customers

### Financial outcomes

One of the key drivers of reforms in many of the jurisdictions examined was to put the provision of water services on a more financially sustainable footing.

There is considerable evidence that the structural reforms in the jurisdictions examined in this study were largely successful in achieving one of their key objectives: enabling the funding of major investment programs (typically to meet drinking water quality and environmental standards).

Most utilities post-merger are in strong financial positions and are self-funded without any central government support.

However, in some of the jurisdictions the operating models adopted after the reform have resulted in businesses which are financially constrained (e.g. in Ireland, the abolition of domestic tariffs has resulted in Irish Water being reliant on the Exchequer).

### **Drinking water quality and environmental outcomes**

The available evidence across the jurisdictions suggests that the aggregation and related reforms have led to improvements in drinking water quality performance which were a key driver of reforms in many of the jurisdictions, although in some cases there is further progress required. In general it is difficult to attribute improvements in drinking water quality to aggregation as opposed to other factors, most notably the introduction of or better enforcement of drinking water quality regulation. However, as the improvements were largely achieved through major investments in water treatment infrastructure, which in turn were clearly enabled by enhanced financial and management capacity following structural reform, it is reasonable to conclude that both structural reform and more effective regulation contributed to the improvements, and that either on its own would be unlikely to have achieved the improvements which occurred.

The available evidence across the jurisdictions also suggests that the aggregation and related reforms have led to improvements in environmental quality performance which were a key driver of reforms in many of the jurisdictions, although in some cases there is further progress required (and improvements in environmental standards have in some case been accorded a lower priority than drinking water quality). Again, it is difficult to attribute improvements in environmental outcomes to aggregation as opposed to other factors, most notably the introduction of or better enforcement of environmental regulation. This is especially true given that some jurisdictions introduced stricter and better managed environmental compliance. However, as the improvements were largely achieved through major investments in wastewater treatment infrastructure, which in turn were clearly enabled by enhanced financial and management capacity following structural reform, it is reasonable to conclude that both structural reform and more effective regulation contributed to the improvements, and that either on its own would be unlikely to have achieved the improvements which occurred. It is also important to note that there can be a significant delay between improved regulatory compliance and improved environmental outcomes, particularly if the receiving environments are in poor condition.

### **Impacts on local government**

One potential concern with aggregation of local government water and wastewater service providers is that it will result in a loss of a revenue source for local governments and/or that there are significant cost associated with the process of aggregation.

In cases where there was a transfer of ownership of water service assets from local government to other parties (from local government to a higher level of government or in England where the industry was privatised), the financial impact varied depending on the financial value placed on the assets transferred and paid in recompense. However, it also needs to be recognised that the transfer of assets also relieves the original local government owners of their ongoing obligations for service provision and investment, and the financial burdens which might have otherwise had to be borne to fund major investments. Indeed, a key driver of reforms in a number of jurisdictions was the inability of local government to fund needed upgrades in infrastructure.

In cases where ownership of the water utility remained with local government, the financial impact on local government will depend critically on the ownership and governance arrangements that were put in place.

Another potential cost of aggregation relates to the perceived loss of control of service provision at a local level as well as concerns about loss of local employment if water-related services are centralised. Again, these impacts will depend heavily on the precise governance and related arrangements which are put in place. The challenge is how to best balance these local impacts with the provision of efficient and effective services. Different approaches have been taken in different jurisdictions

One potential concern with aggregation of local government water and wastewater service providers is that this may lead to a loss of economies of scope with other council functions (e.g. roads and transport, communication, waste management, or recreational services). It has also been suggested that economies of scope also arise from the ability to effectively and efficiently coordinate strategic land use planning and land use development control with infrastructure intensive services such as water supply and sewerage services. Such issues do not appear to have emerged in practice as a major problem in the jurisdictions examined in this study. Indeed, the available suggests that concentration of water-related services within a specialised provider has led to significant performance improvements.

## Key factors affecting outcomes

Given that the structural reforms were in most cases accompanied by a suite of other governance, regulatory and pricing reforms it is impossible to be definitive about the extent to which the observed costs and benefits can be ascribed to aggregation as opposed to these other reforms. In addition, there are a range of external factors independent from institutional changes (e.g. natural events) which contribute to observed outcomes.

### Aggregation/structural reform

While aggregation and related governance changes is clearly not the only driver of the observed improvements in performance, the observed experience suggests that it was key in providing the managerial and financial capacity to undertake the actions required to improve performance. In particular, aggregation appears to:

- Offer opportunities to realise economies of scale;
- Enable critical mass and recruitment of expertise to undertake transformational management;
- More easily facilitate the adoption of regional solutions;
- Enable funding and delivery of large-scale investment programs; and
- Spread the costs across a broader customer base.

The fact that performance improvements were observed in jurisdictions where there were not accompanying regulatory reforms (e.g. Auckland) supports this conclusion. In our view it is inconceivable that the progress that has been made in many of the jurisdictions we have studied would have occurred if only regulatory reforms had been adopted and no structural reforms had been made.

### Complementary regulatory and pricing reforms

Most aggregations have coincided with introduction of complementary regulatory, governance and pricing reforms. These reforms have clearly also been a major driver of improved performance:

- Independent economic regulation has increased pressure on businesses to provide services as efficiently as possible and to focus on customer outcomes;
- More effective governance arrangements have provided clearer direction and discipline on management; and
- Clearer and better enforced drinking water quality and environmental regulation has sharpened focus on achieving compliance with regulatory obligations.

In our view, it is telling that in all of the overseas jurisdictions we have investigated, these sorts of reforms have been rolled out alongside industry aggregation. This is because all of these reforms appear to be complementary. It seems unlikely that simply making organisations larger will on its own result in better management and performance. It is necessary to create the conditions for management to pursue better performance, including through greater regulatory oversight and effective governance.

Equally, it is unlikely that the introduction of independent economic regulation, new governance models and clearer and more effective enforcement of water quality and environmental standards would have achieved the same level of improvements in the absence of structural reform which enhanced the ability of the regulated businesses to comply (or improve compliance). The evidence suggests that the most significant improvements in performance are realised when aggregation goes hand-in-hand with complementary reforms of the kind described above.

### External factors

Clearly the observed costs and benefits following reforms can also be influenced by external factors that are independent of the reforms (e.g. natural events such as drought, earthquakes or floods, climate change). While it is important to take such external factors into account when seeking to attribute observed outcomes to reforms which were adopted, perhaps a more important observation is that aggregation in itself can enhance resilience and the ability to manage such events.

### A combination of regulation and aggregation has driven benefits

A combination of regulation, better governance models and aggregation has driven benefits:

- It is difficult to clearly attribute the impacts of mergers because complementary economic, health and environmental regulatory reforms, as well as clearer and more effective governance arrangements for water service providers, were introduced in most jurisdictions.
- Nevertheless, structural reform is clearly an important driver of a wide range of benefits including more efficient and effective service provision.
- A reform model that best facilitates aggregation, regulation and more effective governance appears to lead to the best outcomes.

### What are the implications for water reform in New Zealand?

While this report has examined a number of service delivery/governance models and related reforms adopted in a number of jurisdictions where local government water suppliers have been aggregated, it is beyond the scope of this review to suggest a preferred model or models for New Zealand.

In any event, our study suggests that no single model is ideal for all circumstances. The experience in other jurisdictions also suggests that it may not necessarily be appropriate to move straight to the final model, as transitional models can help facilitate change and demonstrate benefits, while managing stakeholder concerns.

In addition, a clear lesson is that while structural reform is clearly an important driver of benefits, a reform model that best facilitates aggregation and regulation to achieve its outcomes appears to lead to the best outcomes:

- Structural reforms can provide the *capacity* to deliver performance improvements; and
- Regulatory and governance reforms can provide the ongoing *incentives* to deliver performance improvements.

Another potential implication is that structural and regulatory reform is not a silver bullet to addressing a major capital investment backlog – there is also a need for a clear plan on how the trade-offs between the timeframe to reach full compliance, bill impacts for customers and returns to owners (where relevant), are to be resolved.

Proactively released by the Department of Internal Affairs

# 1 ABOUT THIS REPORT

## 1.1 Contextual background

The New Zealand Government is currently undertaking a cross-agency policy review, led by the Department of Internal Affairs (DIA), to develop options and recommendations for system-wide performance improvements in the water services sector, covering drinking water, wastewater and stormwater (the three waters). The review focusses particularly on:

- Water service delivery/governance arrangements (including funding, finance and capability); and
- Design of regulatory arrangements (health, environmental and economic arrangements).

In November 2018, Cabinet agreed that the government would embark on a staged process of three waters reform over the next 18 months involving policy decisions on:

- System-wide reform of drinking water regulation (as highlighted by the Havelock North incident), and targeted reform of environmental regulation of wastewater and stormwater as a priority by June 2019.
- Service delivery arrangements and economic regulation.

In relation to service delivery arrangements, Cabinet agreed that three high-level options will be the main focus of further analysis and engagement:

- proceed with drinking water and environmental regulatory reforms only, with voluntary, local government sector-led reforms to service delivery arrangements;
- establish a three waters fund to support voluntary service delivery improvements;
- create an aggregated system of dedicated, publicly-owned, drinking water and wastewater providers.

In relation to the third option, aggregation, there are likely to be widely differing views amongst key stakeholders on the desirability of such an approach, and on the relative merits of different aggregation models, of which there are many (e.g. regional or multi-regional models). There is a clear need for robust evidence on the potential benefits or dis-benefits of aggregation to promote more informed debate and decision making.

## 1.2 Purpose and scope of this report

This report distils the real-world experience and outcomes of aggregation and related reforms in the water sector where aggregation and related governance and regulatory reforms have been implemented in a number of jurisdictions. The jurisdictions investigated include Australia (Tasmania and Victoria); Great Britain (England, Wales and Scotland); the Republic of Ireland; and New Zealand (Auckland and Wellington). These jurisdictions were identified by DIA as being most relevant to New Zealand (e.g. all involved aggregation of local government water functions).

This report systematically identifies the potential sources of, and distils the available evidence on, the benefits/costs from aggregation and related reforms in these jurisdictions. The benefits and costs examined include, but are not limited to, the short and longer-term impact of aggregation and related reforms on the following:

- customer pricing, investment, debt, staffing (numbers and capabilities);
- performance against drinking water and environmental standards;
- remote/rural water schemes;

- capital and/or operating efficiencies associated with aggregation; and
- service quality and customer satisfaction improvements.

One potential source of benefits/cost of interest relate to economies/diseconomies of scale and/or scope. This report provides an overview of the available evidence (including the economic literature as well as observed experience) on these economies/diseconomies, recognising that the relationship between scale and cost may vary for different parts of the supply chain (e.g. water and wastewater treatment, distribution networks, retail activities) and that a key issue is whether aggregation is likely to enable these economies to be realised. For balance, we recognise the potential costs associated with aggregation, including the transaction cost associated with mergers as well as potential diseconomies. In addition, we have sought to consider any economies of scope (rather than scale) that come from having the water business as part of local council, which could potentially be lost.

Another potentially important source of benefits from aggregation relates to achieving critical mass and financial sustainability, which in turn may give rise to a range of benefits such as the ability to attract and retain skilled/specialised employees, the ability to enter into competitive contracting of various sorts, and being better able to adapt to new threats or requirements that have a strong element of fixed costs, managing risk associated with climate change, etc). We have assembled the available evidence on whether and to what extent these benefits have been achieved following aggregation in other jurisdictions.

We also recognise that a compelling case for change – in the specific context of aggregating local government water supply functions – needs to extend beyond the economics to encompass broader social and community concerns as well as less tangible impacts. Where feasible we have also sought to assess the available evidence on the impact of aggregations of local government water supply functions on matters such as local government cashflows and the ability to undertake other local government functions.

It should also be recognised that it is difficult to attribute benefits and costs solely to aggregation per se, when aggregation of local government water suppliers has typically been accompanied by complementary institutional, governance and regulatory reform.

The analysis in this report pinpoints the key reasons why reforms in some jurisdictions were effective and others were less so. This provides insights on effective models for implementing reforms and, just as importantly, pitfalls that should be avoided.

### **1.3 Approach to this study**

This study draws on a range of evidence including the economic literature, observed experience in the jurisdictions identified by DIA, relevant published reports and studies, and other available information and anecdotal evidence from our own direct experience.

We have also drawn on a team of consultants and other contacts who have “lived and breathed” water reform in the jurisdictions nominated by DIA over the last two decades, and who have provided first-hand insights.

### **1.4 Structure of this report**

Our report is deliberately structured around key themes or issues of interest rather than being a comprehensive record of the history of reform in each of these jurisdictions for two reasons. Firstly, it is the lessons and themes *across* jurisdictions, rather than the detailed minutiae of reforms in particular

jurisdictions, that are likely to be of most relevance and use to DIA when considering options for reforms in New Zealand. Secondly, not every jurisdiction offers relevant lessons on every issue of interest to DIA. Therefore, the main task of this report is to look across jurisdictions to identify the key lessons that may be relevant to New Zealand—recognising that the experience of reforms and industry restructuring varies from one jurisdiction to the next.

The remainder of this report is structured as follows:

- Section 2 provides an overview of the aggregation and related reforms in the selected jurisdictions noting both the common elements and key differences in the approaches adopted.
- Sections 3 through 7 examine the evidence of the impacts of these changes on various elements of industry performance:
  - Cost and efficiencies (Section 3);
  - Customer outcomes in relation to prices and service quality (Section 4);
  - Financial outcomes (Section 5);
  - Drinking water quality and environmental outcomes (Section 6); and
  - Impacts on other local government functions (Section 7).
- Section 8 examines the key sources and drivers of these outcomes.

Proactively released by the Department of Internal Affairs



## 2 OVERVIEW OF REFORMS IN SELECTED JURISDICTIONS

### 2.1 Overview

This section provides a high-level overview of the nature of the aggregation and related reforms undertaken in the jurisdictions covered in this study. This review has examined the experience in a range of selected jurisdictions which were seen as providing the most insights and were of greatest relevance to New Zealand.

The intent is not to describe the reform models of each of the jurisdictions in detail but rather to highlight the common elements of these reforms as well as points of difference, the process or transition, and what other related reforms were also undertaken in each of the selected jurisdictions.

This section also provides a synthesis of the stated rationales for undertaking the aggregation and related reforms and the structure and general performance of the industry prior to the reforms.

### 2.2 What were the key drivers of reform?

In the jurisdictions examined within the scope of this study, the water industry was originally comprised of a large number of local government suppliers operating within their boundaries, although the timeframes over which the structure of the industry evolved and the transitional models adopted varied somewhat across these jurisdictions. In describing the industry structure 'pre-reform', we have focussed on the time of the key reforms which presaged the current structure.

For the majority of the jurisdictions examined, there is a high degree of commonality in the key drivers for reform. These interrelated objectives typically included to:

- Address major infrastructure investment deficits that had adversely affected the standard of services being delivered to users;
- Move the supply of water-related services to a more financially sustainable footing;
- Dramatically improve drinking water quality and environmental performance;
- Improve regional co-ordination and facilitate better long-term regional solutions; and
- Achieve economies of scale and avoid duplication of functions and cost.

The fundamental driver of reforms in many jurisdictions (Tasmania, non-metropolitan Victoria, Ireland, and England and Wales, Scotland) was a desire to address evident failures in the performance of local government suppliers in providing water and wastewater services and, in particular, failure to meet drinking water quality and environmental standards, reflecting under-investment and lack of funding associated with inadequate financial capacity.

Public reports and policy statements at the time of these structural and related reforms typically acknowledged the need for large-scale investment programs to bring water and wastewater infrastructure to modern day standards and the need for structural reform to be able to deliver these major investment programs.

In some jurisdictions (e.g. Ireland, Wellington, Tasmania) there was also concern about the lack of adequate regional coordination and resource planning. Effective regional planning, rather than a number of smaller organisations with limited capacity and responsibility, can ensure that greater long-term planning, optimisation and compliance of water resources according to regional priorities is met. This is discussed further in section 3.4.

The desire to improve efficiency and financial viability was also an important driver in many of these jurisdictions (and in the case of the Melbourne metropolitan water sector was the key motivation).

A brief summary of the key features of aggregation in each of the jurisdictions is provided in **Table 1** at the end of this subsection. Below, we discuss briefly the main reforms that occurred in each jurisdiction.

### 2.2.1 Australia

The situation in Tasmania (see Box 1: ) is representative of the problems the structural reforms to the sector were seeking to address.

#### **Box 1:** Water industry performance in Tasmania pre-reform

Before the water industry reform in Tasmania, the 29 councils across Tasmania performed all water and wastewater services for connected properties.<sup>2</sup> The main drivers for reform were the non-compliance of many drinking water schemes and wastewater treatment plants and underfunding of capital works more generally. Many of the 29 councils were failing to meet drinking water quality and environmental standards. In 2005 an assessment by Engineers Australia ranked Tasmania as having the worst water and wastewater infrastructure in the country.

The Tasmanian Government established a Ministerial Water and Sewerage Taskforce to undertake a wide-ranging review of the industry in 2006. The review found that the industry was performing poorly:

- There was limited compliance with modern day drinking water standards: 23 Tasmanian towns were on permanent boil water alerts (some of which were key tourist towns in the State);
- Environmental performance was poor: low levels of compliance with standards for Level 2 Wastewater Treatment Plants<sup>3</sup>;
- Half the service providers had not undertaken voluntary asset condition assessments and approximately 70% did not have strategic asset management plans;
- Approximately 15,000 properties on the urban fringes in Tasmania with a block size of less than 1,500 square metres were not connected to reticulated sewerage networks who could generally expect to be connected to the network.
- Financial returns for the sector (in the order of 2% to 4%) were inadequate for servicing debt, resulting in under-investment in services.

The review estimated that investment of around \$1 billion was needed over a 10-year period to bring services up to contemporary standards and to accommodate anticipated network growth.

<sup>2</sup> According to the Australian Bureau of Statistics, Tasmania had a population of approximately 520,000 people as at 30 June 2018.

<sup>3</sup> 'Level 2' STPs are wastewater treatment plants with a design capacity to treat an average dry-weather flow of 100 kilolitres or more per day of sewage or wastewater.

The Taskforce concluded that both structural and regulatory reform of the sector was required to bring it to a sustainable footing.

*Source: Ministerial Water and Sewerage Taskforce*

The reforms in Tasmania were to some extent driven by precedent elsewhere in Australia, most notably Victoria.

During the 1970s, urban water and sewerage services across Victoria were provided by hundreds of water trusts, sewerage authorities and local councils. In contrast, a single entity (the Melbourne and Metropolitan Board of Works) serviced Melbourne.

While there was some rationalisation of the council suppliers over the 1980s, by the early 1990s there were still about 120 different water authorities across Victoria providing a range of water, sewerage and waterway management functions. In addition, Melbourne Water was formed by the merger of Melbourne and Metropolitan Board of Works and a number of smaller urban water authorities in 1992.

The structural, regulatory and governance reforms which paved the way for the current urban water sector in Victoria occurred from the mid-1990s when the number of urban water authorities was reduced to around 20 and there was final separation of water authorities from local councils.

While reforms affected urban water services across the whole State, the drivers of the reforms and the nature of the reforms varied markedly between the non-metropolitan (outside Melbourne) and metropolitan (Melbourne) sectors.

While regulatory and governance reforms applied to all suppliers, the structural changes involved aggregation in the non-metropolitan sector but disaggregation in the Melbourne metropolitan sector.

