

Your scribe has considered compiling a summary publication on environmental issues, but realises it will further contribute to the paper environmental pollution already existing. It would include presentation summaries of the following addresses to our Club: -

- Andy Rigg from Co-operative Research Centre for Greenhouse Gas Technologies on “What to do about CO<sub>2</sub>”
- Ian Kiernan from Clean Up Australia – subject “ $E = 1$ ” relating to cleaning up the environment
- Peter Howard, Chair of Geology at Macquarie Uni – subject “Climate Change –Ice Ages through Geologic Time”
- Martin Thomas from UMPNER – “Nuclear Energy – Australia’s Opportunity”
- Stuart White, Head of Institute of Sustainable Futures, University of Technology “Pathways to a Sustainable Future”

And now Martin Poole, a Chemical Engineer and co-founder of a wind energy company. As outlined by Terry Young in his introduction, Martin has worked in the energy industries in Australia and UK for over 15 years, having started in offshore oil production for BP in the North Sea. He is also a director of Low Energy Supplies and Services whose activities include creation and sale of carbon emissions abatement certificates and electricity demand management projects. He is Chairman of the Energy Committee of The Warren Centre.

In his opening remarks, Martin indicated his address would cover energy sources and the management of transition to alternatives.

Australia’s energy sources currently include black coal, brown coal, gas, hydro, oil, solar and wind. Looking at the future on a world scale, it is widely accepted that energy demand is increasing rapidly, particularly with growth in India and China being virtually unstoppable. Demand is estimated to double by 2030 - already happening in OECD countries and with Australia exceeding the OECD average.

Opening his summary of various options, Martin mentioned a sky wind farm generator being researched in WA – (*more can be learnt about this option if you Google “High Altitude Wind Power”*). There is a growing “fed up” attitude towards wind towers in the US and Europe. Next he outlined a solar thermal plant at Kramer Junction, California with movable parabolic troughs designed to always face the sun and turn over at night to conserve heat. This system creates hot water/steam to power a steam generator but does not result in a very good efficiency/cost ratio. These huge solar units cover large areas and sterilise the land. An Australian invention the Compact Linear Fresnel Reflector with its flat glass interleaved mirrors (a modest unit being trialed at Liddell NSW) achieves economies of size and cost over earlier versions.

Another source, the Wave Energy Conversion Unit has been trialed off Port Kembla. It collects and concentrates wave energy by trapping the air ahead of a wave. But such generators have been subject to destruction by freak waves much larger than anticipated. Coal has proven to be a very reliable low cost source of energy for many years. Concerns about environmental damage resulting from the burning of such fossil fuels have become a major and controversial issue of more recent times. With significant cost involved, research into ways of achieving a “cleaner outcome” is continuing. This research includes various Carbon Capture options such as Pre, Post (eg Loy Yang in Victoria), Oxyfuel, and Internal Gas Fired, also the associated long term Carbon Capture Storage “CCS”.

Problems associated with CCS include appropriate geological features not located near generators, high transport costs and long term risk – and this research needs a lot more money than is currently committed. Another technology is Ultra Super Critical “USC” – involving pulverised coal and increasingly higher temperatures and pressures.

The political reality is that objections are raised to all options. The “NIMBY” syndrome (“*not in my back yard*”) is prevalent and politicians are conscious that all objectors are also voters. Energy politics are too big, too long term, and affect too many.

Martin referred to the current Energy White Paper which sets out the strategic aim of cleaner, adequate, reliable and affordable energy. (*Google "Energy White Paper" and its all there in detail*). Discussion papers have been produced. Current aim of the Manageable Renewable Energy Target is a 60% reduction in greenhouse gas by 2050.

Referring to NSW, Martin discussed the possible transition from 90% reliance on coal to other options. Wind has been proven world wide and Australia has a lot of wind resource. It doesn't tie up land and is simple and reliable with low capital cost. This industry is currently operating under policy direction set by the previous Government. NSW is responsible for 1/3<sup>rd</sup> of Australian energy production. He argues the population responsible for the huge cost involved should favour any less costly alternative. The State will need extra capacity by 2013/14. He mentioned air conditioning installed in an ever-increasing proportion of buildings which creates a peak load for only approx 10 days per year. Regulations are causing uncertainty for future investment in coal fired generators. Installation of Gas Generators would require a huge investment.

Referring to water usage, NSW coal fired generators use 15% of State water consumption for cooling. That 15% could be created by desalination and wind power.

His company Epuron is actively engaged in wind and solar energy in Europe, Middle East, India and Australia and has already sold 3 wind farms in NSW. The South coast of Australia has good regular wind supply. NSW with an area 1,000 x 1,000km and a strong electricity network provides a great basis for wind power, even allowing for the intermittent variability factor. This State has an obsession with "base load" mainly caused by hot water systems - which could be heated alternatively by solar cards.

In question time, his response to a query re geo thermal hot rock energy source indicated a potential in the NE corner of SA, although a long way from major load areas. Queried as to nuclear option he commented on its long-term waste disposal problem as with carbon, but it should be considered.

Appreciating Martin's affinity with solar and wind power, we were none the less informed on the many problems and options to be considered by decision makers in providing appropriate solutions to our future energy needs. And Graham Slee's vote of thanks clearly indicated the appreciation of us all.