

*Infrastructure New Zealand*  
**2024 International Delegation**

# Partnering for Growth: **Lessons from Europe**

**Dublin, Ireland**  
**Belfast, Northern Ireland**  
**Copenhagen, Denmark**

**May 2024**





Samuel Beckett Bridge  
Dublin, Ireland

# Foreword

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Trevor Mallard, New Zealand Ambassador to Ireland



**In the past 30 years, Irish real incomes have tripled and income inequality has dropped. There are many factors that have helped: encouragement of foreign direct investment, the highest tertiary education levels in Europe, low corporate tax rates and a community acceptance of the need for immigration for skilled workers have all played a part.**

A step change in the quality of infrastructure has also made a vital difference. The roading network is the most visible example but urban public transport including metro trains, trams and bus lanes, and high-capacity reliable electricity and broadband transmission systems are also much improved. Like New Zealand, health and housing construction remain challenges.

European Union finance in the early years of membership was important, Ireland is now a net contributor. But what has been even more important is a pipeline of projects, as part of an agreed core economic policy stretching forward several decades, across all the political parties that have led the government over the last thirty years.

The New Zealand Embassy in Dublin was pleased to welcome the delegation from Infrastructure New Zealand to Ireland, to help open a few doors and have some opened for us. I hope the lessons of the visit contribute towards an improvement in the decision making that lifts the quality of New Zealand's Infrastructure.

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# Delegation Purpose

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**Infrastructure New Zealand's (INZ) eighth international delegation was several years in the making due to the interruption caused by COVID-19. It was originally planned to occur in March 2020, but was postponed when international borders were closed that month due to the COVID-19 global pandemic.**

INZ is delighted to announce the reinstatement of our international delegation study tour to Ireland and Copenhagen, with the addition of Northern Ireland due to recent interest in City Deals. Over the years, Infrastructure New Zealand has led numerous international delegations to explore how other nations unlock opportunities through enhanced funding and delivery partnerships between various levels of government and the private sector. These delegations have been highly successful in identifying exemplary practices across the infrastructure sector, facilitating the sharing of insights, and stimulating conversation and debate about potential applications in Aotearoa New Zealand.

The purpose of this tour was to investigate first hand, understand the workings and importantly, consider how we might transfer some of what we observe for the benefit of New Zealand. Through site visits in Dublin, Belfast and Copenhagen, and presentations and discussions, we learnt how these successful, small nations are delivering national economic, social and environmental wellbeing.

Influencing the appropriate approach to the future of infrastructure planning, funding and delivery in our country is one primary aim. Of course, delegations are also great connectors of people, and an added benefit of previous delegations has been the opportunity to spend rare and valuable periods not only in self-reflection but also on the generation of new ideas in the company of our peers. Opportunities for networking and collaboration between our private and public sector delegates, as well as with our international experts and hosts, are enormous.

Our first destination, Dublin, Ireland has returned from major economic downturn in 2008 to be one of the strongest performing economies in the EU. Investing in the right infrastructure has been, and will continue to be, a significant factor in achieving that growth along with its culture of embracing foreign direct investment in key sectors.

Belfast, the capital of Northern Ireland, is a city of contrasts, with a vibrant cultural scene and a history marked by periods of conflict, notably the Troubles. The city has undergone significant regeneration, with investments in infrastructure and urban development enhancing its appeal as a business and cultural hub. A reasonably recent City Deal and accompanying investment has reinforced its diverse economy driven by sectors such as technology, financial services, film and screen media, and tourism.

Denmark's advanced and well-functioning infrastructure is one of the secrets of its success. The nation uses its comparatively high tax rates to invest in world-class infrastructure of all types, which plays an integral role in their well performing, low-inequality economy. The dynamic between infrastructure and the Danes' well-established social support networks will also be of interest to many delegates. I am certainly looking forward to learning more about this relationship.

A delegation like this requires a tremendous amount of work and I would like to acknowledge the contribution of a few individuals and organisations who have played an integral role in planning this delegation. In particular, we would like to acknowledge the Infrastructure New Zealand team and those at the Irish Embassy, the New Zealand Embassy in Ireland and Sweden and the INZ member organisations who have assisted with this impressive one-week itinerary.

We invite you to read our key findings here and continue to engage with the INZ team and delegates about how we take these recommendations forward in the New Zealand context as we aspire to improve infrastructure decision making, planning, funding, and delivery.

# Thank you to our 2024 Europe Delegates and Hosts

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**Thank you to our delegates who committed significant time and resources to accompanying our team to Dublin, Ireland, Belfast, Northern Ireland, and Copenhagen, Denmark.**

These insights and recommendations for the future of New Zealand's Government relationship, and water service provision are not only a reflection of the input from the speakers and sponsors we hosted, but the delegates themselves who brought the full weight of their experience to bear in discussions about lessons learnt from each session. The group has directly contributed to this overview of the trip and will be part of a community of the INZ delegation alumni.

## Delegates:

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**Richard Anderson**, Head of Corporate and Structured Finance, Westpac New Zealand Limited

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**Quintin Blackburn**, Senior Principal - Project Delivery, Beca Ltd.

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**Mair Brooks**, Partner, Infrastructure Advisory - Major Projects and Infrastructure, KPMG NZ

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**Jennifer Caldwell**, Partner, National Chair, Buddle Findlay

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**Ed Cook**, Director, Rider Levett Bucknall

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**Simonne Eldridge**, Executive Leader, Clients + Brands, Tonkin + Taylor

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**Mark Fraser**, General Manager, Urban Development and Delivery, Kainga Ora

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**Mayurie Gunatilaka**, NZ Country Leader, Arup

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**Catherine Hemi**, Partner, Frequency NZ

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**Tuhi Isaacsen**, Industry Director, Built Environment, Aurecon NZ Ltd

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**Nick Leggett**, Chief Executive, Infrastructure New Zealand

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**Michael Loan**, Head of Infrastructure, Russell McVeagh

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**Wei Lu**, Head of Investment Banking & Specialised Finance, China Construction Bank, New Zealand

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**Susan Lucking**, Head of Infrastructure, Government & Specialised Finance, BNZ

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**Liz Maguire**, Chief Digital Officer, New Zealand Transport Agency

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**Michelle McCormick**, Policy Director, Infrastructure New Zealand

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**Anthony McFadden**, General Manager, NSW/ACT, QLD & New Zealand, John Holland

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**Paul Melville**, Partner - Infrastructure Advisory, EY

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**Graham Mitchell**, CEO, Crown Infrastructure Partners

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**Karl Nicholson**, Head of Resources, Energy and Infrastructure, ANZ Bank NZ Limited

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**Issy Pasley**, Events and Marketing Lead, Infrastructure New Zealand

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**Ian Purdy**, Head of Direct Property and Infrastructure Investment, Accident Compensation Corporation

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**Katherine Skipper**, Studio Principal, Warren and Mahoney Architects, New Zealand Limited

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**Jane Small**, Group Manager Strategic Development Programmes and Property, Auckland Transport

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**Katrina Van Houtte**, Partner, Dentons

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**David Wood**, Deputy Chief Executive, Investment & Monitoring, Ministry of Transport

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**Fraser Wyllie**, Managing Director, NZ & Pacific, McConnell Dowell

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### Thank you also to our hosts:

|                                              |                                                      |                                                                                                                                       |
|----------------------------------------------|------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|
| Pre-Delegation Briefing and Networking event | <b>Irish Embassy</b>                                 |  <b>Ambasáid na hÉireann</b><br>Embassy of Ireland |
| Pre-Delegation Dinner                        | <b>China Construction Bank (CCB)</b>                 |                                                    |
| Dublin Welcome and Reception Dinner          | <b>Rt Hon Trevor Mallard and New Zealand Embassy</b> |                                                    |
| Day One - Dublin                             | <b>KPMG</b>                                          |                                                    |
| Day Two - Dublin                             | <b>Jacobs</b>                                        |                                                    |
| Day Three - Belfast                          | <b>Northern Ireland Executive</b>                    |                                                    |
| Day Four - Copenhagen                        | <b>ARUP</b>                                          |                                                    |
| Day Five - Copenhagen                        | <b>EY</b>                                            |                                                  |

### The Delegation met with these organisations:

#### Dublin

Central Bank of Ireland  
Irish Department of Housing, Local Government and Heritage  
Department of Housing, Local Government and Heritage, Irish Department of Public Expenditure, National Development Plan Delivery and Reform  
Irish Development Authority  
Irish Strategic Investment Fund  
Dublin City Council  
KPMG  
Port of Dublin  
Transport Infrastructure Ireland  
The Land Development Agency, Ireland  
Uisce Éireann Irish Water  
Jacobs  
Iarnród Éireann Irish Rail  
National Transport Authority

#### Belfast

Translink  
Belfast City Council

#### Copenhagen

Danmarks Nationalbank  
By & Havn  
City of Copenhagen  
Sund & Bælt – Femern A/s  
Metroselskabet – Copenhagen Metro  
Arup  
Danish Ministry of Transport  
DANVA – Danish Water and Wastewater Association  
EY

# Lessons from Ireland, Northern Ireland and Denmark for New Zealand

## Key findings

**Both Ireland and Denmark have had interesting journeys in their socio-economic development post-World War II.**

For a long time, both had lower GDP than New Zealand but now both are materially ahead. Both countries had depopulation issues, with Ireland the starkest, but the city of Copenhagen also suffered with a halving of their population. Through key strategic decisions, Ireland and Denmark have recovered, with their governments both having a strong macro-economic outlook. They have made several key decisions (helped by joining the EU but this wasn't a free gift) to transform their economies after the war which has seen strong economic growth which assists to direct investment into infrastructure. Both have also undertaken major infrastructure projects, especially transport related, either publicly or privately funded, and have delivered these at a scale much greater than New Zealand.

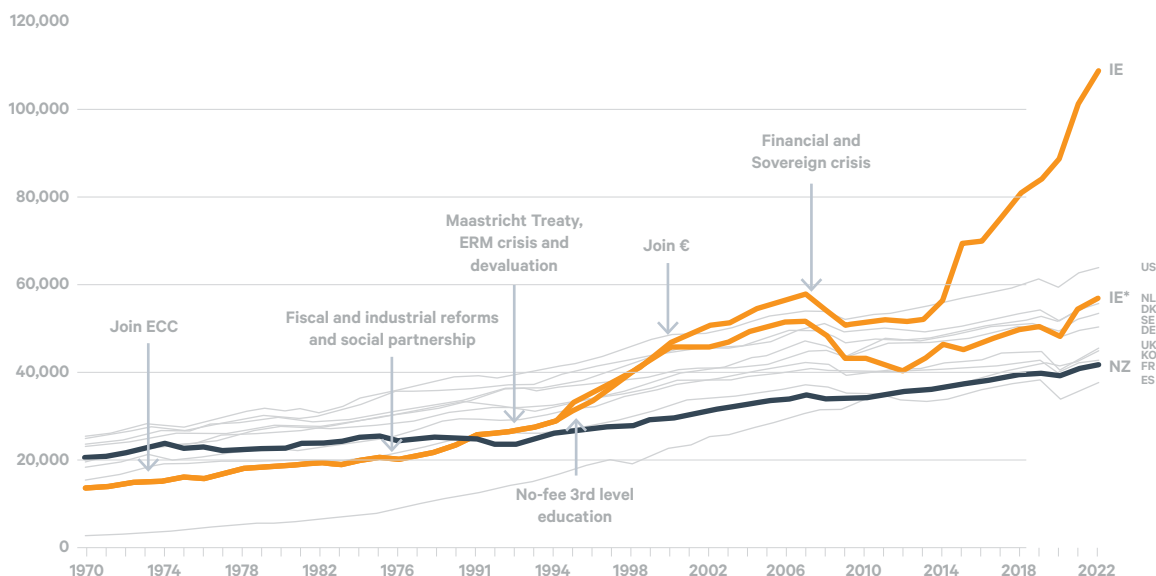
## Ireland

**Ireland's proximity to markets and membership of the European Community have been critical in its ability to attract offshore investment, multinational companies, mobile labour, and provide key policy and regulatory frameworks that impact directly on infrastructure planning and delivery, particularly in the context of climate response.**

Ireland is highly integrated into the global economy. Key drivers of productivity higher than the EU average include an educated workforce (noting that free tertiary education was introduced in the late 1990s) and openness to foreign direct investment (including an open and progressive tax regime). While there has been significant investment in key infrastructure there are still constraints, especially in housing, water (particularly supply), energy (transition to net zero) and transport (including electrification of fleet).

### Irish growth in context - beware headline GDP

Real GDP per capita (GNI\* for IE\*)

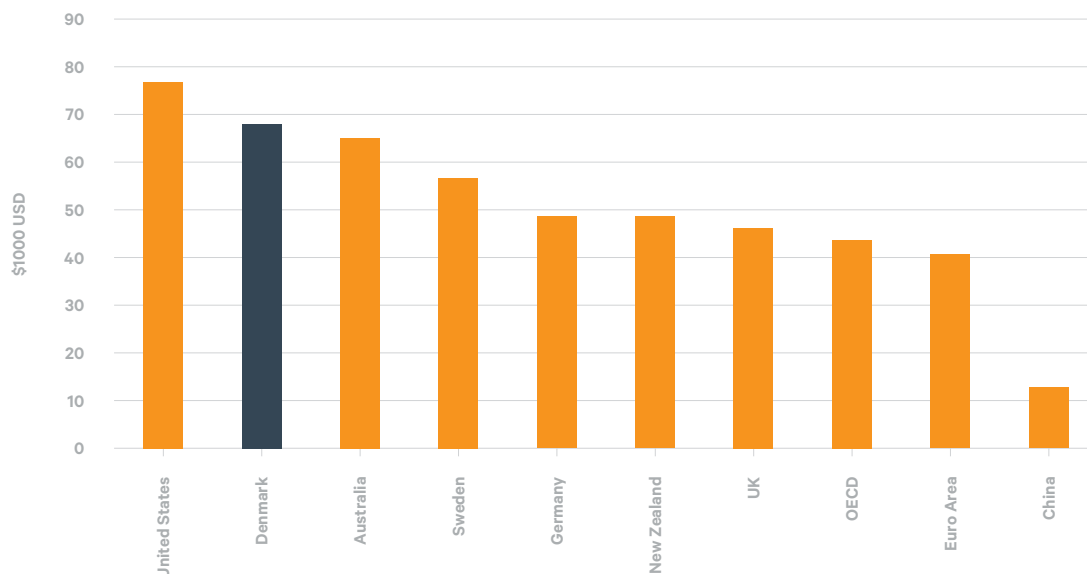


## Denmark

**Danish economic growth has been fuelled by value-added products and services. It is a very flat, low lying country and, with the exception of the shallow North Sea with its consistent winds, it is not blessed with natural resources. Denmark has had its share of hard economic times, and, with considerable foreign debt, it was almost bankrupted as recently as the 1980s.**

Since then, economic recovery has been led by value-added services and products provided by now global companies such as Carlsberg (beverage), Maersk and DSV (logistics), Novo Nordisk (pharmaceuticals) and Vestas (wind energy). Like Ireland, big pharmaceuticals have been key GDP (and GVA – gross value added) generators for this recovery. Novo Nordisk, Denmark's successful pharmaceutical company, produces 12% of Denmark's GDP (compared with tourism at 10%, for example) and the GVA produced by Maersk is even higher. Denmark is part of the EU, but has not joined the Euro, and has an open border arrangement with some EU countries providing access to human resource which also helps to fuel its economic growth.

