

From: [Dent, Alan](#)
To: [Sam Ponniah](#)
Cc: 9(2)(a) [@dia.govt.nz](#); [Tan, John](#)
Subject: RE:Feedback on the industry study
Date: Sunday, 11 April 2021 10:26:46 am
Attachments: [image007.png](#)
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Sam

Let me know what times you might have tomorrow for a call. Just want to make sure we have a meeting of minds re how deep you are expecting us to go re some of the material sent through. We can certainly pick up on key themes e.g.

- Workforce is not just an issue in NZ
- Responses to the challenge can be observed in other jurisdictions e.g. US etc
- Further – it is not just about replacing like for like
- New technologies are driving changes in how the sector operates – which are requiring new skill sets
- Those new skill sets will be in demand beyond just water – so water needs to have a competitive proposition
- Longer term productivity gains will require not only the capital (i.e. ability to pay) and access to new technologies but also a workforce versed in (i) creating the new assets/networks and related systems and (ii) ability to operate
- This in turn will have implications for the supply chain from both a labour and an equipment perspective

That said

- There is a huge amount of investment required just to get an understanding of what assets exist currently/the state of those assets
- It is unlikely that the sector can wait till all the ducks are aligned in a way that permits a near term step change in the way the sector operates – current asset conditions don't offer that window
- Therefore, in the near to medium term a lot of the investment will still look relatively conventional
- Which means that labour intensive (skilled/semi-skilled) FTEs are going to be a big part of the stress – as these are the people who are needed to deliver on the ground

We are aware of thinking/actual initiatives around digital utilities – including having access to the plans from some of the Australian water utilities specifically related to that issue. From a credibility perspective we have been reluctant to go too hard down that route given where the industry is starting from and at least some feedback that suggests that there are still questions re the benefits v costs of going too hard, too early around all things digital.

I am available most times tomorrow

Cheers

Alan Dent

Partner | Corporate Finance

Deloitte

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From: Sam Ponniah <9(2)(a)@martinjenkins.co.nz>
Sent: Friday, 9 April 2021 5:44 PM
To: Dent, Alan <9(2)(a)@deloitte.co.nz>
Cc: 9(2)(a)@dia.govt.nz; Tan, John <9(2)(a)@deloitte.co.nz>
Subject: [EXT] Feedback on the industry study

Hi Alan

Thanks for providing us with the draft of the industry study.

As noted, I've shared this internally and with a selected group of stakeholders (Taituarā, LGNZ and Treasury) and below is the consolidated set of feedback. Also attached are our embedded comments in the report. Happy to discuss next steps once you've had a chance to consider the feedback. I've also attached WICS efficiency slides, which document the efficiency gains in Scotland and how these have been achieved.

1. **More extensive use of the readily available literature.** As a general comment, we think there are some broader trends and insights from the readily available literature that could be reflected in the study, for example:
 - o Labour shortages in the sector internationally and what governments are doing about it:
 - <https://www.epa.gov/sustainable-water-infrastructure/water-sector-workforce>
 - <https://www.brookings.edu/wp-content/uploads/2018/06/Brookings-Metro-Renewing-the-Water-Workforce-June-2018.pdf>
 - https://www.waternz.org.nz/Attachment?Action=Download&Attachment_id=973
 - <https://iwa-network.org/addressing-talent-shortages-in-the-water-sector-is-pivotal-for-utilities-operational-reliability/>
 - https://www.epa.gov/sites/production/files/2020-11/documents/americas_water_sector_workforce_initiative_final.pdf
 - o Broader trends impacting the sector / workforce globally
 - https://www.wsaa.asn.au/sites/default/files/publication/download/WSAA%20Workforce%20Skills%20of%20the%20Future_0.pdf
 - <https://www.idrica.com/blog/trends-for-the-water-industry-in-2021/>
 - https://www2.deloitte.com/content/dam/Deloitte/pl/Documents/Reports/pl_Water-Tight-2-0-The-top-trends-in-the-global-water-sector.pdf

Water NZ efforts to develop a workforce strategy

- https://www.waternz.org.nz/Category?Action=View&Category_id=1060
 - Digital transformation - mentioned in the above articles but also specific examples here:
 - <https://www.scottishwater.co.uk/about-us/news-and-views/220719-blog-john-cairney-digital-transformation>
 - <https://www.smart-energy.com/industry-sectors/iot/scottish-water-atos-capgemini/>
 - <https://thesolutionsjournal.com/2020/05/14/future-water-digital/>
 - Customer focus
 - https://www.waternz.org.nz/Attachment?Action=Download&Attachment_id=2621

Would be good to reflect these in the final report to provide a better understanding of how the sector has changed, is changing or is likely to change, and what implications this has in thinking about implications for the supply chain.

2. **The risk of loss of skilled labour** to Australia was questioned (see embedded comments in the report but is it worth a wider look at the differences between the water sector in Australia and NZ e.g. why is the labour market more highly valued? This could extend to better understanding the maturity and effect of regulation within their sector)
3. **Workforce transition risks and how these should be mitigated (linked to the above point about looking internationally)**. On the presentation relating to workforce, there seems to be a major gap in terms of the training and development pathway – there are (still) obstacles in NZ, and bodies such as Water NZ has previously submitted on the current system. Slides 9 & 10 don't include contributions to workforce by Training Providers and Training Specifiers within the system. There also appear to be gaps in terms of science staff e.g. labs, monitoring, compliance. In upsizing the sector workforce to the estimated 8,444, these institutions will be critical, as will recruitment and certainty around regulation (especially relating to wastewater and freshwater management regimes).

When you interrogate the pathways required for specifying and development of training, undertaking the training, and ongoing CPD/competency assessment it is more likely to take 5 -10 years to scale up, rather than the 2-5 stated.

The short to medium term timeframe coupled with transition risks appear at face value to have a reasonable chance to catch implementation of reform off-guard and lead to stifling supply, which puts implementation objectives of the reform at risk.

This reinforces the need for a workforce strategy to begin as early as possible. Is there more detail from the interviews or the literature on key features or principles for a strong transition pathway? Maybe drawing on the case studies?

The language here should be focused on opportunities as much as risk – what are the policy settings and other actions required to support the transition? The studies / articles above provide some useful examples to help.

4. **Innovation**. The section on innovation and productivity provides some useful insights into the drivers of productivity. Would be interested to know if there were more specific views on innovation (e.g. some water distribution companies are considering options to build renewable energy functions into their water systems – given climate goals etc. Reform is likely to enable opportunities for greater innovation within the sector but what are the drivers for this (e.g. scale, clarity of policy, longer-term focus?).
5. **Medium to longer-term implications of COVID**. There was some discussion about short-term implications but is this likely to be material over the longer term?

Cheers

Sam

Sam Ponniah | Senior Consultant

MartinJenkins

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From: 9(2)(a)
To: [Sam Ponniah](#)
Cc: 9(2)(a); [Tan, John](#); [Dent, Alan](#); 9(2)(a) [@dia.govt.nz](#)
Subject: RE:NZ business demography stats
Date: Monday, 12 April 2021 11:24:45 am
Attachments: [image001.png](#)
[image002.png](#)
[image003.png](#)
[image004.png](#)
[image005.png](#)

That is very helpful. Thank you, Sam (and Nick).

Cheers,

9(2)(a)
M: 9(2)(a)

From: Sam Ponniah <9(2)(a)@martinjenkins.co.nz>

Sent: Monday, 12 April 2021 9:21 AM

To: 9(2)(a) <9(2)(a)@deloitte.com.au>

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Dent, Alan <9(2)(a)@deloitte.co.nz>; x@xxx

Subject: [EXT]NZ business demography stats

Hi 9(2)(a),

If you haven't looked at this already, Nick reminded me today that the NZ business demography statistics has data that might help with defining direct/indirect employment in the three waters sector. This might help to explain some of the difference between the Water NZ figures and the ~25,000. The "water supply, sewerage and drainage services" category has an employee count (headcount not FTE equivalent) of about 2,000. Have also included "other waste collection services" and "other heavy and civil engineering construction", the latter has an employee count of 20,000, a large proportion of which I presume would relate to construction and repair of plants etc. It also breaks down by region and TA. If nothing else, it provides a useful complement to the Water NZ figures so can help to fill in some of the data gaps.

Link here and see attached table that I extracted this morning

<http://nzdotstat.stats.govt.nz/wbos/Index.aspx?DataSetCode=TABLECODE7601#>

See <https://www.fwc.gov.au/awards-and-agreements/minimum-wages-conditions/annual-wage-reviews/previous-wage-reviews/annual-wa-0> for explanations of the different classifications

Cheers

Sam

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From: [Tan, John](#)
To: [Sam Ponniah](#)
Cc: [Dent, Alan](#); 9(2)(a); 9(2)(a); 9(2)(a); 9(2)(a)
Subject: Exec Summary
Date: Tuesday, 13 April 2021 10:09:07 am
Attachments: [Exec Summary v1.0.docx](#)

Sam

In advance of our catch up this morning, I have sent through a copy of the draft Exec Summary that we intend to include in our report. The report is going through final tabulation and edits today with a view to circulating it for final review by Alan, Paul and myself today and providing this to you tomorrow. Note that the Exec Summary hasn't been finally reviewed and some of the numbers in square brackets could change marginally – but we do not expect the substance of the narrative to change. Does that timing work for you?

John

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DIA 3 Waters Report – Executive Summary

Economic Impact Assessment

Deloitte Access Economics has used its in house Regional General Equilibrium Model (DAE-RGEM) to model the potential impact of reform based on two scenarios:

- The **counterfactual scenario** which sets out a possible pathway of what Councils might be expected to spend if the reform did not proceed.
- The **system transformation scenario** sets out the effect of a policy reform scenario where water services are provided by a small number of asset owning multi-regional water service entities (WSEs), operating under efficient regulatory standards, economic regulation and significantly improved access to capital resulting in a substantial uplift in capital expenditure

Each of the scenarios above have a high and low case – resulting in four economic impact scenarios modelled. Each scenario shows that reform could deliver significant economic benefits:

| Scenario | Change in GDP | Change in Production | Average change in FTEs | Average wage increase | Increase in Taxes |
|---|---------------|----------------------|------------------------|-----------------------|-------------------|
| 1. Low Scenario: Low system transformation vs low constrained counterfactual | \$12b | \$23b | 4,321 | 0.7% increase | \$3b |
| 2. Optimistic Scenario: High system transformation vs low constrained counterfactual | \$26b | \$52b | 9,544 | | \$6b |
| 3. Historic Scenario: Low system transformation vs historic counterfactual | \$19b | \$37b | 7,231 | | \$4b |
| 4. High Scenario: High system transformation vs high constrained counterfactual | \$23b | \$42b | 8,209 | 1.4% increase | \$5b |

The economic impact analysis shows that under our preferred analysis range, which contrasts the Low and High Scenarios described above:

- Reform is likely to deliver significant economic benefit of [\$12 - \$23 billion] over the next 30 years, in real NPV terms¹ relative to the counterfactual.
- This is equivalent to the New Zealand economy being [0.23% to 0.43%] larger per annum than it otherwise would have been in the counterfactual.
- Tax revenue may increase by [\$3 - \$5 billion] from 2022 to 2051 in real, NPV terms.

The reform is also projected to increase employment in the New Zealand economy:

¹ All references to NPV are calculated over a 30 year period (2022 to 2051) using a real discount rate of 5%

- By adding between [4,321 to 8,209] full time equivalent (FTE) jobs on average per annum over the next 30 years compared with the counterfactual.
- This represents [0.19% to 0.37%] of the current total workforce in the economy or between [0.26% and 0.50%] of the total FTE jobs in the economy.
- We expect the number of FTEs in the water sector may initially decline by approximately [1,191 to 2,387 FTEs pa initially], relative to the counterfactual, as a result of efficiencies gained through the removal of duplicative jobs as a result of the reform, more efficient capital, and limited mobility as a result of an aging workforce. This initial decline is relative to an assumed current water sector workforce of [~9,000 FTEs]. However, overall we still expect total water sector employment to be nearly 80% higher than current levels after 30 years.
- Scotland had a similar outcome in its water reform with Scottish Water's headcount reducing by 2,500 FTEs as a result of the reform, but total employment in the water sector and supply chain has increased by a net estimated 4,000 FTEs. WICS noted that New Zealand could experience something similar.
- The reform is expected to support growth in jobs across all other sectors in the economy, with the greatest positive impact expected in the construction, trade, business services and other services sectors.
- Reform is also expected to generate an increase in average wages of between 0.7% and 1.4% over the 30 year period modelled.

The positive economic impact is expected to be distributed across New Zealand's regions and reflecting the heterogeneity of the regions' relative size, capital intensity, water intensity and import penetration:

- Every region is expected to be positively impacted by the economic impact of reform in terms of GDP growth and employment growth.
- Relative to the size of existing regional GDP, the economic impact of reform on the large metropolitan areas is on average closer to the national average, with the Auckland region being enjoying the lowest relative GDP gain. The provincial and rural regions enjoy the highest economic impact relative to the size of existing regional GDP.
- The relative employment impact as a result of the reform across region has been estimated by looking at the estimated additional FTEs expected to be generated for each region divided by the proportion of the current regional workforce. On this measure, the metro regions enjoy lower relative employment benefits, other than Wellington and other regions which have a strong public administration, education and business services workforce relative to the national average. Provincial or rural status is not determinative of employment impact.

The positive impact is also distributed across industries. Trade, Financial Services, Business Services, and Other Services are expected to see the largest increases in GDP as a result of reform. Other Services includes Public Administration and Defense, Education, Human Health and Social Work activities, and Dwellings (i.e. housing). These are large sectors, which all benefit from the GDP and output growth the Reform facilitates. In addition, the Dwellings sector is a large capital user, which benefits from more efficient capital as a result of reform. The step up in investment as a result of Reform increases capital efficiency, and therefore output in the water sector. However, from 2034 onwards, due to efficiency driven cost savings GDP in the water sector is expected to decline.

Affected Industries

We have validated the economic impact analysis through targeted stakeholder interviews to test the potential implications of the reform on a number of industries. We tested the stakeholder information through the use of international and local case studies and perspectives from Taumata Arowai – the new regulator. We also considered the implications and considerations.

Significant change on industry participants is expected post reform:

- **Councils** who participate in the reforms will no longer control water assets. While this may result in a reduction in the Council workforce, it is expected to be more than offset by investment in regions by the new water entities.
- **Engineering, consulting and advisory firms** will scale up their investment in operations and employees, despite likely issues with finding skilled labour.
- **Contracting firms** expect to see bigger workforces and a higher focus on compliance areas given the new regulatory environment. International firms may draw on offshore expertise and technology but will still need to deploy significant numbers of people on the ground.
- **Materials and equipment providers** are already scaling up in some cases in preparation for reforms. Over time, increased investment in the sector is likely to result in an acceleration in the deployment of new technologies which will flow through to operational efficiencies.

Supply Chain: Greater visibility of the investment pipeline is seen as a key driver of improvements in the efficiency and scale of the supply chain:

- The scale of the investment pipeline is likely to be attractive for new entrants, particularly major organisations with a significant presence in Australia but which are not currently present in New Zealand.
- Participants with an existing presence in New Zealand are likely to scale up their local operations as they gain greater confidence in the reform. While new / scaled up entities may bring new capability, there is a likelihood that this may involve the acquisition and consolidation of local entities or existing capability.
- There is likely to be significant benefits of supply chain scale – including higher spend across standardised requirements, standardisation of parts and materials and greater purchasing power, and the availability of greater specialisation.
- There is potential for existing smaller and mid-scale domestic operators to be squeezed out – reducing the potential diversity of the supply chain – especially as a result of lumpiness or uncertainty associated with the project pipeline through the transition period.
- New Zealand is considered a small market by international standards for materials and equipment. While the current global supply chain is still being disrupted from the effects of Covid-19, a significant step up in investment is not expected to have a significant impact on the ability to access material and equipment over and above the generic challenges that the country faces by virtue of its scale and location.

Labour Market: the water sector is experiencing a workforce shortage, which is likely to be exacerbated by the reform in the short to medium term.

- The delivery of water services and the related capital expenditure required to sustain and expand water infrastructure is labour intensive – particularly in relation to renewals/minor capital works which represent a significant element of the overall capital spend.

- The number of qualified staff needed to deliver capital works is already under stress due to a lack of overseas resources, increasing remuneration expectations and other opportunities in the wider construction sector. The contractor market is currently sized to reflect historic delivery requirements. The workforce is expected to be squeezed further as spending on Three Waters projects, shovel ready infrastructure projects, climate change and RMA reforms increase nationally.
- We have estimated that an increase in annual investment of ~\$2.5 billion pa may require an additional 3,000 to 6,000 FTEs, which is not dissimilar to the economic modelling which estimated an increase in the water sector workforce over the reform period of 80% from a ~9,000 existing workforce.
- There are concerns as to the capacity of the workforce to meet the demand signalled through the current council LTP process. A very significant step-up in investment in water infrastructure is anticipated over and above that committed to following Government's initial \$761m stimulus package as part of the first round of the reform process.
- Providers have indicated a wariness about resourcing up to meet that demand due to a concern as to the potential for a "boom/bust" cycle of investment, whereby following a burst of spending by councils there is something of a hiatus as the new water entities work through their planning and prioritisation processes.
- The most immediate pressure points are likely to be specialist water consultancy expertise, which is seen as scarce and "boots on the ground" labour. Several interviewees noted that migration policies (once borders re-open) could help mitigate skill shortages in the near-term, but 'growing our own' was viewed as preferential. Again, reference was made to the Christchurch experience and the significant reliance placed on imported labour.
- Notwithstanding the scale of the sector, current providers and industry participants consider that there is a relatively low awareness of career opportunities and little in the way of sector driven training and development. This situation is compounded by the current industry structure and its fragmented approach to procurement.
- While articulating career opportunities supported by a focus on training pathways could mitigate some of the labour supply challenges, there are significant risks that the benefit of these initiatives could be diluted. In particular, as borders open – particularly with Australia – there is a high degree of risk of parts of the trained/skilled workforce moving offshore to better remunerated opportunities in the near term. This situation could be compounded if borders with Australia re-open before those with other countries such as South Africa, the UK and Ireland, which have been large sources of both skilled and semi-skilled labour previously.
- Issues with workforce availability are not unique to New Zealand. Globally the sector is experiencing challenges with an aging workforce and a step up in staffing requirements required as a consequence of the introduction in new technologies. In the longer term, the water reforms and related step up in investment combined with the changing staffing requirements do create an opportunity to reposition the water sector as a career opportunity.

Capital Requirements: Access to capital is critical for funding the new entities. Reforms should make it easier to fund water infrastructure.

- Long-term funding certainty for major infrastructure providers of water infrastructure, such as councils currently or WSEs, is pivotal to achieving gains in the sector. The certainty provided enables an entity to take a long-term view of its investment programme. This allows it to develop a construction pipeline that can be funded through the economic cycle.

- The certainty provided by a long-term pipeline of work enables the eco-system to work effectively and to drive innovation and efficiency. Parties can invest with confidence leading to efficiencies which can be shared.
- The contracting and consulting firms we interviewed did not foresee capital constraints as an issue for them in scaling up in response to the reforms. The main hurdles discussed were labour supply and certainty of water entity investment.
- Smaller and mid-sized entities with more limited access to capital may be challenged if aspects of the supply chain start to consolidate. This situation could be exacerbated if lumpiness or uncertainty associated with the forward investment programme through the transition phase impacts on cash flows and the ability to invest or retain/attract key staff.

Innovation & Productivity: Evidence in other jurisdictions indicates significant productivity gains are achievable over time with changed industry structure and other parallel developments such as an enhanced regulatory regime. Opportunities for productivity gains include:

- An immediate gain in developing a materially better understanding of the asset base and its condition, which should inform better planning processes and ensure that the right investment decisions are being made and wasteful spending reduced
- Making efficient investment decisions – for example settling on the most efficient regional or cross regional waste-water plant networks
- The ability to move away from current council procurement practices which are seen as being fragmented, risk averse and far too focussed on price as opposed to whole of life value in the tender evaluation process
- Increased standardisation of componentry, which drives cost efficiency, specialisation and inventory management benefits
- Increased use of intelligent componentry to reduce cost/improve performance
- A better appreciation of/willingness to use international best practice/assets rather than a “do it yourself” approach
- The ability to attract specialist global capability
- The ability to outsource work at scale through improved procurement processes

Despite the optimism around potential productivity gains, parties interviewed did express some concerns given the country’s relative isolation from major centres of capability, the potential for a lack of collaboration between the WSEs particularly in relation to cross boundary investment decisions and standardisation, and the risk that workflow for the industry slows during the transition period in the interim as the supply chain scales up. It was noted that productivity gains take time to accrue and there were mixed views expressed around the gains available in the water sector from advancements in technology enabled asset management practices until some of the more fundamental issues with the current system are addressed.

From: [Tan, John](#)
To: [Sam Ponniah](#)
Subject: RE:ETA on final report
Date: Wednesday, 14 April 2021 2:31:13 pm
Attachments: [image001.png](#)
[image002.png](#)
[image003.png](#)
[image004.png](#)
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Hi Sam

It will definitely be today. I reviewed it last night and the team are just incorporating Paul and Alan's comments now

John

From: Sam Ponniah <9(2)(a)@martinjenkins.co.nz>

Sent: Wednesday, 14 April 2021 2:21 PM

To: Tan, John 9(2)(a)@deloitte.co.nz

Subject: [EXT] ETA on final report

Hi John

Appreciate you must be busy pulling everything together for the final report. I have lined up a couple people to review on our end so was just wondering when you're planning to have this to us today? Understand if it needs to be closer to the end of the day but just let me know so I can manage our internal review.

Cheers

Sam

Sam Ponniah | Senior Consultant

MartinJenkins

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Subject: Draft Three Waters Economic Impact & Affected Industries Report
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[DIA Three Waters Economic Impact & Affected Industries Report v1.0.pdf](#)

Hi Sam

Please find attached our draft report for the Economic Impact & Affected Industries of the Three Waters Reform.

Please let me know if you would like to set up a time to discuss or to cover any questions that you might have

Kind Regards

John

John Tan

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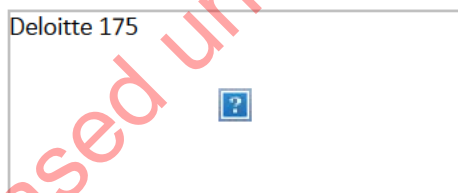
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Department of Internal Affairs

DRAFT Industry Development Study and Economic Impact Assessment
Draft for Discussion | Commercial in Confidence

April 2021

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1. Executive summary

Executive Summary – Economic Impact

The reform is estimated to deliver large economic benefits, across all modelled scenarios.

Deloitte has been engaged by Department of Internal Affairs to assess the potential economic impact of the Three Waters reform, and to develop an understanding of the opportunities and risks for the affected industries in this reform. The economic impact assessment and affected industries study will provide evidence to support the RIA.

Economic impact assessment

We have used our in-house Computable General Equilibrium (CGE) model, the Deloitte Access Economics Regional General Equilibrium Model (DAE-RGEM), to estimate the potential impact of reform based on two scenarios: The core scenarios:

- The counterfactual scenario, which sets out a possible investment pathway for Councils if the reform did not proceed.
- The system transformation scenario, which sets out the effect of a policy reform scenario where water services are provided by a small number of asset owning multi-regional water service entities (WSEs), operating under efficient regulatory standards, economic regulation and significantly improved access to capital – resulting in a substantial uplift in capital expenditure

Each of the scenarios above has a high and low case, resulting in four modelled scenarios. Each scenario shows reform could deliver significant economic benefits:

| Scenario | | Change relative to the counterfactual, 2022 to 2051 | | | | |
|----------|---|---|--------|--------------|---------------|-------|
| | | Incremental capex (Model Input) | GDP | Average FTEs | Average wages | Taxes |
| 1. | Low: Low system transformation vs low constrained counterfactual | +\$42b | +\$12b | +4,321 | +0.13% | +\$3b |
| 2. | Optimistic: High system transformation vs low constrained counterfactual | +\$107b | +\$26b | +9,544 | +0.27% | +\$6b |
| 3. | Historic: Low system transformation vs historic counterfactual | +\$76b | +\$19b | +7,231 | +0.20% | +\$4b |
| 4. | High: High system transformation vs high counterfactual constrained | +\$90b | +\$23b | +8,209 | +0.24% | +\$5b |

Executive Summary – Economic Impact

The estimated economic impact is large because water is an input to every business and household – hence the reform impacts every corner of the economy.

The economic impact analysis focuses on the incremental impact of the policy reform. However, the counterfactual already envisages a material step up in investment from the status quo – with the associated employment and GDP impact. For instance, under the Low Scenario, the GDP impact is estimated based on incremental capital expenditure of \$42 billion on top of \$78 billion of capital expenditure already included in the counterfactual. The results presented in this report are therefore conservative.

The impact on gross domestic product and taxes

The economic impact modelling shows that under the Low and High Scenarios described on the previous page:

- Reform is likely to deliver a significant economic benefit of \$12 - \$23 billion over the next 30 years, in real present value* terms, relative to the counterfactual.
- This is equivalent to the New Zealand economy being 0.23% to 0.43% larger per annum than it otherwise would have been in the counterfactual.
- Tax revenue is estimated to increase by \$3 - \$5 billion from 2022 to 2051 in real present value terms.

The positive impact is also distributed across industries. Trade, Financial Services, Business Services, Construction and Other Services are expected to see the largest increases in GDP as a result of reform. GDP in the water sector also increases initially, but declines from mid 2030, due to efficiency driven cost savings in this sector.

**Unless otherwise stated, all references to NPV are calculated over a 30 year period (2022 to 2051) using a real discount rate of 5%, per New Zealand Treasury guidelines.*

The impact on employment and wages

Under the Low and High Scenarios, the reform is also projected to increase employment in the New Zealand economy.

- By adding between 4,321 to 8,209 full time equivalent (FTE) jobs on average per annum over the next 30 years, compared with the counterfactual.
 - This represents 0.19% to 0.37% of the current total workforce in the economy or between 0.26% and 0.50% of the total FTE jobs in the economy.
 - We expect the number of FTEs in the water sector may decline by approximately 1,191 to 2,387 FTEs per annum relative to the counterfactual. This is the result of efficiencies gained through the removal of duplicative jobs due to reform, more efficient capital and limited mobility as a result of an aging workforce. This decline is relative to an assumed current water sector workforce of approximately 9,000 FTEs. However, overall we still expect total water sector employment to be nearly 80% higher than current levels after 30 years.
 - Scotland had a similar outcome in its water reform, with Scottish Water's headcount reducing by 2,500 FTEs as a result. However, total employment in the water sector and supply chain in Scotland has increased by a net estimated 4,000 FTEs. The Water Industry Commission for Scotland (WICS) noted New Zealand could experience something similar.
 - Reform is expected to support growth in jobs across all other sectors in the economy, with the greatest positive impact expected in the Financial Services, Trade, Business Services, Construction and Other Services sectors.
 - We also modelled a sensitivity on the High Scenario, where we assumed double the percentage of FTEs be filled by inbound migration, which results in additional FTEs of 8,680 – i.e. 471 more FTEs than the main High Scenario. This demonstrates what might be possible with a workforce strategy that includes more inbound migration.
- 21 • Reform is also expected to generate an increase in average wages of between 0.13% and 0.24% over the 30 year period modelled.

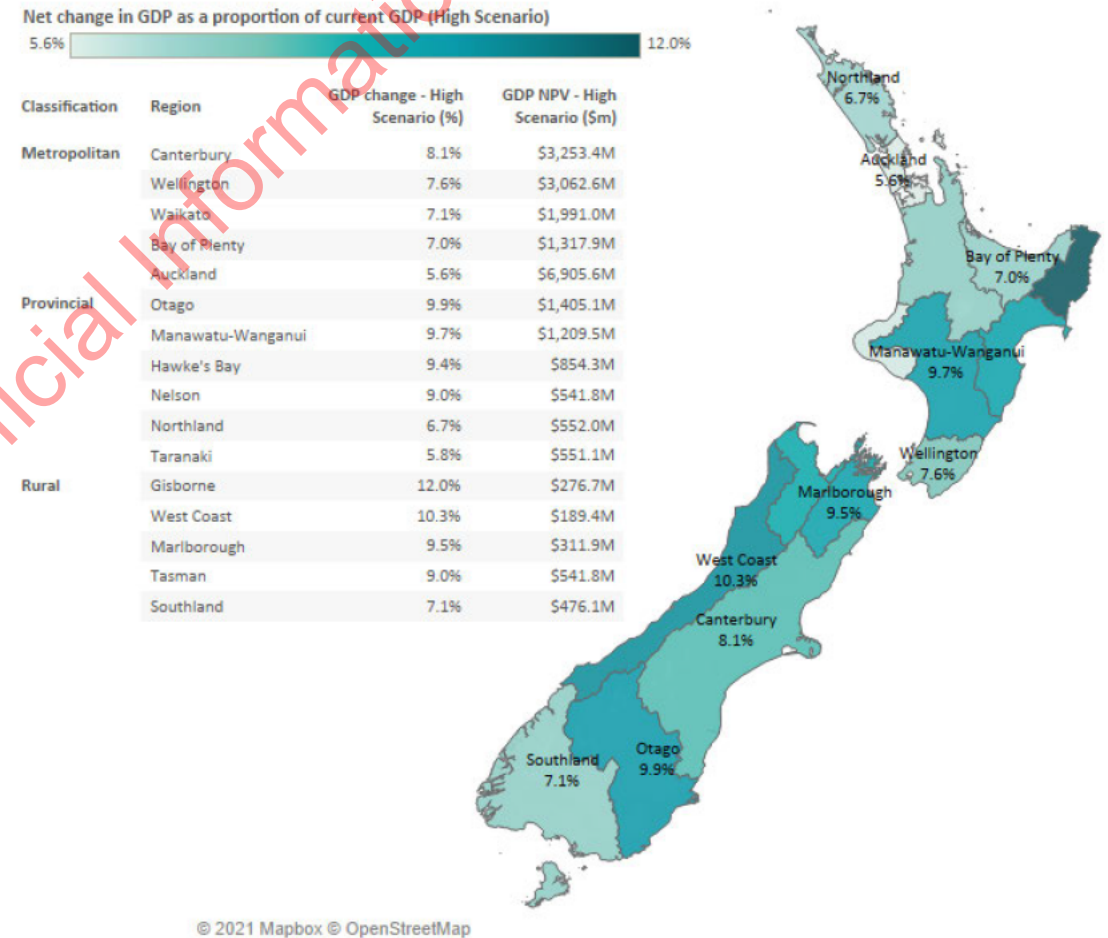
Executive Summary – Economic Impact

Reform is expected to increase employment and GDP across New Zealand, but this impact will not be evenly distributed across all regions.

Every region is expected to be positively impacted by the economic impact of reform in terms of GDP and employment growth. However, this positive economic impact is distributed across New Zealand’s regions in a way that reflects heterogeneity in the relative size, capital intensity, water intensity and import penetration of the regions:

- Relative to current regional GDP, metropolitan areas see the smallest relative gains (i.e. they are closer to the national average). Provincial and rural regions enjoy the highest economic impact relative to their current regional GDP.
- We have estimated the employment impact of reform across regions by dividing estimated additional FTEs due to reform by the current regional workforce. Metropolitan regions experience lower relative employment gains, other than Wellington which has a high share of employment in public administration and business services – both sectors which strongly benefit from reform. Provincial or rural status is not determinative of employment impact.

The positive impact is also distributed across industries. Trade, Financial Services, Business Services, and Other Services are expected to see the largest increases in GDP as a result of reform. GDP in the water sector also increases initially, but declines from mid 2030, due to efficiency driven cost savings in this sector.



*Unless otherwise stated, all references to NPV are calculated over a 30 year period (2022 to 2051) using a real discount rate of 5%, per New Zealand Treasury guidelines.

Executive Summary – Affected Industries

Reform will have a significant impact on industry participants.

Industry development study

We have validated the economic impact analysis through targeted stakeholder interviews to test the potential implications of reform on a number of industries. We tested information provided by stakeholders through the use of international and local case studies, and perspectives from Taumata Arowai – the new regulator. We also considered the implications and considerations.

Significant changes on industry participants are expected post reform:

- **Councils** who participate in the reforms will no longer control water assets. While this may result in a reduction in the Council workforce, this decrease is expected to be more than offset by investment the new water entities undertake.
- **Engineering, consulting and advisory firms** will scale up their investment in operations and employees, despite likely issues with finding skilled labour.
- **Contracting firms** expect to see bigger workforces and a higher focus on compliance areas given the new regulatory environment. International firms may draw on offshore expertise and technology but will still need to deploy significant numbers of people on the ground.
- **Materials and equipment providers** are already scaling up in some cases in preparation for reform. Over time, increased investment in the sector is likely to result in an acceleration in the deployment of new technologies, which will flow through to operational efficiencies.

Supply Chain

Greater visibility of the investment pipeline is seen as a key driver of improvements in the efficiency and scale of the supply chain:

- The scale of the investment pipeline is likely to be attractive for new entrants, particularly major organisations with a significant presence in Australia but which are not currently present in New Zealand.
- Participants with an existing presence in New Zealand are likely to scale up their local operations as they gain greater confidence in reform. While new or scaled up entities may bring new capability, this may involve the acquisition and consolidation of local entities or existing capability.
- There are likely to be significant benefits of supply chain scale – including higher spend across standardised requirements, standardisation of parts and materials, and greater purchasing power, as well as the availability of greater specialisation.
- There is potential for existing smaller and mid-scale domestic operators to be squeezed out, thereby reducing the potential diversity of the supply chain – especially as a result of lumpiness or uncertainty associated with the project pipeline through the transition period.
- New Zealand is considered a small market by international standards for materials and equipment. While the current global supply chain is still being disrupted by the effects of Covid-19, a significant step up in investment is not expected to have a large impact on the ability to access materials and equipment over and above the generic challenges New Zealand faces given its scale and location.

Executive Summary – Affected Industries

While reform may exacerbate labour shortages in the water sector and its affected industries in the nearer term, it also creates an opportunity to reposition the water sector as a strong career opportunity.

Workforce

The water sector is experiencing a workforce shortage, which is likely to be exacerbated by the reform in the short to medium-term.

- The delivery of water services and the related capital expenditure required to sustain and expand water infrastructure is labour intensive – particularly in relation to renewals/minor capital works, which represent a significant element of the overall capital spend.
- The number of qualified staff needed to deliver capital works is already under stress due to a lack of overseas resources, increasing remuneration expectations and other opportunities in the wider construction sector. The contractor market is currently sized to reflect historic delivery requirements. The workforce is expected to be squeezed further as spending on Three Waters projects, shovel ready infrastructure projects, climate change and RMA reforms increase nationally.
- There are concerns as to the capacity of the workforce to meet demand signalled through the current council long-term plan (LTP) process. A very significant step up in investment in water infrastructure is anticipated over and above that committed to following Government's initial \$761m stimulus package, as part of the first round of the reform process.
- Providers have indicated a wariness about resourcing up to meet that demand due to a concern as to the potential for a "boom/bust" cycle of investment, whereby following a burst of spending by Councils, a hiatus occurs as the new water entities work through their planning and prioritisation processes.
- The most immediate pressure points are likely to be on specialist water consultancy expertise, which is seen as scarce and "boots on the ground" labour. Several interviewees noted that migration policies (once borders re-open) could help mitigate skill shortages in the near-term, but 'growing our own' was viewed as preferential. Again, reference was made to the Christchurch experience and the significant reliance placed on imported labour.
- Notwithstanding the scale of the sector, current providers and industry participants consider that there is a relatively low awareness of career opportunities and little in the way of sector driven training and development. This situation is compounded by the current industry structure and its fragmented approach to procurement.
- While articulating career opportunities supported by a focus on training pathways could mitigate some of the labour supply challenges, there is a risk the benefit of these initiatives could be diluted. As borders open – particularly with Australia – parts of the the trained/skilled workforce may move offshore to better remunerated opportunities in the near term. This situation could be exacerbated if borders with Australia re-open before those with other countries such as South Africa, the UK and Ireland, which have traditionally been large sources of both skilled and semi-skilled labour.
- Issues with workforce availability are not unique to New Zealand. Globally the sector is experiencing challenges with an aging workforce and a step up in the skills required as new technologies have been introduced. Countries such as the US have introduced initiatives directed at addressing this challenge..
- In the longer term a combination of a better articulation of career opportunities, the changing nature and increased sophistication of the roles/emerging roles available and the scale of the investment going into the water sector creates the prospect of elevating the status of a career in the water sector with a flow through to the ability to attract both domestic and international talent..

