INFRASTRUCTURE

PAVING THE WAY

Learning from New Zealand's Past to Build a Better Future

Matthew Birchall

THE NEW ZEALAND INITIATIVE

www.nzinitiative.org.nz

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Published by
The New Zealand Initiative
PO Box 10147
Wellington 6143
New Zealand
www.nzinitiative.org.nz

ISBN
978-1-7386009-0-8 (PRINT)
978-1-7386009-1-5 (ONLINE)

RR75

Printing by TBD Design

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About the New Zealand Initiative

The New Zealand Initiative is an independent public policy think tank supported by chief executives of major New Zealand businesses. We believe in evidence-based policy and are committed to developing policies that work for all New Zealanders.

Our mission is to help build a better, stronger New Zealand. We are taking the initiative to promote a prosperous, free and fair society with a competitive, open and dynamic economy. We develop and contribute bold ideas that will have a profound, positive, long-term impact.

ABOUT THE AUTHOR

Matthew is a Research Fellow at The New Zealand Initiative, focusing on infrastructure and housing.

A historian by training, Matthew's writing on the British Empire has been published in the *Journal of Global History and Global Intellectual History*. He was awarded the Royal Historical Society's prestigious Alexander Prize in 2021 for the best scholarly article based upon original historical research.

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ACKNOWLEDGEMENTS

My thanks to Oliver Hartwich for providing invaluable feedback on earlier drafts. Michael Bassett, John Boshier, Eric Crampton, Gary Hawke, Dave Heatley and Scott Wilson were generous with their time and expertise. My thanks to them all. Steven Joyce kindly sat down to talk through the finer points of UFB, which enabled me to get to grips with the more recent past. Finally, I would like to thank Nick Leggett for generously writing a foreword and for helping to launch the report.

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Foreword

There's that old chestnut about stopping digging when you are in a hole. That is exactly what New Zealand must do if it is to fundamentally change decades of underscoping, underscaling and underinvesting in our public infrastructure.

Dr Matthew Birchall's report perfectly orientates us to the first step of the change we require – he shows us where we have come from.

New Zealand once built for the future, delivered ambitious infrastructure, and partnered with the private sector.

No longer.

It's clever to enlist a historian as our guide on this journey. New Zealand's past is not so far behind us, allowing Kiwis to see the benefits – and the pitfalls – of previous investments.

New Zealand has fallen into some bad habits when it comes to infrastructure policy. Where and why did we lose our way? How did we become entangled in red tape and drive the private sector away? When did we lose the courage to take action? And why have we centralised everything?

Matthew's report explores these big questions.

As New Zealand grows, it is vital that we build bipartisan support on critical infrastructure. This entails achieving broad consensus among our main political parties to prevent disruption caused by changing governments in our short electoral cycle. It also means bolstering the influence of Te Waihanga / The New Zealand Infrastructure Commission, the independent body that advises government and promotes projects.

Above all, it is essential that New Zealand's water services and major transport projects are not subject to political influence. Matthew's report vividly demonstrates the potential consequences when infrastructure policy is dictated by political whims.

The report is also a timely stock-take of what has worked well and what has gone wrong.

While it may be tempting to believe that relying solely on government for building and funding everything will somehow just work out in the end, this report draws on examples such as Julius Vogel's rail network and Think Big to underscore the risks of accumulating significant debt to finance poorly planned infrastructure projects.

Instead, we should allow private sector financing to guide and construct projects, extracting efficiency that benefits the nation and enables Kiwis to lead healthy and fulfilling lives. It is crucial to prioritise infrastructure that drives economic productivity. Matthew's insights underscore the fact that the government lacks all the answers and the necessary funds. Unless we change course, we are in danger of repeating history's missteps.

The same goes for localism.

New Zealand has fallen into a trap of centralising infrastructure policy. Wellington will always play a role in the provision of big-ticket items like our national road network, but shifting power away from the capital when appropriate would lead to better outcomes.

Matthew's discussion of Taranaki's success with toll gates and the Auckland Harbour Bridge's unique financing model underscores the power of local initiatives in driving infrastructure progress.

By actively involving local stakeholders in decision-making and resource allocation, we can harness the collective strength of our communities and bridge the gap between ambitious projects and available funds.

Finally, Matthew's report serves as a clarion call for New Zealand to return to the cultural mindset that drove its early progress.

New Zealand was once a nation that celebrated the completion of infrastructure projects, fostering a sense of pride and community spirit. Rekindling this passion for building and simplifying the bureaucratic process is essential.

We must replace excessive rules and regulations with a climate that embraces growth, allowing us to address housing shortages, improve transport networks, and adapt to the challenges of climate change.

Matthew Birchall provides us with a glimpse of our past, reminding us that we were once builders. This report makes a compelling case for returning to the principles of private enterprise, localism, and a positive attitude towards growth and development.

By drawing inspiration from our past, we can recapture the spirit of building that once defined us and pave the way for a better future.

Nick Leggett
CEO of Infrastructure New Zealand

Introduction

Good infrastructure is essential for modern life.

Just think about your day.

Maybe you caught the train to work or picked up the kids from school in your car. You hopefully made use of the water network for your daily shower. And you probably charged your phone or laptop using a power grid.

But have you ever wondered where this infrastructure came from?

While we often talk about New Zealand's current infrastructure woes, we sometimes neglect the valuable lessons from our past. That is a missed opportunity.

In the 19th century, New Zealand's early settlers overcame an acute infrastructure deficit by building roads, railways, towns, and cities without letting bureaucracy hold them back. We still use their infrastructure today.

As we confront our infrastructure challenges and a $210 billion deficit, it is essential to draw upon history to shape a better future.[1]

This report reframes New Zealand's infrastructure debate, using history to offer insights and guidance. It highlights key infrastructure success stories, from the laying of toll roads in the Taranaki in the 19th century to the broadband rollout in the 21st century. It also explores a number of cautionary tales to help us avoid past mistakes.

The report asks three big questions about New Zealand's infrastructure legacy.

1. Has private enterprise or state-led development been more successful?

Government borrowing may appear to offer a quick fix for our infrastructure deficit, but it would be financially irresponsible and may result in a misallocation of resources. History shows that large-scale public infrastructure projects, such as those championed by Premier Julius Vogel (1873–1875) and Prime Minister Robert Muldoon (1975–1984), can have disastrous economic consequences in the long run. On the contrary, the broadband rollout and the construction of the first bridge over the Waimakariri River exemplify the advantages of private capital.

2. Have projects fared better under Wellington or local authorities?

Advocates of a reinvigorated Ministry of Works say it could coordinate and manage large-scale infrastructure projects more effectively than local authorities or private enterprise. They contend that only a centralised approach can complete projects efficiently and build infrastructure to a high standard across the country. However, this perspective overlooks examples of historical inefficiencies and neglect of local needs that have accompanied past centralised infrastructure policies.

Greater localism empowers communities to custom-build projects for more responsive and targeted development.

3. What role does culture play in fostering growth and development?

New Zealanders used to take pride in getting things done. As one of the final projects of the Enlightenment, New Zealand was established with the conviction that progress was possible. The nation's founding spirit has diminished, with projects now often delayed by lengthy consenting processes and strict regulations. This report aims to recapture the positive approach to growth and development that underpinned New Zealand's most enduring infrastructure achievements.

Chapter 1 traces the national rail network Vogel helped build in the 1870s. Limited regulation and favourable immigration policy allowed Vogel to deliver on his ambitious infrastructure promises. Yet his centralised approach to public works shows how Vogel prioritised political calculations over local knowledge, resulting in inefficient spending on rail lines without a clear economic rationale. Furthermore, his government's extensive borrowing to fund infrastructure led to significant debt that took years to repay.

Two thematic chapters on roading (Chapter 2) and housing (Chapter 3) follow. How did we go from dirt tracks to modern motorways, provincial toll roads to Transmission Gully? As New Zealand transitions to electric and other low-carbon vehicles, it is crucial to study the origins of our road network. And what about the places we call home? The overview of housing places the current crisis in context. New Zealand delivered in the 19th and 20th centuries because development was prioritised over rules and regulations.

Chapter 4 cautions against overzealous state intervention. The focus here is Robert Muldoon's Think Big venture funding massive industrial projects through government borrowing. Localism and private enterprise come next. Chapter 5 explores the innovative funding mechanisms behind the construction and early operation of the Auckland Harbour Bridge, while Chapter 6 brings us to the efficient broadband rollout.

A concluding chapter telescopes lessons for the future. Embracing private enterprise, local knowledge, and a cultural attitude that welcomes growth and development can help us overcome our current roadblocks.

The historical examples in this report illustrate how New Zealand was once able to deliver infrastructure. There is no reason why we cannot do it again.

CHAPTER 1:
Steam and steel

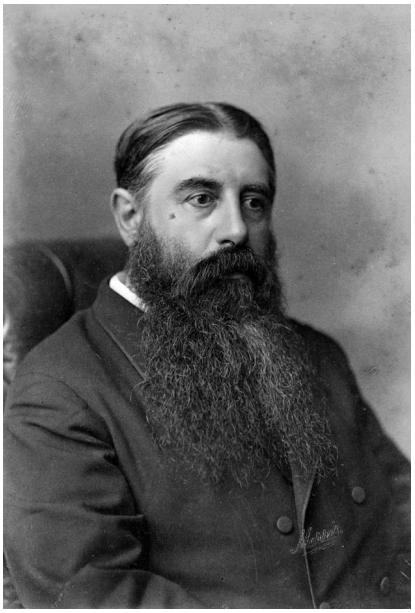
Julius Vogel is the godfather of New Zealand infrastructure. His Public Works Policy (PWP) transformed the country beyond recognition, by spurring on extensive investment in transport infrastructure such as railways, telegraph lines, roads and bridges. Vogel's signature policy, the PWP, was a catalyst in New Zealand's evolution from a relatively isolated and undeveloped colony into a more connected, modern and prosperous nation.[2]

Many historians have hailed Vogel as a visionary. Indeed, Fabian social reformer William Pember Reeves went so far as to call Vogel an "imaginative materialist."[3] Reeves' characterisation captures something of Vogel's ability to occupy that elusive middle-ground between practical politics and the realm of the possible.

However, Vogel was a contentious figure even in his day and his legacy is mixed. According to Vogel's biographer, he was labelled a "snob," a "carpetbagger," and a "corrupting influence in politics," while some referred to him as an "impudent adventurer" who played fast and loose with the country's purse strings.[4] Vogel was a gifted but divisive personality.

This chapter explores the valuable lessons that can be gleaned from Vogel's experience in constructing New Zealand's railway system. While identifying two crucial factors that contributed to his success – limited regulation, and favourable immigration policies – it also examines the substantial shortcomings of his centralised strategy for the railways.