The drivers for amalgamations of the non-metropolitan water authorities were described at the time as follows:<sup>4</sup>

*Authorities are to be encouraged to amalgamate with the eventual aim of catchment focused non-metropolitan urban water authorities. The Government will create incentives to amalgamate and it is clear that for many non-metropolitan urban water authorities to do so will be in the best interests of the authority and its customers.*

*Amalgamation should result in an estimated \$10 million annual savings through more co-ordinated management.... Another consideration is the level of future capital expenditure requirements. At present, much of the drinking water in this sector fails to meet accepted public health standards. Requirements to raise standards due either to Government policy or increased customer expectations, is likely to result in capital expenditure requirements beyond the capacity of the small customer bases of many existing authorities. Government assistance will not be as freely available as in previous years. However, economies of*

<sup>4</sup> State Government of Victoria Office of State-Owned Enterprises, Department of the Treasury (1993), Reforming Victoria's Water Industry A Competitive Future - Water,

*scope and scale mean that larger authorities will be better able to meet capital requirements internally.*

*Apart from the administrative economies to be gained, the future need for expert technical and scientific capabilities will increase to the point where small authorities will be unable to afford sufficient competence of their own.*

*Thus economies of scale, through better use of capital and support capabilities, will improve efficiency, service and importantly, water quality.*

Further amalgamations have occurred over the last 10 years. For example, Glenelg, Portland Coast and South West Water merged in 2006 to form Wannon Water, motivated by reaching a critical mass to deliver regional capital works programs and to meet more stringent regulatory standards.<sup>5</sup>

In contrast, the reforms to the metropolitan sector implied a view that the scope of Melbourne Water's activities had become too large. As part of a broader Government program of reform to government-owned business enterprises, in 1995 Melbourne Water was disaggregated to form one water and sewer wholesaler and waterways manager (Melbourne Water), three retail water businesses (City West Water, South East Water and Yarra Valley Water) and a parks and waterways recreation authority (Melbourne Parks and Waterways later to become Parks Victoria). The key drivers were a desire to improve efficiency and customer focus by creating retail businesses that would be more accessible to and focussed on their customers.<sup>6</sup>

*While Melbourne has long enjoyed safe drinking water, historically, some areas of the water industry have been inefficient and characterised by overstaffing, poor productivity, over investment and capital misallocation. In particular, the industry has a high level of outstanding debt and annual debt servicing costs.*

*The reforms are aimed at overcoming these problems and achieving long term, public benefit. The reforms introduce commercial measures that will improve customer services and ensure a healthy, long term future for the metropolitan water industry.*

### **2.2.2 England and Wales**

The development of the water sector in England and Wales was also driven by a desire for more viable suppliers and in particular the need to finance major investments to meet EU standards for drinking water quality and the environment.

In 1945 there were more than 1,000 bodies involved in the supply of water and around 1,400 bodies responsible for sewerage and sewage disposal. Most of these were local authorities, but there were also

<sup>5</sup> Wannon Water Annual Report 2006

<sup>6</sup> VOSOE 1995, p. 17

several statutory private water companies. Planning for water resources was a highly localised activity, with little co-ordination at either a regional or national level.

The Water Resources Act 1963 was in response to a severe drought in 1959 and flooding events in 1960. The Act recognised the importance of a co-ordinated approach to water resource planning and introduced an administration system for the right to remove groundwater ('abstraction permits'). This was intended to make sure that existing and future water resources were adequately conserved.

There was some consolidation during this period and greater investment in the form of grants from central government, water supply and sewerage services were still provided on a local basis. Responsibility in any one area lay with one of a number of different types of organisation:

- individual local authorities (water and sewerage);
- joint organisations covering the areas of two or more local authorities (water and sewerage); and
- statutory private water companies which were set up by Act of Parliament (water supply only).

In the early 1970s ongoing concerns with water resource planning and future demand growth led to further restructuring. The Water Act 1973 established 10 new regional water authorities. These authorities were responsible for managing water resources and supplying water and sewerage services on a fully integrated basis. These authorities took over control of the services that local authorities had previously been supplying. The area that each water authority covered was broadly based on river catchment areas. Existing statutory private water companies were unaffected by the changes.

The Water Act 1973 required the regional water authorities to operate on a cost recovery basis. Capital to meet the necessary investment was raised by borrowing from central government and from revenue for the services provided. However, it was difficult for water authorities to invest significantly in their assets, largely due to tight fiscal controls and general economic instability. For example, the government permitted the water industry in 1982 to spend only half of the total capital investment spent in 1974.<sup>7</sup> Water utilities started to borrow less with a lack of debt financing and resulted in insufficient investment. Additionally, the structure of the authorities meant that they were responsible for both discharging treated water into the environment and monitoring discharges into the environment.

Therefore, in the Water Act 1983 the government reduced the role of local government in decision making and gave the authorities scope to access the private capital markets. This did not result in a significant decrease in the number of pollution incidents as water quality advisory panels were largely ineffective and water utilities were unwilling to self-regulate. There was also little desire to provide any additional public finance to meet the demand for capital investment.

Concurrent to these developments, external environmental reporting showed that river quality deterioration was outpacing any quality improvements for the first time since 1958, and in 1988 11% of sewerage failing lenient discharge permit requirements. Following these environmental breaches, the European Community started prosecution proceedings against the government against non-compliance, which Ofwat acknowledges as a major factor for reform in 1989.<sup>8</sup> Indeed, in the 1980s the UK as a whole was seen as the 'dirty man of Europe' for the poor quality of its natural environment. Inland and bathing water quality were extremely low. In some waters, widespread pollution affected even the most resilient ecosystems.

With the government unwilling to fund increased investment requirements from an increase in taxes or increased borrowing, privatisation started to be considered. This followed privatisation of British Telecom and British Gas in 1984 and 1986 respectively. An initial discussion paper released in 1986

<sup>7</sup> Ofwat, 2006, The development of the water industry in England and Wales

<sup>8</sup> Ofwat, 2006, The development of the water industry in England and Wales

signalled the intentions of the government to privatise water, and after developing frameworks for regulation and transfer the government transitioned the existing water utilities to privatised water businesses under the Water Act 1989.

### 2.2.3 Scotland

In 1975, there were nine Scottish Regional Councils who controlled the public water supply and sewage disposal of the country. The Regional Councils were then replaced with three new Scottish Water authorities, East, West and North of Scotland Water, in 1996. This reform was motivated by three factors:<sup>9</sup>

- Consolidation was to reach a critical mass in capital investment to meet EU drinking water and wastewater standards. According to the Scottish Office in 1992<sup>10</sup>, who regulated water utilities before the just after the merger, £5 billion was required over a period of 15 years was required to update infrastructure to ensure compliance. This was due to inefficient and inadequate investment of Scottish councils
- The government at the time wanted to limit increases in public sector borrowing requirements, and sought a restructure to facilitate private financing options for water businesses
- Earlier reform in England and Wales signalled that the Scottish water industry may be too fragmented. Anecdotal evidence from aggregated water service providers across the border suggested that significant managerial, technical and financial economies of scale could be captured in Scotland.

### 2.2.4 Republic of Ireland

In Ireland, prior to 2014, water and wastewater services were provided by 34 local authorities to the approximately two million homes and two hundred thousand business premises in Ireland. There were several issues identified with the previous structure that were the catalyst for reform:

- **Low levels of investment:** Local authorities were primarily reliant on Exchequer funding for water and wastewater investment, as there were no tariffs on domestic water services. Inability to access alternative sources of funding had resulted in substantial and historic under-investment in water and wastewater services.
- **Cost efficiencies:** Cost efficiencies did not compare well against international benchmarks. This was likely driven by:
  - underinvestment, which meant that higher levels of operating expenditure (e.g., in the form of higher maintenance works) were required to operate sub-scale and aging capital assets;
  - fragmented operations resulting in significant levels of duplication across local authorities; and
  - difficulties in achieving economies of scale, especially for cross-county projects.
- **Lack of cooperation on strategic initiatives:** This fragmented model posed challenges for delivery of strategic or national infrastructure programmes, or strategic initiatives such as in relation to water quality.
- **Water quality:** The European Water Framework Directive (WFD) is a key initiative aimed at improving water quality throughout the EU. It applies to rivers, lakes, groundwater, and coastal waters. The Directive requires an integrated approach to managing water quality on a river basin basis; with the aim of maintaining and improving water quality. It is expected that it will cost Ireland

<sup>9</sup> J.W. Sawkins, V.A. Dickie, Regulating Scottish Water, Utilities Policy 8 (1999) 233–246

<sup>10</sup> The Scottish Office, 1997. Drinking Water Quality. The Scottish Office, Edinburgh.

several billion euro to reach full compliance with the Water Framework Directive by 2027. The previous model was seen as an inhibitor in achieving this compliance.

### 2.2.5 Auckland

The establishment of Watercare was part of a large-scale reform of council structures in the Auckland region after the Royal Commission on Auckland Governance. Most of these reforms were driven by what has been described as an “infrastructure deficit” by various Royal Commission submissions, where the segmentation of councils inhibited longer term planning for growing populations. Along with Watercare, other council-controlled organisations were introduced, including Auckland Transport and Auckland Council Investments Ltd.

Under the previous industry model, retail water distribution was undertaken by the six councils of the region, with bulk water supply and wastewater managed by the Auckland Regional Services Trust (ARST). The ARST owned and managed bulk water and wastewater assets, but stormwater was managed by local councils.

### 2.2.6 Wellington

Prior to 2004, the Greater Wellington Regional Council managed bulk water assets and supplied bulk water to a number of councils in the Wellington region. These councils then had responsibility for delivering potable water through their own distribution networks to end customers; collecting, treating and disposing of wastewater; and collecting and disposing of stormwater. In doing so, most asset management functions were undertaken by councils in-house, while larger scale infrastructure work and management of wastewater treatment was typically outsourced to third parties.

In the late 1990s, Wellington City Council and Hutt City Council commenced consultation on the possibility of merging their council roles under a joint water management unit, motivated by establishing greater regional management of three waters, economies of scale and removing duplication of effort. In 2004 Wellington City Council and Hutt City Council established a joint venture entity called Capacity Infrastructure Services. This entity provided operational and management services for the water wastewater and stormwater networks operated by Wellington City Council and Hutt City Council.

Emerging evidence on the benefits of centralised provision of operational and management services by the joint venture (e.g. the Controller and Auditor General in 2004 suggested savings from economies of scale and labour costs) motivated the other councils of Upper Hutt and Porirua City to also participate in the joint venture (but to retain ownership of their own networks). Wellington Water was established in September 2014 as a result of a merger between Capacity Infrastructure Services and Greater Wellington Regional Council's bulk water supply group.

## 2.3 What models of aggregation/service delivery were adopted?

All of the jurisdictions covered in this study were subject to reform which has at some point involved the aggregation of what were previously local government owned and operated water supply activities. That said, the timeframe over which these aggregations occurred varied considerably and some are still in relatively early stages of operation (e.g. the water utilities in Tasmania and Ireland).

There are also important differences in the precise models adopted:

- In Tasmania, Ireland, Scotland and Wales the service delivery models involved the eventual establishment of a single supplier for the whole jurisdiction;

- In some cases aggregation of suppliers occurred to a regional level (e.g. England and Wales, non-metropolitan Victoria, Auckland, Wellington<sup>11</sup>);
- In one case (metropolitan Melbourne) the structural reforms involved disaggregation rather than aggregation;
- The ownership and governance arrangements varied considerably under the models adopted:
  - In Tasmania, Wellington and Auckland ownership remained with local government;
  - In Ireland and Scotland ownership now vests with national government while in Victoria water businesses are now owned by the State Government;
  - In England the water utilities were privatised;
  - In Wales Welsh Water is a not-for-profit company limited by guarantee owned by Glas Cymru and is run solely for the benefit of customers; and
  - In Wellington a shared services model (rather than a formal merger) was adopted involving establishment of a joint venture entity, which provides operational and management services for the water and wastewater networks owned by five separate councils.
- The size and precise functions undertaken by these entities varies considerably.
  - Typically, the utilities are responsible for water and wastewater services but not stormwater management, which has largely remained the responsibility of local government.
  - Notably, the water suppliers in Wellington and Tasmania service about 150,000 and 200,000 connections respectively. With the exception of non-metropolitan Victoria, the other water utilities considered in this study are considerably larger.
- An integral element of creating new entities was the establishment of new governance arrangements, with all involving the appointment of independent skills-based boards.

## 2.4 How was aggregation staged?

It is important to note that in many cases the current service delivery model was not implemented in a single step as a one-off aggregation of multiple local government suppliers. Rather, structural reform has often involved a transitional pathway, whereby aggregation has occurred in stages. For example:

- In Tasmania, the 29 local government water suppliers were first merged into three regional suppliers and a shared services entity in 2009, before being merged into a single state-wide utility in 2013 (see Box 2: ).
- In regional Victoria, aggregation occurred progressively over decades from the 1970s when urban water and sewerage services were provided by hundreds of water trusts, sewerage authorities and local councils, through the 1980s when there was rationalisation of the council suppliers to about 120 different water authorities across Victoria, to the mid-1990s when the number of regional urban water authorities was reduced to around 13 and there was final separation of water authorities from local councils.
- In metropolitan Melbourne, Melbourne Water was formed in 1992 after the merger of Melbourne and Metropolitan Board of Works and a number of smaller urban water authorities. This was then vertically and horizontally disaggregated in 1995 to form three water retailers (City West Water, Yarra Valley Water and South East Water) whilst Melbourne Water remaining as the wholesale bulk water, sewer and waterways manager.

<sup>11</sup> Note that Wellington Water's footprint does not cover the whole of the greater Wellington region.



- In Scotland in 1975 there were nine Scottish Regional Councils, who provided public water supply and sewage disposal services. The Regional Councils were then replaced with three new Scottish Water authorities, East, West and North of Scotland Water, in 1996, which were in turn merged in April 2002 to form a single provider of water services in Scotland, Scottish Water (see Box 3).
- In Wales the water industry was restructured in 1973 when the Welsh National Water Development Authority took over water and wastewater functions of a large number of water boards and local government authorities. Welsh Water was established in 1989 when this authority was privatised. In 1996 Welsh Water took over a local electricity company and became a water and electricity multi-utility known as Hyder. It was subsequently purchased in 2000 by Western Power Distribution which then sold the water business to Glas Cymru in May 2001.
- In Ireland, a staged approach was taken, whereby transfer of control of service provision from local authorities to Irish Water is being undertaken over many years (see Box 4: ).
- In Auckland, Watercare became an integrated service provider responsible for all water and wastewater services in the Auckland region, integrating previous Local Network Operators.
- In Wellington, the aggregation has involved sharing only certain functions (i.e. management services) through establishing a joint venture while asset ownership has remained with individual councils, and initially only entailed two councils but subsequently extended to more councils in the Wellington region and may extend to others in the future.

Proactively released by the Department of Internal Affairs

**Table 1:** Summary of key features of aggregation that occurred in different jurisdictions

JURISDICTION	LEVEL OF AGGREGATION	OWNERSHIP AND GOVERNANCE	CUSTOMERS	REVENUE	WATER SUPPLIED	SERVICES SUPPLIED
Tasmania	Consolidated 29 local council suppliers to a single, vertically integrated entity (TasWater)	Councils own defined shares and State Government owns a 10% share. A representative group appoints an independent board	204,949 connected properties	\$336 million AUD (2018)	56,156 ML per annum	Water and wastewater. Stormwater remains responsibility of local councils.
Victoria (Metropolitan)	Disaggregated one vertically integrated entity to one bulk water supplier and three retail suppliers	Owned by Victorian State government and governed by independent boards	Each retail business serves between 1.027 million and 1.86 million connected properties	Between \$671 million and \$1005 million AUD (2017)	Between 116,000 and 154,000 ML per annum	Bulk water supplied, and wastewater treated by Melbourne Water, retail functions and distribution performed by retailers. Large stormwater catchment is managed by Melbourne Water with councils taking smaller roles
Victoria (Non-Metropolitan)	Consolidated hundreds of council providers into 13 vertically integrated entities	Owned by Victorian State government and governed by independent boards	The businesses each serve between 17,000 and 304,000 connected properties	Between \$20 million and \$216 million AUD (2017)	Between 2,000 and 59,000 ML per annum	Water and wastewater. Stormwater managed by ten catchment management authorities
Ireland	34 local authorities merged into one vertically integrated entity (Irish Water)	Owned by Irish government and governed by independent board. Local representation remains advisory bodies	1.56 million connected properties	€1.013 billion EU (2018)	620,000 ML per annum	Water and wastewater. Local authorities manage stormwater
England	Transitioned from hundreds of providers to ten publicly owned water authorities to now ten privatised water and sewerage companies	Various private company models. Regulated by Ofwat	3.41 million (Thames) to 535,000 (Wessex) connected properties (WASCs)	£2.027 billion (Thames) to £224 million (Wessex) GBP (2014)	938,000 ML (Thames) to 120,450 ML (Wessex) per annum	Water and wastewater. Stormwater managed by local authorities.

	(WASCs) and six water only companies (WACs)					
Wales	Single supplier across Wales	Not-for-profit company limited by guarantee	1.4 million connected properties	£756 million (2017/18)	302,220 ML per annum	Responsible for water, wastewater and public surface water sewers
Scotland	Consolidated nine regional councils into one vertically integrated entity (Scottish Water)	Publicly owned by Scottish Government, but overseen by independent board	2.52 million connected households	£1.191 billion GBP (2018)	503,700 ML per annum	Water and wastewater. Stormwater responsibility split between councils, road authorities and Scottish Water
Auckland	Vertically integrated one bulk water supplier and six retail authorities in Watercare Services	Owned by Auckland Council, and governed by independent board	435,000 connected properties	\$641.6 million NZD (2018)	133,225 ML per annum	Water and wastewater. Stormwater managed by Auckland City Council and Auckland Transport
Wellington	Management & advisory services for four local councils (including Wellington City and some surrounding local councils) and one regional council provided by one regional entity Wellington Water	Equally owned by five councils in Wellington region. Independently governed but councils still have control of their water services.	Approx. 153,000 connected properties	\$153.9 million NZD (2018)	51,100 ML per annum	Water, wastewater and stormwater under a "trusted advisor model." Local councils ultimately still have control over water services

Source: Frontier Economics

**Box 2:** Approach to establishing Taswater

Water service aggregation in Tasmania began in 2009, where 29 local council suppliers were aggregated to three local government-owned regional entities (supported by a shared services entity) which commenced operations on 1 July 2009. The model was implemented through the Water and Sewerage Corporations Act 2008, which created the three regional corporations, Ben Lomond Water, Cradle Mountain Water and Southern Water and the common services corporation, Onstream. The three Regional Corporations managed the transfer of some \$2 billion in water and sewerage assets from the previous ownership by 29 councils, three bulk water authorities and some state government agencies with the transfer of some 615 staff. Independent skill-based Boards were appointed for each corporation, which each paid tax equivalent payments, loan guarantee fees and dividends to its owners.

The establishment of these new entities did not lead to an immediate improvement in performance nor was it met with universal acclaim. According to Sanderson and Wardlaw<sup>12</sup>, the performance of these corporations was poor and Councils generally did not support the new bodies once staff, assets and information was transferred. In October 2010 the Tasmanian Parliament established a select committee to investigate and report on the operation of the new water and sewerage corporations, which followed with the recommendation that the existing four corporations be aggregated into a single State-wide organisation.

The Water and Sewerage Corporation Act 2012 established the Tasmanian Water and Sewerage Corporation Pty Ltd (TasWater) which commenced operations on 1 July 2013, where the previous water corporations were dissolved and all assets transferred to Taswater. Each council took up a shareholding in the new entity, with the relative shares reflecting the value of the assets contributed by each.

Specific governance arrangements were agreed which were intended to provide guidance to TasWater as to how the local governments' interests should be taken into account by TasWater but without day-to-day intervention in its operations. The key features include:

- Each of the councils holds a defined share in the corporation.
- Establishment of an Owners' Representatives' Group (ORG) comprised of one representative from each of the 29 councils.
- Owner councils determined that the Board should comprise a Chairman and six non-executive directors, who should be skills based and independent and appointed by the Board Selection Committee, under delegation from the Owners' Representatives' Group.
- Specific instruments which set out the Owners' expectations of TasWater including balancing of commercial imperatives with regional impacts and state-wide economic objectives.
- Provisions governing payment of dividends to the owners.

