# The Nordic Model: **Infrastructure, Innovation, and Inclusion**

Stockholm, Sweden | Oslo, Norway **2026**

Infrastructure® New Zealand

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# Foreword

June 2026

There is something that happens on a delegation that is difficult to replicate in any other setting. You are away from the inbox, away from the day-to-day, and you are standing in front of infrastructure that works, watching how a city moves, hearing directly from the people responsible for making it happen, and asking questions you would never quite get to in a conference room at home.

That was the experience of our Nordic delegation in May 2026. Across five days in Stockholm and Oslo, a group of New Zealand infrastructure leaders visited transport agencies, city planners, rail operators, water authorities, research institutions, and urban developers. We saw a congestion charging system that has been running for nearly two decades. We walked through an urban development that produces almost no waste and heats its homes from biomass. We heard from economists and engineers who have spent careers studying why infrastructure projects go wrong, and what to do about it.

What struck me most was not any single project or policy. It was the coherence of the systems we encountered. In both Sweden and Norway, infrastructure is treated as a long-term national endeavour, planned across decades, funded with discipline, evaluated transparently, and largely insulated from the short-term reactive media or political pressures that too often shape decisions in New Zealand. That coherence does not happen by accident. It is the product of deliberate institutional design, political and civil culture, and a willingness to make trade-offs visible rather than defer them.

New Zealand is not Sweden or Norway. Our history, our place in the world, and our institutional settings are different. Not every lesson translates directly. But the gap between what we observed and where we currently are is not primarily a gap in technical capability. It is a gap in system alignment, in the way our planning, funding, politics, and delivery connect, or fail to connect, over time. That is a solvable problem.

Infrastructure New Zealand runs delegations because we believe that the quality of thinking about our infrastructure challenges improves when a diverse group of people process the same experience together. The conversations that happen on the margins of a site visit or over dinner in a city you do not know produce a candour and creativity that is hard to manufacture at home. The insights from those conversations feed directly into our policy and advocacy work, and we hope they feed into the work of everyone who joins us.

This report captures the key themes and actions we are taking from the Nordic delegation. We hope it contributes to the broader conversation about how New Zealand builds a more coherent, resilient, and long-term infrastructure system.

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

# Introduction

New Zealand's infrastructure system is at a turning point. The pressures are familiar. Ageing assets, a history of underinvestment, planning frameworks that struggle to keep pace with growth, and a political cycle that too often disrupts long-term priorities before they have a chance to take hold. At the same time, the ambition is real. RMA reform, the National Infrastructure Plan, renewed interest in public-private partnership, and growing recognition of the link between infrastructure and economic productivity have created genuine momentum for us to do better.

The question is not whether New Zealand needs a more coherent, long-term approach to infrastructure. The question is what that looks like in practice, and whether we have the institutional settings, the funding discipline, and the societal and political will to sustain it.

Too often, we look inward when considering how to improve. Infrastructure New Zealand has long advocated for learning from international best practice, and for understanding how other countries leverage strategic planning, stable funding, and genuine alignment between central and local government to deliver better infrastructure outcomes. The Nordic countries, Sweden and Norway in this instance, offer a compelling case study.

Both countries share meaningful similarities with New Zealand. They are long, geographically varied nations with relatively small, dispersed populations. They are perceived as stable, well-governed, and high-quality places to live. They face many of the same pressures: ageing infrastructure, maintenance backlogs, the challenge of connecting remote communities, and the need to decarbonise transport and energy systems without disrupting the economic foundations that fund public services.

> **"It is perhaps the level of dispersion of funding and power at the regional and municipal level which is of most relevance" [as the key difference between New Zealand and the Nordics].**
>
> Delegate Note: Welcome Dinner with NZ Ambassador, Day 0

But the differences are instructive. Sweden and Norway plan infrastructure across twelve-year horizons, with funded plans that survive changes in government. Their cities integrate land use, transport, and sustainability from the outset rather than trying to retrofit coherence into fragmented decisions made over decades. Their local governments have the revenue tools, the planning authority, and the institutional capability to be genuine partners in national infrastructure delivery. And their public institutions have built the kind of transparency and consistency in decision-making that generates trust – among industry, among communities, and across political parties.

In May 2026, Infrastructure New Zealand led a delegation of 36 infrastructure leaders to Stockholm and Oslo to see these systems firsthand. The programme was designed to test ideas, challenge assumptions, and bring back lessons that are genuinely applicable to the New Zealand context. This report captures what the delegation found and what it means for the decisions we face at home.

We invite you to explore the findings and join the conversation about how New Zealand builds the infrastructure system its people and economy need.

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# 10 Lessons from the Nordics

**The ten findings below reflect the most consistent and actionable themes from five days of sessions, site visits, and conversations across Stockholm and Oslo.**

## 01

## Long-term Planning Creates Stability

**Sweden and Norway plan infrastructure over 12+ years with regular reviews, giving industry, councils and governments confidence and continuity.**

**1.1** Develop a funded, long-term national infrastructure plan spanning at least 12 years, refreshed on a regular cycle independent of election timelines.

**1.2** Make explicit what is funded, what is not, and on what basis - so trade-offs are visible to industry, councils and the public.

**1.3** Insulate core planning functions from ministerial direction on individual projects.

## 02

## The System Should Drive Politics - Not The Reverse

**Nordic countries largely work within agreed national plans, while New Zealand too often resets priorities with each political cycle.**

**2.1** Build cross-party consensus around a long-term infrastructure framework that survives changes in government.

**2.2** Strengthen independent oversight of infrastructure prioritisation to reduce political interference in project selection.

## 03

## Infrastructure is About Systems of Flow

**Transport, energy, water, freight, data and supply chains are all connected. When flows fail, economies and societies fail.**

**3.1** Adopt a systems approach to infrastructure planning that explicitly maps interdependencies across transport, energy, water, digital and freight networks.