Vogel rode roughshod over local opinion and prioritised political calculations in his decision-making. This led to inefficient and unnecessary spending without a sound economic rationale. In addition, his government's extensive borrowing to fund its public works programme burdened the country with significant debt, which took many years to repay. His overzealous involvement in the railways ultimately set back New Zealand's long-term economic trajectory.



Sir Julius Vogel (1835–1899), Premier and Treasurer, PAColl-0439-1, Alexander Turnbull Library, Wellington, New Zealand.

Despite these failings, Vogel successfully built a national rail network. The PWP holds crucial lessons about completing large-scale projects. When Vogel announced his rail project in 1870, only 74 km of fully operational train lines existed.[5] And these were the success stories. In the mid-1860s, Southland's attempt to build a wooden railway ended in utter fiasco and bankruptcy.[6]

By the end of the 1870s, Vogel's ambitious rail programme had catapulted the rail network to over 2,000 km, with new tracks crisscrossing every province. The revolutionary effects of

steam and steel were undeniable, and the country was abuzz with the newfound ability to conquer distance. Rail historian André Brett notes that the PWP's success was evident in the train tracks extending from cities deep into the hinterlands like tentacles.[7] For the first time, the New Zealand economy was integrated into a nationally unified transport system.[8] The industrial revolution had well and truly arrived.

The speed and scale of the PWP was staggering. How was Vogel able to build so much, so fast?

In late 19th century New Zealand, the legal and regulatory system was relatively undeveloped and sparse. Few regulations applied to infrastructure projects, and the government could pursue projects with greater flexibility and discretion than today. Without a regulatory thicket to navigate, Vogel was free to construct with speed and certainty – unhindered by red tape.

Back then, the *Resource Management Act* (RMA) and other legislation that could potentially derail Vogel's plans did not exist. The *Immigration and Public Works Act 1870* bestowed upon the government broad land acquisition powers for public purposes, including constructing railways. Public works were unfettered by strict regulations and consenting processes.[9] Vogel and his government could build almost straight away and with relative impunity.

Undertaking a similar large-scale transportation project today would undoubtedly face significant difficulties. Far more stringent rules regulate everything from land acquisition, environmental impact assessments, and worker safety. While regulations protect the public and the environment, they also delay and increase costs. It is nigh on impossible now to build ambitious projects like those Vogel did.

A construction team on the North Island Main Trunk Line, Volcanic Plateau, 1908, 1/1-007689-G, Alexander Turnbull Library, Wellington, New Zealand.

Vogel's immigration drive also stimulated the swift construction of New Zealand's rail network. This point is worth keeping in mind as we grapple with our own labour shortage in the wake of Cyclone Gabrielle.

Building a national rail network from the ground up required far more labourers (and skilled labourers) than New Zealand had. Vogel decided to increase the labour force through assisted immigration. To encourage people to come to New Zealand and work, the government offered financial incentives such as free or subsidised passage, help with finding a job, and even land.[10]

People poured into the country. Jock Phillips, the distinguished New Zealand historian and encyclopaedist, calculates that just under 300,000 Europeans arrived in New Zealand between 1871 and 1886. In 1874 alone, there was a net increase of 38,000 immigrants, a figure that was surpassed only during the giddy highs of globalisation in 2002.[11]

The new arrivals were crucial to the success of the Public Works Policy. At the time, there was a shortage of skilled workers in New Zealand. Many of the immigrants who came brought with them expertise in engineering and construction, as well as a willingness to work hard in difficult conditions.

Indeed, Vogel's immigrants worked on all aspects of the rail network, from constructing tunnels and bridges to laying tracks and operating trains. They also played a key role in the maintenance and repair of the railways to ensure efficient functioning over the years. Without their contribution, the rail network would have been delayed, less efficient, and much more difficult and expensive to build.

It was a principle dear to Vogel's heart. "From whatever point of view you regard it – whether from the highest social or the narrowest pecuniary view – immigration is a profit to the State," Vogel noted in his now famous 1870 financial statement.[12]

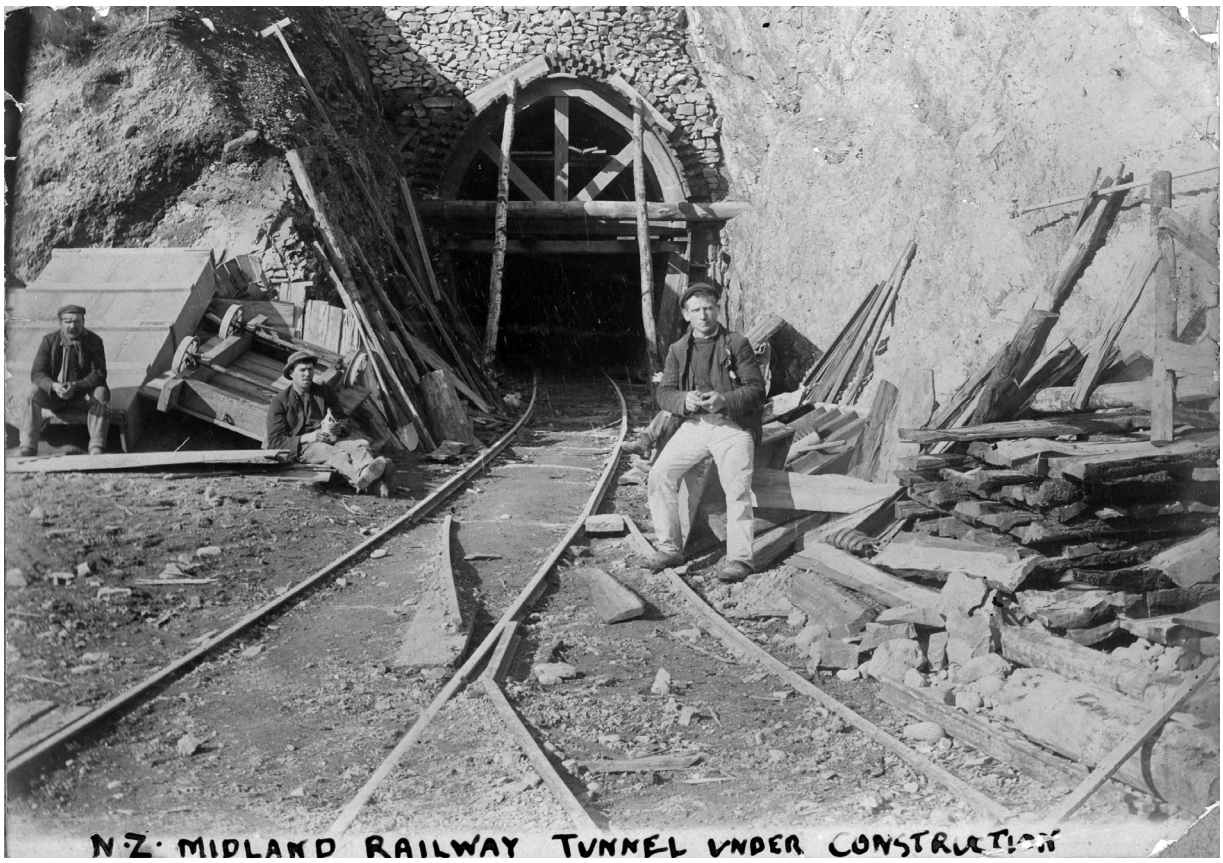
Vogel knew better than most how indispensable immigration was to large-scale construction. The workers who came to New Zealand made his PWP possible – something to keep in mind for our own rebuild.

However, Vogel's success in establishing a consolidated rail system came with some drawbacks. Perhaps the most lamentable aspect of his rail policy was the excessive politicisation of the decision-making process. Rail routes were frequently constructed for political expediency rather than sound economic reasons. In fact, Minister of Works John D. Ormond was even accused of manipulating the route of a rail line to boost the value of his property.[13]

Then there was the West Coast railways saga in the 1880s. Despite numerous reports stating its lack of economic viability, the Stout-Vogel ministry connected the West Coast to Nelson and Canterbury.[14] It was not a coincidence that railway lines were eventually approved for construction despite frequent scrutiny. On the contrary, they were built because too many individuals had a political interest in ensuring their completion.

After a government-sponsored railway failed to materialise, Vogel adroitly manoeuvred two bills through the House giving generous land concessions to any private company that could construct the lines instead. This was accompanied by further concessions and a memo that gave a distorted view of the project's prospects.[15] This caused a major controversy. The *Southland Times* called the project "a gigantic folly," while the *New Zealand Herald* said it was "nothing short of wild speculation."[16] They were not wrong.

The New Zealand Railway Company was formed in 1886 to take on the ambitious task of



A pensive look. Otira railway tunnel under construction, c. 1920, PAColl-0678-01, Alexander Turnbull Library, Wellington, New Zealand.

turning the railways into a profitable enterprise. Historian Neill Atkinson notes that by 1984, the firm had built 120 km of lines for £1.3 million.[17] Such a steep price would not give a return on investment. The government took over the lines the following year before a lengthy legal dispute about compensation began. Although the Midland line was finally completed in 1923, the route between Īnangahua and Nelson was abandoned in 1931.[18] Had Vogel and his backers not pushed ahead with the West Coast railways, a substantial amount of taxpayer money could have been saved.

Equally problematic was Vogel's excessive borrowing. In fact, Vogel's opponents referred to his public works policy as an "orgy of gambling and extravagance"[19] – and it is hard to disagree. Just as Prime Minister Robert Muldoon plunged the country into economic crisis in the 1980s, so did Vogel imperil New Zealand's prospects by saddling the country with debt. Between 1870 and 1876 alone, Vogel borrowed £10 million from the United Kingdom (approximately $1.5 billion today). These infrastructure excesses damaged the country's fiscal position, with severe economic consequences.

