

Engineering e2e Steering Group report

Comments and recommendations from the Engineering e2e Steering Group to TEC.

OUR APPROACH IS TO COLLABORATE, COMMISSION AND COMMUNICATE

Set up in 2014, Engineering e2e's task is to find ways to draw more students into tertiary study in engineering – particularly in the NZDE and BEngTech programmes – to help address New Zealand's critical shortage of engineers. Our partners in this work are engineering employers, professional organisations and educators, all of whom are critical to the engineering education and training system.

Engineering e2e uses and shares data produced by other organisations or initiatives, such as TEC, Vocational Pathways, Occupational Outlook and My Qual. The data we gather and share is also important to managing our performance – and that of the partners involved in our projects. It informs our work plan, in terms of selecting which issues to concentrate on and how we will implement our projects. We also use relevant external data to evaluate those projects and monitor how our activities contribute to our goal.

We have sought advice and new ideas from wherever they're available and interpreted them for the engineering sector. We don't work on the projects themselves; we commission experts to do that. Setting up each project involves: researching the problem, researching possible solutions, talking with stakeholders to contract an expert, delivering each project in stages – it's an iterative cycle of trial and evaluation. This model will work in any system and will benefit the wider system.

We regularly communicate with stakeholders, publish a monthly newsletter, and share information and stories on our website. Engineering e2e continually seeks feedback on our projects and communications, and invites suggestions about how we could extend or improve our activities.

COLLABORATION WITH PROFESSIONAL ORGANISATIONS HAS LED TO CHANGE

Engineering e2e's 500+ goal was set in response to the National Engineering Education Plan (NEEP) report, research produced by Engineering New Zealand (then IPENZ). This research forecast future shortages of engineers, particularly NZDE and BEngTech graduates.

Engineering e2e has established Memoranda of Understanding with five engineering professional organisations to better understand specific skills needs in

the sector and to engage engineers in our initiatives.

For example, the Institution of Fire Engineers (IFE) informed us of the impact of changing regulation in the fire industry; 3,000 current employees now need an NZDE. We have been able to support the IFE and Manukau Institute of Technology to establish a NZDE in fire and to explore micro-credentials.

The Institute of Public Works Engineers Australasia New Zealand Division has completed a study into the skills needed in public works. They have partnered with Engineering e2e on a degree apprenticeship and micro-credentials to help find the 12,000 more engineering professionals New Zealand will need by 2025.

EVALUATION OF ENGINEERING E2E FOCUSED OUR WORK

At the end of 2016, the New Zealand Council for Educational Research evaluated Engineering e2e to determine how well the programme had performed as a systems integrator. A systems integrator catalyses, coordinates and monitors education-to-employment activity. Systems integration is a high-level, flexible, all-encompassing approach.

The evaluation told us that the role of a designated integrator supporting the engineering education-to-employment system is important. The evaluation also told us that our stakeholders have conflicting priorities and perspectives. The Government and the NEEP report both highlight an economic demand for engineer graduates qualified at Levels 6 and 7. However, students, families and whanau have a career opportunities demand that prompts them to favour Level 8 qualifications and professional engineer status. Some employers, especially small-to-medium sized ones, may employ Level 8 graduates in positions for which they are overqualified to cover the widest scope of work. New Zealand's history of very little coordination between education and employment sectors, and a lack of esteem for vocational education, is hampering progress.

