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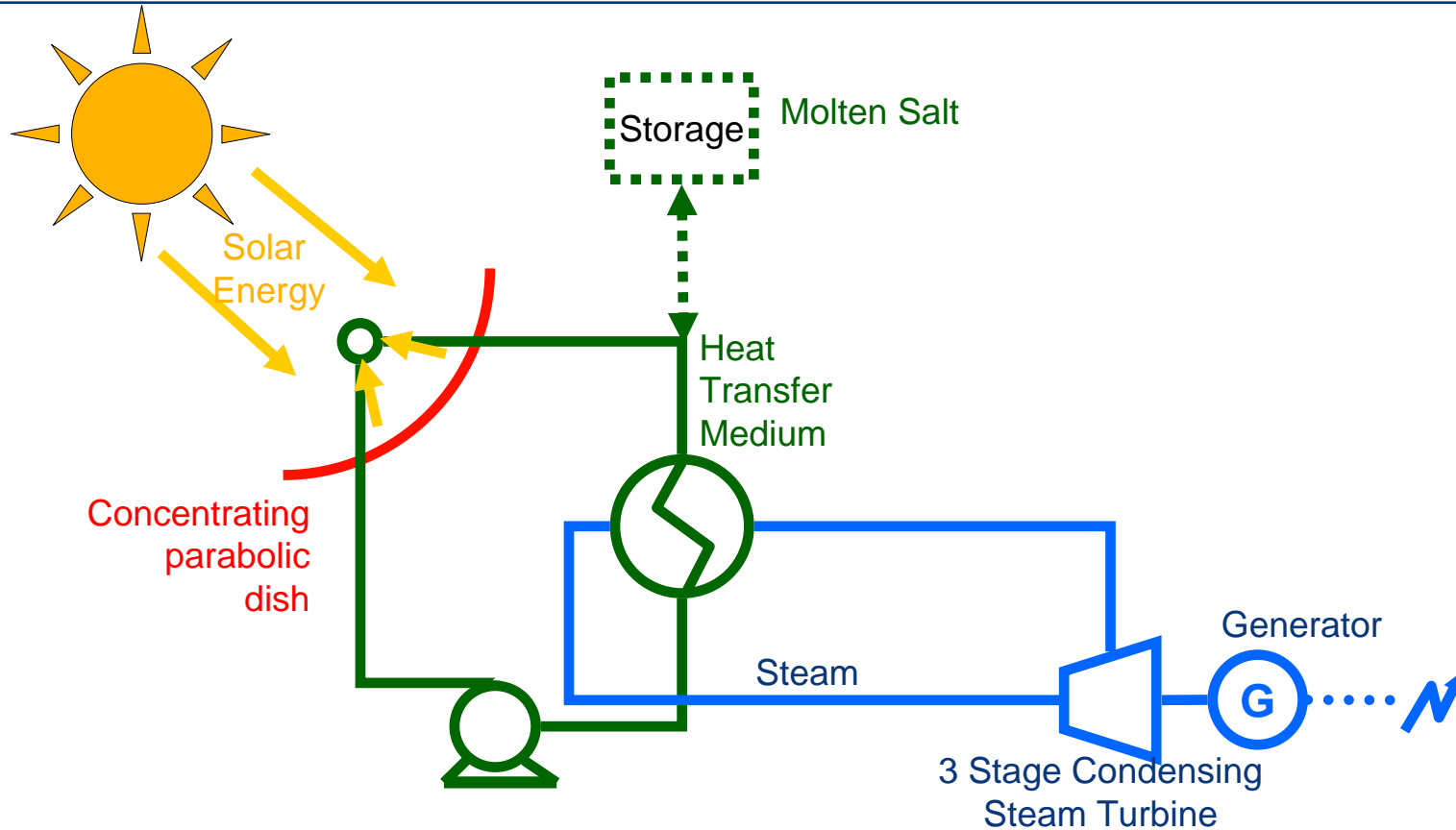
Advanced Solar Thermal Power Generation

All-Energy Australia October 2009





- ▶ Advanced Solar Thermal explained
- ▶ History of Advanced Solar Thermal
- ▶ Solar thermal energy in Australia
- ▶ Example 250 MWe power station
- ▶ Opportunities
- ▶ Location of solar thermal power stations





