



# THE ELECTRIC ENERGY SOCIETY OF AUSTRALIA INC

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To: Energy White Paper Taskforce  
Department of Industry

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## Energy White Paper Submission

### Introduction

The Electric Energy Society of Australia (EESA) is an independent incorporated body operating as a technical society with Engineers Australia. The EESA formed in 1924 and we are about to celebrate our 90th anniversary. Initially operating in NSW we have grown to a national body with 750 members. The Society's main aim is delivering Continuing Professional Development (CPD) to its members who are drawn from many parts of the Electricity Supply Industry, but in particular the Electricity Distribution and Transmission sector. Amongst our members we have very high level of expertise across many of the areas to be the subject of the Energy White Paper.

This submission focuses mainly on nuclear energy and renewables. The EESA represents and takes interest in all methods of Generation, Transmission, Distribution and End Use technologies. At our last Annual Conference (2013) we gave particular focus to the opportunities for nuclear energy in Australia, including the need for Australia to develop its own education pathways for locally produced nuclear engineers. Many parts of our submission have been influenced by the outcomes of our last conference.

### Need for an Efficient Low Cost and Sustainable Energy Supply

One important task for government is to restore conditions whereby Australian industry once again becomes internationally competitive. Obviously there are many factors involved, but a very important one is the provision of reliable, low-cost and sustainable electricity.

Poor decisions in the energy area over many years has meant that Australia has lost its energy comparative advantage with the rest of the world. With well thought out policies, Australia's long term energy competitiveness can be restored in ways that will provide long term national benefits.

### Nuclear Energy Needs to be Considered for the Future Energy Mix

There are several new technologies either being used or developed for electricity generation in Australia, but the only one which is operational in many other countries that is capable of providing emission free reliable low cost baseload continuous electricity is nuclear. We are therefore disturbed that the government does not have nuclear energy included in its fuels under consideration.

We realise that many people still believe the old objections to nuclear energy and they are not aware that modern technology has rendered these objections as myths. The Electric Energy Society of Australia recently held a conference session at which industry and academic experts explained why the objections are now myths. They also made it clear that some of the future developments will be very suitable for use in Australia. We sent out a number of invitations to the session, but unfortunately no one from government was able to attend. We received several replies from politicians to our invitation and these indicated a significant lack of understanding on the subject.

We see education of the general population on nuclear energy as being vitally important and this needs to be addressed by government in the interests of developing a sustainable long term energy strategy.

## **Renewables**

One respondent at our conference said that we do not need nuclear because Australia is the lucky country for renewables. In fact the opposite is the case. European countries are fortunate to have access to large scale nuclear generation. Because of very limited storage capabilities, electricity must be generated at exactly the same moment as it is used. The intermittent nature of wind and PV solar renewables present a major problem for power system operations. If a system is relying on a generator which suddenly drops its output, even for a few seconds, a significant blackout could occur and if it is sufficiently widespread it could take a week to restore supply. System operators are of course well aware of the risk and they maintain sufficient spinning reserve to take over when the renewables suddenly reduce output.

The large scale introduction of intermittent generators like solar and wind into our power systems vastly increases the need for spinning and ready reserves and hence the need for more conventional generation such as open cycle gas turbines. This has the effect of increasing the cost of the conventional generation, creating a more peaky less predictable load cycle for the non-intermittent generators and poor use of our precious natural gas reserves. Carbon savings created by the wind and solar generation are lost due to the efficiency losses on the conventional generators. The end result is higher generating costs and little or no environmental gain. Without a large scale energy storage capability, renewable generation from intermittent wind and PV solar is marginal. To make the existing PV solar and wind generators work effectively on a full power system basis, research and development of large scale energy storage needs to become a priority.

It is estimated that for every 100 MW of installed wind generation, 90 MW of conventional generation is required to back it up. The cost implications are obvious.

A strong interconnected transmission system has been built across Europe. Individual European countries use each other as backup. France, which has 80% nuclear generation operating 24 hours a day seven days a week plus the large scale hydro systems in Scandinavia are a great source of backup. In fact Germany and other European countries use a significant amount of French nuclear electricity to back up their wind farms when the wind slows down and their PV solar when the sun does not shine. In Australia, long distances limit interstate transfers resulting in more backup being supplied locally. The result is the proliferation of fuel inefficient open cycle gas turbines instead of the more fuel efficient and lower CO<sub>2</sub> emitting combined cycle gas power stations. The outcome being the wasting our precious natural gas reserves.

## **Education on Nuclear Energy**

The EESA believes it is very important that governments and the public fully understand the potential advantages of nuclear energy in Australia. The Electric Energy Society plans to rerun educational

sessions, starting shortly with one in Adelaide. We would urge government to try very hard to send key people to one of these sessions so that they will know the facts and not just listen to the old myths.

### **Developments with Nuclear Energy**

There is a lot of development taking place in the world on nuclear energy. The Australian National University in Canberra has several programs running and the University of New South Wales has indicated that it intends next year to start a postgraduate course. Unless there is sufficient research in Australia however, graduates will be forced to go overseas and we will lose their expertise. Furthermore, Australia needs to be significantly involved in world research to ensure requirements particular to our country are taken into account. It is therefore very important that the government supports research in conjunction with overseas organisations and this can readily be done through universities, CSIRO, etc.. This will also allow our people to be trained, so that when the time comes to install a nuclear generator we will have the know-how and a number of competent people.

Furthermore, the technology will have been developed with Australian requirements in mind to suit Australian conditions.

### **Like More Information?**

We will be very pleased to provide further information on education, development opportunities and any other material associated with our submission on request.

**Dr Robert Barr AM**  
**EESA National President**