In 2018, the Tasmanian Government prepared a Bill which would transfer ownership of TasWater to the State. While this did not proceed, TasWater subsequently agreed with the State Government for it to take a 10% shareholding in the company in return for a \$200 million equity injection over the next decade.

*Source: Frontier Economics*

**Box 3:** Approach to establishing Scottish Water

The initial reform to aggregate councils into three water providers in Scotland was subject to significant consultation, where a privatised model similar to England and Wales was rejected in favour of a public-ownership model.<sup>13</sup> The three public water authorities were accompanied with a new Economic Regulator, the Scottish Water and Sewerage Customers Council (SWSCC).

The Water Industry Commission for Scotland (WICS) then replaced the functions of the SWSCC and the Scottish Office, who had regulated large capital investments. WICS conducted reviews of the three water authorities to regulate their charges and found significant losses in attempting to finance capital expenditure. These financial losses had led to the water industry worth £500 million less than the combined outstanding debts.<sup>14</sup> Reviews of charges by WICS found that significant increases in price tariffs were required to meet capital investment requirements, especially in the North with disperse customer bases and infrastructure.<sup>15</sup> These reviews were a catalyst to merge the three retailers, such that to harmonise tariffs across the country to prevent large increases in bills in high cost areas.

Further consultation with the introduction of Scottish Water in 2002 reiterated the importance for public ownership of water supply assets. Scottish Water was established as a 'public corporation of a trading nature'.<sup>16</sup> The firm is to behave as though it operates in the private sector and so is expected to cover its costs from the charges levied on consumers. Unlike a private company, the company is not owned by shareholders and it does not pay dividends either. WICS allowed Scottish Water £200 million in the recoverable revenue allowance in a one off Spend to Save programme, to cover one-off transformation and restructuring costs that would reduce future annual operating costs. These costs included business transformation (£54 million), new capital investment (£44 million) and staff severance costs (£84 million).<sup>17</sup> As WICS allowed these costs to be recovered, they were transferred onto customers through water tariffs in the hope it would reduce bills in the medium term.

Source: Frontier Economics

<sup>12</sup> Sanderson, Ron and Wardlaw, Stuart, 2015, Structural Reform in Tasmania, in: *Dollery, Brian and Tiley, I Perspectives on Australian Local Government Reform*, The Federation Press: Sydney, pp 8-29

<sup>13</sup> J.W. Sawkins, V.A. Dickie, *Regulating Scottish Water*, *Utilities Policy* 8 (1999) 233–246

<sup>14</sup> Ioris, A, 2008, Water Institutional Reforms in Scotland: Contested Objectives and Hidden Disputes, *Water Alternatives* 1 (2), pp 253-270

<sup>15</sup> Water Industry Commissioner for Scotland. (1999). *Strategic Review of Charges 2000–2002*

<sup>16</sup> Overview of the water industry in Scotland, Audit Scotland, October 2005, page 6.

<sup>17</sup> Scottish Water 2004/05 Annual report.

**Box 4:** Approach to establishing Irish Water

Irish Water is owned by the state-owned utility company, Ervia, which in 2014 was called Bord Gáis Networks. Ervia now has two main subsidiary companies: (the renamed) Gas Networks Ireland and Irish Water. The rationale for creating a utility with both gas and water businesses was to drive further economies of scale through shared services at the corporate level. It was also thought that a utility of scale could better attract experienced and qualified managers, which would be required for the type of capital roll-out envisaged for Irish Water.

Upon establishment, Irish Water took over full control of capital projects from local authorities. Irish Water inherited responsibility, assets and functions from the previous local authority model. This involved the transfer of €11 billion in assets to Irish Water in January 2014.

Upon establishment, it was also recognised that it would take time for Irish Water to build the required capacity and to develop a unified approach to the water sector. Therefore, Irish Water was required to enter into Service Level Agreements (SLAs) with each local authority for the delivery of water and wastewater services. Those SLAs run for a period of 12 years. This collaborative approach was enabled by the Water Services (No.2) Act 2013, which also sets out the statutory protections for the terms and conditions and pensions of workers, should these agreements be terminated. This facilitates the local provision of water and wastewater services in partnership with Irish Water. SLA costs were initially about 74% of Irish Water's operating expenses, with its proportion decreasing as over time service provision is passed over to Irish Water. These SLAs were intended to provide greater certainty for local authorities and existing staff, and retain some of the advantages of the existing model. However, as discussed below, SLAs may have impeded Irish Water's ability to maximise efficiency gains.

*Source: Frontier Economics*

## 2.5 What other reforms were implemented?

Typically, the structural changes to the urban water sector in the jurisdictions examined were part of a broader suite of reforms applied to the urban water sector (or more broadly to government-owned utilities) in these jurisdictions—with the notable exception of Wellington, where the formation of Wellington Water was largely an initiative of the relevant local governments to improve urban water planning and service provision.

The key related reforms included:

- The introduction of independent economic regulation to oversee the prices and services levels provided by the monopoly businesses (Tasmania, Victoria, Ireland, England and Wales, Scotland);
- Environmental and drinking water quality regulation: establishment of independent regulators for these functions; and
- Pricing reforms, which typically involved moves towards full cost recovery and in some cases user pays pricing (e.g. Tasmania, Victoria) although in other cases (e.g. Ireland) such measures were subsequently abandoned due to community backlash. Rationalisation of diverse pre-existing tariff structures to uniform region-wide tariffs was another common initiative associated with aggregation.

Some additional initiatives have been undertaken to supplement the original structural and regulatory reforms. Of particular note is the adoption of a 20-year Long Term Strategic Plan (LTSP) developed by TasWater in 2016 as a basis for reaching consensus with key stakeholders (including the health and

environmental regulators, State government). The plan aims to set an outline for the investment necessary to meet the regulatory and compliance standards, as well as the trade-offs required to achieve such standards. Overall, the LTSP provides direction for TasWater over the next 20 years, as well as acting as a focus point, reflective of the organisation's targets, customer preferences and customer support. The LTSP links strategic objectives with proposed works and improvements and has been designed to guide ongoing capital planning and the development of all future Price and Service Plans (PSPs).

### 2.5.1 Australia

The reforms in Tasmania provide a good example of how reform of the service delivery model was part of a comprehensive reform program. In addition to the structural reform of the sector, independent economic, health and environmental regulation was introduced as was reform of the tariff structures across the State. As noted in the Second Reading Speech for the Water and Sewerage Industry Act 2008:

*This bill, the water and Sewerage Industry Bill 2008, provides for the establishment of enhanced regulatory arrangements for Tasmania's water and sewerage sector. It forms part of a new framework that will meet the growing challenges ahead for the sector in Tasmania... the Water and Sewerage Bill 2008 supports the sustainable operation of the water and sewerage sector and the protection of customers through ensuring that services will meet community and business needs both now and into the future...*

*... the current regulatory framework is not driving service providers to meet accepted modern environmental and public health standards and does not have the proper mechanisms in place to ensure that appropriate outcomes are achieved. Additionally, financial returns in the sector are at a level which does not support long-term sustainability or, importantly, the appropriate use of debt to fund these long-life assets.*

*Investment approaching \$1 billion over the next decade is required just to bring the sector as a whole up to an appropriate standard. Further, Tasmania's water and sewerage service providers have not been subject to direct price regulation... Such price regulation will achieve more sustainable outcomes, thereby driving critical investment in areas in which it is most needed and valued.*

*This bill represents a significant reform for the water and sewerage sector, though its provisions are not unique to this sector in other jurisdictions, or to other monopoly network infrastructure. It is, however, an accepted regulatory framework that has operated in other jurisdictions for more than a decade. What we have done is to use the experience in other states to develop a best-of-breed framework which provides the right balance of flexibility, protection and clarity for licensed businesses and for customers. This is a solid platform upon which we can move this sector to a self-sustaining footing.... this bill provides for*

*improved management of the water and sewerage sector through a significantly more accountable, transparent and enhanced regulatory framework.*

The framework for independent economic regulation was established under the provisions of the Industry Act and regulations under that Act, to be administered by the independent Tasmanian Economic Regulator (OTTER). OTTER has the power to regulate pricing service standards and long-term investment in water and sewerage infrastructure. This framework aims to ensure competitive market outcomes in relation to both price and service while ensuring the financial sustainability of the regulated businesses. The Industry Act provides for the establishment of an economic regulatory framework for the provision of water and sewerage services including:

- A licensing regime, requiring any person or entity owning or operating water and sewerage infrastructure, or supplying water or sewerage services to others to be licensed, unless otherwise exempted;
- An independent Economic Regulator for the sector with clear accountabilities and responsibilities to ensure effective and efficient outcomes for the sector and the protection of customers;
- A customer service standards framework for the sector, including a Customer Service Code, to ensure that service providers meet a minimum level of service;
- Independent pricing regulation of the sector with service providers required to submit a price and service plan to the Economic Regulator to outline the services, revenue requirements and operational requirements of the service provider (the plan to be the basis upon which the Economic Regulator makes a price determination);
- The Economic Regulator to be guided by legislated pricing principles when making a price determination, including the principle of two-part pricing for water services;
- An annual state of the industry report prepared by the Economic Regulator in consultation with the other industry regulators (on matters including customer service, water quality, financial performance, environmental and water management) and service providers; and
- The regulatory framework to require mandatory asset management planning in the sector (this requirement is formalised as a condition of the operating licences issued by the Economic Regulator).

In addition to pricing, the Economic Regulator is responsible for regulating service standards and conditions of supply. In this regard, the Economic Regulator has issued a Customer Service Code (the Code) as required under the Industry Act.

Amongst other things, the Regulator is required to monitor the performance of the industry and report on the performance of regulated entities through the publication of an annual water and sewerage State of the Industry Report. This report is intended to perform a significant role in maintaining public accountability of the providers of water and wastewater services in Tasmania by providing a comprehensive, independent review of the service standards, quality, reliability and pricing of the industry in the State. For the purposes of this review, the annual reports published since 2007 provide a valuable source of data on how performance of the industry has changed since aggregation and related reforms were implemented around a decade ago.

Similar reforms were undertaken in Victoria, where as part of the restructuring process (in conjunction with the privatisation of the energy industry), the Government established the Office of the Regulator-General, which later became the Essential Services Commission (ESC). On 1 January 2004, the ESC became the economic regulator for all water businesses in Victoria.



- A key part of this regulatory framework, particularly for the metropolitan sector, was the establishment of 'competition by comparison' whereby the regulator was to develop and oversight a reporting regime which establishes comparable performance measures and ensure publication of relevant data at least annually.
- A system of operating licences overseen by the economic regulatory was also established. The principal conditions of the licences cover provision of services, performance standards (e.g. water quality, effluent discharge, service interruptions, water pressure, customer protection), oversighting of pricing, customer service guarantee, customer liaison and penalty provisions.
- Another key reform was a move towards user pays pricing which involved progressively removing the link between water bills and property value rates and replacing it with a two-part tariff comprising a fixed charge and a volumetric charge for every unit of water consumed.

### 2.5.2 England and Wales

In England and Wales, three separate, independent bodies were established to regulate the activities of the water and sewerage companies. These were:

- the National Rivers Authority (replaced by the Environment Agency in 1996) – which took over the remaining functions, assets and staff of the water authorities as the environmental regulator;
- the Drinking Water Inspectorate – as the regulator of drinking water quality; and
- the Office of Water Services (Ofwat) – as the economic regulator.

These bodies also regulated the statutory private water companies (the water only companies).

The process of privatisation also changed the way the companies were regulated and controlled. The private companies were subject to economic regulation by Ofwat. Ofwat set revenue controls every five years that aimed to ensure that companies did not exploit their monopoly positions while incentivising the companies to reduce costs and become more efficient. Companies were also incentivised to improve quality of service (covering supply interruptions, leakage, pollution incidents, sewer flooding, customer service, etc).

### 2.5.3 Scotland

In Scotland the water sector is subject to economic regulation by the Water Industry Commissioner for Scotland (WICS), which was established in 1999. WICS operates similar approaches to Ofwat, though it has evolved and adapted the methodologies to suit the public ownership structure in Scotland. The aim of WICS was to address two shortcomings:<sup>18</sup>

- Yearly price determinations created little incentive to make long term decisions. WICS introduced longer term price determinations which gave greater certainty of income flows and the ability to span longer term infrastructure investments.
- To consolidate the economic regulatory roles of water utilities into one commission. This gave the commission the resources and legislative ability to challenge efficiency, operating and capital costs, and therefore recommend more challenging price limits.

### 2.5.4 Republic of Ireland

Irish Water was also made subject to economic and environmental regulation.

---

<sup>18</sup> J.W. Sawkins, V.A. Dickie, Regulating Scottish Water, Utilities Policy 8 (1999) 233–246

- **Economic regulation:** The Commission for Regulation of Utilities (CRU) has responsibility for economic regulation of the water sector. Irish Water is subject to a revenue control regime, which is similar in structure to pre-existing regulatory regimes for electricity and gas distribution and transmission in Ireland. This regulatory regime includes efficiency targets, output monitoring, incentives and, ultimately, caps on tariffs to non-domestic customers and the government (on behalf of domestic customers).
- **Environmental regulation:** The Environmental Protection Agency is the environmental and technical regulator for Irish Water. While the EPA already had existing regulatory functions in relation to water and wastewater quality, as Irish Water is a single provider of these services the EPA now has greater ability to monitor and engage on these outcomes.

### 2.5.5 New Zealand

In the case of Auckland, the establishment of Watercare was part of a large-scale legislative reform of council structures in the Auckland region after the Royal Commission on Auckland Governance. Most of these reforms were driven by what has been described as an “infrastructure deficit” by various Royal Commission submissions, where the segmentation of councils inhibited longer term planning for growing populations and resulted in a decline in assets to adequately meet service standards.

Wellington Water was also consolidated in the backdrop of a voluntary review of council operations to capture greater investment and regional planning in Wellington. However, in this case the councils did not merge following the review (which was not under consideration).

Unlike other jurisdictions, reforms to the service delivery models of the water sector in Auckland and Wellington were not part of nationwide changes, and therefore were not accompanied by other regulatory reforms such as independent economic regulation (which require national or state legislation to implement).

## 3 COSTS AND EFFICIENCIES

### 3.1 Introduction

This section distils the available evidence on the impact of aggregation and related reforms on costs (comprising both operating and capital expenditure) and efficiencies. As far as possible, this seeks to examine the impacts associated with aggregation separately from those attributable to related reforms.

While this section includes an overview of the economic literature on economies of scale and scope in the water industry, the focus here is on whether productive and dynamic efficiency benefits have been realised in practice following aggregation of urban water suppliers.

### 3.2 Aggregate costs

In summary, the evidence suggests that aggregation does not reduce total pre-aggregation costs, at least in the short term, but this is an inevitable consequence of improving standards of services and environmental outcomes. As noted in the previous section, a significant driver of reforms in a number of jurisdictions was to facilitate significant catch-up investment in infrastructure. In many cases, the required investment was very large. This does not mean that reforms of the kind pursued were costly and therefore not worth undertaking. Arguably, the significant investments undertaken as part of the reforms were necessary to restore or raise service standards, and the reforms were a means of delivering that required investment.

#### 3.2.1 Capital costs

In most of the jurisdictions examined in this review, aggregate capital expenditure typically increased following aggregation of smaller suppliers.

The principal reason for this is that as noted above the structural reforms were associated with (and indeed often motivated by) the need for very large capital programs designed to address a backlog of under-investment. In some cases, capital expenditure also increased to enhance system resilience and security in long-term water supply (e.g. Victoria following the Millennium drought) – but the need for such expenditures was independent of aggregation.

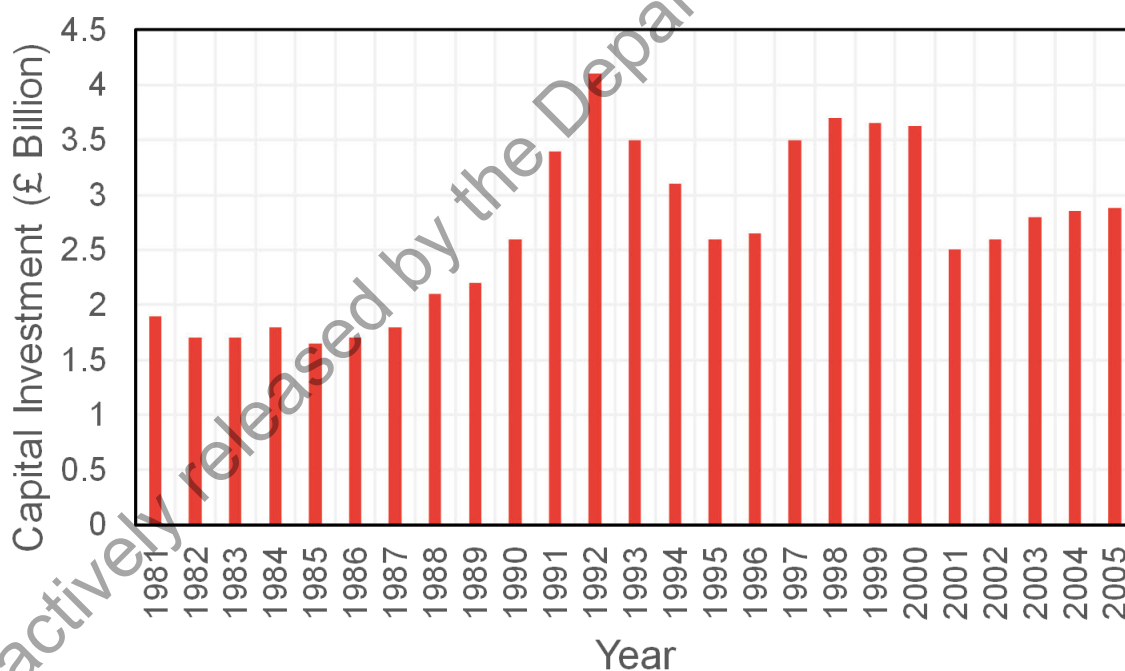
In this regard the often-significant increases in costs following aggregation do not reflect a failure of the structural changes to the urban water sector in these jurisdictions but, rather, an inevitable consequence of improving the standards of services and environmental outcomes which were not previously being achieved. For example, in Tasmania since 2009 approximately \$1 billion in capital investment has been made in the sector. Operating costs have also increased as new plants have come online, but these are being offset partially by productivity gains (\$20m in annual nominal savings since TasWater was established).

That said, how these higher costs were recovered from some combination of customers, owners and government was a key factor in the implementation of the reforms and how they were perceived by the community. This is further discussed further in the discussion on customer outcomes.

Examples of how capital costs changed after the reforms include:

- Both regional and metropolitan Victorian water businesses have had large increases in capital expenditures since the step reforms in 1995. These were largely to build system capacity and security due to the increasing impacts of the Millennium drought. As noted previously, these expenditures were independent of reform and capital investment was not a major driver for aggregation/reform.
- Irish Water is currently investing significant amounts in its capital program. About a quarter of planned capex by Irish Water (€200 million out of €800 million in 2019) is currently targeted towards national water and wastewater programmes. These are the types of programmes that were envisioned when a national utility was set up in order to overcome the challenges of coordination between local authorities. Therefore, total capex costs are increasing, although the Commission for Regulation of Utilities (CRU) actively monitors Irish Water's capex and delivery of outputs and outcomes. For non-network capex (which is about 13% of total capex), the CRU has imposed a 5% annual efficiency target.
- Over the fourteen years after the mergers, the water industry in England and Wales invested around £50 billion to build new and maintain existing assets. This capital expenditure is shown in **Figure 1** below, which indicates a significant uplift in investment in the years after aggregation. After aggregation, greater proportions of this capital expenditure were on service quality improvements, with smaller increases with general capital maintenance. This highlights the intentions of the water companies to deliver better services to customers than before privatisation.