## 04

## Total Resilience is a Defining Challenge

**Resilience is broader than civil defence - it includes energy security, water, fuel, climate adaptation, supply chains, digital infrastructure and national capability.**

**4.1** Embed resilience as a primary criterion in infrastructure investment decisions alongside value for money.

**4.2** Require major infrastructure investment cases to price the cost of disruption and failure, not only the cost of repair, so that proactive resilience spending can be compared on equal footing with reactive recovery spending.

## 05

## Maintenance is Core Infrastructure Investment

**Nordic systems place huge emphasis on maintaining and upgrading existing assets before simply building new ones. Real funding follows need.**

**5.1** Adopt an explicit maintain-first investment hierarchy with a published and auditable split between maintenance and new-build spending.

**5.2** Address the infrastructure maintenance backlog as a priority economic issue, not just an asset management one.

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## 06

## Consensus is Actively Built Before Decisions are Made

**The Nordics do not avoid difficult conversations - they work through them early so projects can proceed with durability and trust.**

**6.1** Invest in pre-decision engagement on major infrastructure initiatives, particularly those involving behaviour change or new user charges.

**6.2** Be transparent about revenue use and trade-offs from the outset – public trust follows demonstrated intent.

## 07

## Transparency Creates Discipline and Legitimacy

**Trade-offs, project rankings, costs and even what is not funded are made visible, improving accountability and public trust.**

**7.1** Publish infrastructure prioritisation assessments, including what was not funded and why.

**7.2** Apply consistent cost-benefit frameworks across all investment areas and make results publicly available.

## 08

## Local Government Needs More Tools and Capability

**Municipalities have more powers and responsibilities, stronger revenue tools, land ownership and long-term planning authority, creating better alignment between growth and infrastructure.**

**8.1** Give local government clearer revenue tools and co-funding frameworks to partner effectively with central government on infrastructure.

**8.2** Develop a city deal framework with binding central government funding commitments and independent oversight to monitor progress and coordinate across central and local government.

## 09

## Infrastructure Must Be Tied to National Economic Strategy

**The strongest systems are clear about what economic outcomes they are trying to enable - growth, productivity, exports, resilience and national cohesion.**

**9.1** Publish a long-term national economic strategy to provide enduring direction for infrastructure investment and development.

**9.2** Frame infrastructure investment in terms of the economic outcomes it enables, not just the assets it produces.

## 10

## New Zealand's Challenge is System Alignment

**We are often fragmented: planning, funding, development timing and politics pull in different directions. The Nordics align these much more effectively over time.**

**10.1** Treat system alignment, across planning, funding, delivery and politics, as the primary infrastructure governance challenge.

> The strongest infrastructure systems are built on long-term thinking, transparent decision-making, and alignment between planning, funding, governance and economic outcomes.

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# Sweden

## Built for the century, not the cycle

| 10.5m | 450,295$^{km2}$ | Stockholm | $58,000$^{USD}$ |
|---|---|---|---|
| POPULATION | AREA | CAPITAL | GDP PER CAPITA |

| Constitutional Monarchy | Swedish Krona (SEK) | Since 1995 | Since 2024 |
|---|---|---|---|
| GOVERNMENT | CURRENCY | EU MEMBER | NATO MEMBER |

**Sweden sits at the northern edge of continental Europe, stretching nearly 1,600 kilometres from its southern agricultural plains to the Arctic tundra above the Arctic Circle.**

Long, lean, and thinly populated outside its major cities, it shares more than geography with New Zealand, both countries occupy a similar place in the global imagination as stable, well-governed, and desirable places to live. Sweden's population of around 10.5 million is spread across a land area more than 60 percent larger than New Zealand's, with density concentrated in the Stockholm, Gothenburg, and Malmo corridors.

Politically, Sweden is a constitutional monarchy with a parliamentary system. The Riksdag, Sweden's single-chamber parliament, operates on a four-year election cycle. Coalition government is the norm, and the country has a deep tradition of consensus politics. Parties across the spectrum have historically worked toward durable, cross-party agreements on major policy settings, particularly in areas like infrastructure, welfare, and economic management.

Sweden's infrastructure governance is built around multiple actors and multiple veto points. Trafikverket, the Swedish Transport Administration, is responsible for planning, building and maintaining national transport infrastructure and develops the long-term national infrastructure plan. But even nationally prioritised projects must pass through local approval. Municipalities hold the planning monopoly through the Planning and Building Act, and the Environmental Code can impose conditions or stop a project entirely. The result, as one presenter described it, is a system that is not arbitrary, but not fully centralised, coordinated, balanced, and deliberately slow.

Sweden joined the European Union in 1995 and acceded to NATO in March 2024. Its economy is export-driven, with strengths in manufacturing, pharmaceuticals, telecoms, and green technology. One striking fact: Stockholm was the first city in the world to implement a permanent congestion charging scheme, following a successful trial in 2006.

> **"Infrastructure systems should not be assessed solely on value for money in stable times, but on their ability to absorb stress and continue functioning during disruption. Modern conflicts increasingly centre on the control of critical flows – energy, trade, transport, and data — rather than territory alone."**
>
> Delegate Note: Scene Setting with Andreas von der Heiade, Day 1

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# Theme 1

## Long-term Infrastructure Planning as a System Discipline

### What We Saw

A theme that emerged consistently was the extent to which long-term thinking is embedded throughout the planning system rather than treated as a policy aspiration. The delegation heard from Stockholm's strategic planning team about a Comprehensive Plan that looks ahead to 2060, built on a tradition of successive strategic plans adopted in 1952, 1999, 2012, and 2018. These are not documents that gather dust; they actively shape investment decisions, coordinate investment across agencies, and provide a stable framework that survives changes in government.

At the national level, Sweden operates a rolling 12-year national infrastructure plan (currently covering 2026 to 2037) funded to approximately 1,171 billion SEK and refreshed every four years. The process is structured: Trafikverket provides a direction framework in year one, a bill is introduced to parliament in year two, projects are identified within the funding envelope in year three, and the government approves the plan after public hearings in year four. Approval locks in funding, subject to four-yearly revision. Critically, the plan is quite stable across changes in government and infrastructure is not usually a central election issue in Sweden.