Executive Summary – Affected Industries

Reform should improve access to capital, and provide opportunities for significant productivity gains.

Capital Requirements

Access to capital is critical for funding the new entities. Reform should make it easier to fund water infrastructure.

- Long-term funding certainty for major infrastructure providers of water infrastructure, such as Councils currently or WSEs post reform, is pivotal to achieving gains in the sector. The need for regulatory certainty and the ability for regional water authorities to know they can recover capital costs in the long term from customers.
- The certainty provided enables an entity to take a long-term view of its investment programme. This allows it to develop a construction pipeline that can be funded through the economic cycle.
- The certainty provided by a long-term pipeline of work enables the ecosystem to work effectively, and drive innovation and efficiency. Parties can invest with confidence, leading to efficiencies which can be shared.
- The contracting and consulting firms we interviewed did not foresee capital constraints as an issue for them in scaling up in response to reform. The main hurdles discussed were labour supply and certainty of water entity investment.
- Smaller and mid-sized entities with more limited access to capital may be challenged if aspects of the supply chain start to consolidate. This situation could be exacerbated if lumpiness or uncertainty associated with the forward investment programme through the transition phase impacts cash flows and the ability to invest or retain/attract key staff.

Innovation & Productivity

Evidence from other jurisdictions indicates significant productivity gains are achievable over time with a different industry structure, and parallel developments such as an enhanced regulatory regime. Opportunities for productivity gains include:

- An immediate gain in developing a materially better understanding of the asset base and its condition, which should inform better planning processes and ensure the right investment decisions are being made and wasteful spending is reduced.
- Making efficient investment decisions – for example, settling on the most efficient regional or cross regional waste-water plant networks.
- The ability to move away from current council procurement practices which are seen as being fragmented, risk averse and far too focussed on price as opposed to whole of life value in the tender evaluation process.
- Increased standardisation of componentry, which drives cost efficiency, specialisation and inventory management benefits.
- Increased use of intelligent componentry to reduce cost/improve performance.
- A better appreciation of/willingness to use international best practice/assets rather than a “do it yourself” approach.
- The ability to attract specialist global capability.
- The ability to outsource work at scale through improved procurement processes.

Despite the optimism around potential productivity gains, parties interviewed expressed some concerns given the:

- Country’s relative isolation from major centres of capability
- Potential for a lack of collaboration between the WSEs, particularly in relation to cross boundary investment decisions and standardisation
- Risk workflow slows during the transition period as the supply chain scales up.

It was noted that productivity gains take time to accrue and there were mixed views expressed around the gains available in the water sector from advancements in technology enabled asset management practices until some of the more fundamental issues with the current system are addressed.

2. Introduction and scope

The request

An economic impact assessment of the Three Waters reform and its implications for industry

Overview

Effective three waters services are essential to the health, environment and economic wellbeing of all New Zealanders. However, New Zealand's three waters system is facing major challenges, and will continue to do so without transformational reform. Estimates suggest local government water service providers face a significant infrastructure deficit, which could take 30 years to eliminate and exceed the funding and operational capacity of many Councils.

In June 2020, Cabinet agreed to the Three Waters reform (reform) needed to address this infrastructure deficit. This will see the delivery of three waters services shifted from 67 Councils to a smaller number of multi-regional water services entities (WSEs). In addition to service delivery reform, regulatory reform to establish a water services regulator, Taumata Arowai, are well underway. These reforms are part of the wider Three Waters programme established in 2017, in the wake of the Havelock North water supply outbreak.

Cabinet will take substantive policy decisions relating to the reforms in April/May 2021, to enable drafting instructions to be issued. Department of Internal Affairs (DIA) is preparing a Regulatory Impact Assessment (RIA) to support Cabinet decision making. The RIA will assess the impacts of reform, as well options available to the Government regarding design features of the new WSEs, and the overall three waters system.

Purpose of this report

Deloitte has been engaged by DIA to assess the potential economic impact of the reform, and to develop an understanding of the opportunities and risks for the affected industries in this reform. The economic impact assessment and affected industries study will provide evidence to support the RIA.

Structure of this report

This report presents the findings of economic impact assessment and industry development study.

Part one - Economic Impact Assessment

- Overview of economic impact assessment
- Scenario overview
- Approach and inputs
- National impacts
- Workforce impacts
- Distributional impacts

Part two – Industry Development Study

- Overview, including engagement process and methodology
- Industry structure
- Supply chain and workforce
- Capital requirements, and innovation and productivity
- Potential impact of reform and case studies

Scope

An economic impact assessment of the Three Waters reform and its implications for industry

Scope

The key requirements of the economic impact assessment were to:

- Analyse the potential economic impact of reform, focusing on how GDP, employment, wages and taxes could change as a result.
- Consider how this economic impact is distributed across areas, particularly at a national and regional level, and, to a lesser extent, local level.
- Discuss how these impacts could differ across sectors.
- Comment on the likely drivers of these impacts, where possible.
- Outline the assumptions and caveats behind this analysis.

The following analysis is out of scope for the economic impact assessment:

- While we have considered the high-level impact of reform on Councils, we have not analysed the detailed impact on individual Councils. Differences between individual Councils (e.g. different debt profiles) will influence the specific impact of the reform on that Council.
- We have not modelled wages and taxes at a sector level. Taxes are modelled in aggregate, rather than decomposed into specific types of taxes.
- Our analysis focuses only on the potential economic impacts of reform, not social, environmental, cultural, or other wider impacts.

The key requirements of the industry development study were to:

- Engage with affected industries through stakeholder interviews.
- Review relevant experiences of domestic and overseas reforms, and summarise key insights for New Zealand in case studies.
- Develop a narrative that sets out the industries most likely to be affected by reform, their current state, implications of reform for these industries, how they need to develop to leverage the benefits of reform, and how the Government could support industry development.

The following analysis is out of scope for the industry development study:

- While we have identified challenges associated with the envisaged increase in investment, from a workforce perspective our role has not extended to the development of the workforce strategy.
- Our engagement was focussed on entities and sector bodies associated with the immediate water sector supply chain. We did not engage with Councils, wider businesses, or social interests, which may be impacted by the water reform.

General use restriction

This report is prepared solely for the internal use of the Department of Internal Affairs. This report is not intended to and should not be used or relied upon by anyone else and we accept no duty of care to any other person or entity. The report has been prepared for the purpose of set out in our terms of engagement dated 24 February 2021. You should not refer to or use our name or the advice for any other purpose.

3. Economic impact assessment

Overview

An economic impact assessment of the Three Waters reform

The request

Deloitte has been engaged by DIA to assess the potential economic impact of the Three Waters reform, and to develop an understanding of the opportunities and risks presented to the affected industries. The economic impact assessment and affected industries analysis will provide evidence to support the Regulatory Impact Assessment (RIA).

This section of the report provides **results for the economic impact** of the reform. In particular, Deloitte assessed the economic impact of a material step up in investment in connection with the reform, and how this would flow through to national, regional, and local indicators such as GDP, employment, wages and taxes. The next section discusses risks and opportunities for industries affected by reform.

Structure of this section of the report

This report presents the findings of economic impact assessment as follows:

- Overview of economic impact assessment
- Scenario overview
- Approach and inputs
- National impacts
- Workforce impacts
- Distributional impacts

Overview of the economic impact of the reform

- Economic activity involves a range of complex interactions between households, businesses and governments with these agents operating across regions and countries. A change in any part of the economy can therefore have a ripple effect throughout the whole economy. For example, a new project or program might create economic opportunities in one region, but could also increase the scarcity of inputs, and in turn affect output in other sectors.
- Computable General Equilibrium (CGE) models are the best-practice method available for examining the impacts of a change in one part of the economy on the broader economy. This is because CGE models explicitly account for behavioural responses of consumers, firms, governments and foreigners, while evaluating the impacts of a given policy change. At the same time, CGE modelling also accounts for resource constraints and effectively represents the economic trade-offs that face the economy and its participants.
- The economic impact of the reform has been estimated using Deloitte Access Economics' in-house Regional General Equilibrium Model (DAE-RGEM). More technical detail regarding CGE modelling can be found in Appendix A. Economic impact modelling compares two future projections of the economy (scenarios) and compares the difference between the two to estimate net impacts.

The two scenarios are:

- **Counterfactual:** Under the counterfactual scenario, we assumed a pathway for the water sector in the absence of reform. This scenario draws on the expected investment profiles without the reform over the 30 years from 2022 to 2051.
- **System transformation:** This scenario models the New Zealand economy with reform, providing an illustrative bookend of the accelerated investment profile the reform could enable relative to the counterfactual. This scenario factors in the expected investment profiles under the reform over the 30 years from 2022 to 2051.

Summary of results for core scenarios

Reform could deliver a significant economic benefit. Our focus in reporting the results are on the Low and High Scenarios to provide an indicative range of the potential economy impact.

Our analysis focuses on Low Scenario and a High Scenario, as this provides a low and high range for the resulting economic impact. Each scenario contains high or low inputs for forward investment profiles for the counterfactual and system transformation scenarios. The net economic impact for each scenario is presented below. We have used a 5% discount rate*, per the New Zealand Treasury's default discount rate.

A summary of the net economic impact relative to the counterfactual – 2022 to 2051

| Scenario | GDP | Production | Average FTEs | Average wages | Taxes |
|--|--------|------------|--------------|-----------------|---------|
| 1. Low Scenario: Low system transformation vs low constrained counterfactual | +\$12b | +\$23b | +4,321 | +0.13% increase | +\$2.6b |
| 4. High Scenario: High system transformation vs high counterfactual constrained | +\$23b | +\$42b | +8,209 | +0.24% increase | +\$4.9b |

Source: Deloitte

Definitions

GDP: Change in real Gross Domestic Product (GDP) in present value terms over the period 2022 to 2051. GDP includes value added and taxes.

Production: Value of the change in production in present value terms over the period 2022 to 2051. Production is the change in GDP plus the change in intermediate outputs.

Average FTEs: Average change in full-time equivalent employees per annum, over the period 2022 to 2051.

Average wages: Percentage change in average annual wages as a result of reform, over the period 2022 to 2051.

Taxes: Value of the change in overall taxes, in present value terms, as a result of reform over the period 2022 to 2051.

Using an Social Rate of Time Preference of 3.5%, under the Low Scenario, the GDP result is \$15b, production is \$27b and taxes are \$3.1b. Under the High Scenario, the GDP result is \$28b, production is \$51b, and taxes are \$5.9b.

Summary of results for other modelled scenarios

The Optimistic and Historic Scenario also shows a large positive impact across the economic as a result of the Reform.

We also modelled two other scenarios based on alternative assumption sets. The net economic impact of the other scenarios is shown below. We have also used a 5% discount rate here. We do not consider the Optimistic Scenarios as likely and the Historic scenario is based on historic capital spend rather than a forward looking perspective. Neither scenario is included in our preferred scenario range.

A summary of the net economic impact relative to the counterfactual – 2022 to 2051

| Scenario | GDP | Production | Average FTEs | Average wages | Taxes |
|---|-------|------------|--------------|---------------|-------|
| 2. Optimistic Scenario: High system transformation vs low constrained counterfactual | \$26b | \$52b | 9,544 | 0.27% | \$6b |
| 3. Historic Scenario: Low system transformation vs historic counterfactual | \$19b | \$37b | 7,231 | 0.20% | \$4b |

Source: Deloitte

Definitions

GDP: Change in real Gross Domestic Product (GDP) in present value terms over the period 2022 to 2051. GDP includes value added and taxes.

Production: Value of the change in production in present value terms over the period 2022 to 2051. Production is the change in GDP plus the change in intermediate outputs.

Average FTEs: Average change in full-time equivalent employees per annum, over the period 2022 to 2051.

Average wages: Percentage change in average annual wages as a result of reform, over the period 2022 to 2051.

Taxes: Value of the change in overall taxes, in present value terms, as a result of reform over the period 2022 to 2051.

4. Scenario Overview

Scenario Overview

This section summarises the scenarios considered in our assessment of the potential economic impact

Overview of the counterfactual and system transformation scenarios

To understand what the economic impact of the reform could be, it is necessary to determine what the water sector could look like in the absence of reform, and what it could look like with reform. This can be summarised into two broad scenarios:

The counterfactual scenario sets out a pathway for the water sector in the absence of reform. The counterfactual describes what Councils are expected to spend if the reform did not proceed, and the extent to which they might face regulatory pressure. Debt and price constraints have been applied to the counterfactual. The counterfactual differs from the status quo, which we have not modelled, given regulatory changes (including the establishment of Taumata Arowai) have been confirmed by Cabinet and are in the process of implementation. Data for the counterfactual was based on WICS' phase two analysis, which was sourced through the Request for Information (RFI) process.

The system transformation scenario is an illustrative bookend of the forward investment profile the reform could enable far more quickly than under the counterfactual. Data for the system transformation scenario was based on WICS' phase two analysis, and modelling undertaken by WICS.

More detail on the policy parameters for each of the scenarios is provided on the subsequent pages.

Stakeholders need to feel confident reform will deliver an economic benefit, in order for it to progress. However, given substantive policy decisions which drive the exact volume and nature of investment are yet to be made, there is uncertainty around what the economic benefit might be. To account for this uncertainty, we have modelled four main scenarios, as described opposite.

Overview of the modelled scenarios

We have used two alternative inputs (a low estimate and a high estimate) for both the counterfactual and the system transformation scenario. This formed four modelled scenarios for the economic impact assessment:






- 1. Low Scenario:** This scenario is characterised by a **low** estimate of the expected spend by Councils in the face of new regulatory constraints, and the spend with reform based on relationships between historical enhancement and growth investment in the **UK** and various geographical indicators (WICS Approach 1).
- 2. Optimistic Scenario:** This scenario is characterised by a **low** estimate of the expected spend by Councils in the face of new regulatory constraints, and the spend with reform based on relationships between historical enhancement and growth investment in **Scotland** and various geographical indicators (WICS Approach 2).
- 3. Historic Scenario:** This scenario is characterised by an estimate of the expected spend by Councils without additional regulatory pressure (i.e. spend is based on the **historical trend**), and the spend with the reform based on relationships between historical enhancement and growth investment in the **UK** and various geographical indicators (WICS Approach 1).
- 4. High Scenario:** This scenario is characterised by a **high** estimate of the expected spend by Councils in the face of new regulatory constraints, and the spend with reform based on relationships between historical enhancement and growth investment in **Scotland** and various geographical indicators (WICS Approach 2).

This report focuses on the Low Scenario (the most conservative scenario) and the High scenario. We modelled the Optimistic Scenario and the Historic Scenario as sensitivities. The High Scenario with a more flexible international migration assumption was also modelled as a sensitivity.

Counterfactual Scenario

Under the counterfactual scenario, Local Government retains responsibility for three waters services.






Our low and high estimates for the counterfactual draw on constrained expenditure figures provided by DIA. Constrained expenditure reflects the amount of investment that might be possible without reform, with particular debt and price constraints imposed. The table below outlines the key, high-level policy parameters underpinning the counterfactual.

| Dimension | Description |
|---|--|
|  Number of providers | There is no amalgamation of water services into a small number of WSEs. Instead, the 67 Councils continue to provide three waters services, and retain direct ownership of water assets and responsibility for their funding. Revenue is sourced from households or other Council funds, with some price increases for customers. Some efficiency gains are assumed for larger Councils, but overall efficiency gains are much lower under the counterfactual than under the system transformation scenario. |
|  Regulatory standards | The establishment of Taumata Arowai, and the introduction of a new water services regulatory framework, will place greater pressure on Councils to improve service delivery. This is expected to improve compliance, regulatory oversight, and transparency and accountability. More regional collaboration across Councils in relation to resource management and land use planning is also anticipated. |
|  Volume of investment | A renewed, collective focus on three waters services and greater public scrutiny around service delivery, is expected to drive a small increase in investment. However, a large infrastructure deficit will remain. |
|  Financial constraints | Affordability constraints will limit significant investment, and see most Councils deferring much of their required investment. Borrowing is also likely to rise, although Councils' will not exceed 500% debt to revenue limit for water assets . Councils are expected to offset this higher debt to revenue ratio for water assets with lower debt to revenue ratios for other assets, so they continue to meet the LGFA debt covenant of 250%. |
|  Economic regulation | Economic regulation is not introduced - or at least not to the same extent as under a system transformation scenario – as it is not feasible to apply this to 67 separate Councils. This also hinders efficiency gains. |

System Transformation Scenario

System transformation transfers three waters services from Councils to a small number of WSEs.

Our low and high estimates for the system transformation scenario are sourced from WICS. The system transformation scenario reflects investment that might be possible with reform, based on either the UK's or Scotland's water reform experience. The table below highlights the key, high-level policy parameters underpinning this scenario.

| Dimension | System transformation |
|---|---|
|  Number of providers | Three waters services are shifted away from Councils' remit to a small number of multi-regional water service providers – likely three to five statutory, asset-owning entities. Other legislative changes to enhance the governance, management and resourcing of three waters, are also enacted. These changes will deliver a range of efficiencies, including elimination of duplicated functions, a greater ability to attract and retain talent, more effective procurement, and optimisation of asset levels. |
|  Regulatory standards | As under the counterfactual, the WSEs would be subject to monitoring by Taumata Arowai, and a new water services regulatory framework. This will place greater pressure on Councils to improve network performance. However, Taumata Arowai will be able to perform its role more efficiently, as it will not need to monitor 67 separate Councils. |
|  Volume of investment | Significant capital investment by the WSEs will be enabled through the separation of balance sheets from local Councils, and financial and operational autonomy, which will improve access to debt. The package of reforms (aggregation, policy clarity, stronger governance, and economic regulation) will also enable new entities to realise economies of scale in the delivery of three waters services, which can help to offset the significant forward investment requirements. As a result, capex is significantly higher under the system transformation scenario relative to the counterfactual, and the infrastructure deficit is reduced faster. Government funding will support the transition and establishment phases of reform. |
|  Financial constraints | The WSEs will be better able to borrow to fund infrastructure requirements than Councils, as strengthened financial structures will allow them to take on more debt. |
|  Economic regulation | Amongst other things an economic regulatory regime regulates the maximum revenue WSEs can earn for a given level of investment, taking into account required levels of service. |

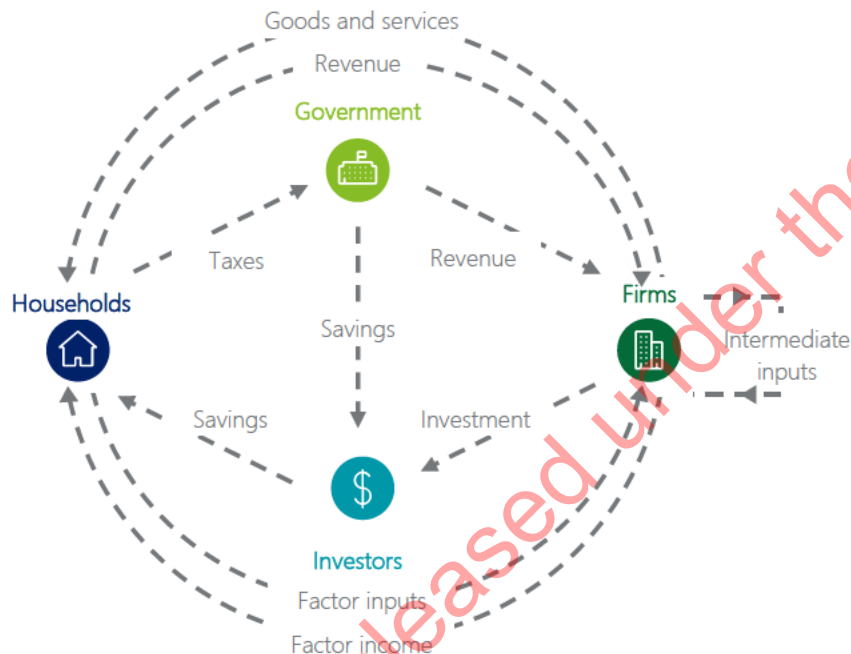
5. Approach and inputs

Overview

We used Computable General Equilibrium modelling to determine the potential impact of reform on GDP, production, employment, wages and taxes.

The Economic Impact Assessment aimed to understand the impact of reform on GDP, production, employment, average wages and taxes – and how these impacts differ across regions and sectors. This requires an economic model which can assess the impact of a major change or policy on the economy, both over time and in terms of its distributional effects. CGE models are best suited to answering such questions.

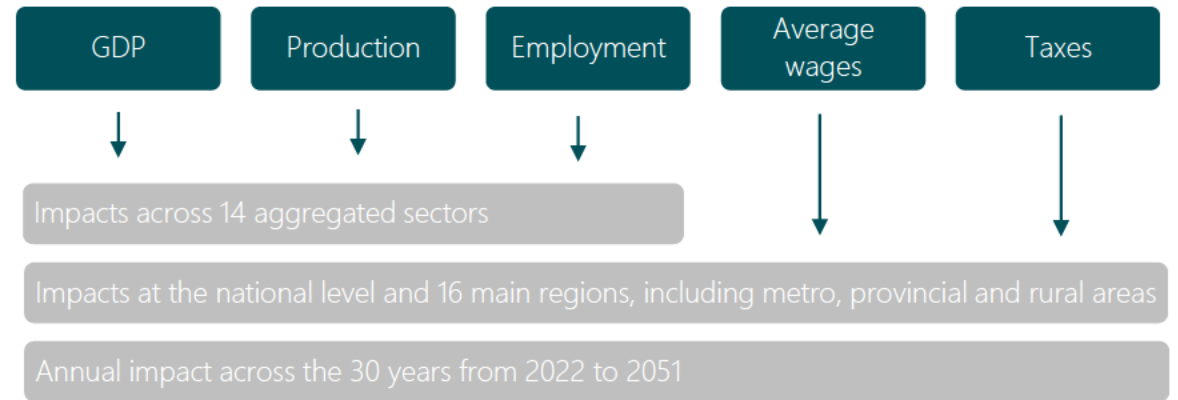
We modelled the economic impact of reform DAE-RGEM, which is a large-scale, dynamic, multi-region, multi-commodity model, representing the demand and supply relationships in the world economy. Below is a visual representation of DAE-RGEM.



To show how the economy could change as a result of reform, DAE-RGEM requires a clearly defined baseline scenario, which represents the world without the policy in question (essentially business as usual), and a policy scenario or ‘shock’ to the model, which captures the world with the policy in question.

We refer to the baseline scenario as the counterfactual, which describes a pathway for the water sector in the absence of reform, and the policy scenario as the system transformation scenario, which describes the world with reform. We set out the key parameters underpinning each scenario on the following pages.

The indicators we modelled, and the dimensions across which they were modelled, are set out below. We have built and used a sixteen region, and fourteen aggregated sector version of DAE-RGEM. The list of sectors and regions is provided in Appendix B.



The impact of COVID-19 has been excluded from our analysis. Despite the impact to economic activity, we do not expect it to be an enduring factor over the 30-year timespan of our analysis (2022 to 2051).

Formulating the shock for the Economic Impact Assessment

We have aggregated incremental capital expenditure profiles from individual Council/ Territorial Authorities into 16 regions to include within our CGE Model.

The three waters infrastructure network consists of infrastructure and processes used to collect, store, transmit through reticulation, treat, and discharge, three waters. At its core, reform involves a significant increase in investment to address historical underinvestment in three waters and the infrastructure deficit it has resulted in. DIA and WICS provided capital expenditure (capex) data for the system transformation and counterfactual scenarios, which projected the likely spend with and without reform.

As discussed earlier, CGE modelling considers the flow-on effects of investment in the water sector on other sectors, while accounting for the overall constraints in the economy (e.g. availability of labour). We formulated the CGE shock according to the steps below:



Formulating the shock for the Economic Impact Assessment

We modelled an increase in capex, targeted towards the water sector. The resulting increase in water sector output was assumed to be driven by improved capital productivity.

1. The core input into the CGE model for each scenario was incremental capital expenditure i.e. the difference between projected capex under the system transformation scenario, and projected capex under the counterfactual.
2. The incremental investment data was collected at an individual Council/TA level, and aggregated to a regional level based on the regional boundaries defined by Statistics NZ and the location of each TA within a region. Where a TA's geographic boundary spans across two regions, we allocated that TA to the region with the greatest overlap.
3. The regional incremental investment profiles were used as the shock to our CGE model and implemented as capital-productivity induced expansion in the water sector's output:
 - i. The reform aims to amalgamate, modernise and better provide water services, with the process funded by increased user charges (taxes). So the policy to be modelled has three key components: an increase in investment (making up for historical underspend), efficiency improvements in the water sector, and increased user charges (taxes) to recoup the additional capital cost expenditure.
 - ii. At present, there is only concrete information on the capex component. Simulating a blanket increase investment across the various regions would give biased impacts – especially given the sector-specific nature of the investment and the general nature of capital in our model. Without some way to specifically target the water sector, the results would struggle to tell a meaningful story, given generic CAPEX shocks tend to have broad-based benefits with particular concentration in construction, trade and business services.
 - iii. Deloitte used the capex data for the water sector and implemented them as capital-productivity induced expansion in the water sector's output. The way we are interpreting the figures is essentially through their intended outcome rather than the investment's expenditure effect. To determine the appropriate link between the level of capital expenditure and the implied improvement in the water sector's output, we pro-rated the investment figures down by the ratio of capital as an input to the water sector as well as the share of capital usage, for which the water sector accounts. So in cases where a region is set to receive a given increase in investment, it instead receives a proxied boost to water output which is achieved via more efficient capital coming online.

Scenarios modelled

We modelled four scenarios, with incremental capital expenditure the key input for each scenario.

To understand the potential economic impact of reform, we modelled four main scenarios our in-house CGE model.

The table below summarises the total investment* required under the counterfactual and system transformation scenarios, under different data inputs – either a low estimate or a high estimate, or in the case of the “Historic Scenario”, the counterfactual is based on trends in historic spend.

Water investment projected under each modelled scenario and the incremental water investment applied to assess the economic impact of reform (Total capex, 2022 to 2051, billions)

| Scenario | System transformation capex | Counterfactual capex | Incremental capex |
|---|-----------------------------|----------------------|-------------------|
| 1. Low Scenario: Low system transformation vs low constrained counterfactual | \$120b | \$78b | \$42b |
| 2. Optimistic Scenario: High system transformation vs low constrained counterfactual | \$185b | \$78b | \$107b |
| 3. Historic Scenario: Low system transformation vs historic counterfactual | \$120b | \$44b | \$76b |
| 4. High Scenario: High system transformation vs high counterfactual constrained | \$185b | \$95b | \$90b |

Source: Deloitte

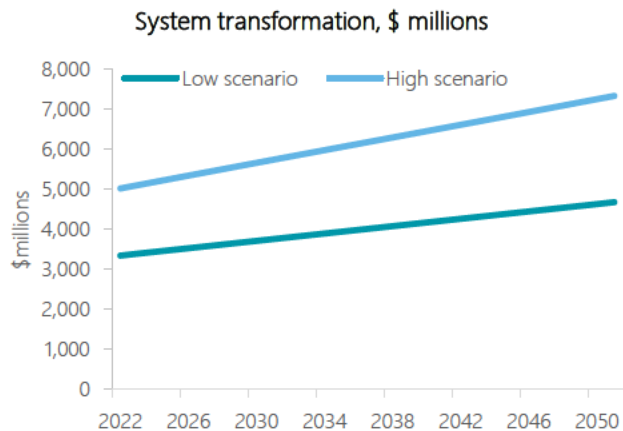
*We have not modelled operating expenditure (opex), noting the focus of reform is on capital expenditure, including addressing historical underinvestment and the resulting infrastructure deficit. Modelling opex would likely show an additional economic benefit, which implies the results presented in this report is conservative.

Incremental capex profiles

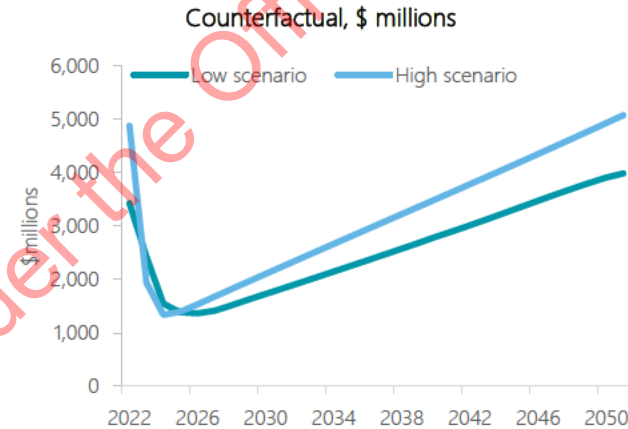
Using data from WICS and DIA, we produced an incremental capex for each modelled scenario. The shape of the incremental capex profile is based on the data inputs provided by WICS and DIA.

WICS provided a low and high estimate for the system transformation scenario, based on benchmarking against investment levels in Scotland or the entirety of the UK (i.e. WICS' approaches one and two), with these figures reflecting the policy parameters outlined on page 20. DIA provided a low and high estimate for the counterfactual scenario, based on the parameters on page 19. Data for the incremental capex profile was based on Phase 2 WICS data sourced through the Request for Information (RFI) process, and parameters developed by DIA.

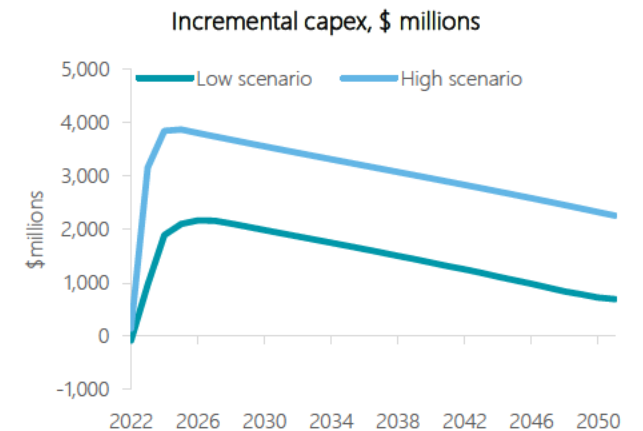
These capex profiles were used to calculate incremental capex, or additional investment directly attributable to reform. This is the difference between projected capex under the system transformation scenario, and projected capex under the counterfactual for each year between 2022 and 2051. Given the incremental capex profiles are the core input to the CGE model, they directly influence the shape of our results, when presented over time. The capex profiles (all in real terms) are provided below.



Source: WICS



Source: DIA



Source: Deloitte based on WICS and DIA

Incremental capex profiles

Using data from WICS and DIA, we produced an incremental capex for each scenario. These were the core inputs to the CGE model.

What drives the shape of the counterfactual?

In 2022, Councils are expected to increase borrowing to facilitate investment, and therefore reach their 500% debt to revenue limit for water assets. By extension, this means Councils also hit their 250% debt to revenue limit for all assets. As Councils have exhausted borrowing headroom, investment plateaus between 2023 and 2025. From 2026 onwards, Councils gradually gain headroom and are able to increase investment. They gain headroom because the revenue growth assumption exceeds the projected growth in capex.

Our counterfactual already includes a significant step up in investment relative to the status quo. The economic modelling cannot explicitly account for the impact of existing systemic challenges in the water sector, such as reactive and inefficient spend, and a lack of clear career pathways – which will likely continue under the counterfactual. As a result, the economic impact results presented in this report are a conservative estimate of the potential economic impact of reform.

Water infrastructure is complex, expensive, and largely located underground. Based on WICS data, below ground infrastructure is expected to comprise approximately 60% of investment. A number of studies suggest underground infrastructure leads to higher local employment multipliers given the relatively labour intensive nature of associated capex. Due to data limitations in the counterfactual, our economic impact assessment focuses on the impact of the total investment profile and the Affected Industry section qualitatively discusses the different impacts above versus below ground capex could have.

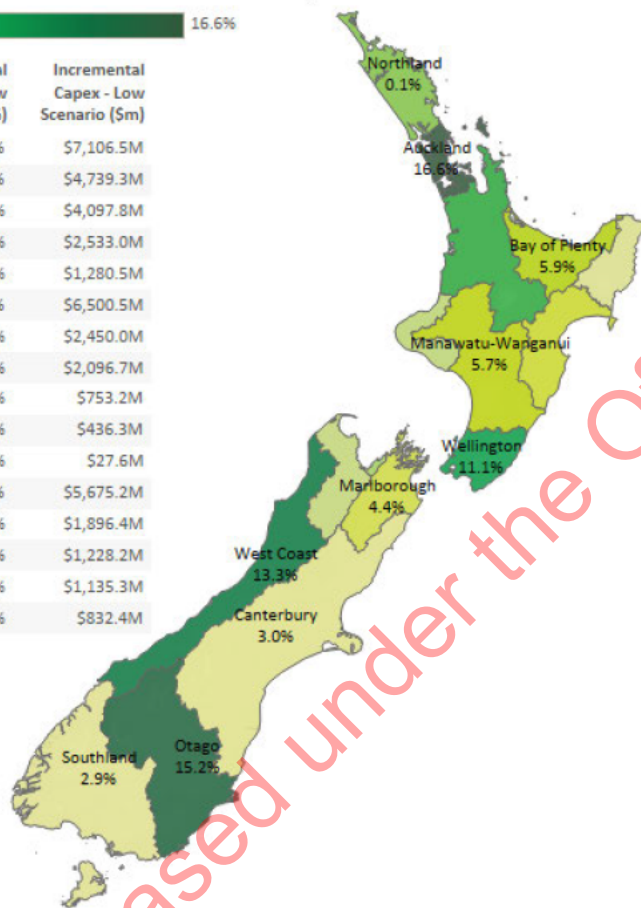
Incremental capex profiles

Using data from WICS and DIA, we produced an incremental capex profile for each scenario. These were the core inputs into the CGE model.