**Figure 1:** Combined capital expenditure – Water Industry in England and Wales



Source: Adapted from Ofwat 2006, *The development of the water industry in England and Wales*

- Scottish Water's capital costs increased in the initial years it was established, investing £1,265 million from 2002 to 2005. This investment was largely to improve service level requirements, but large amounts were also spent on improving drinking water and environmental outcomes (such as sewerage discharge). This is discussed further in section 6. Growth in capital expenditures has now slowed and in some years declined over the last ten years as initial works to improve compliance and service requirements have been completed.

- Watercare capital expenditures increased by over 100% in first three years after the merger as total assets increased from approximately \$2.5 billion NZD to over \$8 billion in the same period as Watercare consolidated retail water functions. Some regional capital expenditures such as water treatment plants, where before there had been underinvestment, were introduced after the reform which would have driven part of these increases. Capital costs have since slowed in recent years, indicating that major infrastructure deficits identified at the merger have been addressed.

### 3.2.2 Operating costs

Operating costs account for all other costs associated with the provision of water services, including wages, energy, regulatory compliance, customer call centres, debt servicing etc. Most jurisdictions were able to achieve operating cost efficiency savings after the reform.

For example, in England and Wales, water businesses outperformed Ofwat operating expenditure efficiencies significantly in the 1990s and has since levelled off. It is also important to note that these improvements in operating expenditure occurred against the backdrop of improved customer services and regulatory requirements.

Most jurisdictions achieved cost efficiencies from operating costs similar to those achieved in England, and so is discussed in the next section on cost efficiencies.

### 3.2.3 Transitional costs

There is also some evidence that there is typically a short-term increase in operating costs following mergers or aggregations due to the need to incur administrative and legal costs to establish the new entity, invest in new systems, pay out redundancies, etc. The magnitude of these costs can vary significantly depending on the nature and scale of the aggregation. For example:

- These transitional costs can be significant for very large restructures. For example, the Water Industry Commission for Scotland (WIC) allowed Scottish Water £200 million in the recoverable revenue allowance in a one off Spend to Save programme, to cover one-off transformation and restructuring costs that would reduce future annual operating costs. These costs included business transformation (£54 million), new capital investment (£44 million) and staff severance costs (£84 million).<sup>19</sup>
- The Greater Wellington Regional Council (GWRC) incurred additional costs of \$0.5 million in establishing Capacity Infrastructure Services. These costs were for management of the merger change process, with associated external resources and a project team working on rationalising systems and processes across the new organisation. When GWRC's water supply team was merged into Wellington Water, a service-level agreement was drafted to ensure Wellington Water would be positioned to provide management services back to the five councils from its own staff and resources. To facilitate this, a capital grant of \$1.1 million was made to Wellington Water for the purchase of GWRC water supply operational vehicles and Petone office-based assets.<sup>20</sup>
- In Victoria, it was estimated in 2007 that re-aggregating the three Melbourne retailers into a single business (which did not eventuate) was likely to cost between \$38 million to \$63 million, including systems integration costs (IT and billing systems), redundancy costs, costs of renegotiating existing contracts, and other costs such as costs of communicating with staff and customers.

<sup>19</sup> Scottish Water 2004/05 Annual report.

<sup>20</sup> Wellington Water 2014/15 Annual report.

### 3.3 Productivity and efficiency

A key question however is whether the aggregation and related reforms have led to the provision of water and sewerage services more efficiently than they would have been provided in the absence of these reforms – i.e. whether the underlying efficiency of service provision has improved?

There is strong and consistent evidence that the structural and related reforms implemented in the jurisdictions examined in this review have led to significant improvements in productivity and efficiency.

As discussed further in section 8, it is difficult to determine how much of these efficiency improvements can be attributed to structural reforms (i.e. aggregation) alone, relative to other reforms (e.g. introduction of independent economic regulation that actively incentivised efficiency improvements).

#### 3.3.1 Tasmania

The most recent Price and Service Plan from TasWater for the regulatory period of 2018-21 highlights \$3.2 million ongoing savings from procurement efficiency. A further \$5.5 million per year in productivity savings derives from salaries and the ability to prioritise labour (reduce opportunity costs of workforce), which is attributed as a direct result from the merging of water businesses. The merger of the former regional corporations and the restructuring to the new state-wide operational model impacted almost all employees and resulted in redundancies, largely at the management level. This resulted in the reduction in FTE roles from 842 to 788 in the year after the merger. This number has increased to its current level of 877. This reflected additional vacancies which were filled in response to “growth in the capital program and to deliver strategic projects associated with the development of the Network Operations Centre, the centralised call centre in the north west and the implementation of the Price and Service Plan.”<sup>21</sup> The employee numbers have roughly remained the same since.

#### 3.3.2 Victoria

Operating costs per property fell rapidly for all three retail providers in Melbourne, Victoria compared to other water providers nationally in the initial years after the 1995 reform. Reductions in the charges applied to the retail water authorities for bulk water services from Melbourne Water drove most of these falls, but 23% of the savings are said to have come from efficiency gains by the water retailers such as such as rationalisation of duplicated procurement, outsourcing and staffing costs.<sup>22</sup> The Essential Services Commission (ESC) 2012 Productivity Report estimated that the Total Factor Productivity (TFP<sup>23</sup>) change between 1998 to 2006 for the disaggregated metropolitan water utilities was significant and positive—between 1.5% and 2.4% per annum.

Over time, however, the level of productivity improvements generated in the early years appears to have levelled off. Evidence from the ESC Productivity Report in 2012 shows that after 2006 to 2010, average total factor productivity declined by 0.1 percent for metropolitan suppliers. This may be driven by a significant increase in aggregate costs associated with a major investment in water security infrastructure in response to the millennium drought such as desalination plants (noting here that such investment would have been required regardless of the industry structure).

<sup>21</sup> Taswater Annual Report 2014-15 p. 18

<sup>22</sup> Victoria Competition and Efficiency Commission, December 2007, Water Ways: Inquiry into Reform of the Metropolitan Retail Water Sector, draft report.

<sup>23</sup> A measure of total factor productivity (TFP) aims to capture all the outputs produced by an entity and all the inputs used to produce those outputs.

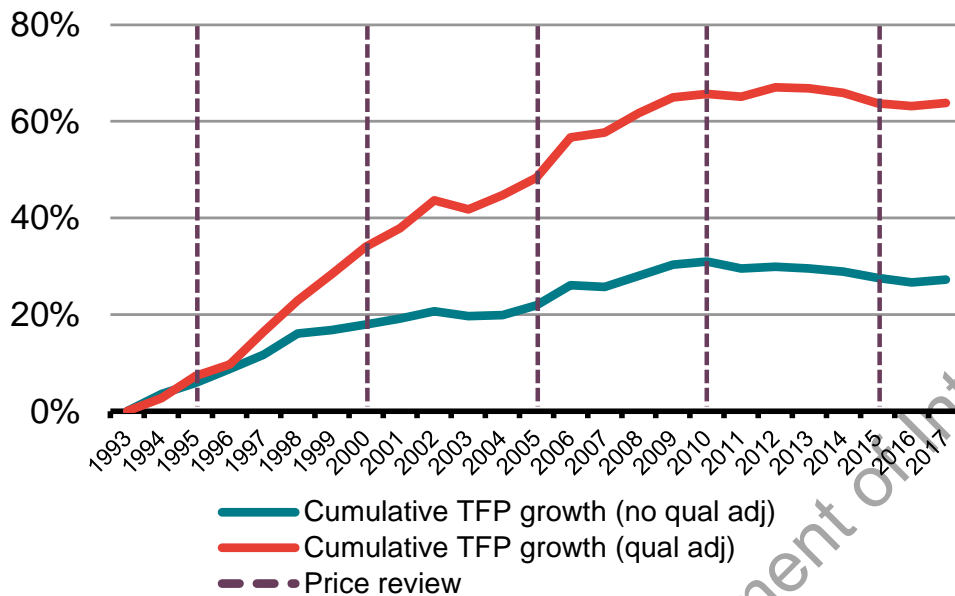
### 3.3.3 Republic of Ireland

In Ireland, the economic regulator (CRU) has set efficiency improvements for Irish Water at 5% per annum up until now. In 2018, the CRU set Irish Water's revenue cap for 2019, requiring a further 5% efficiency improvement and noting that between the start of 2015 to the end of 2019, Irish Water will have been required to deliver efficiencies of circa 25% within its base controllable operating expenditure. In the 2017 Irish Water Annual Report, Irish Water noted efficiencies of €116 million through payroll, contractor management, energy and general overheads, generally achieving the efficiencies set out by the CRU.

Capital expenditure savings had reached €290 million and Irish Water are on target to achieve accumulative savings of up to €500 million by 2021. In relation to capex, efficiency targets are more challenging as Irish Water is currently investing significant amounts in its capital programme. Therefore total capex costs are increasing, although the CRU actively monitors Irish Water's capex and delivery of outputs and outcomes. For non-network capex (which is about 13% of total capex), the CRU has imposed a 5% annual efficiency target, similar to opex.

### 3.3.4 England

In England, annual productivity growth for the water and sewerage sector has averaged 2.1% since privatisation when adjusting, on a conservative basis, for output quality. Productivity growth was high during the immediate post-privatisation period, then followed a period of intermediate growth in the first five years of the 2000s, with a significant drop in productivity growth since 2007 following the Global Financial Crisis (GFC). One measure of efficiency is total factor productivity (TFP) measures (see **Figure 2**), which assesses how effectively water businesses are able to convert costs in water service outcomes. While annual productivity growth can be seen to fluctuate from year to year, TFP growth has increased by 64% over the period of analysis when adjusting for the quality of services provided, and by 27% on the most conservative basis without this quality adjustment. This estimate of quality unadjusted cumulative TFP growth implies that inputs (which translates to costs) would have been 27% higher without these productivity improvements, which translates to £2.72 billion higher costs (with total costs being £12.70 billion).

**Figure 2** Cumulative TFP growth, 1993-2017

Source: Frontier Economics

Note: Relative to TFP in 1993

### 3.3.5 Scotland

In Scotland, Scottish Water stayed within the revenue caps from 2002/03 to 2004/05. It achieved WICS's efficiency targets in operating expenditures through a reduction in its workforce, investment in automation and the redesigning of processes and systems. From 2002/03 to 2005/06, Scottish Water generated savings of £453 million in operating costs, which is equal to a reduction of approximately 40%. In total, Scottish Water achieved £946 million worth of savings over the period of four years, where savings in capital investment accounted for £494 million.

The overall savings to customers were estimated to be £746 million as ministers agreed a 'spend to save' allowance of £200 million, which was funded by customers and spent on Scottish Water's cost reduction initiatives. A proportion of the target savings related to additional merger savings, such as management costs, general overheads, bulk procurement and scientific services, and these were estimated to reach £39m by 2005/06, compared to £136m for other opex savings. Staff numbers reduced from 5,648 in April 2002 to 3,756 by April 2005. Staff severance costs amounted to £84.8 million of the £183.6 million restructuring and transformation costs incurred by Scottish Water in its first three years (Auditor general for Scotland, 2005, Overview of the water industry in Scotland).

### 3.3.6 Auckland

In Auckland, Watercare reports that it has achieved 'regional cost efficiencies' of \$100 million which enabled it to reduce retail water charges by 30% from what they would have otherwise been from 1 July 2011. The drivers they believe these efficiencies derive from are largely labour cost changes where staff numbers reduced from 1100 in 2010 to 600 in 2012. These staffing numbers have since increased to 920 in 2018. This could indicate that the initial reduction was inefficiently small or could be associated with a number of factors such as increasing demand in Auckland, changing business priorities, internal role changes or possibly lack of regulatory oversight.



A reduction in capital expenditure of \$90 million that was previously scheduled but deemed unnecessary after the amalgamation also contributed to these reported cost efficiencies. However, one consequence of cost efficiencies was job losses that resulted from the integration, with approximately 500 positions shed in two years from the merger. Subsequently staff number have increases as outsourced functions have been brought back in-house to improve performance.

### 3.3.7 Wellington

In Wellington, a report in 2004 by the Controller and Auditor General analysed the viability of consolidating initial water services into a joint management model for the Wellington City and Hutt City councils (before the creation of Capacity Infrastructure Services).<sup>24</sup> It reports financial analyses conducted in 2002, which estimated there could be net savings of \$4.1 million in the first five years of a possible integration, along with at least \$1.6 million a year thereafter. These cost savings are quoted to have driven the initial establishment of Capacity Infrastructure Services, despite these savings being minor compared to the total annual operating costs of the two councils and Capacity Infrastructure Services. These savings were evaluated by PWC in 2012, which found that Capacity Infrastructure Services had saved Wellington City and Hutt City councils approximately \$2 million in the first five years, and then \$1.1 million thereafter to 2013. Capacity Infrastructure Services reported similar savings of \$3.8 million in their 2012 annual report. Wellington Water's statement of intent for 2017-2020 allows for only a very small increase in operating expenses across Wellington Water and the councils following substantial increases in the years after the merger with Greater Wellington Regional Council. One difficulty in identifying cost savings attributable to the new service delivery model is the significant changes in strategic direction under Wellington Water including much more coordinated management of assets, management of risks and shift in focus to resilience following floods and seismic activity in recent years.

## 3.4 Management initiatives to improve efficiency

Efficient and effective provision of three waters services means ensuring these services are provided at lowest long-term cost to customers while complying with regulatory and other obligations. This in turn requires management systems and processes of a well-run water business in areas such as business planning; customer and stakeholder management; asset management; capital planning and delivery; water quality management; water security management; environmental/sewerage management; operations and maintenance; people and safety; and governance, structure and support systems.

Thus, another indicator of whether aggregation is likely to lead to efficiencies in service provision is whether aggregation was associated with the introduction of management initiatives that underpin efficiency improvements over both the short and longer term. In this regard, the establishment of new entities in the jurisdictions included in this study clearly led to major transformation in the management of these businesses and the adoption of new systems and processes. It is difficult to conceive that the improved strategic management observed in these examples could have been delivered under the previous industry structures.

For example:

- Following aggregation, TasWater pursued several productivity improvements, including the centralisation of procurement, parcelling up of minor projects and asset management systems.

<sup>24</sup> See section 2.2.6 for a brief discussion on the history of reforms in Wellington that led to the establishment of Capacity Infrastructure Services.

These outcomes are a result of greater centralisation of management and resources compared to the previous model. TasWater has also undertaken a major asset condition assessment to better understand the state of the assets which it inherited from councils, on which there was previously very incomplete information.

- In Victoria, Wannon Water was formed in 2005 after the merger of three smaller water authorities. Within 100 days of the merger, Wannon Water was able to introduce a Risk Management plan for all its water supplies, which had not been achieved previously and had resulted in regulatory non-compliance in drinking water quality. This also included consolidation of asset management plans and systems.
- After aggregation, Scottish Water embarked on the short term “Spend to Save” program, which implemented investment to achieve business efficiency and performance within five years. This investment included overall business transformation to improve on opex savings, and greater automation on existing capital investments. This was accompanied by a comprehensive review of the major issues Scottish Water would face in the long term to accompany future strategic reviews of charges set out by WIC. It was identified that the asset management did not accurately reflect the true condition and performance of the asset stocks. This led to the development of the Work and Asset Management System, so that Scottish Water could better prioritise investment and maintenance in the long term.
- Irish Water has commenced a process to design a “Single Public Utility” under the Water Industry Operating Framework (WIOF) Programme. That is, over time Irish Water will increasingly take on more responsibilities for work currently provided under the SLAs by local authorities. The original end date for the SLAs was 2025. Currently, WIOF is central to Irish Water’s plan to create combined efficiencies of €1.1bn by in the end of 2021<sup>25</sup>. It has been recognised by the CRU that the SLA model may be impeding Irish Water’s ability to deliver cost reductions in the short term, and that a unified approach to operating water and wastewater services under one utility in the manner proposed will lead to greater efficiencies and improved services to customers over time.
- Watercare, upon taking over retail water services in Auckland, published a strategic framework for the direction of the business. This was to coordinate and facilitate decision-making on the overall company to help address the new challenges faced after aggregation. This included the preparation of a new Regional Asset Management Plan, to better coordinate infrastructure from the previous water service providers into a regional focus. A Long-term Infrastructure Plan (50 years) and a Facility Plan (five years) were also developed to provide greater detail on short- and long-term goals. These plans were the catalyst for major investments such as upgrades to treatment works in the Franklin district.
- In Wellington, Wellington Water has introduced a sophisticated service planning system which has enabled future issues and risk to be addressed rather than deferred beyond the 10-year planning period. The integration of management services has also enabled the systematic use of IT systems to manage asset networks, especially in the smaller surrounding constituencies such as Porirua and Upper Hutt.

### 3.5 Evidence of economies of scale

A number of the efficiencies achieved following aggregation as reported above can be seen as realisation of economies of scale, where average costs fall as scale increases (see Box 5: ). For example, reduction in corporate overheads, staff rationalisation and elimination of duplicated functions all constitute economies of scale. The evidence tends to suggest that in many cases moving water suppliers towards a more optimal scale can lead to significant cost efficiencies being realised.

<sup>25</sup> CER16342 CRU Decision on Irish Water Revenue for 2017-2018 p. 11

This does not imply, however, that a greater degree of aggregation will always result in scale efficiencies. Indeed, in the Melbourne metropolitan water sector, disaggregation (in conjunction with regulatory and other reforms) appears to have led to cost efficiencies. In addition, analysis undertaken in the 2007 Victorian Competition and Efficiency Commission (VCEC) report found that further merging the three Melbourne water utilities would not necessarily lead to net benefits.

Proactively released by the Department of Internal Affairs

**Box 5:** Economic studies of economies of scale and scope in the urban water industry

Several papers have attempted to identify the existence of, and characteristics associated with, economies of scale and scope amongst water utilities. These studies are summarised by meta-analyses by Abbott and Cohen in 2009,<sup>26</sup> and more recently by Saal et al in 2013.<sup>27</sup>

A water utility is said to be operating with economies of scale if a proportional increase in all outputs is less than the proportional increase in associated costs. This is true when a firm has increasing returns to scale to their production function.

Broadly, both the meta-analyses arrive to similar conclusions that there are long run economies of scale for average sized utilities when measured on cubic metres of water supplied. Economies of scale also appears to be greater for smaller organisations, which indicates that these smaller utilities may be able to reduce average costs by increasing their output. However, several studies also find that economies of scale are exhausted at certain scale, and larger organisations may face diseconomies of scale. The economic regulator in New South Wales, IPART, reviewed many of the same studies and concluded that evidence for economies of scale is mixed, showing either economies or diseconomies depending on the study.

This evidence suggests what Saal et al describes as U-shaped average cost estimates, indicating an optimal size for water utilities before water utilities become too large and operate with diseconomies of scale. Both papers cautiously do not conclude on what this optimal size might be, as the variety of geography, population density, customer types and the services provided by each utility will make this optimal size vary across cases. Despite this, some studies utilised in the meta-analyses suggest that the optimal size for water and sewerage utilities might exist around 125,000 urban connections, with other studies suggesting up to one million when considering denser populations or water-only utilities. The economic regulator in England and Wales, Ofwat, referring to water companies that serve populations from 90,000 to seven million customers, concludes there is "...an absence of scale economies at the level of the total appointed businesses."<sup>28</sup>

Economies of scope are characterised when cost savings can be achieved in joint production of a bundle of separate products rather than separate specialised production. Water utilities may capture economies of scope if water service functions are combined in horizontal integration (e.g. bulk water and wastewater), through vertical integration (e.g. bulk water supply and urban water distribution), multi-utilities (e.g. integration of water and gas distribution) or through integration of other activities such as environmental management and regulation.