▶ Solar Island

- Parabolic mirrors concentrate sunlight onto collector tubes
- Mirrors track the sun from East to West
- Oil is heated in the collector tubes

▶ Power Island

- Heated oil from the Solar Island heats water in a boiler to produce steam
- The steam drives a conventional turbine to generate power

▶ Storage

- Operating hours of the plant can be extended by storing heat in molten salt for later recovery
- Conventional technology in nuclear power generation

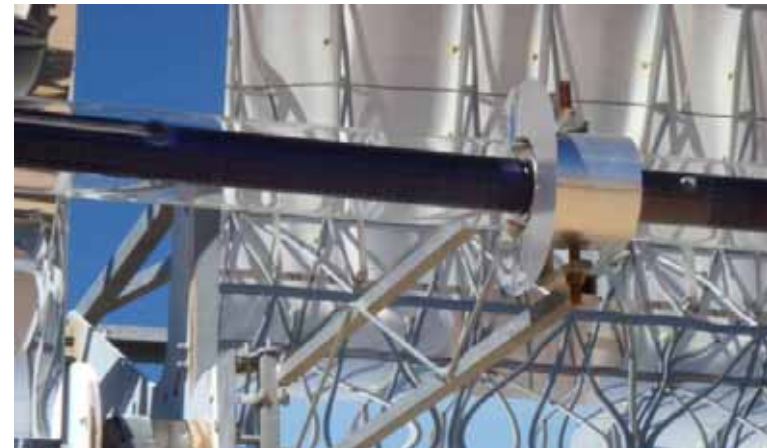
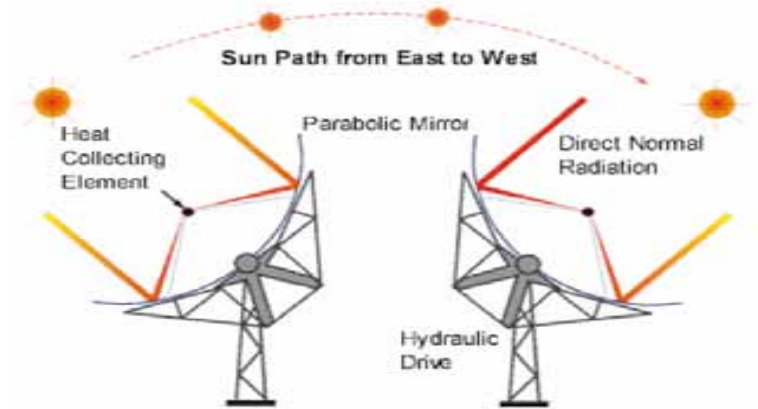
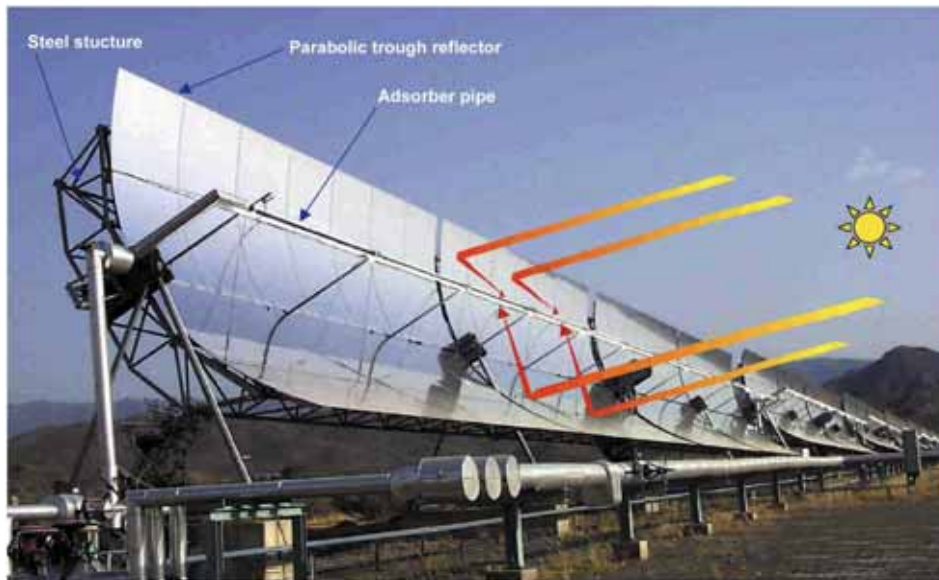