When the global economic depression hit in the 1870s, the New Zealand economy suffered a severe blow. The country's dependence on the PWP left it vulnerable to shocks and fluctuations in the world market. Domestic economic activity contracted sharply, and many of Vogel's construction projects were postponed or abandoned. This led to mass unemployment and social unrest, from which the country took several years to recover.[20]

In truth, the economics of rail in New Zealand was never as robust as Vogel insisted. It was clear by the late 1870s that the rail network

was not generating sufficient revenue to cover its operating costs and investment needs.[21] Mounting public pressure demanded an inquiry into the state of the railways. The government responded by appointing a Royal Commission, which published a damming report in 1880. It found that state involvement in rail operations had led to the building of too many lines without corresponding demand.[22]

Despite the Commission's findings, the rapid pace of rail construction continued largely unchecked. The network expanded relentlessly until the 1930s, mostly disregarding financial sustainability. Only then did the rate of construction start to slow down, and by 1952, the network had reached its maximum length of 5,695 km.[23]

Insights from Vogel's rail development are relevant even in the 21st century. In particular, the PWP proves what light regulation and favourable immigration can achieve. It was in this context that Vogel was able to build approximately 1,300 kms of railway between 1870 and 1880, thereby transforming New Zealand from a fledgling antipodean colony into a modern nation. As Raewyn Dalziel notes, Vogel "contributed more to the development of New Zealand and possessed a greater vision of its place in the Pacific, and in the world, than any other politician of his time."[24]

However, that vision came at great cost. Overriding local interests, Vogel centralised power and ignored detractors whose opinions ran counter to his grand ideas. The result was a bloated and expensive rail network that New Zealand did not need. Many of these policy dilemmas continue to plague ambitious infrastructure projects to this day.

Vogel's story encapsulates both the pitfalls and possibilities of painting on a big canvas.

CHAPTER 2:

The road less travelled

Few experiences are as iconic as the classic Kiwi road trip. Most New Zealanders can recall childhood trips along the coast or deep into the bush, while tourists marvel at the scenic beauty that greets them along the way as they meander through the country in their lurid green campervans. But roads are much more than a mode of transport. They are paragons of progress and development that have shaped modern New Zealand. As journalist Vaughan Yarwood notes, the introduction of the car led to a flurry of road-building that shattered the country's "Age of Isolation."[25]

Today, driving is ubiquitous. More than 80% of New Zealanders commute by car, truck or motorcycle: State Highway 1 in central Auckland alone carries more than 200,000 vehicles a day.[26] But how did this extensive road network develop and what lessons can we learn from its expansion and evolution? This chapter takes a historical journey through New Zealand's highways, from its earliest roads to Transmission Gully. It argues that New Zealand's road transport policies have been most successful when they have incorporated road pricing strategies, and that greater flexibility in funding and financing would enable New Zealanders to better maintain this essential national asset moving forwards.

New Zealand's first roads, like much else in the young colony, were humble affairs. People and goods typically travelled by horse or bullock. Roads were often made of soil and clay. This changed only in the late 19th century when motor vehicles arrived and railways expanded.[27]

Some of New Zealand's earliest roads were bridle trails, named after the head-gear on a horse's harness. These narrow paths were later widened

Wellington urban motorway under construction at Shell Gully, c. 7 August 1974, PAColl-9150-24, Alexander Turnbull Library, Wellington, New Zealand.

to dray roads, which could accommodate a horse and cart, and were eventually strengthened with crushed stone.[28] Only the most heavily used roads were sealed with asphalt.

Suffice to say, road trips in early New Zealand were not for the faint of heart.

Not surprisingly, coastal shipping was the preferred mode of transport in the early 19th century, conveying people and goods between towns.[29] As a result, roads were relatively short and primarily connected ports to seaside settlements. New Zealand was still a maritime nation.[30]

Before European colonisation, Māori used waka (canoe) and mōkihi (raft) to travel along the country's many rivers and lakes, and even across the Pacific Ocean. If travel by water was not possible, Māori used walking paths cutting through easily navigable terrain. There were no roads, wheeled vehicles or horses. In the South Island, State Highway 1 hews closely to a traditional Māori coastal trail.[31]

Beach crossings were a popular mode of travel among Māori, and later Europeans. Colonial newspapers printed vital information about tides for those travelling by sand.[32] Today's punters who drive across the black sands of Muriwai and the golden sands of Ninety Mile Beach can trace their origins as a transit corridor back to the early 19th century.

The colonial state controlled trade and commerce, but it proved poor at building vital transport infrastructure. Money for public works was scarce, construction was sluggish, and roads that could have opened up the country were left unbuilt. When William Wakefield, the New Zealand Company's principal agent, tried to corral the government into building roads in Wellington, he was summarily disabused of the notion by Colonial Secretary Willoughby Shortland.[33] Europeans had founded a settlement there in 1840, but it was not until early 1854 that a road connecting the city to Petone started operating.[34] This happened only after Scottish immigrants arrived in 1862.

Such was the state of New Zealand's road network in the mid-19th century.

As late as 1871, Greymouth lacked a single dray road leading out of town. "All inland communication," notes Rosslyn J. Noonan, "was by boat, horse track, or the occasional tramway."[35] And it was not just the wild West Coast that struggled with land transport. A bullock wagon took a week to travel between Wellington and Greytown, a far cry from today's short drive. Aucklanders were likewise put off by the city's shoddy streets. An observer in the 1840s likened Queen Street to an "impassable bog," and thought that a trip along Karangahape Road was an adventure.[36] Some would still think the description apt.

Despite the colonial road system's flaws, its noteworthy achievements can inform modern land transport policies. For instance, during the 19th and early 20th centuries, toll revenues proved to be a successful mechanism for local authorities to finance road construction. Otago boasted 13 toll gates by 1868; toll gates proliferated in places as diverse as the Manawatu Gorge and Waipuku in the Taranaki. As Carl Walrond observes, the Taranaki was one of the most enthusiastic adopters of toll gates, with seven in 1906. And it made a difference, too. By the early 1900s, the Taranaki had some of the North Island's best roads; by 1935, two-thirds of its main roads were sealed.[37]

Unfortunately, this aspect of New Zealand's transport heritage is often overlooked. Today, New Zealand has only three toll roads operating.[38] Compare that with the 1860s when tolls were operating across the country – from the Great South Road in Auckland to Clarendon and West Taieri in Otago. William White, an entrepreneurial hotel owner from Kaiapoi, even built a drawbridge across the Waimakariri at his own expense, and collected toll fees for the permitted seven years. Impressed by White's success, the Canterbury Provincial Council awarded him the contract to build the first bridge across the Rakaia River.[39]

Even so, Kiwis never took to toll roads. As early as 1849, disgruntled Wellingtonians were having it out on the pages of the *New Zealand Spectator and Cook's Strait Guardian*, the first Wellington newspaper to establish a stable circulation.[40] And in 1890, the good people of Kaiwharawhara burned the toll gates and hurled them across the Hutt Road into a watery grave.[41]

Tollgate at Waipuku, Taranaki, c. 1920s, MNZ-1674-1/4-F, Alexander Turnbull Library, Wellington, New Zealand.

Nonetheless, tolls can augment our roading network today if managed well, just as they did in the past. Tolls provide a dedicated revenue stream to help fund road construction and maintenance. In addition, those who benefit from the service (road users) are also the ones who pay for it rather than the taxpayer, which better aligns incentives. Paying fees encourages drivers to use roads more efficiently.

Although tolls were instrumental in financing some of the finest roads in colonial New Zealand, it became apparent by 1920 that a new standard of roading was required.[42] The disjointed local road system was no longer adequate to meet the demands of the motor age. The government reacted to this challenge by enacting the *Main Highways Act 1922*, which Dudley Chapman justly describes as a pivotal moment in New Zealand's land transport history.[43] The legislation established the basis for a national roading network and ushered in a period of significant expansion.

By embedding the "user pays" principle, the *Main Highways Act* had a significant influence on road transport policy. The Act brought into existence the Main Highways Account, which received revenue from vehicle registration, license fees and tyre tax. When the *Motor Spirits Taxation Act 1927* was enacted, the account also received proceeds from petrol tax.

This expansion was overseen by the Main Highways Board, which was funded by central government and authorised to nominate arterial roads as main highways. And it did so energetically, much to the relief of the squeezed local authorities who had previously struggled to pay for the necessary construction and upkeep of through roads. The Board initially built 5,954 miles of main highways, and by 1952 that figure had reached 12,723 miles.[44]

However, New Zealand's roads struggled to meet the growing needs of the day. Heavier vehicles and increased traffic were not accompanied by parallel investment in the country's roading stock, and the neglect only deepened during World War II.[45] By the late 1940s, New Zealand's roads were in a parlous state.

Improved methods of funding land transport were urgently required, but the subsequent wave of liberalisation did not occur until the 1970s when road user charges (RUC) legislation was passed.

Relief workers excavating the hillside to improve the Akatarawa Road, January 1932, 1/2-084131-G, Alexander Turnbull Library, Wellington, New Zealand.

In the meantime, the focus shifted to motorway construction. In 1950, the Ministry of Works (MOW) achieved a significant milestone by building New Zealand's first motorway, connecting Takapu Road and Johnsonville. Another notable achievement came in 1954 when the Auckland to Wellington road was fully sealed, further enhancing the country's transportation infrastructure.

It is worth noting that the funding for motorways relied almost exclusively on general taxation, rather than a direct user-pays system. The motorways were funded through the government's general tax revenue and national budgetary allocations. This centralised funding approach had both advantages and limitations. It allowed for a unified approach to motorway development but limited the flexibility and direct accountability that a user-pays system could offer.

An emboldened National Roads Board replaced the Main Highways Board.[46] This more powerful agency worked closely with local authorities, establishing a Roading Division within the MOW with a specific emphasis on motorways. The 1960s witnessed a flourishing period of motorway construction as attention and resources were devoted to their development.

The MOW was disbanded in the late 1980s, more than a hundred years after its foundation in 1870. It could claim a lot of credit for the modernisation of the country's roads. From a smattering of unsealed roads in the 1870s, New Zealand now boasted a truly national road network that could take you from Cape Reinga at the tip of the North Island all the way to Bluff in the deep south.[47] Nonetheless, it was also increasingly clear that the MOW had outlived its utility. The department was squandering limited funds on poorly designed roads, and had become

bloated and inefficient. Reform aimed to increase accountability and transparency, with contracts for road construction tendered in a competitive process.[48]

However, recent land transport policy in New Zealand has squandered the opportunities opened up by the reforms of the 1980s. This is all the more regrettable given the high-level work undertaken in the 1990s, culminating in the *Land Transport Pricing Study*.[49] Unfortunately, the road pricing strategies devised during this period were not implemented for political reasons, resulting in long-lasting consequences for road users in New Zealand. As Patrick Carvalho notes, the "average New Zealand driver is not getting the best deal from the way roads are being funded. For one, we are paying for our streets and highways roughly the same way we did 50 years ago, despite technological advances and global best practice."[50]

This lack of progress in modernising road funding mechanisms is concerning, especially given the significant growth and development New Zealand has experienced. The National Land Transport Fund, which is currently funded from petrol excise duties, road user charges, and registration and vehicle license fees, supports the construction and maintenance of New Zealand's extensive road network in 2023. There are now nearly four million registered vehicles that can travel across 11,000 kilometres of state highways and 83,000 kilometres of local roads. The state highway network alone is worth more than $50 billion.[51]

Although New Zealand has come a long way since bridle paths made of soil and clay, it is high-time that we double down on the principles of road user-charging that have served us so well in the past. By implementing a more robust road pricing system, New Zealand can better plan and build the roads of tomorrow.

