

Garnaut Submission - Issue Paper 4 Research and Development Low Emission Technologies

Zero Emission Network

Zero Emission Electricity Grid

It is possible today with existing commercially available technologies to run our national electricity grid by renewables.

There is massive potential to reduce our energy use through energy efficiency, good design, and behaviour change in every part of our economy. Investment in this area is vital if we are to minimise the cost of building new renewable based electricity generation infrastructure.

A former CSIRO climate scientist said in reference to energy auditing work he was associated with that all homes and business they audited found they could achieve a 25% energy saving with a one year payback period. This represents a gross market failure that needs to be redressed.

At the same time we can replace our fossil fuel based energy systems using a combination of commercially available and proven renewable technologies, including options such as wind power, solar thermal, solar cells, geothermal and wave power.

Renewable systems can supply both our base load and peaking power needs; hydro already supplies peak power, and using technology such as that developed by Keith Lovegrove and his team at ANU or equivalent systems being used in the US, solar thermal energy can be stored and drawn on as needed. Smart meters in homes and businesses can also manage peak demands further reducing the need for peaking power plants.

In the short term while the renewable systems are expanded our coal plants can be converted to gas.

There will also need to be significant investment in our national electricity grid to meet the needs of dispersed renewable energy production rather than large scale centralised coal based generation it was originally designed for.

Once we have begun to roll out our renewable based solutions. Richer countries will need to transfer resources, know-how and technology to the poorer countries at no cost. Australia should take on this role in our region.

Research

The Dutch government through their Sustainable Technology Development Program concluded that globally we need to improve our eco-efficiency of most human activities by a factor of 20 to 50 if we are to become sustainable and globally socially equitable (1). This means a reduction in material and energy inputs and pollution outputs by 95-98% and to achieve this we must develop along three lines of innovation in the short, medium and long terms.

The Dutch team define these innovation processes as follows:

- **Short Term 0-5 years target 30%** - environmental care and good house keeping, such as quality management, maintenance, auditing and efficiency drives, and "end of pipe" measures.
- **Medium Term 5-20 years target 80%** - process or product-integration technological improvements and reorganisation.
- **Long Term 20-50 years target 90-98%** - fundamental renewal of technologies and organisational arrangements.

Of critical importance is the long term technological renewal process critical to achieving the 90-98% goal. These processes have long lead times, are economically high risk and not sustained by markets and hence leadership of some description is required to begin these technological renewal processes and achieve them in the shortest as possible time frames.

Fortunately much of the initial research and development has been completed to create a zero emission based electricity system enabling us to implement these solutions in the short to medium term.

Coal based CCS

Continued provision of government support for research into technologies such as carbon capture and storage (CCS) for coal needs to be halted and redirected to the renewable energy production and energy efficiency.

The most optimistic estimates of the cost of coal related CCS technology predict that it will delivery electricity to the grid at cost greater than can be supplied from wind power with dedicated back up, and consequently there is no reason, economic or otherwise to continue to waste money research Coal CCS.

1. Weaver etal, 2000, "Sustainable Technological Development", Greenleaf Publishing, Sheffield UK