Studies on economies of scope are sparse, largely due to the greater variety of integration models available for utilities. Abbot and Cohen find that there may be economies of scope amongst small institutions for both horizontal and vertical integration. Saal et al suggests there is significant evidence of economies of scope when considering vertical integration and multi-utilities, but mixed evidence for horizontal integration. Neither study finds conclusive evidence addressing integration of other services such as stormwater or environmental management.

<sup>26</sup> Abbott, M. and Cohen, B., 2009. Productivity and efficiency in the water industry. *Utilities Policy*, 17(3-4), pp.233-244.

<sup>27</sup> Saal, D.S., Arocena, P., Maziotis, A. and Triebs, T., 2013. Scale and scope economies and the efficient vertical and horizontal configuration of the water industry: a survey of the literature. *Review of network economics*, 12(1), pp.93-129.

However, it is important to note that aggregation in itself does not automatically lead to realisation of economies of scale, as many of the existing networks will continue to be needed to supply services across the relevant geographic area. Moreover, rationalisation of those assets may only be possible over the longer term. For example, as noted by the Tasmanian Economic Regulator, the network of many large, dispersed assets delivering water and sewerage services to regional and urban towns across Tasmania has remained largely unchanged, a legacy that remains regardless of changes to operating boundaries and regulatory frameworks.

The observed experience in the jurisdictions in this study would also seem to support the existence of U-shaped average cost estimates, indicating an optimal size for water utilities before water utilities become too large and operate with diseconomies of scale. While there have clearly been scale efficiencies for amalgamating smaller authorities, which were arguably inefficiently small, the experience in Melbourne where efficiencies were achieved following disaggregation of the previously integrated Melbourne Water supports the notion that at some point further aggregation can lead to diseconomies of scale.

Given the relatively small size of the existing water suppliers in New Zealand, however, it would seem that concerns about potentially inefficient small scale are likely to be more relevant than concerns about inefficiently large scale.

---

<sup>28</sup> Ofwat, 1993, Comparing the Cost of Water Delivered: Initial Research into the Impact of Operating Conditions on Company Costs, Research Paper Number 1, March

## 4 CUSTOMER OUTCOMES

This section distils the evidence on the impact of aggregation and related reforms on customer outcomes. Key areas of interest include:

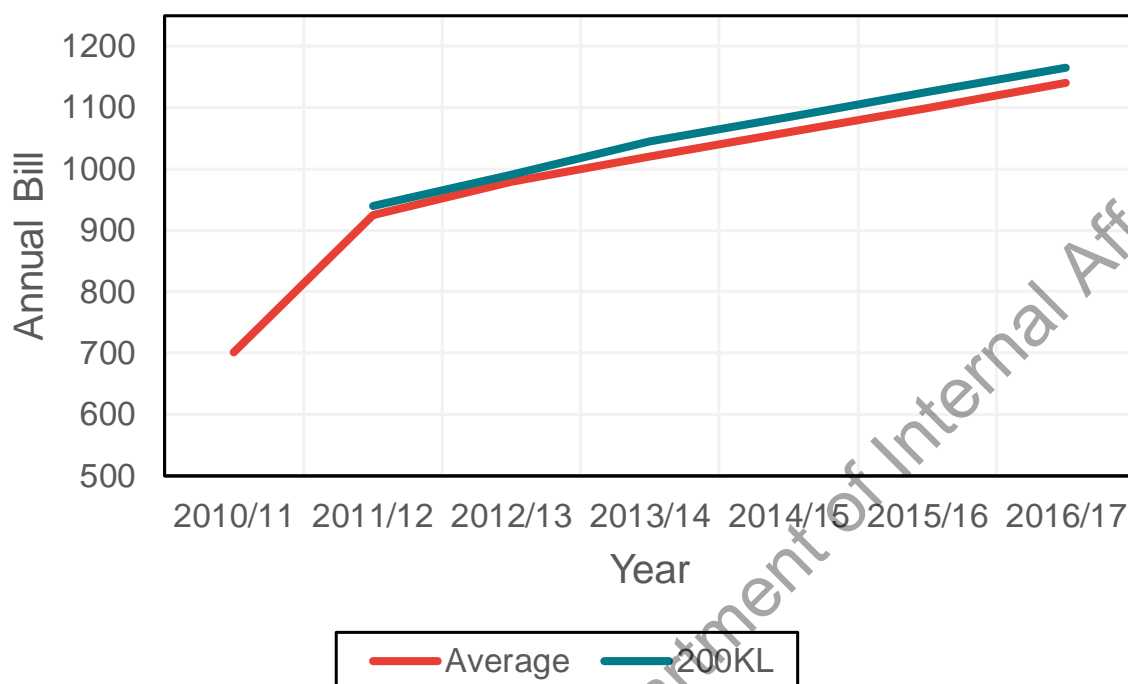
- Impacts on customer bills (both the impacts on average bills and impacts on particular groups of customers);
- Service standards; and
- Overall customer satisfaction.

### 4.1 Impacts on customer bills

#### 4.1.1 Investments in improved services have put upward pressure on bills

For most of the jurisdictions examined, aggregation was associated with significant increases in average customer bills – but as discussed in subsequent sections of this report this reflects significant investments in improving customer service standards (see section 4.2) and compliance with drinking water quality and environmental regulation (see section 6).

A typical experience is that of TasWater, where the Tasmanian economic regulator (OTTER) State of the Industry reports show that average household annual bills have increased significantly since the reform, based both on typical household usage and when adjusting for annual demand differences through a standardised 200kl usage (see **Figure 3**).

**Figure 3:** Average Annual bills for combined water and sewerage services

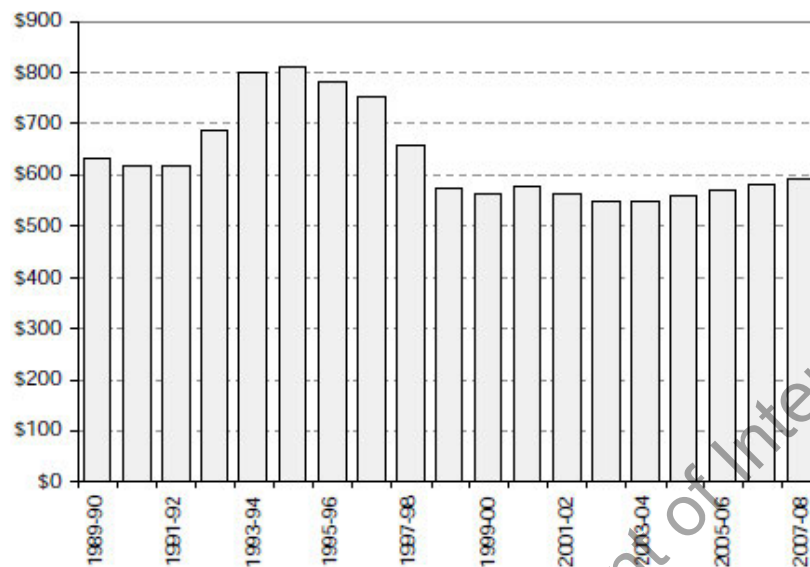
Source: OTTER state of the industry reports

Significant increases in customer bills were also observed in some other jurisdictions. For example, in England and Wales customer bills rose sharply in the initial years after privatisation, reflecting increased capital expenditure to improve services. Ofwat concluded that the average household bill in real terms 20 years after privatisation was 42% higher, with some companies having an increase of up to 81%.

The significant increases in customer bills in these cases is closely related to the major increases in costs following aggregation reflecting the need to undertake large-scale investment programs (see section 3.2). That is, higher bills do not imply the new entities are significantly more inefficient than their predecessors, rather they are mainly due to the roll-out of very large capital programs designed to improve compliance with drinking water quality and environmental standards.

One outlier here is Ireland, where the major capital expenditures associated with national water and wastewater programmes undertaken by Irish Water have not been reflected in higher bills to customers. Instead, water services are funded by general government revenue which has meant that customers have not been faced directly with the costs of these investments. User charges were introduced for the first time after the reform but were met with significant public backlash and were subsequently removed.

In those jurisdictions where the driver for reform was more about efficiency than the roll-out of major capital programs to address previous under-investment, bills tended to fall following structural reforms (see **Figure 4**). For example, Melbourne retailers were the only national water service providers who had decreases in average annual water bills in real terms for the period between 1995 and 2007.

**Figure 4:** Average Household bills for 230kl consumption – metropolitan water

**a** Figures are real 2007/08 dollars.

**b** includes water and sewerage charges.

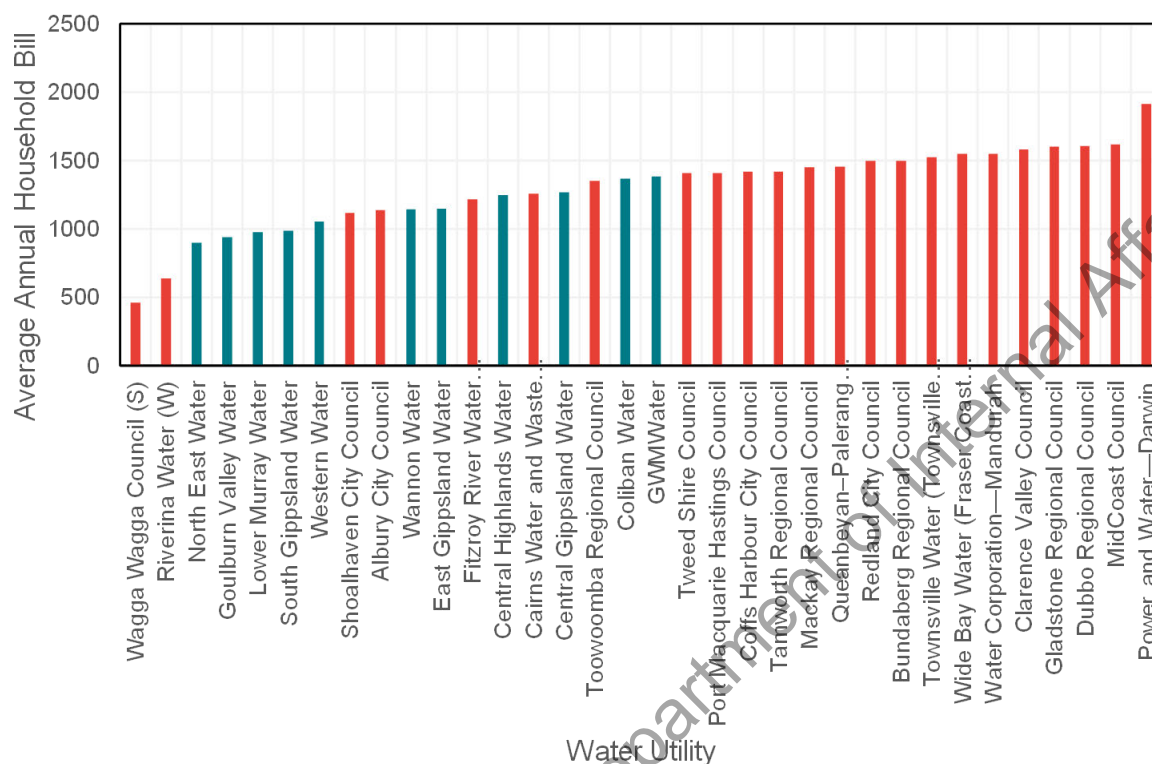
Source: VCEC, 2007, *Water Ways: Inquiry into reform of the metropolitan retail water sector*

Water supply and wastewater interruption standards were all met by the retailers in Melbourne. The years up to 2007 however were largely affected by drought where interruptions were exacerbated by tree roots and drying clay soil in some regions. Despite this, the ESC had found that network reliability and performance had been declining in the years before the drought and after the reform, and are confident that these trends would have continued behind the effects of the drought on the system.

Furthermore, ESC found that customer complaints fell in the 11 years after reform by 31% even with the restrictions and water interruptions from the drought. This meant that the ESC was generally impressed with the performance of the water retailers, and state that significant performance improvements have been made since 1995.

Victorian regional water suppliers currently have some of the lowest water bills in the country, despite increasing operating and capital costs associated with water supply infrastructure over the last 15 years – as denoted by the blue bars in the Figure below.



**Figure 5:** Average Household Annual Bill 2015/16 – Medium Australian Utilities

Source: Bureau of Meteorology

Watercare report that the efficiencies achieved from the reforms allowed them to achieve water supply tariff reductions ranging from 0.6% in Manukau City to 62.9% in the rural Rodney District (see **Table 2**).<sup>29</sup> On top of these savings, some residents experienced further reductions in bills from the removal of other service fees, such as the annual fixed service charge in the former Auckland City council.

**Table 2:** Water Prices for Watercare, before and after aggregation

	OLD PRICE PER KL	PRICE PER 1 KL AFTER JULY 2011	PERCENTAGE CHANGE
Rodney District (rural)	\$3.50	\$1.30	-62.9%
Rodney District (Urban)	\$1.96	\$1.30	-33.7%
North Shore City	\$1.52	\$1.30	-14.5%
Waitakere City	\$1.74	\$1.30	-25.2%
Auckland City (ex-Metrowater)	\$1.62	\$1.30	-19.7%

<sup>29</sup> The Controller and Auditor General, 2014, Report from the Controller and Auditor-General, Watercare Services Limited: review of service performance.

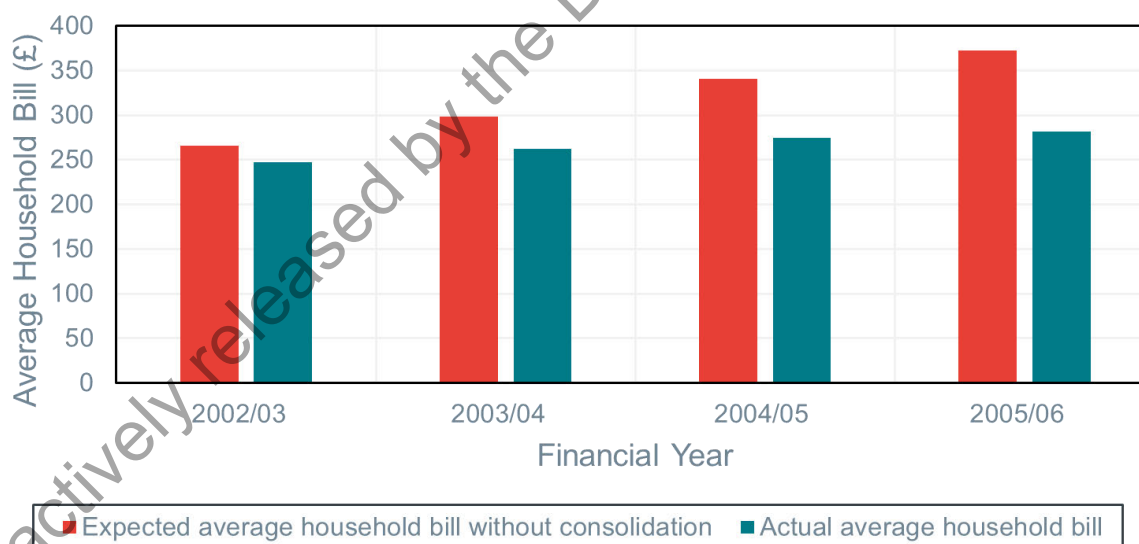
Manukau City (ex – Manukau Water)	\$1.31	\$1.30	-0.6%
Franklin District	\$2.00	\$1.30	-35%

Source: Adapted from Watercare Services Ltd 2011 Annual Report

There is also evidence the cost savings attributable to aggregation have lowered bills relative to what they would otherwise have been, taking into account the need to recover costs associated with the major investment programs. For example, operating costs as a proportion of household bills have declined slowly since privatisation, rather than increasing slowly before privatisation. Recent growth in household bills reflect significant capital programs, which in turn has driven level of service improvements.

A similar picture emerges in other jurisdictions. For example, as Scottish Water became more efficient over time, the amount which customers have saved on their bill increased (Figure 3). An average household saved £90 on their bill in 2005-06 but would have faced an annual bill of £372 if the efficiencies were not realised. Business customers also benefited from lower bills. More recently, WICS CEO Alan Sutherland reports that the Scottish Water industry performs extremely well compared to the privatised companies in England for customer outcomes. From 2002 to 2015, Scottish Water had an increase in real household bills of 3%, compared to between 20% and 47% in England which had also achieved efficiency improvements as described above. This is despite Scottish Water having the second largest annual capital investment per connected property in the same time period.<sup>30</sup>

Figure 6: How much Scottish Water customers saved on their bills



Source: Costs and performance report 2003-06 Detailed Findings, WIC

#### 4.1.2 Independent economic regulation has constrained bill impacts

It is also important to recognise that a number of other related reforms and initiatives have served to ameliorate the impacts of large cost increases on customers' bills. As discussed in section 2.5, structural

<sup>30</sup> WICS, 2016, Water Industry Commission for Scotland: Integrating customer perspectives in a regulatory setting presentation.

reform in the water sector has generally been accompanied by regulatory reform and in particular the establishment of independent economic regulation. Economic regulation is designed to promote the long-term interest of consumers by ensuring only efficient and prudent costs incurred by water authorities are passed onto customers. This is because water utilities are regional monopoly suppliers of water services, and lack competition to incentivise cost efficient behaviour. Economic regulators typically review expected costs for water authorities over a set time-period into the future, and then determines a certain cap on revenue allowed to be recovered by water tariffs (or in some cases set the water tariff themselves).

Scrutiny by independent economic regulators has undoubtedly lowered bills compared to what they otherwise would have been absent economic regulation. For example, the Tasmanian economic regulator OTTER's final 2018 decision reduced the maximum amount of regulated revenue that TasWater is able to earn during the third regulatory period by almost \$155 million from the amount proposed by TasWater. This in turn meant price increases were capped at 4.6% per annum rather than a potential 7.9% per annum. These reductions were mainly due to OTTER approving lower rates of return on capital and lower allowances for other costs than those proposed by TasWater. Other measures have also been adopted to mitigate bill impacts on customers. Staying in Tasmania, it is important to note that funding of TasWater's very large capital program was secured via a combination of lower dividends, price increases to customers via a well-defined price path, a State government equity injection and productivity savings.

Similarly in Victoria, economic regulation and reporting through the Essential Services Commission (ESC) beginning in in 1995 (known then as the Office of the Regulator General) was also complemented by a pricing restructure in 1998. This moved water and wastewater pricing towards user-pays basis rather than standardised flat rates for the services. A one-off capital injection of \$850 million (of which \$550 million went to Melbourne Water) was also used to induce profitability of the newly formed water authorities. Both these contributed to water bills being 34% below the level in 1994/95 in real terms in 2007.

Section 3.3 explained that cost savings since aggregation have also been observed in jurisdictions such as England & Wales, Ireland and Scotland. At least some of these savings appear to have been driven efficiency targets set by the economic regulators in those jurisdictions, and the financial rewards available to the businesses to meet those targets under incentive-based regulation.