CHAPTER 3:
A place to call home

New Zealand is a house-proud nation. The "quarter-acre dream" and "a place in the sun" are some of the most evocative phrases in the Kiwi lexicon. For many, owning one's home is far more than just having a roof over one's head. It is the embodiment of success, the physical manifestation of what historian Gael Ferguson calls the New Zealand dream.[52]

Yet, in recent years, the dream has become a nightmare. New Zealand is home to some of the most expensive houses in the world. In fact, over the past 20 years real house prices here have grown faster than in any other OECD country.[53]

It has not always been this way. In the 19th century, we built towns and cities. For much of the 20th century, we found ways to house a growing nation. This chapter explores housing policy before the current crisis, and it does so in the conviction that knowing what has worked well in the past can help us grapple with the challenges of the present.

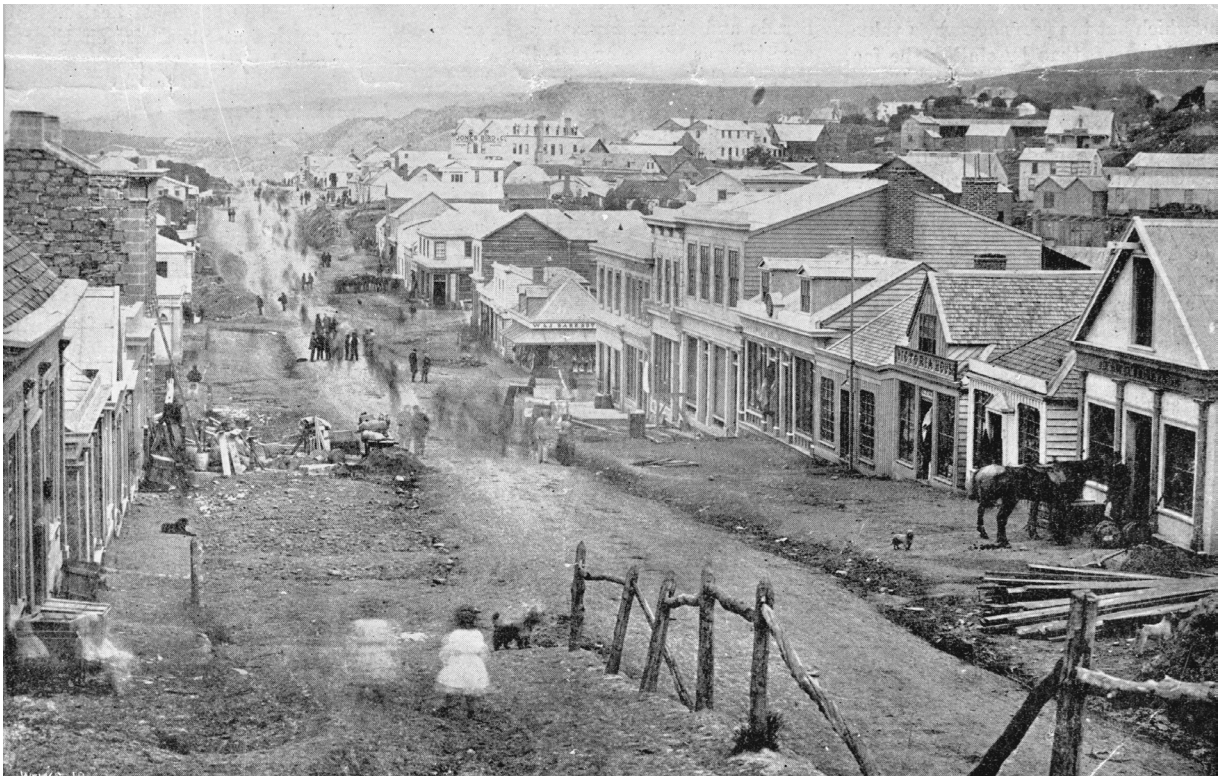
The housing market in the 19th century took a free-market approach. Under laissez-faire capitalism in Britain and the Anglosphere, the state played a relatively modest role in people's day-to-day lives.[54] Settler societies such as Australia and New Zealand boomed from the 1820s, and towns and cities were at the heart of the action. James Belich calls it an era of "explosive colonization."[55] People, ideas and capital poured into the country.

The market led the way in housing all newcomers. Local government had few restrictions on urban land, so homes were built with relative ease. Economists would later call this a light-touch regulatory environment. Developers could build with relative ease, both up and out; spatial plans were unknown. Growth and commerce were a priority in the start-up societies of the early colonial period.[56] Red tape came later, and city planning only from the 1950s.[57]

Citing the risk of fire, some local authorities and provincial councils banned the construction of raupo (flax) whare and cottages, while others levied a tax to discourage their construction. Indeed, New Zealand's first housing regulation, the *Raupo Houses Act 1842*, aimed to discourage using flax and other inflammable materials by levying a £20 tax per annum on such dwellings.[58] Several local bodies passed by-laws specifying the type of buildings that could be erected within defined areas.[59]

Historians have noted the failings of the market-oriented approach to housing in the latter half of the 19th century.[60] Indeed, by the 1860s better housing standards were sorely needed. Poor public health provision and overcrowding were turning inner-cities into slums, where diseases such as scarlet fever and typhoid rapidly spread. In 1864, the *Otago Daily Times* said Dunedin had "reproduced with faithful accuracy the wretched tenements, and filthy back slums of an English town."[61] It was little better elsewhere.

That said, it is important to recognise how far New Zealand had come. More than 300,000 people were living here by 1870, up from around 80,000 when the Treaty of Waitangi was signed in 1840.[62] All of today's major cities had broken ground, and the rudiments of a national economy were locking into place. While far from



Princes Street, Dunedin, 1861, 1/4-002689, Alexander Turnbull Library, Wellington, New Zealand.

perfect, New Zealand was a good place to call home because of private enterprise and the will to build.

Although state intervention in the housing market is typically associated with the First Labour Government (1935-1949), the first state housing scheme was inaugurated by Liberal Prime Minister Richard Seddon some 30 years before 12 Fife Lane was built in Miramar.[63]

The public outcry over slumlords and deteriorating cities impelled Seddon to pass the *Workers' Dwelling Act 1905*. The government was to build affordable rental properties on the outskirts of towns to house workers and their families.[64] The first "workmen's homes" were built on Patrick Street, Petone – and they still stand today. Urban historian Ben Schrader says this scheme made the Liberals the "first central government in the Western world to build public housing for its citizens."[65]

Despite good intentions, the scheme failed. The rents were too high. Like KiwiBuild, the first state houses catered to the relatively well-off.[66] Manual workers who could afford to rent one of these properties were consequently few and far between. What is more, poor transport infrastructure made commuting to the periphery of town unrealistic.[67] What good was it moving to the suburbs if you couldn't get back after the night shift? Far better to stay where you were and save for the hope of a better day.

Seddon's gambit had at least one long-lasting consequence. The state became the mainstay of the housing market, reaching its apogee with the First Labour Government's iconic state housing scheme. No other government, before or since, has used to such an extent the state's resources and authority to address housing issues.[68] Prime Ministers Michael Joseph Savage and Peter Fraser were noteworthy in this regard.

By the time Labour left office in 1949, the state dominated both the home-ownership and rental markets. Whole suburbs such as Naenae in Lower Hutt and Ōtara in Auckland were developed, and nearly 30,000 state houses were built.[69] "For better or worse," writes Gael Ferguson, "the homes built during this time came to symbolise the very heart of the New Zealand dream."[70]

How did it work?

The government used cheap Reserve Bank credit to fund building rental properties for working families. State construction may have been a neater conceptual fit, but the government understood that it lacked the capacity and expertise to tackle such a project; only the private sector could do it. In fact, Labour stridently opposed the Public Works Department (PWD) implementing this ambitious scheme. Savage said the PWD "could not build a fowl-house let alone a five million pound housing scheme."[71] As a result, private firms, notably Fletcher Construction, built the new homes under the watchful eye of government.[72] Mostly forgotten is the fillip state housing gave New Zealand's construction industry.

Despite wartime shortages, rising building costs, and teething problems, the government persisted. By March 1939, it had built or had begun building 5,390 homes.[73] And the public was clamouring for more.

Notably, Labour decided not to subsidise its housing project. This reflected deeply held beliefs of self-reliance and individual responsibility. It also meant that if state funds were not to be squandered on the able-bodied, government had to recover the cost of its beneficence.

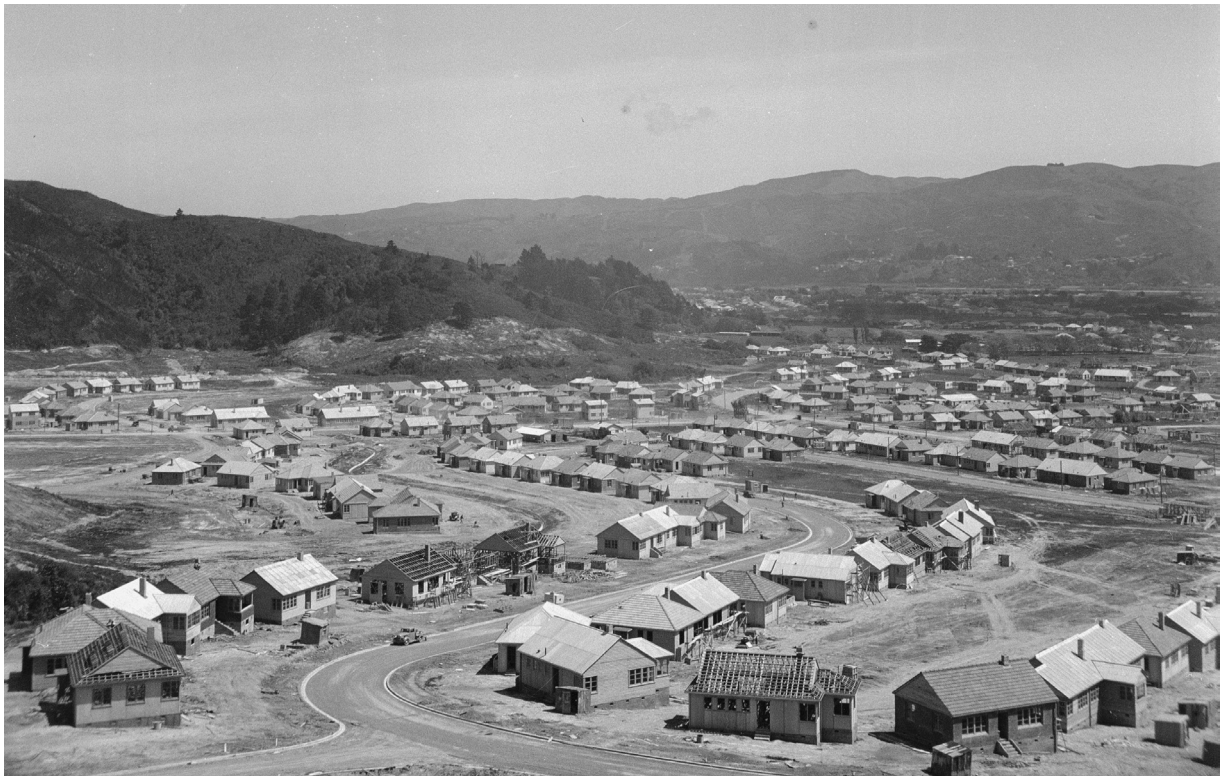
This aim was much harder to realise. Cost recovery presumed that building at scale would reduce construction costs, enabling government to recoup money from rent.[74] Economies of scale was the operative concept. However, rising construction costs during the war upended the foundation of the project. The state-housing project started losing money at least from the mid-1940s, but it may have always done so.[75]