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Parabolic Trough Reflector & Collector



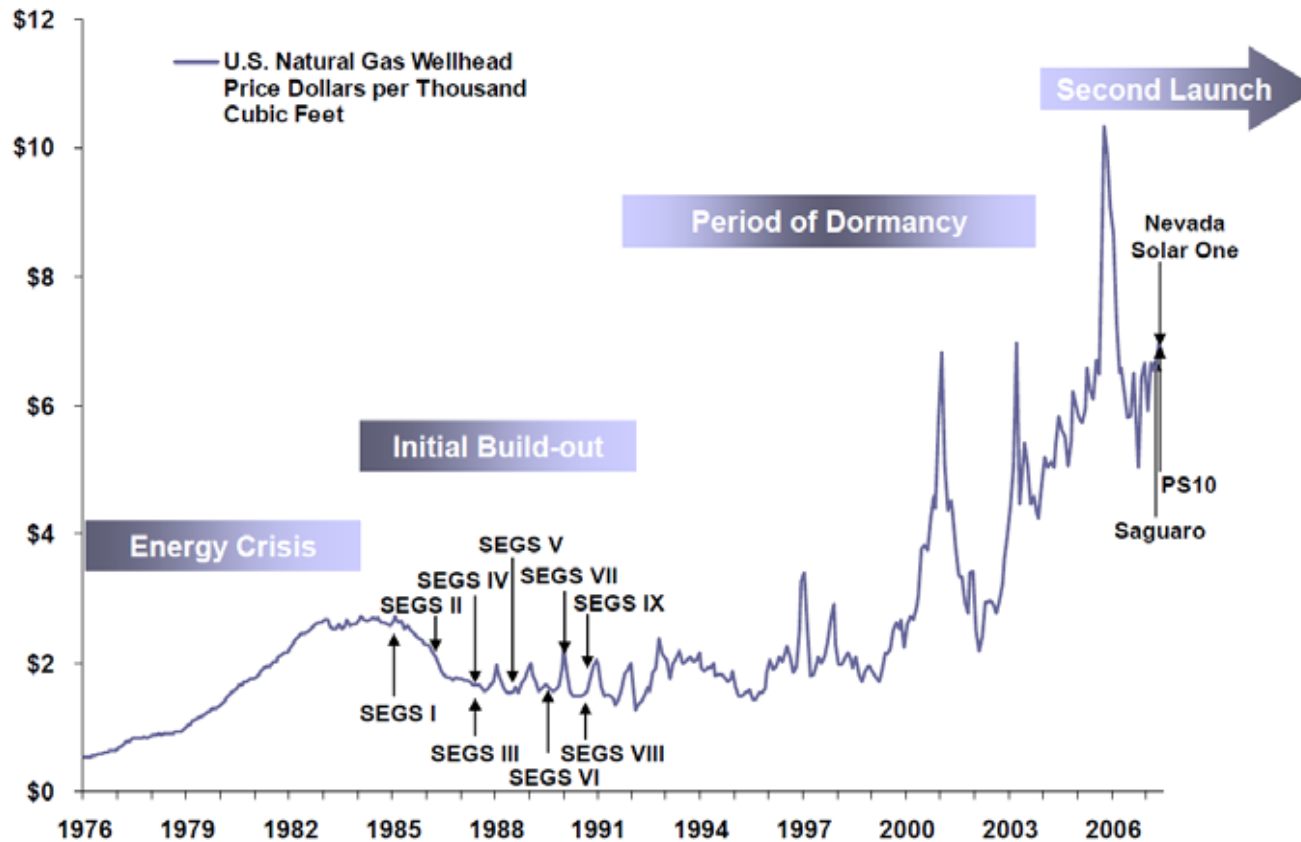


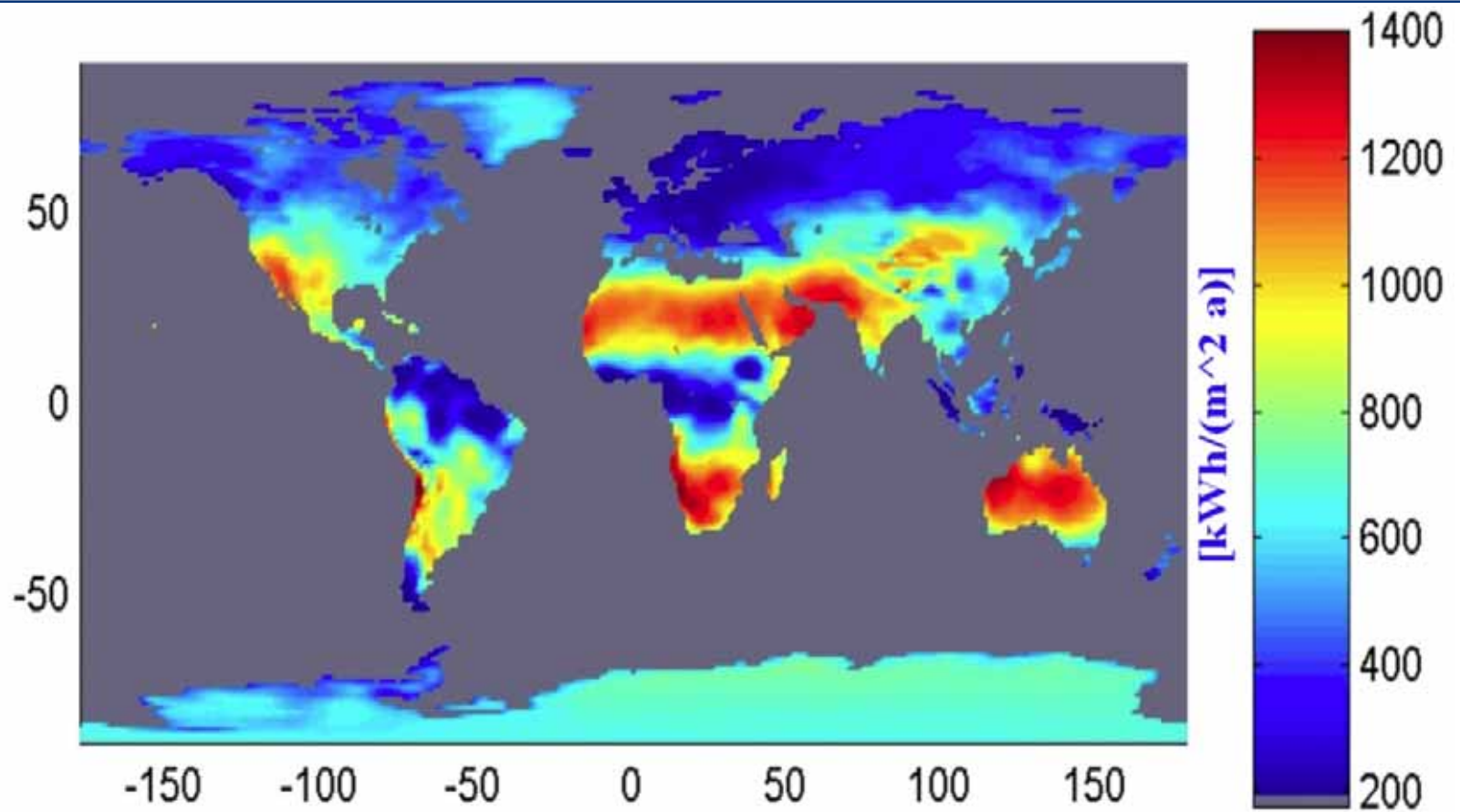