### Danish GDP per capita is among the highest in the western world



# Political Coalition and Economic Management

## Ireland

### Political Coalitions and Social Partnerships:

Ireland's political coalitions created plans to manage the economy by forming partnership programmes that encouraged industrial peace, fair wage growth and reduced tax burdens. These compromises ensured stability and economic growth.

### Economic Stability:

Despite changes in political power, there has been consistency in enterprise policies, focusing on attracting and retaining businesses through favourable R&D and tax policies. This has led to significant foreign direct investment (FDI) and economic growth, with FDI jobs employing a substantial portion of the workforce.

## Denmark

### The Danish political system supports great infrastructure planning and delivery.

With its 16 representative political parties, governments do not have majority mandates, and this requires political parties to work together. This, and its four-year political term, provides a great platform for efficient infrastructure planning and delivery.

All parties agreed the Public Transport Plan, and all parties, except the Green Party, agreed to their Road Plan. As an example of how this works in practice is that all political parties' transport representatives meet weekly to discuss and agree Denmark's long-term transport plans. Essentially this was explained to the delegation as an unofficial bipartisan agreement driven by collaboration. As a result, transport/ infrastructure issues rarely feature in elections, infrastructure plans are agreed in the background, and long-term planning and execution are enabled and efficient.

### Key insights and recommendations for New Zealand:

- **Form inclusive political coalitions** – New Zealand should form broad-based political coalitions and social partnerships to develop economic plans that promote industrial peace, fair wage growth and tax reforms.
- **Consistency in economic policies** – Maintaining consistent economic policies across political changes can attract and retain businesses, driving economic growth.
- **Seek bipartisan long-term political agreement** – In order to make sustained progress on infrastructure development and address critical gaps, New Zealand should take steps to achieve long-term bipartisan political agreement on significant infrastructure plans and investments such as transport.

## Relationship between Vision/ National Policy and Delivery/ Funding Plans

Ireland and Denmark have clear national visions which are encapsulated in national policy and flow through different hierarchical level plans. But most importantly there is cohesion across different sectors and investment plans to support the implementation of the plans and realise progress towards the vision.

### Ireland

**Project Ireland 2040 combines the twin pillars of the National Planning Framework (NPF) and the National Development Plan (NDP), which provide crucial integration between land use and infrastructure delivery.**

The NPF identifies where urban growth should be located (regionally balanced, city-focused and compact) and requires regional spatial planning. The NPF triggers a domino effect, influencing regional and local plans which are developed by 31 city and county councils. These local plans must align with the NPF, ensuring cohesive and comprehensive planning. The NPF ensures that all levels of government work towards common strategic goals. This reinforcing of the vision through the planning instruments and across government sectors provides a powerful more cohesive framework.

Ireland's NDP outlines a long-term capital investment plan, providing clear funding allocations and priorities. This 10-year investment strategy currently allocates €165 billion to infrastructure projects that align with the NPF priorities including housing, transport and climate change interventions. Ambitious investment is envisaged but delivery has been challenging. The NDP was reviewed in 2021 to ensure alignment with the NPF.

### Key insights and recommendations for New Zealand:

- **The importance of hierarchical planning framework including spatial plans** – There is no shortage of land use planning in New Zealand, but in the absence of either a spatial planning mechanism (such as was provided by the now-repealed Spatial Planning Act 2023) or an integrated infrastructure delivery plan (with funding allocation), progress towards achieving the NPS objectives will be slow.
- **Independent planning oversight** – New Zealand should consider if there is a need for independent planning oversight similar to the Irish Office of Planning Regulator. As the planning context becomes more complex, the need for oversight of compliance and alignment with government policy (and in Ireland's situation, EU environmental directives) should be considered.

## Belfast

Place-based agreements, such as the Belfast Region City Deal, take time to develop but can galvanise strong partnerships and transform a region's economic landscape. The foundations of the Belfast Deal were laid by a comprehensive understanding of the region's economic strengths, weaknesses and aspirations, and being clear about the strategic sectors that should be invested in and enhanced.

- In the Belfast example, funding comes from councils, universities, the Northern Ireland Government, the UK Government, and the private sector. Emphasising private sector involvement ensures all stakeholders have a vested interest in the projects. The focus is on collective investment rather than asset revenue. Effective governance is the deal's backbone, along with regular reporting against the agreed KPIs, but with a long-term view taken to the achievement of the outcomes. A dedicated Project Management Office that coordinates the programme of activities is also important.

### Key insights and recommendations for New Zealand:

- **Successful city deals need to be targeted and specific** – You cannot do everything. The development of city deals require analysis of strengths, weaknesses, where the region wants to head, and then use this to choose specific areas for focus, then identify projects.
- **The importance of having a broad range of partners** – Deals should be wider than just central and local government. Universities are key, especially if technology/innovation is a focus.
- **Need to withstand changes in the founding parties** – Ensure deals signed with central government can weather changes in the political landscape.



## Denmark

Collaboration is a key feature in Denmark's success as a country. Vision and values are translated into the planning framework and into not only their physical infrastructure but also their social infrastructure. Danes are generally proud of their social infrastructure and what their high-income taxes (circa 50%) provide them in terms of their lifestyle and the quality of their built environment.

Urban life is dominated by positive thinking – “what is a good life?” In Denmark this has clearly translated into widely accepted concepts such as:

- No urban sprawl – consent is able to be obtained for compact city living which is high quality
- Great architecture and urban design
- “Facing the water” and being able to swim in clean water is important

### Key insights and recommendations for New Zealand:

- **Establish a clear vision and agreement as a society as to what's important –**  
There is an opportunity for New Zealand to learn from this to be prosperous and retain the things that are important to us.



Cityscape on the Nyhavn Canal  
Copenhagen, Denmark

## Infrastructure Planning and Delivery

**Denmark is looked to as an international exemplar for infrastructure planning and delivery. Both Ireland and Denmark have undertaken a programme of very large infrastructure projects and have the systems in place to achieve this. Both countries have utilised legislation to ensure that significant projects are cemented in place.**

Both Copenhagen and Dublin are smaller than Auckland in population but have metro and light rail systems which are the focus of ongoing expansion. The value of high quality inter-regional road connections is also recognised. All have been planned and delivered over a period of time which supports wider economic activity. Both jurisdictions have a mature approach to risk allocation around who is best placed to manage this, and this was evident in their procurement and delivery.

### Ireland

**Ireland looks to Denmark in terms of its large project governance and delivery expertise. Updated guidance for governance of major projects has been developed which now requires independent external review of projects over €200 billion at key milestones by a major project advisory cross-agency group.**

Implementation of NPF and NDP is monitored with publication of an Investment Projects Tracker every 6-9 months. Interestingly the construction sector group ensures regular open dialogue between government and the delivery sector to secure skills pipeline, drive productivity improvements, improve value for money and focus on ensuring a sustainable construction industry.

### Denmark

**The Danish political system supports great infrastructure planning and delivery. Transport or infrastructure issues rarely feature in elections, which means infrastructure plans are agreed and long-term planning and execution are enabled and efficient, without politically based start-stop interventions.**

#### **Key insights and recommendations for New Zealand:**

- **Re-establish regular construction sector dialogue with government** – Regular engagement with the construction sector on key projects has helped these run smoothly once projects are underway.
- Periodic external scrutiny of project affordability and deferral of final decisions pending updated business cases appear to be worthy of consideration in New Zealand.



Cityscape on the Nyhavn Canal  
Copenhagen, Denmark

## Innovative Funding

**Both Ireland and Denmark have utilised innovative funding and financing mechanisms for infrastructure and take a long-term view of these key assets.**

### Ireland

**Public-private partnerships (PPPs) are used in about 30 live projects, mostly in transport, schools and water infrastructure. The PPPs align with the NDP which also allocates €165 billion across various departments/sectors/regions to align with NPF priorities. Private investment is currently mostly in housing and education, while transport infrastructure is now mostly state funded except for the Metro (Dublin City to airport).**

Ireland has evolving access to sovereign and private funding now. Transport is the best success story with its strategic motorway network funded by EU cohesion funds and the European Investment Bank. The Irish Development Authority's (IDA's) 75-year-old long-term strategy to attract foreign direct investment has been supported by a consistent pro-business approach across successive governments. The IDA delivers development-ready land to market, focused on attracting inbound investment in centres of expertise (pharmaceuticals, medical technology, software, etc).

The Irish Strategic Investment Fund (ISIF), a former sovereign wealth fund, now a development fund with priorities including food and agriculture businesses, climate-related infrastructure and housing, enables investments, for example expanding Irish port capacity to enable delivery of offshore wind. For smaller projects, the ISIF provides a 'patient source of long-term capital', crucial for some projects to be viable and not available from the private sector. The payback period can be longer provided it is still commercial. On residential developments, the ISIF can fund lead infrastructure upfront then a fee is charged on the sale of each site when development is complete. The ISIF can take on higher risk than the private sector would be comfortable with and is also able to remain invested for a longer period to recoup an acceptable return (e.g. a 30-year period to get the full return).

Ireland's attitude towards FDI has been characterised by a welcoming and supportive environment. The country has consistently prioritised creating a stable, business-friendly atmosphere. Key elements of this strategy include competitive corporate tax rates, investment in education and infrastructure improvements. There is also a strong emphasis on maintaining political stability and providing a consistent policy framework that supports both indigenous and foreign enterprises.

FDI has been a cornerstone of Ireland's economic policy, significantly contributing to the country's rapid economic growth, particularly during the Celtic Tiger period (mid-1990s to mid-2000s). Multinational companies, attracted by favourable conditions, have established operations in Ireland, driving job creation and technological advancements. Today, FDI accounts for a substantial portion of Ireland's GDP and employment, with foreign-owned companies employing around 12% of the workforce.

### Denmark

**Denmark also uses innovative private financing especially with the Copenhagen land and metro development model. It also utilises the limited government debt guarantees to fund major bridges and tunnel connections.**

Mega projects are financed by central government with its favourable financing options. The government's AAA credit rating is used to secure low-cost finance for Denmark's infrastructure, including water.

The Mega projects all have very strong drivers for revenue capture (e.g. the ability to set tolls for roads significantly less than pre-project ferry tariffs, with no or significantly longer alternative routes).

### **Key insights and recommendations for New Zealand:**

- **Effective use of PPPs** - Implement PPPs judiciously, learning from Ireland's experiences to avoid potential pitfalls and ensure efficient project delivery. New Zealand needs to look to expand sources of funding for infrastructure.

## Water Regulation, Funding and Management in Ireland and Denmark

**It was interesting to contrast the different approaches to water service provision between Ireland and Denmark. The focus has been on water investment, especially wastewater and improving waterways due to EU requirements. Both countries had economic regulation and widespread use of water meters with full regulation of the sector (same in UK).**

Ireland is still undergoing a full transition to one water service provider, Uisce Éireann (Irish Water) which has control of all water and wastewater, with 80% of it funded by central government. The distribution/collection networks are old and bigger than they need to be with high levels of leakage (33% of water in Dublin is lost due to leakage). Leakage as well as a lack of user charges means demand is very difficult to control. Unfortunately, the domestic user charging model collapsed in 2016 due to public pushback and lack of political commitment (though all households are metered).

Water shortages are forecasted due to climate change. Steps are being taken now to pipe freshwater from the Shannon River in the south (170 kilometres away). This project has a 10-year timeframe including a business case, spatial planning and a public hearing process.

By contrast, Denmark has maintained local control of water service providers – 65% of water works (by volume) are municipality-owned, and 35% are community-owned cooperatives. Despite some consolidation, local ownership of water assets is preferred. Water companies share efforts in certain areas while retaining local ownership and contracting delivery to the private sector. Denmark also relies entirely on groundwater and culturally, it is considered unacceptable to consume surface water.

Metering is very high and there is consumer acceptance of charging. This means the water services companies recover all of their costs from users (based on metering) and there are no tax grants to the water sector. The user-pays model and the structural separation of water companies from municipal balance sheets have been successful, although pricing will come under pressure in the future as capex requirements increase (in particular to address the increasing investment required for climate adaptation).

### Key insights and recommendations for New Zealand:

- **Metering and user charges are important but need to have consumer understanding** – The pricing system is based on full-cost recovery and user pays, subject to regulated revenue caps. Not only does this approach generate revenue but more importantly it directly drives consumer behaviour and reinforces water conservation.
- **Consider climate change impacts on water provision now** – Forecast changes in rainfall and its location are being planned for now.



## Transport Infrastructure

**Both Copenhagen and Dublin have achieved a lot in transport infrastructure given they are of smaller size and population than Auckland. Copenhagen has four metro lines (and is starting to build a fifth), a major regional train network and international roading links. Dublin has light rail, a tunnel under the city, excellent regional connectivity through motorways (some of which are tolled and were developed using PPPs) and a new metro (which will have a PPP element).**

Belfast has developed the Glider rapid transit system along its east to west corridor and plans to add a north to south corridor.