The plan is also notable for what it makes visible. Projects are ranked by cost-benefit ratio, adjusted for wider considerations, and the assessments are published. The plan shows not just what is funded, but what is not, and on what basis.

### Why It Matters

New Zealand's infrastructure investment has historically been shaped by three-year political cycles. Priorities shift with elections, projects are committed and then deferred, and industry has no reliable signal about what is coming. The Swedish model shows what becomes possible when planning and funding are genuinely decoupled from short-term political incentives. Industry can invest in capability, councils can plan ahead, and government can hold a consistent line on priorities.

### How We Can Apply It

New Zealand should develop a funded, long-term infrastructure plan that sets national priorities across a 10-15 year horizon, with regular independent reviews rather than ministerial resets. The plan should make explicit what is funded, what is not, and on what basis.

#### WHAT THEY SAID

**"Funded long-term infrastructure budgets with reduced input on specific projects from Ministers is the way to go."**

Delegate Note: Funding the Future: Sweden's model for Long-Term Infrastructure Investment, Day 3

**"The 2060 horizon is also important. It gives Stockholm the ability to make decisions that are not just about the next budget, next election, or next growth pressure. There is still a political process, but the long-term plan appears to give the city a stronger anchor and a more consistent direction."**

Delegate Note: City of Stockholm Transport Department and City of Stockholm Urban Planning Department, Day 2

**"The transparent demonstration of the benefit-cost ratio of all in-plan and out-of-plan projects shows the opportunity cost of choosing to do some things over others."**

Delegate Note: The Swedish National Road and Transport Institute, Day 3

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# Theme 2

## Decisions Made Early Determine Outcomes, Not Just Delivery

### What We Saw

One of the most challenging and useful sessions of the Stockholm programme was an evidence-based dissection of why infrastructure projects go wrong. The central argument was deliberately provocative: cost overruns are not primarily a delivery problem. They are a consequence of how decisions get made in the early stages of a project's life.

The data is striking. Most cost escalation in infrastructure occurs during planning and design, not construction. Projects get committed before sufficient design maturity, cost certainty, and risk understanding are in place, pushed forward by funding cycles, political commitments, or stakeholder expectations. This was termed the 'winner's curse': the projects that look most attractive at the point of selection are precisely the ones most likely to experience cost escalation, because their apparent attractiveness often reflects optimistic assumptions rather than rigorous analysis.

Sweden's response is structural. The 12-year plan creates space to delay irreversible decisions and maintain competition between projects for longer. Cost-benefit frameworks are applied consistently and published, making opportunity costs visible. Projects are not committed until a genuine level of design and cost maturity has been reached. Consenting timelines remain a significant challenge with some applications taking five to eight years, but the discipline around early decision quality is markedly stronger than most comparable systems.

### Why It Matters

New Zealand has experienced significant cost increases between business case approval and delivery on a number of major projects. These overruns are often attributed to construction performance or supply chain pressures, but the evidence points to a more uncomfortable truth: the problems were typically baked in much earlier. When projects are committed for political reasons before design maturity is sufficient, no amount of delivery excellence can fully recover the position.

### How We Can Apply It

Greater discipline is needed around the quality and timing of early decisions. This means resisting pressure to advance projects before they are genuinely ready, being transparent about opportunity costs within a constrained funding envelope and investing in the analytical capability needed to make those judgements well. It also means being honest about what consistent, transparent prioritisation looks like across different investment areas, where current practice varies considerably.

#### WHAT THEY SAID

**"Improving outcomes requires a shift in focus from delivery to the quality and timing of upstream decisions, supported by stronger discipline, clearer prioritisation, and greater system transparency."**

Delegate Note: Trafikverket/Linköping University, Day 1

**"Once a cost-benefit analysis is completed, an agency doesn't appear to further redefine or manipulate scope or outcomes to drive a subsequent change."**

Delegate Note: VTI – The Swedish National Road and Transport Research Institute, Day 3

# Theme 3

## Consensus is Built, Not Assumed

### What We Saw

Sweden's approach to infrastructure decision-making is inseparable from its political culture. Across every session in Stockholm, from the Vice Mayor for Transport to academics and researchers, the delegation encountered the same principle: bring people with you before you make the decision, not after. This is not naive idealism. It is a pragmatic recognition that decisions made without genuine stakeholder alignment tend not to stick, and the cost of rebuilding trust is far higher than the cost of building it in the first place.

The Vice Mayor, Lars Stromgren of the Green Party, described a deliberate two-step process for major changes – an initial dialogue phase designed to surface concerns and test ideas, followed by formal decision-making. The congestion charging experience is the most vivid illustration. The 2006 trial was controversial. But rather than forcing the issue, the city let the results speak. After twelve months of operation and a 20 percent reduction in traffic volumes, public support shifted substantially.

This points to a broader principle the delegation heard described as the 'Valley of Political Death', the period immediately before a new charging or behaviour-change system goes live, when public opposition peaks, political risk is highest, where sunk costs are visible and benefits have yet to be demonstrated. Surviving this window requires not just communication, but genuine trust built over time through transparency about intent and revenue use.

### Why It Matters

New Zealand tends to consult on decisions rather than build consensus toward them. The distinction matters. Consultation can become a process that is technically completed but politically hollow, producing submissions that do not meaningfully shape outcomes, and opposition that simply moves from the consultation phase to the courts or the media. The Swedish experience suggests that investment in genuine pre-decision engagement is not just good governance; it is a practical tool for getting difficult projects delivered.

### How We Can Apply It

For major infrastructure initiatives, particularly those involving behaviour change (e.g. new user charges or significant urban transformation), New Zealand should invest more heavily in pre-decision engagement and be more transparent about revenue use and trade-offs. Piloting initiatives before permanent implementation, as Stockholm did with congestion charging, is a proven way to demonstrate real-world benefits and allow public sentiment to catch up with policy intent.

