



Community Environment Network Inc.

An alliance of community and environment groups

10th November 2016

Email: ec.sen@aph.gov.au

Re: Environmental Committee Retirement of Coal Fired Power Stations

Dear Committee,

This submission is on behalf of the Community Environment Network (CEN) which is a network of community and environment groups in the Central Coast and Lake Macquarie. CEN was established in 1997 and has the Mission of Supporting *Ecologically Sustainable Development* (ESD) and opposing threats to ESD.

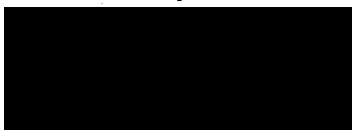
CEN has a membership of 400 including 70 groups. These groups in turn have a membership of approximately 5,000 members. CEN is a highly credible organization and has contributed an estimated \$8 million to the Central Coast and Lake Macquarie environment from grants, contracts and donations plus another \$20 million in work by volunteers as 'In Kind' since formation.

I am currently the Chairman of CEN and worked in the Power Industry on and off for a period of approximately 25 years from 1969. During this time I was variously tradesman, draftsman, engineer, manager and executive. I hold a Bachelors Degree in Engineering from the University of NSW and a Masters degree in Management from Macquarie University and prior to retirement in 2012 was accredited as a Fellow of the Institution of Engineers. In this time I had experience with staff downsizing due to structural reforms and the closures of Vales Point A power station and Wangi power station.

CENs submission is attached and a local NSW meeting of the committee is needed to allow people affected to have direct input.

If the opportunity is available I would like to present arguments on behalf of CEN to the committee.

Yours sincerely,



Chairman of CEN

CEN SUBMISSION RETIREMENT OF COAL FIRED POWER STATIONS

NSW Power Stations use the steam turbo-generator as the major means of electricity generation. Sir Charles Parsons invented the steam turbine in 1884 and this has been the main stay of power production for over 100 years. There has been no more efficient technology found to replace the steam turbo-generator when burning coal. Over this period, the scale of the technology in NSW increased from 15 MW at Pyrmont in 1914 to 12,000 MW by 1990. It can be expected that modern Wind and Solar technologies will increase in size with technology.

Burning coal to produce electricity has enabled huge economic development to occur at a low cost with high reliability. However, as time has passed the technology created other problems or has been unable to be adapted to issues associated with the burning of coal.

These problems included:

1. The turbo- generator is approximately 35% efficient, this means that the heat produced by 65% of coal burnt has to be released into the environment. Most of this waste energy is in the form of heated cooling water through condensers or cooling towers.
2. Air Pollution, in about 1990, the NSW industry became aware of concerns over climate change from CO₂, SOX and NOX emissions. Until then engineers had thought that the CO₂ was absorbed into the natural environment. Coal is usually about 70% Carbon plus 10% as moisture and 20% as ash and trace elements. The moisture reduces boiler efficiency as it needs to be evaporated for the coal to burn, while ash and trace elements create millions of tonnes of waste and nasty chemical compounds for disposal. However, most of the carbon will convert to CO₂ and be released to the atmosphere.
3. Air pollution from SOX and NOX were implicated in acid rain and boiler designers were addressing this through boiler and burner design. However, it is not possible to eliminate the production of these compounds when coal is burnt. They include compounds of selenium, boron and uranium.
4. Fines from coal stacks and transport as well as fine ash from exhaust emissions are very deleterious to human health. While these can be reduced by good management they cannot be eliminated. Asthma is common is power industry workers and in nearby families.
5. The claims by the Coal Industry that Clean Coal was the answer are completely spurious. Clean Coal is coal that has been washed in a solution of ferrous chloride to reduce ash (this may be from 20% ash down to 10% ash). However, moisture levels will rise to maybe 14%. This means instead of 70% Carbon, it contains 76% Carbon. It still produces CO₂ when burnt.

Newer fossil fuel technologies including combined cycle gas turbines achieve efficiencies of near 60%. Gas is regarded as the system gap filler until base load renewable are established.

In summary, burning coal is bad for the environment and for human health.

Social impacts of closing coal fired Power stations are not as significant today as they would have been in the past, for example:

6. Employment, in 1980 Vales Point (1-6 Units) was staffed with 1600 people. At that time production needed to increase by 10% p.a. to meet demand. This led to a significant increase in the population of the Central Coast in the 1970s.
7. In the mid 1990s this number had fallen to 240 (only 15%) with structural and micro economic reform. The coal mines went through a similar pathway and staff numbers reduced significantly. All the while achieving similar output. The loss of 85% of the staff did not create undue problems due to retraining, support and other assistance including voluntary redundancies in the period from 1990.
8. Affordability, electricity costs have occurred in recent years due to over investment by traditional generators and suppliers in unnecessary infrastructure. This increased costs by nearly 30% and made the *poles and wires* less competitive. This resulted in increased services charges on consumers which they can avoid by using local renewable energy.

In summary, staff numbers have already been reduced by far greater numbers as a result of management actions and necessary reform. Poor investment decisions in poles and wires have worked to counteract subsidies to the coal industry.

System Factors,

1. **System Stability** is a big consideration in distributed power system design. Systems have become less stable since the 1990s due to reductions in Spinning Reserve to reduce costs. In the past frequency stability was achieved through running some turbo-generators lightly loaded to allow demand to rapidly increase by steam valves opening until Hydro plant could be brought on line. This increased risk but it led to reductions in costs. The more common Risk Based approach is now used in determining reliability levels. The expansion of the poles and wires system by retailers and generators in the recent past has added to the system instability by adding more long power lines. However, experience with the behavior of renewable systems and technology will solve these problems
2. **System Demand**, is a more difficult beast to predict due to weather, temperature or other factors driving human behavior. Examples abound, including more storms and natural disasters with a warming atmosphere, increasing air conditioning with increasing hot summer days and reducing demand as appliances and electronic devices become more compact and efficient.
3. **Energy storage**, has been achieved only through hydro based generation including the highly inefficient pumped storage systems. However, we now have the Tesla Battery

Just Transition, is needed as workers move from a centralized power source to more distributed home based systems. Power stations are located in rural areas and staff develop a camaraderie, independence and role within a hierarchical structure. This means many will not handle power station closure very well and indeed some will have no option but to retire.

Options need to be available for people to:

- retain their self worth;
- have life options, and;
- feel in control of their lives.

Retraining in installing renewables or other jobs needs to take account of this. It is recognized that some of these approaches will not meet the needs of all workers. However as providers of an essential services for decades they deserve our appreciation and recognition. In this regard the closure and relocation of the Power House Museum in Ultimo is a retrograde step that ignores the industrial heritage values of NSW.