There is real ambition in all three cities in terms of transport system provision and a good understanding of how good access supports the wider economy as well as social interactions.

All modes (walking, cycling, public transport, road and rail) are considered vital in Ireland and Denmark and have a clear place in national transport strategies and plans. In Ireland, this national direction is translated at the local level through specific city strategies which also contain clear targets. Transport plans are supported by funding from general taxation with a few additional user-pays projects.

Denmark has also delivered significant user-pays/public-private mega projects, including the Great Belt Fixed Link to Norway, the Oresund Fixed Link to Sweden and the Fehmarn Belt Fixed Link to Germany. These projects justify a user-pays approach due to their inability to be funded from the state budget, the public's familiarity with paying for travel, lack of free alternatives and the associated significant travel time reductions of using these routes. The projects are managed by state-owned companies responsible for planning, construction and financial management, with funding raised through state-guaranteed loans and repaid by tolls. It's anticipated that the tolls will remain once the loans have been repaid.

The Copenhagen Metro is owned by three public entities (Danish State, City of Copenhagen and the City of Frederiksberg). It has a 'five-finger' design plan with metro lines being built radiating away from the city circle along five corridors and carrying 120 million passengers per annum. Autonomous electric trains depart every 1.5 minutes, 24 hours a day and have a 99%+ reliability rate. Capex costs for Metro have been funded by land sales, including the development of the initial metro line. The first development was south of Copenhagen in 2002, which cost €6 billion. The same approach will continue with the Lynetteholm development. The risk sits with Metro, but it is funded by a government loan with operational surpluses repaying the loan over a 40-year period.

### Key Metro design aspects:

- Small trains, high frequency (three car trains, 39 metres long, 350 people per train). Potential to extend to four trains to increase capacity by 30% (stations have been sized to allow for this expansion if required).
- Station size kept as small/shallow as possible as this reduces capex and maintenance costs. Stations focused on people entering and leaving rather than 'lingering'. Electronic ticketing used with tap on, tap off function. Small stations require less space and are cheaper with standardised designs used. Shallow tunnelling is also more cost effective.

Planning is underway for a Metro line extension (M5) and the Danish government is looking to utilise more collaborative forms of contract with the main contracting entity.

On a smaller scale, as a component of the Belfast City Regional Deal, Belfast chose a cost-effective and flexible public transport option over more advanced modes, such as light rail. Light rail was rejected due to it being estimated to cost three times the costs of a bus rapid transit (BRT) system. Recognising potential negative perceptions of a BRT system, Translink developed a comprehensive strategy to address this, including branding using the Glider name, distinctive bus design and a targeted marketing strategy. The bus stop design incorporates off-board ticketing, public art and real-time journey information, differentiating it from other city bus services.

### Key insights and recommendations for New Zealand:

- **Integrated planning** – Develop comprehensive transport strategies for major urban areas, similar to Ireland's approach. There is also an opportunity for New Zealand to leverage the Danish approach to longer-term planning as well as utilising its funding Special Purpose Vehicle.
- **Major project funding** – Copenhagen has adopted an innovative approach to sourcing funding by selling/developing land. What innovative approaches could New Zealand consider to supplement funding for major infrastructure projects?
- **Ensure there is clear design 'intent' for any future metro, light rail or rapid transit projects in New Zealand**  
– Consider the need for eight-to-nine car trains that many metros adopt. Copenhagen's approach of small, high-frequency trains reduces capex and opex costs, as well as carbon footprint. Station design is all about moving people in and out quickly. Keep design for station 'boxes' to the minimum and where possible as close to being within the cross-section/envelope of the tunnel itself. This generates significant costs savings.
- **A more collaborative form of contract**  
– Note Copenhagen Metro's intent to establish a more collaborative form of contract with contractors for the upcoming M5 metro extension project. This is similar to the efforts of the New Zealand Construction Accord, and Infrastructure New Zealand should continue to advocate for this to major government agencies such as NZTA, AT, KiwiRail and Watercare.

## Climate Change and Resilience

**Copenhagen and Dublin are both focused on climate change and building resilience within their infrastructure. Viewing these challenges as opportunities has enabled these countries to take a long-term approach but build in short-term actions to address immediate resilience issues while remaining agile to deal with the future environment and adverse impacts.**

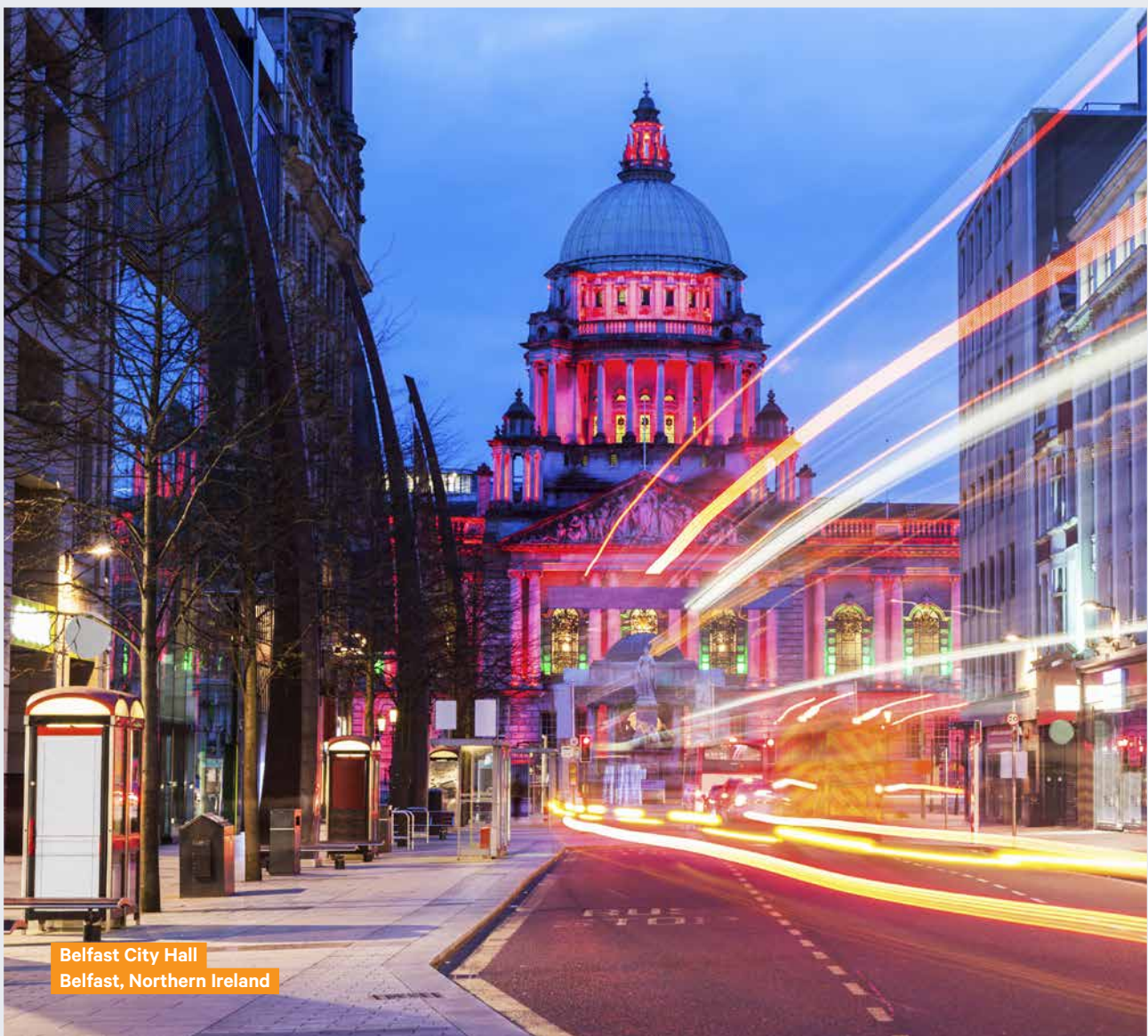
Ireland East Coast Railway Infrastructure Protection Projects (ECRIPP) is a critical initiative aimed at safeguarding the scenic railway along the coast south of Dublin. This 65-kilometre route is particularly exposed to coastal erosion and the effects of climate change. The ECRIPP project was developed to ensure the long-term sustainability of the corridor and to support a climate-resilient society. The initial phase of the project involved extensive data collection through various methods. Based on the data gathered, several potential solutions were scoped, such as rock revetments, groynes, curved walls, beach nourishment, breakwaters and seawalls.

Funded by the Department of Transport, the ECRIPP project faces unique challenges typical of coastal management projects. The planning process involves a two-stage approach. The first stage consists of creating a long list of solutions and assessing their feasibility. The second stage uses a multi-criteria analysis to evaluate these options comprehensively. A risk-based approach, incorporating a risk matrix, helps prioritise spending to maximise the project's impact.

Following a major cloudburst event in 2011, Copenhagen was prompted to develop a comprehensive water management plan, following the natural flow of water. This plan involves surface infrastructure projects with an implementation period of 20-30 years. Looking longer term and as a solution to address storm surges and coastal erosion has seen the development of a 50-year solution. This initiative is Lynetteholm, a major reclamation project at the mouth of the harbour. It is also a new major urban development project that will finance new metro lines and a new bypass. It solves three problems – financing infrastructure, protection against flooding and reducing pressure on housing market. It is on a large scale and will provide housing for an estimated 35,000 new residents and should be completed in 2070.

### Key insights and recommendations for New Zealand:

- **Climate change challenges offer opportunities** – A long-term vision (up to 2100) can underpin key transport corridors such as Ireland's East Coast railway by focusing on maintaining and protecting existing infrastructure, rather than looking to an entirely new and much more expensive solution. While addressing climate change resilience challenges, also look to see what other issues can be addressed with one solution over the long term.



Belfast City Hall  
Belfast, Northern Ireland

# Partnering for Growth

## Delegation Session Summaries

### Pre-Delegation Briefing and Welcome Events

Prior to departing New Zealand, the Europe Delegation was briefed on the study tour programme at an event kindly hosted by the Irish Embassy with thanks to Ambassador, Her Excellency Jane Connolly, Deputy Head of Mission Paul O'Hara, and team.

INZ's Partnering for Growth: Lessons from Europe Delegation commenced in Dublin, Ireland, with a warm welcome by Ambassador the Rt Hon Sir Trevor Mallard and the New Zealand Embassy team at the official residence. Thank you, Ambassador Mallard for welcoming us and also for joining us for some of the business session in Dublin. We really appreciated your insights and the connections you were able to make between the contexts in each country. Thank you also for kindly agreeing to provide the foreword for this report.

### Pre-Delegation Dinner

Hosted by   
**CCB**

Before delegates left for Europe, we were pleased to be generously hosted by CCB New Zealand at Shed 5 in Wellington. Thank you to CCB for hosting us.



### Day One 13 May – Dublin, Ireland

Hosted by 

#### Overview

Day one of the delegation was hosted by KPMG in its Dockland offices located in the urban regeneration area that had previously hosted port operations.

The first sessions provided an introduction to the Irish economic story, particularly highlighted by the Irish Development Authority presentation which outlined its 76-year history. The transformation had been many years in the making as the country transitioned from an agricultural economy to the more diverse and global trade economy it is now. A 'Team Ireland' approach to foreign direct investment was fascinating as it ensures investors have a great experience, and barriers are removed. The delegation also gained insights into Ireland's central planning system and how this was translated and implemented at the local level during a session with Dublin City Council.

A lunch session covered the climate impacts including the development of a second National Adaptation Plan. The focus of this is on the integration of local spatial plans and better integration between different sectors. The group then rode the Luas tram down to the Port of Dublin where we undertook a seaside tour of the port in challenging weather conditions. This provided a great insight into how well the wharf and surrounding land space were utilised. Post-Brexit, this port is extremely busy.

## Central Bank of Ireland – The Irish Growth Story

**Ireland's economy is strongly underpinned by its relationships with multinational enterprises (MNEs) and an open economy approach.**

This strategic openness, developed with targeted sectors in mind, enables Ireland to maximise the potential of its relationships with MNEs. The consistency of this approach, despite changes in government over the years, provides stability and certainty for these enterprises. A significant part of Ireland's appeal lies in its connection to the European Union, which enhances its attractiveness to global businesses, as well as its commitment to a highly educated population, which has become one of its greatest assets.

Ireland has focused on enhancing the skills of its workforce by offering free tertiary education, thereby increasing the skilled labour pool and enticing global multinational corporations to set up operations within the country. The funding and financing landscape for infrastructure projects has also evolved, with Ireland's return to surplus reducing the reliance on private capital for some projects. However, public-private partnerships remain important due to other contributing factors, including the ability for the private sector to manage the whole of life integration and transition from construction to operations. Ireland is planning to significantly increase its annual infrastructure investment, addressing substantial needs in housing, transport (including public transport and electrification), energy, and water.

A critical issue facing Ireland is its housing shortage, exacerbated by a halt in new builds following the global financial crisis (GFC). To address this, Ireland aims to increase housing production to approximately 50,000 units per year, as outlined in the national planning framework. Additionally, Ireland seeks to leverage its position by boosting investment in offshore wind energy and new transmission lines between Ireland, France and the UK. This would not only improve Ireland's renewable energy proportion but also position the country as a potential net energy exporter. Nonetheless, challenges remain, including managing an ageing population.

### Key Lessons for New Zealand:

- To maximise the benefits to the economy, we require consistency in the approach to private investment and the 'vision' for New Zealand. Ireland made a considered decision to actively seek out foreign investment in targeted sectors, an approach that has been endorsed and continued by successive governments. The resulting policy stability has paid dividends with continued investment into the country from the private sector. We can learn from the need to provide certainty in our approach to private investment and being clear on the scale and pipeline of opportunity if we want to form long-term, sustainable relationships.
- Planning regime and ultimate vision are very important. The housing stock that was being developed pre-GFC was suboptimal in location as local authorities were making decisions without a broader plan. The current approach is more targeted and supported by other investment in enabling infrastructure.

*Susan Lucking, Head of Infrastructure, Government & Specialised Finance, BNZ*

## **Department of Housing, Local Government and Heritage and Department of Public Expenditure - National Development Plan Delivery and Reform**

This was followed by a session on Project Ireland 2040 and the National Planning Framework by representatives from the Department of Housing, Local Government and Heritage. It was useful to gain an understanding of the Irish planning system layers and spatial planning elements, including the EU relationship.