#### WHAT THEY SAID

**"The critical element of enacting a new congestion charging system is surviving the Valley of Political Death - the period when public sentiment is lowest, political points get scored, fear of the unknown is greatest."**

Delegate Note: VTI – The Swedish National Road and Transport Research Institute

**"Success [of congestion pricing] depends on system design, interface risk, stakeholder alignment, and public trust."**

Delegate Note: Trafikverket/Linköping University, Day 1

**"[Sweden's] general approach is to try and bring together parties to mutually acceptable conclusions. This also extends to bringing along key stakeholders – for example, a two-step process to bring in swimming areas around Stockholm, managing initial concerns before formal decisions were made."**

Delegate Note: Welcome Dinner with Vice Mayor for Transport and Urban Environment, Day 0

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# Theme 4

## Urban Development as a Systems Problem

### What We Saw

Sweden's approach to urban growth is inseparable from how its infrastructure governance is structured. Decisions run across three genuine levels of authority, national government, 21 regions, and 290 municipalities, each holding real powers and the ability to slow or block a project outright. Rather than streamlining this into a single decision-maker, Sweden has built deliberate friction into the system, forcing alignment between levels of government before a project is locked in, rather than litigating disagreements after the fact.

That same systems instinct extends to sectors that are easy to treat as an afterthought in growth planning. At the Stockholm International Water Institute, the delegation heard that water infrastructure is planned and funded as core economic infrastructure rather than an environmental compliance line-item, on the logic that reliable water systems underpin everything else a growing city depends on, from energy and food production to public health and industrial activity. The throughline across both sessions was the same: growth, governance, and utilities are not separate workstreams to be sequenced. They are one system, and Stockholm plans them that way.

### Why It Matters

New Zealand tends to treat governance coordination and infrastructure sectors as separate problems, solved by separate people on separate timelines. Central and local government negotiate funding and consenting somewhat independently of how water, transport, and energy planning interact with each other. The result is growth that is technically compliant at every individual step but incoherent as a whole, where a housing development outpaces its water network, or a transport corridor is designed without reference to where growth is actually planned to occur.

### How We Can Apply It

New Zealand should treat multi-level governance coordination as a design feature of infrastructure planning rather than a bureaucratic hurdle to streamline away, and should integrate utilities like water into growth planning from the outset, as core economic infrastructure, rather than retrofitting them once land use decisions have already been made.

#### WHAT THEY SAID

**"The system is not arbitrary, but not fully centralised – [it is] coordinated, balanced, and deliberately slow"**

Delegate Note: Ministry of Rural Affairs and Infrastructure, Day 2

**"Water is not just an environmental issue, it is critical economic infrastructure that underpins growth, resilience and community wellbeing."**

Delegate Note: Stockholm International Water Institute, Day 2

# Theme 5

## Local Government as a Genuine Delivery Partner

### What We Saw

One of the most consistent impressions across the Stockholm programme was the sheer capacity of local government to act. Stockholm City is not simply an implementer of central government decisions – it is a genuine co-investor, co-planner, and in many cases the primary driver of urban infrastructure outcomes. The city holds the planning monopoly, and co-funds infrastructure alongside national government through agreed frameworks.

Sweden's 290 municipalities have access to their own revenue tools, including local income tax, and there are no formal caps on local debt. This means local government can invest ahead of growth, co-fund national infrastructure, and take a long-term view on asset development.

Sweden's system operates across national, regional and municipal levels, but it is the municipalities, that are the strongest tier below national government.  This concentration of power and revenue at the municipal level creates a very different dynamic to New Zealand, where local government is often revenue-constrained and capability-limited.

### Why It Matters

New Zealand's local government sector is uneven in its capability and constrained in its funding. Smaller councils often lack the expertise and balance sheet to partner effectively with central government on major infrastructure. This shows up as consenting delays, infrastructure that does not connect across boundaries, and housing growth that outpaces supporting networks.

### How We Can Apply It

New Zealand's current RMA reform and spatial planning work is a genuine opportunity to rebalance the relationship between central and local government. Sustained investment in local government capability, alongside clearer revenue tools, co-funding arrangements, and planning frameworks that genuinely empower councils to act, would help close the gap between planning ambition and delivery reality.

#### WHAT THEY SAID

**"This is different to most Council Long Term Planning that occurs at the moment which is more of a budget or list of projects rather than a more comprehensive integrated urban planning focus."**

Delegate Note: City of Stockholm Transport Department and City of Stockholm Urban Planning Department, Day 2

**"Municipalities also fund transport infrastructure — their planning monopoly and revenue from income taxes enable a far more powerful level of infrastructure leadership than NZ Local Government."**

Delegate Note: VTI – The Swedish National Road and Transport Research Institute, Day 3

# Site Visit

## E4 Stockholm Bypass

The E4 Stockholm Bypass is one of the three largest investments in Sweden's current 12-year national plan: 21 kilometres of new motorway, 18 kilometres of which run through tunnel, with six major interchanges and extensive intelligent transport systems threaded beneath the city. Strategic planning for the corridor dates back to the 1940s and 1950s, though the project wasn't formally approved until 2009. Construction began in 2014, with partial opening planned for 2026 and full completion in 2030 – a 21-year span from approval to finish, carried across multiple changes of government, the Global Financial Crisis, COVID-19, and the energy market disruption that followed.

The scale required real innovation: roughly 24 million tonnes of rock excavated, with around 9.5 million tonnes shipped out by sea via temporary ports rather than trucked through the city, to minimise disruption to communities along the route.

The Executive Director Major Projects at Trafikverket oversees a portfolio of more than 30 mega-programmes in rail, roads and locks worth a combined 50 billion EUR. The discipline behind that scale is deliberate: projects of this complexity are only committed once scope, cost and risk are sufficiently understood. The bypass is not just an infrastructure project. It is evidence of what a well-funded, long-term planning system can deliver when politics does not get to relitigate the decision halfway through.

**"The planning system can be characterised as a 'slow-moving wheel' – but one that continues rolling regardless of changing economic and political conditions."**

Delegate Note: E4 Bypass Site Visit, Day 1

# Site Visit

## Stockholm Royal Seaport

Stockholm Royal Seaport is the largest urban development in Sweden, transforming a former gasworks and portside industrial site into a neighbourhood of 12,000 homes and 35,000 workplaces. The project is designed to be fossil-fuel free by 2030: residential waste travels underground through pneumatic pipes to a portside collection point, then by sea to Stockholm's biomass plant, which already supplies around 80 percent of the heat for the city's homes. No resident is more than 200 metres from water or green space.

