

# Engineering our future: infrastructure for Tasmania



*Feedback on Infrastructure Tasmania's 30-Year Infrastructure Plan (Consultative Draft) from Australia's peak body for engineering, on behalf of 1540+ Tasmanian members and associated stakeholders.*

## 1. About this submission

### 1.1 Engineers Australia

Engineers Australia is the peak body for the engineering profession in Australia. With about 100,000 individual members across Australia – including 1540+ members in Tasmania - we represent individuals from a wide range of disciplines and branches of engineering. Engineers Australia is constituted by Royal Charter to advance the science and practice of engineering for the benefit of the community.

Engineers Australia's response is guided by our Charter and Code of Ethics which states that engineers act in the interest of the community, ahead of sectional or personal interests towards a sustainable future. Engineers are members of the community and share the community's aspirations for Australia's future prosperity.

### 1.2 Introduction

This submission has been informed by members of Engineers Australia in Tasmania with input from members and stakeholder from across the state and our various sub-committees to provide representative perspectives from their particular engineering disciplines and industries.

Engineers Australia (EA) welcomes the opportunity to provide this submission to Infrastructure Tasmania as feedback and input to the 30-Year Tasmanian Infrastructure Strategy (consultative draft).

EA thanks Infrastructure Tasmania for developing a strategy and vision – it is of vital importance that we have a collective view of where we are heading with future investment in Tasmania's infrastructure.

EA supports the approach and underpinning themes used in crafting a strategy focused on infrastructure, namely to achieve:

1. a productive and connected economy
2. healthy and safe communities
3. sustainability and resilience

Engineers Australia supports the key messages contained in the report and broadly agrees with the challenges and opportunities identified.

In reviewing the Strategy, however, what we feel is needed next is the plan for how the strategy is going to be achieved; at a very broad level, Tasmania has a number of already-existing 'lists of infrastructure projects' and now a broad vision of the future in the form of this strategy, but how will it all be achieved? Page 5 of the Strategy notes that "The Strategy does not list specific projects or actions,

instead it outlines a future Infrastructure vision, along with steps we need to take to get there.”

We believe the Strategy could provide more detail on these steps and we respectfully share some insight into what we think some of those important steps need to be. We also pose some questions regarding next steps after the strategy.

### **1.3 Contact details**

To discuss the contents of this submission further, please contact:

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### **1.4 Key Messages and Questions**

#### **Create local jobs – build our future, whilst building our future**

How will the future investment in infrastructure support local direct job creation?

The infrastructure vision is a ‘once in a lifetime’ opportunity to build skills and capabilities, and inspiration for the future, within our communities. The projects will happen regardless as the required workforce can be sourced from other locations but creating maximum opportunities for the involvement of Tasmanians is an opportunity not to be missed.

EA suggests that doing so will require more active consideration of workforce development as having a Tasmanian workforce ready with the right skills at the right time will be essential to enable their participation. We particularly note the challenges in developing a local engineering workforce (see Points in section 2).

EA asks: how can we help, and are you aware of our current efforts to guide workforce development for the engineering sector?

#### **Short-term training for long-term gaining**

How can infrastructure projects across Tasmania in the immediate future better contribute to building the skills, capability and capacity of our workforce and companies in order to deliver the larger and more significant projects in the 10-30 year period? In other words, how can current and near-term infrastructure projects be guided and supported to provide more internships, graduate roles, traineeships, and leadership training so that we are ready for the future, and what role will Infrastructure Tasmania play?

EA suggests that in releasing the Strategy, Infrastructure Tasmania also actively engage with stakeholders on leveraging current projects to build the capabilities and workforce that we will need to deliver the projects in the Strategy.

#### **Inspiring the next generation – “look what Tasmanians can do!”**

Tasmania is about to build a broad range of amazing things, big and small. This effort and investment should form the foundation of richer culture of ‘can do anything’ attitude in our communities that will drive the next iteration of visions and economic and infrastructure developments for our communities.

EA asks: How can communities and education providers use the stories and experiences of projects to build inspiration, belief and future capability in the next generation to not only deliver the next iteration of an infrastructure strategy but also further develop Tasmania as an innovative, agile economy and community. How can the infrastructure projects themselves, support this, and how can Infrastructure Tasmania lead and support such initiatives?

EA suggests actions such as coordinating and supporting engagement by infrastructure projects with the public under a themed program, such as at events like the annual Festival of Bright Ideas each August.

### **Build diversity & inclusion while we build our infrastructure**

Diversity of the workforce has traditionally been a 'challenge' for infrastructure related projects - for example, the engineering and constructions sectors typically have workforces composed of only about 10% women.

This lack of diversity has a range of negative impacts on projects and organisations and also restricts the ability of others in the community to benefit from the opportunities associated with the infrastructure sector.

It is critically important that our future investment in infrastructure drives diversity and inclusion in the engineering sector. Engineers Australia encourages the inclusion of more active programs to support diversity within infrastructure projects associated with the Strategy. EA has strong experience in this area and would welcome the opportunity to contribute ideas and projects. Current programs underway in Tasmania include specific CPD activities to support and drive diversity in the engineering sector, scholarship programs for female engineering and TAFE students, gender mentoring initiatives and workplace cultural change programs for practicing engineers and their employers.