## **Irish Planning System: Project Ireland 2040 – The National Planning Strategy**

The Irish planning system is characterised by a clear three-layer hierarchy: national, regional and local. Achieving policy alignment at all levels has taken six years. The National Planning Strategy, part of Project Ireland 2040, includes the National Development Framework and the National Development Plan. This strategy addresses critical issues such as housing shortages, ghost estates post-GFC, climate change impacts, congestion, infrastructure deficits, and social and economic inequality.

### **National Planning Framework**

Introduced in 2018, the National Planning Framework (NPF) is a high-level strategic plan guiding Ireland's development until 2040. The NPF is a key component of the national planning strategy, setting national objectives and principles to ensure sustainable economic, social and environmental development. It tackles population growth, job creation, housing needs, regional balance and climate change, promoting balanced regional growth and urban regeneration.

### **Spatial Planning and Legislation**

Spatial plan development is governed by EU directives, emphasising social, economic and environmental pillars. The NPF, which is reviewed every six years, provides a foundation for Regional Spatial and Economic Strategies and city and county development plans. The Office of the Planning Regulator oversees these plans, ensuring alignment and evaluating implementation.

### **National Development Plan**

The National Development Plan (NDP), a €165 billion investment for infrastructure until 2030, aims to distribute growth predominantly outside Dublin. It delineates sectoral spending and targets urban and regional development, although progress is ongoing and subject to revisions. The National Development Plan has more than 1000 projects valued at over €20m in it. These are regularly tracked, and the results published.

### **Land Activation Measures**

Ireland is implementing measures such as the residential zoned land tax to encourage development and address housing issues. This tax, still under consultation, imposes a 3% annual charge on the market value of undeveloped land, aiming to disincentivise land banking and promote housing delivery.

## Monitoring and Governance

The implementation of Project Ireland 2040 is overseen by various leadership groups and a cross-government coordination group, ensuring consistent tracking and adjustment of projects. High-profile delayed and costly projects, such as the National Children's Hospital, have led to revised governance arrangements to enhance oversight and procurement strategies, drawing on international best practices from Denmark and Norway.

### Key Lessons for New Zealand:

- There is real power in having a clear comprehensive national strategy with a vision with other documents cascading directly from this such as a National Planning Framework, regional spatial plans and local plans. National direction and policies on key aspects, such as population targets, urban development patterns, and access to healthcare, education, and transport, that align make a difference. All government policy aligns with the National Planning Framework and marries capital investment to the Plan.
- Clear roles on implementation, including the establishment of an independent Office of Planning Regulator which ensures local authorities and the responsible government departments correctly implement national and regional policy at all stages of the planning process.
- Consider land activation measures such as a residential zoned land tax designed to bring forward development on land not yet developed, and disincentivise land banking.
- Look to international best practice on large-project procurement and delivery – take advice from the likes of the International Monetary Fund and other countries that do it better.
- Maintain dialogue directly between government and the construction sector and monitor delivery progress openly.

*Michelle McCormick, Policy Director, Infrastructure  
New Zealand*



## **Irish Development Authority – Ireland's Foreign Direct Investment Story**

**The Irish Development Agency (IDA) was established 75 years ago and now has 360 staff, a budget of €200 million and 21 overseas offices. IDA has 1800 clients employing 300,000 people, or 12% of the Republic of Ireland workforce.**

Ireland has a big focus on tertiary education; 63% of young people have degrees. IDA has a close relationship with universities. Having a highly educated workforce makes Ireland a more attractive investment destination for companies involved in the tech sector.

Ireland is part of the EU and has very low company tax rates (12.5% until 2023) even by European standards (15%).

It is widely accepted that foreign direct investment is good for Ireland; it brings jobs and has resulted in many new 'spin-out' companies from the large multinationals that have based themselves in Ireland. There is a 'Team Ireland' approach to welcoming investors and removing investment barriers.

IDA has a regional property strategy. IDA owns 52 business parks and 22 strategic sites in regional areas. IDA builds ahead of demand so it always has land and/or facilities ready to go for international players who need space. In this way Ireland can spread the benefits from foreign direct investment around the country. The IDA focuses its attention on companies that it believes will have a competitive advantage in Ireland.

### **Key Lessons for New Zealand:**

- Opposition to foreign direct investment in New Zealand is largely limited to the purchase of farmland, and the purchase of existing business. The regulatory regime reflects this position. There is seldom opposition to foreign firms setting up new operations in New Zealand, which is the kind of FDI that IDA is promoting. However, new large manufacturing operations typically require large land areas and may therefore still require OIA approval. Local authorities that have built business parks have come under strong criticism from the property sector (e.g. CentrePort's Harbour Quays Precinct) objecting to the use of ratepayer funded competition. One possibility is to create FDI zones (potentially owned by Crown financial institutions) where manufacturing facilities are permitted.
- New Zealand's corporate tax rate is currently 28%, while it is 30% in Australia (28% for small companies). Lowering it further would have significant implications for the relationship. New Zealand does have a screen industry grant that provides significant rebates for film investment. Consideration could be given to extending this rebate to adjacent sectors such as computer games and music.
- IDA focuses its attention on companies that it believes will have a competitive advantage in Ireland. Potentially lower tax rates for agritech companies, climate reduction technologies or oceanographic research.
- New Zealand needs to significantly improve its performance in education. This is vital, but how?

## **Irish Strategic Investment Fund – Investing with Impact**

**Part of the National Treasury Management Agency, the Irish Strategic Investment Fund (ISIF) used to be a €20 billion sovereign wealth fund. However, the majority of the fund was used to bail out the Irish banks during the GFC. The remaining €5 billion to €6 billion was used to form the ISIF.**

The fund has the twin objectives of delivering investment returns and making an economic impact. A key element for an economic impact is that the investments made by the fund create additional economic benefits rather than displacing economic activity that would otherwise have happened.

The fund invests primarily in two ways:

- First, by investing as a minority investor in international infrastructure funds. A condition of ISIF's investment in the fund is that the proportion of the fund invested in Ireland is higher than ISIF's proportional ownership of the fund. This has successfully 'crowded in' investment into Ireland and brought some of the best venture capital fund managers to Ireland. Investment returns have been good. This has resulted in €10 billion of co-investment into Ireland.
- Second, the fund invests directly into projects in Ireland. There is no restriction on the way that ISIF does this in terms of structure.

### **Key Lessons for New Zealand:**

- This style of investing is challenging. The requirement for additionality pushes the fund into taking risks that other investors wouldn't normally take. Because the fund is taking risks that others won't, it becomes very difficult to determine the returns that are required and benchmarking investment returns becomes very difficult.
- New Zealand has recent experience of this kind of fund with the Regional Growth Fund, the Shovel Ready projects and NZ UP programme.
- There is a significant risk that the fund deteriorates into investing in the pet projects of ministers. A far better approach would be to have separate agencies for investment (e.g. NZ Super) and delivery of strategic assets (e.g. NZTA, Kāinga Ora).



## **Dublin City Council – Central-Local Government Relationship Arrangements for Infrastructure Delivery**

### **Evolution of Infrastructure Planning: From Fragmentation to Coordination**

Historically, Ireland's local authorities operated independently, leading to uncoordinated planning efforts. Growth pressures necessitated a structured planning framework, resulting in a three-tiered structure encompassing national, regional and local levels. This structure, developed gradually, aims to align local planning efforts with national strategies.

#### **The Three-Tier Structure**

1. **National Level:** Provides overarching strategic direction and policy guidelines.
2. **Regional Level:** Regional bodies, once weak in governance, now play a significant role in planning, ensuring compliance with national directives.
3. **Local Level:** Local authorities create and implement development plans tailored to their specific contexts.

The National Planning Framework (NPF) and the National Development Plan (NDP) are the cornerstone of Ireland's infrastructure strategy, setting investment priorities and growth targets. Regional governance ensures local alignment with national strategies, a structured approach that was absent before 2000. The Minister for Housing, Planning, and Local Government provides strategic direction, ensuring cohesive development strategies nationwide.

#### **Regional Spatial and Economic Strategy**

The Regional Spatial and Economic Strategies aligns local plans with national and regional policies, undergoing multiple debates among councillors to ensure political buy-in and adherence to broader objectives.

### **Local Authorities and Development Plans**

Local authorities balance local priorities with national objectives in their development plans. However, tensions often arise when changes to boundaries or policies are proposed. Local governments are incentivised to foster business development as a significant funding source. Coordinated central policies and planning regulations have emerged in response to financial pressures and developmental challenges. Local authorities also oversee individual building projects, with planning applications appealable to a state body, ensuring alignment with national priorities. Local Area Plans (LAPs) engage residents deeply invested in local developments, balancing local desires with national policies. The role of politicians is to establish the policies which are then administered by professional staff. The aim to reduce political interference in planning processes.

#### **Planning Regulation and Oversight**

Following tribunal recommendations, the Office of the Planning Regulator monitors local plans to ensure adherence to national policies, advising the minister to intervene if necessary.

#### **Key Lesson for New Zealand:**

The evolution of Ireland's infrastructure planning reflects a shift from fragmented local efforts to a more coordinated and hierarchical approach. While challenges remain, particularly in balancing local loyalties with national priorities, the establishment of a three-tiered structure, regulatory oversight and strategic planning frameworks like the NPF and NDP signify substantial progress. As this system continues to evolve, it promises a more cohesive and effective approach to infrastructure development in Ireland.

Overall, councils and communities have a lesser role, funding responsibility and voice than New Zealand when central government directs transport projects through their cities and towns. This appears to improve both delivery, and progress.

*Nick Leggett, Chief Executive, Infrastructure New Zealand*

## KPMG Ireland – Climate Roundtable Session

**The Climate Action and Low Carbon Development (Amendment) Act 2021 commits Ireland to 2030 and 2050 targets for reducing greenhouse gas (GHG) emissions and providing the governance framework. Net zero by 2050. And to provide for resilience and establish a climate framework.**

The National Adaption Plan is centrally led. It includes sectoral adaption plans taking into account:

- Inland and coastal flooding/weather events
- Heat-related risks

It is currently being updated to reflect lessons learnt since it was launched in 2018:

- Including engagement with private sector and local government
- A key sticking point has been delivery of actions within each sectoral plan

It suffered from silo decision making which has led to misalignment across sectors and lessons learnt include:

- The need for better integration cross sector with spatial planning
- Avoid adaption in one sector that has a negative impact on another sector
- Better use of nature-based solutions integrated with engineered solutions
- Climate change projections need to be set at a national level – consistent approach to data and scenarios

Private sector adaption is being driven by the EU taxonomy (allows financial and non-financial companies to share a common definition of economic activities that can be considered environmentally sustainable) and to assist green investment decisions, consider impact of flooding risk and extreme temperatures on assets. There is a Taskforce on Climate-related Financial Disclosures (TCFD).

Government investment assessments taking into account resilience of infrastructure (sweat the assets and make then resilient). Starting to see squeeze in insurance market with some areas not able to get insurance. Only just starting to think about retreat, for example SouthWest Ireland. Dublin Harbour will see twice the average sea level rise than that forecast for other areas. The Office of Public Works looks after all flood defences across Ireland and is starting to apply an adaptive management approach.

### Key Lessons for New Zealand:

- Ireland tends to look at New Zealand due to similarities (excluding natural hazards) – both nations are grappling with similar issues.
- National leadership with consistent scenarios using data and a cross-sector approach.

*Simonne Eldridge, Executive Leader, Clients + Brands, Tonkin + Taylor*

## **Port of Dublin – Post Brexit plans and development**

The tour of the port from the seaside was amazing and really gave a great insight into how well the space was utilised. Post-Brexit, this port is extremely busy but has plans to develop brownfield and provide more land back to the city. Dublin Port handles nearly 50% of all trade in the Republic of Ireland, serving as the main gateway for trade, passengers and ferries. Located in the heart of Dublin City on the Liffey River, it is well connected to the national road and rail networks.

### **Post-Brexit Experience and Future Development**

Following Brexit, Dublin Port has navigated increased trade complexities and adapted its operations to maintain efficiency. The port's strategic location and infrastructure have been critical in managing these changes.

### **MasterPlan to 2040**

The Port's MasterPlan to 2040, currently undergoing its third review, outlines future development and expansion strategies. One significant project includes the granted maintenance dredging of the inner Liffey Channel and Dublin Bay to accommodate larger vessels and improve navigability. The 300-year old seawalls which still protect the shipping channel were impressive but will need to be strengthened to address climate change resilience concerns.

## **Urban Regeneration and Docklands Development**

Port operations have been consolidated closer to the river mouth, creating opportunities for urban development in the former port areas. The Dublin Docklands have undergone significant regeneration, transforming into a vibrant area with mixed uses, including offices, entertainment, retail, and housing. The Luas tram line enhances connectivity, making the docklands a dynamic part of Dublin's urban landscape.

### **Key Lessons for New Zealand:**

- International ports continue to develop their activities and are relocating these away from urban development.
- Importance of Ireland tending to look at New Zealand due to similarities (excluding natural hazards) – both nations grappling with similar issues.
- Clear role for the port and national leadership with consistent scenarios and data and cross sector approach.



## Day Two

### 14 May – Dublin, Ireland

Hosted by **Jacobs**

#### Overview

**Day Two of the delegation was hosted by Jacobs in its Sandyford offices which was accessed using the Luas tram.**

Luas is 20 years old this year and there are plans to celebrate this milestone and the system's success. Presentations provided further insights into Ireland's transport system, including funding and plans to continue charging tolls once the PPP's concessions have expired after 2033 in order to maintain a revenue stream. Delegates gained an understanding of the National Transport Authority and its role in integrated transport planning for Dublin City. Improving walking and cycling routes and reallocating road space have been successful as the city looks to implement its six-year development plan. A major development is the planned bus corridors which will commence construction shortly.

With Ireland looking at gaining an additional 1 million more people by 2040, the Land Development Agency outlined the work it is doing to rebalance the location of housing across the country. Like New Zealand, water infrastructure is also a challenge despite there being massively increased investment and the forming of one national utility, Uisce Éireann. Resiliency projects like the plan to take water from the River Shannon to supply Dublin are ambitious. Other climate resilience work is being undertaken in Ireland in order to address coastal erosion, particularly around critical rail lines. Later the delegation headed to Connolly Station to catch the train to Belfast.