The old gasworks silos are being converted into a hotel and music venue, with the Stockholm Opera already confirmed to perform there for the next five years. The development also includes indoor climbing facilities, museums, doctors, dentists and pre-schools, several of which are deliberately built in flexible structures designed to convert into housing as Sweden's falling birth rate reduces future demand for childcare – urban amenity treated not as a fixed list of features, but as infrastructure built to adapt as the city's needs change.

The key enabling condition was land ownership: the City of Stockholm owned the site outright, funding development through taxes and land sales, which gave it the mandate to set long-term sustainability and amenity conditions a private developer wouldn't have had the motivation to deliver alone. For New Zealand, where land of this scale is almost always privately held, Royal Seaport is less a template to copy than a demonstration of what becomes possible when public land ownership and long-term planning are combined.

**"If central and local governing bodies were encouraged to work together with private developers to forward plan areas for population growth and develop a master plan for the supporting infrastructure, the developments could be more ambitious in scale."**

Delegate Note: Stockholm Royal Seaport visit, Day 2

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# Norway

## Where resilience is a way of life

| 5.5m | 385,207$^{km2}$ | Oslo | $89,000$^{USD} |
|---|---|---|---|
| POPULATION | AREA | CAPITAL | GDP PER CAPITA |

| 94,600$^{km}$ | 4,200$^{km}$ | 1,100+ | 49 |
|---|---|---|---|
| PUBLIC ROADS | RAILWAY NETWORK | TUNNELS | AIRPORTS WITH SCHEDULED FLIGHTS |

**Norway hugs the western and northern edge of the Scandinavian Peninsula, stretching nearly 1,800 kilometres from its southern tip to the North Cape, deep inside the Arctic Circle.**

Mountainous, fjord-cut, and sparsely populated outside a handful of cities, it's the kind of country New Zealanders recognise without ever having been there – long, lean, geographically dramatic, and quietly proud of being a good place to live. Norway's population of 5.5 million sits close to New Zealand's own, scattered across a coastline that runs for tens of thousands of kilometres once every fjord is counted.

Politically, Norway is a constitutional monarchy with a parliamentary system, governing across national, regional and municipal levels, with the 12-year National Transport Plan as the central framework guiding investment. Norway sits outside the EU, participating in the single market through the EEA instead, but it was a founding NATO member in 1949 — a fact that has taken on fresh weight since Russia's invasion of Ukraine, with defence spending rising and infrastructure increasingly viewed through a "total defence" lens.

Norway's wealth sets it apart. The Government Pension Fund Global, the world's largest sovereign wealth fund at roughly USD 1.7 trillion, gives the country a level of fiscal headroom most nations, New Zealand included, simply don't have. That headroom hasn't bred complacency: Norway has experimented with introducing competition inside government itself, splitting sections of its highway network away from the incumbent roads agency and handing them to a separate, deliberately mixed public-private agency to see whether a new entrant could do better.

> **"The key insight was the introduction of the concept of competition within government sector... Nye Veier was intentionally staffed with professionals with a mixture of public and private sector backgrounds, in order to maximise the combined strengths of each."**
>
> Delegate Note: Scene Setting with Ketil Solvik-Olsen, Day 4

# Theme 1

## Maintain First, Build New Last

### What We Saw

Across multiple sessions in Oslo – from the Norwegian Public Roads Administration to Bane NOR and the Institute for Transport Economics – there emerged a single investment principle as 'maintaining what you have before you build something new'. This is not simply a preference. In Norway, it is embedded as an explicit investment hierarchy in national policy: maintain first, improve where possible, build new only when necessary. The hierarchy has direct funding implications built into the 12-year National Transport Plan.

The Norwegian Public Roads Administration session gave the delegation a clear picture of how this plays out in practice. Norway's state highway network of approximately 10,600 kilometres includes about 5,600 bridges and over 600 tunnels. It has a maintenance backlog that dates to the 1950s, with a deliberate pivot toward maintenance over new investment as a direct response to decades of underinvestment.

Norway's quality assurance scheme, established in 2000 under the Ministry of Finance rather than the transport ministry, requires independent external review at two decision gates before parliamentary approval of funding. Projects are budgeted at P85 but managed to P50, with the uncertainty provision held centrally to resist scope creep. Three of four Norwegian government projects are completed below their P85 budget – a direct result of projects being approved only after scope is clearly defined and uncertainty is substantially resolved.

### Why It Matters

New Zealand faces the same front-end cost escalation problem and the same political incentive to announce new projects over maintaining existing ones, without an equivalent mechanism to make that trade-off transparent or binding.

### How We Can Apply It

New Zealand should adopt a maintain-first investment hierarchy with a transparent split between maintenance and new-build spending. It should also consider a Norway-style quality assurance regime requiring independent review of major projects before funding approval. These are low-cost governance interventions with proven results. In Norway, three out of four projects are delivered below their P85 budget.

#### WHAT THEY SAID

**"Norway has embedded a clear investment hierarchy into national policy: maintain first, improve where possible, build new only when necessary."**

Delegate Note: Statens Vegvesen (Norwegian Public Roads Administration), Day 4

**"Long planning timelines comparable to New Zealand, but with fewer 'stop–start' disruptions."**

Delegate Note: Statens Vegvesen (Norwegian Public Roads Administration), Day 4

**"A key lesson from the Nordics is that 'less is more' – clear goals, measurable outcomes, transparent assessment criteria, and easily digestible formats are essential to inform public debate and reduce the influence of political swings."**

Delegate Note: Institute for Transport Economics, Day 4

# Theme 2

## Total Resilience as a Planning Lens

### What We Saw

Resilience was the organising idea behind almost every session in Oslo. Norwegian planners use a concept called "total defence," which treats energy, transport, digital infrastructure and water as a single system rather than separate risks. Former Minister of Transport Ketil Solvik-Olsen framed it simply: modern threats target the flows societies depend on, not territory. Since Russia's invasion of Ukraine, that framing has shaped real investment decisions, including renewed priority for east-west transport corridors and defence spending directed at energy and digital resilience.