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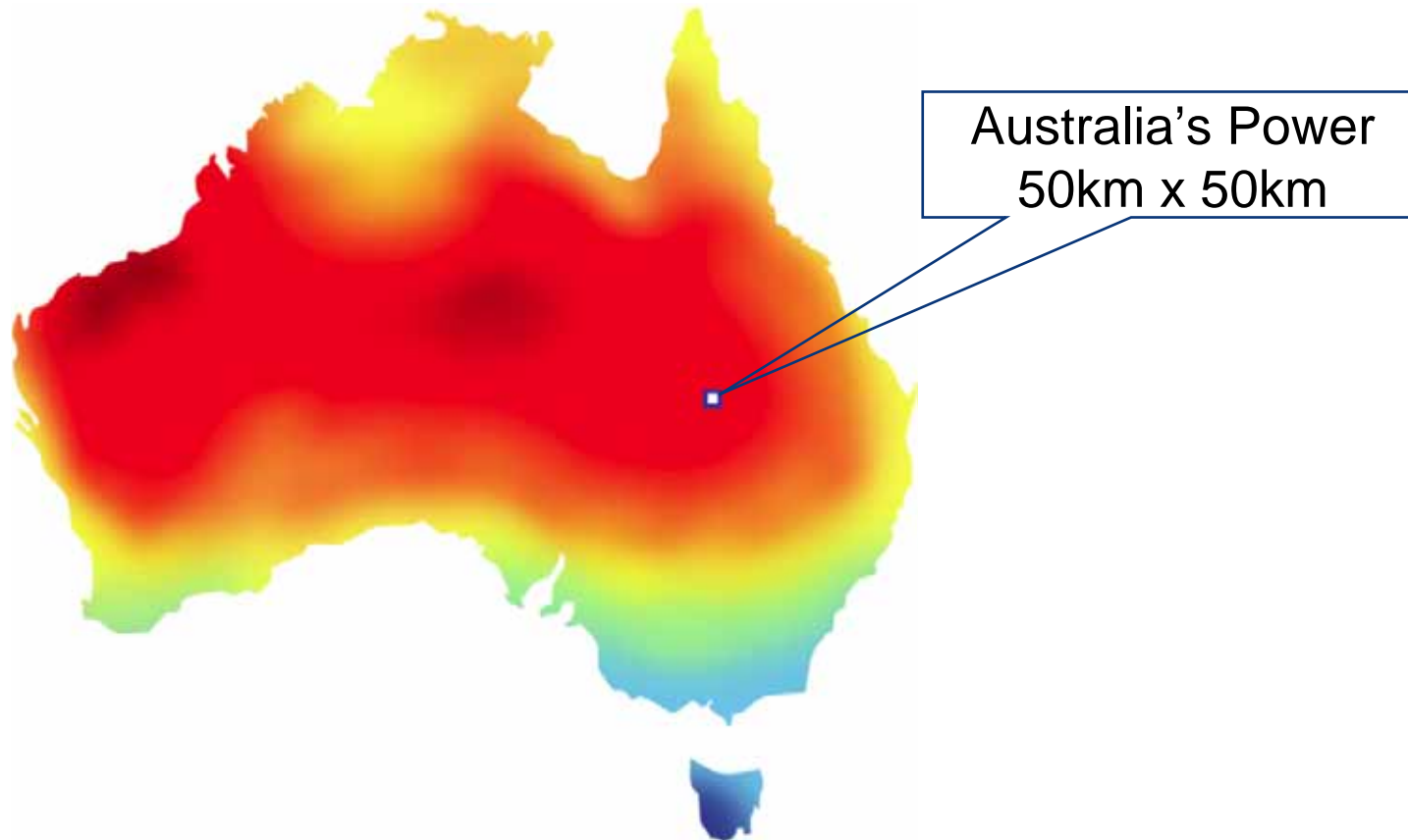
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Proven Operation