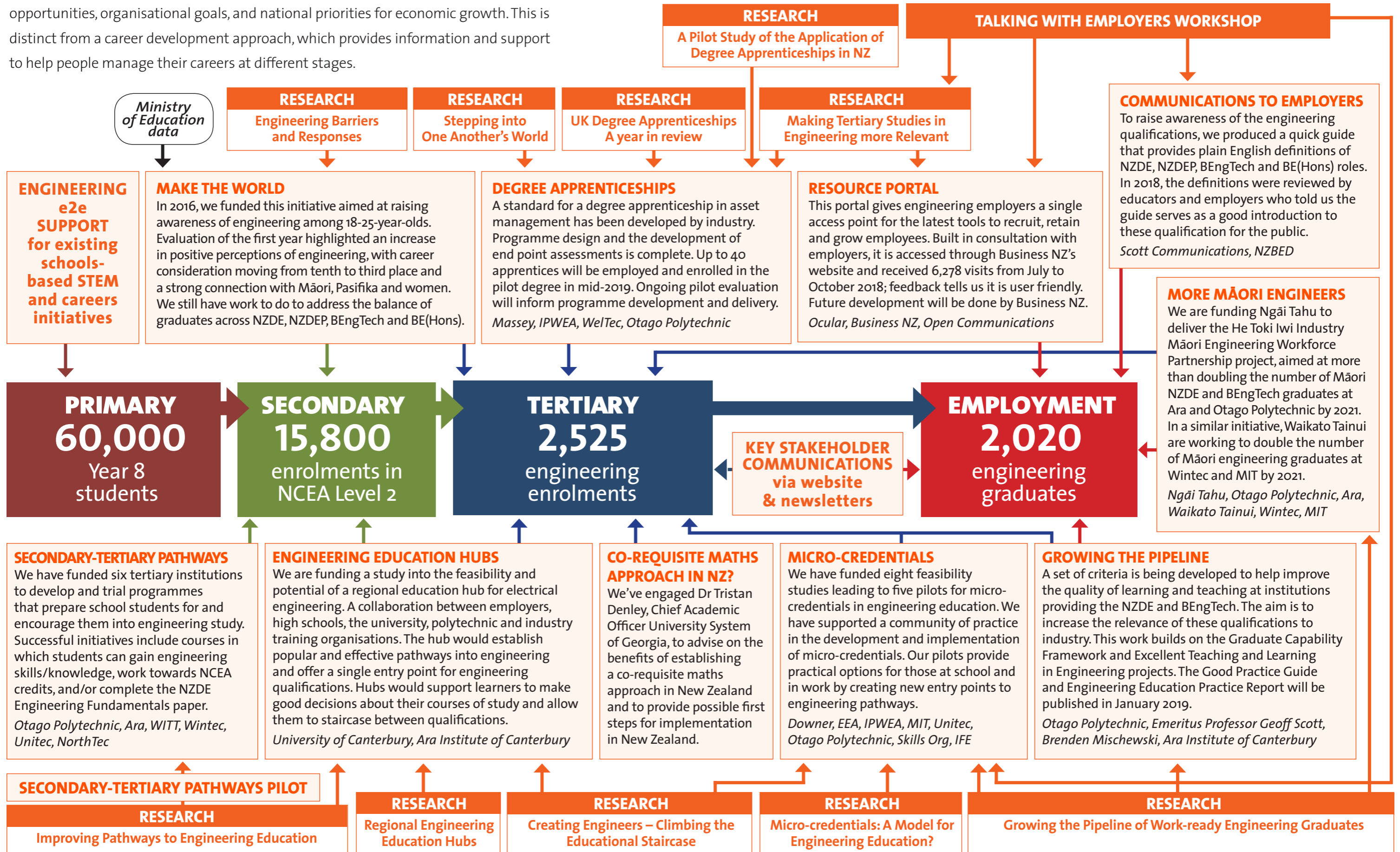
This evaluation has focused our plans for the programme over the next two years. The ongoing challenge is to increase the number of Level 6 and Level 7 graduates. To help achieve this, Engineering e2e will focus on successfully completing the initiatives we have begun.

INTEGRATING THE ENGINEERING SYSTEM

Engineering Education-to-Employment initiatives support innovation across the system



Engineering e2e's workforce development approach focuses on coordinating individual opportunities, organisational goals, and national priorities for economic growth. This is distinct from a career development approach, which provides information and support to help people manage their careers at different stages.