The same lens applies to climate. During the PwC session, we learned from Vestland County that they priced the cost of infrastructure failure, not just the cost of repair, in their planning processes. This includes the cost to freight, emergency services and regional connectivity when a road closes. The goal is to secure funding before failure occurs, not after.

Water carries the same logic and, arguably, needs it most. Norsk Vann, representing 325 of Norway's 357 municipalities, put the scale of the problem plainly: NZD 82 billion is needed over the next 20 years to renew ageing assets, meet new EU water standards, and adapt to a changing climate. The deeper issue is structural – responsibility is split across municipalities with no central economic regulator, and smaller councils are struggling to attract the people needed to distribute the cost of water infrastructure across a larger population.

### Why It Matters

New Zealand shares the same exposure: growing natural hazard risk, ageing assets, and budgets that push resilience to the back of the queue until something fails. Norway treats resilience as a planning discipline applied consistently across sectors, not a label attached after a disaster. The water parallel is the closest of all – Norway's fragmented, municipally-led system and reform debate echo New Zealand's own water reform journey almost exactly.

### How We Can Apply It

New Zealand should embed resilience as a primary investment criterion alongside value for money, not a secondary check applied after the economic case is made. Vestland's approach, costing disruption rather than just repair, is a practical model for transport. In water, the lesson is structural: reform needs national coordination on funding, workforce and standards to match entity consolidation, since Norway shows fragmentation can persist even after delivery is reorganised.

#### WHAT THEY SAID

**"Infrastructure systems should not be assessed solely on value for money in stable times, but on their ability to absorb stress and continue functioning during disruption. Modern conflicts increasingly centre on the control of critical flows, energy, trade, transport, and data, rather than territory alone."**

Delegate Note: Scene Setting with Ketil Solvik-Olsen, Day 4

**"Both countries are responding to the limitations of highly fragmented, municipally-led systems that are struggling to meet increasing regulatory, investment, and capability demands."**

Delegate Note: Norsk Vann, Day 5

**"A key challenge identified was securing political alignment and long-term funding certainty before visible infrastructure failures occur."**

Delegate Note: PwC Climate Resilience session, Oslo

# Theme 3

## Rail as More Than Rail

### What We Saw

Bane NOR, Norway's rail infrastructure owner, manager and developer, runs one of the more distinctive business models the delegation encountered. It is one of Norway's largest landowners, and it deliberately recycles capital: surplus land around station precincts and old rail workshops is developed into commercial or residential precincts and sold into the private market, with the proceeds reinvested rather than returned to the state. The same logic applies to its fibre network, built originally to run rail signalling, but now sold with surplus capacity into the private telecoms market. Bane NOR is now one of Norway's largest private fibre providers.

Maintenance is treated with the same discipline. Bane NOR has deliberately pivoted toward maintenance over new investment, and is candid about two hard-won lessons: don't repair yourself into a new problem, since strengthening one part of a network, a reinforced bridge, for example, can unintentionally redirect flooding or ice build-up elsewhere on the network; and watch the renewals market closely, since other European countries undertaking large renewal programmes are creating a supply constraint that pushes up cost and extends timelines for everyone, Norway included.

Rail is also valued for more than its transport economics. Norway has long used its rail network to connect remote northern regions to the south, treating that connection as worth funding for social cohesion as much as commercial return, even where a narrow benefit-cost case would struggle to justify it.

### Why It Matters

Rail infrastructure should be viewed as more than a transport asset. Bane NOR's capital recycling model shows how land, station precincts and supporting infrastructure can generate revenue for reinvestment, while its maintenance discipline offers a live case study in managing an ageing, climate-exposed network strikingly similar in scale to KiwiRail's. The broader lesson, that infrastructure value extends beyond a narrow benefit-cost calculation, is one New Zealand could apply through a social cohesion and connectivity lens.

### How We Can Apply It

New Zealand should consider how public infrastructure owners can be better enabled to capture and recycle value from their own asset bases, including station precinct development, commercial use of supporting infrastructure, and reinvestment of proceeds. Maintenance and renewal need to be prioritised through a system-based approach to asset management, with early planning for the cost and supply constraints that come with large-scale renewals.

#### WHAT THEY SAID

**"Bane NOR brings a private sector focus to ownership and development of assets. It recycles its asset base and ensures that assets are being deployed for purposes that reflect their highest and best value. The capital gains from the development of assets are captured by Bane NOR for the benefit of its broader stakeholders."**

Delegate Note: Bane NOR, Day 4

**"The session highlighted the similarity of Bane NOR's asset base to KiwiRail's, and the associated challenges both face, from a maintenance backlog to increasingly emerging challenges such as climate change. It highlighted that our rail network is not all bad, actually quite similar to some of our international peers despite the bad press it might receive locally."**

Delegate Note: Bane NOR, Day 4

# Theme 4

## Making Partnerships Endure

### What We Saw

One of the most practically instructive sessions of the Oslo programme was the presentation on Oslopakke 3 and the Urban Growth Agreement: a model of how central and local government bind themselves to a shared infrastructure programme over decades, with committed funding, clear accountability, and independent oversight to keep it honest.

The Oslo packages show a deliberate evolution. Oslopakke 1 (1990–2000) used a toll ring to fund road network development. Oslopakke 2 (2001–2007) shifted the focus to public transport, financed by increased tolls. Oslopakke 3 (2009–2036) introduced a new western toll ring, with revenue directed to strengthening public transport and reducing private car growth. The Urban Growth Agreement sits above these packages as a binding, government-led agreement involving the Ministry of Transport, Ministry of Local Government, Akershus County, Oslo municipality, and neighbouring municipalities, each with specific obligations toward a shared goal of zero growth in private car traffic.