Incremental Capex - Low Scenario (%)



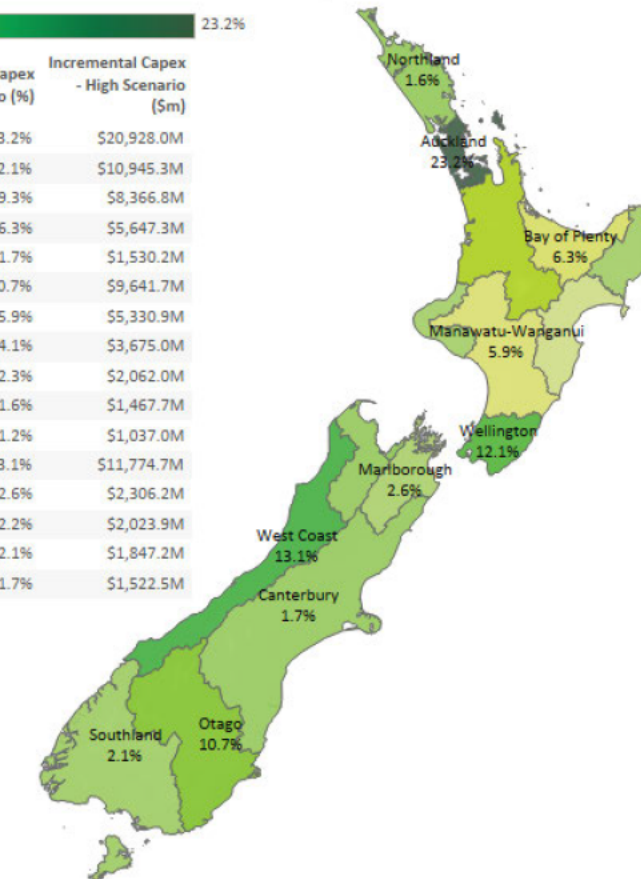
| Classification | Region | Incremental Capex - Low Scenario (%) | Incremental Capex - Low Scenario (\$m) |
|----------------|-------------------|--------------------------------------|--|
| Metropolitan | Auckland | 16.6% | \$7,106.5M |
| | Wellington | 11.1% | \$4,739.3M |
| | Waikato | 9.6% | \$4,097.8M |
| | Bay of Plenty | 5.9% | \$2,533.0M |
| Provincial | Canterbury | 3.0% | \$1,280.5M |
| | Otago | 15.2% | \$6,500.5M |
| | Manawatu-Wanganui | 5.7% | \$2,450.0M |
| | Hawke's Bay | 4.9% | \$2,096.7M |
| | Taranaki | 1.8% | \$753.2M |
| | Nelson | 1.0% | \$436.3M |
| Rural | Northland | 0.1% | \$27.6M |
| | West Coast | 13.3% | \$5,675.2M |
| | Marlborough | 4.4% | \$1,896.4M |
| | Southland | 2.9% | \$1,228.2M |
| | Gisborne | 2.7% | \$1,135.3M |
| | Tasman | 1.9% | \$832.4M |
| | Canterbury | 3.0% | \$1,280.5M |



Incremental Capex - High Scenario (%)

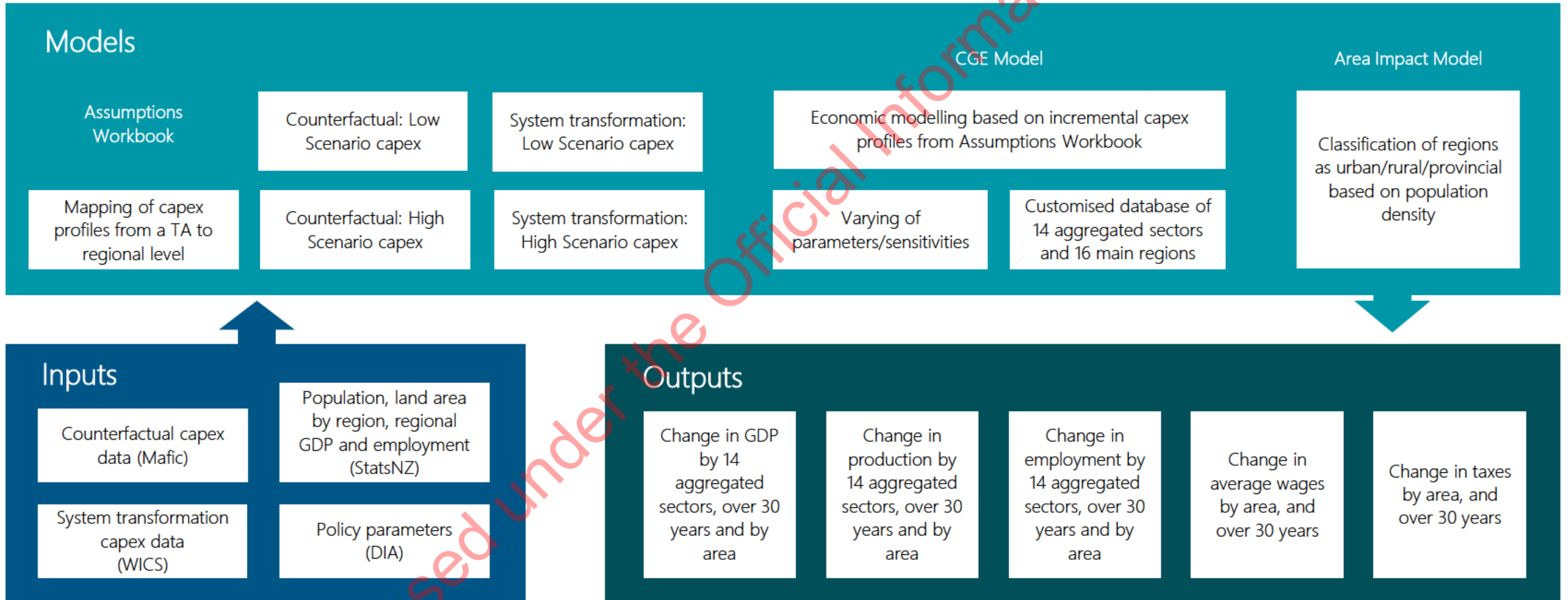


| Classification | Region | Incremental Capex - High Scenario (%) | Incremental Capex - High Scenario (\$m) |
|----------------|-------------------|---------------------------------------|---|
| Metropolitan | Auckland | 23.2% | \$20,928.0M |
| | Wellington | 12.1% | \$10,945.3M |
| | Waikato | 9.3% | \$8,366.8M |
| | Bay of Plenty | 6.3% | \$5,647.3M |
| Provincial | Canterbury | 1.7% | \$1,530.2M |
| | Otago | 10.7% | \$9,641.7M |
| | Manawatu-Wanganui | 5.9% | \$5,330.9M |
| | Hawke's Bay | 4.1% | \$3,675.0M |
| | Taranaki | 2.3% | \$2,062.0M |
| | Northland | 1.6% | \$1,467.7M |
| Rural | Nelson | 1.2% | \$1,037.0M |
| | West Coast | 13.1% | \$11,774.7M |
| | Marlborough | 2.6% | \$2,306.2M |
| | Gisborne | 2.2% | \$2,023.9M |
| | Southland | 2.1% | \$1,847.2M |
| | Tasman | 1.7% | \$1,522.5M |
| | Canterbury | 1.7% | \$1,522.5M |



Model design

An overview of our model design, the key inputs and outputs are provided below.



Key data sources

The WICS' system transformation profile uses two approaches: the investment in the UK (Approach 1) or Scotland (Approach 2). DIA's counterfactual capex profile assumes debt and pricing constraints.

System transformation data

WICS provided data based on their defined Approaches One and Two for the system transformation scenario.

Approach one

Under approach one, the 'Revised approach used in phase one', WICS estimated potential expenditure on enhancement, growth and renewals. Enhancement and growth expenditure refers to the provision of new assets or enhancement of existing assets, while replacements refer to capital maintenance expenditure needed to maintain existing service levels to customers.

Enhancement expenditure was modelled based on investment in the UK, with population and geographic drivers accounted for. A similar method was used to estimate growth investment, but data for this was sourced from the RFI. This included growth from projected new connections and a cap per connected citizen of \$70,000 to account for financial constraints faced by Councils. Renewals were modelled in terms of the average annual replacement expenditure (i.e. economic depreciation), based on asset values reported by Councils.

Approach two

This aligns with approach one, with modelling undertaken based on population and geographic drivers, growth adjustments, and capping. However, modelling was benchmarked against Scotland only (rather than all of the UK). This was deemed appropriate as Scotland has many geographical and economic similarities with New Zealand.

Counterfactual

DIA drew on WICS data to forecast capex under the counterfactual scenario. A starting position was determined for Councils (i.e. revenue, operating expenditure, debt), and in turn the level of capital expenditure that might be possible if Councils reach their debt limits, and raise water prices in line with historic increases.

The assumed water price increase was a maximum of 4.3% per annum, in line with the historical rate of increase (between 1993 and 2018).

As mentioned, the debt limit imposed does not allow Councils to exceed a debt to revenue ratio of 500% for water assets. This is a conservative assumption, as most Councils use lower debt to revenue ratios in other areas to offset a higher debt to revenue ratio for water assets, ensuring they do not breach a debt to revenue ratio of 250%.*

The forecast interest rate is assumed to be 3.5%.

*Note the maximum debt to revenue ratio has been temporarily increased due to COVID-19. For FY21 and FY22, 300% will apply; and for each of the next four financial years, a decrease of 5% until 280% will apply for FY26 and beyond.

6. National Impacts

Impact on gross domestic expenditure, production and tax implications

Impact on gross domestic product

The reform impacts every corner of the economy and could see the economy expand by NZD 12 billion to NZD 23 billion over the next 30 years, relative to the counterfactual.

The scenarios reported demonstrate the range of potential economic benefits derived from the reform. The larger impacts are the results underpinning the **High Scenario**, while the more moderate results are the results underpinning the **Low Scenario**.

Overall, under the **High Scenario**, the reform allows economic activity to increase relative to the counterfactual, resulting in higher Gross Domestic Product (GDP) for New Zealand. GDP is value added plus taxes.

Compared to the counterfactual, under the High Scenario, Deloitte estimated the reform:

- Will increase the GDP by a cumulative **NZD 22.9 billion** from 2022 to 2051 (in present value real terms using a real discount rate of 5%).
- On average, the **New Zealand economy would be 0.43% larger** per annum than it otherwise would have been under the counterfactual.
- To put the economic impact of the reform into context, the NZD 22.9 billion deviation **represents 7.0% of the current size** of the total New Zealand economy.

Under the **Low Scenario**:

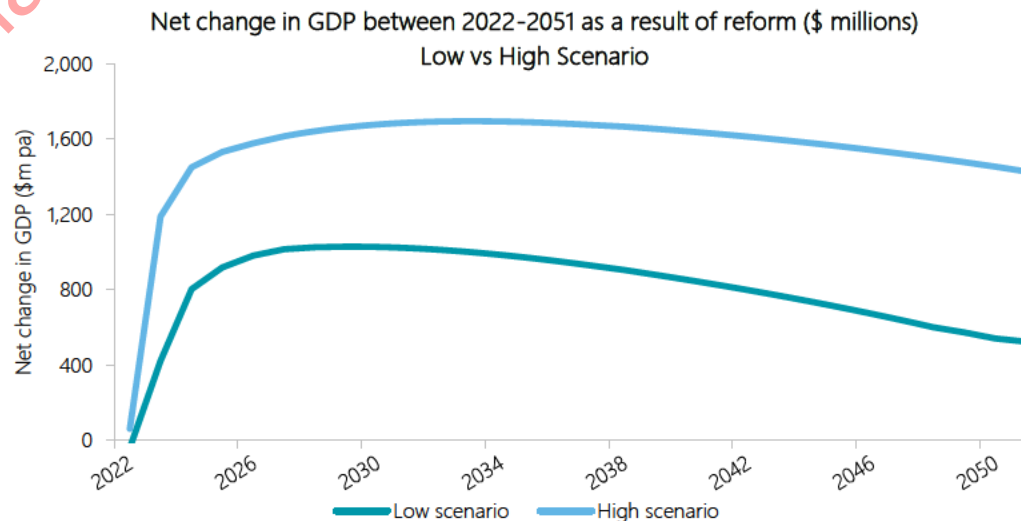
- GDP will increase by **NZD 12.4 billion**, which represents **3.8% of the current size of the economy**.
- In relative terms this equates to an **average increase in GDP of 0.23% per annum**.

The economic impact analysis focuses on the *incremental impact of the policy reform*. However, the counterfactual already envisages a material step up in investment from the status quo – with the associated employment and GDP impact. For instance, under the Low Scenario, the GDP impact is estimated based on incremental capital expenditure of \$42 billion on top of \$78 billion of capital expenditure already included in the counterfactual.

National GDP impact relative to the counterfactual over 2022 to 2051

| Scenario | GDP impact (\$b) | Average increase in GDP | Percentage of the current size of the economy |
|----------|------------------|-------------------------|---|
| Low | 12.4 | 0.23% | 3.8% |
| High | 22.9 | 0.43% | 7.0% |

Source: Deloitte



Source: Deloitte

These results highlight the critical role the reform can play in the New Zealand economy. These results also show that even under the a more moderate investment profile, reform will still deliver 48 economic dividends for New Zealand.

What impact does reform have across industries?

Low Scenario and High Scenario gross domestic product impacts varies across sectors- Trade, Financial Services, Construction, Business Services and Other Services is projected to gain the most.

As with the regional impact of reform, the impact on industry is not equally distributed. In the first decade of reform, when incremental capex at its highest, GDP in the water sector increases. However, it begins to decline from 2034 onwards, as the capex profile also reduces. In NPV terms, GDP in the water sector still increases by \$23m between 2022 and 2051.

The step up in investment increases output in the water sector, via improved capital efficiency. While value added declines in the water sector, this is offset by an increase in intermediate inputs (how reform benefits all other sectors). When it comes to GDP, the decline in water sector value add is not offset by the increase in taxes, so GDP decreases in the sector.

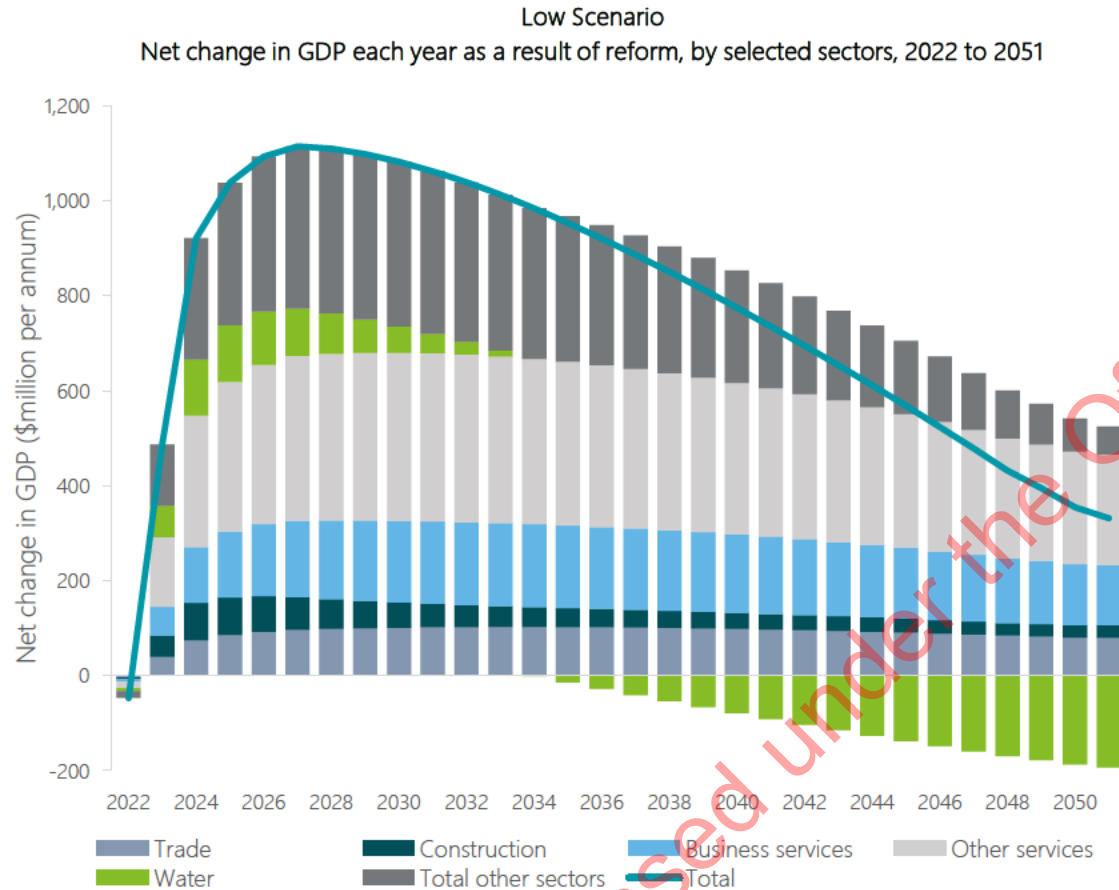
Under the Low Scenario, Trade (\$1.3b) Financial services (\$0.6b), Construction (\$0.6b) Business Services (\$2.2b), and Other Services (\$4.5b) are expected to see the largest increases in GDP as a result of reform. Growth in GDP in the business services sector due to reform may be associated with greater activity at the Strategy and Planning, and Financing and Procurement, stages of the water industry life cycle.

Under the High Scenario, GDP in the water sector increases between 2022 and 2034, and subsequently declines from 2035. In NPV terms, GDP in the water sector still increases by \$1.9b between 2022 and 2051. Trade (\$2.4b) Financial services (\$1.2b), Construction (\$1.3b) Business Services (\$4.0b), and Other Services (\$8.2b) are expected to see the largest increases in GDP as a result of reform.

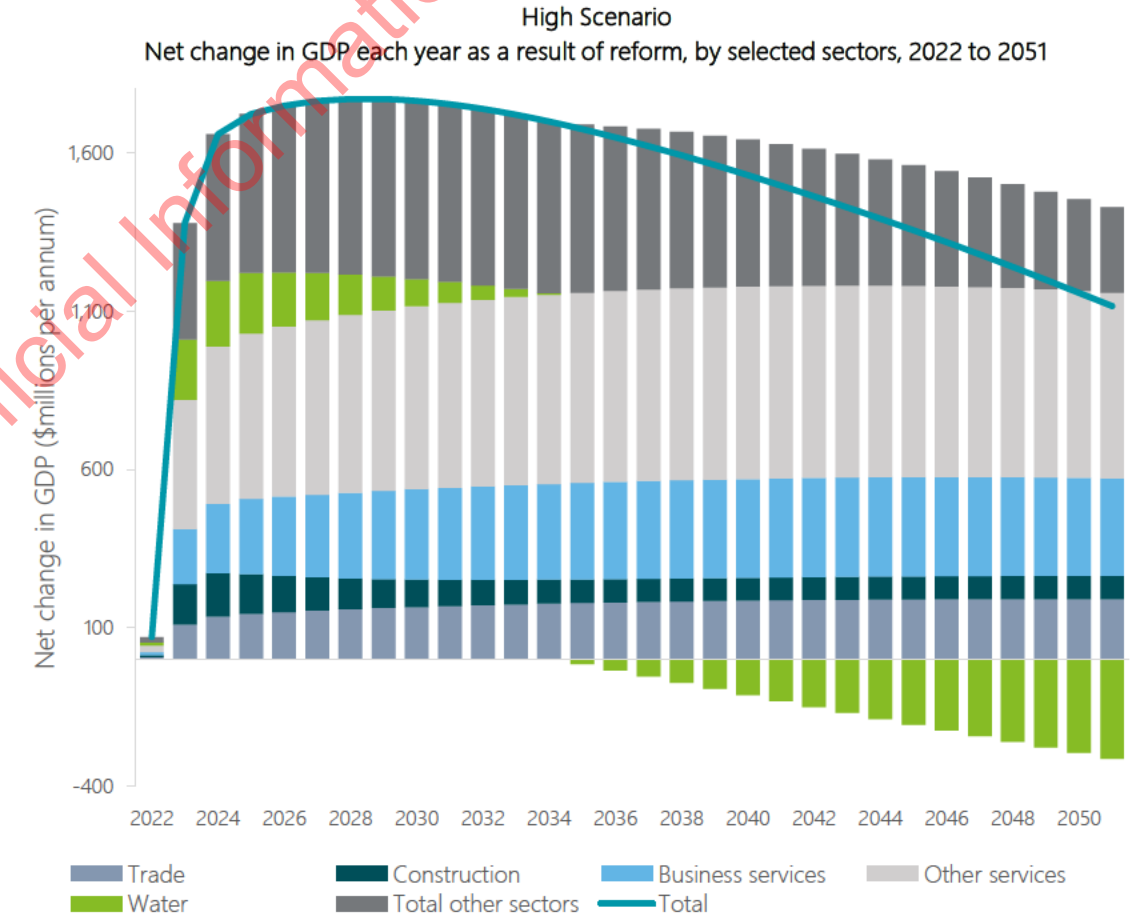
The other services sector is forecast to see the largest increase in GDP. Other services includes Public Administration & Defence, Education, Human Health and Social Work Activities, and Dwellings (i.e. residential housing). Part of the increase in GDP in other services will be driven by government activity associated with reform. However, dwellings is a large capital user, which benefits from the more efficient use of capital reform brings about. Moreover, the other services sector generally benefits from the broader economic benefits delivered by reform, which translates to an increase in GDP.

What impact does reform have across industries?

Low Scenario and High Scenario gross domestic product impacts varies across sectors- Trade, Financial Services, Construction, Business Services and Other Services is projected to gain the most.



Source: Deloitte



Source: Deloitte

Impact on production and taxes

Reform could see production expand by \$25 billion to \$46 billion over the next 30 years, relative to the counterfactual, and generate \$2.7 billion to \$4.9 billion in additional tax revenue.

Impact on production

Reform will expand production (value added plus intermediate inputs) in the New Zealand economy. Compared to the counterfactual, under the High Scenario, Deloitte estimated the reform will:

- Expand production at a national level by **\$45.8 billion** (in real present value terms using a real discount rate of 5%), over the period 2022 to 2051.
- On an annual average basis, production is projected to increase **\$3.0 billion** per annum relative to the counterfactual.

Under the **Low Scenario**, reform is projected to:

- Expand production (above the counterfactual level) at a national level by **\$24.6 billion** (in real present value terms using a real discount rate of 5%), over the period 2022 to 2051.
- On an annual average basis, production is projected to increase **\$1.5 billion** over the next 30 years.

Impact on tax

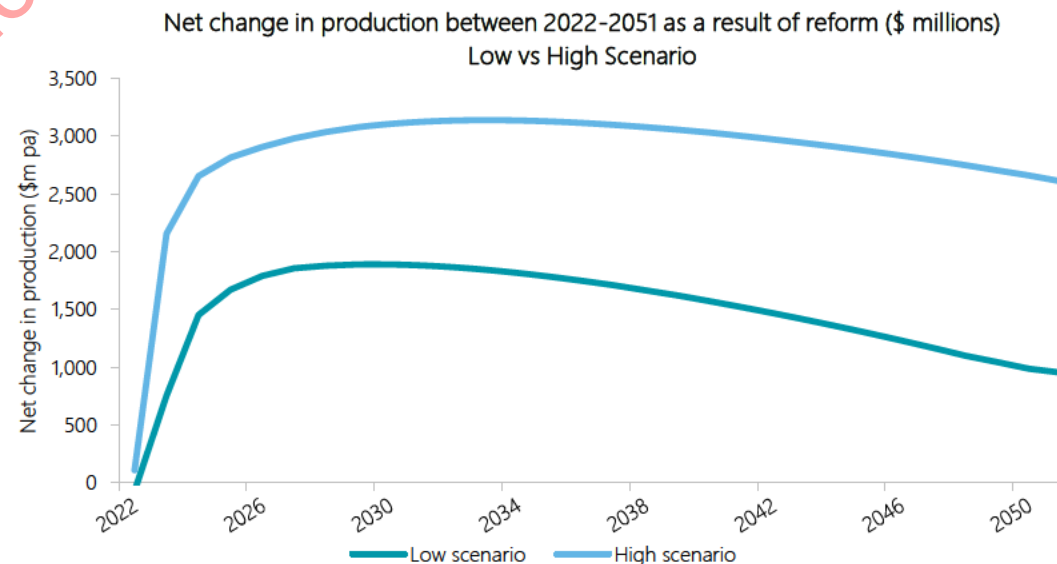
Deloitte also estimated the tax revenue associated with the reform.

- Under the **Low Scenario**, our modelling shows reform will increase tax revenue by **\$2.7 billion** from 2022 to 2051 (in real, net present value terms using a real discount rate of 5%) relative to the counterfactual.
- Under the **High Scenario**, Deloitte also estimated the tax revenue associated with the reform. Our modelling shows reform will increase tax revenue by **\$4.9 billion** from 2022 to 2051 (in real, net present value terms using a real discount rate of 5%) relative to the counterfactual.

National impact on production relative to the counterfactual over 2022 to 2051

| Scenario | Production (\$b) | Average annual increase (\$b) |
|----------|------------------|-------------------------------|
| Low | 24.6 | 1.5 |
| High | 45.8 | 3.0 |

Source: Deloitte



Source: Deloitte

7. Workforce Impacts

Workforce Impacts

Reform is expected to support jobs across the economy. Relative to the counterfactual, New Zealand could have on average an extra 4,321 to 8,209 additional FTE jobs between 2022 and 2051.

Impact on employment

Reform is also projected to increase employment in the New Zealand economy.

Under the **High Scenario**, it is estimated reform will:

- Add **8,209 full-time equivalent (FTEs)** on average, each year, over the next 30 years compared to the counterfactual scenario.
- On average, the number of FTEs is **0.28% larger** than it otherwise would have been under the counterfactual.
- This represents approximately **0.37% of the current total workforce** in the economy or **0.50% of the total FTEs** in New Zealand.*

Under the **Low Scenario**, it is estimated reform will:

- Add **4,321 FTE jobs** per annum from 2022 to 2051, compared to the counterfactual scenario.
- On average, the number of FTEs is **0.15% larger** than it otherwise would have been under the counterfactual.
- This represents approximately **0.19% of the current total workforce** in the economy or **0.26% of the total FTEs** in New Zealand.*

It is estimated the impact on employment will peak around 2024 and reflect the shape of the incremental investment profiles.

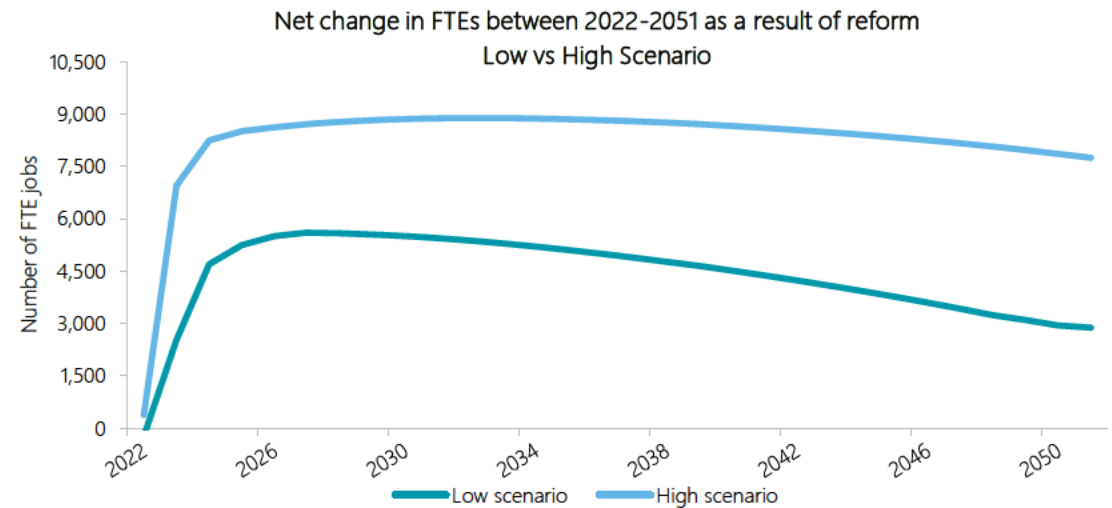
We also modelled a sensitivity on the High Scenario, where we assumed double the percentage of FTEs filled by inbound migration, which results in additional FTEs of 8,680 – i.e. 471 more FTEs than the main High Scenario. This demonstrates what might be possible with a workforce strategy that includes more inbound migration.

*According to Statistics New Zealand, the total workforce is currently 2,239,691 and the total current number of FTEs is 1,636,300.

National impact on employment, relative to the counterfactual, 2022 to 2051

| Scenario | Average additional FTEs pa | Average increase in FTEs pa | % of the current size of the workforce | % of the current full-time equivalent jobs |
|----------|----------------------------|-----------------------------|--|--|
| Low | 4,321 | 0.15% | 0.19% | 0.26% |
| High | 8,209 | 0.28% | 0.37% | 0.50% |

Source: Deloitte



Source: Deloitte

Workforce Impacts

Reform is expected to support jobs across the economy. However, FTEs in the water sector are expected to be between 1,191 and 2,387 lower under reform relative to the counterfactual.

Impact on employment

In both scenarios the employment impact in terms of additional FTEs is significantly positive for all sectors, except for a decline in FTEs in the water sector. We note there is currently an excess of 4,000 FTEs in drinking water, wastewater and storm water services in local Councils across New Zealand.* The reasons for the projected decline in additional FTEs the water sector include the removal of duplicative jobs through reform, the fact the water sector has an ageing workforce, and the adoption of more efficient capital through reform.

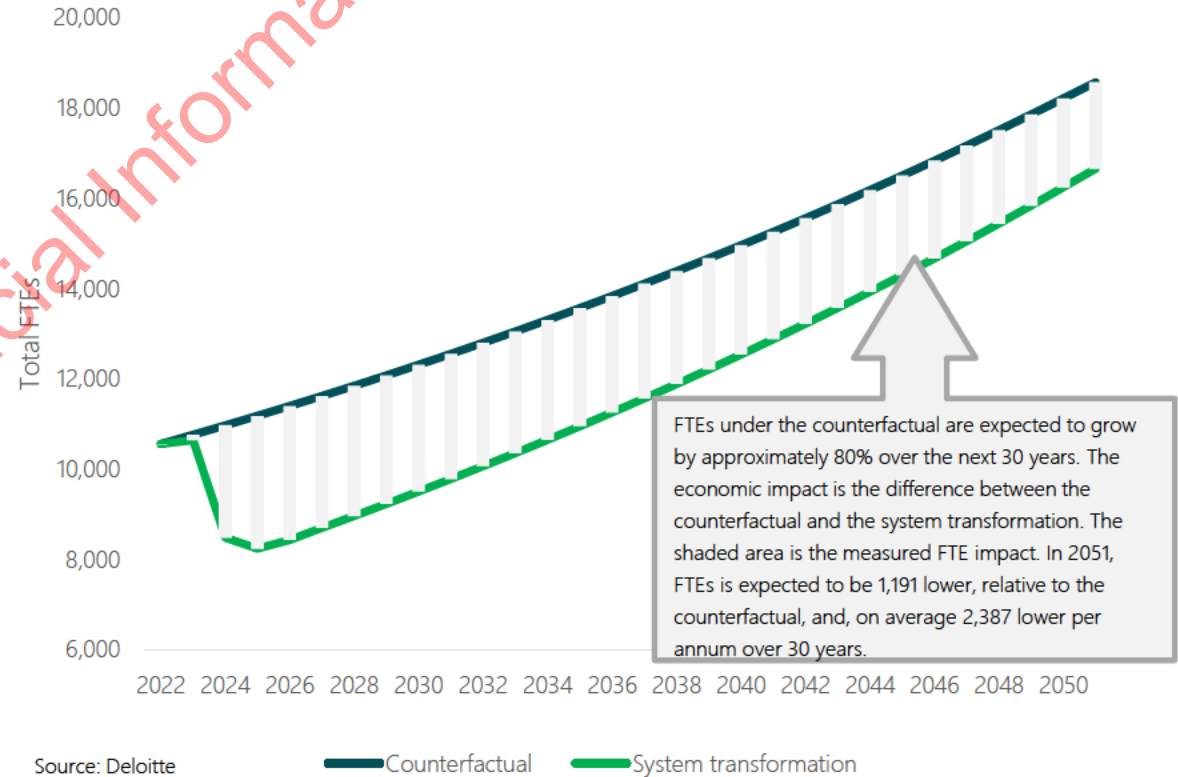
At a national level, additional FTEs in the water sector are projected to decline, on average, by 1,191 (under the Low Scenario) and 2,387 (under the High Scenario) as a result of reform.

This equates to a 0.04% (Low Scenario) and a 0.08% (High Scenario) reduction in the annual estimated increase in FTEs relative to the counterfactual.

However, this does not mean the water sector shrinks below current employment levels over the 30 year period. On the contrary, total water sector employment at the end of the 30 years is nearly 80% higher than current levels. As the sector grows over time, the employment level rises to almost 80% higher than the current levels. The difference between the counterfactual and the system transformation is the measured impact on employment. This point is illustrated in the graph on the left.

Scotland had a similar outcome in its water reform. Scottish Water's headcount reduced by 2,500 FTEs as a result of the reform; but total employment (water sector and its supply chain) has increased- a net estimated increase of 4,000 FTEs. WICS noted that a New Zealand could experience something similar.**

An illustration of the impact on FTEs in water sector (Total FTEs - based on the High Scenario)



*Water New Zealand, National Performance Review 2018 – 2019 (Water New Zealand, 2019), 18. https://www.waternz.org.nz/Attachment?Action=Download&Attachment_id=4271

** WICS, 01 April 2021, Economic Analysis of water services aggregation [Draft report], page

Workforce Impacts

While there is a decline in additional FTE jobs in the water sector, the additional activity associated with the reform is expected to create additional FTEs across all other sectors in the economy.

Reform generates crowding out to some degree. The contraction of water sector employment creates more available labour supply for other competing industries, relative to the counterfactual. However, these effects are limited by the relatively low level of unemployment in New Zealand currently, as there are fewer people readily available to take on a new job. Crowding out is also largely associated with the rest of the world, implying a greater inflow of migration.

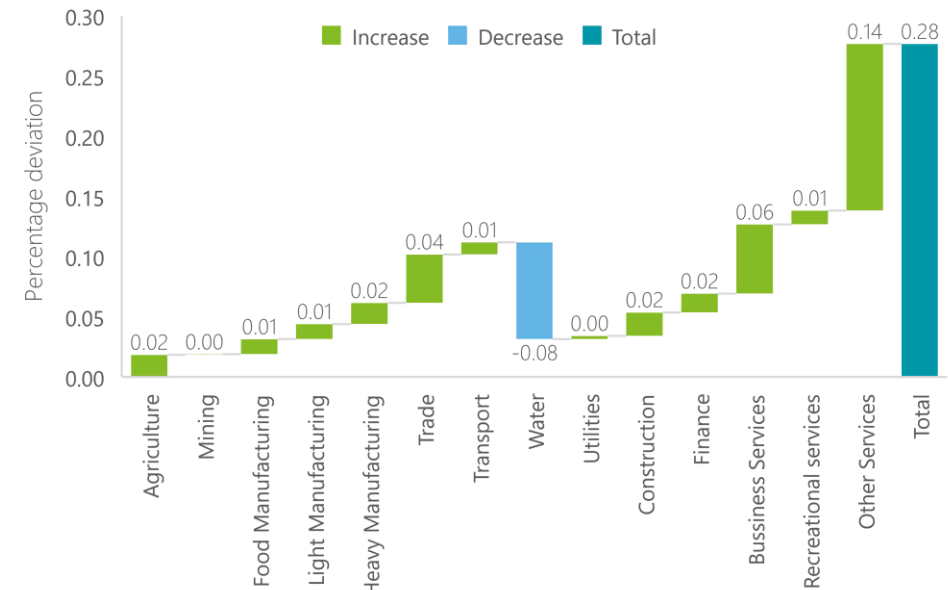
As noted earlier in the report, FTEs would be **0.15% larger under the Low Scenario** and **0.27% larger under the High Scenario** than it otherwise would have been in the counterfactual scenario.