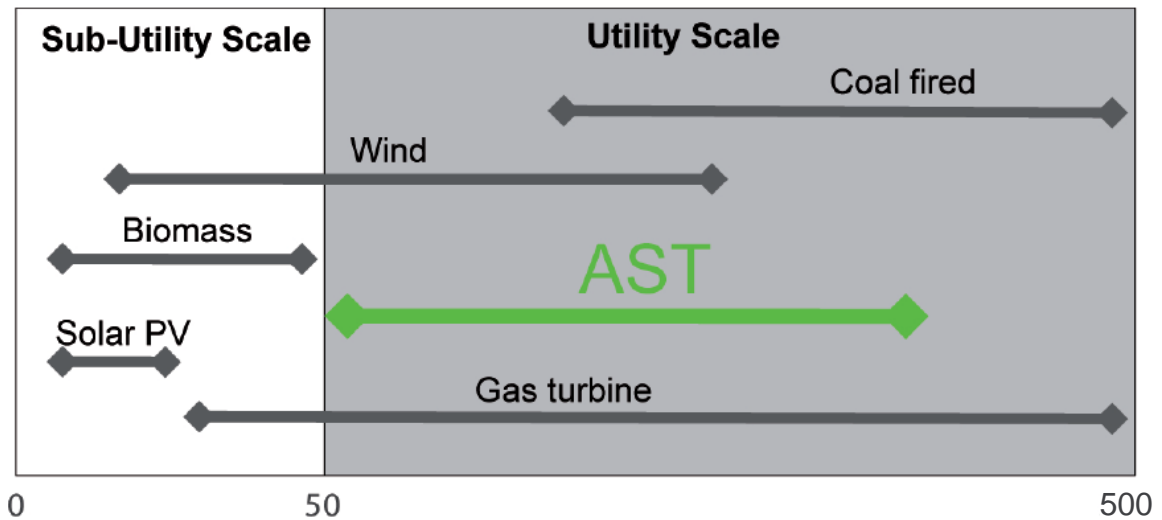








- ▶ Proven technology
 - Successfully operated and improved for over 20 years in California
- ▶ Ideally suited to areas of high solar intensity and little rain
 - Low environmental and social impact compared to other renewables
- ▶ Provides utility-scale power from 50 to 300 MW