It must be noted that the infrastructure strategy and associated projects can inadvertently have negative impacts on diversity in the infrastructure professions through activities such as the language and images used in depicting and describing projects and roles (eg the cliché of white men in hard hats). EA suggests a proactive approach to ensuring our infrastructure vision and strategy, and future plans, promote a diverse and inclusive community.

### **Maintain a broad engineering ecosystem**

Tasmania currently has the benefit of a broad 'engineering ecosystem' of organisations, with large (eg Hydro Tasmania, TasWater), mid (eg GHD, Pitt & Sherry) and small organisations (eg BridgePro, Sugden and Gee) contributing to the delivery of engineering services needed in the state. This breadth provides flexibility, agility and innovation in responding to needs.

Delivery of the Infrastructure Strategy has the potential to support this ongoing breadth through ensuring opportunities for the participation of all forms of companies in the projects. Alternatively, the strategy has the potential to negatively impact the ecosystem and cause the potential loss of the 'smaller players' to the ultimate disadvantage of the community.

As an example, current changes to the process and opportunities for involvement of smaller engineering firms in projects with TasWater, as it transitions to the new Capability Development Office delivery model, are having an impact on the ability of smaller engineering firms to employ engineers and to take on new graduates.

This is not intended by TasWater and should be rectified in coming months but illustrates how changes to the infrastructure project landscape can longer term impacts (such as fewer graduates being employed in 2020, meaning less 'engineers with 5 years experience' in 2025).

## 2.0 Main Points for consideration with regards to engineering

### **Point 1: Infrastructure workforce needs more planning and consideration**

*Tasmania needs more information about size and capabilities of the engineering workforce we are going to need over the next 5-30 years, so we can most efficiently use our training and development capabilities to develop a highly effective workforce.*

Tasmania will need an appropriately skilled workforce to achieve this infrastructure vision.

The engineering workforce in particular is of great significance, including engineers, technologists, engineering associates and paraprofessionals members of the team – their skills are essential to maintaining our existing services and lifestyles, supporting ongoing evolution in our competitiveness, and providing the foundations for future innovations and new economic opportunities. The decisions that engineers make in projects can have massive implications on the value and effectiveness of investment in infrastructure (from catastrophic failures to more subtle impacts on cost overruns or on performance or total service life of assets).

Therefore having access to a sufficiently skilled engineering workforce will be vital to achieving the infrastructure strategy - but engineering professionals take almost a decade to train (with sufficient qualifications and experience), and Tasmania has some of the lowest rates of engineers per head of population in Australia and other OECD countries.

Tasmania will need to significantly grow its engineering workforce to support the delivery of these projects, and to simultaneously address other changes impacting the profession such as an ageing workforce and the disruption of digital and Industry 4.0.

Whilst we have more information about the project portfolio, and a new 30-Year Infrastructure Strategy, very little is known about the specific engineering workforce requirements including skill sets and the size of the engineering workforce needed to deliver these projects.

For example, how many electrical engineers will be needed in Tasmania to deliver major projects in the next 5-10 years? Other questions include;

- How many engineering professionals will we need to deliver projects such as transformation of our local power grids to integrate more renewable and smarter energy systems, the deployment of larger electric vehicle fleets, and expansion of our communities and industry?
- How do these needs link to the specific requirements for the Battery of the Nation or Marinus projects in terms of 'numbers of bodies' or specific technical skill sets, and the timing of these

- needs?
- How do we plan to source this workforce – trained by UTAS and TasTAFE, recruited from Victorian projects or skilled international migrants? Are there any specific upskilling requirements that will be needed?
  - Also how do these needs align or conflict across sectors – manufacturing, agriculture, Defence and science specialist programs, housing, health, civil construction etc?

Training and development takes time to plan and deliver, and without more information on workforce needs, we run the risks of projects not being achievable, costing more than they should, or contributing less to the creation of careers and value for Tasmanians.

*Recommended action: support for a sector and state-wide 'engineering and infrastructure workforce advisory group', building on the existing activities of the Engineers Australia Workforce Development Advisory Board.*

**Point 2: Our pipeline for early-career engineering workforce faces significant challenges – our Infrastructure vision needs this and can be part of the solution**

*To have sufficient engineers in the future, Tasmania needs to provide more support to engineering employers for the development of student and graduate engineers and should be embedded into the Infrastructure strategy*

Put simply, there aren't enough roles for student engineers to gain exposure to practice during their studies, and to secure sufficient professional roles upon graduation (ie graduate engineer roles in Tasmania).

There are numerous causes for this but the end result is it is challenging and expensive for employers, particularly smaller engineering firms, to commit to employing and developing graduate engineers in what Engineers Australia believes will be sufficient numbers to support our future engineering workforce needs.

We note that programs do exist in Tasmania to support apprentices and trainees but there is very little support for Tasmanian employers with the significant costs to employ, develop and mentor engineering students and graduates.