## Transport Infrastructure Ireland – Transport Planning, Funding, Delivery and Operations in Ireland

**Transport Infrastructure Ireland (TII) is a state agency and reports to a board. It provides funding to local authorities that procure transport projects that comply with standards set by the TII.**

Generally, TII's roads functions are discharged through local authorities. TII works hard on its relationship with local authorities, providing training and an annual conference. The positive relationship allows them to collaborate and work efficiently together.

Ireland has a highly dispersed population and the highest density of roads in Europe. Of the 100,000km of roads in Ireland, TII manages 5400km of inter-urban roads. These roads carry >50% of Irish car journeys and >99% of domestic freight. More than 200 million public transport trips also rely on using the National Road Network (NRN).

TII develops infrastructure for the Luas (the light rail system, and Luas is the Irish word for speed) and its rolling stock. Opened in 2004, the Luas system comprises three lines covering a total distance of 43km. In 2023 there were 48.2 million passenger journeys on the network. TII is also responsible for greenways, the national cycle network and the Dublin MetroLink. MetroLink is the proposed high-capacity, high-frequency rail line running from Swords to Charlemont and connects Dublin City to the airport. The 18.8km route will provide for 50 million passengers a year.

Better Road User Charging Evaluation (BRUCE) is a strategic decision-making process to explore future options for the next generation of road user charging in Ireland. Currently there are 13 PPP concessions over 400km of highway with 12 tolling points. Many of the PPPs expire between 2033 and 2037. TII is considering whether highways should continue to be tolled after the debts have been repaid in order to provide an ongoing revenue stream beyond the consolidated fund.

### Key Lessons for New Zealand:

- Incremental roll-out of road user charges needs to be thought about from an equity lens and the wider benefits need promoting (climate and financial sustainability, demand and disruption management, pollution reduction)
- The handback of any PPP projects needs to be thought about upfront (e.g. will the roads continue to be tolled beyond the PPP period of 25-30 years?)

*Tuhi Isaachsen, Industry Director, Built Environment,  
Aurecon NZ Ltd*

## Ireland's Land Development Agency – Unlocking Land for New Homes

**Ireland has struggled with a boom-bust cycle in housing. Leading up the GFC, it was building 90,000 to 95,000 homes per year.**

The sector collapsed during the GFC and the government raided the national superfund to bail out the banks. There was evidence of this crisis still with ghost houses visible from the train in the middle of nowhere between Dublin and Belfast. Developers were building projects of 100+ dwellings in villages that had populations of 300 and were not necessarily where people wanted to reside. After the GFC, housing construction was almost zero for the following 7-8 years.

Now there is a significant housing shortage, and the population is growing fast. Ireland needs to be building about 35,000 homes a year, or more, with 65% growth in greater Dublin, which holds a third of the country's population. There is a similar culture to New Zealand in attitudes to housing and density, with a history of rural living and single-site housing. Ireland is trying to make the shift to more sustainable urban forms just like New Zealand.

LDA is a commercial state-sponsored body established in 2018 to coordinate public lands to provide affordable and social homes. It has 150 staff. It has mapped all public land in Ireland in cities of more than 10,000 people. Twenty sites have been identified for transfer to the LDA subject to due diligence. The LDA was given a €\$3.75 billion grant and is able to borrow a further €\$1.2 billion giving a capital base of €\$5 billion. It will use this to develop and recycle capital from development profits and sales. A housing plan for Ireland, Housing for All, was released in 2021 and sets a delivery target of 33,000 homes per year.

LDA partners with the development industry as they are the ones that will build most of it via various sales and development agreements. Interestingly it was commented that the projects that have stalled are those where the private sector is the development project partner with the LDA.

There is going to be a land tax of 3% per annum applied to sites that the government/planning says should be developed and aren't. This is a very strong stick to force people to release/sell land for housing rather than continue to hold and land bank. The LDA is run on a commercial basis but will accept a positive return over time rather than the private sector's 20% return at project completion – 'low and slow'. The LDA has to build affordable housing (50% of builds) and a further 20% of builds as social although the definition of social is much wider than New Zealand's. The affordable is owned by the local council or territorial authority and they take a 20% equity stake. The LDA is also targeting affordable rental where the LDA will be landlord. The target is 800 homes over four years. The LDA also acquires land to get development happening faster. If LDA sells land that will fit more than five homes, then the development must also include affordable homes.

In Ireland, a Tier 1 builder is delivering 2000 to 3000 homes per year and there are several Tier 1 builders doing this and they are much larger than New Zealand's largest builders. But building affordable apartments is hard, just as it is in New Zealand. The LDA affordable product faces slow uptake for buyers, especially in regional markets. The LDA affordable rental is in very high demand. Rental rate is set at 35% of income and there is significant demand, for example 6000 applications for 300 homes.

### Key Lessons for New Zealand:

- There is obvious inter-agency/public sector collaboration 'and they don't fight in public'
- Centrally led sector coordination and the characteristics of Ireland's construction market has allowed a significant increase in the scale of residential building in a relatively short time. Although it still needs more because they underbuilt for so long.

*Mark Fraser, General Manager, Urban Development and Delivery, Kainga Ora*

## Irish Water/Uisce Éireann – Irish Water Infrastructure Funding Arrangements and Service Delivery

### Background

Irish Water was established in 2014 and rebranded to Uisce Éireann following the Water Services (Amendment) Act 2022. It is 100% owned by the Irish Government and consolidates all drinking and wastewater assets from 31 local authorities. The assets are now consolidated, but this was fairly recent, and they are still working through the final stages of implementation. There is a progressive transfer of staff from local authorities until 2026; most underground assets have been transferred, and 500 above-ground assets are still pending due to consent and ownership issues. Irish Water provides national water and wastewater services to residents (80%) and businesses (20%).

In the decade since 2014, there are around 70 new or upgraded water treatment plants, and around 125 new or upgraded wastewater treatment plants. This work has been driven largely by EU water directives, particularly on drinking water, wastewater treatment (tertiary and aiming for quaternary), water quality, with an urban wastewater treatment directive coming shortly.

The distribution/collection networks are old and bigger than they need to be with high levels of leakage (around 33% in Dublin). Leakage plus lack of user charges means demand is very difficult to control. They do charge for excessive use, but this only applies to residential not commercial use. Water shortages are expected in future due to climate change (forecasting higher rainfall in west, less in the east), and Dublin is already under pressure (it is hugely dependent on the River Liffey where the allocation is frequently exceeded in summer). A new project to pipe freshwater from the Shannon River in the south (170km) has a 10-year timeframe, including the business case, spatial planning then the public hearing process.

### Regulation

The Economic Regulatory Commission (CRU) regulates price and quality, overseeing Uisce Éireann and other utilities, which includes price setting with material efficiency outcomes required, service outcomes and a capital programme. They compare to UK utilities and also levy penalties for poor performance.

The Environmental Protection Agency (EPA) regulates drinking water (99.7% compliance) and wastewater services, issuing and enforcing approximately 1100 authorisations nationally. Ireland is subject to various EU directives on water quality and wastewater treatment. In relation to the EU Water Framework Directive which aims for good status water quality by 2027, Irish Water targets achieving this for ~50% of waterways.

Urban Wastewater Treatment Directive focuses on energy neutrality, enhanced treatment, and reducing overflows. Significant upgrades are planned, such as the €500 million investment in the Ringsend Wastewater Treatment Plant. Wastewater requirements in Ireland are much more stringent than in New Zealand, and require the removal of residual traces from pharmaceutical, cosmetics, micro plastics, and farm runoff.

## Services and Funding

Uisce Éireann has around a €2 billion annual budget of which 80% is from central government funding. Residential services are free and funded by the Irish Government following the collapse in 2016 of the domestic user charging model due to public pushback and lack of political commitment (though all households are metered). These services are supported by a state subvention payment (€1 billion annually) and capital grants (~€454 million in 2022).

Commercial services are charged for, generating about €350 million annually. Funded through operational cashflows and debt which is borrowed from the state. There are also connection charges, and these vary based on meter length and plant capacity needs. Network replacement is around 65,000km of network with a replacement rate of 0.4% per year.

## Strategic Plans and Efficiency Goals

The Water Services Strategic Plan is a statutory 25-year plan, with detailed five-year plans. There are efficiency goals including annual price efficiency targets of 2%, 4%, 4%, and 6%. Investment plans are set for pricing stability and necessary infrastructure investments.

## Observations

Water asset transfer – Uisce Éireann suggested that a survey and standard development should precede asset transfer, thorough asset surveys be conducted, and standards developed before consolidating water services, and near-universal installation of smart water meters by the end of 2024 to monitor usage. It has promoted water conservation by implementing measures to encourage residential water conservation despite the lack of direct billing.

The Irish Government faces significant financial responsibilities to fund water services. There is a need to plan for significant government funding and investment to support the transition and ongoing operations.

## UE advice to those contemplating reform (i.e. New Zealand):

There are benefits of a single national utility (which can prioritise needs across the country and access sovereign debt funding at the government bond rate under the oversight of a regulator which focuses on efficiency when confirming funding). Anyone looking at similar reforms needs to form a national core of expertise to conduct a full audit of the existing standards and asset base, build a model of the network and see how it responds to rainfall events, then prepare comprehensive drainage plans which provide a robust evidential basis for investment.

*Jennifer Caldwell, Partner, National Chair,  
Buddle Findlay*

## Key Lessons for New Zealand

- Implement robust regulatory frameworks for price, quality and environmental standards to drive improvements. Strong regulatory oversight and economies of scale and scope will lead to benefits and ensure improved asset management, customer service and environmental outcomes.
- A single entity model brings efficiency and control, reducing layers of management and standardising operations.
- Invest in smart infrastructure: Roll out smart water meters to monitor and manage water use efficiently. The lack of residential billing may challenge water conservation efforts.
- Significant investment and financial support are required to maintain and improve infrastructure and the impost on the Irish taxpayer is considerable.

## **Jacobs and Irish Rail - Climate Resilience: East Coast Resilience Rail Project**

**The East Coast Railway Infrastructure Protection Projects (ECRIPP) is a critical initiative aimed at safeguarding the scenic railway along the coast south of Dublin.**

This 65km route, similar to the Kaikōura railway to Picton, is particularly exposed to coastal erosion and the effects of climate change. Key features of this railway include four tunnels that pass through the Bray cliff, making it an essential part of the passenger rail network, including the southside DART, commuter and intercity services.

Frequent storm events have necessitated significant maintenance efforts, as tracks are often inundated. In 2017, Irish Rail began exploring potential measures to mitigate this risk. While relocating the railway was considered, the business case did not support this option due to significant ecological and cultural heritage concerns, and the overall costs involved.

The ECRIPP project was developed to ensure the long-term sustainability of the corridor and to support a climate-resilient society. The initial phase of the project involved extensive data collection through various methods, including ProjectMapper, dilapidation surveys, and UAV surveys. Based on this data, several potential solutions were scoped, such as rock revetments, groynes, curved walls, beach nourishment, breakwaters, and seawalls.

Funded by the Department of Transport, the ECRIPP project faces unique challenges typical of coastal management projects. The planning process involves a two-stage approach. The first stage consists of creating a long list of solutions and assessing their feasibility. The second stage uses a multi-criteria analysis to evaluate these options comprehensively. A risk-based approach, incorporating a risk matrix, helps prioritise spending to maximise the project's impact. The project is now in the Emerging Preferred Option process.

One significant challenge is planning infrastructure projects with a long-term horizon, up to 2100, which entails considerable costs and a complex consenting process. To address these challenges, the project focuses on immediate needs for the next 25 years while deferring less critical work to manage costs and planning consents effectively. This approach ensures that every euro spent provides value, starting from an ideal scenario and scaling down to what is essential.

Timing the necessary works is crucial, particularly concerning tracking sea level rise. The project aligns with UN Sustainability Goal 13 and national planning policies that address increased risks, such as hurricanes. Irish Rail aims to act as a mature client, engaging collaboratively with stakeholders, recognising that the issue is of national importance, not just an Irish Rail concern.

In summary, the ECRIPP is designed to protect and sustain vital coastal railway infrastructure against climate change and coastal erosion impacts. By focusing on essential short-term measures and preparing for long-term challenges, the project seeks to maintain a resilient and efficient rail network for Ireland.



## Recommendations for New Zealand

- Extensive planning and optioneering process being carried out is leading to a robust, cost-effective solution. The methodology is first to focus on identifying the need and then work out what options deliver that need in the most cost-effective way possible, looking at whole of life costs, including maintenance, not just the capital project cost. This is not business case development locked in layers of bureaucracy but a rigorous stress-testing of options to arrive at the best solution.
- An example of how to have a long-term vision (up to 2100), with a short-term plan and deliver the solution progressively over time.
- Use of data-led decision-making to assist planning, that is, mapping the projected sea level rise and ensuring a solution is delivered within time. Having a long-term plan makes it possible to adapt the timeframes if, for example, sea levels were to rise at a faster rate.
- Issue of climate change adaptation and resilience is being considered in the broader context of the rail network being vital to keep Ireland Inc's economy moving and for people to continue to commute efficiently by rail. Similar thinking could be applied in New Zealand to iRex – with long-term planning how can we deliver a sustainable solution over time as cost effectively as possible?
- Focus is on maintaining and protecting existing infrastructure, rather than looking to an entirely new and much more expensive solution. Ultimately, it's cheaper to maintain and future-proof what you have.

*Katrina Van Houtte, Partner, Dentons*



## Day Three

### 15 May – Belfast, Northern Ireland

#### Overview

**As the delegation travelled by train from Dublin to Belfast, it was very interesting to see the changing landscape which signalled the border between Ireland and Northern Ireland.**

The housing and general environment around the train line looked more tired and less prosperous. The prime purpose of visiting Belfast was to see first-hand the transformation that is underway, largely driven by the Belfast City Regional Deal with the United Kingdom Government. A key component of the deal has been the development of a Bus Rapid Transit system, the Glider. The delegation learnt more about this impressive system through a visit to Translink's Milewater Service Centre.