## 4.2 Service standards

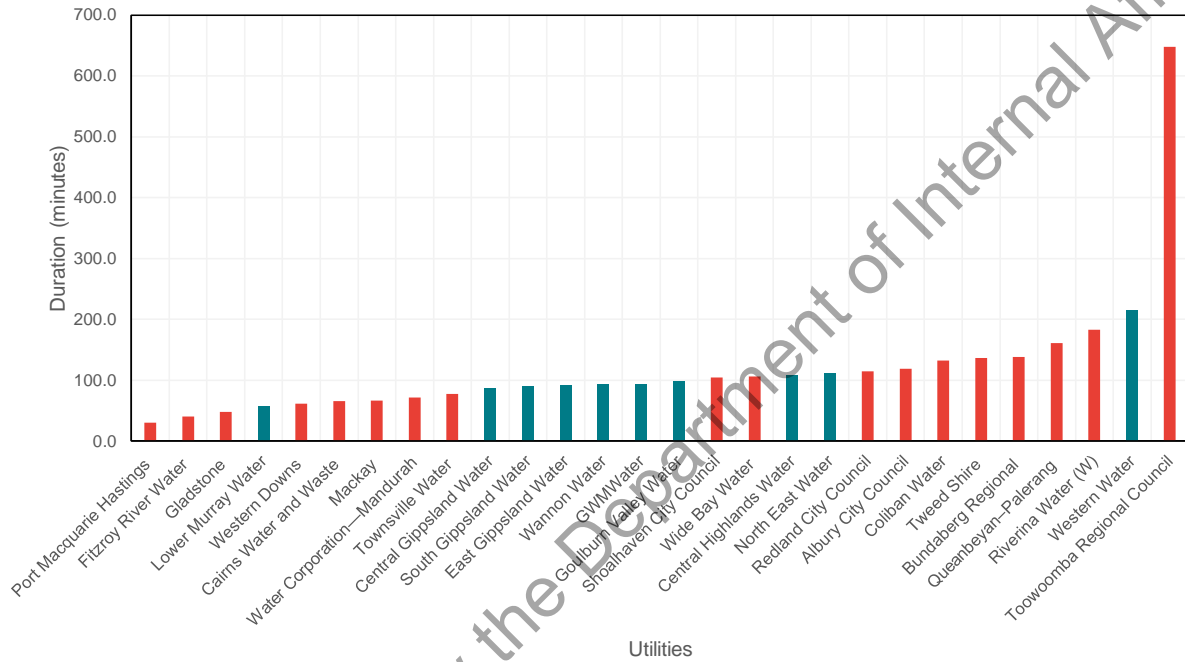
This section discusses general service standards across water and wastewater. Drinking water quality and environmental outcomes are discussed in more detail in section 6.

While bills have often increased following aggregation and related reforms, service standards have also generally improved over the same period, although in some cases these improvements are difficult to quantify due to the lack of a pre-reform baseline. For example:

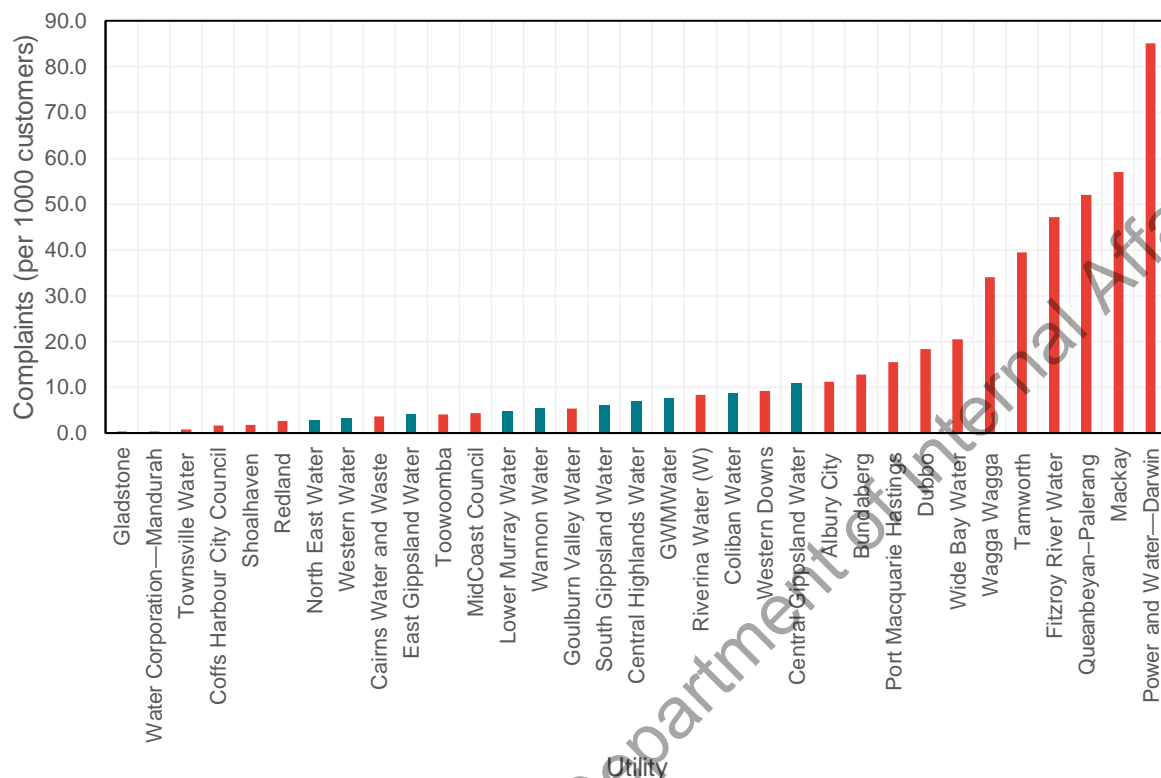
- The OTTER State of the Industry Report indicates that the total number of breaks in TasWater's water main systems have had a downward trend since the aggregation, and the time taken to attend to higher priority breaks is now much shorter. Some issues remain, such as an increase in interruptions to water services since aggregation, and the time impacted on interrupted customers. Sewerage service standards have had little improvement, which OTTER attributes to increased stormwater ingress into wastewater systems.
- There is general agreement that the reforms in Melbourne led to significant improvements to customers services for the retailers. In Melbourne, the ESC found in 2007 that customer complaints fell in the 11 years after reform by 31% even with the restrictions and water interruptions from the

drought. In regional Victoria average duration of water interruptions is largely consistent with the national average of equivalent regional water suppliers (see blue bars in **Figure 7**). This is despite the number of water interruptions being much higher in some Victorian regions due to the clay soil. All service providers also perform well against total number of complaints received per 1,000 connected customers and have remained consistently under ESC targets over the last ten years (see blue bars in **Figure 8**).

**Figure 7:** Average duration of interruptions (medium and large regional water utilities in Australia)



Source: Bureau of Meteorology

**Figure 8:** Total complaints (water and sewerage) per 1,000 customers

Source: Bureau of Meteorology

- In Ireland, the CRU monitors Irish Water’s customer metrics as part of its monitoring regime. These customer metrics relate to call handling and complaint handling. While many of these metrics have improved significantly – such as speed of telephone response – these changes may be driven by exogenous factors, such as the removal of domestic billing which would have significantly decreased call volumes.
- In Scotland, Customer Performance Assessments are part of an overall Annual Out-Performance Incentive Plan which encourages utilities to outperform targets, with Scottish Water benchmarked against England and Wales providers. The OPA is calculated by 17 individual performance measures, weighted according to customer preferences. These indicators include water supply measures such as quality and interruptions, wastewater services including pollution incidents and flooding of sewers, and customer service outcomes. Since the measures have been introduced, Scottish Water has consistently achieved above the targets set out by regulators. Rapid improvements in the earlier years can be attributed to the large capital investments after aggregation, which improved service standards across Scotland. Scottish Water now is one of the leading service providers using this measure in Great Britain.
- In England and Wales water utilities are assessed by Ofwat on their overall delivery of customer outcomes through the Overall Performance Assessment (OPA) and are shown in **Table 3**. This assessment is an index of 17 indicators weighted by importance for customers. These include service quality such as leakages and water pressure, wastewater compliance and faults and overall customer satisfaction measured through complaints and call centre performance. Overall, the indicators show a steady improvement in the early years with a stabilisation after around ten years. Most scores calculated from these indicators are now clustered around the top end of the scale.

Recently, Ofwat reports that water businesses have performed satisfactory against several measures of customer satisfaction, with customers generally satisfied with the services being offered.<sup>31</sup>

Proactively released by the Department of Internal Affairs

<sup>31</sup> Ofwat, 2015, Companies Performance 2014/15

**Table 3:** Overall performance assessment indicators

	90-91	92-93	95-96	96-97	97-98	98-99	99-00	00-01	01-02	02-03	03-04
	%	%	%	%	%	%	%	%	%	%	%
Properties at risk of low pressure	1.85	1.26	0.78	0.43	0.25	0.16	0.13	0.11	0.1	0.06	0.04
Properties subject to unplanned supply interruptions of 12 hours or more	0.42	0.38	0.58	0.21	0.15	0.05	0.06	0.11	0.12	0.05	0.14
Population subject to hosepipe bans	41	12	39	30	3	3	0	0	0	0	0
Properties subject to sewer flooding (overloaded sewers and other causes)		0.05	0.02	0.02	0.03	0.02	0.03	0.03	0.02	0.02	0.01
Properties at risk of sewer flooding incidents (once in ten years incident)			0.07	0.07	0.07	0.07	0.08	0.08	0.05	0.04	0.03
Properties at risk of sewer flooding incidents (twice in ten years incident)		9	0.07	0.06	0.05	0.05	0.04	0.04	0.02	0.01	0.01
Billing contacts not responded to (within 5 working days)	31.1	20.1	10	8.16	4.74	2.53	1.52	0.86	1.23	0.53	0.47
Written complaints not responded to (within ten working days)	31.0	18.1	5.79	5.07	1.99	1.28	0.64	0.44	0.66	0.15	0.14
Bills not based on meter readings			3.67	2.32	0.87	0.34	0.33	0.7	0.45	0.16	0.15
telephone calls not answered within 30 seconds				26.9	18.7	9.7	9.21	7.64	6.37	5.89	5.85

Source: Adapted from Ofwat 2006, *The development of the water industry in England and Wales*

- In Auckland, SOI targets of customer satisfaction are reported in the annual reports of Watercare and show an increase and greater consistency in performance since the merger in 2010. These targets include overall satisfaction with Watercare, average costs for households and response to complaints and urgent issues. The integration of customer call centres, after initial frictions with staff training, turnover and the complexity of the pricing across the jurisdictions, have maintained above SOI targets for customer satisfaction since 2012. Factors such as development of website inquiries and billing consistencies have been quoted in the annual reports as drivers of these satisfaction scores since the merger. The Auditor General in 2014 stated that Watercare performance is in line with international standards for customer service, and is further supported in recent WSAA benchmarking where Watercare placed in the top 5 out of the 38 Australasian water businesses surveyed in customer satisfaction, trust and reputation (as well as value for money, efficient management and effective planning).<sup>32</sup>
- Wellington Water has introduced three outcomes for customers and 12 service goals and funding is now aligned with these outcomes. Value for money measures are beginning to be developed.

### 4.3 Impacts on customers in rural and regional urban areas

Another key issue of interest is how aggregation and related reforms have affected different groups of customers, and in particular customers in rural and regional urban areas (i.e. small communities and towns outside the major cities) which are typically higher cost to serve. As drinking water quality was of particular concern for many regional areas (for example Tasmania, Auckland and Scotland), these regional outcomes are discussed in section 6.

As noted in section 2.5, a common feature of many of the aggregations in the jurisdictions examined in this study was a move to harmonise tariffs across the service area – typically involving standardisation of a wide array of pre-existing tariff structures into a common ‘postage stamp’ pricing regime.

As a general rule, this standardisation of tariffs has tended to favour customers in more remote, higher cost areas at the expense of customers in lower-cost, more densely-settled areas. For example:

- TasWater implemented a staged transition to a ‘target tariff’ with customers in some regions facing bill increases and others benefiting from lower bills (relative to what they would otherwise have been given the underlying increase in bills). This entailed cross-subsidisation of customers in higher cost areas by those in lower cost areas. For example, TasWater set the fixed water component charges in 2013-14 at \$403.28 in the North-West (small and sparse population) and \$289.21 in the South (denser population). When standardised across regions in 15-16, this charge changed to \$329.48 for all regions, reducing the fixed component cost of water supply for the North West region but with slight increases for the North and Southern regions.
- In Scotland, prior to the creation of Scottish Water, customers paid different water charges depending on their location in the country. Customers of North of Scotland Water Authority were paying much higher charges than those in the East and West of Scotland. Scottish Water harmonised the charges across Scotland after the WIC ruled that charges for users in the same customer group should be identical. After this harmonisation of charges, the average customer who was previously served by the East and West of Water Authorities faced increases in their water bill that were greater than inflation. In contrast, for the average customer in the north, charges have fallen in real terms.
- In Auckland, prior to the standardisation there were 44 different tariff regimes, collected through property rates, direct billing from council or billing from third party providers. Standardisation of tariffs

<sup>32</sup> Watercare, 2018, “Watercare ranks highly among Australasian counterparts”.



was introduced in July 2012 for all residents and for non-domestic customers two years later. Depending on how the customer was billed previously for wastewater, the changes may have increased or decreased their wastewater bills. Watercare has since reported in their annual reports that average water expenditure compared to average household incomes has consistently remained around 0.85%, compared to the target set in the SOI of 1.5%. These targets are consistent with affordability pre-reform, and Watercare submitted to the Auditor General that larger water tariff increases were avoided with integration efficiencies. However, the Auditor General has raised doubts as to whether the target of 1.5% was reasonable and whether there were adverse distributional effects of the tariff changes.

While tariff standardisation benefits some customers at the expense of others, one significant consequence is that it spreads the costs of expensive upgrades in local area across a broader customer base. While tariff standardisation is not a necessary feature of aggregation, aggregation provides the scope for funding costly works in more remote regions from a broader funding base, which was not available under the previous more disaggregated industry structure. In this sense, aggregation can relieve localised affordability constraints, which may otherwise have prevented investments being made in smaller communities. This in turn has led to service improvements in regional areas. As noted above, for example, many small towns in Tasmania have received improved water quality and boil water notices have been removed. Similarly, in the case of Watercare customers in Rodney and Franklin have experienced significant improvements in drinking water quality and environmental standards due to infrastructure upgrades.

#### 4.4 Overall customer satisfaction and perceptions

Assessing how overall customer satisfaction and perceptions have been affected by aggregation and related reforms is difficult because prior to the reforms there was often no systematic collation of customers' views.

This means that even where performance standards have improved, this may not necessarily translate into measures of improved customer satisfaction. For example, according to Mike Brewster (TasWater CEO), TasWater's "customer base [is] not convinced that TasWater provides value for money or indeed reforms were needed but perceptions are changing."<sup>33</sup> This is further highlighted by increases in customer complaints, largely driven by concerns around water quality. Given that water quality compliance has in fact improved, these complaints may be driven by other factors, such as greater public communication of water quality issues (such as public alerts) or higher expectations of TasWater compared to the previous suppliers.

One issue which appears to have negatively affected customer and broader public perceptions about reforms in a number of the jurisdictions relates to resistance to more cost-reflective/user-pays pricing and in some cases the way in which these changes were communicated to customers. For example, in Ireland domestic water tariffs were introduced in 2015, but they were soon removed after significant public backlash over the introduction of user-pays pricing. In Auckland, the Auditor-General found that the standardisation of tariffs and inclusion of the wastewater tariff by Watercare in the same bill may have led to confusion about water costs. Given that some wastewater tariffs were previously collected in property rates, Watercare found that some residents incorrectly concluded that water prices had increased exponentially. According to the Auditor-General, Watercare also failed to communicate reasons for rate increases in the year following the integration. In 2014 the Auditor General recommended that Watercare should better communicate tariff changes to residents in the future, such

<sup>33</sup> Mike Brewster, Presentation to New Zealand water summit 2018.

as providing trend information on affordability and clearer reasons for tariff increases on the bills.<sup>34</sup> A follow-up in a review by the Auditor General in 2016 found that Watercare was providing a better customer service through communication and performance indicators<sup>35</sup>.

Proactively released by the Department of Internal Affairs

---

<sup>34</sup> The Controller and Auditor General, May 2014, Watercare Services Limited: Review of service performance

<sup>35</sup> The Controller and Auditor General, October 2016, Watercare Services Limited: Review of service performance: Progress in responding to the Auditor-General's recommendations

## 5 FINANCIAL OUTCOMES

One of the key drivers of reforms in many of the jurisdictions examined was to put the provision of water services on a more financially sustainable footing.

This section distils the available evidence on the impact of aggregation on the financial viability of water supply functions following aggregation and related reforms, including the ability to fund investment; financial viability; debt and credit ratings.

### 5.1 Ability to fund investment

There is considerable evidence that the structural reforms in the jurisdictions examined in this study were largely successful in achieving one of their key objectives: enabling the funding of major investment programs (typically to meet drinking water quality and environmental standards).

For example:

- More than £116 billion was invested in water infrastructure in England in the 25 years since privatisation to address chronic past under-investment, primarily around drinking water quality and environmental standards.
- In Tasmania, since 2009 approximately \$1 billion in capital investment has been made in the sector. However, it is important to note that funding of TasWater's very large capital program was secured via a combination of lower dividends, price increases to customers via a well-defined price path, a State government equity injection and productivity savings.
- Scottish Water invested £1,265 million from 2002 to 2005, with large proportions spent on improving drinking water and environmental outcomes. Growth in capital expenditures has now slowed and in some years declined over the last ten years as initial works to improve compliance and service requirements have been completed.
- Wellington Water has developed a stable financial model but this has taken some time to put in place.

### 5.2 Financial viability

Most utilities post-merger are in strong financial positions and are self-funded without any central government support (the exception being Irish Water). For example:

- TasWater has moved to a sound financial footing. The most recent State of the Industry Report found that TasWater has sufficient revenue to maintain financial sustainability, with a net profit after tax of \$28.6 million in 2016-17. OTTER observed that during the year, TasWater returned \$19.5 million to its shareholders as dividends which represented 68% of its profit after tax (not including income tax equivalents and guarantee fees which totalled \$10.5 million). It also noted that TasWater's net debt to equity ratio continues to rise although, at 29.8%, the ratio is lower than almost all of its mainland counterparts and is much lower than the median of all major utilities in Australia at 79%. OTTER did note however that TasWater's economic rate of return remain relatively low as it continues to work towards meeting its regulatory compliance obligations.<sup>36</sup> OTTER did note however that TasWater's economic rate of return remain relatively low as it continues to work towards meeting its regulatory

<sup>36</sup> OTTER, Tasmanian Water and Sewerage Sector State of the Industry Report 2016-17, p.79.

compliance obligations.<sup>37</sup> It is important to note that funding of TasWater's very large capital program was secured via a combination of lower dividends, price increases to customers via a well-defined price path, productivity savings and a \$200m State government equity injection. This equity injection, for a return of 10% stake in Taswater, is designed to increase and speed up the capital works programs in Taswater whilst keep water bill increases below 3.5% by 2025.<sup>38</sup>

- Annual reports show that Watercare has maintained a strong financial record since merging bulk water and wastewater services. The most recent financial statement in 2018 shows a budget surplus, with growth in operating and depreciation costs not exceeding growth in revenue. At the time of integration of retail functions in Watercare in 2010, Watercare budget deficits had been recorded in the years preceding and following, driven by higher capital expenditures. Notably, revenue growth has not derived from large increases in water prices over time, with the average water bill prices for residents not changing greatly compared to average household incomes. Watercare funds all of its operating costs and capital projects through water and wastewater service charges, infrastructure growth charges and borrowings. Watercare is therefore financially self-sufficient and is not cross-subsidised from rates revenue from Auckland Council.
- Scottish Water inherited a debt burden of £2.1 billion post-merger and increased borrowing was considered as financially unsustainable by the WIC. Continued reliance on new borrowing would lead to excessive increases in future bills to fund the borrowing. Therefore, under the Water Industry (Scotland) Act 2002, Scottish Water is required to stay within the new borrowing limits. Because of this, the average increase in new debt per connection has remained much lower than water providers in England and Wales over the period between 2002 and 2015.<sup>39</sup> Currently, Scottish Water has ranked consistently among the top performing UK water suppliers financially. The current price determination from 2016-21 produced by WIC requires Scottish Water to reduce operating expenditures by 2.2% yearly and investment costs by 16%, a continual push from WIC to close the efficiency gap between Scottish Water and other UK providers. Despite these ambitious regulatory targets, Scottish Water continues to operate with financial surplus with the last financial year receiving £75 million before tax to be reinvested into capital investment programs and customer service improvements.
- Irish Water is an exception as it is not self-funded. Although Irish Water must operate efficiently according to the economic regulator CRU, it is funded from general government revenue. One of the considerations in creating Irish Water was that a public utility of such scale would have capacity to borrow on the international markets. The idea was that this would enable the company to become financially sustainable over time. Moreover, as an independent company, it could raise debt off the government's balance sheet, and therefore not impact on overall public debt ratios. However, this was predicated on the company being funded primarily through tariffs on both domestic and non-domestic services. (Up to that point, there were no domestic water tariffs in Ireland.) Domestic water tariffs were introduced in 2015, but they were soon removed after significant public backlash. Without domestic tariffs, Irish Water is not considered to be an independent company under EU rules as the government is considered to have "considerable control" of the company (i.e. through funding over 50% of revenue). Therefore, Irish Water is unable to borrow off the government's balance sheet. The consequence of this is that Irish Water is now reliant on the Exchequer both for funding domestic water services, but also for equity to invest in capital programmes.
- Glas Cymru is a single purpose company formed to own, finance and manage Welsh Water. It is a 'company limited by guarantee' and because it has no shareholders, any financial surpluses are retained for the benefit of Welsh Water's customers (see Box 6: ).

