# What does effective workforce planning for infrastructure look like? – ICE presidential roundtable summary

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## Background

Around the world, governments are grappling with the same question: do they have the workforce, skills and capacity needed to deliver on ambitious infrastructure agendas? This is not a new issue, but it has become more urgent as governments commit to achieving net-zero emissions, strengthening climate resilience and accelerating digital transformation.

These priorities require not only significant investment in physical infrastructure but also a skilled, adaptable workforce capable of delivering that infrastructure at scale and speed. Yet many countries are struggling to keep pace. A lack of coordinated, long-term workforce planning, coupled with global competition for skilled professionals, is creating bottlenecks that threaten to delay progress, inflate costs, and undermine delivery.

This roundtable was chaired by ICE president Jim Hall and joined by Philip Aldridge, Chief Executive of Waihanga Ara Rau, New Zealand's Construction and Infrastructure Workforce Development Council. Infrastructure leaders from around the world explored how different countries are tackling the complex challenge of workforce planning for large-scale infrastructure delivery, what's working, and how these insights can inform governments' approaches to building a resilient, skilled workforce capable of delivering the infrastructure of the future.

*Recap: Governments are responding to the skills challenge in different ways. Some are reforming immigration systems to attract global talent. Others are investing in technical education, apprenticeships, and new training pathways. A few are embedding workforce planning into national infrastructure strategies. For example, in its recent 10-Year Infrastructure Strategy the UK Government outlined investment in skills and workforce development to support infrastructure delivery, including £625 million for construction training and £1.2 billion annually for youth skills by 2028–29. It is also aligning immigration policy with skills needs and improving national planning through bodies like Skills England.*

Key discussion points:

- The impact of cyclical demand, poor working conditions and other factors that are causing weak workforce retention rates in many countries.
- Developing clear career pathways, more proactive engagement and rethinking entry requirements to attract more young people and increase diversity in the workforce.
- The opportunities and challenges posed by AI and other disruptive technologies, from new skills requirements, the need to adapt and reskill workers and inverting the traditional knowledge pyramid.
- The importance of generating and harnessing reliable data insights for workforce planning.
- Fostering collaboration and partnerships between government, industry, the education sector and other stakeholders to enable effective workforce planning.

## Workforce attraction and retention

Around the world, infrastructure workforces face challenges in attracting and retaining people. In the UK, for example, dropout rates in apprenticeships are very high (the figure for engineering is around 50%).

Cyclical demand is a key factor. In the UK, a typical construction downturn sees around 150,000 people leave the sector. In New Zealand, investment has also trended towards boom-and-bust cycles. The country has a massive NZ$200bn infrastructure gap, but the current government has pulled back on expenditure and wants to increase private investment. The current downturn means it is losing a lot of skilled people to Australia, on top of a long-term shortage of workers, which will cause capacity problems when demand ramps up again.

Stable, long-term and accurate pipelines that are kept up to date are essential to give companies in the supply chain the confidence and clarity needed to invest in developing enough people with the right skills. New Zealand, for example, is developing a 30-year infrastructure plan to try and boost certainty.

Uncertain demand is not the only factor behind weak attraction and retention rates. Waihanga Ara Rau's research suggests poor HR functions and leadership are driving poor staff retention in New Zealand. Its priority work areas, therefore, include improving mentoring programmes and mental health support. In the UK, many projects now have framework agreements between employers and unions that include clear commitments on matters like skills development, apprenticeships and working conditions.

### Boosting diversity and career pathways

A big challenge – and opportunity – is positioning the profession in a way that attracts more people towards engineering as a career. In the UK, for example, only 10% of apprentices are women. In New Zealand, Māori and Pacific people are underrepresented in STEM subjects and careers. Singapore is overdependent on immigrant construction workers because its citizens do not want to pursue careers in the sector.

Addressing these challenges means thinking vertically as well as horizontally about the workforce, both to ensure education provision and skills policy is shaped by industry demand and to create clear pathways for young people from STEM subjects in schools into training and jobs.