#### Translink – Belfast's Rapid Transit Glider System

**The Translink visit provided insights into the Belfast Bus Rapid Transit (BRT) Glider scheme and its use of zero-emission vehicles.**

As a key component of Belfast's City Deal, the Glider system has been a significant success, with patronage on the East-West line surpassing initial expectations, peaking at 40,000 additional passengers per week compared with 2017 bus patronage. The success has led to additional buses on the route and plans for a North-South route extension as part of the City Deal.

#### Observations

Belfast chose a cost-effective and flexible option over more advanced modes, such as light rail, which was rejected due to its estimated threefold cost and lack of adaptability. Recognising potential negative perceptions of BRT, Translink developed a comprehensive strategy to address this, including branding with the Glider name, distinctive bus design and a targeted marketing strategy. The bus stop design incorporates off-board ticketing, public art, and real-time journey information, differentiating it from other bus services.

Translink collaborated closely with the Glider supplier to improve the product. The fleet includes 80 battery electric and 23 hydrogen buses, aiming to be climate positive by 2050. This collaboration with local bus manufacturer Wrightbus, Northern Ireland's fastest-growing business, has fostered a reciprocal relationship benefiting the community. Although the hydrogen fleet received additional central funding, it remains cost-ineffective without subsidies due to the high costs of refuelling infrastructure and buses. However, hydrogen buses offer advantages over electric vehicles (EVs) in terms of range and refuelling time, comparable to internal combustion engine (ICE) equivalents.

Interestingly, EV buses did not require changes in pavement design despite axle loads, raising questions about the significant pavement design costs for similar projects in New Zealand. Translink's careful planning around routes and timetables facilitates the use of EVs. Passenger support for the shift to zero-emission transport has been strong.

The Glider system also features integrated ticketing within the wider network, simplifying passenger use across the network. This integration has positively impacted retail businesses along the Glider route, increasing footfall.

Despite these successes, Translink appeared to lag digitally compared with New Zealand, prompting reflection on whether New Zealand's focus has been appropriately placed. Advanced digital systems are of limited use without sufficient drivers and other fundamental resources.

### Recommendations for New Zealand

- Translink is fully integrated, managing bus and train, including running services, ticketing, scheduling and infrastructure. This appears to enable a more efficient and cost-effective decision-making process, removing the horse-trading and gamesmanship between organisations. It should give greater clarity around decision-making and delivery for major projects, as well as improved operation, etc. It also helps with the marketing of the Glider as an integrated system, as well as enabling better managing up to politicians.
- Translink developed a very clear, pragmatic strategy to answer a defined question and then designed, marketed and implemented it effectively. This is a nice parallel to the Copenhagen Metro, which is simple, cost-effective and pragmatic too. There is learning here for New Zealand's rapid transit and light rail proposals.

*Ed Cook, Director, Rider Levett Bucknall (RLB)*

### **Belfast City Council – Place based Agreements in Action – Learning from Belfast's Experience with the UK City Deals**

**The Belfast Region City Deal, signed in 2021, represents the culmination of a decade of effort by Belfast City Council. This ambitious initiative involves strong partnerships with the UK Government and the Northern Ireland Executive, aimed at transforming the region's economic landscape.**

The deal has set projects in motion, with funds actively flowing. Its foundation was laid by a comprehensive understanding of the region's economic strengths, weaknesses and aspirations. The deal targets enhancing innovation, digital capabilities, tourism, infrastructure, and employment. It aims to create 20,000 jobs, improve connectivity, elevate the region's tech profile, and generate £400 million in Gross Value Added (GVA). Tourism and traditional investors play pivotal roles in this growth.

Funding comes from councils, universities, the Northern Ireland Government, the UK Government, and the private sector. Emphasising private sector involvement ensures all stakeholders have a vested interest in the projects. The focus is on collective investment rather than asset revenue. Effective governance is the deal's backbone. A comprehensive project list required extensive work to shortlist. The governance group negotiates funds with the UK Government, and each investment pillar (infrastructure, tourism, employment, etc.) has a dedicated board. Belfast City Council manages fund distribution through a full-time Project Management Office (PMO) funded by the partners.

Strategic investments have been made in specific industries, such as the film industry, to create high-paying jobs and enhance the region's skills base. The deal encompasses diverse projects. Innovation projects, often led by universities, are nearing completion. Digital projects have received £25 million for enabling infrastructure. Tourism projects, led by regional partners, focus on recreating old attractions. Key infrastructure projects include a cycle bridge, a road and a rapid transit network.



Investment areas were identified through a thorough assessment of the region's strengths and weaknesses. Ideas from various organisations were analysed, with some negotiation ensuring all stakeholders benefited. Each agreement has specific targets, with benefits and KPIs clearly defined. Projects are highly focused on achieving these targets, with provisions to request funds back if KPIs are not met. Signing the deal was crucial for retaining long-term government commitment, providing stability through challenges.

Projects were not subject to public consultation but emerged from local planning and were tested locally. The primary community demand for high-paid jobs is addressed through tech investments. Around £100 million in private funding has been secured, demonstrating strong private sector engagement.

The Belfast Region City Deal is a landmark initiative set to transform the region's economic future. With strategic partnerships, robust governance, and a focus on innovation and infrastructure, the deal aims to create a thriving, resilient economy with opportunities for all. Ongoing projects and investments reflect a strong commitment to long-term growth and sustainability.

### Recommendations for New Zealand

- City Deals require analysis of strengths, weaknesses, where region wants to head.
- Needs to be targeted and specific – cannot do everything.
- Need line of sight from deal projects back to what region wants/needs, with more/better jobs at the forefront.
- Choose areas for focus, then down to projects.
- Need broad range of partners. Universities are key if technology/innovation is a focus.
- Ensure deal signed with central government can weather storm of changes in political landscape.
- Need strong, well set-up governance and a dedicated project management office.

*Paul Melville, Partner - Infrastructure Advisory, EY*



## Day Four

### 16 May – Copenhagen, Denmark

Hosted by **ARUP**

#### Overview

##### The delegation was hosted on their first day in Copenhagen by Arup.

Presentations to the delegation provided an opportunity to learn about the Danish economy, their approach to mega infrastructure developments, and the role that public development companies play in driving innovative urban development projects which also fund their metro system development. Copenhagen City Council also gave a very insightful presentation on its sustainable city initiative and the storm surge plans. Ahead of a field visit to the Copenhagen Metro, Metroselskabet, the delegation learnt more details of how it was established originally as a single line from the central city to the airport by a public development company which also undertook adjacent urban development to pay for the metro. The Metro operates at a very impressive 99% reliability but unfortunately our tour of the metro system coincided with one of its very few unexpected system breakdowns. Fortunately, services were operating again by the evening in time for peak commuters and a local football derby.

#### Danmarks Nationalbank (DNB) – The Danish Economy, Population and Growth

**Danish GDP per capita is among the highest in the world (\$US74,000 in 2022), just lower than the USA and \$US22,000 greater than New Zealand's.**

The economy is very open with a large export focus of around 43% of GDP, with a heavy weighting to services and manufacturing, in particular pharmaceutical manufacturing (Novo Nordisk) and shipping (Maersk). 33% of GDP is imported, and gross value added domestically has increased from 3% in 2015 to 10% now – Novo Nordisk has been a significant contributor to this.

The government sector is large, with high tax (local and central government) providing a high standard of free healthcare and education and a strong social benefit structure. Government debt to GDP tracked at similar levels to New Zealand up until COVID but has diverged since then with surpluses reducing that ratio relatively quickly while New Zealand's has remained elevated. There is a cross-party budget law which requires a fiscal deficit not to exceed 0.5% of GDP in any year. As a result, Denmark has a strong credit rating – AAA, the same as New Zealand.

Membership of the EU provides flexible access to labour and allows firms to compete across the EU. 50% of exports go into the EU and Nordics, with USA at 15% being next largest. Unemployment is low at 3%.

DNB is the central bank and conducts monetary policy independently of the European Central Bank (ECB) but in practice follows the ECB very closely. 2% inflation is targeted. The Danish Kroner is pegged to the Euro and can vary +/- 2.25% from the Euro.

State guarantees or direct state loans are provided to state-owned companies raising debt to fund infrastructure projects. This allows capital to be raised at effective sovereign interest rates.

#### Key Observation

- The key advantage that Denmark has over New Zealand is access to a market of 350 million people on its doorstep, which provides flexible labour, firms with deep expertise across many sectors and a deep market for its exports. The other key advantage is a political system with strong cross-party consensus and mechanisms to ensure consistency of approach to policy and in particular investment in infrastructure across political cycles.

*Richard Anderson, Head of Corporate and Structured Finance, Westpac New Zealand Limited*

## **By & Havn – Building Sustainable and Modern Cities**

**By & Havn (B&H) is a public development corporation owned by the Danish Government (5%) and the City of Copenhagen (95%). The company operates through multiple subsidiaries and manages assets transferred from both national and local governments.**

The local government rezones land, increasing its value. B&H borrows against this increased value, using the capital either to fund metro construction or local infrastructure projects. The company oversees land sales and lease agreements, using the yield to service debts.

Established in 2007 alongside Metroselskabet, B&H engages in joint ventures with pension funds and developers to build high-quality housing that attracts residents. B&H adopts a long-term, intergenerational perspective in its projects.

Key projects include:

- **Ørestad** – Upon completion, it will provide 34,000 jobs, accommodate 20,000 students and house 38,000 residents.
- **Nordhavn** – Planned to create 35,000 jobs and house 45,000 residents. It began with an architectural competition and the agreement of a metro line in principle.

B&H's value chain includes the transformation of former industrial areas, emphasising planning, construction, sales, commercial real estate management, and urban life development. The projects integrate UN sustainable development goals, focusing on creating liveable urban spaces within planetary boundaries.

### **Key Observation**

- Copenhagen has transformed from a bankrupt city in 1993 to a thriving urban centre that embraces its waterfront and prioritises urban life. By 2025, the city aims for 75% of all trips to be made by walking, cycling or public transport, facilitated by the necessary infrastructure, including super bicycle highways.

B&H remains committed to continuous improvement and has set even more ambitious goals for the future, striving to enhance urban life and sustainability further.

*Mayurie Gunatilaka, NZ Country Leader, Arup*

## **City of Copenhagen – Resilient and Sustainable City Solutions: Dealing with Heavy Rainfall**

**Copenhagen, with a population density of 7000 inhabitants per square kilometre and 20% of its housing public, predominantly features apartment-style living.**

The city sees an influx of approximately 500 new inhabitants each month, with an average living space of 41.3 square metres per person. Currently, 60,000 new homes are being built across the city to accommodate this growth.

In the 1970s, Copenhagen faced severe pollution issues, and by 1993, the city was bankrupt. However, city leaders set a vision to revitalise it, aiming to make the river and harbour swimmable again. This vision led to the concept of 'Blue Urban Space' turning the city towards the water and creating momentum for urban renewal. The city's development approach prioritises 'urban life' over 'urban space', focusing on creating vibrant, liveable environments.

Copenhagen's current climate plan aims to achieve carbon neutrality by 2025. The city has made significant strides in sustainability and climate adaptation. Wind energy supplies 590 megawatts, and the district heating system covers 99% of the city. The 'Energy Leap' initiative, in partnership with 56 large building owners, covers 39% of the city's total building stock, amounting to 19 million square metres of floor area.

The city administration exemplifies its commitment to sustainability through various initiatives. Notable projects include the Copenhagen Hill waste-to-energy and carbon capture plant, green public transport, and an emphasis on making cycling the easiest choice for transportation. Copenhagen has 24 bridges dedicated to walking and cycling, and the city prioritises clearing cycle lanes of snow before roads. These measures have made cycling and walking the fastest ways to travel within the city.

As of 2022, Copenhagen achieved a 74% reduction in emissions compared with 2010. Although this fell short of its target due to external factors, the city remains committed to further reductions. Political courage is necessary for decisions such as fuel tax increases to achieve the remaining goals. The Climate Plan 2035 aspires to make the city climate positive, focusing on consumption-based emissions with targets set by politicians and detailed implementation plans by officials.

A major cloudburst event in 2011 prompted the development of a comprehensive water management plan, following the natural flow of water. This plan involves surface infrastructure projects with an implementation period of 20 to 30 years. Climate adaptation projects in Copenhagen are designed with co-benefits in mind, as seen in the case study of Skt. Kjelds Plads and others.

The city faces significant storm surge risks, particularly from the south. Socio-economic analyses have been conducted to assess direct and indirect losses, leading to a plan to build a land barrier around the city. Collaboration with insurers helps understand flooding caused by rain versus sea level rise. A storm surge fund, contributed to by all ratepayers, supports these initiatives. Denmark, as a whole, has the highest risk of flooding in the EU.

City pride and high tax expectations drive the commitment to achieving good outcomes for public investment. Designers are involved early in the process to ensure that each project fits, complements and improves its surrounding area. The city actively resists standardisation, recognising that place-specific design, though potentially costlier, yields significantly better results.

Small architectural competitions are a cornerstone of community projects, involving local juries and community representatives in the selection process. Winning designs are carried through to completion, providing small firms with opportunities to make significant contributions and often achieve their 'big break'. This approach ensures that every project is tailored to its specific context, enhancing the overall urban fabric of Copenhagen.

Copenhagen's approach to city design is deeply communal, reflecting the Nordic mindset of shared responsibility. The Danish way is to view problems as opportunities, as exemplified by the successful effort to make the harbour swimmable. Both short-term and long-term perspectives guide the definition and refinement of problems and opportunities.

### Key Observation

- Copenhagen's approach to city design is deeply communal, reflecting the Nordic mindset of shared responsibility. The Danish way is to view problems as opportunities, as exemplified by the successful effort to make the harbour swimmable. Both short-term and long-term perspectives guide the definition and refinement of problems and opportunities.

*Katherine Skipper, Studio Principal, Warren and Mahoney Architects, New Zealand Limited*

## **Sund & Bælt Learnings from the Fehmarn Belt Project**

**The Fehmarn Belt Fixed Link is currently under construction between Denmark and Germany. This ambitious project will connect the Danish island of Lolland with the German island of Fehmarn, crossing the 18km-wide Fehmarn Belt in the Baltic Sea.**

Once completed, it will become the world's longest road and rail tunnel. The tunnel will significantly reduce travel time between Lolland and Fehmarn, replacing the existing ferry service, as it saves around 160km of the current travel distance. This green transport corridor will serve as a vital link between central Europe and Scandinavia as part of a sustainable European transport network.

