Submission

No 20

INQUIRY INTO THE ECONOMICS OF ENERGY GENERATION

Organisation: Essential Energy

Name: Ms Terri Benson

Position: Managing Director

Date Received: 10/02/2012

10 February 2012

Mr Jonathan O'Dea MP
Chair
Public Accounts Committee
Parliament House
Macquarie Street
SYDNEY NSW 2000

VIA EMAIL: pac@parliament.nsw.gov.au

Dear Mr O'Dea

SUBMISSION TO THE INQUIRY INTO THE ECONOMICS OF ENERGY GENERATION

Thank you for your invitation to make a submission to the Public Accounts Committee inquiry into the economics of energy generation.

Essential Energy is a NSW Government-owned corporation, with responsibility for building, operating and maintaining Australia's largest electricity network - delivering essential network services to more than 800,000 homes and businesses across 95 per cent of NSW, parts of southern Queensland and northern Victoria.

As an energy distributor, Essential Energy's role is to deliver safe and reliable essential services to families and businesses across regional NSW.

To meet growing peak energy demand and maintain reliability Essential Energy is investing around $6 billion maintaining and building new electricity infrastructure in the five years to 2014.

The company is also the sole Australian representative in the Global Intelligent Utility Network Coalition (GIUNC) – a group of forward thinking utility companies from around the world who are working together to develop innovative solutions to energy supply issues for the benefit of utility companies and their customers.

Terms of Reference most relevant to Essential Energy

Essential Energy's submission will focus on two specific parts of the Terms of Reference, being:

- the potential for, and barriers to, development of alternative forms of energy generation in New South Wales; and
- best practice in alternative energy generation in other jurisdictions

Traditional energy generation, transmission and distribution models are being challenged by the recent rapid adoption of embedded generation technologies by customers.

Our submission will concentrate of the challenges and opportunities for embedded generation to make an economic contribution to the energy needs of the distribution network.

Current use of Embedded Generation

Embedded generation can be defined as small-scale energy generation located within the distribution network.

At present, approximately 57,000 embedded generators are located within Essential Energy's network area, representing approximately 150 megawatts of generation capacity. These generators are typically 1.5 to 10 kilowatt solar photo-voltaic (PV) systems, and are installed at residential premises.

As has been widely reported, the installation of solar PV generators to date has been primarily driven by the availability of State and Commonwealth subsidies, though feed-in tariffs and Renewable Energy Certificates (RECs). However, since the wind-down of these schemes from 1 July 2011 Essential Energy has continued to see customer demand (albeit reduced) to install solar PV systems as a means of contributing to household energy needs, and mitigating against rising energy costs. We therefore expect installation of embedded generation to be a continuing trend across our network area.

Network challenges presented by Embedded Generation

At present, the installation of embedded generators within the network occurs in an uncoordinated manner. Once approval from the network business has been provided, the location of the generator is determined by the customer who is installing it. This has resulted in a situation where embedded generation is located on the basis of customer demand, rather than locations where the generator can best contribute to the overall operation of the electricity network.

In some instances "clustering" of embedded generation has occurred, where large numbers of systems have been installed within a small area of the network. This has strained network capacity, and required increased expense and network management to maintain power quality.

As most embedded generators are solar PV systems, weather conditions determine the extent to which embedded generators can contribute energy to the network. On a typical sunny day, maximum generation from a solar PV generator occurs between midday and 3pm, when energy needs across the distribution network are usually moderate. At times of peak energy demand, typically between 5pm and 10pm, embedded generation makes practically no contribution, and therefore, at present, does not offset the investment required in large-scale generation, transmission and distribution to provide adequate capacity for times of peak demand.

Given these circumstances, at present embedded generation offers benefit only to the customer who has installed the system, and no substantial gain to the wider network.

Opportunities for Embedded Generation to contribute to network management and investment

Although the current use of embedded generation presents difficulties, Essential Energy believes with improvements in policy, technology and network infrastructure, embedded generation can make a significant contribution to energy generation at times of peak demand, and in the future, may also potentially reduce the investment needed to engineer the network for increasing peak loads.

It is our submission that there are three inter-related fundamentals that need to be in place for embedded generation to maximise its contribution, these are:

- Development and use of energy storage technology;
- Deployment of "smart grid" technology to manage the energy network; and
- The ability to site embedded generators at areas of the network where they are of most economic benefit.

Storage for embedded generation

Technology is currently being trialled in Australia and internationally that stores the energy output of small-scale embedded generators. These storage cells allow energy to be generated when weather conditions permit, and then release the stored energy to the network at times when it is required.

Storage is a necessary tool to align the generation capacity of embedded generation with periods of peak energy demand. Once proven, consideration of policy settings to encourage the use of storage for embedded generation will be required.

In developing a vision for our network out to the year 2025, Essential Energy recognised the need to be a proactive participant in the distributed generation field. Subsequently our Vision 2025 includes a specific distributed generation related objective to ***"Be recognised as the industry leader in facilitating distributed generation including renewables".***

To realise this objective, Essential Energy has been carrying out research and development in the distributed generation area with the aim of minimising the disruptive effects of distributed generation, while at the same time harnessing the ability of distributed generators to contribute to network management.

This program has now reached the field trial stage with the aim of utilising leading technology developed in Australia to 'smooth' the effects of power flow reversal, interact with energy storage to reduce network peak demand and maximise the energy efficiency of the network.

Deployment of "Smart Grid" technology

The use of embedded generation creates a more complex energy network that requires more active management. Essential Energy is building this capability through the deployment of Smart Grid technology, and trials are underway with 2000 customers in the Bega area of NSW, and will soon expand to Port Macquarie.

Smart Grid is a range of technologies that allows energy customers and the network operator to more actively monitor, direct and control energy within the network. Through more active management the use of existing energy assets is maximised, with less redundancy needing to be built into the network to maintain reliability.

Specifically in the case of embedded generation, Smart Grid allows the energy being generated at many sites to make a coordinated contribution to electricity requirements of the network at any given time.

Optimising the siting of embedded generation

Not all areas of the energy network will benefit equally from the use of embedded generation. At present, embedded generation at some sites is uneconomic with the costs of providing network infrastructure and management being greater than the value of the energy produced.

To maximise the contribution of embedded generation priority needs to be given to installation at sites where the energy generated is of greatest economic benefit to the network. These sites can be identified on the basis of typical weather conditions, capacity and features of the local distribution network, and energy use patterns in the geographical area.

To support this, Government policy is required that allows distribution businesses to consider the economic benefit to the network when approving embedded generation at a particular site.

Government may also wish to consider policy initiatives that encourage larger-scale embedded generation at non-residential premises, where they are located in areas of the network that would benefit from their use as a peak demand management tool.

Thank you for the opportunity to submit to the Committee. Essential Energy would also welcome the opportunity to expand on any aspects of our submission with the Committee.

If you would like to discuss this submission further, please contact [redacted]

Yours sincerely

Terri Benson
Managing Director