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Base load electricity

Making South Australia's electricity solar powered.

The thrust of the so called 'Green Power' movements so far has been to make a proportion of Australia's power from renewable resources or to make newly added capacity from renewable resources. This is only a limited and partial aim.

It is technologically feasible to use solar energy for the total supply of all of South Australia's electricity grid and if desired to make S A a net exporter of electric power to the Eastern States. Neither wind generators nor photo-voltaic plates nor advanced battery systems will provide base load power but all of those would be contributors to an overall system.

This would be a long term project; there are some technical advances needed so some research and development activity is required but no new principles need to be discovered; it would be possible to construct a low power pilot plant using existing technology then use that for experimentation to define the most economical ways to increase power levels.

Because solar energy is a distributed resource an electricity grid system using many small generators powered purely from solar collection would require development of a new method of generator synchronization from an external timing signal. This would require design of new equipment but is well within the capabilities of electronic control systems that are presently known.

The outline of the proposed system is to collect solar energy as low grade heat (black pipes out in the sun), concentrate the heat to power station boiler temperatures then use standard steam turbines to drive presently available generators. In order to provide base load power with reasonable reliability the heat would need to be stored in a system that will hold heat in the winter time for approximately 1,000 hours of operation (6 weeks at 24 hrs per day). Currently available heat storage systems quote 2 to 4 hours of operating time so this is where technological development is needed.

I have no figures on the overall cost required for the complete replacement of all the existing power stations with solar collection installations but it should not be too difficult to estimate a cost for a pilot plant to test principles.

Are you interested?

Jim Sinclair.