The government could have raised rents to cover the difference but did not. State housing was supposed to ensure tenants enjoyed security of tenure equal to homeowners. So higher rents were off the table. This hobbled the project in the long run, and shackled the government when costs rose. Aside from financial unsustainability, state housing would soon prove politically divisive.[76] And it bred discontent, too.

Many New Zealanders began wondering why relatively wealthy Kiwis were living in state-subsidised homes. Except for a select few, most of the very poor were excluded from state housing. About 10 years after Labour had launched its housing project, public opinion was split. The privileged state tenant now became a political lightning rod, and New Zealanders increasingly rejected government's central role in housing.

Change came with Sidney Holland's election in 1949. The First National Government redefined the purpose of state housing by emphasising the private sector's role and the primacy of home ownership. Whereas Labour's housing policy supplied affordable rental properties to workers and their families, National wanted New Zealand to be a democracy of home owners, not of renting tenants.[77]

They were largely successful. Michael Bassett and Luke Malpass note that nearly 17,000 state housing tenants purchased their own home from 1951 to 1961.[78] By the early 1960s, the Kiwi dream of owning one's own backyard was firmly entrenched in the national psyche. More and more people wanted to own their homes over securing long-term leases. Suburbia blossomed.



State Housing, Naenae, Lower Hutt, 30 October 1944, 1/4-001179-F, Alexander Turnbull Library, Wellington, New Zealand.

How did National reorient state housing towards ownership?

Rather than building a large number of new homes, as Labour had done, National gave cheap finance for housing. It introduced 10% suspensory loans of the house cost to borrowers. If the borrower still lived in the house after seven years, the loan was written off.

Unsurprisingly, the generous lending conditions were popular. Whereas state-financed loans increased from less than 20% of all dwellings built in the year to March 1950, that number jumped to nearly 34% by 1954. In aggregate terms, the number of loans the State Advances Corporation approved surged from 2,202 in 1950 to 5,402 in 1954.[79]

But the heyday of state involvement in housing did not last. During the 1970s and '80s, the government progressively stepped back. State lending and state housing continued, but on a much smaller scale. The private sector was now driving the housing market, not the government. State assistance topped up what private industry could not deliver, limiting direct relief to those suffering real hardship.

What lessons can we learn from New Zealand's experiment with state housing?

It is commonly assumed that market failure and even unfettered capitalism caused the current housing crisis.[80] But the reality is quite different. New Zealand built homes in the post-war years not because the state was too involved but because it did not constrain development by leaving the sector relatively unregulated.

Bassett and Malpass have shown that few planning rules existed until the late 1950s. Recent research supports their findings.[81]

Most urban areas were generating district planning schemes, but a culture of construction still defined the housing industry. Bassett and Malpass say building a home on one's own plot in the 1950s was a "fairly easy proposition with only a few basic rules to follow: height restrictions, minimum ceiling levels, and six feet (later two metres) from the section boundary so as not to inconvenience neighbours."[82] Buildings needed to follow basic sanitation provisions and safety measures, but the regulatory framework did not curb the will to build. Developers were free to construct homes, and so supply kept up with demand.

Pen and paper would soon quash that spirit. From the 1970s, the regulatory burden on building started gathering momentum. What began as a trickle soon turned into a flood.

In a recent report, the New Zealand Infrastructure Commission/Te Waihanga tracked the evolution of urban planning in the 20th century. It shows how the growing body of planning policies in the previous century constrained housing supply.[83] That is no surprise to those familiar with the core tenets of urban economics, but this insight is often missing from the New Zealand housing debate.

When state housing was introduced in the 1930s, the regulatory environment was conducive to building new dwellings in existing and new suburbs. Recall that many suburbs such as Taita in Hutt Valley and Glen Innes in Auckland are products of state housing. They would not exist in the same form today if planning restrictions had been rigid.

Yet, little by little, the impediments to building have increased. The once permissive construction culture is now lost. Beginning with the *Town and Country Planning Act 1977*, New Zealand has progressively legislated its way out of housing affordability. Rather than stimulating new housing and infrastructure provision, the Act "prioritised preservation of amenity for existing residents."[84] This tendency was amplified by the *Resource Management Act 1991* (RMA), which takes an effects-based approach to planning. The RMA makes new development accountable for negative effects, such as environmental degradation, but it does not give sufficient weight to the upsides of building. The mandate for extensive public consultation, meanwhile, forces projects to pass ever more hurdles and can be appealed more easily.

Planning regulations have also become more complex. Tracking plan length is an imperfect measure but it can help establish how much the regulatory burden is hurting or helping development. It indicates "the number of things that are being regulated and the detail in which they are being regulated."[85] In New Zealand's three largest cities, plan length increased substantially between 1965 and 2000. Significantly, the Infrastructure Commission found that the RMA was a crucial driver in this process.[86]

Under the Auckland City Council's first District Scheme (1961), the City of Sails had the capacity to triple the population in the inner suburbs. That was halved in the early 1970s and cut further in the 1980s. While the 2016 Auckland Unitary Plan restored some capacity, it still constrained sprawl. As Jason Krupp and Khyaati Acharya argue, the idea that "compact cities" use land more efficiently does not stack up.[87]

New Zealand's state housing programme has cast a long shadow over our housing policy. When the newly appointed Minister of Housing Phil Twyford spoke about the future of housing in late 2017, echoes of the 1930s abounded:

> We are going to put the state back into state housing.

> Our government rejects the view that state housing is a redundant idea from the 1930s and that modernisation means selling off the houses and getting charities and the private sector to do this work instead.[88]

As Twyford and the Sixth Labour Government found out, fixing the housing crisis was not as easy as putting the state back into the housing market. The growing regulatory thicket since the 1970s doomed KiwiBuild from its inception. Until the restrictive planning settings choking off supply are removed, New Zealand will fail to build enough affordable houses for more people to want to live here.

This makes understanding the history of housing all the more important.

New Zealand delivered in the 19th and 20th centuries because it prioritised development over rules and regulations.

That is sadly no longer the case.

In the 19th century, European settlers established themselves on the other side of the world. And they did so with a pioneering spirit in a light-touch regulatory environment. Private enterprise built New Zealand's first homes.

In the 20th century, the state built a suburban arcadia in conjunction with the private sector. The construction industry built most of the houses for prospective homeowners who themselves benefitted from generous state lending policies.

Yet what really mattered were liberal policy settings that enabled development.

Urban planning did not stop construction. And restrictive legislation such as the *Town and Country Planning Act* and the RMA still lay in the future. As a result, housing supply organically responded to the growing population while keeping house prices affordable.

State housing in the 20th century was a great success for reasons very different from what proponents of state intervention give today. There will be more doomed experiments like KiwiBuild if we fail to learn the right lessons.

CHAPTER 4:
The seduction of grandeur

Robert Muldoon did not shy away from government intervention. "My [National] Government's policy for New Zealand was to pick potential winners and support them," he noted in 1985 with characteristic directness.[89] Nothing could have been more out-of-step with the national mood music. David Lange's Fourth Labour Government, which swept to power in July 1984, had hit the ground running with a series of reforms that would deregulate the economy.[90] Muldoon would have none of it. For him, the "reason governments exist is to intervene."[91]

And intervene he did. Nowhere was this more pronounced than in energy policy, where Muldoon unleashed one of the most far-reaching industrial development programmes in New Zealand's economic history. Barry Gustafson rightly compares the state-led and state-funded energy revolution of the early 1980s to the public works programmes Vogel and Seddon spearheaded in the second half of the 19th century.[92]

Fittingly, Muldoon's gamble on energy quickly earned the sobriquet Think Big.

The animating idea was simple enough. After the second oil shock of 1979, New Zealand suddenly found itself in deep trouble. World oil prices doubled, growth plummeted, and inflation ran rampant. In response, Muldoon pushed for energy growth and private sector investment. His government's growth strategy aimed to improve New Zealand's industrial sector, and energy was earmarked as a particularly promising prospect.[93] This strategy was marketed as having the potential to create 410,000 additional jobs throughout the 1980s.

By the standards of the day, the Think Big projects were world-scale. These were large, technologically complex undertakings, and they had a price-tag to match. Some estimates calculate that the flagship energy ventures cost as much as $8.2 billion.[94] A significant amount of funding and financing was paid for by government borrowing.

Taken together, Think Big comprised eight major projects:

1. an ammonia/urea plant at Kapuni
2. a methanol plant at Waitara
3. the Tiwai Point potline
4. a synthetic fuel plant at Motunui
5. expansion of the Marsden Point Oil Refinery
6. expansion of the New Zealand Steel plant at Glenbrook
7. electrification of the rail network between Te Rapa and Palmerston North
8. construction of the Clyde Dam.

It was a monumental undertaking. As Brian Easton humorously recalls a Treasury official telling him, "It seemed impossible to 'stop the b*****s building power stations.'"[95]

What compelled Muldoon to place such an audacious bet on the future of energy?

In truth, there was much to recommend Muldoon's push for growth. Indeed, John Boshier argues convincingly that Think Big was a logical policy response during this tumultuous period.[96] The fatal flaw was to think that government should pull all the levers, and that commercial decisions should be made with political considerations front of mind.