There may be a bigger role for bodies like the ICE in inspiring children and other potential entrants by showcasing engineering as a forward-looking, diverse, tech-savvy sector. Examples of such initiatives include the annual 'Big Bang' competition for pupils and students in science and engineering run by Engineering UK. Waihanga Ara Rau is part of a multi-agency diversity group and supports programmes like the Māori leadership forum to help attract and retain more diverse talent into the infrastructure workforce.

Some countries, like Australia, are also asking whether long-standing training processes and requirements for entry into the workforce (such as apprenticeship models or recognition of prior training) are too restrictive to meet the requirements for a skilled and flexible workforce, and whether and how they could be sped up to boost entry levels.

Other potential barriers for new entrants could include trends towards increased working from home and outsourcing more tasks to "global centres of excellence", which may be making it harder for new entrants to develop basic engineering skills or to learn through proximity to experienced colleagues.

## The impact of AI

New technologies like robotics and AI will increasingly impact future workforce demand. Infrastructure cannot evolve if the workforce stays static.

Adapting and applying these new technologies will be difficult, so they will create opportunities through demand for more people with the right advanced skills. The need for some existing jobs will decrease or evolve. Governments and industry will need to develop new training frameworks to develop the right skills and support people to retrain or adapt.

One impact of the rise of AI and new technologies may be the inversion of the traditional knowledge pyramid, whereby new joiners are likely to have the sharpest skills. How to marry these emerging skills to the deep expertise of more experienced engineers will be a new challenge for companies.

Technology is also impacting recruitment in the professional services part of the infrastructure sector. Firms are seeing massive increases in the volume of applications for early careers programmes due to technological shifts in application processes, but this is creating an additional burden for them in terms of filtering the right people.

## Harnessing data insights

Hong Kong has taken a data-led approach to engineering and construction workforce planning. Workers have a card to tap in and out of their shifts, generating data which is fed into a publicly available model which is updated weekly. The data is combined with Hong Kong's capital expenditure programme. It enables the government to assess workforce trends and needs at a very granular level, for example, where shortages will arise in specific trades, and base its quota system accordingly.

While this approach works well in a city-state environment like Hong Kong, it may be more difficult at a national level in larger countries. Nevertheless, generating and harnessing reliable data insights is a critical tool in workforce planning. Waihanga Ara Rau has developed a Workforce Information Platform setting out its analyses of the supply of and demand for people across the construction and infrastructure sectors.

## Collaboration and partnerships

Effective workforce planning depends on collaboration and partnerships between government, industry, the education sector and other stakeholders. For example, reliable pipelines and more cross-sector collaboration could help manage workforce deployment to reduce the impact of downturns on the number of people leaving the sector and ensure there are the right skills in the right place at the right time.

Waihanga Ara Rau is government-funded but industry-led. It is seen as a non-partisan advisor, able to convene all the key stakeholders, and its advice is trusted by them, including supply chain companies, government and investors. It has also sought and benefited from the involvement of a range of government departments, covering relevant issues like education and immigration.

However, while the model has benefited from the buy-in of the government and senior industry leaders, political change is a risk to its work. Long-term workforce planning benefits from stability, but governments change; they can be short-term and reactive and political and investment priorities can shift quickly. This can be a particular challenge in New Zealand, which has three-year national election cycles.

Another challenge in the UK is how to integrate the government's national industrial strategy with increased regional devolution, which will see regional mayors have greater skills and employment remits and could add more complexity to systems-level planning.

## Questions to take away

- What more can governments, supply chain companies and engineering institutions do to attract and retain more diverse talent into the infrastructure workforce?
- How can governments in various geographies and population sizes better capture and deploy data to inform workforce planning?
- Are governments and companies being proactive enough to understand and manage the impacts, risks and opportunities from AI and other technological disruption on infrastructure workforces?
- How can countries embed long-term workforce planning strategies and mechanisms that withstand political cycles and shifting political priorities?

## Further reading

- Engineering New Zealand: Long-term skills shortage – Action Plan 2025
- PwC: The Fearless Future: 2025 Global AI Jobs Barometer