<sup>37</sup> OTTER, Tasmanian Water and Sewerage Sector State of the Industry Report 2016-17, p.79.

<sup>38</sup> Taswater, 2018, Councils vote overwhelmingly to support Government becoming a shareholder.

<sup>39</sup> WIC, 2016, Water Industry Commission for Scotland: Integrating customer perspectives in a regulatory setting presentation

**Box 6:** Welsh Water

As a 'company limited by guarantee'; Welsh Water has no shareholders and so its corporate governance functions are the responsibility of its Board, which has a majority of independent non-executive directors, and its Members. The Members comprise around 70 individuals appointed following a process undertaken by an independent membership selection panel. Members are not representatives of outside stakeholder groups but rather are unpaid individuals whose duty is to promote the good running of the company, in the best interests of its customers. Nevertheless, the regulator requires the business to operate as if it were a fully commercial undertaking and a listed company, complying with the Combined Code.

Under Glas Cymru's ownership, Welsh Water's assets and capital investment are financed by corporate bonds and retained financial surpluses. The Glas Cymru business model aims to reduce Welsh Water's asset financing cost, the water industry's single biggest cost.

In common with other water utilities, the prices that Welsh Water charges to its customers are capped by the economic regulator Ofwat. Ofwat calculates the price limits based on the amount of revenue needed to cover operating costs, depreciation and earn on a reasonable cost of capital on the Regulatory Asset Base (RAB).

The price limits that Ofwat sets for Welsh Water are based on same cost of capital figure that is applied to the (traditional equity-financed) water utilities in England. The pricing is therefore based on a full cost of capital, including an implied return on equity. At the latest price control in 2014, to cover the period 2015-2020, the pre-tax cost of capital was around 4.1% in real terms. This regulatory model should therefore allow Welsh Water to generate financial surpluses over and above its debt financing costs.

These financing efficiency savings to date have largely been used to build up further reserves to insulate Welsh Water and its customers from any unexpected costs and also to improve credit quality so that Welsh Water's cost finance can be kept as low as possible. Gearing (measured as debt as a percentage of the RAB) has reduced from 93% in 2000 to 65% in 2014. This reduction in gearing is reflected in improved credit ratings (current ratings are A/A3). These are the strongest in the UK water sector.

If the level of financial reserves is considered sufficient, any additional financial surplus is returned by Welsh Water to customers in the form of a 'customer dividend'. Since 2000 some £150 million has been returned to customers in the form of these customer dividends and, in addition, some £10 million of support has been provided for disadvantaged customer groups via social tariffs and an assistance fund.

Welsh Water has identified the balance between reducing customer bills through customer dividends and the longer-term benefits to customers from retaining higher reserves. In its 2014 Business Plan for the period 2015-2020, Welsh Water stated that the centrepiece of its financing strategy is the maintenance of credit ratings because this is consistent with achieving the lowest possible sustainable bills for customers over the long term.

- If the company were to accept a lower credit rating in AMP6 this would enable it to target lower interest cover ratios, and therefore a lower rate of return on [capital], all else equal. This would be consistent with lower bills in the first instance but would give rise to higher bills over the longer term. This is because a lower credit rating would increase both costs and risk going forwards, in a number of ways:
- A lower credit rating increases the cost of issuing new debt, all else being equal.

- As well as raising the cost of the debt that is issued, a lower credit rating also reduces the flexibility of a financing strategy, in particular by restricting the range of sources available. The lower certainty of being able to raise finance when it needs to do so would increase costs, because it would need to hold additional liquidity. It could also create risks for customers by raising the possibility of delays to necessary investment;

A credit downgrade for Welsh Water could fundamentally change market sentiment towards us, in particular because it could be taken as a signal that further downgrades could be possible in the future. The experience of 1998-2001 shows that once the perceptions of the providers of debt turn negative and are characterised by uncertainty, it is not a matter of companies having to pay higher interest rates on new debt: rather, there is a risk that the providers withdraw completely, and it takes time and effort to coax them back;"

For these reasons, Welsh Water targets a credit rating that is above the level seen in the rest of the industry, where the companies have recourse to equity investors in the event of major adverse shocks.

*Source: Frontier Economics*

However, in some of the jurisdictions the operating models adopted after the reform have resulted in businesses which are financially constrained:

- Regional water suppliers in Victoria have had increases in capital and operating expenditures in recent years, reflecting greater infrastructure investment for system resilience. Most of these regional water utilities are not in a financial position to pay tax. However, the ESC in their price determinations have highlighted that the regulatory asset base is much lower than the depreciated actual historical value of the water utilities' assets. Through the processes calculating the allowable revenue the water business can receive, the depreciated actual historical value of assets for these water businesses would have led to large price increases in the first ESC price determination.<sup>40</sup> As a result, a considerable proportion of the asset costs introduced by these regional water companies in the years before 2004 are not reflected in the companies' regulated asset bases, and therefore cannot be recovered through user water charges. However, the companies may still be actually using assets invested in historically to deliver regulated services and, if so, would be incurring the costs associated with maintaining and financing those assets. Hence, the regulated revenues the businesses are allowed to recover may not be sufficient to cover their actual costs, and this may contribute to the weaker financial positions of some of these businesses.
- In Ireland, the abolition of domestic tariffs has resulted in Irish Water being reliant on the Exchequer (see Box 7.).

<sup>40</sup> ESC Price determinations 2018

**Box 7:** The link between user charges and capacity to finance investments

One of the considerations in creating Irish Water was that a public utility of such scale would have capacity to borrow on the international markets. The idea was that this would enable the company to become financially sustainable over time. Moreover, as an independent company, it could raise debt off the government's balance sheet, and therefore not impact on overall public debt ratios.

However, this was predicated on the company being funded primarily through tariffs on both domestic and non-domestic services. (Up to that point, there were no domestic water tariffs in Ireland). Domestic water tariffs were introduced in 2015, but they were soon removed after significant public backlash.

Without domestic tariffs, Irish Water is not considered to be an independent company under EU rules as the government is considered to have "considerable control" of the company (i.e. through funding over 50% of revenue). Therefore, Irish Water is unable to borrow off the government's balance sheet. The consequence of this is that Irish Water is now reliant on the Exchequer both for funding domestic water services, but also for equity to invest in capital programmes.

*Source: Frontier Economics*

Proactively released by the Department of Internal Affairs

## 6 DRINKING WATER QUALITY AND ENVIRONMENTAL OUTCOMES

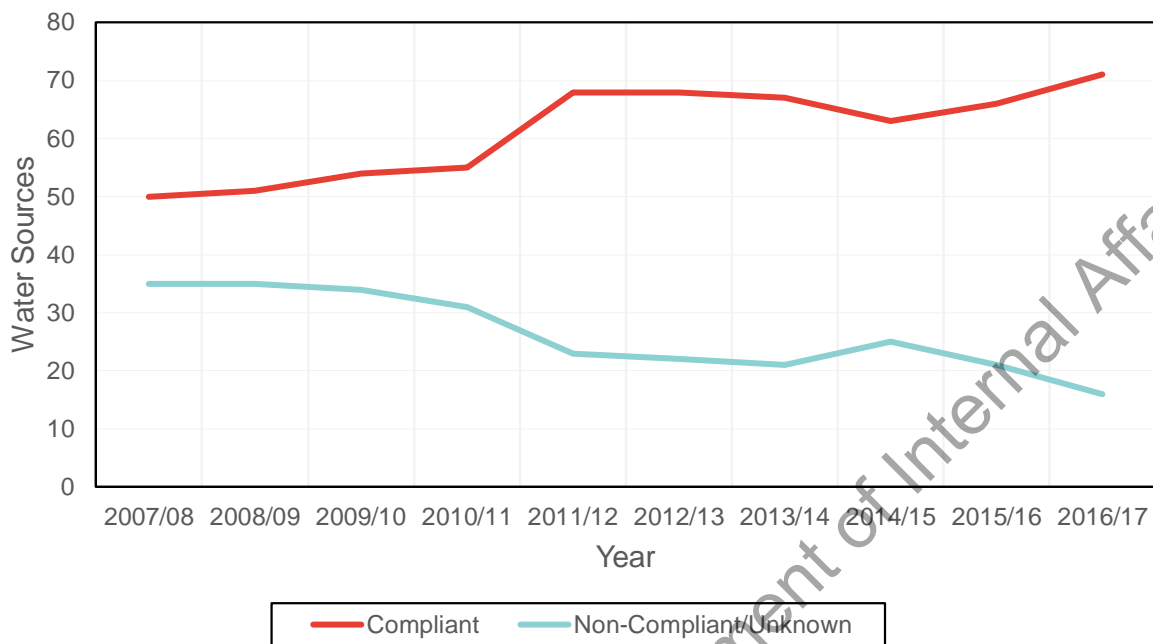
This section distils the available evidence on the impact of aggregation and related reforms on the achievement of drinking water quality and environment standards. This draws on publicly available evidence of improved compliance with drinking water quality standards or reduction in boil water notices and compliance with environmental standards.

### 6.1 Drinking water quality

The available evidence across the jurisdictions suggests that the aggregation and related reforms have led to improvements in drinking water quality performance which were a key driver of reforms in many of the jurisdictions, although in some cases there is further progress required:

- In Tasmania there has been major improvement in water quality outcomes since the commencement of the reforms (see **Figure 9**). As noted in section 2.2 above, prior to the reforms some 23 water supply areas were on permanent Boil Water Alerts. While drinking water public health warnings continued to be required for many years, all have recently been rescinded following acceleration of TasWater's regional towns water supply program. Full compliance with drinking water quality health targets is expected within the next few years. It was reported by OTTER in its 2018 determination that the Director of Public Health considered TasWater's progress in improving water quality to be noteworthy, noting that at that time TasWater had achieved a progressive reduction in public water supplies subject to boil water alerts or public health alerts, and a corresponding reduction in the number and proportion of consumers of public water supplies who receive water that is non-compliant with microbiological health guidelines (less than 1% of the population receives a microbiologically non-compliant drinking water supply from TasWater).



**Figure 9:** Bacteriological Compliance of Water Supplies in Tasmania

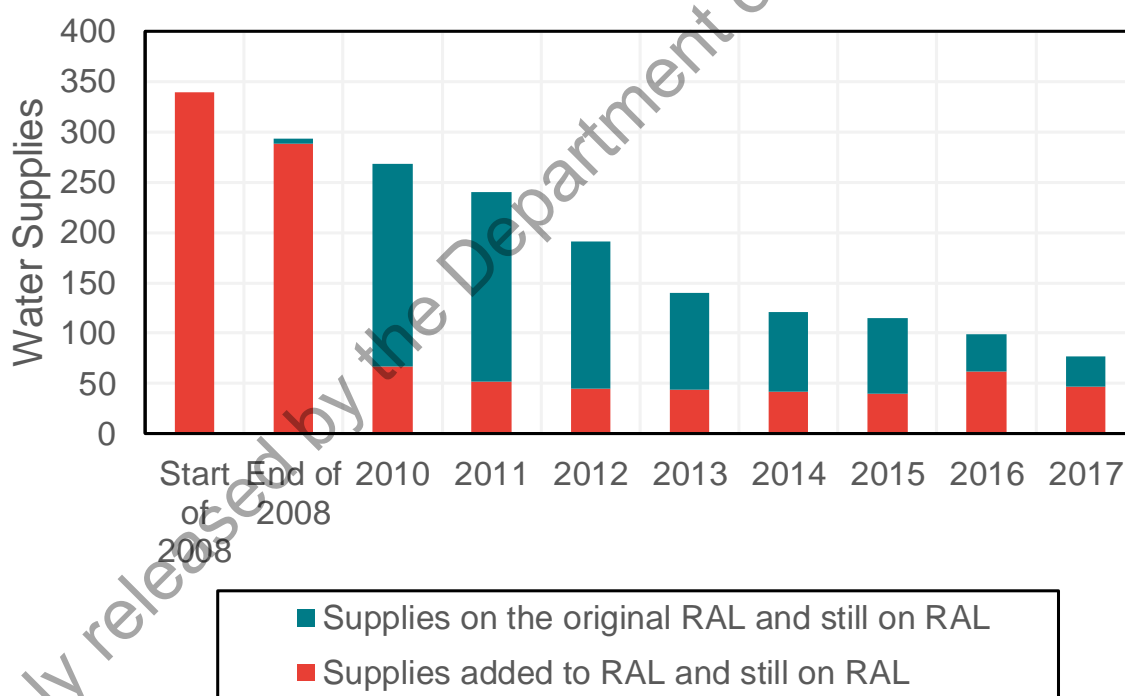
Source: *Tasmanian Economics Regulator State of the Industry Reports*

- In Victoria, the VCEC report points to a small overall improvement to water quality compliance from 1995 to 2006, with the Melbourne retailers achieving 100% compliance in 2005/06. Water quality complaints declined by 36% in the same period. There had always been consistently high compliance in the Victorian water sector before the reforms, and it is difficult to attribute these improvements to any one factor.
- In Ireland, evidence of gains in drinking water quality and environmental outcomes is currently tentative, but with expectations that there will be further gains over time:
  - the latest data available from the CRU from 2016 shows that compliance levels during 2016 increased slightly in some areas, particularly those relating to Trihalomethane (THM) compliance. For other metrics, such as Boil Water Notices and Water Restrictions, there were no significant improvements between 2015 and 2016.
  - The Environmental Protection Agency (EPA) every year since 2008 has published the Remedial Action List (RAL), which lists public water supplies in need of significant corrective action (see **Figure 10**). Supplies are added to the list if they consistently fail compliance of water quality, or if the EPA indicates there is a lack of operational control at the treatment plant. The EPA reports that the number of supplies requiring remedial continues to decline, but this represents a continuation of the trend since before Irish Water was formed, rather than a step change in outcomes. The EPA has identified several priority issues affecting drinking water quality and has recommended that Irish Water take a strategic national approach to these issues. One of these initiatives is conducting water safety hazard plans, which Irish Water has undertaken in increasing numbers in recent years.

**Table 4:** Water quality compliance metrics: Irish Water

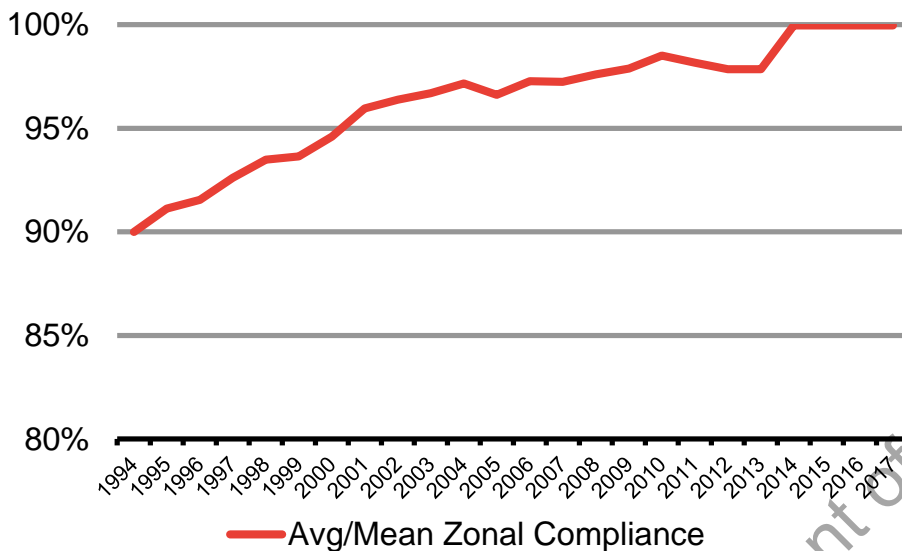
WATER QUALITY MEASURE	2014	2015	2016
Microbiological compliance	99.91%	99.95%	99.94%
Chemical compliance	99.35%	99.38%	99.46%
Trihalomethane (THM) compliance	91.32%	91.22%	93.07%
Lead compliance	97.68%	98.59%	97.83%
E. coli compliance	99.93%	99.96%	99.98%

Source: Irish Water Performance Assessment: CRU Commentary on Irish Water Report No. 2 February 2018

**Figure 10:** Water supplies on Remedial Action List - Ireland

Source: EPA, Drinking Water Report for Public Supplies 2017

- In England and Wales in 1989, regulations were introduced for the first time to set specific targets for drinking water quality. Over the past twenty years the companies have successfully employed a range of expertise to improve services to consumers and the environment. Only 78% of bathing waters in England and Wales met the minimum standards in 1990 and this has risen to 99%. Only 55% of rivers were rated either good or excellent in 1990, and by 2007 this had risen to 72%. Ofwat attributes the high level of compliance to improvement programmes at water treatment and service reservoirs and renovating distribution systems. It is difficult to attribute whether these improvements were driven by mostly privatisation or regulation. However, Ofwat acknowledges that a combination of both, along with rising public expectations and tightening EU regulations has driven the improvements.

**Figure 11** Drinking water quality, 1994-2017

Source: Frontier Economics

- In Scotland the Drinking Water Quality Regulator (DWQR) reported that there has been a steady improvement in the microbiological quality of Scotland's drinking water since 1990s. In 2004, the number of coliform tests not meeting the standards at customers' taps were approximately 0.6%, which is an improvement from 1% of test failures in 1999. The DWQR believes that much of this improvement was due to Scottish Water's investment to refurbish service reservoirs and upgrade/replace smaller water treatment works. Currently, drinking water compliance has remained consistently high in Scotland over the last 10 years and has steadily increased since the first aggregation. In 1997 compliance was around 98% and has now increased to 99.91% compliance in a stricter regulatory environment.
- Watercare has consistently met water quality targets set out by the SOI's according to Watercare's annual reports. These targets include the quality of water in the metropolitan system, as well as more rural supplies and wastewater treatment. One such improvement was in the rural area of Franklin, where a \$116 million Watercare project was prioritised in 2010 and completed in 2015. Watercare's chief executive, Raveen Jadura, attributed the success of the number of projects to the critical mass of funding that has been achieved through the merging of water services in the region:<sup>41</sup>

*When we took over the water supply infrastructure from Franklin District Council when the Super City was formed in 2010, most of the local treatment plants were producing water that did not comply with the Ministry of Health's standards. The former Franklin District Council had been unable to carry out the necessary upgrades to the water network because of its relatively small population that was expected to fund the work.*

<sup>41</sup> Watercare Services Ltd, 2015, 2014/15 Annual Report, p. 24.