*Recommendation action: explore options to make it more viable for engineering employers to support the early career development of engineering professionals, including student placements and graduate roles, and to embed support options into contracts and plans for delivery of projects identified in the Infrastructure Strategy.*

We particularly suggest the Victorian Government's Local Jobs First program as a source of inspiration, which includes two key elements: (link: <https://localjobsfirst.vic.gov.au/about>)

**"Local Jobs First** - Victorian Industry Participation Policy (VIPPP), which improves opportunities for local suppliers to compete for work on all types of government contracts, helping to create and sustain opportunities for Victorian

businesses and workers. This policy is about local industry development.

**Local Jobs First** - Major Projects Skills Guarantee (MPSG), which gives focus to providing opportunities to Victorian apprentices, trainees and cadets to work on high value government construction projects. This policy is about growing the next generation of skilled workers in Victoria.”

**Point 3: In building a skilled and capable engineering workforce, whether locally grown or ‘imported’, we need to adopt a common competence framework to maximise quality and efficiency and to minimise risk – and EA recommends we use the internationally recognised Chartered competency framework (already supported by the vast majority of engineering employers in Tasmania, but not formally embraced).**

Ensuring that our engineering workforce has the right qualifications, relevant competency to practice, and currency of knowledge will be a challenge as we will have to ‘import’ and ‘grow’ significantly higher numbers of engineering professionals than we do at present (or have ever).

*Recommended action:* Engineers Australia propose that the internationally recognised Chartered competency framework be leveraged by employers and users of engineering services as the common benchmark to define competence for engineering professionals in Tasmania in order to minimise risk and maximise efficiency and opportunity for engineering professionals and organisations in Tasmania.

**8 reasons why Tasmania should adopt Chartered as the benchmark for our engineering workforce:**

**Reason 1: Optimise our risk management of recruiting and training a competent workforce**

*‘How will we know the engineers working on our infrastructure projects are competent’?*

Tasmania will need to ‘import’ higher numbers of engineers, but how will we know the engineering professionals we recruit have the right qualifications, the practical competency, the currency of knowledge, and the ethics and values that are aligned with our community?

Conventional methods of CVs and personal connections won’t work at scale and the qualifications that HR departments will be assessing will be more complex (more international), putting pressure on recruiting teams to evaluate based on limited information.

EA is confident that Chartered is the solution: the system is designed for this purpose (and does this role for the Australian government) and enables Tasmanian employers to manage the risk at the front end by leveraging 3<sup>rd</sup> party expertise and internationally recognised systems and standards.

**Reason 2: Efficient development of our workforce;**

if we use a commonly agreed framework for development of our engineering graduates, we reduce the risk that we over or under develop in any particular organisation, sector, or area of competence (maximising the ROI of our training investment).

**Reason 3: Growing Grads with a common foundation**

Will enable increased mobility for grads and confidence for employers; eg Hydro will have more confidence in recruiting for Battery of the National a civil engineering grad from a civil contractor on road projects if they were developed to a common competency framework of CPEng as the grads in the Hydro grad program.

**Reason 4: Savings in performance, consequences**

Whilst assessing for competence has a cost, anecdotal evidence across industry in Australia indicates it leads to ROI through savings in better risk management and performance by ensuring our engineering teams meet quality benchmarks.

**Reason 5: Access to markets for our industry:**

Tasmanian engineering service providers who export services to markets and clients that require formal registration/licensing or Chartered specifically face the risk of losing access to markets or being less competitive. At present there are 'hard' registration requirements for engineering professionals to be registered in place or under development for major markets for Tasmanian engineering services such as QLD, NSW, VIC, TAS; and 'soft' requirements for Chartered by customers such as Defence, Transport for NSW, Sydney Water.

**Reason 6: Attract/retain our engineering talent:**

Do we develop our staff to the internationally recognised gold standard? Do we ensure early career professionals will have the tickets they need for national and international mobility?

Could Tasmania be the state that supports all engineering team members to be Chartered?

**Reason 7: Avoid the race to the bottom of talent:**

If other jurisdictions are requiring formal assessment of professional competence to practice, where do the professionals go how can't/won't get assessed? To Tasmania?

**Reason 8: Supporting and strengthening Brand Tasmania:**

How do we align with the Brand of Tasmania, and best use it to attract people to the state? Come and become an engineer in Tasmania and work on compelling projects that support a sustainable future, in a highly diverse and Chartered workforce.

### 3.0 Additional Information

#### **What is Chartered and current applications in Tasmania?**

The Chartered framework is the internationally recognised badge for engineering professionals who are competent, current in knowledge to practice, and committed to a code of ethics.

The Chartered framework defines 16x common areas of professional competence. Assessment as Chartered is based on experience of applying knowledge into practice in the profession, assessed by peers in industry and by an independent assessment body (Engineers Australia).

A Chartered engineer, for example, holds the CPEng credential, has at least 3 years' experience (generally 5-7 years), has been assessed by their peers and industry as meeting the 16x competencies, maintains ~50 hours of CPD per year in their area of practice (audited) and is committed to the Engineers Australia Code of Ethics.

Chartered is currently used as one of the eligibility criteria for licensed building professionals in Tasmania.