It will be the world's longest immersed tunnel at 18km and a depth of around 40m and will be completed in 2029. It is being funded through a long-term user pays system. The confidence to proceed with such an ambitious project was clearly demonstrated with Denmark letting the contract and commencing pre-construction works before the German planning approval was given.

It offers several valuable lessons that New Zealand could consider:

- 1. Strategic Vision and Planning:** The Fehmarn Belt Fixed Link is seen as a unique opportunity to create a European hub for green growth, innovation, exchange, and international cooperation. New Zealand could learn from this approach by developing a long-term strategic vision for its infrastructure projects, considering their impact on regional development and connectivity.
- 2. Sustainable Development:** The Fehmarn Belt project emphasises sustainable development, not only in terms of the environment and climate but also social and economic aspects. New Zealand could prioritise sustainability in its infrastructure planning, ensuring that projects align with environmental goals and benefit local communities.

- 3. Strategic Partnerships and Collaboration:** The Fehmarn Belt project involves collaboration across borders, sectors and walks of life. New Zealand could benefit from fostering strategic partnerships with neighbouring regions, industry stakeholders and local communities to enhance project outcomes and address shared challenges.
- 4. Infrastructure Investment:** The Fehmarn Belt Fixed Link represents a significant investment in infrastructure. New Zealand could learn from the importance of allocating resources and funding strategically to major projects, ensuring their successful implementation and long-term benefits. This project is comparable in size to that of the Øresund Bridge or the Great Belt Bridge which have both been a success, giving confidence in the investment decision.
- 5. Efficient Design, Construction and Quality Control:** The construction of the Fehmarn Belt tunnel involves precise planning, innovative design, specialised vessels and construction techniques, and quality supervision to ensure the 120-year design is achieved. New Zealand could focus on efficient construction methods, rigorous quality control, and adherence to timelines when executing large-scale infrastructure projects.

### **Key Observation**

- By studying the Fehmarn Belt project, New Zealand can gain insights into setting ambitious goals, effective project management, sustainable development, and connectivity, ultimately enhancing its own infrastructure initiatives.

*Fraser Wyllie, Managing Director, NZ & Pacific,  
McConnell Dowell*

## Copenhagen Metro – Funding and Delivery of the Metroselskabet

**The Copenhagen Metro is owned by three public entities (Danish State, City of Copenhagen, City of Frederiksberg. It has a ‘five-finger’ design plan with metro lines being built radiating away from the city circle along five corridors.**

Key Metro figures: 360,000 passengers per day, 120 million passengers per annum, departures every 1.5 minutes, driverless trains 24hr/day, 99% + reliability.

Capex costs for the Metro have been funded by land sale and development Initial line from land sales The first development was south of Copenhagen in 2002 which cost €6 billion. The same approach will continue into future with the Lynetteholm development. Risk sits with the Metro but it is funded by a government loan. Operation surplus repays the loan over a 40-year period.

The system embraces simplicity with three driverless autonomous car trains running every 90 seconds. It really is a ‘turn up and go’ system. This approach has meant the stations and platforms have been kept small, reducing the overall footprint and cost. Standardised designs and fitting are used, with the biggest variation being in the colour of the station tiles. Deliberately there are no shops or toilets in the stations so people move quickly through the system.

### Key Metro Details

- Small trains, high frequency (3 car trains, 39m long, 350 people/train). Potential to extend to four trains to increase capacity by 30% (stations have been sized to allow for this expansion if required).
- Station size kept as small/shallow as possible; reduces capex and maintenance costs, stations focused on people entering and leaving rather than lingering. Electronic ticketing used with tap on, tap off function. Small stations require less space and are cheaper with standardised designs used. Shallow tunnelling is also more cost-effective.
- Planning underway for Metro line extension (M5) – looking to establish more collaborative forms of contract with the main contracting entity.

### Application to New Zealand and Key Lessons for Our Context

- Metro design ‘intent’ for any future metro or light rail projects in New Zealand – consider the need for 8-9 car trains that many metros adopt. Copenhagen’s approach of small trains, high frequency reduces capex and opex costs, as well as their carbon footprint.
- Metro stations – consider real intent of stations which is to move people in and out quickly. Keep design for station ‘boxes’ to the minimum and where possible as close to being within the cross-section/envelope of the tunnel itself. This generates significant costs savings.
- Major project funding – Copenhagen has adopted an innovative approach to sourcing funding by selling/developing land. What innovative approaches could New Zealand consider to supplement funding for major infrastructure projects?
- Note Copenhagen Metro’s intent to establish a more collaborative form of contract with contractors for the upcoming M5 Metro extension project to deliver better outcomes in all areas. Similar to the efforts of the New Zealand Construction Accord, InfraNZ should continue to advocate for this to major government agencies such as NZTA, AT, KiwiRail, Watercare, etc.

*Anthony McFadden, General Manager, NSW/ACT, QLD & New Zealand, John Holland*

### Application to New Zealand and Key Lessons for Our Context

- Small trains lead to smaller footprint and cost while producing superior service.
- Long-term government funding allows long payback period from variety of sources. Enables commercial risk to be taken on land sales and fare box.

*Karl Nicholson, Head of Resources, Energy and Infrastructure, ANZ Bank NZ Limited*



## Day Five 17 May – Copenhagen, Denmark

Hosted by **EY** Building a better working world

### Overview

**On our last day the delegation was kindly hosted by EY in its offices in a redeveloped area near the Metro in Frederiksberg.**

The delegation learnt more about Denmark's transport system which has political consensus and long-term support. A user pays approach is well accepted by the population and this has enabled mega road and rail projects such as the Great Belt Fixed Link and the Oresund Fixed Link. Long-term cheaper loans backed by a limited government guarantee have proved to be a successful and repeatable formula.

The delegation learnt about the Danish water service delivery model. Water is metered with the Danish paying separately for their drinking and wastewater. This has led to great progress identifying and eliminating leaks and generally reducing water consumption over the past 40 years. Benchmarking between companies is valued and seen as providing important insights for making improvements. Copenhagen is also implementing its climate plan. While well known as a bike city, its mode share continues to remain reasonably static despite significant investment in public transport. Road pricing is now being researched again with an innovative study with volunteers who are given money at the start and have to make a payment if they use a car.

Innovation and bold approaches to problems were evident in the proposal to construct a new artificial island in the Danish North Sea to link the various offshore wind farms and the new artificial island, Lynetteholmen, which will be a new suburban development as well as providing storm surge protection near the mouth of Copenhagen Harbour. A site visit to this development conveyed the sheer scale of the development and the long-term horizon and commitment to this reshaping of the city form are quite extraordinary.

## **Ministry of Transport and Building – Overview of the Danish Transport System**

**Denmark, with a population of approximately 5.9 million, has 1.4 million residents in Copenhagen. Although Denmark's area is smaller than New Zealand's, it includes over 400 islands, necessitating diverse infrastructure solutions to ensure high mobility across all regions.**

Copenhagen's central area is densely populated, while its outskirts are less so. The city features an integrated transport system, including a well-utilised metro service and high-quality walking and cycling facilities, such as dedicated bridges across canals.

In 2021, Denmark's coalition government, including all 21 political parties, agreed to the bipartisan Infrastructure Plan 2035. A further example of this collaboration was explained in the two green parties choosing not to participate in roading policy discussions, roading being something they do not align with, choosing to focus their efforts in other areas. This plan aims to reduce congestion, enhance public transport, and facilitate a green transition, encompassing road and rail improvements and cycling infrastructure. The plan focuses on several key pillars:

**Green Road Transport:** Incentives for green vehicles through tax subsidies and significant taxes on non-green fleets, with charging equipment largely provided by the private sector.

**High-Demand Areas:** Greater investment in public transport in Copenhagen and its surroundings, including a new metropolitan network and subsidies for municipalities to invest in high-class public transport modes.

**Integrated Modes:** Investment in new road infrastructure alongside more and faster trains to connect the country.

**Socio-economic Calculations:** Mapping proposed projects based on socio-economic effects, focusing on projects with greater benefits.

### **Application to New Zealand and Key Lessons for Our Context**

Collaboration is a key feature in Denmark's success as a country.

Danish culture is strong and largely aligned on many key issues allowing progress. There is an opportunity for New Zealand to learn from this to be prosperous and retain the things that are important to us. Urban life is dominated by positive thinking: Think "what is a good life?"

- no urban sprawl – consent is able to be obtained for compact city living which is high quality
- great architecture and urban design
- 'facing the water' and being able to swim in clean water is important

Danes are generally proud of their social infrastructure and what their high income taxes (circa 50%) get them. Due to this strong social fabric, Denmark rates well in accordance with the Gini Coefficient which measures social equality.

*Quintin Blackburn, Senior Principal - Project  
Delivery, Beca Ltd.*

The plan is supported by a €21.5 billion investment managed by the Ministry of Finance. Apart from a few user-pays projects, funding is fully covered by general taxes. Significant new investments in road and rail are centrally funded, accounting for about 90% of planned investment from 2021 to 2035, while cycling and local bus facilities are funded through a contestable fund available to local municipalities.

The plan's implementation is overseen by weekly political meetings where projects are prioritised and funded. Once approved, projects are legislated, making them difficult to repeal. The plan has seen consistent agreement across 76 debates since its inception.

Denmark has also delivered significant user-pays/public-private mega projects, including the Great Belt Fixed Link to Norway, the Oresund Fixed Link to Sweden, and the Fehmarn Belt Fixed Link to Germany. These projects justify a user-pays approach due to their inability to be funded via the state budget, the public's familiarity with paying for travel, lack of free alternatives, and significant travel time reductions. These projects are managed by state-owned companies responsible for planning, construction and financial management, with funding raised through state-guaranteed loans repaid by tolls.

### **Political Consensus**

The Danish Infrastructure Plan 2035, determined by cross-party consensus, sets national and regional transport priorities, focusing on roads, public transport and cycling. Cross-party collaboration was necessary to achieve the plan. The plan was approved under a minority government, meaning there needed to be broad appeal and a sense of everyone gets something.

Based on a green road transport plan, traffic forecasts, mode correlation assessments, socio-economic impacts, and financial frameworks, the plan requires €21.5 billion over 14 years, with €14.2B for new investments and €7.5 for ongoing operations and maintenance. The plan is owned by the Ministry of Transport. It includes around 50 roading projects, cycling infrastructure, electrification of vehicle fleet and supporting charging infrastructure, road safety, traffic noise, CO2 reduction (note annual road toll, 154). Public transport priorities include new metro lines for Copenhagen, faster trains and bus rapid transit.

Denmark's investment in public transport aims to enhance socio-economic benefits rather than drive mode shift. Road pricing includes a 150% tax on new vehicle purchases (excluding cheaper EVs) and a flat fee for heavy vehicles, transitioning to a per-kilometre charge from January. Tax income from fuel is not hypothecated, reflecting a strategic approach to funding and investment.

Implementation of the plan is governed by a weekly cross-party politicians meeting. They track progress, make decisions, approve funding. All approved projects are legislated, making it very difficult to repeal them. If the Government changes, the plan does not. (If one party doesn't agree with a decision, they can step out, but the project still goes ahead).

### **Mega projects**

Denmark has delivered some very large projects that are managed and funded separately from the Transport Plan (Great Belt DKK45 billion which is to be repaid over 36 years; Oresund Fixed Link (Denmark to Sweden link), DKK29 billion, to be paid over 50 years; and Fehmarn Belt (Denmark to Germany, in build now) DKK55 billion to be paid over 28 years.

Each project is set up as a special purpose vehicle (SPV) company that raises the funding, delivers the project and operates the road.

Funding is primarily raised by bonds that are state guaranteed (but issued by the SPV). The SPV pays a fee to the government for the guarantee. The loans are paid back by tolling the roads/rail (e.g. Great Belt is DKK200/NZ\$50 for a private vehicle trip). It's anticipated that the tolls will remain once the loans have been repaid.

Lending is off balance sheet for the Danish state – it's on the balance sheet of the SPV.

## Other observations

Analysis shows that more investment in public transport does not drive mode shift, but has positive socio-economic impacts (e.g. productivity) that supports further investment in green infrastructure.

Road pricing – 150% tax on new vehicle purchases (excluding cheaper EVs). There is currently a flat fee for RUC for heavy vehicles, which is moving to per km travelled from next year. Tax income from fuel is not hypothecated.

### Key Observation

There is an opportunity for New Zealand to leverage the Danish approach to longer-term planning as well as utilising its funding Special Purpose Vehicle.

Recommend visit by our Minister of Transport.

*Liz Maguire, Chief Digital Officer, New Zealand Transport Agency*

### Key Observation

Implementation of the plan is governed by a weekly cross-party politicians' meeting. They track progress, make decisions and approve funding. All approved projects are legislated, making it very difficult to repeal them. If the government changes, the plan does not. (If one party doesn't agree with a decision, they can step out, but the project still goes ahead).

*Jane Small, Group Manager Strategic Development Programmes and Property, Auckland Transport*

## Danish Water and Wastewater Association (DANVA) Municipal Water Service Delivery in Denmark

**Denmark operates a decentralised water system where municipality-owned water companies and numerous community-owned cooperatives manage water and wastewater assets.**

The structural separation of water assets from municipal balance sheets ensures that funding for water-related activities is ring-fenced. The system functions on a user pays basis, achieving full cost recovery through metered usage without tax grants. Water companies are regulated monopolies under 'cost-plus' revenue caps, which have generally decreased over time. Water losses in Denmark are relatively low, with non-revenue water at 7.18% in 2022. Water consumption has decreased since the 1980s due to increased costs and metering. There is a need for more flexible revenue caps and significant investment for climate adaptation and pipe replacement anticipated in the 2050s.

Denmark relies entirely on groundwater and culturally it is considered unacceptable to consume surface water. Sixty-five percent of waterworks (by volume) are municipality-owned, while 35% are community-owned cooperatives. Despite some consolidation, local ownership of water assets is preferred. Water companies share efforts in certain areas while retaining local ownership and contracting delivery to the private sector.