The graphs below provide a breakdown of average annual increase in FTEs by sector, with reform expected to generate a negative change in water sector FTEs but an increase in FTEs in all other sectors, particularly **Construction, Trade, Business Services, and Other Services**. Other Services includes Public Administration and Defence, Education, Human Health and Social Work activities, and Dwellings (i.e. housing). These are large sectors, which all benefit from the GDP and output growth reform facilitates. In addition, the Dwellings sector is a large capital user, which benefits from more efficient capital as a result of reform. **Charts on the sectoral breakdown of the employment impact, in absolute additional FTEs jobs, are presented on the next page.**

Low Scenario: A sectoral breakdown of the average change in FTEs, 2022 to 2051

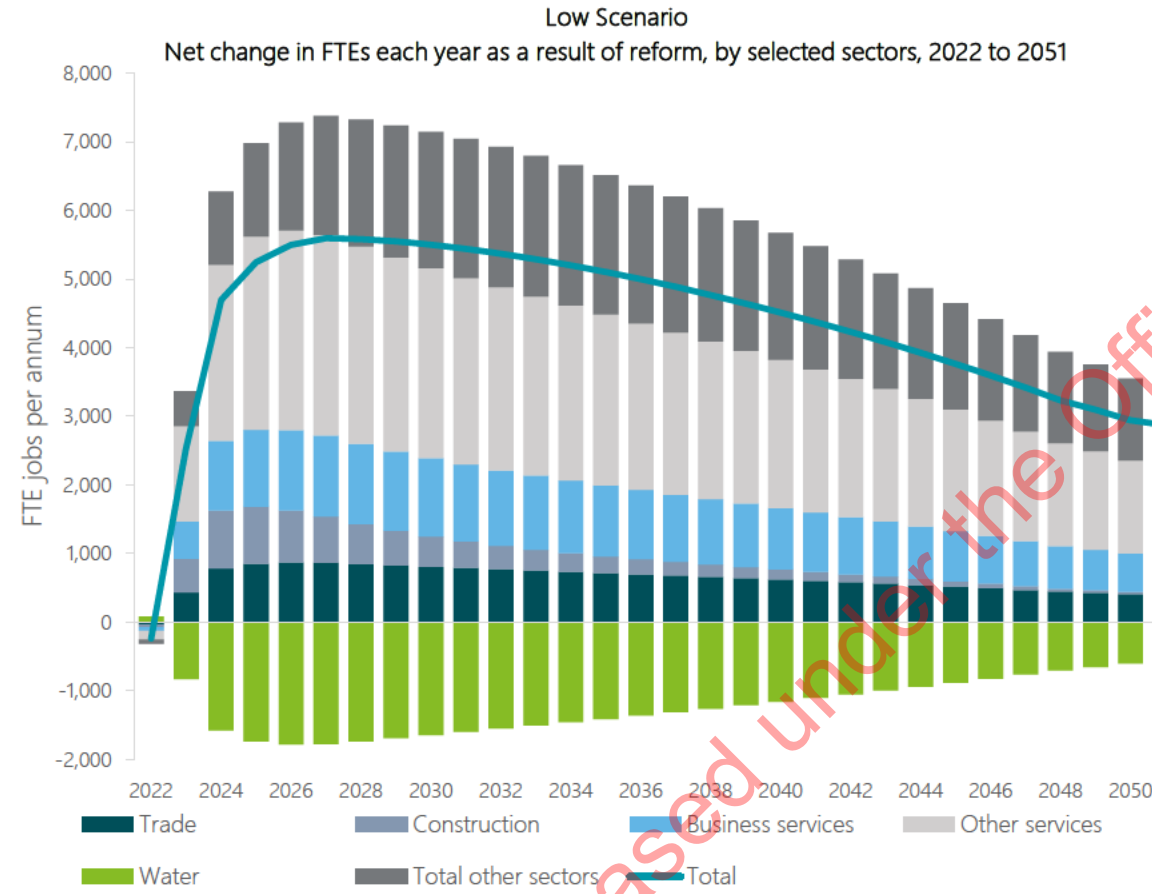


High Scenario: A sectoral breakdown of the average change in FTEs, 2022 to 2051

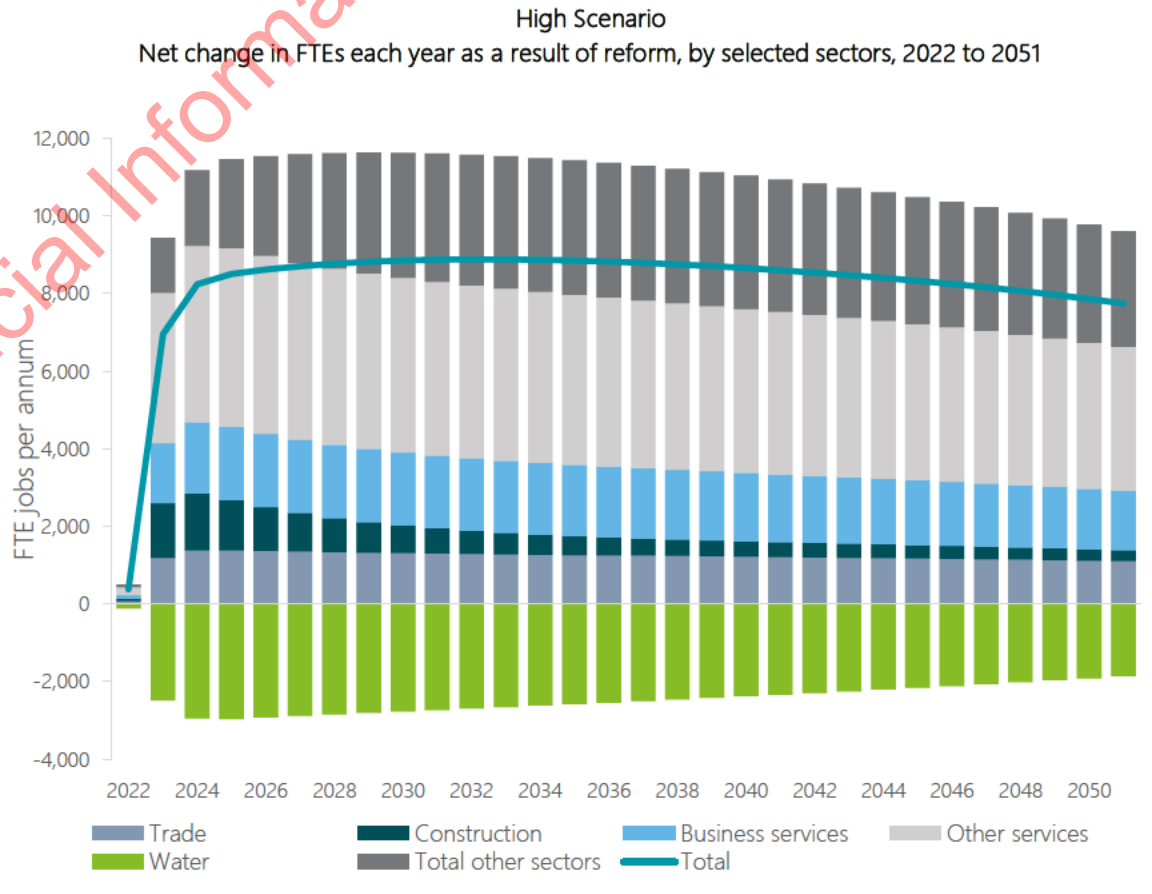


Workforce Impacts

The additional activity associated with reform is expected to create substantial additional FTEs across all other sectors in the economy between 2022 and 2051.



Source: Deloitte



Source: Deloitte

Wage Growth

Average wages are expected to increase as a result of the reform, mainly driven by an increase in labour productivity.

At the national level, reform is expected to generate an increase in average real annual wages of **0.13% under the Low Scenario, and 0.24% under the High Scenario**, over the period from 2022 to 2051.

National impact on real wages, relative to the counterfactual, 2022 to 2051

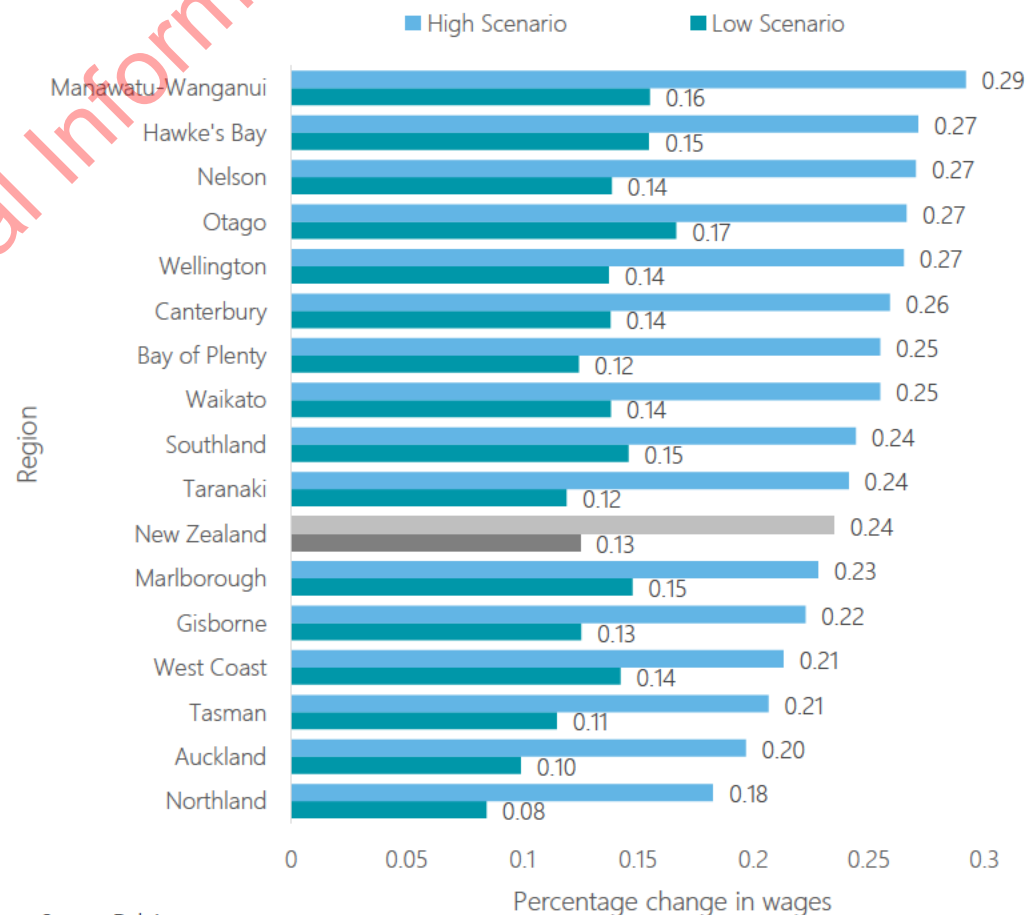
| Scenario | Average increase in annual wages in real terms |
|----------|--|
| Low | 0.13% |
| High | 0.24% |

The increase in wages is mainly driven by the increase in labour productivity as a result of reform. Reform is expected to drive improved capital productivity through capital deepening – an increase in the proportion of capital stock relative to the number of labour hours worked. Capital deepening therefore leads to an increase in labour productivity, which can be associated with changes in wages.

All regions are expected to see an increase in average wages, but with some variation across regions. The impact on wages across regions is driven by the structure of the each regional economy, cost of labour and labour productivity. In addition, sectors which see some of the largest gains in employment and GDP (e.g. Business Services, Financial Services), are more likely to have a higher proportion of skilled (rather than unskilled) employment, which increases the cost of labour.

The modelling suggests most regions will see an increase in annual average real wages close to the national impact. Manawatu-Wanganui is estimated to gain the most as a result of reform, followed by Hawke’s Bay, Nelson, Otago and Wellington. On the other hand, Auckland and Northland see smaller gains relative to the national average.

Average change in wages as a result of reform, regional overview
Low vs High Scenario



8. Distributional Impacts

How is the impact distributed across regions and across metropolitan, provincial and rural areas?

Distributional Impacts

Every region in New Zealand is positively affected by the economic impacts of the reform, but not all regions are impacted equally.

The previous section of the report explored the national economic impact of the reform – but that’s only part of the story. Every region is positively affected by the economic impact of reform, with increases in GDP, production, employment, taxes and average wages are expected. However, not all regions are impacted equally – the magnitude of the increase in GDP and employment differs considerably across regions, and when considered in terms of metropolitan, rural and provincial areas. Rural and provincial areas (per the classifications below, based on population density) have the most to gain from reform, as these regions currently face large infrastructure deficits.

Heterogeneity in these impacts across regions is the result of differing structures and dynamics of each region’s economy. Import-oriented regions (that is, inter-regional importing, as well as imports from overseas), benefit more than areas which are more exposed to domestic demand (spending and production within that area). As a result, smaller, import-oriented regions such as the West Coast, Gisborne, Marlborough and Southland see larger relative benefits.

We classified the 16 main regions into metropolitan, provincial and rural areas, based on population density and regional characteristics to consider local impacts of reform. Opposite is a summary of the classification we used:

Regions classified as metropolitan

Auckland
Wellington
Bay of Plenty
Waikato
Canterbury

Regions classified as rural

Gisborne
Tasman
Marlborough
West Coast
Southland

Regions classified as provincial

Northland
Hawke's Bay
Taranaki
Manawatu-Wanganui
Nelson
Otago

Source: Deloitte

What impact does reform have across areas?

Low Scenario

Impact on the gross domestic product, by region, relative to the current regional GDP

New Zealand is projected to gain NZD 12.4 billion as a result of the reform, representing approximately 3.8% of the current size of the total New Zealand economy. What is the distribution of this impact across areas?

The heat map shows the overall impact on regional GDP, in real present value terms over 30 years, as a proportion of the region's current GDP. Relative to the impact on the economy at a national level, regions characterised as rural and provincial will most benefit from the reform.

Based on the current GDP of each region, **all rural regions are estimated to benefit more than the national average as a result of reform.** The estimated GDP deviation would represent 7% of the current regional GDP in the West Coast, 6.8% in Gisborne, 6.3% in Marlborough, 4.9% in Tasman-Nelson region and 4.4% in Southland.

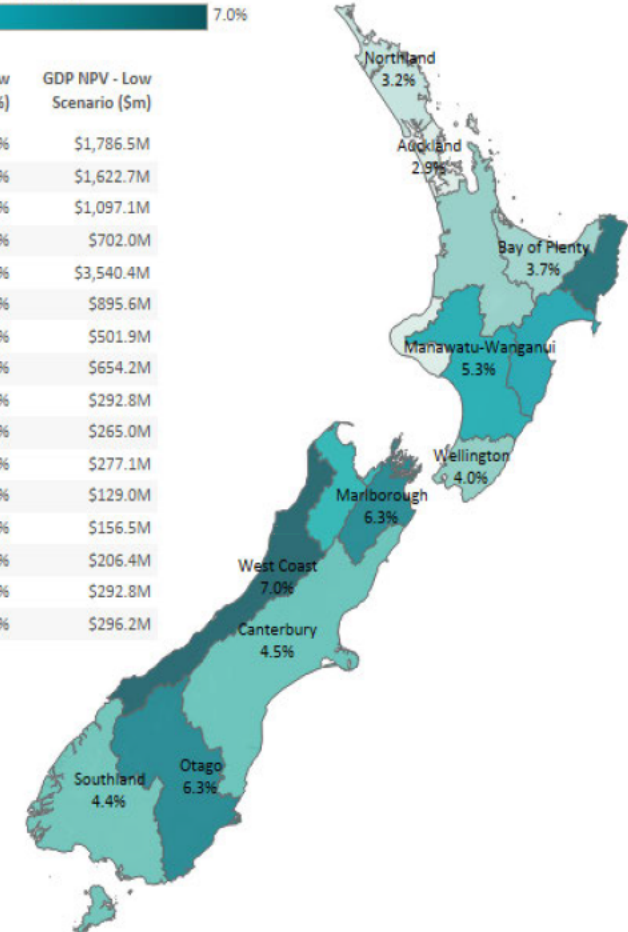
Most regions classified as provincial will also gain more than the national average. The estimated GDP deviation would represent 6.3% of the current regional GDP in Otago, 5.5% in Hawke's Bay, and 5.3% in Manawatu-Wanganui. Regions characterised as provincial that will gain less than the national average include Northland (where the estimated GDP impact is 3.2% of the current regional GDP), and Taranaki (where the estimated GDP impact is 2.9% of the current regional GDP).

Metropolitan regions see larger gains than the national average, except for Auckland. The GDP impact is 2.9% of the Auckland's current GDP. Waikato and Wellington are estimated to have a benefit slightly higher than the national average, where the GDP deviation is 3.9% and 4.0% of the current regional GDP. Canterbury is the region with the most benefit in metropolitan areas, where the GDP impact is 4.5% of its current regional GDP.

Net change in GDP as a proportion of current GDP (Low Scenario)



| Classification | Region | GDP change - Low Scenario (%) | GDP NPV - Low Scenario (\$m) |
|----------------|-------------------|-------------------------------|------------------------------|
| Metropolitan | Canterbury | 4.5% | \$1,786.5M |
| | Wellington | 4.0% | \$1,622.7M |
| | Waikato | 3.9% | \$1,097.1M |
| | Bay of Plenty | 3.7% | \$702.0M |
| | Auckland | 2.9% | \$3,540.4M |
| Provincial | Otago | 6.3% | \$895.6M |
| | Hawke's Bay | 5.5% | \$501.9M |
| | Manawatu-Wanganui | 5.3% | \$654.2M |
| | Nelson | 4.9% | \$292.8M |
| | Northland | 3.2% | \$265.0M |
| | Taranaki | 2.9% | \$277.1M |
| | West Coast | 7.0% | \$129.0M |
| | Gisborne | 6.8% | \$156.5M |
| Rural | Marlborough | 6.3% | \$206.4M |
| | Tasman | 4.9% | \$292.8M |
| | Southland | 4.4% | \$296.2M |
| | Canterbury | 4.5% | \$1,786.5M |
| | Wellington | 4.0% | \$1,622.7M |



What impact does the reform have across areas?

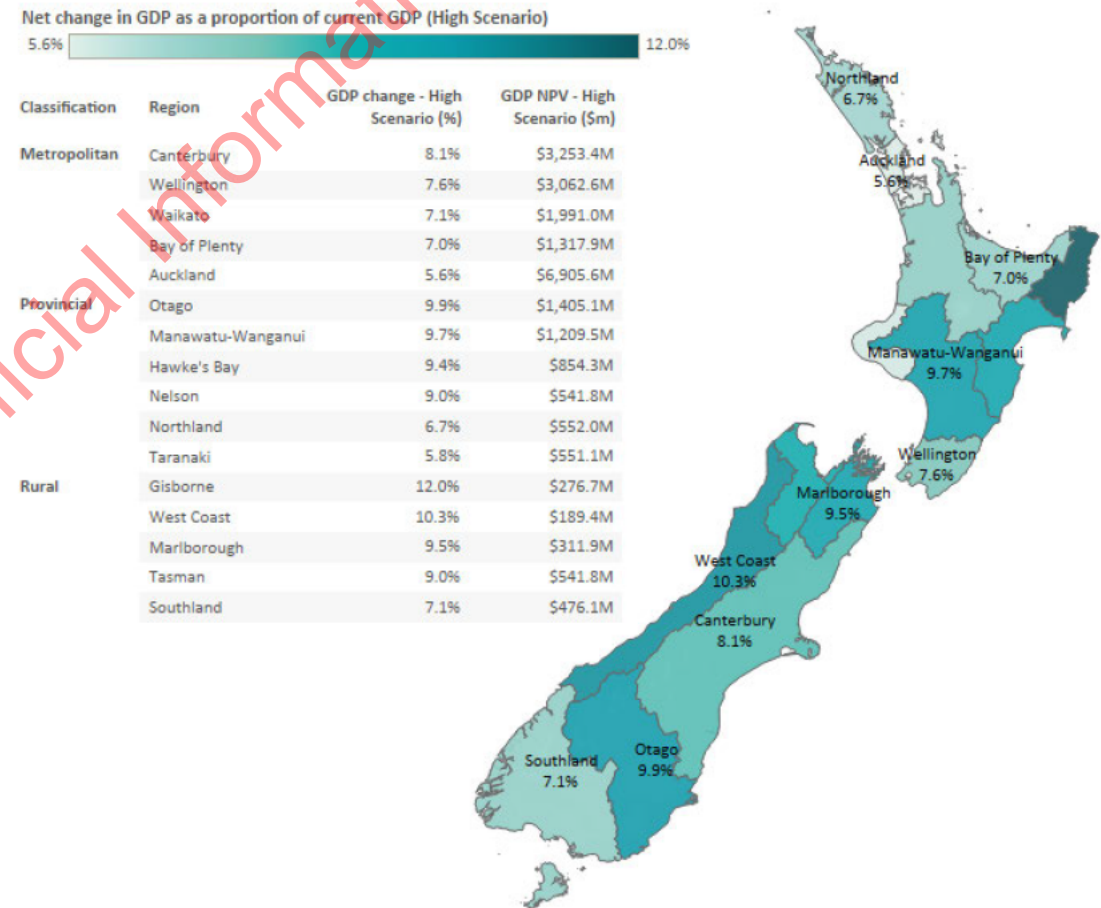
High Scenario

Under the High Scenario, it is estimated New Zealand would gain NZD 22.9 billion over 2022 to 2051, representing represent 6.9% of the current size of the total New Zealand economy. The GDP impact under the High Scenario reveals a similar area distribution compared to the Low Scenario. Rural regions are estimated to gain the most relative to the estimated national average as a result of the reform.

The heat map shows **all rural regions are estimated to benefit more than the national average as a result of the reform**. The estimated GDP deviation would represent 12.0% of the current regional GDP in Gisborne, 10.3% in West Coast, 9.5% in Marlborough, 9.0% in Tasman/Nelson and 7.1% in Southland.

Most regions in Provincial areas will also gain more than the national average. The estimated GDP deviation would represent 9.9% of the current regional GDP in Otago, 9.7% in Manawatu-Wanganui and 9.4% in Hawkes Bay. Regions characterised as provincial areas that will gain less than the national average include Northland (where the estimated GDP impact is 6.7% of the current regional GDP) and Taranaki (where the estimated GDP impact is 5.8% of the current regional GDP).

Metropolitan regions are estimated to benefit in a cluster around the national average, except for Auckland. The GDP impact is 5.6% of the current GDP in Auckland. The impact in Bay of Plenty is also slightly less than the national average at 7.0%. Waikato and Wellington are estimated to have a benefit slightly higher than the national average, where the GDP deviation is 7.1% and 7.6% of the current regional GDP. Canterbury is the region with the most benefit in metropolitan areas, where the GDP impact is 8.1% of its current regional GDP.



Is job growth higher or lower than the national average?

Low Scenario

Under the Low Scenario, it is estimated reform will add 4,321 FTEs per annum from 2022 to 2051 or 0.19% of the total current workforce, relative to the counterfactual. To consider the relative employment impact as a result of reform across regions, we looked at the **estimated additional FTEs for each region as a proportion of the current workforce in that region**. The heat map opposite shows the estimated regional employment impact as a result of reform.

Provincial regions are estimated to gain the most relative to the estimated national average as a result of the reform, along with two metropolitan regions – Wellington and Canterbury.

All rural regions will benefit from additional FTEs as a result of the reform, but job growth is higher than the national average in some regions and lower in others. Southland’s additional FTEs, relative to the counterfactual, is estimated to be 0.23% of its current workforce. The equivalent figure for the West Coast is 0.21%, and 0.20% in Marlborough – all above the national average. Gisborne is close to the national average at 0.18%, as well as Tasman at 0.15%. These regions are estimated to have a higher contraction in FTEs in the water sector relative to other rural regions.

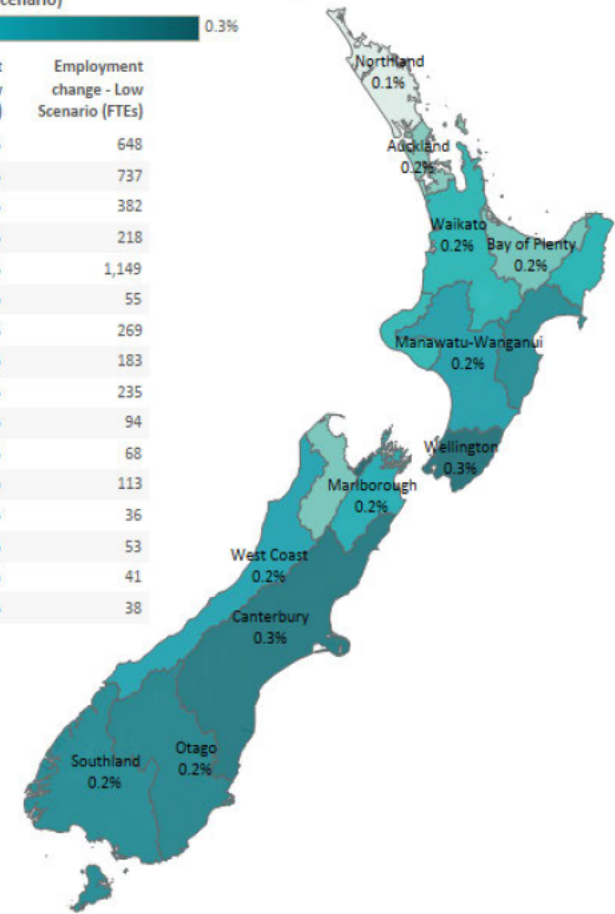
Regions classified as provincial areas show a similar outcome. Some regions are above the national average: Nelson’s estimated additional FTEs is 0.26% of the total workforce, followed by Otago at 0.24%, Hawkes Bay at 0.23% and Manawatu-Wanganui at 0.21%. Provincial regions which experience smaller gains than the national average include Taranaki at 0.18%, while Northland is below the national average at 0.10% of the current total regional workforce.

The two metropolitan regions estimated to benefit more than the national average are Wellington (0.26%) and Canterbury (0.25%), mostly due to the strong presence in Business Services and Other Services. Other metropolitan areas are projected to benefit less than the national average – the estimated additional FTEs will be 0.18% of Waikato’s current workforce, 0.16% of Bay of Plenty’s current workforce, and 0.15% of Auckland’s current workforce. Much of this is driven by the estimated decline in the water sector relative to the other sectors. For example, in Auckland and the Bay of Plenty the deviation in FTEs is -5% on average, while in Wellington and Canterbury it is estimated to be -2%, on average between 2022 and 2051.

Net change in FTEs as a % of current employment (Low Scenario)



| Classification | Region | Employment change - Low Scenario (%) | Employment change - Low Scenario (FTEs) |
|----------------|-------------------|--------------------------------------|---|
| Metropolitan | Wellington | 0.3% | 648 |
| | Canterbury | 0.3% | 737 |
| | Waikato | 0.2% | 382 |
| | Bay of Plenty | 0.2% | 218 |
| | Auckland | 0.2% | 1,149 |
| Provincial | Nelson | 0.3% | 55 |
| | Otago | 0.2% | 269 |
| | Hawke's Bay | 0.2% | 183 |
| | Manawatu-Wanganui | 0.2% | 235 |
| | Taranaki | 0.2% | 94 |
| | Northland | 0.1% | 68 |
| | Southland | 0.2% | 113 |
| Rural | West Coast | 0.2% | 36 |
| | Marlborough | 0.2% | 53 |
| | Gisborne | 0.2% | 41 |
| | Tasman | 0.2% | 38 |
| | Wellington | 0.3% | |
| | Canterbury | 0.3% | |



Is job growth higher or lower than the national average?

High Scenario

Under the High Scenario, reform will add 8,209 FTEs per annum from 2022 to 2051 compared to the counterfactual scenario, representing approximately 0.37% of the total current workforce. The heat map opposite shows what the estimated regional employment impact could look like as a result of reform.

As with the Low Scenario, there is some heterogeneity across regions. Regions with a large proportion of their workforce in Public Administration, Education and Business Services are expected to gain the most relative to the national average, while regions with a higher share of water sector employment are expected to gain the least relative to the national average.

All regions classified as rural will benefit from additional FTEs as a result of the reform, but job growth is higher than the national average in some regions and lower in others.

Southland's additional FTEs, relative to the counterfactual, are estimated to be 0.38% of the current workforce, which is above the national average. The other rural regions are slightly below the national average – Gisborne, West Coast and Marlborough are all estimated to gain FTEs equivalent to 0.31% of its regional workforce, while in Tasman this figure is 0.29% of its current workforce.

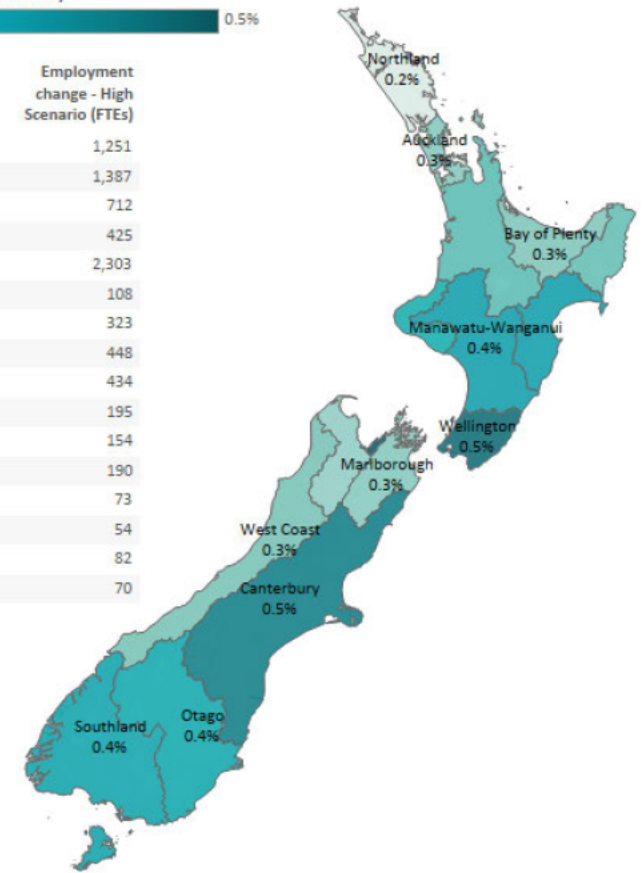
Regions classified as provincial areas show a similar outcome. Some regions are above the national average: Nelson's estimated additional FTEs represents 0.52% of the total workforce, followed by Manawatu-Wanganui, Hawke's Bay and Otago at around 0.40% of their respective workforces. Provincial regions which gain slightly less than the national average include Taranaki at 0.36%, while Northland's gain is below the national average at 0.22% of its current workforce.

The two metropolitan regions estimated to benefit by more than the national average are Wellington (0.50%) and Canterbury (0.47%), mostly due to the strong presence in Business Services and Other Services. Other metropolitan areas are projected to benefit less than the national average - estimated additional FTEs represent 0.33% of Waikato's current workforce, 0.31% of Bay of Plenty's current total workforce, and 0.30% of Auckland's current workforce.

Net change in FTEs as a % of current employment (High Scenario)



| Classification | Region | Employment change - High Scenario (%) | Employment change - High Scenario (FTEs) |
|----------------|-------------------|---------------------------------------|--|
| Metropolitan | Wellington | 0.5% | 1,251 |
| | Canterbury | 0.5% | 1,387 |
| | Waikato | 0.3% | 712 |
| | Bay of Plenty | 0.3% | 425 |
| | Auckland | 0.3% | 2,303 |
| Provincial | Nelson | 0.5% | 108 |
| | Hawke's Bay | 0.4% | 323 |
| | Manawatu-Wanganui | 0.4% | 448 |
| | Otago | 0.4% | 434 |
| | Taranaki | 0.4% | 195 |
| | Northland | 0.2% | 154 |
| | Southland | 0.4% | 190 |
| | Gisborne | 0.3% | 73 |
| Rural | West Coast | 0.3% | 54 |
| | Marlborough | 0.3% | 82 |
| | Tasman | 0.3% | 70 |



Source: Deloitte

10. Overview of affected Industries

Introduction & reform Objectives

Targeted stakeholder interviews were undertaken to understand the implications of the reform on a number of different industries.

We engaged with a cross section of service providers through an interview process. The purpose of these interviews was to understand providers' current role in the sector and how the industry in which they operate (the "Affected Industry") might evolve under a Three Waters "reform" scenario. While the information and insight gained through the interview process has been anonymised, all statements and sentiments reflected in this report can be referenced back to documented interview notes.

In undertaking the interview process, we have been mindful of the structural proposals and aim of government with respect to Three Waters reform. This provides critical context for the industry engagement process. In particular, the Three Waters reforms are expected to culminate in the establishment of a small number of multi-regional water services entities (WSEs) in 2023 and to drive a material step up in investment in the sector.

The aims of the Three Waters reform process that are expected to have implications for Affected Industries include:

- Significantly improving the safety and quality of drinking water services, and the environmental performance of drinking water and wastewater systems (which are crucial to good public health and wellbeing, and achieving good environmental outcomes);
- Ensuring all New Zealanders have equitable access to affordable three waters services;
- Improving the coordination of resources, planning, and unlocking strategic opportunities to consider New Zealand's infrastructure and environmental needs at a larger scale;
- Increasing the resilience of three waters service provision to both short and long-term risks and events, particularly climate change and natural hazards;

- Moving the supply of three waters services to a more financially sustainable footing, and addressing the affordability and capability challenges faced by small suppliers and Councils;
- Improving transparency about, and accountability for, the delivery and costs of Three Waters services, including the ability to benchmark the performance of service providers; and
- Undertaking the reform in a manner that enables local government to further enhance the way in which it can deliver on its broader "wellbeing mandates" as set out in the Local Government Act 2002.

By creating a small number of WSEs, the reforms intend to ensure:

- Entities are of significant scale to deliver benefits from aggregation over the medium to long-run;
- Entities have independent balance sheets to enhance access to capital and alternative funding instruments, driven by increased balance sheet strength; and
- Entities are specialist providers with a core focus on delivering drinking and wastewater services as a priority.

We note that Affected Industries include suppliers to water providers. While they form a critical part of the supply chain they are broader than the water sector as it is defined for the purposes of our CGE modelling.

Affected Industries Stakeholder Engagement Process

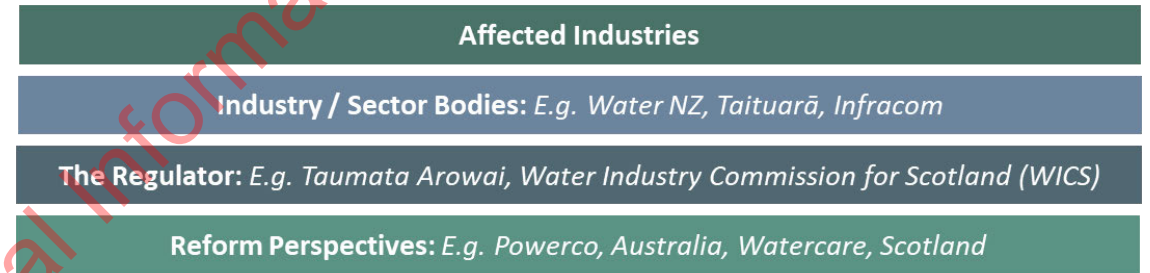
Targeted stakeholder interviews were undertaken to understand the implications of the reform on a number of different industries.

There was generally a very good level of awareness of the proposed reform and stakeholders were highly engaged. Significant thought had been given by the industry participants interviewed as to how they would respond and the wider implications for their industry. Further, there was significant acknowledgement of the role DIA had played in ensuring a high level of engagement with industry.

A large share of the step-up in investment initiated by the reforms will be capital in nature i.e. investing in upgrading/enhancing the existing network and in new infrastructure. As such, this formed a significant part of our focus for the interview process. Further, we note that it is the “shock” created by a material step up in investment that is the focus of our CGE modelling. Specifically, we explored how capital programmes are delivered currently – with reference to the asset lifecycle. We then explored how delivery might change under a scenario which combines an industry restructure that is expected to enable clear market signalling of the medium to longer-term investment pipelines and more sophisticated procurement alongside a significant increase in investment.

The other major area that we focussed on was the labour market impact from reforms, including the capacity constraints, skill shortages and possible solutions to help meet the significant increase in workforce required. Labour represents the key factor input into the investment process, so access to a workforce at scale and with the skills necessary to deliver the investment programme is seen to be critical.

A schematic of the interview coverage is set out below:



As illustrated, in addition to the discussions held with industry participants, we interviewed representatives from industry bodies and those with perspectives of the experience in NZ both in Water and Electricity distribution and in Water in other jurisdictions to obtain further evidence/insight as to how the combination of structural and regulatory reform can enhance the performance of the sector.

We also interviewed the New Zealand regulator (Taumata Arowai) and the Scottish regulator (Water Industry Commission for Scotland – WICS) to obtain perspectives on the anticipated process for New Zealand and the actual experience in a jurisdiction that had undergone substantive reform.

Methodology

Targeted stakeholder interviews were validated against case studies, and four criteria: supply chain, labour market, access to capital and innovation and productivity

Targeted stakeholder interviews

Targeted stakeholder interviews

Targeted interviews were undertaken to assist with developing an understanding of both the impact of reform on industries, and the potential policy implications.

Interview questions were directed at assessing how stakeholders participate in the sector currently and how they are responding, or planning to respond, to the reforms. We also tested perspectives on potential efficiencies or opportunities that could arise, and challenges or constraints they envisage as a result of the reform.

We shared questions with participants in advance of the interviews to ensure a more informative and targeted conversation.

Validate against case studies and criteria

Testing and validating stakeholder information

We tested and validated the information collected through stakeholder interviews against local and international case studies and criteria.

International case studies included water reforms in Australia and Scotland.

Local case studies included the New Zealand electricity sector reform, and the experience of Watercare in Auckland.

Taumata Arowai – the new regulator – provided perspectives as to how it saw the role would impact on investment priorities and, in particular, as between drinking and wastewater.

We considered the following criteria for each:

- Supply chain
- Labour market
- Access to capital
- Innovation and productivity.

Implications and considerations

Implications and considerations

Information from the stakeholder interviews was synthesised to develop a narrative of the consequences of the Three Waters reform.

The following slides discuss the implications of the reform on each criteria and highlight key constraints and risks.

The narrative provided through the interviews is developed to complement the economic impact assessment and highlight consequences for specific sectors.

