

Dear Secretariat

**Re: Australian Universities Engaging Industry, Government, Industries and Communities**

I would like to thank the Review of Australian Higher Education for the opportunity to make this submission. Many changes have occurred in Australian higher education in the past 10 years. Higher education has applied itself to these changes. Many more challenges face higher education such as increasing student-teacher ratios, reductions in government funding, an ageing work force, declining national student enrolments, below average Australian population with degree qualifications compared to other advanced nations, increased global competition for researchers and students. The consequence of these challenges is the need to identify opportunities for this sector.

New organizational practices in Australian Universities provide for innovation from creative and multi-disciplinary teams. An example of this shift is a multi-disciplinary program in renewable energy.

The forthcoming introduction of carbon trading to reduce demand for fossil fuel based energy will allow renewable energy production to be more competitive. In 2007, world-wide investment in the renewable energy industry was US\$71 billion (excluding large scale hydro) with 47 percent in wind power and 30 percent in solar photovoltaic. Investment in large scale hydro was estimated to be a further US\$20 billion (REN21 Renewables 2007 Global Status Report). Over the past three years US\$300 billion has been invested in renewable energy and by 2030 US\$10 trillion will have been invested to convert the world's energy industry to a low-carbon future (New Energy Futures 2008).

The renewable energy industry requires a highly skilled group of technology and business professionals. These professionals need to be developed across a range of technologies that exist, are emerging and are in the future.

These technologies are in wind power, micro, small and large hydro, tidal power, battery technology and other energy storage devices, renewable fuels, wave energy, geo exchange, energy conservation, solar thermal electric, photovoltaic, landfill gas, all electric vehicles, biomass, geothermal electric, municipal solid waste, and ocean thermal. Indeed, climate change and overly expensive and declining fossil fuels requires urgent attention to renewable energy

awareness programs and qualifications in high schools, TAFE Colleges and universities across Australia.

The types of specialist areas for renewable energy industry include business strategists, policy makers and analysts, engineers, applied and theoretical researchers, product developers, technology transfer officers, manufactures, regulators, entrepreneurs, managers, financiers, installers and maintainers. For example, policy recommendations for renewable energies from the 2004 International Conference on Renewable Energies in Bonn (p. 19) argued that masters and PhD programmes are needed to bring forward the skilled people needed for the design, construction, and communicating the benefits of renewables.

The renewable energy industry requires multi-disciplinary teaching and research. The types of disciplines that need to participate in the renewable energy industry include engineering, science, law, business, public policy and other fields. Specifically, urgent funding is required for the development of curricula and resources for multi-disciplinary education along with funding to develop multi-disciplinary education and research centers for the renewable energy industry. Increase the funding for higher-education based research and development on renewable energy technology in theoretical, applied and production research and development.

In brief, action is required at the national level for an analysis of current and future demand and supply of qualifications in renewable energy. For example, a web based search of the current geographic analysis of Australia for qualifications in renewable energy finds a range of certificates, diplomas, degrees and post-graduate qualifications. These qualifications are in different types of renewable energy technologies. There currently exists a lack of consistency of offerings across Australia.

A significant enterprise is required for closer working relationship between industry, government and the Australian education sector in the form of public-private partnerships. This network would also address issues relating the research and development alliances, technology transfer, professional development, education and training, promoting renewable energy technologies and informing government policy on the renewable energy industry status and future trends. In addition, attention is required in exporting education, expertise, project implantation and products in renewable energy in developing countries like India and China. These nations will soon be at the top of the list of carbon emitting nations.

The committee is most welcome to contact me for future discussions on these issues.

Yours sincerely

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