### Economic Regulation

The 2007 municipal reform reduced the number of municipalities from 270 to 98, impacting the number of water companies. A 2009 sector reform mandated the organisation of water and wastewater services in limited companies, enhancing transparency and avoiding funding mix-ups with other municipal activities. Ageing infrastructure is a concern, with major pipe replacements expected in the 2050s. The pricing system is based on full cost recovery and the polluter-pays principle. All customers must have individual water meters, with payments calculated based on consumption. Metering charges provide funding for both capex and opex requirements of the water companies, with the possibility of debt being raised to cover future pipe replacements.

## Climate Change Adaptation

Copenhagen faces significant water management challenges, with broader issues arising elsewhere in Denmark due to irrigation and industrial use. Denmark's non-revenue water levels are low compared with other European countries and in 2022 was at 7.18%, with mandatory network meters and penalties for loss rates above 10%.

The 2011 Copenhagen flood significantly shifted thinking with municipal planning towards greater climate change adaptation, with substantial investment required in the coming decades. The cost of climate adaptation in the water sector is expected to be DKK50 billion to DKK75 billion (€6.7 billion to €10 billion) in the next 20 to 30 years. Insurance claims in Copenhagen for the 2011 event were at DKK7 billion.

### Key Observation

- The pricing system is based on full cost recovery and user pays, subject to regulated revenue caps. This means that the water services companies recover all of their costs from users (based on metering) and there are no tax grants to the water sector.
- The user pays model and the structural separation of water companies from municipal balance sheets have been successful, although pricing will come under pressure in the future as capex requirements increase (in particular to address the increasing investment required for climate adaptation).

*Mike Loan, Head of Infrastructure, Russell McVeagh*

## EY - Copenhagen's Green Transition

**Over the past 40 years, Copenhagen has transitioned from an industrial city to a liveable city. This been achieved with an economic and climate change transition from a city in poverty in 1980s, a clean-up in the 1990s and then moving to a climate focus from the 2000s.**

In 2012 the City of Copenhagen agreed on an ambitious climate action plan. The ambitions was to be CO<sub>2</sub>-neutral by 2025. The city has managed to reduce emissions from energy production significantly. Although the emissions from transport have remained the same. This city transformation was achieved with a three-pronged strategy:

- Encourage the economy back into the city
- Get people living in the city
- Generate taxes to fund the transition

The climate agenda going forward is a new Climate Plan 2035 that involves widening the scope and setting new targets.

**Scope 1:** All CO<sub>2</sub> emissions from the city

**Scope 2:** Indirect emissions from electricity and heating

**Scope 3:** Additional indirect emissions from consumption, air transport, etc.

**Target 1:** Reduce CO<sub>2</sub> from private consumption by half

**Target 2:** Reduce CO<sub>2</sub> from public procurement by half

**Target 3:** Positive climate effect from biomass and CCS

## Transitioning the Transport

The city has had some major investments in public transport in the past 20 years, concluding with new metro lines. Unfortunately, public transport investments are not reducing CO2 and local emissions. Copenhagen still has around 30% of car usage and this is the 'uncomfortable truth' as citizens are buying more cars than ever. Policy measures are seen as more important going forward covering limitations on parking in the city centre: Zero Emissions Zones; road pricing; Last Green Mile Copenhagen and the Sustainable Urban Logistical Plan. What Copenhagen has found is that it is not easy for a city to control traffic. The impact of transport on the city is complex and often misunderstood. Reduction in emissions may, to a large extent, be a problem that solves itself. However, new problems follow such as congestion, noise, emissions outside the city (consumption, e.g. international aviation, etc.).

## Financing the New Infrastructure

Completed and future infrastructure investment carries significant costs. Significant infrastructure investments have been made in the past 20 years. Further substantial investments are still planned. Local taxes cannot fund large infrastructure investments due to regulatory constraint therefore Copenhagen has reclaimed land and unlocked land to support development and the sale of this land funds other infrastructure. This was achieved through the creation of the public company By & Havn aimed at financing infrastructure through loans and repaying those loans via land sales. Since 1995 Copenhagen has grown by 35%. This growth has to a large extent financed the metro lines.

The next initiative is Lynetteholm, a new major urban development project that will finance new metro lines and a new bypass and solve three problems: finance infrastructure; protect against flooding; and reduce pressure on housing market. It is on a large scale with an estimated 35,000 residents and should be completed in 2070.

### Key Observation

The City of Copenhagen has successfully financed significant new infrastructure through innovative methods. It has not been easy to achieve political and environmental goals with new infrastructure. Going forward the focus is expected to shift. Plans to construct new infrastructure remain, but alternative financing methods are required, there is only so much land that can be reclaimed. There is a growing emphasis on policy measures to shape the future of the city through energy transition, economic prosperity and livability.

*Mair Brooks, Partner, Infrastructure Advisory - Major Projects and Infrastructure, KPMG NZ*



## EY – North Sea Energy Island: Danish Ambitions in a European Context

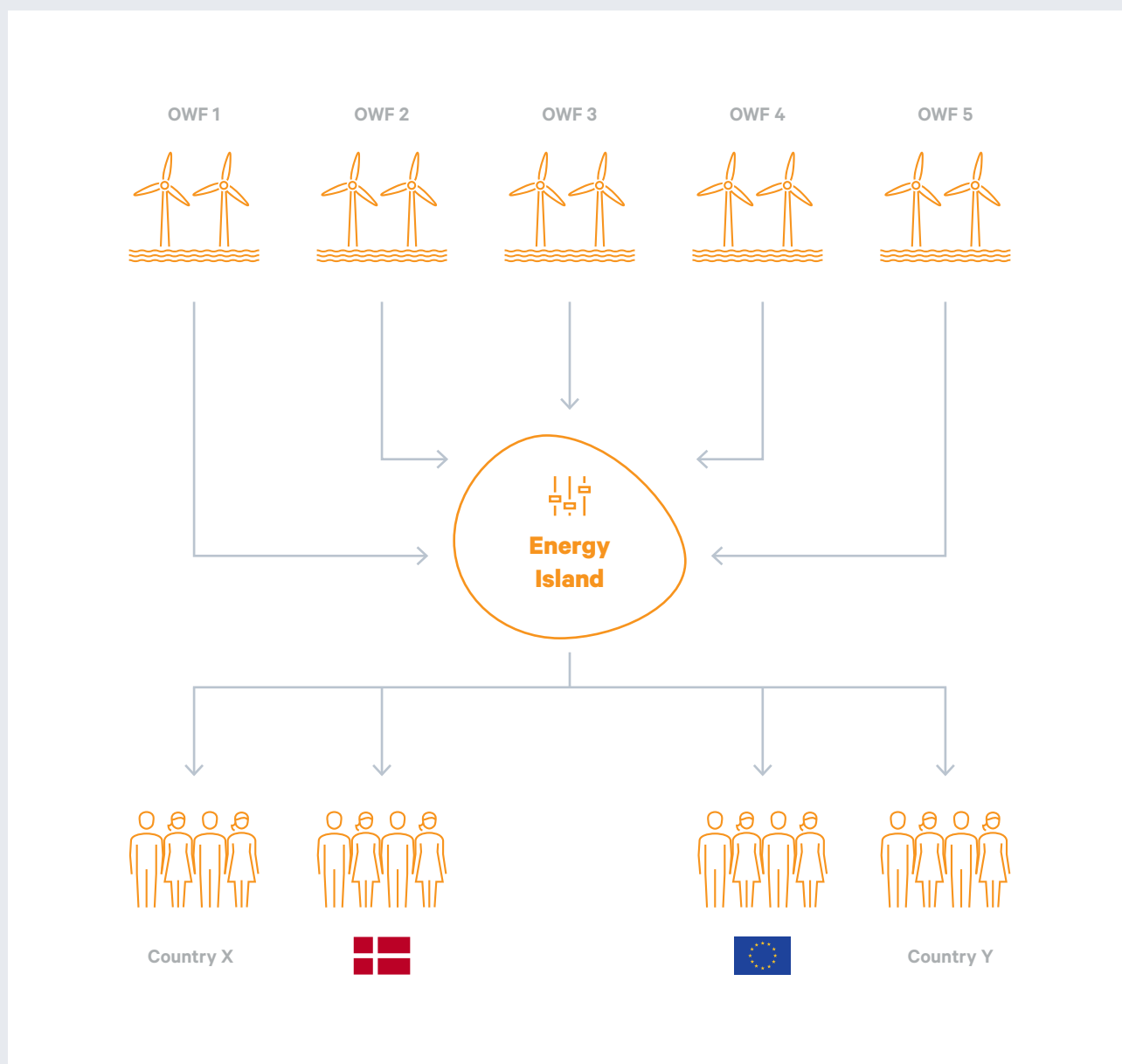
**The concept of constructing two energy islands in the middle of the North Sea by 2033 is an ambitious undertaking likened to being equivalent of a Mars mission for the Danish energy system.**

The energy island is an artificial island planned to be built approximately 80km off the coast of western Jutland. It is expected to have an initial capacity to serve 3 gigawatts of offshore wind and later reach full capacity at 10GW.

The EU's green agenda is in response to global surface temperature warming and the instability in Europe which threatens reliance on fossil fuels, such as the Russian-

European natural gas pipelines and theoretical capacities. The European Green Deal goals include an objective to reach climate neutrality by 2050, and an ambitious 2030 climate target of at least 55% reduction of net emissions of greenhouse gases as compared to 1990. To replace fossil fuels and provide energy security, the target is set for North Sea to deliver 50% of the required capacity for the EU to become carbon neutral (around 300GW by 2050). The North Sea offers some of the greatest wind conditions in the world for offshore wind energy.

A cross-border approach with transmission system operators from Belgium, Denmark, Germany and the Netherlands have undertaken to develop a meshed offshore grid. The meshed offshore grid are clusters of offshore wind farms with fewer cables connected to shore that can route power to two or more national grids.



Why an Energy Island was chosen as the solution:

- Offshore wind offers higher speeds at a greater consistency to onshore winds, and a hub creates capacity at scale.
- Creating hubs further out to sea reduces the 'not in my backyard' effect and nuisance to public.
- Cabling costs can be high for offshore wind individual connections, but by creating a central hub, the cost of connections can be minimised.
- The scale of production means some electricity can be used for Power-to-X (PtX), for example fuelling ships and planes with green energy, etc.

The Danish system operator of the transmission network, Energinet, is commencing preliminary studies on the seabed around Bornholm and the area in the North Sea where it has been decided the island and offshore wind farms will be located. These preliminary studies are intended to ensure that both the offshore wind farms and the artificial island are placed in areas that are suited for construction and where they will have the least possible impact on the environment. The Danish Energy Agency is preparing a procurement for the shared ownership of the island construction in the North Sea. The 5-6GW of offshore wind farms in the North and Baltic seas will also be put out to tender later.

## Application to New Zealand

In 2022, 87% of the electricity generated in New Zealand came from renewable sources, including hydropower, geothermal power and wind power. Hydropower remains the dominant source, accounting for 60% of the total electricity generation. Wind energy plays a significant role in New Zealand's renewable electricity generation. But currently, just over 6% of New Zealand's electricity is generated from wind turbines.

### Key recommendation

The New Zealand Government has committed to reaching net zero for long-lived gases by 2050, set a target that 50% of total energy consumption will come from renewable sources by 2035, and has an aspirational target of 100% renewable electricity by 2030.

To assist with New Zealand's green transition, offshore renewable energy wind farms will be a key player with the costs expected to decrease significantly, reaching a level comparable to onshore wind farms.

New Zealand can benefit from reviewing the different approaches of international governments for regulating offshore renewable energy with key choices as to the role of government in conducting feasibility activities, and when to grant exclusivity to developers.

*Catherine Hemi, Partner, Frequency NZ*



## **By & Havn – Lynetteholm Artificial Island**

**Lynetteholm is the land/island reclamation project as part of a solution to deal with storm surge and sea level rise that the City of Copenhagen is currently facing.**

It will create an artificial peninsula on the seaboard of East Copenhagen Port and together form a ring barrier with the newly developing urban peninsula of Nordhavn to protect Copenhagen from sea level rise and stormwater issues.

The Lynetteholm project is expected to house 35,000 people in a total of 275 hectares of reclaimed land. The project was approved by the Danish Parliament in 2021 and is to be built over the next 50 years till 2070. The project will be owned and built by By & Havn, an enterprise owned 95% by the City of Copenhagen and 5% by the central government. The Danish infrastructure model has designed to transfer the asset ownership to a central or local government owner company, in this case, Lynetteholm will transfer onto By & Havn's balance sheet.

The reclamation will be done in two phases to create an artificial island in 10 to 12 metres of deep water with a total of 80 million tonnes of soil transported. The initial estimate cost of the project is DKK2.4 billion (around NZ\$561m), but the budget has now risen to DKK3.4 billion (around NZ\$795m).

Interestingly, the funding model for mega infrastructure projects is very different to New Zealand and other Commonwealth countries. Instead of budget funding from government balance sheet or being privately funded by the private sector, By & Havn acts as a borrower to borrow at the sovereign rate by borrowing through central government to indirectly access institutional investors. In this way, the central government acts as an intermediary to pass on the sovereign rate without the borrowing being put on its own balance sheet. However, this has caused some controversial discussion within the Nordic countries and the EU on whether the Danish Government should use a different method to recognise the debt.

The project itself has attracted some environmental debate regarding potential threats to the delicate saline balance of the surrounding waters and worries about setting up an example of maladaptation.

### **Key recommendation**

The Danish Government and infrastructure sector have a very strong long-term value on major infrastructure projects with:

- Long-term planning and aligning each individual project into a total infrastructure development programme to make sure there is no resource fighting and devaluation by oversupply at any period, for example, the Nordhavn project planned to be constructed from 2008 to 2027 and Lynetteholm is expected to accelerate after 2027.
- Self-funding model. Allocating land development capital gains to fund public transport for the same development area. This is a very healthy model to enable and ensure the balance between key infrastructure assets, public transport and urban development.
- Very clear identification of project ownership and a system to ensure cross-party support with a long-term certainty for large projects.

*Wei Lu, Head of Investment Banking & Specialised Finance, China Construction Bank, New Zealand*





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