Project Overview

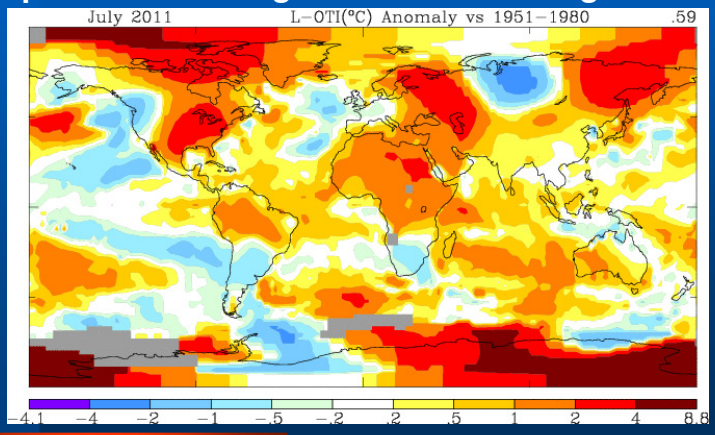
Beryl Solar Thermal Power Station

A MDEG Proposal

By Ian McAdam

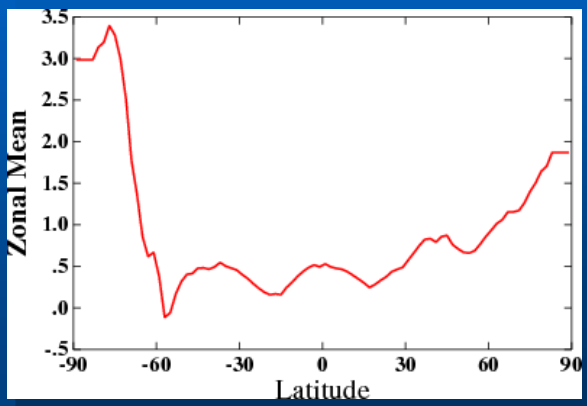
Why Renewable Energy?

