FUTUREGRID
an australian research collaboration

CSIRO FutureGrid Research Project – Planning for Change and Choice

What is needed for the Future Power System?

Executive Summary

The attached document is the final report summarising the work of the three-year CSIRO Future Grid Research project – a collaboration between CSIRO and four universities supported by $3M from CSIRO's Flagship Collaboration Fund. The project was set up to enhance Australia's capacity to plan and design the most efficient, low emission electricity grid for Australia up to the year 2050.

The FutureGrid Project Summary Report ("FG Report"), completed in August 2016, was tabled at a Roundtable Briefing (RtB) at the University of Sydney in September, attended by senior representatives from government, regulators and transmission network service providers.

Disruptive change in the electricity system, and the need for policy to respond in a timely, yet measured way was noted by RtB participants as a key challenge for governments, regulators and the industry. The FutureGrid Research project has proposed ways of addressing some of the challenges, and emphasised the need for ongoing work in this area. These are discussed in the attached FG Report. More recent work being undertaken in the area was also noted by the RtB, including:

- ENA-CSIRO – Electricity Network Transformation Roadmap (from July 2015)
- AEMO – Future Power System Security Program (from Dec 2015)
- AEMC – System Security Market Frameworks Review (from July 2016)
- Australian Academy of Science (report) – Energy for Australia in the 21st Century (June 2016)

Since the RtB, the South Australian Black System event in late September has underscored the importance of "timely yet measured" work to guide the ongoing transformation of the electricity system – if only to ensure that stake-holders and governments are well-informed and well-advised. The event has led to a number of new investigations, including by AEMO and AER, and a review by Australia's Chief Scientist, Alan Finkel for the COAG Energy Committee.

Given the critical importance and the complexity of the electricity system, the nature of the challenges (and opportunities!) it faces, and the wide range of stake-holder interests, there is a clear need for ongoing high level coordination of work in this area, through the COAG Energy Council.

The following are key points from the FutureGrid Project Summary Report.

Key Messages:

- The electricity grid – the backbone of the whole electricity system – is frequently described as one of the largest and most complex machines ever built.

- Despite this complexity, the system has been optimised over many decades under relatively stable conditions, historically providing "Affordable" (internationally cost-competitive) and "Reliable" (secure, resilient) power to consumers

- The system is now facing rapid disruptive change – driven by environmental imperatives, new technologies and changing consumer preferences and behaviours

- Timely and astute policy review and reform is therefore required to guide the transformation of the system

- Policy review and reform must be guided by robust, multi-disciplinary research and modelling that encompasses the operation of all parts of the "machine"

- This will enable optimal future investment decisions in the long-lived assets that make up the power system

Key Questions for ongoing research and investigation:

- How can Australia meet its climate change policy objectives while maintaining a Reliable and Affordable grid? This is often posed as a trilemma - Sustainable, Reliable and Affordable – in which any two are only achievable at the expense of the third.

- How can the trilemma be turned into a trifecta?

- More specifically, what rules, policy and regulatory settings will enable price and investment signals operating in the market to result in the most efficient and effective technologies to be deployed to this end?

- How does Australia build on its Comparative Advantages to turn changes and challenges into new opportunities for growth and prosperity?

Key Proposals for further work:

- Set up a "Future Power System" Project to further develop tools, models and expertise to build capability for "Whole of System" modelling and analysis. This project should work under the auspices of the COAG Energy Council, as part of the high level coordination effort required to guide the transformation of the electricity system.

- The Future Power System project should develop and use open source software modelling tools to the maximum extent possible, to provide platforms for collaboration and information sharing between governments, regulators, industry, researchers, consumers and stakeholders

- The Future Power System project should be led by CSIRO or a major University, with collaborating partners drawn from governments, regulators, industry, researchers and other stakeholders, with funding from some or all of these partners

These issues and proposals are discussed further in the FutureGrid Project Summary Report attached.

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10 November 2016

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