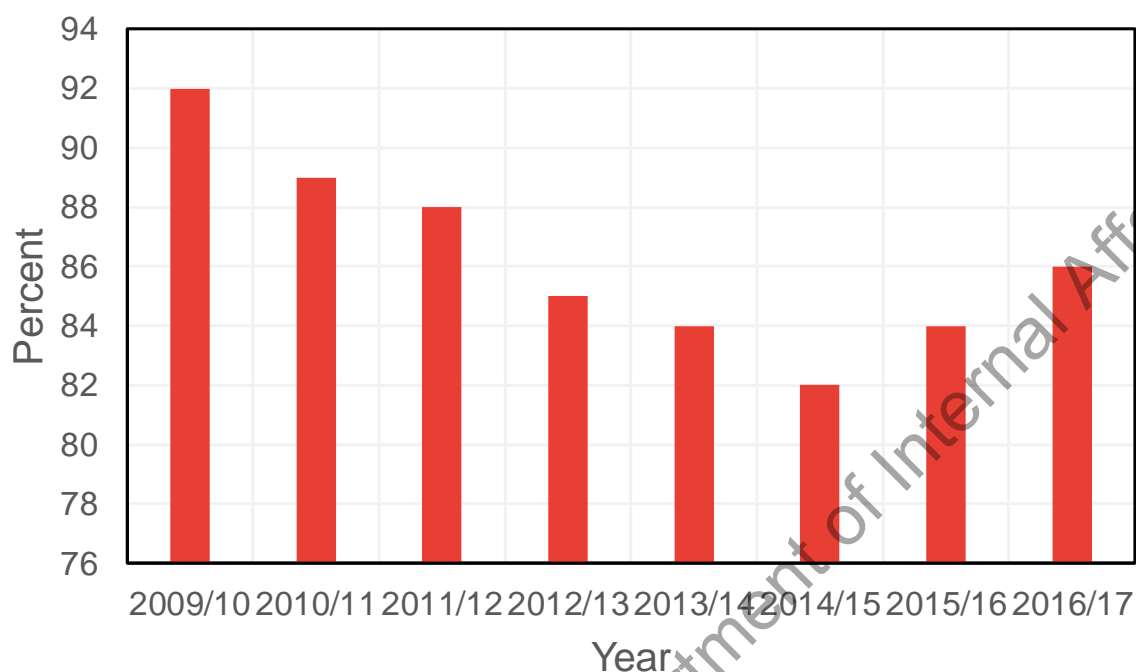
In general it is difficult to attribute improvements in drinking water quality to aggregation as opposed to other factors, most notably the introduction of or better enforcement of drinking water quality regulation. However, as the improvements were largely achieved through major investments in water treatment infrastructure, which in turn were clearly enabled by enhanced financial and management capacity following structural reform, it is reasonable to conclude that both structural reform and more effective regulation contributed to the improvements, and that either on its own would be unlikely to have achieved the improvements which occurred.

## 6.2 Environmental outcomes

The available evidence across the jurisdictions suggests that the aggregation and related reforms have led to improvements in environmental quality performance which were a key driver of reforms in many of the jurisdictions, although in some cases there is further progress required (and improvements in environmental standards have in some case been accorded a lower priority than drinking water quality):

- In Tasmania, while there have been improvements in compliance with environmental regulatory requirements, progress has been slower than the environmental regulator (the EPA) would have preferred.
  - Even by 2017-18, OTTER noted that the performance of the State's sewage treatment plants consistently failed to meet environmental discharge limits with only two of TasWater's 79 sewage treatment plants achieving 100% compliance against regulatory discharge limits in that year.
  - More recently, OTTER's 2018 decision reports that that TasWater and the EPA have developed a memorandum of understanding in recognition that step-change improvement in environmental performance and compliance at Level 2 wastewater treatment plants was required. OTTER observed that while it is premature to comment on progress, there are some promising early signs of improvement.<sup>42</sup> OTTER also noted that improvement site assessments have been completed for 17 wastewater treatment plants and these site assessments are being followed up with improvement action plans (for 11 wastewater treatment plants) and operational control points (for three wastewater treatment plants). The assessments were noted to have delivered on-the-ground improvements, such as the desludging and renewal of diffusers in the aeration chambers at the Rosny wastewater treatment plant, which was completed in September 2017.

<sup>42</sup> For example, state-wide flow weighted compliance has improved from around 42% at the time the memorandum of understanding was signed. Using the TasWater linked limits calculation method, the rolling year to date average (September 2016 to September 2017) is currently 51%, with a peak for May 2017 of 57%.

**Figure 12:** Compliance by TasWater against discharge to waters regulator limits

Source: *Tasmanian Economic Regulator State of the Industry Report 2016/17*

- In Ireland the CRU monitors Irish Water's performance in relation to reducing the number of pollution incidents. The number of pollution incidents increased from 2014 to 2016 (see **Table 5**). However, this increase has been identified as been driven by improved reporting practices rather than a decrease in network performance. Having identified an issue in the standardisation of reporting, Irish Water put in place additional incident training and developed an incident management protocol to more accurately capture data. Again, this points to the challenges in assessing network performance before an appropriate baseline of rigorous data can be established.

**Table 5:** Incidents with potential impacts on environmental and/or human health

CATEGORY	CLASSIFICATION	2014	2015	2016
1	Minor	1,099	1,274	1,305
2	Limited	193	179	146
3	Serious	3	1	2
4	Very Serious	0	0	0
5	Catastrophic	0	0	0
Total Number of Incidents		1,295	1,454	1,453

Source: *Commission for Regulation of Utilities, 2018, Irish Water Performance Assessment*

- In England and Wales compliance requirements have also driven improvements in environmental performance. Significant capital investments have led to improvements in chemical compliance in waterways, pollution incidents, and discharge pollution. Again, a combination of both regulation by the Environmental Agency and greater capital investment after privatisation have been complemented by increased public awareness and EU requirements.
- Scottish Water inherited 168 wastewater treatment plants that were failing or at risk of failing the Scottish Environment Protection Agency's (SEPA) standards. The firm planned to reduce this number to 45 by March 2006 as part of their £480 million investment programme to improve sewer systems and wastewater treatment plants. SEPA's assessment of Scottish Water's compliance with public sewage discharge shows an increase from 88-89% (2002-2003) to 91% in 2004. In 2017, over £1 billion has been invested in environmental quality measures, which has resulted in none of these wastewater treatment plants failing serviceability measures.
- In Auckland Watercare has invested in major replacements of interceptors for wastewater in Auckland. These interceptors are designed firstly to replace old pipelines servicing sewer systems in Auckland, but also to ensure that the wastewater network overflow during wet weather is significantly reduced. These overflow events bring contaminated wastewater into local waterway systems and eventually into the Manukau harbour. This, along with other large-scale capital investments are part of the integrated asset management plans of Watercare. Large projects such as these would have occurred without integration in 2010, given that Watercare managed most of these larger assets already since 1998. However, according to the 2016 Central Interceptor review by Watercare, the availability of greater financial capital, procurement strategies and regional management have enabled Watercare to achieve a greater number of high-profile projects simultaneously, as seen with its asset management plans since 2010.

Again, it is difficult to attribute improvements in environmental outcomes to aggregation as opposed to other factors, most notably the introduction of or better enforcement of environmental regulation. This is especially true given that some jurisdictions introduced stricter and better managed environmental compliance. For example, England and Wales transferred water pollution and management away from the water providers and to the National Rivers Authority in the same year as privatisation, in which had the ability to enforce EU requirements in water management.

However, as the improvements were largely achieved through major investments in wastewater treatment infrastructure, which in turn were clearly enabled by enhanced financial and management capacity following structural reform, it is reasonable to conclude that both structural reform and more effective regulation contributed to the improvements, and that either on its own would be unlikely to have achieved the improvements which occurred. It is also important to note that there can be a significant delay between improved regulatory compliance and improved environmental outcomes, particularly if the receiving environments are in poor condition.

## 7 IMPACT ON LOCAL GOVERNMENT

This section examines the evidence on the impact of aggregation of local government water supply on broader local government functions and concerns. Examples of these concerns include potential impacts on council finances, impact on the ability to deliver other local government functions, potential loss of direct local control over services and impacts on local employment.

### 7.1 Impacts on local government finances

One potential concern with aggregation of local government water and wastewater service providers is that this will result in a loss of a revenue source for local governments and/or that there are significant cost associated with the process of aggregation (see section 3.2.3).

In cases where there was a transfer of ownership of water service assets from local government to other parties (e.g. in Victoria and Ireland where asset ownership passed from local government to a higher level of government or in England where the industry was privatised), the financial impact varied depending on the financial value placed on the assets transferred and paid in recompense. However, it also needs to be recognised that the transfer of assets also relieves the original local government owners of their ongoing obligations for service provision and investment, and the financial burdens which might have otherwise had to be borne to fund major investments. Indeed, a key driver of reforms in these jurisdictions was the inability of local government to fund needed upgrades in infrastructure.

In cases where ownership of the water utility remained with local government, the financial impact on local government will depend critically on the ownership and governance arrangements that were put in place. For example, in Tasmania, local governments were allocated a share of the TasWater ownership based on the relative size of pre-merger asset values. The retention of (joint) ownership of the new utility by local governments meant that access to dividends offsets lost council revenues from supplying water and wastewater services directly – and for many councils relieved them of direct financial responsibility or liability for having to maintain or upgrade existing assets. While dividends were reduced in order for the shareholders to make some contribution to funding the large-scale capital program undertaken by TasWater, these investments would have had to be financed in some way under the counterfactual of continued provision by the 29 individual councils – and it is difficult to see how some of the smaller councils would have been able to fund the sometimes significant investments required (indeed prior to the reforms investments to renew assets were simply not being made).

In the view of Mike Brewster (TasWater CEO), most councils were focussed on the 'big picture'.<sup>43</sup> While initial issues as to how to establish Taswater when considering assets bases across the councils, Mike Brewster has the view that this is somewhat remedied by taking a whole state/jurisdictional view and pushing through this quickly. Since, the establishment of TasWater is viewed by the councils as being very positive, evidenced by the strong campaign the councils engaged in to retain TasWater in predominantly local government ownership when the State Government recently proposed to take ownership of the business. The Local Association of Tasmania noted that the agreement finally reached with the State Government through a memorandum of understanding:<sup>44</sup>

<sup>43</sup> Mike Brewster, Presentation to New Zealand water summit 2018

<sup>44</sup> Local Government Association of Tasmania Annual Report 2017-18, p.13

*...allows Local Government Owners to build upon the excellent work undertaken by TasWater to date, will secure the dividends for councils which importantly contribute to other local infrastructure, and will enable the Government to meet its commitments with regard to pricing and infrastructure investment.*

## 7.2 Loss of control of local services

Another potential cost of aggregation relates to the perceived loss of control of service provision at a local level as well as concerns about loss of local employment if water-related services are centralised.

Again, these impacts will depend heavily on the precise governance and related arrangements which are put in place. The challenge is how to best balance these local impacts with the provision of efficient and effective services. Different approaches have been taken in different jurisdictions:

- In Ireland, the previous model was seen to have some advantages, namely a local body accountable to the local community for the provision of water services; the ability to draw on the wider resources of the local authorities in times of great need for water services; and operational effectiveness of the current locally based maintenance teams with water engineers who "know their assets" and the associated asset maintenance regimes. As noted in section 2.3, the new model sought to retain these advantages in part through the implementation of Service Level Agreements (SLAs) between Irish Water and local authorities. These SLAs were intended to provide greater certainty for local authorities and existing staff through statutory protections for the terms and conditions and pensions of workers, should these agreements be terminated. SLA costs were initially about 74% of Irish Water's operating expenses, with its proportion decreasing as over time service provision is passed over to Irish Water. However, it has been recognised by the CRU that the SLA model may be impeding Irish Water's ability to deliver cost reductions in the short term, and that a unified approach to operating water and wastewater services under one utility in the manner proposed will lead to greater efficiencies and improved services to customers over time.
- In Wellington, the councils that are part of the shared services model have retained responsibility for delivering potable water through their own distribution networks to end customers; collecting, treating and disposing of wastewater; and collecting and disposing of stormwater. Again, however, questions have arisen as to whether funding within individual council budgets has constrained efficiencies and adoption of optimal regional solutions.
- In Tasmania, considerable effort was put in to establishing governance arrangements to ensure TasWater operated within a framework for ensuring local councils' interests were addressed as this was a major concern of councils prior to the structural reforms being implemented. Specific governance arrangements were agreed which were intended to provide guidance to TasWater as to how the local governments' interests should be taken into account by TasWater but without day-to-day intervention in its operations. This includes a Shareholder's Letter of Expectations which sets out the Owners' expectations of TasWater including balancing of commercial imperatives with regional impacts and state-wide economic objectives.
- In Victoria, each of the non-metropolitan water businesses is subject to a Statement of Obligations and are generally seen as remaining closely connected to their communities and undertake a diverse range of activities which support community purposes.



### 7.3 Loss of economies of scope with other council functions

One potential concern with aggregation of local government water and wastewater service providers is that this may lead to a loss of economies of scope with other council functions (e.g. roads and transport, communication, waste management, or recreational services). It has also been suggested that economies of scope also arise from the ability to effectively and efficiently coordinate strategic land use planning and land use development control with infrastructure intensive services such as water supply and sewerage services.

Such issues do not appear to have emerged in practice as a major problem in the jurisdictions examined in this study. Indeed, the available suggests that concentration of water-related services within a specialised provider has led to significant performance improvements. Anecdotal evidence from Watercare is that where maintenance services were previously provided by small local contractors more of this work has been brought in-house but under a model where operational activities are decentralised<sup>45</sup>.

One issue that has arisen in a number of jurisdictions however is how to best assign responsibility for stormwater management. Stormwater management has the potential of providing economies of scope with water supply and wastewater, given the parallels of integrated water management, water treatment and disposal. Another issue is whether this should be undertaken at a regional rather than local level.

In most of the jurisdictions where aggregation of local government water-related services has occurred, this has been limited to water and wastewater services, with stormwater remaining the responsibility of local government. In some cases this does not appear to have led to optimal outcomes. For example, Local Government NSW stated that local NSW councils had a stormwater drainage infrastructure backlog of \$633 million in 2012. Stormwater Australia notes that this was due to local councils finding it difficult to raise sustainable revenue streams and responsibility for better stormwater management outcomes being outside the mandates of local councils.

A notable exception is in Melbourne, where Melbourne Water has stormwater and flood management functions across the Melbourne metropolitan area. The Water Services Association of Australia (WSAA) highlighted that the Melbourne Water management of water, wastewater and stormwater is one of the better models available for stormwater management. This is due to legislation and regional coordination allowing for effective delivery of stormwater and flood management projects. In this case, economies of scope between the services is captured when critical mass enables funding of larger scale projects such as wetlands and trunk systems.

---

<sup>45</sup> Raveen Jaduram, CE Watercare Services limited, pers com, 16<sup>th</sup> April 2019

## 8 SOURCES AND DRIVERS OF COSTS AND BENEFITS

The preceding sections have identified a range of costs and benefits which have been observed following aggregation and related reform to the water sector in a number of jurisdictions. This section seeks to identify the key sources and drivers of these cost and benefits.

A particular focus is to provide informed commentary on the extent to which the reported costs and benefits can be reasonably attributed to aggregation as opposed to related regulatory and other reforms.

Given that the structural reforms were in most cases accompanied by a suite of other governance, regulatory and pricing reforms it is impossible to be definitive about the extent to which the observed costs and benefits can be ascribed to aggregation as opposed to these other reforms. In addition, there are a range of external factors independent from institutional changes (e.g. natural events) which contribute to observed outcomes.

The following discussion provides our observations on the potential contributions of:

- Aggregation/structural reform;
- Complementary regulatory and pricing reforms; and
- External factors.

### 8.1 Aggregation/structural reform

The evidence presented in this report shows there were a range of cost and benefits following aggregation and related reforms to the urban water sector in the jurisdiction examined in this study. The overwhelming balance of evidence is that the reforms have in most cases achieved their objectives, although in some cases this has taken considerable time or is still in progress.

While aggregation and related governance changes is clearly not the only driver of the observed improvements in performance, the observed experience suggests that it was key in providing the managerial and financial capacity to undertake the actions required to improve performance. In particular, aggregation appears to:

- Offer opportunities to realise economies of scale;
- Enable critical mass and recruitment of expertise to undertake transformational management;
- More easily facilitate the adoption of regional solutions;
- Enable funding and delivery of large-scale investment programs; and
- Spread the costs across a broader customer base.

The fact that performance improvements were observed in jurisdictions where there were not accompanying regulatory reforms (e.g. Auckland) supports this conclusion.

In our view it is inconceivable that the progress that has been made in many of the jurisdictions we have studied would have been made if only regulatory reforms had been adopted and no structural reforms had been made in the jurisdictions examined. As noted earlier, as improvements in drinking water quality

and environmental performance were largely achieved through major investments in water and wastewater treatment infrastructure, which in turn were clearly enabled by enhanced financial and management capacity following structural reform, it is reasonable to conclude that both structural reform and more effective regulation contributed to the improvements, and that either on its own would be unlikely to have achieved the improvements which occurred.

## 8.2 Complementary regulatory and pricing reforms

Most aggregations have coincided with introduction of complementary regulatory, governance and pricing reforms.

These reforms have clearly also been a major driver of improved performance. As evidenced in this report:

- Independent economic regulation has increased pressure on businesses to provide services as efficiently as possible and to focus on customer outcomes;
- More effective governance arrangements have provided clearer direction and discipline on management; and
- Clearer and better enforced drinking water quality and environmental regulation has sharpened focus on achieving compliance with regulatory obligations.

In our view, it is telling that in all of the overseas jurisdictions we have investigated, these sorts of reforms have been rolled out alongside industry aggregation. This is because all of these reforms appear to be complementary. It seems unlikely that simply making organisations larger will on its own result in better management and performance. It is necessary to create the conditions for management to pursue better performance, including through greater regulatory oversight and effective governance.

Equally, it is unlikely that the introduction of independent economic regulation, new governance models and clearer and more effective enforcement of water quality and environmental standards would have achieved the same level of improvements in the absence of structural reform which enhanced the ability of the regulated businesses to comply (or improve compliance). For example, while there was some form of drinking water quality and environmental regulation in place prior to the structural reforms, these standards were not being met – in some cases because compliance was not properly enforced by the regulators in the knowledge that the water suppliers were not in a position to do so.

The evidence suggests that the most significant improvements in performance are realised when aggregation goes hand-in-hand with complementary reforms of the kind described above.

## 8.3 External factors

Clearly the observed costs and benefits following reforms can also be influenced by external factors that are independent of the reforms (e.g. natural events such as drought, earthquakes or floods, climate change). While it is important to take such external factors into account when seeking to attribute observed outcomes to reforms which were adopted, perhaps a more important observation is that aggregation in itself can enhance resilience and the ability to manage such events.

## 8.4 Conclusion

It is difficult to clearly attribute the impacts of mergers because of complementary economic, health and environmental regulatory reform (most jurisdictions).

While structural reform is clearly an important driver of benefits, a reform model that best facilitates aggregation and regulation to achieve its outcomes appears to lead to the best outcomes:

- Structural reforms can provide the *capacity* to deliver performance improvements; and
- Regulatory and governance reforms can provide the ongoing *incentives* to deliver performance improvements.

Proactively released by the Department of Internal Affairs

Proactively released by the Department of Internal Affairs

**frontier economics**

BRISBANE | MELBOURNE | SINGAPORE | SYDNEY

Frontier Economics Pty Ltd  
395 Collins Street Melbourne Victoria 3000

Tel: +61 (0)3 9620 4488

[www.frontier-economics.com.au](http://www.frontier-economics.com.au)

ACN: 087 553 124 ABN: 13 087 553