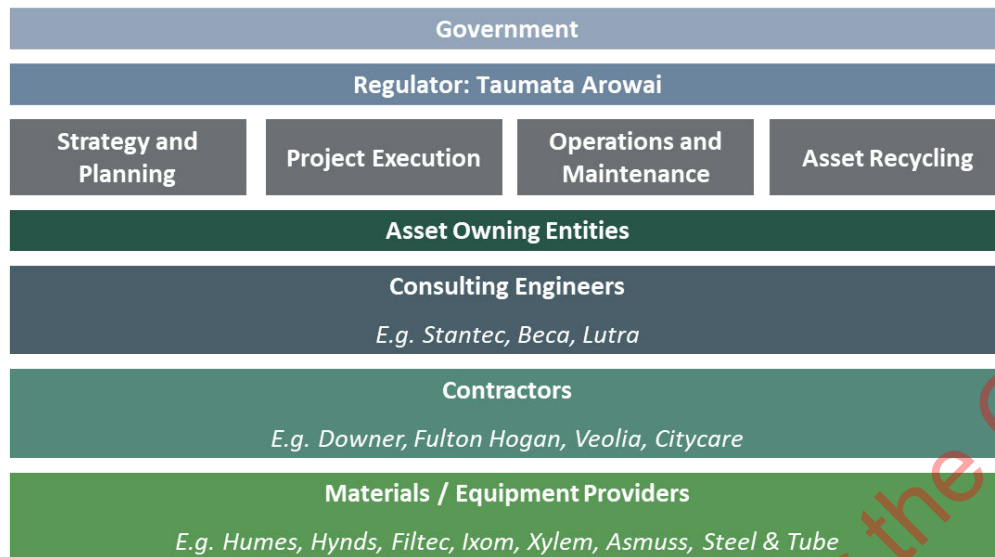
11. Industry structure

Released under the Official Information Act 1982

Overview of Post-reform Industry Structure

The water industry is comprised of many different participants, spanning multiple sectors.

Water industry structure

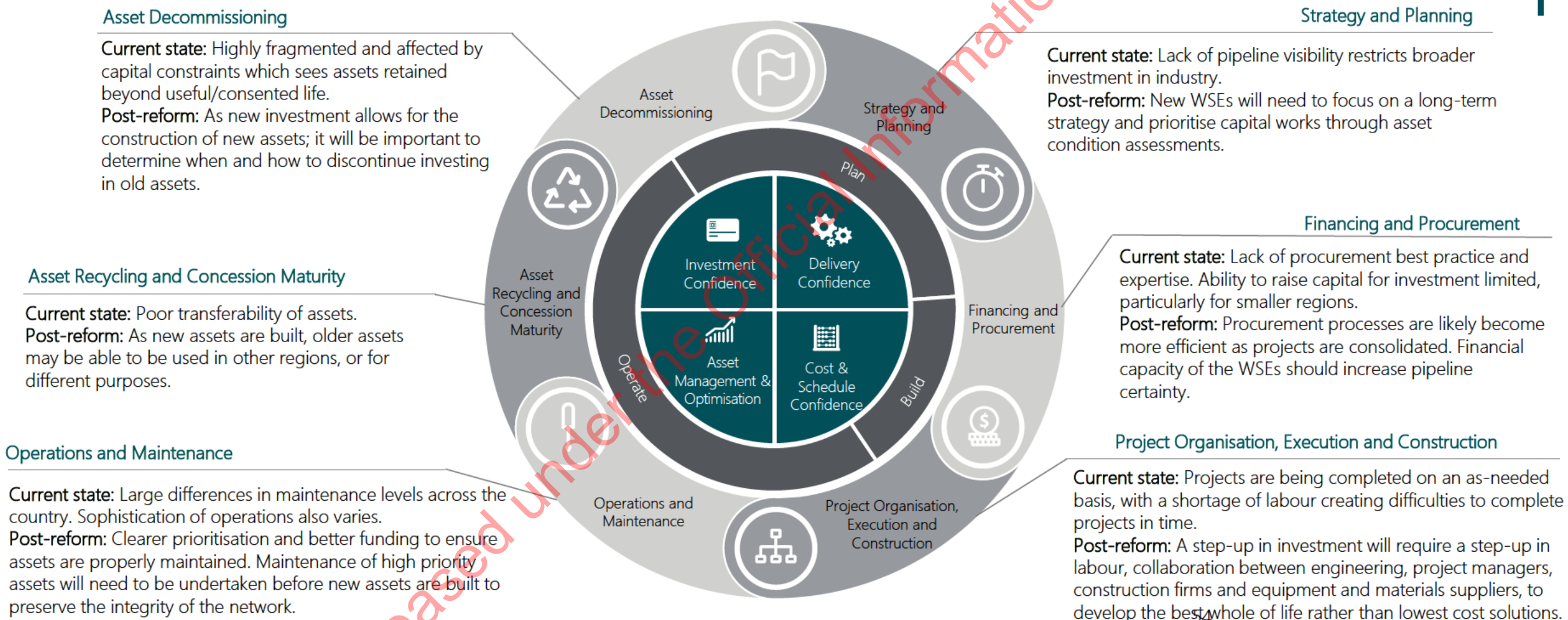


How will things change post-reform?

- **Councils** who participate in the reforms will no longer control water assets for their regions. For some, this will mean a significant change in their operating roles and reduction in workforce and a risk that valuable water sector capability could be lost through the transition process. The local and regional impact of this is expected to be more than offset by the investment in regions by new water entities.
- **Engineering firms** will scale up the number of employees operating in the water sector, although there are issues with finding skilled labour (discussed further below). Clearer pipelines of work should allow these firms to have confidence investing in on-the-ground capabilities. There is some concern that fewer water entities could see more work overall but for a reduced number of consultancies. There are some concerns about the transition-period.
- **Contracting firms** expect to see a bigger workforce and a higher focus on compliance areas given a new regulatory environment. Improved procurement processes will make life easier for these firms and allow work to get underway faster. International firms expect to draw on offshore expertise and technology but will still need to deploy large numbers of people on the ground where the assets are.
- **Material and equipment providers** are already scaling up in some cases in preparation for reforms but are nervous about transition process. There will be potential for better integration of the materials and equipment supply chain into the design process allied with more integrated contracting processes. This is likely to be particularly the case in relation to the more effective use of specialist equipment – for example the use of advanced telemetry equipment to detect network issues and to facilitate the most efficient use of water.

Overview of Industry Structure

A step up in investment will affect the planning, building and operating stages of the asset lifecycle. Specialised entities with a specific water focus should deliver more cohesive pipelines of work and consistent investment.



Overview of Industry Structure

Below is a list of companies and sector bodies we interviewed as part of the engagement process.

| Entity | Profile | # Employees Globally | # Employees NZ | # Employees in Water Services NZ |
|-----------------------|---|----------------------|----------------|----------------------------------|
| Asmuss | Specialises in polyethylene and steel piping, fittings and valves. | N/A | 230 | N/A |
| Beca | Focused on long-term, sustainable solutions for the three waters. | N/A | N/A | N/A |
| Citycare Water | Provider of construction, maintenance and management services across NZ. | N/A | 1,450 | N/A |
| Downer | Have a presence in the design, build and operation phases for the water sector. | N/A | 13,000 | 450 |
| Filtration Technology | Design advanced engineering systems and cost-effective solutions to water and wastewater problems. | 70 | 60 | 60 |
| Humes | Deliver smart, sustainable solutions for water by providing innovations in pipe manufacturing. | 640 | 270 | 245 |
| Ixom NZ | Chemical supplier predominately based in Australia and New Zealand. | 1,000 | 300 | 75 |
| Lutra | Suppliers for containerised treatment plants, and compliance reporting and monitoring tools. | N/A | 30 | 30 |
| Stantec | International professional services firm in the engineering design and consulting industry. | 22,000 | 600 | 200 |
| Steel and Tube | Providers of steel products. | N/A | 1,000 | N/A |
| Taituarā | National membership organisation for local government professionals. | N/A | N/A | N/A |
| Veolia | A mixed business mainly involved in the operation of plants, with a small focus on construction. | 179,000 | 300 | N/A |
| Water New Zealand | The industry body for the Three Waters sector. | N/A | N/A | N/A |
| Watercare | New Zealand's largest water supplier. | N/A | 984 | N/A |
| Xylem Water Solutions | Technology-based water solutions business providing UV disinfectant and biological water treatment solutions. | 15,000 | 22 | 22 |

Overview of Industry Structure

The water industry is comprised of many different participants, spanning multiple sectors.

We have looked to map the participants interviewed to the ANZSIC classifications referred to in our economic modelling. The economic modelling aggregates the following classifications up to the sector level to see gains/losses in each sector per region. We note that the activities of some participants – in particular, consulting engineers – will span a range of activities. The ANZSIC classifications align with those modelled in our CGE modelling.

| Stage of life cycle | ANZSIC classification | # of employees per classification | Sector level | Players |
|--|--|--|--|---|
| Strategy and planning | <ul style="list-style-type: none"> Professional, scientific & technical services | <ul style="list-style-type: none"> 189,000 | <ul style="list-style-type: none"> Professional services | <ul style="list-style-type: none"> WaterNZ, Taumata Arowai, Watercare, Wellington Water |
| Financing and procurement | <ul style="list-style-type: none"> Professional, scientific & technical services | <ul style="list-style-type: none"> 189,000 | <ul style="list-style-type: none"> Professional services | <ul style="list-style-type: none"> Local Councils, Watercare, Wellington Water |
| Project organisation, execution and construction | <ul style="list-style-type: none"> Primary Metal and Metal Product Manufacturing Machinery and Equipment Manufacturing Water Supply, Sewerage and Drainage Services Waste Collection, Treatment and Disposal Services Construction Services Heavy and Civil Engineering Construction | <ul style="list-style-type: none"> 4,100 29,300 2,150 7,100 101,600 37,800 | <ul style="list-style-type: none"> Heavy manufacturing Water Construction | <ul style="list-style-type: none"> Veolia, Ixom, Humes, Hynds, Xylem, Filtration Systems, Beca, Stantec, Lutra |
| Operations and maintenance | <ul style="list-style-type: none"> Water Supply, Sewerage and Drainage Services Waste Collection, Treatment and Disposal Services | <ul style="list-style-type: none"> 2,150 7,100 | <ul style="list-style-type: none"> Water Electricity | <ul style="list-style-type: none"> Citycare, Fulton Hogan, Downer, Stantec |
| Asset recycling and concession maturity | <ul style="list-style-type: none"> Waste Collection, Treatment and Disposal Services Heavy and Civil Engineering Construction | <ul style="list-style-type: none"> 7,100 37,800 | <ul style="list-style-type: none"> Water Electricity | <ul style="list-style-type: none"> Local Councils |
| Asset decommissioning | | | | <ul style="list-style-type: none"> Local Councils, Watercare, Wellington Water |

12. Supply chain

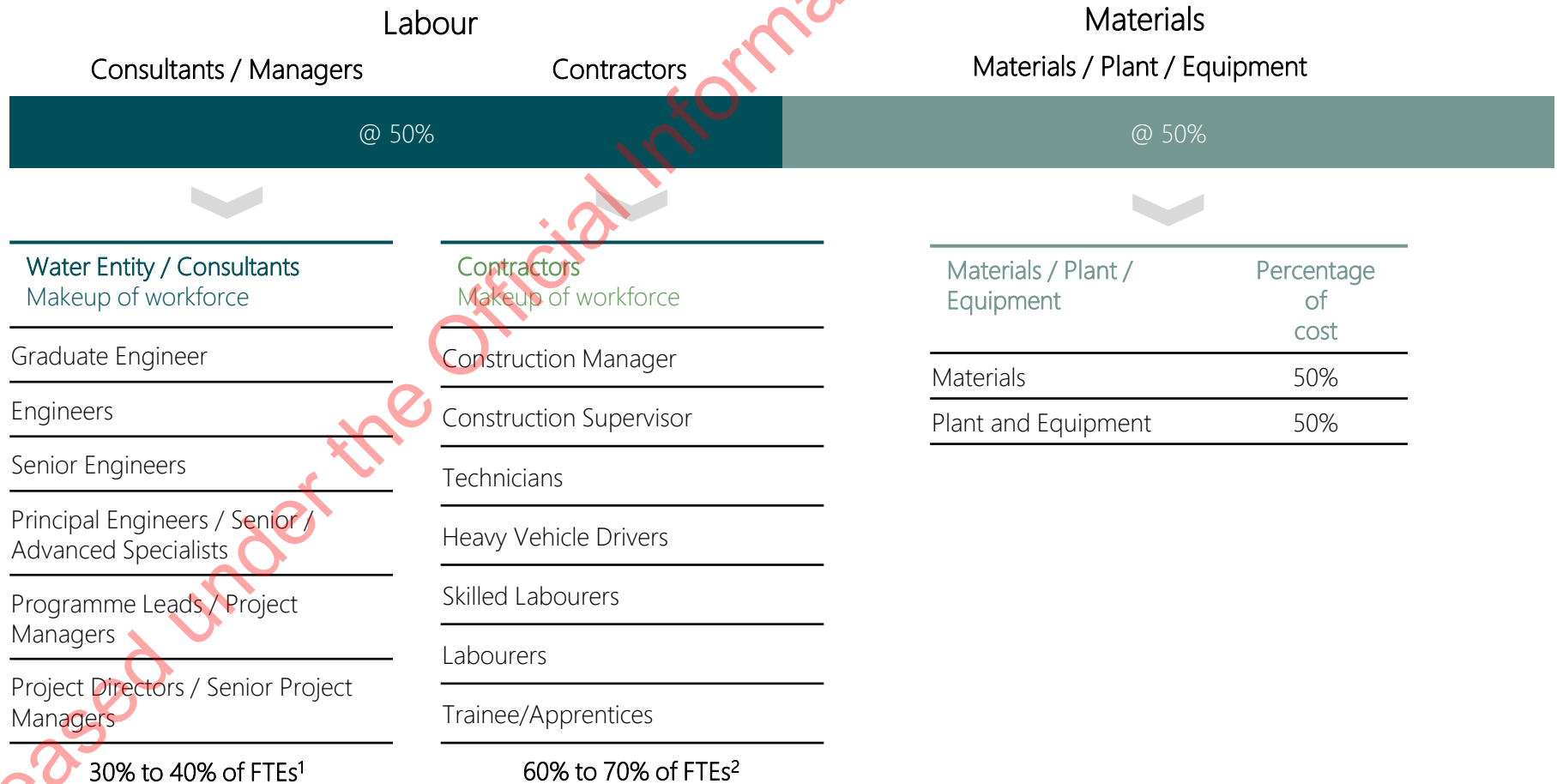
Supply Chain

The water supply chain comprises a mix of materials, plant and equipment and labour.

Water Sector Supply Chain Breakdown by % of Cost

Project Pipeline typically involves a mix of:

- Simple renewals
- Complex renewals
- Pump stations / Treatment station upgrades
- Reservoir upgrades
- Major projects



¹Excludes procurement and wider back office admin and support FTEs.

²It is estimated that @35% to 40% of the workforce will comprise labourers/skilled labourers/trainees and apprentices

Supply Chain

Greater visibility of work pipeline will cause a scaling up of operations with associated benefits

There is an expectation that the increased scale and related funding capability of the proposed new WSEs will drive changes to supply chain arrangements. We tested with industry participants the benefits of greater visibility to the future pipeline of work and the extent to which that would drive changes/encourage suppliers to scale up or innovate. We also discussed industry structure and the extent to which changes to the sector would encourage new entrants/overseas participants with a small footprint currently to scale up. We also canvassed issues of capacity constraints in the supply chain and the flow through implications for costs and efficient planning.

As the industry model and procurement practices mature post any transition period it is expected that the following will occur:

- Industry consolidation is likely to happen through parts of the supply chain as the new WSEs increase the scale at which they procure and move to refine their supply chain arrangements;
- New entrants are likely, particularly major organisations which have a significant presence in Australia but who are not currently present in New Zealand ;
- The scaling up of local operations by participants with an existing presence in NZ – a number of major industry participants (Suez, Veolia etc) and international consultancies and service providers have some footprint in NZ currently and further all are well informed as to the reform programme and the related implications/opportunities;
- While new/scaled up entities may bring new capability there is also a likelihood that scaling up could involve the acquisition of local entities or capability;
- New business models, particularly between the water entities and service providers;

- Scale benefits – higher spend across fewer/more standardised requirements;
- Standardisation of parts and materials used to utilise greater purchasing power;
- Greater specialisation of procurement services; and
- The potential for smaller scale operators to be squeezed out as a result of the procurement processes that the WSEs might adopt out reducing diversity in the supply chain.

Short-term Covid-19 disruption

Some participants noted the supply chain disruption caused by Covid-19. These issues include extended lead times for materials, ports, freight and shipping issues and increased prices for materials. While some of disruption is expected to be relatively short term it has exposed a vulnerability in the supply chain for certain materials (e.g. difficult to get some chemicals involved in water purification). This could drive a preference to reduce reliance on off-shore inputs. Consolidation of suppliers post-reforms may increase vulnerabilities where reliance remains on or shifts to offshore inputs.

Supply Chain

Changing procurement processes should help reduce 'lumpy' supply chains.

Opportunity to learn from the past

There are significant concerns with current government procurement processes as these are applied in the sector currently. The expectation is that current practices will not rollover into the new entities, otherwise gains anticipated from the establishment of the WSEs may be significantly harder to achieve.

Current procurement practices – with the heavy emphasis on cost as opposed to whole of life value – create significant risk. Similarly, the lumpy nature of the work programme makes it difficult for small to medium size organisations to maintain viability, notwithstanding the fact that some are considered critical to the overall supply chain.

As part of the interview process, reference was made to the ability of industry generally to respond to a material step up in demand. The response to the Christchurch earthquakes was cited as an example of a step up in investment of a comparable scale to that envisaged by the water reform process. In this context it was noted that given the urgency of the response, contractual arrangements/procurement practices were not always optimal and that there were lessons from that experience that could be applied to water reform given its planned nature and longer timeframe.

Increased visibility of pipeline is the key driver of procurement improvements

A key expected benefit from the reforms from a supply chain perspective will be improved procurement and pipeline management processes which it is expected the WSEs will implement. The ability to contract at scale with certainty and over a longer timeframe has potential benefits in the form of inventory and working capital management, which in turn flows through to the efficiency of workforce management and project delivery.

Contractors don't want to be carrying/funding huge stores of materials. However, on the other hand they can't afford to have parts of their workforce standing idle because needed materials or equipment is not to hand. The more certainty they have as to the timing and nature of the capital programme the better they are able to coordinate their logistics creating cost efficiencies and reduced capital requirements.

There was minimal anxiety expressed as to the ability of the supply chain to scale up from a materials and equipment perspective. Domestic capacity was not generally identified as an issue. A concern was raised as to the risk to some aspects of the domestic supply chain due to a dependence on a limited number of mid-scale providers. The concern being that if these entities exited the market there would be no domestic capability to fill the gap. However, lumpiness or uncertainty associated with the project pipeline was identified as a more significant issue and a factor contributing to the potential loss of mid-sized domestic capability.

Generally, from a materials and equipment perspective, New Zealand is a small market by international standards. A significant step up in investment in this market is unlikely to have any significant impact on the ability to access materials and equipment over and above the more generic challenges that the country faces by virtue of its scale and location.

The water industry internationally is relatively homogenous from a materials and componentry perspective – there is nothing particularly unique that sets New Zealand's needs apart from that of other jurisdictions. Further, providers of materials and equipment have sophisticated inventory management and logistics arrangements in place which should mean an ability to respond relatively easily to any step up in the demand.

We note that the supply chain both domestically and globally will continue to evolve. For example, Veolia is currently seeking to acquire Suez. That transaction – if successful – would create a global entity comprising some ~250,000 people.

Similarly, as the industry works through near term issues with the transition and immediate capital priorities there will be an increased focus on the more consistent adoption of new technologies and related equipment with that change in demand flowing through to the supply chain.

13. Workforce

Released under the Official Information Act 1982

Workforce characteristics

The water sector and its affected industries are experiencing a workforce shortage, which is likely to be exacerbated by the reform in the short to medium term.

The delivery of water services and the related capital expenditure required to sustain and expand water infrastructure is labour intensive. The material step up in capital expenditure anticipated from the reform process is expected to have implications for both employment and the structure of the labour market.

As part of our interview process, we explored expectations around employment and the need for increased skills development and specialisation. We also addressed expectations and concerns in relation to capacity and capability constraints, productivity concerns and the importance of being able to access offshore talent.

Workforce

The workforce for the sector is complex and spans multiple industries and disciplines, each with their own dynamic. Further, different structures currently apply across different local authorities. In particular, all councils will use a combination of in-sourced and out-sourced provision, but the nature of those arrangements will vary widely.

A significant part of local authorities' workforces and third-party contractors are deployed to support the sector currently. Estimates of the total workforce employed by councils in the sector are in the range of 4,000 – 5,000. The Water NZ National Performance Review 2019-20 (the Review) provides the following analysis of the Council workforce dedicated to the provision of water services. Most, but not all, councils participate in the Review. All the large councils and specialist council-owned providers such as Watercare and Wellington Water do participate.

| Workforce Participant | Number |
|-----------------------|--------------|
| Full-time employees | 2,745 |
| Contractors | 1,196 |
| Total | 3,941 |

Labour and related direct costs – in their various forms – is the largest cost input into capital works by a material margin, representing an estimated 50% of total costs currently (excluding the labour content of the materials and equipment component of the supply chain, which is also significant).

A typical investment process involves the following elements:

- Investigation
- Concept
- Design
- Build

It is only in the “build” phase that materials and equipment are a major input, although these represent a major cost component at that stage.

However, even in the build phase the labour component is still likely to represent in the vicinity of 20% to 30% of the total cost, though this will vary significantly depending on the nature of the asset being created. Renewals and minor capital works – which represent a large component of the immediate investment requirements of the sector are considerably more labour intensive than major capital projects and a relatively greater proportion of that labour component is delivered on location.

A number of interviewees noted that even with the most efficient and innovative processes the need for a significant workforce on hand is unavoidable. Therefore, any significant step-up in investment will similarly require a step up in the size of a workforce that is under pressure.

The number of qualified staff needed to deliver capital works is already under stress due to a lack of overseas resources, increasing remuneration expectations and other opportunities in the wider construction sector. The contractor market is currently sized to reflect historic delivery requirements. The workforce is expected to be squeezed further as spending on Three Waters projects, shovel ready infrastructure projects, climate change and RMA reforms increase nationally.

Workforce composition and substitution

The change in the workforce required to deliver the investment envisaged under the modelled scenarios.

Information as to the makeup of the current workforce is limited – complicated by the fact that the water sector supply chain comprises multiple industry sectors. We understand that there are projects underway that are expected to improve this understanding. This makes it difficult to estimate accurately the nature and scale of the step-up in the workforce required to deliver the capital investment programme envisaged by the reforms and develop an appropriate response.

We have attempted to estimate the increase in the workforce required to deliver the investment envisaged under the modelled scenario modelled. This estimate is illustrative only and intended to provide some indication of the scale of change.

Based on some initial analysis we have estimated that it takes approximately 800 FTEs to deliver \$300 million of capital projects. On this basis and assuming an increase in annual investment by @ \$1.4 billion to \$2.9 billion – being the estimated annual average difference spend under the system transformation scenario versus the counterfactual – this could see the need for an additional 2,900 to 5,700 FTEs (assuming an average annual investment differential of \$2.15 billion) to deliver the capex envisaged - as set out in the table to the right.

It is important to note that this is not the potential total increase in FTEs but rather the difference between the system transformation scenario and the counterfactual. Further, this is related to the number of FTEs estimated to be needed to deliver the increased investment programme – not to any flow on employment impacts.

The efficiency/substitution factor included in the table reflects an assumption that a combination of better workforce practices and substitution – i.e. workers moving to the sector from adjacent roles will reduce the absolute step up in the size of the workforce required.

One opportunity cited related to the Oil and Gas sector. While this sector has scaled back there are a number providers in areas, such as Taranaki, that have specialist piping skills and solutions that would be transferable to the Three Waters sector. However, there is a risk that this capability could be lost if the step-up in Three Waters activity doesn't coincide with the scaling down of activity in traditional areas of focus.

Our Australian colleagues also noted that they have seen some success with shared services models across similar industries, for example sharing a workforce across electricity or fibre providers where sensible.

| | | Efficiency/substitution | | | | | |
|------------------------|-----|------------------------------------|--------------|--------------|--------------|--------------|--------------|
| | | 100% | 90% | 80% | 70% | 60% | 50% |
| | | FTE allocation by discipline/skill | | | | | |
| Planners / Consultants | 30% | 1,720 | 1548 | 1376 | 1204 | 1032 | 860 |
| Managers / Contractors | 70% | 4,013 | 3612 | 3211 | 2809 | 2408 | 2007 |
| Total | | 5,733 | 5,160 | 4,587 | 4,013 | 3,440 | 2,867 |

Workforce risks

The increase in the required workforce estimated in the previous slide does not fully reflect the scale of the change that will occur, or the risks that need to be recognised and mitigated, through the transition.

While the skills of the current workforce will be needed, not all current roles will map neatly to those available in the new WSEs or industry. There may be a need for some in the sector to take up alternative roles and possibly move to different locations. This factor, combined with the relatively older age profile of the council workforce, creates a significant risk that capability could be lost through the transition process. In some regions, it is likely that considerable information on matters such as the location and condition of assets is held through the institutional knowledge of the existing workforce. There is a risk that knowledge will be lost through the transition process as the current workforce retires.

Further, there are other wider risks to smaller councils that will need to be managed. For example, some technical and leadership roles are shared positions that cover a range of council activities rather than just water. A move to WSEs could see that capability lost either to the WSEs, councils or industry. Further, the supply chain that councils engage with on water related matters brings innovation and capability that can have wider applicability across council operations.

Based on experience in other sectors and jurisdictions it is expected that the composition of the workforce will change. There is likely to be proportionally less employment in the WSEs due to a combination of efficiencies that can be expected over time from the consolidation of management structures and systems and processes combined with efficiencies that will be expected from improvement in the performance of the underlying asset base as this is replenished/enhanced. On the other hand it is expected that there would be a step up both proportionately and in absolute terms through the supply chain in response to the increased level of investment anticipated.

There are concerns as to the capacity of the workforce to meet the demand signalled through the current council LTP process. Further, providers have indicated a wariness about resourcing up to meet that demand due to a concern as to the potential for a "boom/bust" cycle of investment, whereby following a burst of spending by councils there is something of a hiatus as the new water entities work through their planning and prioritisation processes.

The most immediate pressure points are likely to be specialist water consultancy expertise, which is seen as scarce and "boots on the ground" labour. Several interviewees noted that migration policies (once borders re-open) could help mitigate skill shortages in the near-term, but 'growing our own' was viewed as preferential. Again, reference was made to the Christchurch experience and the significant reliance placed on imported labour.

Workforce: Career pathways

Industry participants and sector bodies consider that there is a relatively low awareness of career opportunities and little in the way of sector driven training and development.

Industry participants and sector bodies consider that there is a relatively low awareness of career opportunities and little in the way of sector driven training and development. This situation is compounded by the current industry structure and its fragmented approach to procurement. This restricts the ability to develop the industry standard competencies that various organisations such as WaterNZ and Engineering NZ are currently working on.

While articulating career opportunities supported by a focus on training pathways could mitigate some of the labour supply challenges, there are significant risks in the near term that the benefit of these initiatives could be diluted. In particular, as borders open – particularly with Australia – there is a risk of parts of the trained/skilled workforce moving offshore to better remunerated opportunities. This situation could be compounded if borders with Australia re-open before those with other countries such as South Africa, the UK and Ireland, which have been large sources of both skilled and semi-skilled labour previously.

“In Victoria the creation of regional water entities created much better career paths for workers in the industry. It enabled them to specialise in the water industry (rather than being a council employee and having to do to a bunch of other things) plus it meant that rather than having to move from one small council to another to progress their career (which often meant relocating) career path opportunities within in new (larger) organisation became much more available.”

A further issue is the changing nature of the skills required of the workforce. This is driven in part by the changing nature of the technologies required to run water utilities – including advanced monitoring and treatment technologies and information management systems.

Given the feedback from stakeholders around skilled labour shortages, we expect that the labour profile will be lumpier and less predictable than our central forecast implies. There are clearly challenges currently in filling roles and meeting current demand in the workforce. However, we note that access to labour was not identified as a long-term constraint in any of the case studies referred to below.

Growth in the labour force is likely to take 2-5 years to respond to increased demand, and absorb current skill shortages, in order to start seeing a meaningful step-change in employee numbers. This means that efficiency gains in the labour market may take some time to be realised fully.

Pressure on the water workforce is not just a challenge for New Zealand. There is evidence from other jurisdictions such as the US that there are critical staff shortages in the workforce that provides drinking water and wastewater services – a situation likely to be compounded as a relatively old workforce starts to retire. Initiatives are underway to address this issue which could be referenced as part of any process for developing a workforce plan for New Zealand. For example, America's Water Workforce Initiative is a combined initiative involving the Environmental Protection Agency and other federal agencies working with states, utilities, tribes, local government and other stakeholders to address workforce issues.

In the longer term a combination of a better articulation of career opportunities, the changing nature and increased sophistication of the roles/emerging roles available and the scale of the investment going in to the water sector creates the prospect of elevating the status of a career in the water sector. This would see a flow through to the ability to attract both domestic and international talent in both the core water sector and the associated supply chain.

14. Capital requirements

Capital Requirements – New water entities

Access to capital is critical for funding the new entities. reforms should make it easier to fund water infrastructure in NZ.

Through the interview process we looked to assess the importance of improved access to capital as a mechanism for driving improved performance in the sector. Topics tested included the benefits of lower borrowing costs and increased balance sheet capacity and the impact of this on stakeholders.

The interview process validated the premise that there is a critical interplay between funding certainty and the ability to plan and execute at scale over time. That certainty creates the ability to build the commercial relationships that drive innovation and efficiency.

Funding certainty and scale were seen by industry as being critical to the WSEs ability to develop strategic procurement practices and the related supplier arrangements. Clarity around the level of expected investment, breakdown of spending and processes for allocating work were all raised by stakeholders as key areas.

Long-term funding certainty for major infrastructure providers of water infrastructure, such as Councils currently or WSEs, is pivotal to achieving gains in the sector and provides a range of benefits. The certainty provided enables an entity to take a long-term view of its investment programme. This allows it to develop a construction pipeline that can be funded through the economic cycle.

This increased certainty can facilitate the building of the strategic partnering arrangements which characterise sophisticated infrastructure providers – where partners are sufficiently invested in the relationship that they are willing to work with WSEs to develop optimised solutions.

Such relationships bring a multiplier effect in terms of the problem-solving ability and innovation available to the organisation. This can flow into related contracting and supplier arrangements, which can be streamlined to facilitate prompt activation.

Infrastructure providers operate in a complex eco-system that integrates internal and external capability. That external capability includes consultants (engineers, suppliers) and contractors (construction companies) and service providers (companies providing operations and maintenance and facilities management services). These in turn have their own eco-system (sub-contractors, plant and labour-hire etc).

By way of illustration, we note that contracts awarded by Watercare for the period February 2020 to July 2020 involved 29 different organisations providing services ranging from engineering design, planning and feasibility, specialised equipment and spares, and construction services. Suppliers ranged from local providers to major international organisations.

The certainty provided by a long-term pipeline of work enables the eco-system to work effectively and to drive innovation and efficiency. Parties can invest with confidence leading to efficiencies which can be shared.

Capital Requirements – Service providers and contractors

Access to capital is critical for funding the new entities. reforms should make it easier to fund water infrastructure in NZ.

The contracting and consulting firms we interviewed conveyed that once these areas above were addressed, they did not foresee capital constraints as an issue for them in scaling up in response to the reforms. The main hurdles discussed were labour supply and certainty of water entity investment.

The financial capacity WSEs will have should enable the enhanced planning and procurement processes that then flow through to the financial capacity of the affected industries. The ability to contract at scale and over extended time periods with organisations with the financial capacity/creditworthiness that the WSEs are expected to possess will enable industry to scale up and access the capital necessary to do so.

We note that much of the supply chain is not particularly capital intensive. The real capital intensity in the sector sits with the WSEs who will own the water infrastructure. Much of the capital deployed through the supply chain funds working capital. More efficient procurement processes deployed by the WSEs should mean that the investment in working capital through the supply chain does not need to increase in proportion to the step up in the scale of investment.

Further, to the extent that a step up in funding is needed, the expectation is that this will be off the back of a secured programme of work underwritten by the credit worthiness of the As and commercial contracts that ensure that suppliers don't wear an undue share of project risk or the cost of financing major works programmes, i.e. milestone payments based on progress will support cash flows.

Therefore, the large domestic entities in the supply chain – particularly those with access to public capital markets – consultancies and contractors that are offshoots of major regional or international entities are unlikely to face challenges in terms of accessing capital. Furthermore, established operators are likely to be able to access capital at competitive rates. There is a possibility that smaller domestic operators with less access to capital could be acquired as part of any industry consolidation process.

Industry consolidation and stronger and more certain cash flows backed by the scale and financial capacity of the WSEs is likely to put downward pressure on the cost of capital of Affected Industries. That said, many of the larger entities that form part of the supply chain already have the scale and financial strength necessary to command a competitive cost of capital.

Smaller and mid-sized entities with more limited access to capital may be challenged if aspects of the supply chain start to consolidate. This situation could be exacerbated if lumpiness or uncertainty associated with the forward investment programme through the transition phase impacts on cash flows and the ability to invest or retain/attract key staff.

15. Innovation and productivity

Innovation and Productivity

Significant productivity gains are achievable but come with risk.

Evidence in other jurisdictions indicates significant productivity gains are achievable over time with changed industry structure and other parallel developments such as an enhanced regulatory regime. We tested with participants whether they saw reform driving increased research and development of new technology, or the wider development of current technology.

We also tested whether the reform process would likely enhance international partnerships and connections, and in that context, whether the small scale of the New Zealand industry would be an inhibitor.

There is considerable evidence from both the New Zealand and international experience that significant productivity gains are achievable in a sector with the right settings. In particular, the combination of scale and financial certainty allows organisations to take a strategic approach to procurement which can result in a range of outcomes that drive both productivity improvement and innovation.

Opportunities for productivity gains include:

- An immediate gain in developing a materially better understanding of the asset base and its condition, which should inform better planning processes and ensure that the right investment decisions are being made and wasteful spending reduced;
- Making efficient investment decisions – for example settling on the most efficient regional or cross regional waste-water plant networks;
- The ability to move away from current council procurement practices which are seen as being fragmented, risk averse and far too focussed on price as opposed to whole of life value in the tender evaluation process;
- Increased standardisation of componentry, which drives cost efficiency, specialisation and inventory management benefits;

- Increased use of intelligent componentry to reduce cost/improve performance;
- Reduction in overheads and administration costs as duplication is removed, economies of scale achieved, single IT systems can replicate multiple ones.
- A better appreciation of/willingness to use international best practice/assets rather than a “do it yourself” approach;
- The ability to attract specialist global capability, as Watercare has done with its Central interceptor project through its engagement of the Ghella-Abergeldie Harker joint venture (following a tender process in which three of the four short-listed parties were international consortium reflecting the benefit of scale);
- The ability to outsource work. It is important to note that Councils have already outsourced a very significant amount of activity to the private sector. Gains have been achieved through this process, but those gains are diluted by a lack of scale and current procurement practices;
- The ability to construct provider panels that are prepared to invest in capability, bring innovation and offer cost efficiencies off the back of long run, confirmed and large-scale work programmes;
- The ability to build high calibre, internal capability in areas such as strategic planning and procurement, asset management and contract and treasury management;
- A strongly held view that the combination of scale, financial capacity and long-term planning will drive efficiency and contribute to a significant upskilling of the workforce. Several stakeholders provided examples where such gains have been previously achieved; and
- Efficiency can be achieved when capital spend is aggregated into a programme of work that has the scale and which allows providers the flexibility to sequence delivery in the way that best deploys their capability provided objectives are met.

Innovation and Productivity

Significant productivity gains are achievable but come with risk.

There is already a significant representation of major regional and global specialist water service providers in New Zealand. These providers draw on their global capability when serving the New Zealand market including specialist knowhow and R&D capability. However, the ability to fully deploy that capability is affected by the challenges of scale, procurement practices and certainty of opportunity referenced above.

