

## Proposal for Smart Grid Policies

### Introduction

Since its inception in 2008, Smart Grid Australia (SGA) has been providing the government with innovative ideas and suggestions regarding government policies in relation to building a smart energy future. The most significant proposal SGA made was in 2009, which led to the Federal Government's Smart Grid Smart City project (SGSC).

SGA considers that smart technologies have already demonstrated the potential to benefit customers. The next step is to bring these elements together to demonstrate the full smart grid vision. With that in mind SGA would like to propose a more holistic approach to demonstrate the significant social and economic benefits that can be achieved for customers and the nation as a whole. This will require effective integration of new and emerging technology components through standard interfaces, supported by new and compatible business models and regulatory frameworks.

### Need for a holistic approach, underpinned by proven technologies

There has been limited development of holistic solutions at scale, to demonstrate the benefits that can be achieved through careful integration of the components. The SGSC initiative was developed with this in mind, and is taking the first steps to highlight the benefits and challenges associated with implementing a smart grid on a broader scale, providing an operating example of networks of the future.

SGA believes that a long term, holistic vision and framework is required to underpin confidence in progressively implementing smart grid capability. Equally, sufficient analysis and trials have now been completed to identify some high-priority innovations that will achieve significant benefits immediately, without the risk of compromising the longer term future.

### A customer-driven approach

The energy sector is changing rapidly. Customers are now more aware and involved in their energy usage, with an increasing number generating their own power. Growing concern over energy prices and the environment, and the increasing availability of new technologies and energy information has resulted in customers focussing on energy efficiency.

Customers have always expected a safe, reliable, adequate and efficient supply of energy, but it is the customer's appetite for distributed renewables that is now flowing through to significant implications for generation, transmission and distribution. The expected future growth in customer demand for distributed storage, electric vehicles, smart appliances and more energy-efficient technologies will intensify the pressure for modernising network infrastructure with smart grid technologies, and for pioneering new business models.

### The need for Government leadership

Development of the "Smart Grid" is integral to this future - it is needed to allow the effective integration of a diverse set of new technologies that operate in a coordinated manner to improve reliability, lower costs and enhance the customer's experience in managing their own energy.

Industry participants have been active in planning and developing Smart Grids in Australia. Many utilities, manufacturers, suppliers and academic institutions have carried out trials, developed smart grid initiatives and demonstrated practical achievements and benefits. However the main focus to date has been on proving specific concepts, including implementing new technology and systems, and obtaining a better appreciation of customer needs.

The key benefits of these developments are national in nature; many of the social and economic benefits don't show up on the balance sheets of the electricity companies. In order to achieve these national benefits government leadership and government directions are required.

### **Specific proposals for government consideration**

SGA considers that the following initiatives should be taken as a matter of priority:

**1. Develop a long term framework for transforming electricity networks to meet customer needs of the future**

It is now possible, timely and necessary to develop a clear and holistic vision for the future Smart Networks. Achieving this depends on bringing together the knowledge and experience already gained from analysis, testing and trials throughout Australia, including the significant learnings from the SGSC project. The views of customers, particularly those involved in various trials will be paramount.

*Recommendation: That the Energy Minister appoints a independent committee of industry experts (supported a Secretariat) to develop and document the framework for transforming the electricity sector based on a national rollout of intelligent technologies.*

**2. Help customers understand the benefits of Australia's energy future**

Sufficient information is available from various trials to allow many of the benefits to be articulated. There needs to be a compelling description of the benefits of Smart Grids to customers, explained in a clear and simple manner that matches their needs and captures their imagination. There also needs to be a more rigorous cost benefit analysis that will demonstrate the clear economic benefits of the smart grid vision to decision makers.

*Recommendation: Develop and implement a program to help customers understand the benefits associated with Australia's energy future (similar to the way in which they have come to understand the benefits of advanced broadband).*

**3. Develop “holistic” and long term sustainable solutions based on open standards, interoperability and appropriate business and regulatory models**

Technologies involved in the grid of the future are wide-ranging and include distributed and central applications, grid automation, smart meters, home automation etc. Without appropriate interoperability standards, there is a high risk of incompatibilities, inefficiencies and cost premiums.