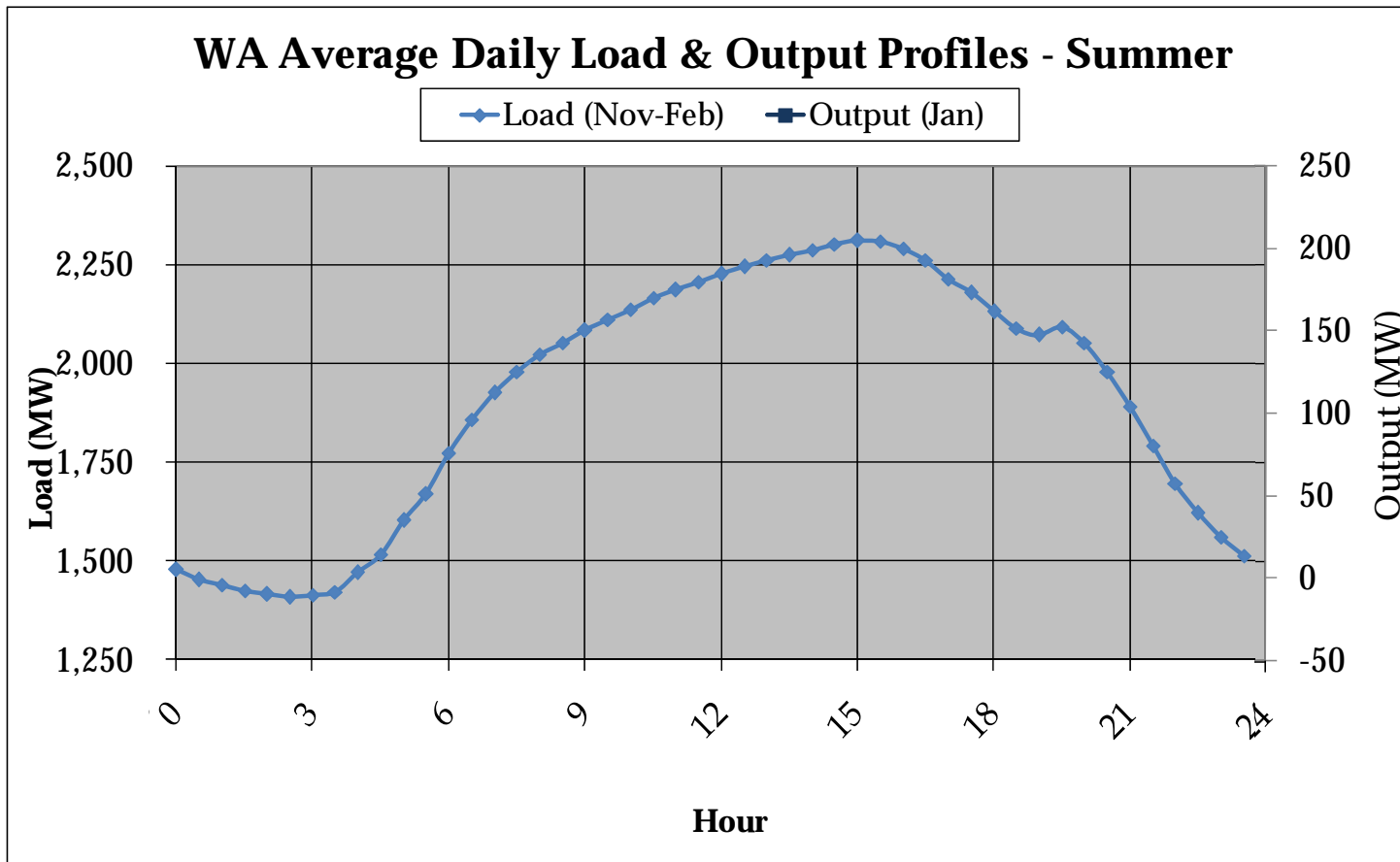