After the Yom Kippur War, a prolonged economic downturn affected the world economy, marked by a combination of inflation and stagnation. Stagflation entered the economic lexicon.[97] As a small country, dependent on a limited range of agricultural commodities to pay its way, New Zealand was especially exposed. Michael Reddell and Cath Sleeman note that New Zealand's current account balance deteriorated almost immediately, from a surplus of 2.5% in June 1973 to a record deficit of 13.4% in March 1975. Growth also nosedived, from 7.2% in 1974 to -2.6% in March 1975.[98] Unemployment rose, share prices tanked, and Kiwis started to head overseas.

Compounding matters was Prime Minister Norman Kirk's "take-or-pay" agreement in 1973 with the Shell-BP-Todd consortium, obliging the government to pay for an agreed amount of gas every year for 30 years irrespective of usage.[99]

The second oil shock of 1979 added fuel to the fire, and it was in this context that Think Big was born.

One crucial assumption supported Muldoon's investment in energy: namely, that world fuel prices would continue to increase. Certainly, there was every reason to think they would. Projections at the time had the cost of future oil imports as high as US$60-70 per barrel.[100] Few disagreed. That the price ultimately collapsed, stabilising at US$15 until the First Gulf War does not mean that the calculation underpinning Think Big was irrational. It just means that it was wrong.

The second oil shock thus gave Muldoon a window of opportunity to use up the country's historic energy surplus:

> New Zealand is energy rich, and that is the positive spin-off from the two oil shocks. At

Prime Minister Robert Muldoon at Kapuni ammonia-urea plant, 13 December 1982, EP/1982/4359/28-F, Alexander Turnbull Library, Wellington, New Zealand.

> $2 a barrel for oil in 1973, much of our energy resource was not worth developing; but at $35 a barrel, eight years later, our energy resources are commercially viable to an extent undreamt of at that time.[101]

Things did not work out the way that Muldoon hoped they would. While Think Big was always risky business, the drop in world oil prices from the mid-1980s sealed its fate. The ventures would have to prove their worth in the marketplace; protection was no longer an option. Muldoon's great experiment was over.

What lessons can we draw from Think Big?

One of the most important concerns megaprojects. Large infrastructure projects often fall short of expectations. Costs begin to spiral, timelines start to blow out, and the end result does not please anyone. As the historical record demonstrates, proponents of megaprojects tend to overestimate benefits and underestimate costs. We might usefully call this the seduction of grandeur. While the literature is relatively slim, it is clear that optimism bias frequently plagues large-scale projects.[102]

Promoters have an incentive, after all, to champion their projects, which means important information about viability is often misrepresented. The goal of vested interests is getting the greenlight, not compiling a realistic cost-benefit analysis that could tilt the scales against implementation.

Economic geographer Bent Flyvbjerg notes that nine out of ten large-scale projects have cost overruns; time delays and benefit shortfalls are ubiquitous. Flyvbjerg posits an "iron law of megaprojects" – such ventures are doomed to be "*over budget, over time, over and over again*."[103]

D.R. Myddelton concurs in a study of six large UK investment projects.[104] Success is very much the exception rather than the rule when it comes to megaprojects.

Unfortunately, Think Big was no exception.

Proponents of Muldoon's growth strategy heralded the creation of hundreds of thousands of jobs. Yet there was little solid evidence to support such ambitious predictions, and the jobs never came to pass. Public outrage grew as the mirage of Think Big faded. By 1989, the core energy projects directly employed fewer than 4,000 people; a further 9,000 were only loosely attached.[105] Think Big had turned into a damp squib.

Worse still was the cost of Muldoon's energy dream. While high inflation during this period necessarily raised costs, capital overruns were enormous. John Boshier calculates that five of the eight projects cost more than double the approved cost, while another venture was 60% more expensive.[106] Those are seriously bad numbers. Clearly, a significant proportion of the capital injected into the energy projects could have been profitably invested elsewhere, a point that even Treasury made at the time.

The broader economic picture was just as bad. Public debt ballooned from just over $4 billion at the start of Muldoon's tenure in 1975 to nearly $22 billion when he left office in 1984.

This deterioration in public finances would hamstring the succeeding Lange Government, which swiftly nationalised the debt incurred by Think Big before deregulating and privatising the energy industry.[107] Although some still quibble over the price government received in the asset sell-off, the country was mostly considered better off with the loss-making ventures gone from government books. As then Minister of Finance Roger Douglas noted in Budget 1986, Think Big was conclusive proof that politicians were poor at picking winners.[108] It was an expensive lesson for New Zealand to learn.

Hydocracker unit reactor lifted by crane, Marsden Point Refinery, 1984, Alexander Turnbull Library, Wellington, New Zealand.

At the very least, Think Big illustrates what can go wrong when political considerations dictate what ought to be commercial decisions. Muldoon's eagerness to achieve energy independence was at heart a political calculation, not a sober assessment of what was in New Zealand's best economic interests.

To be sure, the oil shocks of the 1970s demanded a response. No government could be expected to sit idly as prices at the pump rose exponentially. But that did not exempt the government from weighing the trade-offs between energy self-sufficiency and alternative investment opportunities.

A number of the projects such as New Zealand Steel and the refinery expansion were of dubious economic value, hence the reluctance of the private sector to bear risk. "[The] fundamental concern is that the Government encouraged projects which the private sector was unwilling to undertake," Bernie Galvin noted in a 1984 Treasury report examining the various Think Big ventures.[109]

Muldoon had hitched his political fortunes to Think Big, and could not back down. This was most apparent in the run-up to the 1981 general election. By this point, three of the government's flagship energy projects were languishing: the Aramoana smelter, the Mobil synthetic oil plant, and the Marsden Point oil refinery. A decision was due on a second steel plant, to be overseen by the government-sponsored New Zealand Steel, that would increase steel production from 150,000 to 775,000 tonnes per annum.[110]

Yet, as Barry Gustafson notes, Treasury and the Prime Minister's Department had raised serious concerns about the project's viability. Indeed, almost everyone involved was opposed.[111] But Muldoon's political preferences were clear. National was desperate to campaign on a Think Big success story, and approved the New Zealand Steel plan (and two more energy projects) at cabinet on 27 October 1981, a month before the polls. "In the opinion of at least one of Muldoon's senior and closest advisors, the final decision to approve was done quickly for political rather than economic reasons."[112] Politics, in other words, had decisively won the day.

Pace was also a problem. Muldoon's aim of achieving 50% self-sufficiency in transport fuels by 1985 led to undue haste in the decision-making process, which several ministers and commentators have since acknowledged.[113] Investing in energy is a long-term game needing rigorous evaluation. A rushed process does not allow for prudent deliberation. Projects such as the Clyde Dam are technically complex and carry significant risk, much of it hard to predict. The point is not that large-scale infrastructure projects should take a long time but that investment should be calibrated with the project pipeline. This was manifestly not the case with Think Big.

Nevertheless, Think Big delivered two relatively successful projects: the Taranaki synthetic fuel plant and the Tiwai aluminium smelter. In both cases, funding was secured from international banks, who insisted on a clear total cost to underwrite their loans. Bechtel, a leading US engineering and construction company, oversaw the build. Both projects were of high-quality, properly costed, and completed on time. But the refinery, New Zealand Steel, and Clyde Dam were all delayed for more than two years and faced considerable problems. In the case of the Clyde Dam, the difference between the approved and final cost was 142%.[114]

Think Big was an unmitigated disaster. The search for energy independence, in the final analysis, proved a huge drain on the New Zealand economy. No less harmful was the manner in which the policy was implemented. "In almost every case," Brian Easton notes, "there was a government guarantee, which meant that the public purse took the downside risks. Usually there was no hint to the public or parliament that the government was exposing the taxpayer."[115] It would take structural reform in the 1980s and a reorientation away from government guarantees for the country to extricate itself from the mess Muldoon had manufactured. The episode stands as a cautionary tale for what can happen when governments exert too much power over the commanding heights of the economy.

CHAPTER 5:

Across the Waitematā

Auckland's harbour bridge, a magnificent engineering achievement, is an impressive adornment to a beautiful harbour, and an effective transport channel. It is all these things, but above all, it is a stirring symbol of the spirit of development that is moving New Zealand today.

— Walter Nash[116]

Auckland is difficult to picture without its eponymous bridge. More than 150,000 cars cross it each day, and some days the traffic exceeds 200,000 vehicles.[117] The distinctive "coat-hanger" design is an Auckland icon. Officially opened in May 1959, New Zealand's second-longest bridge transformed the City of Sails. It is an important, if sometimes neglected, part of our transport heritage and it holds lessons for how we can better fund and finance large-scale infrastructure projects in the 21st century.

Today's urbanites think nothing of criss-crossing the Waitematā, but it was not always so easy. Prior to the bridge, you had to catch one of the Devonport Steam Ferry Company's coal-fired vessels. Queues were common and the journey was arduous. The alternative was a cumbersome drive around the harbour via Riverhead, a 50 km journey between Devonport and the city centre.[118] Life was slower in those days.

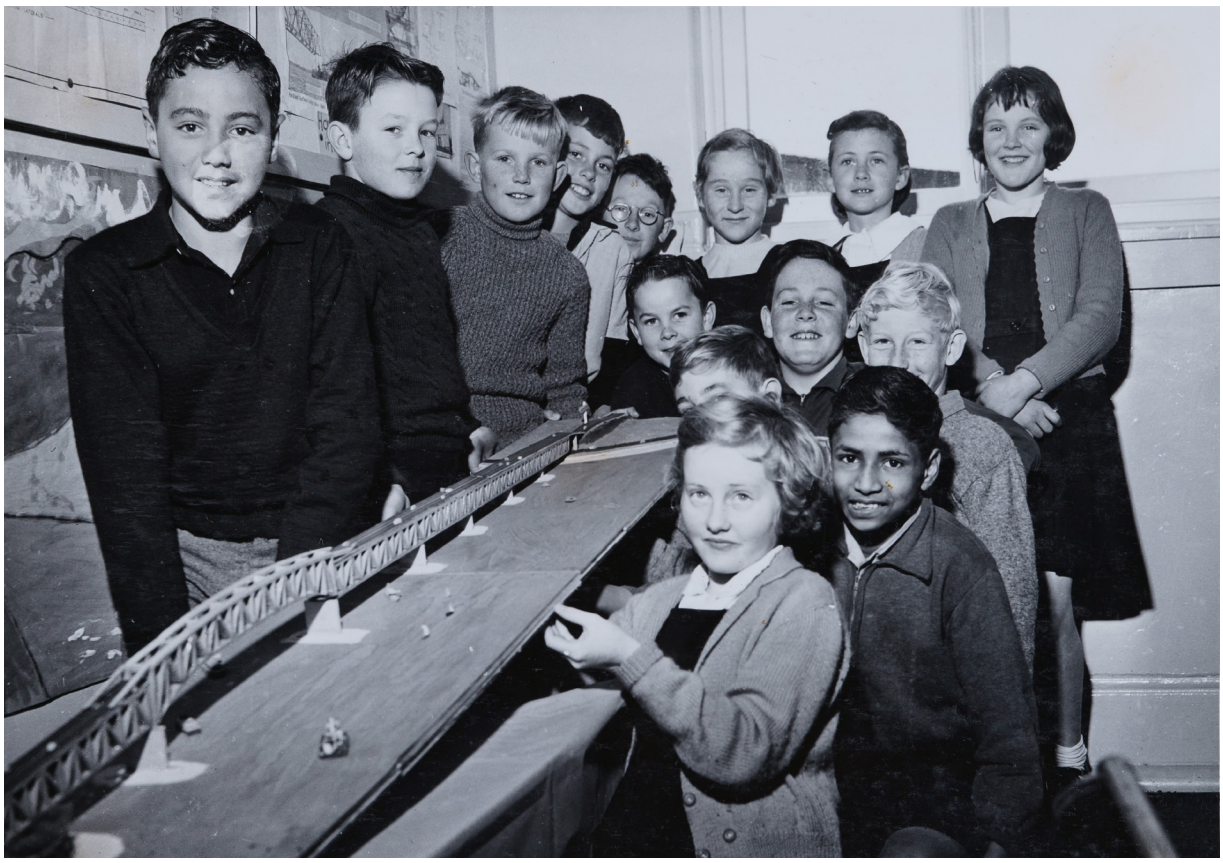
The bridge changed everything. The North Shore, which had been a rural backwater in the mid-1950s with a growth rate only half that of the Auckland average, began to boom.[119] And the Auckland economy surged. It has not looked back since.