What makes this work is not the policies themselves, but the architecture around them. The agreement is binding, not aspirational. It is backed by committed government funding, not annual budget negotiations. And it is overseen by an independent, fully resourced body with a clear mandate to assess progress and coordinate between parties. Over 20 to 30 years, that architecture has delivered a steady shift from road construction to public transport investment that has materially changed how Oslo moves.

### Why It Matters

New Zealand is only now entering into city deals, which makes this the right moment to learn from Oslo's experience rather than retrofit it later. Without binding funding and clear cross-government obligations built in from the start, long-term urban infrastructure programmes risk becoming vulnerable to political change and fragmented responsibility further down the track. Oslo's nearly four decades of experience show that institutional architecture, not policy content, is what determines whether a deal delivers over the long run, and that architecture is far easier to design well at the outset than to retrofit once a deal is already underway.

### How We Can Apply It

New Zealand should structure city and regional deals around binding funding commitments from central government, clear obligations for every tier of government, and independent oversight to monitor progress and coordinate parties. Deals should be built around long-term urban growth outcomes and designed to survive changes in government at both central and local level.

#### WHAT THEY SAID

**"The structure of the two agreements, with a formal Secretariat, provides an example for New Zealand of a city or regional deal that has delivered consistent results over a period of 20-30 years."**

Delegate Note: Secretariat for Oslopakke 3 and the Urban Growth Agreement, Day 5

**"The UGA is analogous to a city or regional deal. However, in the Norwegian context it comprises a binding agreement supported by committed Government funding."**

Delegate Note: Secretariat for Oslopakke 3 and the Urban Growth Agreement, Day 5

# Theme 5

## Energy Independence Through System Thinking

### What We Saw

Norway's energy advantage is often described as a resource endowment, abundant hydropower, when it is more accurately a planning discipline. Hydropower has underpinned the country since the early 1900s, when industrial development was built around cheap electricity rather than electricity being built to serve existing demand. That sequencing logic has held for over a century: generation, grid and storage are planned together, not as separate decisions made by separate agencies. The result is a system that runs on hydropower for 85 to 90 percent of generation, backed by more than 1,000 reservoirs functioning as large-scale storage, and dense interconnection that lets Norway export power when reservoirs are full and import when they are not. At the Arup energy session, the delegation heard that this integration is now a matter of security and competitiveness, not just climate policy. The central argument was about sequencing: building generation capacity without building the grid, flexibility and digital systems to deploy it is close to wasted investment. Energy security, in this view, is an outcome of system design, not a by-product of having enough renewable electricity.

That same logic extended into sovereignty over digital infrastructure. At the Skygard data centre, customer requirements were framed around three connected demands: security, sovereignty and sustainability, with sovereignty (control over where and how a country's data is held) increasingly treated as inseparable from control over a country's energy. The facility's design reflected this thinking directly, returning waste heat from a single data centre to heat thousands of homes, treating energy and digital infrastructure as parts of the same system rather than separate sectors competing for the same grid. New Zealand's position looks comparable on the surface, high renewable generation, a small, dispersed population, but the underlying structure is markedly different. Electrification has reached only around 20 percent of total final energy demand, and grid capacity, not generation potential, is now the binding constraint on going further.

## Why It Matters

The delegation heard repeatedly that the challenge facing advanced economies is no longer simply how to generate clean energy, but how to build an energy system capable of supporting long-term economic growth, resilience and competitiveness. Reliable generation must be matched by investment in networks, storage, flexibility, and workforce capability if electrification is to occur at pace and scale. The Norwegian experience demonstrates that energy security is not achieved through generation alone, but through the deliberate integration of physical infrastructure, markets and institutions.

## How We Can Apply It

New Zealand needs the same deliberate, long-term approach to energy resilience and electrification that Norway has built through decades of coordinated policy settings – from tax incentives to spatial planning to grid investment. This means treating energy independence as a national infrastructure priority, not a market outcome. It means investing in grid capacity as urgently as in generation. It means creating the regulatory and market certainty that attracts long-term private investment in renewables and storage. And, it means managing the transition deliberately by repurposing existing assets, sequencing investment, and building the system-level flexibility that makes a high-renewable grid reliable rather than fragile.

### WHAT THEY SAID

**"Energy independence and security will only be achieved by treating generation, networks, and markets as a single, integrated system."**

Delegate Note: Building a Secure Energy Base for Long-Term Infrastructure Growth, Oslo

**"Skygard's customer requirements are: Security – of data, Sovereignty – control of data, and Sustainability – the [huge] power and water requirements of data centres must be provided in a sustainable way."**

Delegate Note: Skygard session, Oslo

# Site Visit

## Fornebubanen Metro Line

The Fornebubanen is a 7.7 kilometre, six-station metro extension connecting central Oslo to the former Fornebu Airport precinct, due for completion around 2029/30. The line had been discussed for decades, but momentum only built once Oslo's growth strategy identified the roughly 11,000 new homes the corridor would need to support viable rapid transit, land use and transport committed together rather than sequentially. The metro is not being built for the community that exists. It is being built for the community that is coming.

The project also shows procurement doing more than buying an outcome, it is actively shaping a market. Oslo's requirement for predominantly electric construction plant has pushed contractors to solve real operational problems, from charging logistics to residual diesel dependence, rather than wait for the market to move on its own. Environmental management, including relocating protected mussels and nesting birds during construction, was treated as routine delivery rather than an exceptional constraint.

Some of this is easier in Norway than it would be in New Zealand. Tunnelling can proceed beneath private land where there is no direct economic impact on the owner, and sustained cross-party support for public transport investment reduces the policy volatility that disrupts major transit projects elsewhere. Neither condition can simply be imported, but both explain why Fornebubanen could commit early and stay committed.

**"Protect and strengthen integrated land use and infrastructure planning, ensuring major transport investments are tied to long-term urban growth outcomes and housing delivery."**

Delegate Note: Fornebubanen Metro Line Site Visit, Day 4

# Thank You

Infrastructure New Zealand extends its sincere thanks to the organisations and individuals who hosted and presented to the delegation across Stockholm and Oslo. The openness, expertise, and insights shared throughout the visit contributed significantly to the delegation's success. We particularly acknowledge His Excellency Mr Klas Molin, Ambassador of Sweden to Australia and New Zealand, His Excellency Mr David Taylor, Ambassador of New Zealand to Sweden, and their respective teams for their invaluable assistance in facilitating the delegation.