- **The planet is warming faster than we imagine**

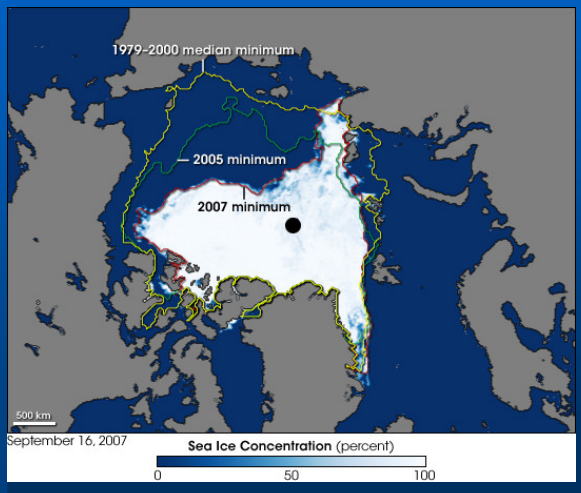


The Poles are Warming

- **Mean temperature rise for 2011**

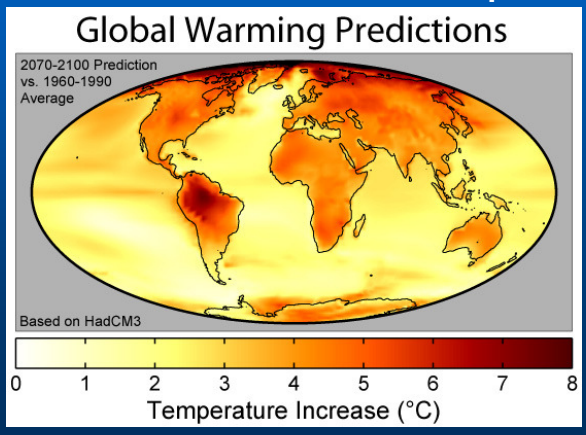


Loss of Ice in the Arctic



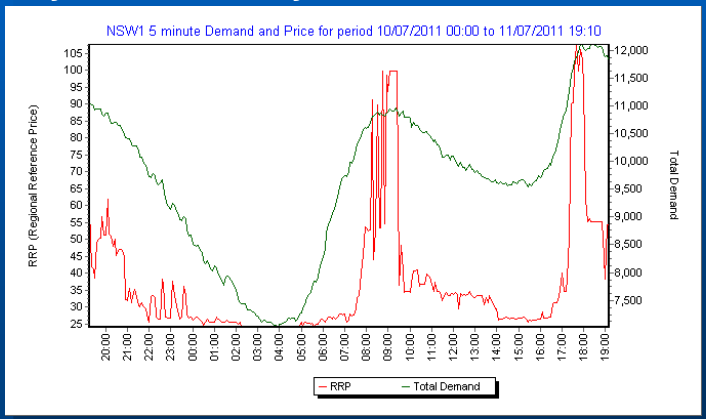
Future Warming

- **HadCM3 model of business as usual temperature rise**



Electricity Costs in NSW

- **10th July 2011 Electricity Prices**



Energy Generation Installation Costs

- Coal Fired Power Station - $1.20/watt
- Gas Fired Power Station - $1.20/watt
- Wind Power - $1.70/watt
- Solar Photovoltaic - $4.40/watt
- Solar Thermal - $3.80/watt
- Geothermal – $3.50/watt
- Nuclear - $7.00/watt

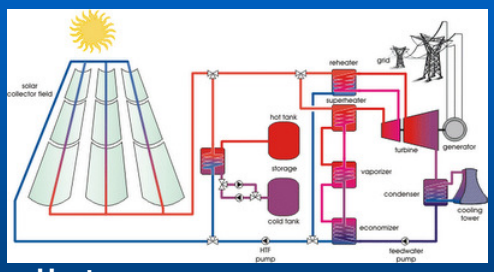
Renewable Energy Options

- Wind Power
- Solar Photovoltaic
  - Small Scale – on individual homes
  - Medium Scale – 1-10MW installations
  - Large Scale – 10MW upwards
- Solar Thermal
- Geothermal
- Hydro

Why Solar Thermal?

- **Disadvantages –**
  - Solar thermal is one of the more expensive options
  - Solar cell prices are falling – making it a cheaper option
- **Advantages –**
  - Solar thermal can supply base load power
  - Biomass can be used as backup energy
  - Peak generation occurs near peak demand

How Solar Thermal Works



- Based on Heat
- Sun's heat must be concentrated to 400-700 deg
- Uses steam to run a turbine, which drives a generator
- Requires water to operate
- Must be medium to large scale

Solar Trough Technology

- Reliable – proven technology
- Uses oil or steam for heat transfer
- Only 1 axis to control

Linear Fresnel Technology

- Uses reflectors to concentrate heat
- Implemented at Liddel and will be used at Chinchilla
- Uses oil or steam for heat transfer

Parabolic Dish Technology

- Dish concentrates heat to focal point
- Can achieve very high temperatures
- Used at White Cliffs and ANU

Solar Tower Technology

- Uses heliostats to reflect heat to a central point
- Very high temperatures achieved
- Used in Spain, trials in Newcastle

Lifetime Input Cost Comparison

- **1000MW Coal Fired Power Station–**
  - **Installation: $1.2 billion**
  - **Fuel Cost: $70,000.00 / hour (coal $140/tonne)**
  - **50 year cost: $28.8 billion**
  - **Lifetime Electricity Cost: 7.3c/kWH**
- **20 x 50MW Solar Thermal Power Stations–**
  - **–Installation: $3.6 billion**
  - **–Fuel Cost: $0.00 / hour**
  - **–50 year cost: $3.6 billion**
  - **–Lifetime Electricity Cost: 2.0c/kWH**

Capital and Fuel costs only, excludes maintenance

Base Load Power

- **Electricity supply 24hrs a day**
- **Molten salt or graphite heat storage**
- **Biomass supplementation**
- **Wind cannot be base load source**

Why Beryl?

- Adjacent to 132kV electricity substation
- Next to Cudgegong River
- Cleared, relatively flat land
- Proximity to electricity consumption
- 50MW power station can be built

Satellite View

Current Status

- Epuron waiting for gov't commitment
- 50MW proposal requires $250-300M
- Waiting for state or federal funding
- Carbon tax may provide funding
- Looking for other interested parties