Recommendations to TEC from the Steering Group

The Engineering e2e Steering Group has guided and overseen the Engineering e2e programme and achieving an additional 500 engineering graduates each year from 2017. The Steering Group's formal role ends in November 2018.

RECOMMENDATIONS

1. Industry involvement is crucial to successful innovation in engineering education. The Steering Group strongly recommends that the connections established between employers and educators be maintained, indeed grown. The variety and success of the Engineering e2e programme provides strong evidence of the positive role employers play in workforce development. Engineering e2e grants funding has been allocated and significant work is now underway. This funding has allowed providers to free up resources to respond directly to labour market needs.
2. Oversight and support is recommended to ensure the success of ongoing Engineering e2e initiatives, including:
 - The existing 21 contracts.
 - Our commitment to consider proposals from the STPPs.
 - Work with Tristan Denley of the University System of Georgia on a co-requisite maths approach.
 - Phase 3 of the degree apprenticeship.
 - A potential pilot of a regional engineering education hub.
3. It is important to continue encouraging feedback and participation by sharing the outcomes of this work with engineering employers and educators through Engineering e2e's publications.
4. Our discussions with small-to-medium engineering firms show that many are unaware of the value of hiring NZDE or BEngTech graduates. We believe there is a great need to continue educating employers about the differences between the three main engineering qualifications.
5. Evaluation of the completed initiatives tells us that, as a designated integrator, Engineering e2e has an important role to play in supporting the education-to-employment system. Further evaluation of Engineering e2e would be useful to determine its long-term effectiveness and inform TEC's ongoing e2e activity in engineering and other disciplines, such as the primary industries and construction.

Our milestones

2014

- Project begins in July
- First Engineering e2e Steering Group meeting – extensive consultation begins with stakeholders
- engineeringe2e.org.nz is launched
- [Monthly newsletters](#) begin
- [Engineering Barriers and Responses](#)
- NEEP Reference Group meeting
- Alternative Engineering Pathways Professional Forum

2015

- [Improving Pathways to Engineering Technology Education](#)
- Strategic update #1 for Minister: [Engineering Change](#)
- Pathways pilot begins
- Talking with Employers Workshop and [Report](#)
- First of our regularly updated [Work Plans](#)
- [Stepping into One Another's World](#)
- [Creating Engineers – Climbing the Educational Staircase](#)
- Strategic update #2 for Minister: [Engineering Our Future](#)

2016

- [Make the World](#) awareness campaign launches in May
- Government allocates extra funding
- Secondary-Tertiary Pathways Project begins
- [Making Tertiary Study in Engineering More Relevant](#)
- [UK Degree Apprenticeships: A Year in Review](#)

2017

- Resource Portal scoping complete
- Research on sponsored degrees continues
- Degree standard written
- [Engineering Education Hubs](#) research complete
- Project to raise employer awareness of NZDE, NZDEP and BEngTech
- Engineering micro-credentials pilot procurement underway
- Eight micro-credential feasibility studies funded
- [Micro-credentialling: A model for engineering education?](#)
- [A Pilot Study of the Application of Degree Apprenticeships in New Zealand](#)
- A series of [Info Sheets](#) published

2018

- www.ree.org.nz launched
- Hackathon held for Wellington High School and ICT Graduate School students
- He Toki Iwi Industry Māori Engineering Workforce Partnership funded
- Prof Julia Clarke, Manchester Metropolitan University, visited to discuss degree apprenticeships
- NZCER's [Engineering e2e: An evaluation](#) finds Engineering e2e's approach useful
- Degree apprenticeship programme phase 2 underway
- Engineering Education Regional Hub feasibility study funded
- Five micro-credentials pilots funded
- Exploration of a co-requisite maths programme begun
- Enhancing Graduate Capability project underway
- Waikato-Tainui Engineering Workforce Partnership established
- Website upgraded and 50 newsletters published