The *Auckland Harbour Bridge Act 1950* established the special purpose Auckland Harbour Bridge Authority (AHBA). Its brief was to "construct, maintain, manage and control a bridge across the Waitematā Harbour from Point Erin to Stokes Point."[120] To finance the bridge, the AHBA issued revenue bonds. These debt instruments are a type of municipal bond linked to a specific revenue stream. For the Auckland Harbour Bridge, the AHBA issued bonds backed by toll revenue. The bonds were popular, and the toll system worked effectively. Toll revenue was collected from 1959 to 1984, when debt incurred during the construction of the bridge had been paid off.

It is hard not to lament the abolition of the toll system. After all, the user-pays system enabled the AHBA to maintain the bridge, make upgrades, and ensure that those who benefited from the bridge were also the ones who paid for it. The arrangement was efficient and fair.

Prime Minister Holland rejected the initial proposal for a five-lane bridge for cost reasons but approved a four-lane bridge in 1956 to be built by the AHBA.[121] It was a massive undertaking. To this day, the Auckland Harbour Bridge ranks as one of the largest engineering feats completed by a New Zealand local authority.

Spanning more than 1,000 metres, the bridge is more than 500 metres longer than the Rangitata River Bridge; Auckland Harbour Bridge is also the second-longest bridge in the country. Built atop piers that sink up to 104 feet, the steelwork is 3,348 feet with a navigation span of 800 feet



Pupils of Royal Oak School with their model of the Auckland Harbour Bridge, 1958, BBW 4622 1a, Archives New Zealand/Te Rua Mahara o te Kawanatanga, Auckland Regional Office.

rising 142 feet above the high-water mark. The superstructure alone required more than 6,000 tonnes of steel.[122]

The bridge was also world leading. The floating-in of the bridge spans presented a significant engineering challenge. The "pick-a-back" operation involved floating-in a central span 177 metres long and 49 metres above sea level at its highest point. It took six days to complete because of choppy wind conditions.[123] The Forth Road Bridge in Scotland was just one of the international firms to study Auckland's new bridge.

No less innovative was the toll system, which received writeups by an Italian motoring publication and the American Bridge Tunnel and Turnpike Association.[124] The toll collection and traffic control systems were considered among the most modern in the world.

While proposals to build a bridge across the Waitematā date back to 1860, when Ponsonby farmer Fred A. Bell proposed a pontoon bridge between Stokes Point and Fanshawe Street, only after the AHBA was established did the tide turn.[125]

The bridge's funding and financing model and its workings were so successful they can inform infrastructure decision-making even today. The AHBA financed the bridge largely by issuing revenue bonds. Investors purchased these bonds and loaned money to the AHBA to fund construction and maintenance. In return, investors received regular interest payments and the principal when the bond matured. Toll revenue, meanwhile, helped the AHBA pay back the bondholders and finance its other debt.

It was an attractive proposition. The first public issue for £375,000 was floated in December

1954 and was quickly subscribed. That would hold true for all subsequent bond issues. When the AHBA wanted to add the original approach roads, for example, it raised the money with consummate ease.[126] John Allum, the indefatigable chairman of the AHBA, noted that "the authority never had the slightest difficulty in getting money."[127]

Although complaints about tolls began even before the bridge was built, the user-pays system worked remarkably well. Nearly five million vehicles crossed the bridge in its first year, with cars paying 2 shillings and 6 pence. This was soon reduced to reflect the extra revenue coming from the healthy stream of traffic moving across the Waitematā. When the five-millionth vehicle crossed the bridge in June 1960, Allum wryly commented that "we [the AHBA] are getting quite blasé about our millions."[128]

A driver in a Volkswagen Beetle pays the toll fee, 22 June 1960, EP/1960/2251-F, Alexander Turnbull Library, Wellington, New Zealand.

Those millions kept the bridge operating smoothly. In the financial year 1967/68, vehicle tolls paid nearly 2 million dollars into the AHBA's coffers.[129] Indeed, the initial problem was too much demand, not too little. Much as thrifty Aucklanders complained, the volume of traffic proves they willingly parted with their cash to use the bridge. O.H. Brannigan, department head of the AHBA, captures something of the early demand by Auckland motorists:

> The small staff could not cope with the volume of the coins received and during the first week after opening, arrangements were made for twelve tellers of the Bank of New Zealand to give assistance with the counting and depositing of the week's takings, in order to clear the backlog.[130]

Coin counting soon became second-nature to staff in the AHBA's toll plaza, however. And the revenue generated helped maintain the bridge and pay for expansive redevelopments (see below). By the time tolls were abolished in 1984, the AHBA had paid of its loans and the bridge was self-financing.

Nonetheless, the Auckland Harbour Bridge has long been regarded as an abject lesson in how *not* to complete a big project. Certainly, the argument has superficial appeal. The AHBA had to add four more lanes as per the initial plan between 1968 and 1969 at considerable cost. What is more, the bridge could bear the additional weight of the "Nippon clip-ons" only because it was overengineered in the first place.[131] Otherwise, the bridge would have had a very short shelf-life for such an expensive piece of kit.

This reluctance to stump up the cash to begin with, so to speak, has been taken as a sign of the City's perennial short-sightedness. A *Herald* editorial marking the bridge's 50th anniversary had no qualms about lambasting the "penny-pinching" approach of Holland's ministry.[132] Nathan McLeay meanwhile has drawn attention to the "perils of cost-cutting and short-term planning" in an otherwise thoughtful survey of the bridge's evolution.[133] In his telling, the construction of the Auckland Harbour Bridge is a story of what might have been.

Such arguments are misplaced. Accusations of miserliness and myopia are easy to level,

especially in hindsight, but they do not apply to the Auckland Harbour Bridge. On the contrary, the critique betrays a lack of understanding about the economics of infrastructure. It assumes that only the largest project is best and ignores cost constraints.

Nicolas Reid argues for viewing the iterative development of the Auckland Harbour Bridge as a triumph, not a mistake. According to Reid, its construction "shows us the value of transport development programmes with successive expansions of transport capacity and expenditure over time."[134]

There are numerous reasons for this.

First, the slimmed down proposal enabled the AHBA to start the project. That was no small achievement given the nearly 100-year-saga that had preceded it.

When the government initially approved a five-lane design with two-footpaths, it opted for a project that it could scarcely afford. Prime Minister Holland questioned its viability, and with good reason. Auckland then was a relatively small city, while the North Shore was a sleepy agricultural hinterland interspersed with beachside villages. In 1951, the population of Auckland was 332,000.[135] It did not need the big bridge. Far better to build the bridge it could afford and help the economy grow, and then scale up.

That is precisely what happened.

Reid notes that the more expansive bridge would have cost £8.1 million, or 7.5% of Auckland's annual GDP. In relative terms, that "would have made the five-lane bridge twice as expensive as any transport project New Zealand has ever undertaken."[136] The bridge that was eventually built cost £7.5 million, or 5% of Auckland's GDP. That is roughly equivalent to a $2 billion saving today.

Far from penny-pinching, the AHBA delivered a cost-effective bridge using the $2 billion saving. The bridge was completed three weeks ahead of schedule, and workers were given a bonus of around £30 each.[137]

This brings me to the clip-ons.

The AHBA's decision to add four lanes in the late 1960s was not a sign that they had initially got it wrong. Rather, growing demand during the bridge's first decade reflects the successful rollout of an innovative addition to Auckland's transport infrastructure.

Moreover, no strong economic rationale existed for the larger bridge in the 1950s.

The clip-ons were undoubtedly expensive, but they were more affordable than is typically assumed. At $7.3 million, the clip-ons amounted to only 0.8% of Auckland's annual GDP, or $800 million today. Adding clip-ons instead of building an additional lane in 1959 was therefore a wise investment strategy that combined lower interest rates on bridge financing and Auckland's growing economy.[138]

The successful evolution of the Auckland Harbour Bridge illustrates the merits of taking a staggered approach to capital investment in infrastructure. There will always be advocates for bigger and supposedly better options. But an iterative approach that builds capacity over time and pays its way increases flexibility and reduces risk.

New Zealand's second-longest bridge is testament to the spirit of progress that blossomed after World War II. That willingness to get things done has arguably been lost, and so has the familiarity with the funding and financing mechanism that underpinned it. Revenue bonds of the sort that helped build Auckland's iconic bridge today support reams of municipal infrastructure projects in the United States, and they could do so here.

CHAPTER 6:

Fibre and the future

Continuing with infrastructure success stories in New Zealand from the Vogel era to Think Big, we now come to a remarkable accomplishment in more recent times. The Ultra-Fast Broadband (UFB) project was launched in 2009 by John Key's National Government to provide 75% of New Zealanders with fibre-to-the-home (FTTP) services within a decade.[139] UFB easily surpassed its mandate.