## Thank You to Our Hosts

| | | |
|---|---|---|
| Day Four - Oslo, Norway | PWC | pwc |
| Day Five - Oslo, Norway | Arup | ARUP |

| Name | Role | Organisation |
|---|---|---|
| **Stockholm** | | |
| David Taylor | New Zealand Ambassador to the Nordic Region | |
| Lars Stromgren | Vice Mayor for Transport and Urban Environment | City of Stockholm |
| Andreas von der Heide | CEO | Consilio International |
| Jonas Eliasson | Director of Transport Accessibility | Swedish Transport Administration and Professor of Transport Systems, Linkoping University |
| Patrick Gune | Executive Director Major Projects | Trafikverket |
| Carolina Fintling Rue | Head of Unit | Stockholm Urban Planning Department |
| Robin Billsjo | Head of Unit | Stockholm Transport Department |
| Niklas Lundin | Senior Adviser | Ministry of Rural Affairs and Infrastructure |
| Camilla Edvisson | Visitor Engagement Officer | City of Stockholm |
| Orjan Lonngren | Architect | City of Stockholm |
| Maria Borjesson | Professor | Swedish National Road and Transport Research Institute (VTI) |
| Johan Grip | Head of Research and Education | Kommuninvest |
| Kristina Alvendal | Industrial Coordinator | Accelerationskontoret (The Acceleration Office) |
| Nils Paul | Senior Policy Expert Infrastructure | Svenskt Naringsliv (Confederation of Swedish Enterprise) |
| Thomas Rebermark | Director | Swedish Water House, Stockholm International Water Institute |
| **Oslo** | | |
| Ketil Solvik-Olsen | Former Minister of Transport and Communications | |
| Silvia Olsen | Director of Research | Transportokonomisk Institutt (Institute for Transport Economics) |
| Sven Marius Gjeruldsen-Halle | Head of International Affairs | Bane NOR |
| Tord Thorshov | Principal Roads Engineer | Statens Vegvesen (Norwegian Public Roads Administration) |
| Peter Tjolsen | Communications Advisor | Fornebubanen, Oslo Kommune |
| Henrik Loseth Janssen | Senior Officer - Climate Strategist | Vestland County Council |
| Mats Ruge Holte | | PwC Norway |
| Frode Skar | Head of Communications | Norsk Vann |
| Alberte Ruud | Head of the Secretariat for Oslopakke 3 and the Urban Growth Agreement | |
| Zita Asdal | Strategic Advisor | Secretariat for Oslopakke 3 and the Urban Growth Agreement |
| Hilde Tonne | Chair | Arup Group |
| Oscar Thogersen | COO | Skygard AS |

# Delegation Members

The 2026 Nordic Delegation brought together 37 leaders from across New Zealand's infrastructure sector - spanning central and local government, legal and financial advisory, construction, engineering, energy, water, and transport. The diversity of the group was deliberate, and it shaped the quality of the conversations throughout the programme.

| Name | Role | Organisation |
|---|---|---|
| Amanda Wilson | Unit Manager - Infrastructure, Security and Government | The Treasury |
| Andy Hagan | General Manager, Investments | NZ Infrastructure Commission \| Te Waihanga |
| Anthony McFadden | Executive General Manager | Downer |
| Ben Hayward | CEO New Zealand | Fulton Hogan Ltd |
| Campbell Barry | Head of Local Government and Partnerships | Agite Consulting |
| Daniel Collins | Partner | Buddle Findlay |
| Dave Neru | Country Manager | Veolia NZ |
| David Robinson | Portfolio Manager | Accident Compensation Corporation |
| Dorian Devers | Chief Renewable Growth Officer | Contact Energy Ltd |
| Fraser Wyllie | Managing Director | McConnell Dowell Constructors Ltd |
| Graham Mitchell | CEO | National Infrastructure Funding and Financing |
| Grant Maxwell | NZ Infrastructure Resilience Lead | Stantec |
| Hamish Bolland | Partner | Chapman Tripp |
| Jennifer Caldwell | Partner | Buddle Findlay |
| Jing Li | Chief Sales Officer | Industrial and Commercial Bank of China |
| Karl Nicholson | Head of Corporate Finance | ANZ Bank NZ Ltd |
| Katrina Van Houtte | Partner | Dentons |
| Kevin Doherty | Group General Manager Transport Services | NZTA |
| Luke Donnelly | Director - Infrastructure | WTP NZ Infrastructure Ltd |
| Matt Lory | Director | RCP |
| Mayurie Gunatilaka | New Zealand Country Leader | Arup New Zealand Ltd |
| Natasha Garvan | Partner | Bell Gully |
| Nick Dunn | Partner | Greenwood Roche |
| Penny Kneebone | Chief Executive | Tonkin + Taylor |
| Quin Henderson | Chief Executive Officer | Southbase Group Ltd |
| Rob Scott | Mayor | Southland District Council |
| Sarah Scott | Partner | Simpson Grierson |
| Simon Healy | Partner | PwC |
| Stefanie Rixecker | Chief Executive | Canterbury Regional Council |
| Susan Lucking | Head of Infrastructure, Government & Specialised Finance | Bank of New Zealand (BNZ) |
| Tim Palin | Partner | Frequency NZ Ltd |
| Tracey Haszard | General Manager - Transport & Infrastructure | Beca Ltd |
| Wayne Juno | Transport Sector Director | Holmes |
| Wei Lu | Head of Infrastructure & Specialised Finance | China Construction Bank (CCB) |

| Infrastructure New Zealand | | |
|---|---|---|
| Danielle Uniza | Policy Manager | Infrastructure New Zealand |
| Issy Pasley | Events and Marketing Manager | Infrastructure New Zealand |
| Nick Leggett | Chief Executive | Infrastructure New Zealand |

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