Despite the optimism around potential productivity gains, parties interviewed did express some concerns including:

- Not all of the gains evidenced in other jurisdictions will be as readily achievable/deliver gains to the same scale in New Zealand given the country's relative isolation from major centres of capability;
- While significant benefits ought to be achievable as a result of the consolidation of the sector into a limited number of specialised entities, achievable gains could be lost if there is not a high degree of collaboration between the entities particularly in relation to cross-boundary investment decisions, sharing of resource and intellectual property, standardisation (plant, equipment, asset definition/management) and workforce development;
- The risk that the **WSEs** will place an early emphasis on the development of back-office systems and processes rather than adopting a "lift and shift" approach, utilising the best of what is currently available at least as an interim step;
- The risk that workflow for the industry slows through the transition period and struggles to get hit the ground running due to a lack of interim work; and

- Productivity gains will take time to accrue. It will only be after WSEs are through the early transition phase and have aggregated, interrogated and enhanced key asset information that the longer-term planning processes that are key to driving a step up in sector performance will begin to emerge. Further, the WSEs will all inherit a myriad of commitments and contractual arrangements that will limit their freedom of operation in the near to medium term.
- There were mixed views expressed around the gains available in the water sector from advancements in technology enabled asset management practices. There was a good level of awareness of the potential impact that – for example – the advance of digital technologies can make in the utilities sector more generally and some of those are being adopted in the water sector. For example Scottish Water references success it has achieved in terms of customer service by integrating the capability offered by social media, mobile, data analytics and cloud computing.
- Some survey participants did question whether access to new technologies/ capabilities would have a material impact in the near to medium term – in particular given the start-point for WSEs in terms of asset information and quality and the likely near to medium term investment priorities.

16. Transition, risks and challenges

Constraints and Risks

Constraints and risks may hinder the realisation of efficiencies.

Currently there are significant constraints in the system that will need to be addressed if industry is to be able to deliver the capacity, innovation and productivity gains anticipated through the reform process. These include:

- A coherent approach to workforce development including alignment between key government agencies (e.g. immigration, education sector), the water entities and industry/industry representative bodies;
- The financial capacity to fund long dated investment programmes – including the ability to access appropriate capital markets;
- Freedom to instigate and develop the skills necessary to execute a strategic approach to procurement;
- The ability to access the calibre of governance and executive leadership able to set-up and then run large, complex organisations with a challenging mandate;
- The ability to unwind existing contractual and other arrangements that, if these were to endure, could impose a significant handbrake on the ability to progress the new sector model; and
- A lot of the embedded asset base/networks will not represent an optimal configuration from a systems performance perspective, so it will only be as the network is replaced/upgraded progressively over time that the full extent of potential gains can be captured.

The parties interviewed included a number who have been associated with major sector reform in New Zealand and internationally.

One of the main risks that stakeholders foresee is around the transition process. In particular:

- There is a relatively older workforce with significant institutional capability that is critical to the delivery of services currently. A disruptive sector transformation creates the risk of a loss of capability needed for the ongoing operation of water networks in the near to medium term;
- New entities taking a disparate approach to the establishment process which sees wasted effort and resources;
- The need to avoid the situation that (as happened in some cases in Victoria) Councils took the opportunity to transfer aging or lower performing staff to the newly created water business and to retain higher performing staff.
- New entities taking a competitive rather than a collaborative approach resulting in duplication of effort and potentially upward pressure on prices;
- Concern around the potential for an investment hiatus through any transition process and disruption to current relationships (e.g. current panel arrangements), with suppliers nervous about overinvesting in capacity given that uncertainty; and

One of the additional risks raised is that some Councils may choose not to participate which will dilute the impact of efficiency gains that the reforms are trying to achieve.

Transition Period

Care and planning needed to manage the transition impact on industry

Many of the stakeholders we interviewed expressed concern about the transition period over the next couple of years.

Key issues:

- A possible reluctance by Councils to spend money on assets that they then are going to hand over in a couple of years anyway. Hence high risk of deferred maintenance in the meantime.
- Increased uncertainty of work pipeline for contractors and suppliers.
- Concern that transition period will drag on for up to five years as entities are slow to establish and then new leadership needs to 'find their feet'. This could mean lack of material investment for a longer time.
- Risk of borders re-opening in the near term and workforce heading overseas, exacerbating labour shortages.

Possible mitigating actions:

- Regulation requirements around water safety standards may force Councils to invest in the interim. Several stakeholders mentioned the positive impact from Government investment post-Covid. Additional grants could help support the industry through the transition.
- Mandate for action for new entities and structuring organisations to enable them to get up to speed quickly. Handover processes need to be thought through carefully to ensure smooth transition.
- Signalling of expected pipeline of work so firms can invest in current talent and keep people on the ground. May need to look at importing labour once borders open to offset any 'brain-drain'. Could see wage pressure in the sector in response to skill shortages.
- The mandate, resourcing and associated powers of any transitional agency will be important – particularly in relation to the design and execution of any industry transformation plan including workforce strategy (with its likely key focus on managing workforce risk).

Current Challenges and Impact of reform

Engineers, suppliers, local Councils, and service deliverers will all be affected by the reform.

The table below summarises issues associated with the sector currently by industry segment and the likely response as structural reforms are implemented and investment steps up.

| Industry segment | Current challenges | Impact of step up in investment |
|------------------------------------|--|---|
| Peak bodies e.g. Water New Zealand | <ul style="list-style-type: none"> Huge numbers of job vacancies Lack of new entrants to the sector | <ul style="list-style-type: none"> Increased number of job vacancies Smaller players may be crowded out |
| Local Councils | <ul style="list-style-type: none"> Uncertainty around long-term pipeline Inability to determine priority assets | <ul style="list-style-type: none"> Will be a sense of urgency to get projects underway Scaled-up projects |
| Consulting engineers | <ul style="list-style-type: none"> Unsure whether to up-resource given the reform may result in a hiatus Lack of local expertise (currently recruiting from South Africa and the UK) | <ul style="list-style-type: none"> Ability to grow engineering firms to plan for the increased capability need Potential for a hiatus while the new entities establish themselves Competition for existing capability rather than a focus on adding capability |
| Material suppliers | <ul style="list-style-type: none"> Import supply chain not operating well due to Covid disruption Convincing Councils to invest in maintenance now | <ul style="list-style-type: none"> Increase in supplies required Requirement for supply changes to facilitate upgrades to meet new standards Greater involvement in planning/design |
| Equipment suppliers | <ul style="list-style-type: none"> Councils do not understand the extent of technologies available Councils are worried about relinquishing control over assets if technology makes some functions automatic | <ul style="list-style-type: none"> More consistent adoption of new technology Better pipeline visibility facilitates better supply chain management Greater involvement in planning/design |
| Service delivery | <ul style="list-style-type: none"> Implementation of new technology requires higher skilled workers Local faults are always going to require local workers on the ground | <ul style="list-style-type: none"> Increased pressure to comply with new regulations which is going to require the industry to upskill workers Significant step up in workforce required – competition for existing workforce |

Current Challenges and Impact of reform

Engineers, suppliers, local Councils, and service deliverers will all be affected by the reform.

The table below summarises mitigations the sector can take to reduce the risk of issues arising as investment steps up.

| Industry segment | Mitigation |
|------------------------------------|---|
| Peak bodies e.g. Water New Zealand | <ul style="list-style-type: none"> • Raise awareness of roles available for school leavers • Roll out national competency framework |
| Local Councils | <ul style="list-style-type: none"> • Prioritise asset condition assessments • Provide long term contracts to increase future certainty |
| Consulting engineers | <ul style="list-style-type: none"> • Roll similar projects into one procurement process to allow contractors to plan their pipeline • Give adequate time to the new entities to focus on understanding the legislation and educating the sector |
| Material suppliers | <ul style="list-style-type: none"> • Begin conversations about reform with Councils early |
| Equipment suppliers | <ul style="list-style-type: none"> • Education will be key – Councils and businesses need to understand that technology is able to be adapted to suit different needs. Primary focus should not be on original innovation, but rather on adapting what is already available. • Equipment suppliers should have input into the planning process. |
| Service delivery | <ul style="list-style-type: none"> • Increase training for current employees |

17. Case studies

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Case Studies

Local case studies include Powerco and Watercare

PowerCo

History

Over the past two decades, New Zealand's electricity industry has undergone considerable structural change as the government has worked to promote competition, reliability and fair prices for consumers. In 1985, the distribution and supply of electricity were the responsibility of 61 electricity supply authorities comprising 21 local government-controlled Municipal Electricity Departments, 38 local Electric Power Boards and 2 government owned authorities. The Electricity Industry reform Act of 1998 consolidated these entities into 29 line distribution companies, with PowerCo as the market leader.

Efficiencies

The sector has realised significant efficiencies since reform. Amalgamation has allowed new entities with bigger balance sheets to access debt markets more easily. A number of synergies have reduced costs, including the ability to consolidate separate back office systems into one system, and the ability to standardise the supply chain to allow for better scheduling. The interplay between the regulator and the entity is a critical element in determining appropriate capital investment plans.

Key takeaways

For 20 years, the electricity sector has been warned of a shortage of skilled workers, yet labour supply has never been a real issue. This is in part due to the proportion of the workforce who are in 'swing roles' and have skills non-specific to a single sector, and partly because it has proved possible to adjust the workforce for jobs that don't require the same level of expertise.

A key takeaway is the need to balance stringent regulation with a level of freedom to allow the sector to evolve. This includes the ability to develop procurement practices that work for the entity and the supply chain, with fair allocation of risk between the entity and supplier being key.

Watercare

History

During the Auckland water industry amalgamation in 2010, Watercare was confirmed as the organisation to manage the drinking water, wastewater and water infrastructure for Auckland. Auckland Council was given responsibility for the public stormwater network and water quality. The goal of amalgamation was to combine the water service functions from eight different Councils to provide a better service to customers, achieve efficiency gains through economies of scale and enable integrated regional planning.

Efficiencies

Watercare has achieved significant ongoing savings for customers through scale and increased capability. The combined entity has enabled Watercare to plan more effectively for the long term and simplify the procurement process through 10-year partnerships with key suppliers. Spending 'development capital' to train multiple groups at a time can also bring efficiencies e.g. having a central maintenance team set up mock street to train field crews.

Watercare has invested heavily in the back-office systems and processes necessary to operate at scale and develop the information and capability to develop asset management and related investment plans.

Key takeaways

There are instances where a collaborative, cross-regional boundary approach to investment could see different capital decisions made with net gains through a lower total capital cost and a better technical solution.

Watercare has also learned that an increase in the scale of projects attracts international interest such as the three international consortia that tendered for the Central Interceptor Project.

Case Studies

International case studies include Tasmania and Victoria, Australia.

Tasmania, Australia

History

Australia's water reform commenced in the 1980s, and has varied state-by-state. In Tasmania prior to 2008, water and sewage infrastructure was owned by 29 local Councils and three bulk water authorities. In 2008, a new Act transferred all council-owned water and sewage assets to three new entities, which consolidated to become one entity, TasWater, in 2013. TasWater is owned collectively by Tasmania's 29 local governments.

Efficiencies

Tasmania is the one state in Australia where a formal review of the water reform has been undertaken. In the Auditor-General's review of water industry reform in 2017, it was determined that the reform had improved public health benefits, but not environmental benefits. This was due to the regulated entities' focus on improving water quality over wastewater compliance and performance.

In terms of financial performance, the consolidation has achieved the expected benefits. Tasmania introduced a two-part pricing model, resulting in appropriate water charging for customers. The revenue TasWater receives has also increased, allowing better handling of the capital expenditure programme, and access to higher levels of debt funding.

Strategic asset planning has also been a large focus, and as a result, there has been an increased maturity in asset planning and improved knowledge over the condition of water assets, enabling prioritisation.

Key takeaways

Although drinking water is prioritised by customers, delaying wastewater improvements may increase controversy and result in fewer benefits overall.

Victoria, Australia

History

Historically, there were ~300 water authorities in Victoria. Consolidation took place in the mid-1990s, and eventually a single bulk provider, Melbourne Water, was established to provide services to the greater Melbourne region. Three companies sit below Melbourne Water as water retailers for Melbourne. 12 regional water businesses provide urban water services outside Melbourne.

Efficiencies

When the new Melbourne structure was first established, the city saw large initial gains. These were primarily through contracting out maintenance and operations to the private sector, as opposed to a local council-based workforce. As the cost of administering big contracts increased, the size of the gains dissipated, but efficiencies were still realised.

Regional Victorian water businesses first realised benefits through the consolidation of back-office functions. There was a focus on standardising systems in the first year of establishment, knowing this would be a critical step. From there, the focus turned to creating operational efficiencies through the optimisation of treatment plants, shared procurement processes and improved benchmarking and "competition by comparison".

While there was a step up in capital investment in regional areas, this took some time to eventuate. This was due to the need to review the existing state of assets, identify regional priorities, prepare capital investment plans and then move to the design and procurement phase.

Key takeaways

It is crucial to focus on establishment of the new entities and administration systems prior to looking at operational and capital efficiencies. These savings will only be realised in the long term, once the initial consolidation is successful.

Case Studies

International case studies also include Scotland, UK.

Water Industry Commission of Scotland (WICS)/ Scottish Water

History

In 1996 Scotland's water industry underwent a radical restructuring process, where the responsibility for delivering water and sewerage services was transferred from the 12 Regional Authorities to three new Public Works Authorities. A new economic regulator was established to protect the interests of consumers. A review two years after the restructure identified the following:

- Financial savings from exploiting economies of scale, reducing cost bases and making use of improved bulk purchasing power
- A lift in capital investment
- Increased transparency in decision making
- Employee impacts managed through early retirement, natural movements and voluntary redundancy packages.

In 2002 further reforms saw Scotland's water industry merged from the three regional water suppliers into one supplier, Scottish Water. WICS is the non-departmental regulatory body with responsibility for managing the regulatory framework designed to encourage the provision of high quality/value for money water services. The Scottish experience is comparable to New Zealand because of the similar population size of >5 million customers and the fact that New Zealand is in a similar position today as Scotland was prior to amalgamation.

Efficiencies

Since the merger, Scottish Water has:

- Reduced operating costs by 40% (the second lowest in the UK)

- Delivered a massive investment programme
- Increased customer satisfaction from 63% to 90%
- Reduced water leakage by 50%
- Reduced health and safety incidents by 90%
- Significantly reduced environmental pollution incidents.

Separating water service delivery from governance functions has also provided a new focus on strategy and lifting levels of service. Finally, Scotland now has improved transparency and benchmarking, and better asset management.

International regard for the Scottish water success has resulted in the establishment of an advisory arm to advise other countries.

Key takeaways

- Similarly to New Zealand, Scotland faced political concerns over the merger. Keeping ownership public while transitioning to a more corporate approach to water delivery alleviated these concerns.
- Employment in the sector as increased significantly with much of that workforce distributed through the regions. Scotland also struggles to attract and retain staff. A key focus at the moment is on recruitment processes and the value provided to new graduates.
- While the absolute scale of the workforce has increased the mix has changed significantly. While Scottish Water's direct workforce has reduced the overall workforce in the Three Waters supply chain has increased significantly.
- Despite sharing similarities with Scotland, the remoteness of New Zealand may provide challenges in the labour and supply chains, resulting in a slower realisation of efficiencies.

18. Appendices

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Appendix A: CGE modelling

This appendix provides technical background to our in-house CGE model, DAE-RGEM.

We used our in-house model to estimate the economic impact of reform. The Deloitte Access Economics – Regional General Equilibrium Model (DAE-RGEM) is a large scale, dynamic, multi-region, multi-commodity computable general equilibrium model of the world economy with bottom up modelling of New Zealand regions. The model allows policy analysis in a single, robust, integrated economic framework. This model projects changes in macroeconomic aggregates such as GDP, employment, export volumes, investment and private consumption. At the sectoral level, detailed results such as output, exports, imports and employment can also be produced.

The model is based upon a set of key underlying relationships between the various components of the model, each which represent a different group of agents in the economy. These relationships are solved simultaneously, and so there is no logical start or end point for describing how the model actually works. However, they can be viewed as a system of interconnected markets with appropriate specifications of demand, supply and the market clearing conditions that determine the equilibrium prices and quantity produced, consumed and traded.

Key Modelling Assumptions

DAE-RGEM is based on a substantial body of accepted microeconomic theory. Key assumptions underpinning the model are:

- The model contains a ‘regional consumer’ that receives all income from factor payments (labour, capital, land and natural resources), taxes and net foreign income from borrowing (lending).
- Income is allocated across household consumption, government consumption and savings so as to maximise a Cobb-Douglas (C-D) utility function.
- Household consumption for composite goods is determined by minimising expenditure via a CDE (Constant Differences of Elasticities) expenditure function. For most regions, households can source consumption goods only from domestic and imported sources. In the New Zealand regions, households can also source goods from interregional. In all cases, the choice of commodities by source is determined by a CRESH (Constant Ratios of Elasticities Substitution, Homothetic) utility function.
- Government consumption for composite goods, and goods from different sources (domestic, imported and interregional), is determined by maximising utility via a C-D utility function.
- All savings generated in each region are used to purchase bonds whose price movements reflect movements in the price of creating capital.
- Producers supply goods by combining aggregate intermediate inputs and primary factors in fixed proportions (the Leontief assumption). Composite intermediate inputs are also combined in fixed proportions, whereas individual primary factors are combined using a CES production function.
- Producers are cost minimisers, and in doing so, choose between domestic, imported and interregional intermediate inputs via a CRESH production function.
- The supply of labour is positively influenced by movements in the real wage rate governed by an elasticity of supply.

Appendix A: CGE modelling

This appendix provides technical background to our in-house CGE model, DAE-RGEM.

- Investment takes place in a global market and allows for different regions to have different rates of return that reflect different risk profiles and policy impediments to investment. A global investor ranks countries as investment destinations based on two factors: global investment and rates of return in a given region compared with global rates of return. Once the aggregate investment has been determined for New Zealand, aggregate investment in each New Zealand sub-region is determined by a New Zealand investor based on: New Zealand investment and rates of return in a given sub-region compared with the national rate of return.
- Once aggregate investment is determined in each region, the regional investor constructs capital goods by combining composite investment goods in fixed proportions, and minimises costs by choosing between domestic, imported and interregional sources for these goods via a CRESH production function.
- Prices are determined via market-clearing conditions that require sectoral output (supply) to equal the amount sold (demand) to final users (households and government), intermediate users (firms and investors), foreigners (international exports), and other New Zealand regions (interregional exports).
- For internationally-traded goods (imports and exports), the Armington assumption is applied whereby the same goods produced in different countries are treated as imperfect substitutes. But, in relative terms, imported goods from different regions are treated as closer substitutes than domestically-produced goods and imported composites. Goods traded interregional within the New Zealand regions are assumed to be closer substitutes again.

- The model accounts for greenhouse gas emissions from fossil fuel combustion. Taxes can be applied to emissions, which are converted to good-specific sales taxes that impact on demand. Emission quotas can be set by region and these can be traded, at a value equal to the carbon tax avoided, where a region's emissions fall below or exceed their quota.

Below is a description of each component of the model and key linkages between components.

Households

Each region in the model has a so-called representative household that receives and spends all income. The representative household allocates income across three different expenditure areas: private household consumption; government consumption; and savings.

The representative household interacts with producers in two ways. First, in allocating expenditure across household and government consumption, this sustains demand for production. Second, the representative household owns and receives all income from factor payments (labour, capital, land and natural resources) as well as net taxes. Factors of production are used by producers as inputs into production along with intermediate inputs. The level of production, as well as supply of factors, determines the amount of income generated in each region.

The representative household's relationship with investors is through the supply of investable funds – savings. The relationship between the representative household and the international sector is twofold. First, importers compete with domestic producers in consumption markets. Second, other regions in the model can lend (borrow) money from each other.

Appendix A: CGE modelling

This appendix provides technical background to our in-house CGE model, DAE-RGEM.

- The representative household allocates income across three different expenditure areas – private household consumption; government consumption; and savings – to maximise a Cobb-Douglas utility function.
- Private household consumption on composite goods is determined by minimising a CDE (Constant Differences of Elasticities) expenditure function. Private household consumption on composite goods from different sources is determined by a CRESH (Constant Ratios of Elasticities Substitution, Homothetic) utility function.
- Government consumption on composite goods, and composite goods from different sources, is determined by maximising a Cobb-Douglas utility function.
- All savings generated in each region is used to purchase bonds whose price movements reflect movements in the price of generating capital.

Producers

Apart from selling goods and services to households and government, producers sell products to each other (intermediate usage) and to investors. Intermediate usage is where one producer supplies inputs to another's production. For example, milk producers supply inputs to the dairy sector.

Capital is an input into production. Investors react to the conditions facing producers in a region to determine the amount of investment. Generally, increases in production are accompanied by increased investment. In addition, the production of machinery, construction of buildings and the like that forms the basis of a region's capital stock, is undertaken by producers. In other words, investment demand adds to household and government expenditure from the representative household, to determine the demand for goods and services in a region.

Producers interact with international markets in two main ways. First, they compete with producers in overseas regions for export markets, as well as in their own region. Second, they use inputs from overseas in their production.

Sectoral output equals the amount demanded by consumers (households and government) and intermediate users (firms and investors) as well as exports.

Intermediate inputs are assumed to be combined in fixed proportions at the composite level. As mentioned above, the exception to this is the electricity sector that is able to substitute different technologies (brown coal, black coal, oil, gas, hydropower and other renewables) using the 'technology bundle' approach developed by ABARE (1996).

To minimise costs, producers substitute between domestic and imported intermediate inputs is governed by the Armington assumption as well as between primary factors of production (through a CES aggregator). Substitution between skilled and unskilled labour is also allowed (again via a CES function).

The supply of labour is positively influenced by movements in the wage rate governed by an elasticity of supply is (assumed to be 0.2). This implies that changes influencing the demand for labour, positively or negatively, will impact both the level of employment and the wage rate. This is a typical labour market specification for a dynamic model such as DAE-RGEM. There are other labour market 'settings' that can be used. First, the labour market could take on long-run characteristics with aggregate employment being fixed and any changes to labour demand changes being absorbed through movements in the wage rate. Second, the labour market could take on short-run characteristics with fixed wages and flexible employment levels.

Appendix A: CGE modelling

This appendix provides technical background to our in-house CGE model, DAE-RGEM.

Investors

Investment takes place in a global market and allows for different regions to have different rates of return that reflect different risk profiles and policy impediments to investment. The global investor ranks countries as investment destination based on two factors: current economic growth and rates of return in a given region compared with global rates of return.

Once aggregate investment is determined in each region, the regional investor constructs capital goods by combining composite investment goods in fixed proportions, and minimises costs by choosing between domestic, imported and interregional sources for these goods via a CRESH production function.

International

Each of the components outlined above operate, simultaneously, in each region of the model. That is, for any simulation the model forecasts changes to trade and investment flows within, and between, regions subject to optimising behaviour by producers, consumers and investors. Of course, this implies some global conditions that must be met, such as global exports and global imports, are the same and that global debt repayment equals global debt receipts each year.

Appendix B: Sectors and regions included in CGE model

We modelled 14 aggregated sectors and New Zealand's 16 main regions.

Sectors

Crops, livestock, Forestry and Fishing
 Coal, oil, gas, and other mining
 Food processing
 Light manufacturing
 Heavy manufacturing
 Trade
 Transport
 Electricity
 Water
 Construction
 Financial services
 Business services
 Recreation services
 Other services

Regions

Northland
 Auckland
 Waikato
 Bay of Plenty
 Gisborne
 Hawke's Bay
 Taranaki
 Manawatu-Wanganui
 Wellington
 Tasman
 Nelson
 Marlborough
 West Coast
 Canterbury
 Otago
 Southland

Classification based on population density

Provincial
 Metropolitan
 Metropolitan
 Metropolitan
 Rural
 Provincial
 Provincial
 Provincial
 Metropolitan
 Rural
 Provincial
 Rural
 Rural
 Metropolitan
 Provincial
 Rural

Appendix C

Stakeholder interviews.

| Organsiation | # Employees in Water | Organsiation | # Employees in Water |
|---------------------------|----------------------|---|----------------------|
| Asmsus | N/A | PowerCo | N/A |
| Beca | 150 | Stantec | 200 |
| City Care Water | 600 | Steel and Tube | N/A |
| Deloitte Australia | N/A | Taituarā | N/A |
| Downer | 450 | Taumata Arowai | N/A |
| Filtration Technology | 60 | Veolia | 300 |
| Humes | 245 | Water Industry Commission for Scotland (WICS) | N/A |
| Infrastructure Commission | N/A | Water New Zealand | N/A |
| Ixom NZ | 75 | Watercare | N/A |
| Lutra | 30 | Xylem Water Solutions | 22 |



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From: [Tan, John](#)
To: [Sam Ponniah](#)
Cc: [Dent, Alan](#); 9(2)(a); 9(2)(a); 9(2)(a); 9(2)(a); 9(2)(a); 9(2)(a)
Subject: RE:Draft Three Waters Economic Impact & Affected Industries Report
Date: Wednesday, 14 April 2021 8:22:21 pm
Attachments: [image001.png](#)
[image002.png](#)
[image003.png](#)
[image004.png](#)
[image005.png](#)
[image006.png](#)

Hi Sam

From a quick stalk of diaries, times that seem to work for most of us on Friday are **9am-10am, 11am-12pm** or **2.30-4pm**

That is aiming for a quorum of Alan, myself and 9(2)(a) on the call + one of 9(2)(a)

I do know that Alan is on leave on Friday, but might be able to join us for an hour or so.

If you pick an hour during one of these slots, with a slight preference for avoiding first thing in the morning if possible (given that its early in Aus) we should be able to line up most key people at our end

John

From: Sam Ponniah <9(2)(a)@martinjenkins.co.nz>

Sent: Wednesday, 14 April 2021 8:07 PM

To: Tan, John 9(2)(a)@deloitte.co.nz

Cc: Dent, Alan 9(2)(a)@deloitte.co.nz; 9(2)(a)@deloitte.com.au; 9(2)(a)

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9(2)(a)@deloitte.com.au

Subject: [EXT] RE: Draft Three Waters Economic Impact & Affected Industries Report

Hi John,

Thanks for this. It might pay for us to book in some time on Friday to discuss with Nick and one or two others internally with an interest. What times would work for you and the team?

Will aim to get comments to you before the end of the week as well.

Cheers

Sam

Sam Ponniah | Senior Consultant

MartinJenkins

M 9(2)(a) T 9(2)(a)

From: Tan, John 9(2)(a)@deloitte.co.nz

Sent: Wednesday, 14 April 2021 4:53 PM

To: Sam Ponniah <9(2)(a)@martinjenkins.co.nz>

Cc: Dent, Alan <9(2)(a)@deloitte.co.nz>; 9(2)(a)@deloitte.com.au; 9(2)(a)

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9(2)(a)@deloitte.com.au

Subject: Draft Three Waters Economic Impact & Affected Industries Report

Hi Sam

Please find attached our draft report for the Economic Impact & Affected Industries of the Three Waters Reform.

Please let me know if you would like to set up a time to discuss or to cover any questions that you might have

Kind Regards

John

John Tan

Partner | Corporate Finance

Deloitte

Level 12, 20 Customhouse Quay, PO Box 1990, Wellington 6140, New Zealand

D: 9(2)(a) | M: 9(2)(a) | O: 9(2)(a) | F: 9(2)(a)

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From: 9(2)(a)
To: [Sam Ponniah](#)
Cc: [Tan, John](#)
Subject: RE:Call Economic Impact & Affected Industries Report
Date: Friday, 16 April 2021 4:01:13 pm
Attachments: [image001.png](#)
[image002.png](#)
[image003.png](#)
[image004.png](#)
[image005.png](#)
[image006.png](#)
[image007.png](#)

Sam,
As discussed, here is the link to the [example report](#)

Best,

9(2)(a)
9(2)(a)

Director | Corporate Finance

Deloitte

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From: Sam Ponniah <9(2)(a)@martinjenkins.co.nz>

Sent: Friday, 16 April 2021 11:54 AM

To: Tan, John <9(2)(a)@deloitte.co.nz>; Dent, Alan <9(2)(a)@deloitte.co.nz>; 9(2)(a)@deloitte.com.au>; 9(2)(a)@deloitte.co.nz>; 9(2)(a)@deloitte.co.nz>; 9(2)(a)@deloitte.com.au>; Nick Davis <9(2)(a)@martinjenkins.co.nz>; xxxxx.xxxxxxxx@xxx.xxx.xx; Campbell Will <9(2)(a)@mafic.co.nz>

Subject: [EXT] RE: Call re: Economic Impact & Affected Industries Report

Hi all,

Below is a proposed agenda for this afternoon's discussion. Let me know if you have anything else you'd like to put on the agenda

1. Water sector workforce transition impacts

- a. What's driving the sudden reduction immediately post-reform?
 - b. Impact of investment profiles on this
 - c. Options for bringing this in line with policy thinking / what a realistic transition path might look like
2. Tax impacts
 - a. Further explanation of how this is determined
 - b. Tax status of WSEs
 3. Proactive release of report
 4. Engagement with Steering Committee and reference group on report
 5. Any other business

Cheers
Sam

Sam Ponniah | Senior Consultant

MartinJenkins

M 9(2)(a) T 9(2)(a)

-----Original Appointment-----

From: Tan, John 9(2)(a) <@deloitte.co.nz>

Sent: Thursday, 15 April 2021 12:23 PM

To: Tan, John; Dent, Alan; 9(2)(a); 9(2)(a); 9(2)(a); 9(2)(a); Sam Ponniah; 9(2)(a) <@martinjenkins.co.nz>; xxxxx.xxxxxxxx@xxx.xxx.xx

Subject: Call re: Economic Impact & Affected Industries Report

When: Friday, 16 April 2021 3:00 PM-4:00 PM (UTC+12:00) Auckland, Wellington.

Where: <https://deloitte.zoom.us/j/98306363897?pwd=UVdwbFRGQzJON1dFcG05WmIWc1c5Zz09>

Hi All

Time tomorrow to chat about feedback on the draft report

9(2)(a) – it would be great if one of you could join

Thanks John



[Join Meeting](#)

Password: 599056

Phone one-tap: US: [+17209289299.98306363897#...*599056](tel:+17209289299.98306363897#...*599056) or
[+12133388477.98306363897#...*599056](tel:+12133388477.98306363897#...*599056)

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Meeting ID: 983 0636 3897

Password: 599056

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From: [Tan, John](#)
To: [Sam Ponniah](#); [Dent, Alan](#); 9(2)(a)
Cc: [Nick Davis](#)
Subject: RE:Comments on draft report
Date: Sunday, 18 April 2021 8:04:38 pm
Attachments: [image001.png](#)
[image002.png](#)
[image003.png](#)
[image004.png](#)
[image005.png](#)

Hi Sam

Thanks for sending through the consolidated feedback. The majority of points look fairly straightforward to incorporate. We might come back to you on a handful of points once we have considered further. We do need those updated capex figures from Mafic on Monday to re-run the modelling, so if you could please give us an update on this in the morning.

One other suggestion that I'd like to raise for consideration: is to potentially release an abridged version of our report, something akin to the exec summary + the addition of some of the additional charts in the main body of the report. A document of that size could also potentially be published in the format of an externally published report, rather than the 'report to DIA' style format at present. Given that we know that some parties such as Castalia have already taken pot shots at the process, giving them less detail/ammunition to work with could limit the amount of third party engagement required. Let me know what you think?

Kind Regards

John

From: Sam Ponniah <9(2)(a)@martinjenkins.co.nz>

Sent: Friday, 16 April 2021 10:26 PM

To: Tan, John 9(2)(a)@deloitte.co.nz; Dent, Alan 9(2)(a)@deloitte.co.nz; 9(2)(a)@deloitte.co.nz

Cc: Nick Davis <9(2)(a)@dia.govt.nz>

Subject: [EXT] Comments on draft report

Hi John, Alan and 9(2)(a)

Thank you for the time earlier today to discuss the draft report. As mentioned at the meeting our main concerns are to do with the dramatic reduction in employment in the water sector which seems at odds with the current thinking around what a transition path might look like but also poses a credibility risk in terms of the scale of reduction that is indicated immediately post reform which looks unrealistic. As agreed we'll have another look at the investment profiles given these appear to be driving these results to look at better reflecting the likely transition / ramping up of spending, consistent with the current policy thinking and also the insights from the second part of the report.

As also mentioned at the meeting, I have consolidated annotated comments throughout the report based on the feedback received internally. These are largely points of clarification, terminology / framing and some questions to consider when finalising the report. They should be relatively straightforward to address but happy to discuss any of these if helpful to clarify the intent/thinking.

Cheers

Sam

Sam Ponniah | Senior Consultant

MartinJenkins

M 9(2)(a) T 9(2)(a)



[Level 16, AIG Building, 41 Shortland St, Auckland](#)

[Level 1, City Chambers, Cnr Johnston & Featherston Sts, Wellington](#)

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From: [Tan, John](#)
To: [Sam Ponniah](#); [Dent, Alan](#); 9(2)(a)
Cc: [Nick Davis](#)
Subject: RE:Comments on draft report
Date: Sunday, 18 April 2021 8:04:38 pm
Attachments: [image001.png](#)
[image002.png](#)
[image003.png](#)
[image004.png](#)
[image005.png](#)

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Kind Regards

John

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Sent: Friday, 16 April 2021 10:26 PM

To: Tan, John <9(2)(a)@deloitte.co.nz>; Dent, Alan <9(2)(a)@deloitte.co.nz>; 9(2)(a)@deloitte.co.nz

Cc: Nick Davis <9(2)(a)@dia.govt.nz>

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Cheers

Sam

Sam Ponniah | Senior Consultant

MartinJenkins

M 9(2)(a) T 9(2)(a)



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From: 9(2)(a)
To: [Sam Ponniah](#); [Campbell Will](#); [Tan, John](#)
Cc: [x@xx](#)
Subject: RE:Mafic and WICS data
Date: Monday, 19 April 2021 8:33:38 pm
Attachments: [image003.png](#)
[image004.png](#)
[image005.png](#)
[image006.png](#)
[image007.png](#)
[image008.png](#)
[image009.jpg](#)
[image010.png](#)

Thanks Sam- that is a question for Campbell, but I recon that is the underlying reason.
 Can I send the updated data and specifications of the simulations below to our Australian team to update our model and results?

Best,

9(2)(a)

From: Sam Ponniah 9(2)(a) @martinjenkins.co.nz>

Sent: Monday, 19 April 2021 8:14 PM

To: 9(2)(a) @deloitte.co.nz>; Campbell Will <9(2)(a) @mafic.co.nz>; Tan, John <9(2)(a) @deloitte.co.nz>

Cc: xxxxx.xxxxxxxxxx@xxx.xxx.xx

Subject: [EXT] Re: Mafic and WICS data

Thanks 9(2)(a), can I just confirm the reason for the ~20bn difference between the old and new sims? Is this effectively the result of the constraint that has been applied to the counterfactual?

Sam Ponniah | Senior Consultant

MartinJenkins

M 9(2)(a) T 9(2)(a)

From: 9(2)(a) @deloitte.co.nz>

Sent: Monday, April 19, 2021 7:51:26 PM

To: Campbell Will <9(2)(a) @mafic.co.nz>; Sam Ponniah <9(2)(a) @martinjenkins.co.nz>; Tan, John <9(2)(a) @deloitte.co.nz>

Cc: xxxxx.xxxxxxxxxx@xxx.xxx.xx<xxxxx.xxxxxxxxxx@xxx.xxx.x>

Subject: RE:Mafic and WICS data

Thanks **Campbell**- The updated data works. Thanks again for amending this. Can you please confirm what is the differentiation between the Low Counterfactual Scenario and the High Counterfactual Scenario.

Sam: Below are the simulations that we will run- can you please confirm that you are comfortable with this.

Below is a summary of the **new sims to be run:**

| Sim | SysTrans | Counterfactual | Incremental |
|-------|--------------------------|--|---|
| Sim 1 | SysTrans_low_O = \$120b | Counterfactual_C_low_O = \$55b (Constrained - low) | Incremental Capex SL vs CC_low = \$65b |
| Sim 2 | SysTrans_high_O = \$185b | Counterfactual_C_low_O = \$55b (Constrained - low) | Incremental Capex SH v CC_low = \$130b |
| Sim 3 | SysTrans_low_O = \$120b | Counterfactual_his_O = \$44b (Historic) | Incremental Capex SL v C_his = \$76b |
| Sim 4 | SysTrans_high_O = \$185b | Counterfactual_C_high_O = \$69b (Constrained - high) | Incremental Capex SH v CC_high = \$116b |

| | | | |
|---|-----------|-----------|-----------|
| Sim 4 (labour supply constraint sensitivity) | Per sim 4 | Per sim 4 | Per sim 4 |
|---|-----------|-----------|-----------|

And the **old** sims, just for reference:

| Sim | SysTrans | Counterfactual | Incremental |
|---|--------------------------|---|--|
| Sim 1 | SysTrans_low_O = \$120b | Counterfactual_C_low_O = \$78b (Constrained - low) | Incremental Capex SL vs CC_low = \$42b |
| Sim 2 | SysTrans_high_O = \$185b | Counterfactual_C_low_O = \$78b (Constrained - low) | Incremental Capex SH v CC_low = \$107b |
| Sim 3 | SysTrans_low_O = \$120b | Counterfactual_his_O = \$44b (Historic) | Incremental Capex SL v C_his = \$76b |
| Sim 4 | SysTrans_high_O = \$185b | Counterfactual_C_high_O = \$95b (Constrained - high) | Incremental Capex SH v CC_high = \$90b |
| Sim 4 (labour supply constraint sensitivity) | Per sim 4 | Per sim 4 | Per sim 4 |

Please let me know if you have any questions.