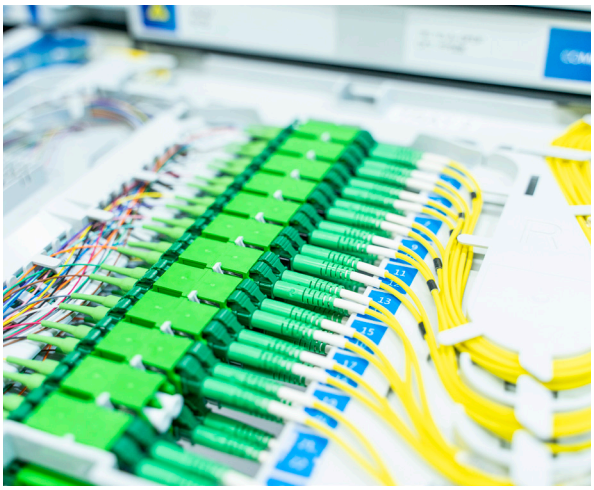
In a rare feat for large-scale infrastructure projects in the 21st century, the unusually bipartisan UFB was delivered on time and on budget. More than 1.8 million homes across 400-plus cities and towns now have access to ultrafast broadband, or over 87% of the New Zealand population.[140] When Covid-19 hit in March 2020, UFB enabled countless Kiwis to stay connected to work and family. The project has been rightly fêted both at home and abroad.[141]

This chapter explores the reasons behind the broadband rollout's success and applies its insights to future infrastructure projects. Aligning incentives and partnership between the public and private sectors (the PPP model) facilitated the project's smooth delivery. Comparing UFB and Australia's National Broadband Network (NBN) helps to illustrate the point. Unlike New Zealand, Australia chose for its broadband rollout a centralised model, which was eventually marked by significant delays, cost overruns, and technical issues.

The UFB project shows the potential benefits of public and private sector partnership. The PPP enabled the government to leverage private capital and expertise to increase investment, reduce risk, and foster innovation. PPPs can be applied to other projects, too; if managed well, they can help bridge the country's infrastructure deficit.

Despite the evident economic and social advantages of enhanced broadband capability, private sector interest in fibre was lacklustre due to the scale of investment required and uncertain demand.[142] As the dominant player in telecommunications, Telecom also lacked incentives to invest in a high-risk venture that would substantially disrupt the existing industry landscape.

Wally McCallum, Graham Mitchell and J.B. Rousselot oversee the rollout of UFB in Opononi, December 2022. Photo supplied by Chorus.



Chorus fibre connections. Photo supplied by Chorus.

Having chosen the PPP model, the government committed $1.5 billion (increased to around $1.8 billion later) to finance the fibre-optic network, provided a stable regulatory environment, and agreed to a revenue streaming arrangement with private sector partners. A public company, Crown Fibre Holdings (CFH), was set up to manage the PPP on the government's behalf. CFH negotiated contracts with private sector partners, managed the Crown's investment, and monitored the UFB rollout's progress.

CFH ran a highly effective rollout. It chose four private sector partners after a competitive tender process: Chorus, Northpower, Ultrafast Fibre, and Enable Networks. They were responsible for designing, building and operating the network infrastructure, and investing capital to support the project. The Auditor-General's office evaluated the first phase of the UFB rollout in 2016 and concluded that the project was well-planned and effectively managed. The Auditor-General also urged other public entities to take a cue from CFH on how to achieve optimal results when collaborating with commercial partners.[143]

The PPP's incentive structure was crucial. Although the government wanted the private sector to build and run the network, it soon realised that the state would have to invest in the common fibre access infrastructure (CFAI) – the key shared infrastructure that retail providers rely on to deliver broadband services to homes and businesses.[144] Despite the inherent risk associated with CFAI investment due to uncertainty around customer uptake, government's contribution reduced risks for private sector partners and encouraged their participation. This is because as more customers connected to the network, the cost of each connection decreased, creating a predictable revenue stream.

Moreover, the PPP allowed the Crown to recoup some of its investment by sharing the returns from selling broadband services when customers used the network.[145] The private companies and CFH split the revenue as per their contracts. CFH was paid for the number of customers connected to the network, and as more customers joined, revenue increased. This gave CFH a return on its investment over time and proved the agency's responsible use of taxpayers' money.

Private partners too had reason to perform well. The PPP allowed them to own and manage the network infrastructure they helped construct. By owning the infrastructure, private partners such as Chorus could earn revenue beyond the initial phase of deployment. This created a long-term revenue stream and incentives to make the initial investment required to set UFB rolling.

Fear of failure also motivated better performance.

If private partners failed to meet specific performance requirements, they faced penalties. These requirements included the number of properties to be connected by a particular date, minimum network standards, and consequences for missed deadlines. Private partners were paid only when they fulfilled their contractual obligations, and a robust dispute-resolution mechanism was set up.[146]

While poor performance was penalised, good performance was rewarded. This drove both the public and private sectors to deliver a high-quality broadband network.

The results of New Zealand's UFB project differ starkly from Australia's NBN. Launched in 2007, NBN is expected to cost an astounding AU$51 billion of taxpayers' money by completion.[147] The results too have been poor. Australia today lags comparable countries in broadband speed and coverage.

According to the OECD, Australia is 28th out of 37 countries for broadband penetration. Meanwhile, the most recent Speedtest Global Index ranks Australia 77th in the world for fixed broadband speed. Australia's average download

speed of 53.33 Mbps puts the country well behind the global median of 78.62 Mbps.[148]

New Zealand outperforms on both counts. The country's broadband coverage is above the OECD average, which is a notable achievement for a country with low population density and challenging geography. Even more impressive is New Zealand's broadband speed (133.05 Mbps), which is well above the global average.[149] Remarkably, all of this came at a fraction of NBN's cost.

NBN's poor results began with Australia's centralised approach to broadband. The government-owned NBN Co. was solely responsible for the design, construction and operation of the broadband network. This level of centralisation made for slow and bureaucratic decisions. Furthermore, the influence of political factors impeded what should have been purely commercial decisions. Market discipline, in other words, was conspicuously lacking.

Take the controversial decision in 2013 to switch from Fibre-to-the-Premises (FTTP) to a "multi-technology mix" (MTM). The aim was to use existing telecommunications infrastructure, including the legacy copper and HFC networks.

The Coalition Government said the MTM decision was based on cost-effectiveness, not political considerations. Coalition had campaigned on MTM in the 2013 election, which it won by a considerable margin. However, experts say the MTM decision was short-sighted and would not save much.

In practice, MTM has been more expensive than FTTP. The Productivity Commission found that unexpected costs associated with the legacy infrastructure added to rather than reduced the project's costs. Furthermore, MTM has higher maintenance costs and has become outdated faster than FTTP.[150]

Unlike a commercial business, the Gilliard Government decided to prioritise the regions over high-density metropolitan areas – another example of NBN suffering due to political imperatives. This focus on the regions delayed the rollout to areas where NBN would have had the most demand and impact, such as urban areas. Taxpayers had to bear the eventual cost blowouts. As the Productivity Commission notes, the "requirement to prioritise regional areas undoubtedly imposed significant costs on NBN Co and, at that time, represented a competitive disadvantage arising simply by virtue of government ownership."[151]

In contrast, the New Zealand Government took a commercially driven approach to broadband; high-density areas with the greatest demand were prioritised for rollout. This ensured a larger number of businesses and households had access to high-speed internet, which supported economic growth and better social outcomes. Once the rollout to urban areas was well underway, the government started shifting its focus to rural areas, bridging the digital divide, and ensuring equal access to high-speed internet for all New Zealanders.

Overall, New Zealand's PPP model used in the UFB rollout crushed the centralised approach in Australia. Embracing the private sector fostered competition, innovation and efficiency, which led to a faster and more cost-effective rollout.

Conclusion

New Zealand faces several infrastructure challenges in the years ahead. Our much debated infrastructure deficit will require significant investment over the medium term, especially in critical areas such as health, transport and housing. Population growth will squeeze our towns and cities. And changing weather patterns will force us to ask searching questions about infrastructure resilience.

However, we cannot just build our way out of these problems.

Yes, we need to make it easier to get things done. And, yes, we need to think strategically and plan for the long-term.

But we also need to spend our limited resources more efficiently.

The Infrastructure Commission notes that New Zealand would have to spend around 9.6% of GDP over 30 years to bridge the infrastructure backlog and build a fit-for-purpose network.[152]

That is simply not feasible. Nor is it desirable.

Every dollar spent on infrastructure is one dollar less spent on education, policing and other priorities.

How, then, can we solve what often feels like an intractable problem?

This report has turned to the past for some lessons about the future. New Zealand has a rich infrastructure heritage that can inspire us to break the impasse. And it can shine a light on what does not work, too.

There are three important takeaways from this history lesson.

Embrace private enterprise

Using government borrowing to wish away New Zealand's infrastructure deficit is tempting. It may even work on a superficial level, but it would be fiscally irresponsible and misallocate resources. The travails of Julius Vogel and Robert Muldoon remind us how disastrous betting big on public infrastructure can be.

But it is not all doom and gloom. New Zealand has proven its ability to leverage the private sector to make sound investment decisions that prioritise commercial outcomes over political considerations, as illustrated by the successful rollout of Ultra-Fast Broadband (UFB).

That is an ideal foundation to build on.

Locals know best

Localism is the lifeblood of responsive and targeted development.

Local communities often know their needs better than distant bureaucrats, so it's important to let those who benefit from growth and development make the decisions. While Wellington has an important role to play in setting infrastructure strategy, local authorities should be empowered to make critical infrastructure decisions – just as they once were.

The high standard of the Taranaki toll roads in the early 20th century and the construction of the Auckland Harbour Bridge after World War II exemplify the advantages of leveraging local knowledge.

Advocates of a Ministry of Works 2.0 insist that it would deliver infrastructure more effectively than local authorities or private enterprise. However, the problem with the original Ministry of Works is that it did not work. It ran roughshod over local knowledge and was highly politicised.

That is a history not worth repeating.

The will to build

The early settlers built roads and bridges, towns and cities. And they did so armed with a positive attitude to building and development. During the mid-20th century, the government was able to create entire suburbs because planning restrictions and zoning regulations did not get in the way. However, in the 21st century, the Sixth Labour Government was unable to fulfil their lofty promises for KiwiBuild because planning restrictions and zoning regulations did nothing but get in the way.

It is imperative New Zealand rediscovers the spirit of construction and simplifies the building process.

New Zealand is poised at an infrastructure crossroads. The network we need to thrive and prosper in the 21st century may look very different from the one our forebears built. But that does not mean that we should ignore the lessons of the past.

New Zealand was once able to deliver infrastructure.

There is no reason why we cannot do it again.

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ISBN
978-1-7386009-0-8 (PRINT)
978-1-7386009-1-5 (ONLINE)

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