Towards a Smart Grid R&D Roadmap in Australia

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The Smart Grids Australia (SGA) Research Working Group (RWG)

- **Primary Aim:** To provide a forum for exploring research questions and ideas from the SGA (industry) members and the research community, and to inform SGA decisions
- **Membership:** CSIRO + 11 Unis + forming international connections
- **Reports** to the SGA Executive Committee through its chair/coordinator (Terry Jones)
- **Related Meetings**
  - 26 May 09
  - 12 August 09 – Roadmap workshop, Sydney
  - 30 November 09 – Smart Grid Forum, Perth
- **SGA presented at**
  - GridWise architecture council – Washington DC, 22 Sept 09
  - TNO Research – The Netherlands, 1 Oct 09
  - Global Intelligent Network Coalition – San Diego, 18 Nov 09
The SGA Research Working Group – Terms of Reference

- Engage the research community in Australia and serve as an experts reference group for SGA
- Assist SGA in developing a coherent national research agenda in Smart Grids, including:
  - Supporting SGA with a wide knowledge base and access to R&D specialists
  - Facilitating discussions and reviews of best practice in specialist areas
  - Gathering information from existing Smart Grid organisations (e.g. USA and EU) and report to SGA where relevant
- Assist SGA to identify the means by which Smart Grid research activity can be appropriately resourced
- Organise an annual workshop / conference (research focussed) that will attract discussion and attention to SG research

Towards a Smart Grid R&D Roadmap
Developing Australia’s Smart Grid R&D Roadmap

Would you like to contribute to the development of a Smart Grid R&D Roadmap for Australia?

The Smart Grid Australia (SGA) Research Working Group and CSIRO are cordially inviting you to participate in a Workshop for Developing the Australian Smart Grid R&D Roadmap.

**Workshop for Developing the Australian Smart Grid R&D Roadmap**

Department of State and Regional Development
MLC Centre, Level 47
19 Northcote Place, Sydney NSW
13 August 2003
9:30 am (for 10:00 am start) to 4:00 pm

**Agenda**

- State of development in Australia, Europe & USA
- Workshop session 1: Strategic R&D pathway
- Workshop session 2: Key R&D priorities
- Other steps

**Overview & Objective**

The federal government’s Department of the Environment, Water, Heritage and the Arts (DEWHA) has commenced a pilot deployment study of its $1.5 million Smart Grid Initiative “Smart Grid, Smart City: renewable energy, smart grid and urban smart grid implementation.” In parallel, Smart Grid Australia (SGA) established and organised the Terms of Reference of the SGA Research Working Group (SWG), which includes the development of a coherent national research agenda in Smart Grids.

To assist SGA to achieve this objective, the CSIRO is currently working with the SGA PWG to organise a national workshop to develop the Australia’s Smart Grid R&D Roadmap towards a future where smart grids are successfully implemented in Australia, benefiting government, the industry, the environment and the general public.

**Australian R&D Roadmap**

- Commenced via a SGA workshop

**Other programs & initiatives**

- (including large-scale demos)

**Research agenda/roadmap from other regions**

- EU - Europe
- USA

**Vision & Goal**

- ‘Successful’ Smart Grids in Australia

**Future**

**Time**
Vision (‘Ideal Outcome’)  

**Smart Grids** enabling an energy supply system that:  
- is *more environmentally-friendly* – reducing GHG emissions & promoting resource-use efficiency  
- enhances *social capital* – empowering and benefiting consumers & building a knowledge-based and highly-skilled workforce  
- supports a *green and healthy economy* – enhancing energy security, driving operational efficiency & facilitating innovation across the value-chain

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**Smart Grid R&D Workshop Outputs**

Q: *What are the key factors (barriers) that could lead to ‘failure’ of Smart Grids in Australia*
Smart Grid R&D Workshop Outputs

Main R&D Topics
## Rating R&D Topics for Priority & Timing

### Table 2: R&D topic prioritization table

<table>
<thead>
<tr>
<th>R&amp;D Topic Area</th>
<th>Impact Score</th>
<th>Feasibility Score</th>
<th>Planning Horizon</th>
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<tbody>
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<td>A. Governance &amp; policy, and industry frameworks</td>
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<td>1. Policy &amp; regulatory oversight</td>
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<td>2. Pre-standardization R&amp;D</td>
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<td>3. Large system simulations</td>
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<td>4. Demonstration projects</td>
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<td>B. Operational methodologies &amp; systems</td>
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<td>1. Control systems</td>
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<td>2. Grid stability and stability</td>
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<td>3. Fault detection &amp; mitigation</td>
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<td>4. Data and communication</td>
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<td>5. Security reinforcement</td>
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<td>6. Distribution reinforcement</td>
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<td>7. Long-distance energy supply</td>
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<td>C. Informational technological &amp; systems</td>
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<td>1. Carbon capture</td>
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<td>2. Grid to consumer</td>
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<td>3. Monitoring and computation</td>
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<td>3.1 Hardware and software integration</td>
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<td>3.2 Software economic models</td>
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<td>3.3 Climate impacts and weather prediction</td>
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Impact Score: A high impact score indicates high value of contribution to stakeholders or general public. Use a scale of 0-5 where 5 is maximum impact. Feasibility Score: A high feasibility score indicates high potential delivery of desired output. Use a scale of 0-5 where 5 is very high likelihood of delivery while 1 means very low likelihood. Planning Horizon: Use a scale of 0-5 where 5 is short term and 0 is for medium-term.

### Smart Grid R&D Workshop Outputs

After first round of 'scoring'
Smart Grid R&D Roadmapping Process

- SGA-CSIRO Workshop
  - Sydney
  - Aug '09

- SG Forum
  - (Prof Peter Wolfs)
  - Perth
  - Nov '09

- SG 'Experts' Group Survey
  - (Underway)

- SGA-RWG Report: “R&D Roadmap”
  - Early 2010

Tracking SG Progress in Australia with the Smart Grid Maturity Model
The Smart Grid Maturity Model (SGMM) is "a management tool that allows utilities to plan, quantifiably measure progress, and prioritize options as they move towards the realization of a smart grid."

Eight Domains:
1. Enabling
2. Planning
3. Optimizing
4. Enabling-Operational
5. Functional
6. Emerging & Iterating
7. Exploring & Iterating
8.Evolving & Realizing

Six Maturity Scales (counting 0 - starting): 1, 2, 3, 4, 5, 6,

For further details, visit: www.sei.cmu.edu/smartgrid/
The SGMM Applications benchmarking of 53 Utilities
(to July 2009)

Participation by geographic region

Participation by utility type

From: The First Annual report on Smart Grid Implementation
Software Engineering Institute, Carnegie Mellon

Thank you