Best,

9(2)(a)

From: Campbell Will <9(2)(a)@mafic.co.nz>

Sent: Monday, 19 April 2021 6:16 PM

To: 9(2)(a)@deloitte.co.nz; Sam Ponniah <9(2)(a)@martinjenkins.co.nz>; Tan, John <9(2)(a)@deloitte.co.nz>

Cc: xxxxx.xxxxxxxxxx@xxx.xxxx.xx

Subject: [EXT] RE: Mafic and WICS data

Hi 9(2)(a) / John

See updated workbook attached. I have reverted back to the WICS forecast (ie without the scaled front end) and used the debt profile to smooth out the hockey stick shape. This should align more closely to the previous version you were using.

Kind regards,

Campbell



Campbell Will
Mafic Partners Limited
M: 9(2)(a)

From: 9(2)(a)@deloitte.co.nz

Sent: Monday, 19 April 2021 4:15 pm

To: Sam Ponniah <9(2)(a)@martinjenkins.co.nz>; Tan, John <9(2)(a)@deloitte.co.nz>

Cc: xxxxx.xxxxxxxxxx@xxx.xxxx.xx; Campbell Will <9(2)(a)@mafic.co.nz>

Subject: RE:Mafic and WICS data

Thanks Sam.

As discussed, attached is a workbook calculating the incremental capex spend by region, 2022 to 2051 in real terms. Please see the first two worksheets and see the yellow highlighted rows where incremental capex is either zero or negative in some years.

We also note that the TA profiles and levels are significantly different to the initial data. Below is a summary table of the counterfactual investment values we had before the low scenario (i.e. the total investment over 30 years in real terms) and the difference with the current data by TA.

| |
|--|
| |
|--|

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Best,

9(2)(a)
[Redacted]

Director | Corporate Finance

Deloitte

Level 12, 20 Customhouse Quay, PO Box 1990, Wellington 6140, New Zealand

D: 9(2)(a) | M: 9(2)(a) | O: 9(2)(a) | F: 9(2)(a)
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Sent: Monday, 19 April 2021 3:56 PM
To: Tan, John 9(2)(a) @deloitte.co.nz
Cc: 9(2)(a) @deloitte.co.nz; xxxxx.xxxxxxxx@xxx.xxx.xx
Campbell Will <9(2)(a)@mafic.co.nz>
Subject: [EXT] RE: Mafic and WICS data

Hi John, is it worth us having a quick discussion so we're clear on this – there's still a little confusion on our end as to how we've ended up with a negative shock. Campbell can run the numbers reasonably quickly but we just need to make sure we're agreed on the policy parameters. We're free at 4.30pm for a quick chat if that works for you?

Cheers
Sam

Sam Ponniah | Senior Consultant

MartinJenkins

M 9(2)(a) T 9(2)(a)

From: Tan, John 9(2)(a) @deloitte.co.nz
Sent: Monday, 19 April 2021 3:45 PM
To: Sam Ponniah <9(2)(a)@martinjenkins.co.nz>

Cc: 9(2)(a)@deloitte.co.nz>; xxxxx.xxxxxxxx@xxx.xxxx.xx

Campbell Will <9(2)(a)@mafic.co.nz>

Subject: Mafic and WICS data

Hi Sam

9(2)(a) has briefed me on the shape of the latest Mafic data and the effect on our modelling – which is to make the capex shock on some of our regions negative – which clearly doesn't make sense. The core issue seems to me that WICS and Mafic are using two different approaches.

Could either of the following approaches work:

- Coming up with the quantum of expenditure that makes the most sense to each of WICS and Mafic and then to apply a consistent profile across both data sets. Otherwise whatever the shape of the differential between the system transformation scenario and the counterfactual will disrupt the regional analysis in the CGE model.
- Another alternative is for Mafic to think about applying some sort of capacity constraint in the initial years to smooth the initial capex uplift in the first few periods. This is both realistic and intellectually pure

The other thing that I am a little worried about is that the existing Mafic profile has quite a bit of capex front ended – and if this is switched to the back end of the profile that it could have a big swing effect in terms of reported NPV.

Can you let us know how Mafic are getting on as the Australian team are on standby to re-run the models

Thanks

John

John Tan

Partner | Corporate Finance

Deloitte

Level 12, 20 Customhouse Quay, PO Box 1990, Wellington 6140, New Zealand

D: 9(2)(a) | M: 9(2)(a) | O: 9(2)(a) | F: 9(2)(a)

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From: [Tan, John](#)
To: [Sam Ponniah](#)
Cc: [Dent, Alan](#)
Subject: Model & Report Updates next week
Date: Sunday, 18 April 2021 9:12:01 pm
Attachments: [image001.png](#)
[image002.png](#)
[image003.png](#)
[image004.png](#)
[image005.png](#)
[image006.png](#)

Hi Sam

Thanks for the feedback on Friday and over the weekend, In addition to the wording edits that you provided, which are in line with our expectations, the agreed plan to re-run the modelling to reflect a different transition capex profile is likely to result in a fair bit of additional effort on our side, which we weren't expecting. In summary, this is likely to involve:

- Re-modelling all 4 core scenarios + the sensitivity assumptions. Unlike financial models, 'dynamic' CGE models, sometimes require assumptions and logic to be re-calibrated within or in between scenario runs and so the exact number of runs is unknown but will likely be more than 4. In terms of data inputs, we have been clear that we would rely upon DIA/Mafic/WICS inputs
- Re-producing the key charts and tables to inform the discussion on Wednesday to confirm the modelling results. This involves taking data from the CGE model and putting them through a series of other Excel or Tableau based analysis and validating that analysis as what drops out of the CGE model is largely raw 'data'
- The 'production' aspect of updating the ~80 page report to make sure that everything ties up again and the narrative reflects the analysis, which will take a few days
- We will also include some time for us to present to the key stakeholder groups in the coming weeks.

The key things that affect our effort are time elapsed and substantive model iterations. While we are two weeks over on time, and this has had an impact on our budget/efficiency, we weren't planning on raising this with you – as the overall scope was largely the same up to that point. However, we do expect to expend a fair bit of effort over the next week to work through the above:

- ~2 days between Alan ⁹⁽²⁾/_(a) /Myself (Narrative, QA and stakeholder reporting)
- ~2 days ⁹⁽²⁾/_(a) (CGE model updates and runs)
- ~3 days ⁹⁽²⁾/_(a) (recalibrating the narrative and model updates)
- 3 days ⁹⁽²⁾/_(a) /Analyst support charts/tables and production

If Deloitte ⁹⁽²⁾/_{(b)(ii)}
[Redacted]
[Redacted]
[Redacted]
[Redacted]
[Redacted]
[Redacted] Can

we chat tomorrow
Thanks & Regards
John

John Tan
Partner | Corporate Finance
Deloitte

Level 12, 20 Customhouse Quay, PO Box 1990, Wellington 6140, New Zealand

D: 9(2)(a) | M: 9(2)(a) | O: 9(2)(a) | F: 9(2)(a)
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From: [Tan, John](#)
To: [Sam Ponniah](#); 9(2)(a); [Campbell Will](#)
Cc: [x@xxx](#); 9(2)(a)
Subject: RE:Mafic and WICS data
Date: Tuesday, 20 April 2021 12:14:26 pm

Hi Campbell

The two tables below set out the current modelling vs the old modelling (Friday)

So that we are all on the same page - can you please set out:

- (1) What has changed between the Old Low Counterfactual (\$78b) vs the New Low Counterfactual (\$55b) in terms of:
 - a. data changes (use of new WICS profiles, which are higher),
 - b. methodology changes (resculpted the front end of the 'nike swososh')
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What I am trying to figure out is why the counterfactual has reduced by \$23b and the reasons above don't seem to make sense in light of this quantum of change

- (2) What is different in terms of thinking between the old Sim 4 High Counterfactual between the old run and the new run – that causes concerns about using the High Counterfactual case

I am pretty keen to Have a Low and High scenario and not to substitute the High Case for the Optimistic case because

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I'm tied up to about 2.30 but would be keen to get some clarity on the above or discuss today

John

From: 9(2)(a) <[redacted]@deloitte.co.nz>

Sent: Tuesday, 20 April 2021 9:28 AM

To: Sam Ponniah <9(2)(a)@martinjenkins.co.nz>; Campbell Will <9(2)(a)@mafic.co.nz>; Tan, John <9(2)(a)@deloitte.co.nz>

Cc: [x@xxx](#); 9(2)(a) <[redacted]@deloitte.co.nz>

Subject: RE:Mafic and WICS data

Importance: High

Thanks Sam,

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| Sim 4 (labour supply constraint | Per sim 4 | Per sim 4 | Per sim 4 |

| | | | |
|---|-----------|-----------|-----------|
| sensitivity) | | | |
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From: [Tan, John](#)
To: [Sam Ponniah](#)
Cc: 9(2)(a); [Campbell Will](#); [xxxx](#); 9(2)(a)
Subject: RE:Mafic and WICS data
Date: Tuesday, 20 April 2021 12:52:44 pm

Thanks Sam. That is a clear explanation. Are you happy for us to use the \$69b high counterfactual as our high case using the narrative that you've provided?

Sent from my iPhone

On 20/04/2021, at 12:49 PM, Sam Ponniah <9(2)(a)@martinjenkins.co.nz> wrote:

Hi John

Have confirmed with Campbell the following in relation to your questions:

1. The new counterfactual takes into account updated information we have on the opex under phase 2 which we didn't have when we ran the original scenarios, this is what has helped us to smooth out the front end of the 'nike swoosh' but also explains the reduction in the counterfactual spend as councils are incurring a higher opex spend. The same price and debt constraints still apply
2. As above, the higher opex spend means that there is now no difference between a low and high counterfactual in terms of what Councils can spend – in other words, all councils are unable to fully meet the capex backlog whereas previously some councils were able to meet the backlog in the low scenario and therefore had capacity to increase their capex in the high scenario. One way through this would be to frame the high scenario as assuming that councils are able to lower their opex spend by around 20% (which translates to a rough 27% increase in the capex spend). We will need to be clear we've relaxed the opex requirement to allow councils to spend more under the high counterfactual scenario and that we haven't sought to quantify where those savings come from (i.e. will likely be a mixture of improved efficiencies, cost savings on opex side or relaxing of debt/price constraints, reprioritisation of spend on capex side etc).

Does that clear things up?

Cheers

Sam

Sam Ponniah | Senior Consultant

MartinJenkins

M 9(2)(a) T 9(2)(a)

From: Tan, John 9(2)(a)@deloitte.co.nz>

Sent: Tuesday, 20 April 2021 12:14 PM

To: Sam Ponniah <9(2)(a)@martinjenkins.co.nz>; 9(2)(a)@deloitte.co.nz>; Campbell Will <9(2)(a)@mafic.co.nz>

Cc: xxxxx.xxxxxxxx@xxx.xxxx.xx, 9(2)(a)@deloitte.co.nz>

Subject: RE:Mafic and WICS data

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From: 9(2)(a) <[redacted]@deloitte.co.nz>
Sent: Tuesday, 20 April 2021 9:28 AM
To: Sam Ponniah <9(2)(a) [redacted]@martinjenkins.co.nz>; Campbell Will <9(2)(a) [redacted]@mafic.co.nz>; Tan, John <9(2)(a) [redacted]@deloitte.co.nz>
Cc: xxxxx.xxxxxxxxxx@xxx.xxx.xx; 9(2)(a) [redacted]@deloitte.co.nz>
Subject: RE:Mafic and WICS data

Importance: High

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From: 9(2)(a)
To: [Sam Ponniah](#)
Cc: [Tan, John](#)
Subject: RE:Counterfactual data
Date: Monday, 19 April 2021 11:04:16 am
Attachments: [image001.png](#)
[image002.png](#)
[image003.png](#)
[image004.png](#)
[image005.png](#)

Thanks Sam,
I just wanted to give a call on the counterfactual data.
We will let you know if we have any questions on this.
Best,

9(2)(a)

From: Sam Ponniah <9(2)(a)@martinjenkins.co.nz>

Sent: Monday, 19 April 2021 10:43 AM

To: Tan, John 9(2)(a)@deloitte.co.nz; 9(2)(a)@deloitte.co.nz

Subject: [EXT] Counterfactual data

Hi John and 9(2)(a)

Attached is the updated counterfactual data. Let me know if you have any questions.

John I'll give you a ring later today to discuss your email last night.

Cheers

Sam

Sam Ponniah | Senior Consultant

MartinJenkins

M 9(2)(a) T 9(2)(a)



Level 16, AIG Building, 41 Shortland St. **Auckland**
Level 1, City Chambers, Cnr Johnston & Featherston Sts. **Wellington**

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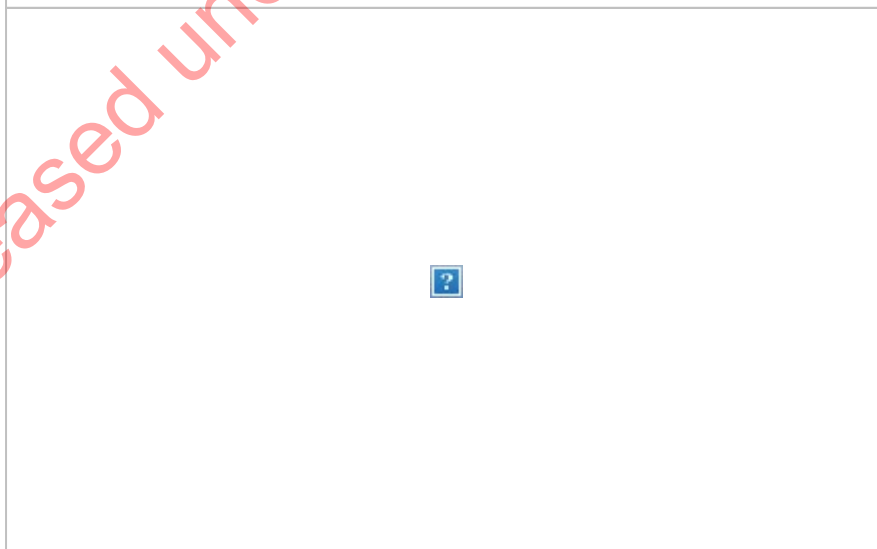
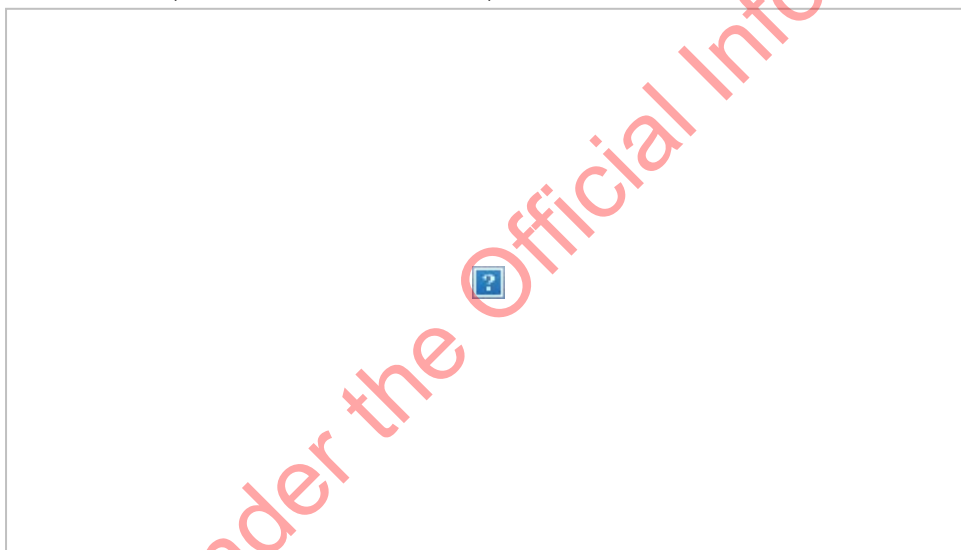
From: 9(2)(a)
To: [Sam Ponniah](#)
Cc: [Tan, John](#); 9(2)(a)
Subject: RE:Counterfactual data
Date: Monday, 19 April 2021 1:31:45 pm
Attachments: [image001.png](#)
[image002.png](#)
[image003.png](#)
[image004.png](#)
[image005.png](#)
[image012.png](#)
[image013.png](#)
[image014.png](#)

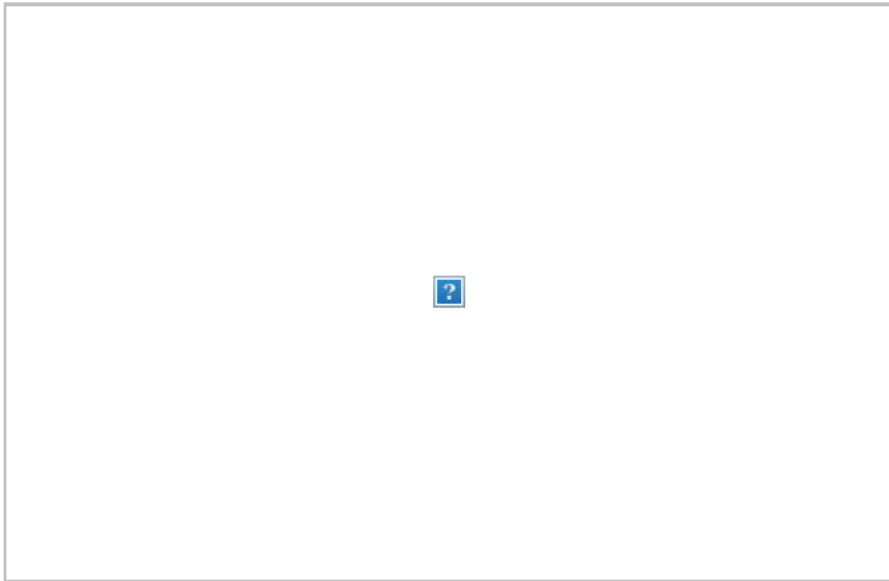
Sam,

Thanks for our call earlier.

As discussed, the updated MAFC Counterfactual is resulting in a negative incremental investment profile from 2030 onwards for regions Auckland, Wellington, Nelson and Tasman- for both the Low and High Scenarios- (i.e. WICS data MINUS MAFC data)- Further, for Auckland the total real incremental investment is now zero for the Low Scenario.

For illustration purposes- below is the updated charts from page 26 of the report. Once the Counterfactual data is higher than WICS data- we will see a negative incremental investment profile over time. In MAFC's initial data for example, the real investment in counterfactual High Scenario was \$5.1b in 2051 but its now \$6.8b.





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| | | |
|--|--|--|
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From: 9(2)(a) @deloitte.co.nz
Sent: Monday, 19 April 2021 1:31 pm
To: Sam Ponniah
Cc: Tan, John; 9(2)(a)
Subject: RE:Counterfactual data

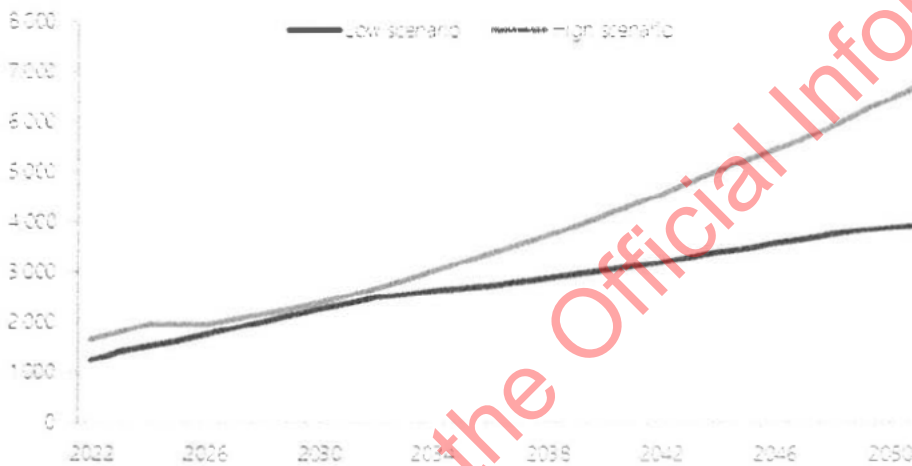
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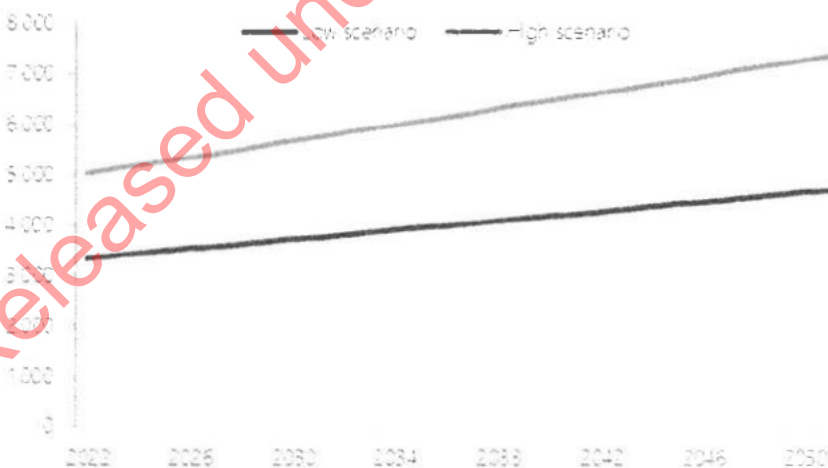
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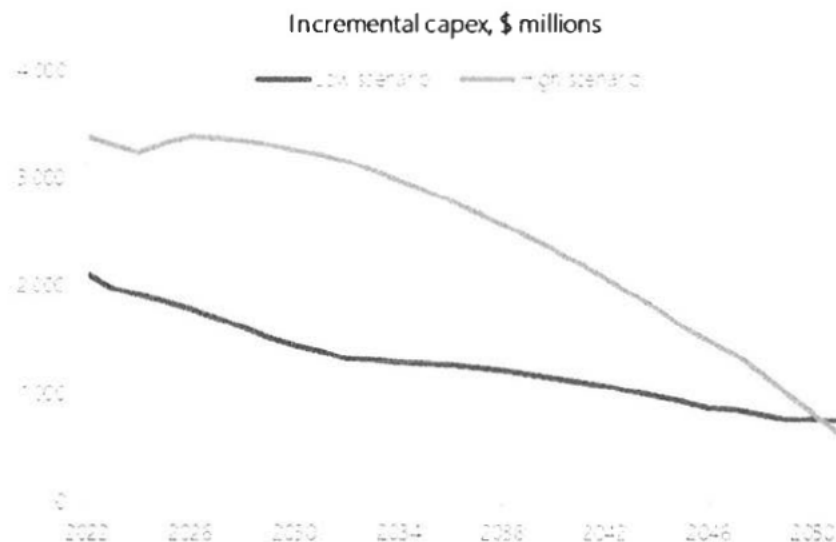
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Counterfactual, \$ millions



System transformation, \$ millions





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From: 9(2)(a)
To: [Sam Ponniah](#)
Cc: [Campbell Will](#)
Subject: RE:Counterfactual questions
Date: Monday, 19 April 2021 1:46:59 pm
Attachments: [image007.png](#)
[image008.png](#)
[image009.png](#)
[image010.png](#)
[image011.png](#)

Thanks Sam,
We are only using REAL capex values.
Data points of current concern are:

Low scenario:

Auckland- the total real capex value is equal to WICS value- so the incremental capex (WICS-MAFIC=0). Further, the incremental capex on an annual basis is negative for Auckland for 2030 onwards.

Nelson- the incremental capex on an annual basis is negative from 2038 onwards

Wellington and Tasman- the incremental capex on an annual basis is negative from 2044 onwards

High Scenario

Auckland- the incremental capex on an annual basis is negative for Auckland for 2040 onwards.

Nelson- the incremental capex on an annual basis is negative from 2047 onwards

Wellington and Tasman- the incremental capex on an annual basis is negative from 2049 onwards

Best,

9(2)(a)

From: Sam Ponniah <9(2)(a)@martinjenkins.co.nz>

Sent: Monday, 19 April 2021 1:18 PM

To: 9(2)(a)@deloitte.co.nz

Cc: Campbell Will <9(2)(a)@mafic.co.nz>

Subject: [EXT] Counterfactual questions

Hi 9(2)(a)

I just spoke to Campbell who thought the issue might be whether we're referring to nominal or real capex numbers – the capex numbers may be higher for some councils in the counterfactual due to the delay in investment incurring higher inflation costs over time.

If you're able to clarify this point and share the specific data points that are causing concerns then Campbell can come back to you on this.

Cheers

Sam

Sam Ponniah | Senior Consultant

MartinJenkins

M 9(2)(a) T 9(2)(a)



[Level 16, AIG Building, 41 Shortland St. Auckland](#)

[Level 1, City Chambers, Cnr Johnston & Featherston Sts. Wellington](#)

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From: 9(2)(a)
To: [Sam Ponniah](#)
Cc: [Campbell Will](#)
Subject: RE:Counterfactual questions
Date: Monday, 19 April 2021 2:01:27 pm
Attachments: [image001.png](#)
[image002.png](#)
[image003.png](#)
[image004.png](#)
[image005.png](#)

Sam,

Let me know if you want to schedule a call to discuss this further?

Best,

9(2)(a)

From: 9(2)(a)
Sent: Monday, 19 April 2021 1:46 PM
To: Sam Ponniah <9(2)(a)@martinjenkins.co.nz>
Cc: Campbell Will <9(2)(a)@mafic.co.nz>
Subject: RE: Counterfactual questions

Thanks Sam,

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Wellington and Tasman- the incremental capex on an annual basis is negative from 2049 onwards

Best,

9(2)(a)

From: Sam Ponniah <9(2)(a)@martinjenkins.co.nz>
Sent: Monday, 19 April 2021 1:18 PM
To: 9(2)(a)@deloitte.co.nz
Cc: Campbell Will <9(2)(a)@mafic.co.nz>
Subject: [EXT] Counterfactual questions

Hi 9(2)(a)

I just spoke to Campbell who thought the issue might be whether we're referring to nominal or real capex numbers – the capex numbers may be higher for some councils in the counterfactual due to the delay in investment incurring higher inflation costs over time.

If you're able to clarify this point and share the specific data points that are causing concerns then Campbell can come back to you on this.



Cheers

Sam

Sam Ponniah | Senior Consultant
MartinJenkins

M 9(2)(a) T 9(2)(a)



  [Level 16, AIG Building, 41 Shortland St, Auckland](#)
[Level 1, City Chambers, Cnr Johnston & Featherston Sts, Wellington](#)

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From: 9(2)(a)
To: [Campbell Will](#); [Sam Ponniah](#)
Subject: RE:Counterfactual questions
Date: Monday, 19 April 2021 2:33:48 pm
Attachments: [image001.png](#)
[image002.png](#)
[image005.png](#)
[image006.png](#)
[image007.png](#)
[image008.png](#)
[image009.png](#)
[image010.jpg](#)
Importance: High

Thanks Campbell.

The capex profiles are now higher for specific regions-Auckland, Wellington, Tasman and Nelson- relative to your initial data.

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Best,

9(2)(a)

From: Campbell Will <9(2)(a)@mafic.co.nz>

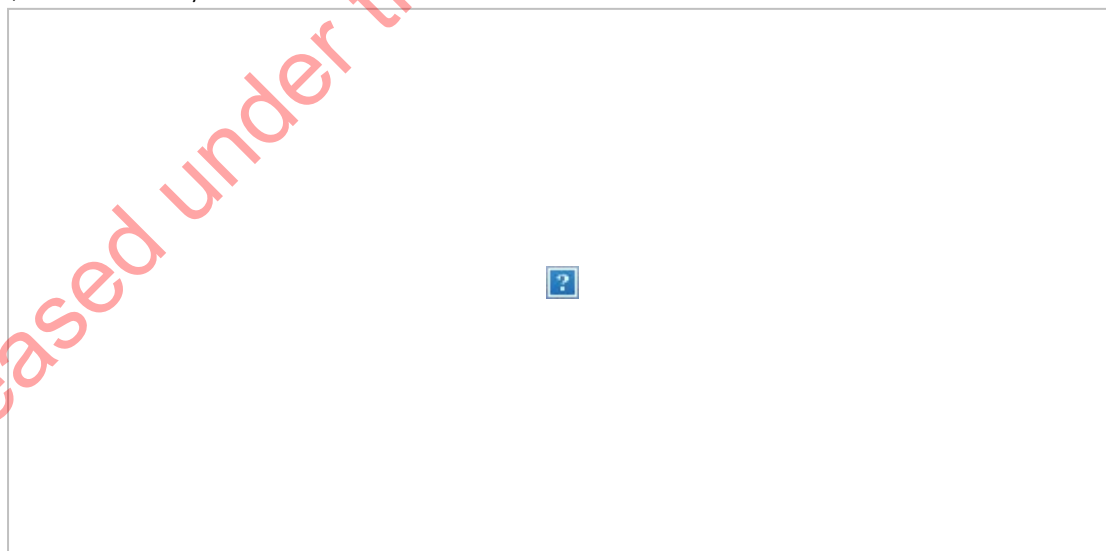
Sent: Monday, 19 April 2021 2:20 PM

To: 9(2)(a)@deloitte.co.nz; 9(2)(a)@martinjenkins.co.nz

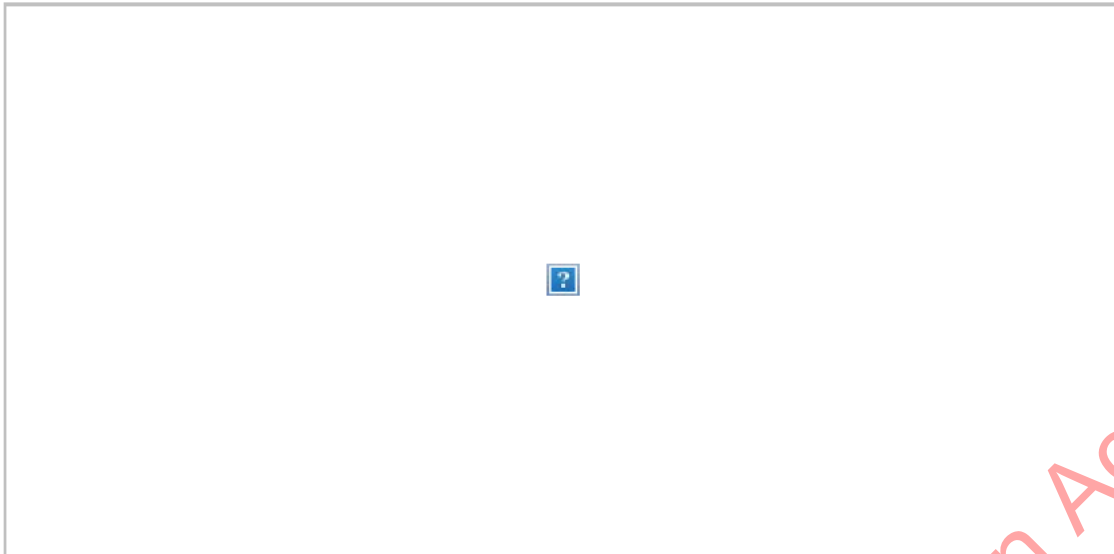
Subject: [EXT] RE: Counterfactual questions

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Kind regards,
Campbell



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Mafic Partners Limited
M: 9(2)(a)

From: 9(2)(a) <[redacted]@deloitte.co.nz>

Sent: Monday, 19 April 2021 2:01 pm

To: 9(2)(a) <[redacted]@martinjenkins.co.nz>

Cc: Campbell Will <9(2)(a)@mafic.co.nz>

Subject: RE:Counterfactual questions

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Sent: Monday, 19 April 2021 1:46 PM

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Cc: Campbell Will <9(2)(a)@mafic.co.nz>

Subject: RE: Counterfactual questions

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Subject: [EXT] Counterfactual questions

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Sam Ponniah | Senior Consultant

MartinJenkins

M 9(2)(a) T 9(2)(a)



Level 16, AIG Building, 41 Shortland St, Auckland
Level 1, City Chambers, Cnr Johnston & Featherston Sts, Wellington

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This is a duplicate scanned email which includes the images which are missing from the previous one above.

From: 9(2)(a) @deloitte.co.nz
Sent: Monday, 19 April 2021 2:33 pm
To: Campbell Will; Sam Ponniah
Subject: RE:Counterfactual questions
Importance: High

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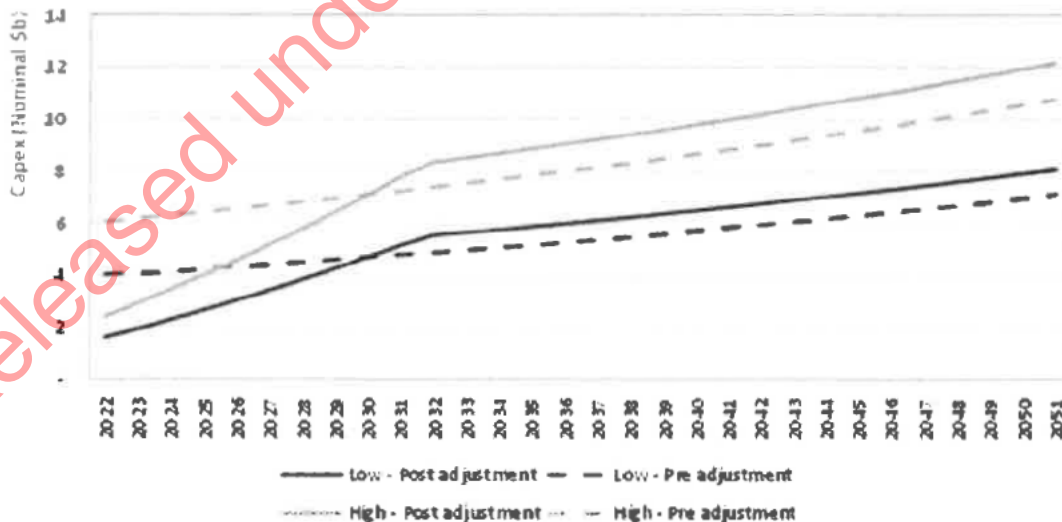
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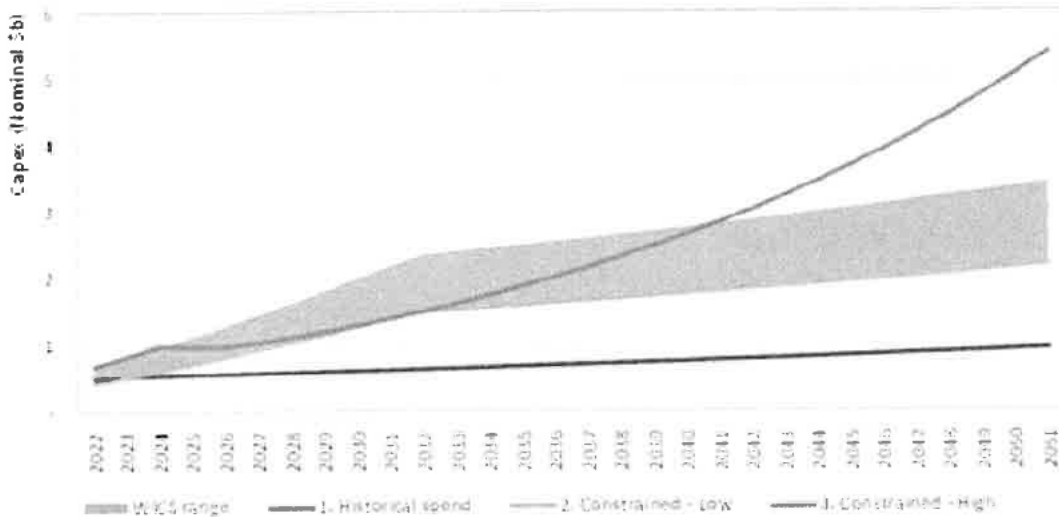
From: Campbell Will <9(2)(a) @mafic.co.nz>
Sent: Monday, 19 April 2021 2:20 PM
To: 9(2)(a) @deloitte.co.nz; 9(2)(a) @martinjenkins.co.nz
Subject: [EXT] RE: Counterfactual questions

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Mafic Partners Limited
M: 9(2)(a)

From: 9(2)(a) <[redacted]@deloitte.co.nz>
Sent: Monday, 19 April 2021 2:01 pm
To: 9(2)(a) <[redacted]@martinjenkins.co.nz>
Cc: Campbell Will <[redacted]@mafic.co.nz>
Subject: RE:Counterfactual questions

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To: Sam Ponniah <[redacted]@martinjenkins.co.nz>
Cc: Campbell Will <[redacted]@mafic.co.nz>
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9(2)(a)

From: Sam Ponniah <9(2)(a)@martinjenkins.co.nz>
Sent: Monday, 19 April 2021 1:18 PM
To: 9(2)(a) <9(2)(a)@deloitte.co.nz>
Cc: Campbell Will <9(2)(a)@mafic.co.nz>
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Sam Ponniah | Senior Consultant
MartinJenkins

M 9(2)(a) T 9(2)(a)

in   

MARTIN JENKINS  Level 16, AIG Building, 41 Shortland St, **Auckland**
Level 1, City Chambers, Cnr Johnston & Featherston Sts, **Wellington**

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End of duplicate copy

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From: [Tan, John](#)
To: [Sam Ponniah](#)
Cc: 9(2)(a); [x@xx](#); [Campbell Will](#)
Subject: Mafic and WICS data
Date: Monday, 19 April 2021 3:46:01 pm
Attachments: [image001.png](#)
[image002.png](#)
[image003.png](#)
[image004.png](#)
[image005.png](#)
[image006.png](#)

Hi Sam

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Can you let us know how Mafic are getting on as the Australian team are on standby to re-run the models

Thanks

John

John Tan

Partner | Corporate Finance

Deloitte

Level 12, 20 Customhouse Quay, PO Box 1990, Wellington 6140, New Zealand

D: 9(2)(a) | M: 9(2)(a) | O: 9(2)(a) | F: 9(2)(a)

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From: 9(2)(a)
To: [Campbell Will](#); [Sam Ponniah](#); [Tan, John](#)
Cc: [x@xx](#)
Subject: RE:Mafic and WICS data
Date: Monday, 19 April 2021 6:56:06 pm
Attachments: [image001.png](#)
[image002.png](#)
[image003.png](#)
[image004.png](#)
[image005.png](#)
[image006.png](#)
[image010.jpg](#)
[image012.png](#)

Thanks Campbell for turning this around so quickly.
I will have a look at the data now and let you know if we have any questions.