Further work is needed to develop the framework for supporting the long term holistic vision. This includes the development of interoperability principles (based around open standards) to ensure that the smart grid can evolve from the capability that is possible today to incorporate future technology that cannot yet be predicted. The maximum benefits of an approach that must necessarily evolve over time can only be captured if there is true business interoperability.

The market structure, regulatory framework and business models must also provide the correct incentives and support efficient smart grid development, dismantling potential implementation barriers. This includes defining the responsibilities and interfaces of the various participants.

*Recommendation: Development of an interoperability framework allowing the effective integration of diverse technology choices as well as facilitating information exchanges between distributors, retailers and customers to support the cost-effective development of new products and services.*

#### **4. Progressing proven elements of the Smart Grid**

SGA is keenly aware that Australia's energy landscape is changing rapidly, and the solutions on which the industry has traditionally relied will not meet needs of the future.

Therefore in addition to planning the long term framework, SGA considers it is critical to commence introducing practical Smart Grid innovations as soon as possible. It is quite clear from trials already completed that there are specific smart grid initiatives which can deliver value now, and which will be consistent with any future vision of the network.

SGA considers that certain initial directions for Smart Grid development<sup>1</sup> could be agreed from existing knowledge (gained from individual testing & trials and from customer engagement & understanding) and a concerted effort should be made to commence implementation as soon as possible. Achieving practical outcomes will assist to promote the more theoretical business case, build momentum, capture broader public interest, and importantly deliver some immediate tangible benefits.

*Recommendation: That the government, regulators and electricity businesses progress the implementation of proven elements of the Smart Grid without delay.*

#### **5. Possible funding initiatives for smart grid projects**

It would be a mistake to think that the work done to date (including the SGSC project) will yield all the answers in planning Australia's energy future. Some early directions are clear, but other measures need to be qualified "in or out" through further testing. Government recognition and support of an ongoing program of targeted trial activities is needed to build vital knowledge to inform policy deliberations and guide future implementation activities.

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<sup>1</sup> Ubiquitous communications, increased sensing and customer portals are examples of Smart Grid elements with demonstrable benefits and around which there is little debate.

As examples, SGA would favour the allocation of modest funding support two key projects:

- *Facilitate the broader deployment of distributed energy resource*

Australians have shown enormous interest in rooftop solar energy, but unlimited growth is not sustainable without upgrades to the grid. In order to further facilitate and maximise the benefits there is an urgent need develop real-time techniques to stabilise the low voltage networks. This will help to resolve network/asset issues created by distributed energy resources (including solar PV, energy storage and electric vehicles) to accommodate increased penetration of these customer distributed resources in the future.

- *Improve the efficiency and safety of rural networks*

The electricity supply infrastructure in rural Australia commonly operates on a quite different electrical principle to the networks in more densely populated areas - using what is known as "single wire earth return" (SWER) architecture. As SWER networks are likely to remain the most cost effective approach, work is needed to develop standard approaches using smart grid technology to optimise the performance and safety and reduce the cost of these networks.

- *Identify the opportunities associated with large-scale data analysis*

As the level of sensing in the network grows (through device monitoring, machine-to-machine communications, smart meters etc), large data sets are becoming available. Using "big data" analysis techniques, the potential exists to gain new insight into operation of the grid, to identify new opportunities for optimisation and the targeted deployment of grid upgrades, and to equip customers with information to guide their future energy choices. As has occurred in other industries like the telecommunications sector, it is anticipated that these new data sources and analytics will also drive new commodity markets, products and services.

*Recommendation: Allocate a budget of (indicatively) \$15m funding to support several targeted trials in areas that are identified as holding significant promise, but where the opportunities and benefits have yet to be confirmed.*

## **Conclusion**

SGA believes that government leadership will continue to be necessary to properly coordinate and deliver Australia's energy future. The recommendations in this paper are intended as a pragmatic set of actionable steps that will build momentum in the process of modernising Australia's electricity supply infrastructure.

SGA has a diverse membership drawn from the energy sector, with deep understanding and detailed practical experience of the future smart grid potential, together with a commitment to implementing them effectively. SGA would be delighted to work further with Government on this proposal and to become actively involved in progressing it further.

We are looking forward to discuss these proposals in more detail with you.

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