Best,

9(2)(a)

Director | Corporate Finance

Deloitte

Level 12, 20 Customhouse Quay, PO Box 1990, Wellington 6140, New Zealand

D: 9(2)(a) | M: 9(2)(a) | O: 9(2)(a) | F: 9(2)(a)

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From: Campbell Will <9(2)(a)@mafic.co.nz>

Sent: Monday, 19 April 2021 6:16 PM

To: 9(2)(a)@deloitte.co.nz; Sam Ponniah
<9(2)(a)@martinjenkins.co.nz>; Tan, John 9(2)(a)@deloitte.co.nz>

Cc: xxxxx.xxxxxxxxxx@xxx.xxxx.xx

Subject: [EXT] RE: Mafic and WICS data

Hi 9(2)(a) /John

See updated workbook attached. I have reverted back to the WICS forecast (ie without the scaled front end) and used the debt profile to smooth out the hockey stick shape. This should align more closely to the previous version you were using.

Kind regards,

Campbell



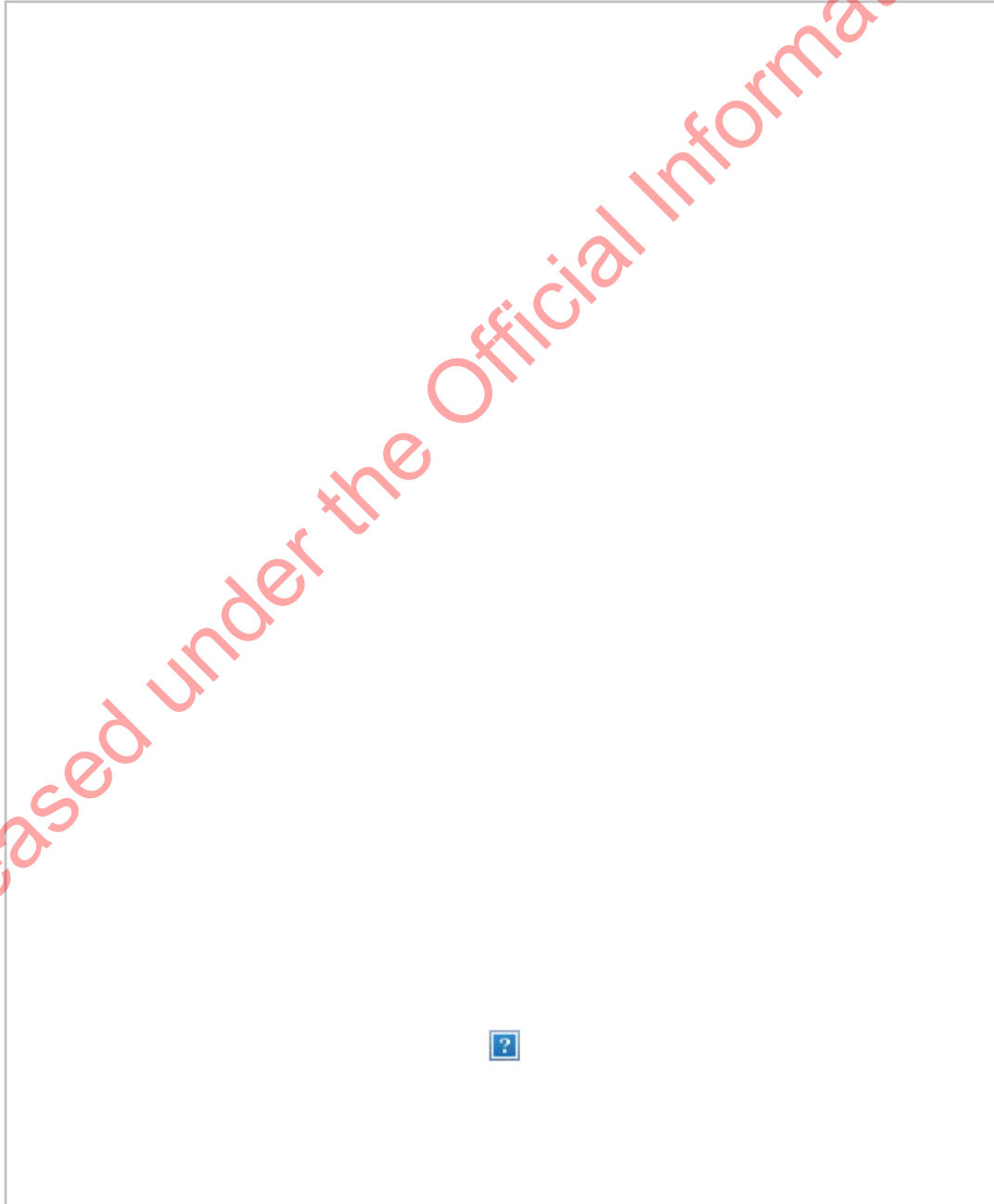
Campbell Will
Mafic Partners Limited
M: 9(2)(a)

From: 9(2)(a) <[redacted]@deloitte.co.nz>
Sent: Monday, 19 April 2021 4:15 pm
To: Sam Ponniah <9(2)(a)@martinjenkins.co.nz>; Tan, John <9(2)(a)@deloitte.co.nz>
Cc: Scott.Priestley@dia.govt.nz; Campbell Will <9(2)(a)@mafic.co.nz>
Subject: RE:Mafic and WICS data

Thanks Sam.

As discussed, attached is a workbook calculating the incremental capex spend by region, 2022 to 2051 in real terms. Please see the first two worksheets and see the yellow highlighted rows where incremental capex is either zero or negative in some years.

We also note that the TA profiles and levels are significantly different to the initial data. Below is a summary table of the counterfactual investment values we had before the low scenario (i.e. the total investment over 30 years in real terms) and the difference with the current data by TA.



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Best,

9(2)(a) [Redacted]

Director | Corporate Finance

Deloitte

Level 12, 20 Customhouse Quay, PO Box 1990, Wellington 6140, New Zealand

D: 9(2)(a) | M: 9(2)(a) | O: 9(2)(a) | F: 9(2)(a)

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Sent: Monday, 19 April 2021 3:56 PM

To: Tan, John <9(2)(a)@deloitte.co.nz>

Cc: 9(2)(a)@deloitte.co.nz; xxxxx.xxxxxxxxx@xxx.xxx.xx;
Campbell Will <9(2)(a)@mafic.co.nz>

Subject: [EXT] RE: Mafic and WICS data

Hi John, is it worth us having a quick discussion so we're clear on this – there's still a little confusion on our end as to how we've ended up with a negative shock. Campbell can run the numbers reasonably quickly but we just need to make sure we're agreed on the policy parameters. We're free at 4.30pm for a quick chat if that works for you?

Cheers
Sam

Sam Ponniah | Senior Consultant

MartinJenkins

M 9(2)(a) T 9(2)(a)

From: Tan, John <9(2)(a)@deloitte.co.nz>

Sent: Monday, 19 April 2021 3:45 PM

To: Sam Ponniah <9(2)(a)@martinjenkins.co.nz>

Cc: 9(2)(a)@deloitte.co.nz; xxxxx.xxxxxxxxx@xxx.xxx.xx;
9(2)(a)@mafic.co.nz

Subject: Mafic and WICS data

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From: 9(2)(a)
To: [Campbell Will](#); [Sam Ponniah](#); [Tan, John](#)
Cc: [x@xx](#); 9(2)(a)
Subject: RE:Mafic and WICS data
Date: Tuesday, 20 April 2021 8:48:08 am
Attachments: [image002.png](#)
[image003.png](#)
[image004.png](#)
[image005.png](#)
[image006.png](#)
[image007.png](#)
[image010.jpg](#)
[image012.jpg](#)
[image013.jpg](#)
[image014.png](#)
Importance: High

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Cc: xxxxx.xxxxxxxx@xxx.xxxx.xx, 9(2)(a) @deloitte.co.nz>

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Mafic Partners Limited

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Cc: xxxxx.xxx@xxx.xxxx.xx, 9(2)(a) @deloitte.co.nz>

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9(2)(a)

Director | Corporate Finance

Deloitte

Level 12, 20 Customhouse Quay, PO Box 1990, Wellington 6140, New Zealand

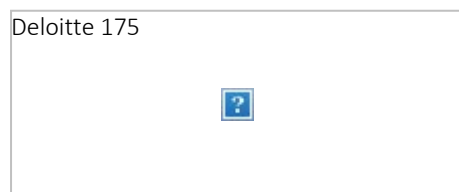
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9(2)(a) [redacted] [@deloitte.co.nz](mailto:[redacted]@deloitte.co.nz) | www.deloitte.co.nz

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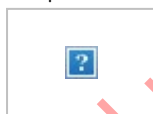
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Campbell



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Mafic Partners Limited

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Sent: Monday, 19 April 2021 7:51 pm

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Best,
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Cc: xxxxx.xxxxxxxxxx@xxx.xxx.xx

Subject: [EXT] RE: Mafic and WICS data

Hi 9(2)(a) /John

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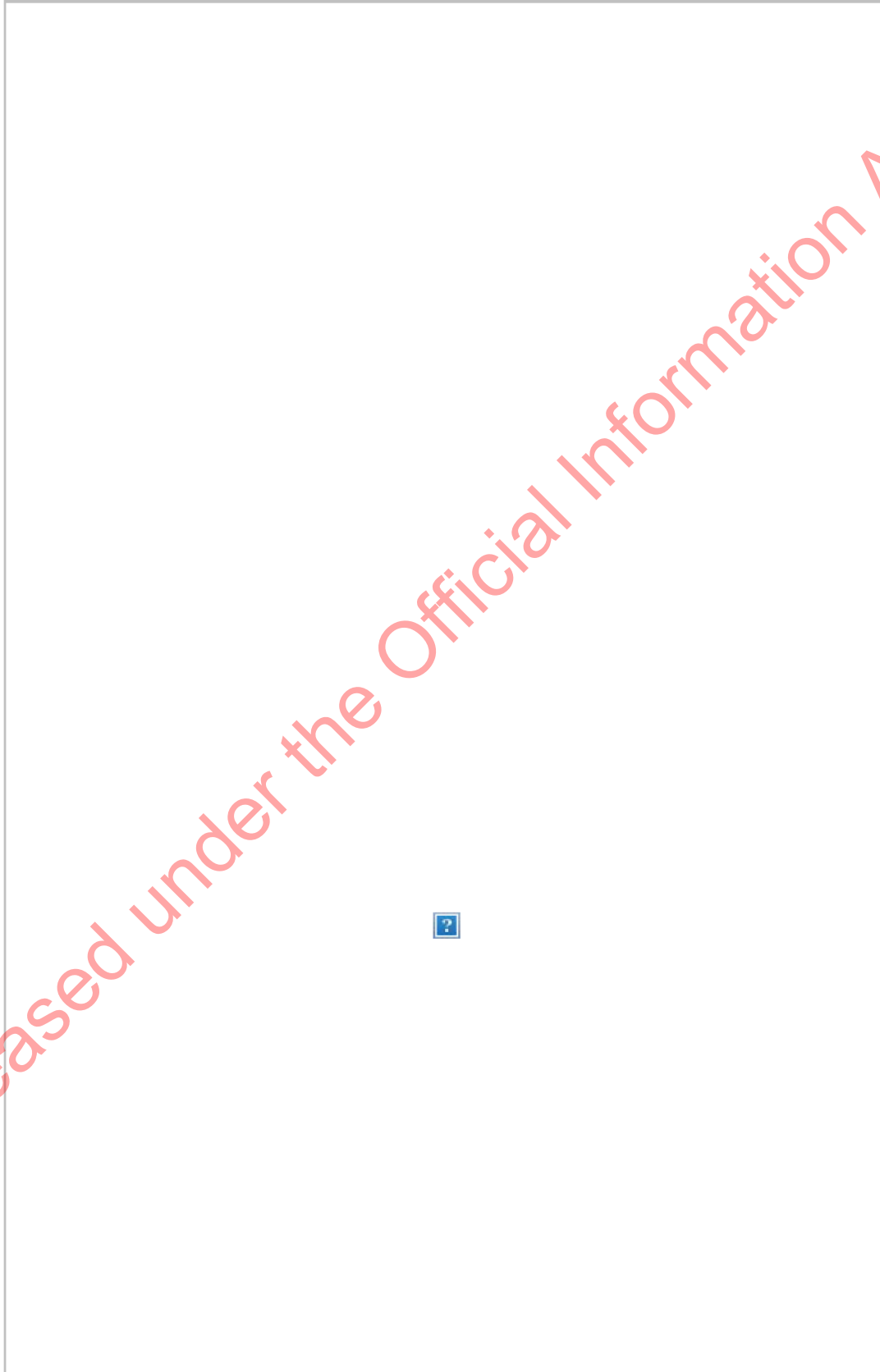
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Best,

9(2)(a)
(a)

Director | Corporate Finance

Deloitte

Level 12, 20 Customhouse Quay, PO Box 1990, Wellington 6140, New Zealand

D: 9(2)(a) | M: 9(2)(a) | O: 9(2)(a) | F: 9(2)(a)

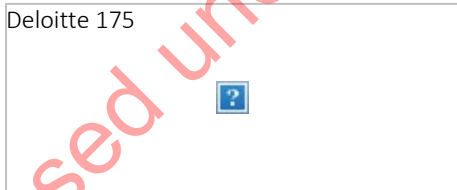
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Sent: Monday, 19 April 2021 3:56 PM

To: Tan, John <9(2)(a)@deloitte.co.nz>

Cc: 9(2)(a)@deloitte.co.nz; xxxxx.xxxxxxxx@xxx.xxxx.xx

Campbell Will <9(2)(a)@mafic.co.nz>

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We're free at 4.30pm for a quick chat if that works for you?

Cheers

Sam

Sam Ponniah | Senior Consultant

MartinJenkins

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Campbell Will 9(2)(a) <9(2)(a)@mafic.co.nz>

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Could either of the following approaches work:

- Coming up with the quantum of expenditure that makes the most sense to each of WICS and Mafic and then to apply a consistent profile across both data sets. Otherwise whatever the shape of the differential between the system transformation scenario and the counterfactual will disrupt the regional analysis in the CGE model.
- Another alternative is for Mafic to think about applying some sort of capacity constraint in the initial years to smooth the initial capex uplift in the first few periods. This is both realistic and intellectually pure

The other thing that I am a little worried about is that the existing Mafic profile has quite a bit of capex front ended – and if this is switched to the back end of the profile that it could have a big swing effect in terms of reported NPV.

Can you let us know how Mafic are getting on as the Australian team are on standby to re-run the models

Thanks

John

John Tan

Partner | Corporate Finance

Deloitte

Level 12, 20 Customhouse Quay, PO Box 1990, Wellington 6140, New Zealand

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This is a duplicate scanned email which includes the images which are missing from the previous one above.

From: 9(2)(a) @deloitte.co.nz>
Sent: Tuesday, 20 April 2021 8:48 am
To: Campbell Will; Sam Ponniah; Tan, John
Cc: Scott.Priestley@dia.govt.nz; 9(2)(a)
Subject: RE:Mafic and WICS data

Importance: High

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Subject: [EXT] RE: Mafic and WICS data

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9(2)(a)

Director | Corporate Finance

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initial total difference to current low scenario data

| | 9(2)(ba)(i) | 9(2)(ba)(i) |
|---------------------|-------------|-------------|
| Auckland | | |
| Ashburton | | |
| Buller | | |
| Carterton | | |
| Central Hawke's Bay | | |
| Central Otago | | |
| Chatham Islands | | |
| Christchurch | | |
| Clutha | | |
| Dunedin | | |
| Far North | | |
| Gisborne | | |
| Gore | | |
| Grey | | |
| Hamilton | | |
| Hastings | | |
| Hauraki | | |
| Horowhenua | | |
| Hurunui | | |
| Invercargill | | |
| Kaikoura | | |
| Kaipara | | |
| Kapiti Coast | | |
| Kawerau | | |
| Lower Hutt | | |
| Mackenzie | | |
| Manawatu | | |
| Marlborough | | |
| Masterton | | |
| Matamata-Piako | | |
| Napier | | |
| Nelson | | |
| New Plymouth | | |
| Opotiki | | |
| Otorohanga | | |
| Palmerston North | | |
| Porirua | | |
| Queenstown Lakes | | |
| Rangitikei | | |
| Rotorua Lakes | | |
| Ruapehu | | |
| Selwyn | | |
| South Taranaki | | |
| South Waikato | | |
| South Wairarapa | | |
| Southland | | |
| Stratford | | |
| Tararua | | |
| Tasman | | |
| Taupo | | |
| Tauranga | | |
| Thames-Coromandel | | |
| Timaru | | |
| Upper Hutt | | |
| Waikato | | |
| Waimakariri | | |
| Waimate | | |
| Waipa | | |
| Wairoa | | |
| Waitaki | | |

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MartinJenkins

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- Another alternative is for Mafic to think about applying some sort of capacity constraint in the initial years to smooth the initial capex uplift in the first few periods. This is both realistic and intellectually pure

The other thing that I am a little worried about is that the existing Mafic profile has quite a bit of capex front ended – and if this is switched to the back end of the profile that it could have a big swing effect in terms of reported NPV.

Can you let us know how Mafic are getting on as the Australian team are on standby to re-run the models

Thanks

John

John Tan

Partner | Corporate Finance

Deloitte

Level 12, 20 Customhouse Quay, PO Box 1990, Wellington 6140, New Zealand

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End of duplicate copy

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From: 9(2)(a)
To: [Campbell Will](#); [Sam Ponniah](#); [Tan, John](#)
Cc: [x@xx](#); 9(2)(a)
Subject: RE:Mafic and WICS data
Date: Tuesday, 20 April 2021 9:10:52 am
Attachments: [image001.png](#)
[image002.png](#)
[image003.png](#)
[image004.png](#)
[image005.png](#)
[image006.png](#)
[image007.jpg](#)
[image009.jpg](#)
[image011.jpg](#)
[image013.png](#)
Importance: High

Campbell and Sam,

Can we not still use the high counterfactual scenario and state if we relax some of the constraints under the counterfactual this is what the capex profile could look like?

If we cannot use the high counterfactual data, the implication of this is that we cannot use the current High Scenario (Sim 4). We cannot use Sim 2 as a high scenario because it's too optimistic.

| Sim | SysTrans | Counterfactual | Incremental |
|--|--------------------------|---|---|
| Sim 1- Low | SysTrans_low_O = \$120b | Counterfactual_C_low_O = \$55b (Constrained - low) | Incremental Capex SL vs CC_low = \$65b |
| Sim 2- | SysTrans_high_O = \$185b | Counterfactual_C_low_O = \$55b (Constrained - low) | Incremental Capex SH v CC_low = \$130b |
| Sim 3 | SysTrans_low_O = \$120b | Counterfactual_his_O = \$44b (Historic) | Incremental Capex SL v C_his = \$76b |
| Sim 4 | SysTrans_high_O = \$185b | Counterfactual_C_high_O = \$69b (Constrained - high) | Incremental Capex SH v CC_high = \$116b |
| Sim 4 (labour supply constraint sensitivity) | Per sim 4 | Per sim 4 | Per sim 4 |

Ultimately, we need a high scenario. If we cannot use the counterfactual high scenario- what alternative would you suggest that you are comfortable with?

Can you please confirm this urgently.

Best,

9(2)(a)

Director | Corporate Finance

Deloitte

Level 12, 20 Customhouse Quay, PO Box 1990, Wellington 6140, New Zealand

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From: Campbell Will <9(2)(a)@mafic.co.nz>
Sent: Tuesday, 20 April 2021 8:40 AM
To: 9(2)(a)@deloitte.co.nz; Sam Ponniah <9(2)(a)@martinjenkins.co.nz>; Tan, John 9(2)(a)@deloitte.co.nz
Cc: xxxxx.xxxxxxxx@xxx.xxx.xx, 9(2)(a)@deloitte.co.nz
Subject: [EXT] RE: Mafic and WICS data

Yes, but because the constraints are limiting capex for all councils under the low scenario, they shouldn't be able to increase capex under the higher forecast.



Campbell Will
Mafic Partners Limited
M: 9(2)(a)

From: 9(2)(a)@deloitte.co.nz
Sent: Tuesday, 20 April 2021 8:34 am
To: Campbell Will <9(2)(a)@mafic.co.nz>; Sam Ponniah <9(2)(a)@martinjenkins.co.nz>; Tan, John 9(2)(a)@deloitte.co.nz
Cc: xxxxx.xxxxxxxx@xxx.xxx.xx, 9(2)(a)@deloitte.co.nz
Subject: RE:Mafic and WICS data

Importance: High

Campbell,

Can you please clarify this. Our team is already conducting the CGE simulations based on both the high and low counterfactuals.

Is the difference between the high and low scenario driven by WICS' high and low capex profiles?

Best,

9(2)(a)
[Redacted]

Director | Corporate Finance

Deloitte

Level 12, 20 Customhouse Quay, PO Box 1990, Wellington 6140, New Zealand

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From: Campbell Will <[redacted]@mafic.co.nz>
Sent: Tuesday, 20 April 2021 8:22 AM
To: [redacted] <[redacted]@deloitte.co.nz>; Sam Ponniah <[redacted]@martinjenkins.co.nz>; Tan, John <[redacted]@deloitte.co.nz>
Cc: xxxxx.xxxxxxxxx@xxx.xxx.xx
Subject: [EXT] RE: Mafic and WICS data

Hi [redacted]

The difference between the low and high is the WICS capex forecast. Under the scenario provided last night, capex for all councils was constrained under the low scenario - so they shouldn't be able to invest more under the high capex scenario (ie capex should be the same under both scenarios). I would suggest just using the low counterfactual and ignore the high counterfactual.

Kind regards,
Campbell



Campbell Will
Mafic Partners Limited
M: [redacted]

From: [redacted] <[redacted]@deloitte.co.nz>
Sent: Monday, 19 April 2021 7:51 pm
To: Campbell Will <[redacted]@mafic.co.nz>; Sam Ponniah <[redacted]@martinjenkins.co.nz>; Tan, John <[redacted]@deloitte.co.nz>
Cc: xxxxx.xxxxxxxxx@xxx.xxx.xx
Subject: RE:Mafic and WICS data

Thanks **Campbell**- The updated data works. Thanks again for amending this. Can you please confirm what is the differentiation between the Low Counterfactual Scenario and the High Counterfactual Scenario.

Sam: Below are the simulations that we will run- can you please confirm that you are comfortable with this.

Below is a summary of the **new sims to be run:**

| Sim | SysTrans | Counterfactual | Incremental |
|----------------|--------------------------|--|---|
| Sim 1 | SysTrans_low_O = \$120b | Counterfactual_C_low_O = \$55b (Constrained - low) | Incremental Capex SL vs CC_low = \$65b |
| Sim 2 | SysTrans_high_O = \$185b | Counterfactual_C_low_O = \$55b (Constrained - low) | Incremental Capex SH v CC_low = \$130b |
| Sim 3 | SysTrans_low_O = \$120b | Counterfactual_his_O = \$44b (Historic) | Incremental Capex SL v C_his = \$76b |
| Sim 4 | SysTrans_high_O = \$185b | Counterfactual_C_high_O = \$69b (Constrained - high) | Incremental Capex SH v CC_high = \$116b |
| Sim 4 (labour) | Per sim 4 | Per sim 4 | Per sim 4 |

| | | | |
|--------------------------------|--|--|--|
| supply constraint sensitivity) | | | |
|--------------------------------|--|--|--|

And the **old** sims, just for reference:

| Sim | SysTrans | Counterfactual | Incremental |
|--|--------------------------|---|--|
| Sim 1 | SysTrans_low_O = \$120b | Counterfactual_C_low_O = \$78b (Constrained - low) | Incremental Capex SL vs CC_low = \$42b |
| Sim 2 | SysTrans_high_O = \$185b | Counterfactual_C_low_O = \$78b (Constrained - low) | Incremental Capex SH v CC_low = \$107b |
| Sim 3 | SysTrans_low_O = \$120b | Counterfactual_his_O = \$44b (Historic) | Incremental Capex SL v C_his = \$76b |
| Sim 4 | SysTrans_high_O = \$185b | Counterfactual_C_high_O = \$95b (Constrained - high) | Incremental Capex SH v CC_high = \$90b |
| Sim 4 (labour supply constraint sensitivity) | Per sim 4 | Per sim 4 | Per sim 4 |

Please let me know if you have any questions.

Best,

9(2)

From: Campbell Will 9(2)(a) @mafic.co.nz>

Sent: Monday, 19 April 2021 6:16 PM

To: 9(2)(a) @deloitte.co.nz>; Sam Ponniah <9(2)(a) @martinjenkins.co.nz>; Tan, John <9(2)(a) @deloitte.co.nz>

Cc: xxxxx.xxxxxxxxxx@xxx.xxxx.xx

Subject: [EXT] RE: Mafic and WICS data

Hi 9(2)(a) /John

See updated workbook attached. I have reverted back to the WICS forecast (ie without the scaled front end) and used the debt profile to smooth out the hockey stick shape. This should align more closely to the previous version you were using.

Kind regards,

Campbell



Campbell Will
Mafic Partners Limited
M: 9(2)(a)

From: 9(2)(a) @deloitte.co.nz>

Sent: Monday, 19 April 2021 4:15 pm

To: Sam Ponniah <9(2)(a) @martinjenkins.co.nz>; Tan, John 9(2)(a) @deloitte.co.nz>

Cc: xxxxx.xxxxxxxxxx@xxx.xxxx.xx Campbell Will <9(2)(a) @mafic.co.nz>

Subject: RE:Mafic and WICS data

Thanks Sam. **The missing image below is the same image which is on page 165.**

As discussed, attached is a workbook calculating the incremental capex spend by region, 2022 to 2051 in real terms. Please see the first two worksheets and see the yellow highlighted rows where incremental capex is either zero or negative in some years.

We also note that the TA profiles and levels are significantly different to the initial data. Below is a summary table of the counterfactual investment values we had before the low scenario (i.e. the total investment over 30 years in real terms) and the difference with the current data by TA.

| |
|--|
| |
|--|

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Best,

9(2)(a)
(a)

Director | Corporate Finance

Deloitte

Level 12, 20 Customhouse Quay, PO Box 1990, Wellington 6140, New Zealand

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From: Sam Ponniah <9(2)(a)@martinjenkins.co.nz>

Sent: Monday, 19 April 2021 3:56 PM

To: Tan, John <9(2)(a)@deloitte.co.nz>

Cc: 9(2)(a)@deloitte.co.nz; xxxxx.xxxxxxxx@xxx.xxxx.xx

Campbell Will <9(2)(a)@mafic.co.nz>

Subject: [EXT] RE: Mafic and WICS data

Hi John, is it worth us having a quick discussion so we're clear on this – there's still a little confusion on our end as to how we've ended up with a negative shock. Campbell can run the numbers reasonably quickly but we just need to make sure we're agreed on the policy parameters.

We're free at 4.30pm for a quick chat if that works for you?

Cheers

Sam

Sam Ponniah | Senior Consultant

MartinJenkins

M 9(2)(a) T 9(2)(a)

From: Tan, John <9(2)(a)@deloitte.co.nz>

Sent: Monday, 19 April 2021 3:45 PM

To: Sam Ponniah <9(2)(a)@martinjenkins.co.nz>

Cc: 9(2)(a)@deloitte.co.nz; xxxxx.xxxxxxxx@xxx.xxxx.xx

Campbell Will <9(2)(a)@mafic.co.nz>

Subject: Mafic and WICS data

Hi Sam

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Can you let us know how Mafic are getting on as the Australian team are on standby to re-run the models

Thanks

John

John Tan

Partner | Corporate Finance

Deloitte

Level 12, 20 Customhouse Quay, PO Box 1990, Wellington 6140, New Zealand

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From: [Tan, John](#)
To: [Sam Ponniah](#); [Dent, Alan](#); 9(2)(a)
Cc: [Nick Davis](#)
Subject: RE:Comments on draft report
Date: Tuesday, 20 April 2021 2:33:28 pm
Attachments: [image001.png](#)
[image002.png](#)
[image003.png](#)
[image004.png](#)
[image005.png](#)

Hi Sam

We'll proceed on the current format. I'll also endeavour to get one of our Comms team to have a look at the report from a non technical perspective – although it is a little bit challenging as we need the numbers to stop moving – which I think based on today's conversations, they hopefully have. Approximately when on Friday do you think you intend to get the draft out to stakeholders?

John

From: Sam Ponniah <9(2)(a)> @martinjenkins.co.nz>

Sent: Tuesday, 20 April 2021 1:01 PM

To: Tan, John 9(2)(a) @deloitte.co.nz>; Dent, Alan <9(2)(a) @deloitte.co.nz>; 9(2)(a) @deloitte.co.nz>

Cc: Nick Davis <xxxx.xxxxxx@xxx.xxxx.xx>

Subject: [EXT] RE: Comments on draft report

Hi John

Thanks for your email and the suggestion of developing a summary report for public consumption. I've discussed with Nick and we're still of the view that the full report should be released for several reasons:

- It is an important part of the evidence base and there will be a high public interest in it, particularly from across the sector
- The findings of the report will feature in advice to Ministers, the RIA and in any public-facing information and communication related to reform and there is a need to be transparent about the basis for those findings
- If it isn't released, it is likely the report will get OIA'd in which case we are unlikely to have sufficient grounds for withholding it, particularly given the high public interest threshold that exists under the Act
- We would prefer for the focus this week to be on the drafting of the full report and interpretation of results from the model runs given the importance of getting this right

You raise a valid point in relation to mitigating the risk of unfair or misinformed challenges to the work and underlying assumptions. As is common in any complex modelling of this sort, we think it's best to mitigate this risk by focussing on the description of the method / results in the main report and ensuring that any limitations are clearly outlined and key judgements are explained so that we are front-footing any potential challenges. DIA will also seek to do this through its usual comms channels (media briefings, supporting comms, Q&As etc) that would follow a proactive release and we can share draft comms material with you as it relates to your report if helpful.

Cheers

Sam

Sam Ponniah | Senior Consultant

MartinJenkins

M 9(2)(a) T 9(2)(a)

From: Tan, John <[redacted]@deloitte.co.nz>
Sent: Sunday, 18 April 2021 8:04 PM
To: Sam Ponniah <[redacted]@martinjenkins.co.nz>; Dent, Alan <[redacted]@deloitte.co.nz>; [redacted] <[redacted]@deloitte.co.nz>
Cc: Nick Davis <[redacted]>
Subject: RE:Comments on draft report

Hi Sam

Thanks for sending through the consolidated feedback. The majority of points look fairly straightforward to incorporate. We might come back to you on a handful of points once we have considered further. We do need those updated capex figures from Mafic on Monday to re-run the modelling, so if you could please give us an update on this in the morning.

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Kind Regards

John

From: Sam Ponniah <[redacted]@martinjenkins.co.nz>
Sent: Friday, 16 April 2021 10:26 PM
To: Tan, John <[redacted]@deloitte.co.nz>; Dent, Alan <[redacted]@deloitte.co.nz>; [redacted] <[redacted]@deloitte.co.nz>
Cc: Nick Davis <[redacted]>
Subject: [EXT] Comments on draft report

Hi John, Alan and [redacted]

Thank you for the time earlier today to discuss the draft report. As mentioned at the meeting our main concerns are to do with the dramatic reduction in employment in the water sector which seems at odds with the current thinking around what a transition path might look like but also poses a credibility risk in terms of the scale of reduction that is indicated immediately post reform which looks unrealistic. As agreed we'll have another look at the investment profiles given these appear to be driving these results to look at better reflecting the likely transition / ramping up of spending, consistent with the current policy thinking and also the insights from the second part of the report.

As also mentioned at the meeting, I have consolidated annotated comments throughout the report based on the feedback received internally. These are largely points of clarification, terminology / framing and some questions to consider when finalising the report. They should be relatively straightforward to address but happy to discuss any of these if helpful to clarify the intent/thinking.

Cheers

Sam

Sam Ponniah | Senior Consultant

MartinJenkins

M [redacted] T [redacted]



Level 16, AIG Building, 41 Shortland St, **Auckland**
Level 1, City Chambers, Cnr Johnston & Featherston Sts, **Wellington**

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Cc: Nick Davis 9(2)(a) @dia.govt.nz>

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Cheers

Sam

Sam Ponniah | Senior Consultant

MartinJenkins

M 9(2)(a) T 9(2)(a)

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Sent: Sunday, 18 April 2021 8:04 PM
To: Sam Ponniah <[redacted]@martinjenkins.co.nz>; Dent, Alan <[redacted]@deloitte.co.nz>; [redacted] <[redacted]@deloitte.co.nz>
Cc: Nick Davis <[redacted]@dia.govt.nz>
Subject: RE:Comments on draft report

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Kind Regards

John

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Sent: Friday, 16 April 2021 10:26 PM
To: Tan, John <[redacted]@deloitte.co.nz>; Dent, Alan <[redacted]@deloitte.co.nz>; [redacted] <[redacted]@deloitte.co.nz>
Cc: Nick Davis <[redacted]@dia.govt.nz>
Subject: [EXT] Comments on draft report

Hi John, Alan and [redacted]

Thank you for the time earlier today to discuss the draft report. As mentioned at the meeting our main concerns are to do with the dramatic reduction in employment in the water sector which seems at odds with the current thinking around what a transition path might look like but also poses a credibility risk in terms of the scale of reduction that is indicated immediately post reform which looks unrealistic. As agreed we'll have another look at the investment profiles given these appear to be driving these results to look at better reflecting the likely transition / ramping up of spending, consistent with the current policy thinking and also the insights from the second part of the report.

As also mentioned at the meeting, I have consolidated annotated comments throughout the report based on the feedback received internally. These are largely points of clarification, terminology / framing and some questions to consider when finalising the report. They should be relatively straightforward to address but happy to discuss any of these if helpful to clarify the intent/thinking.

Cheers

Sam

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