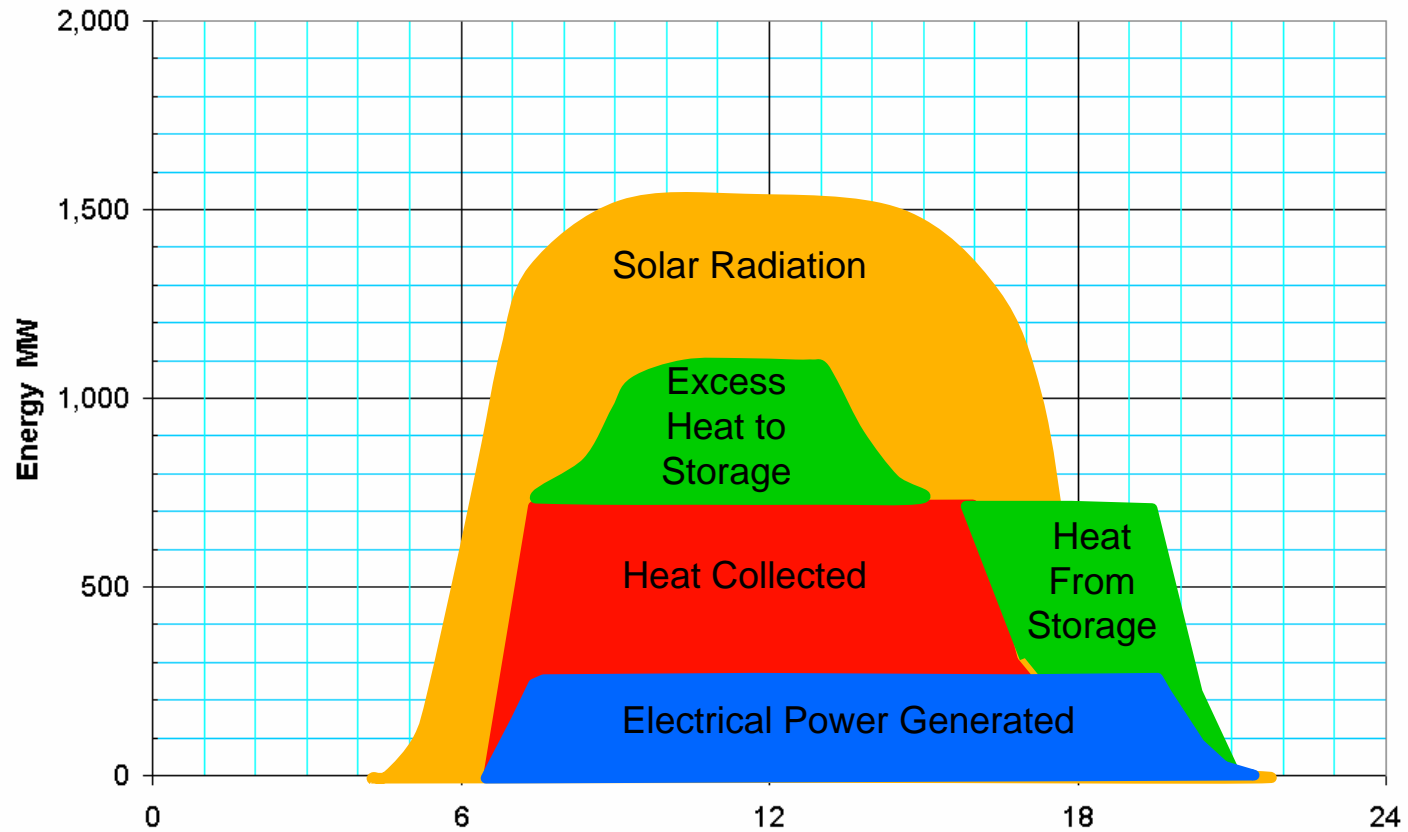


- ▶ **Solar Field**
 - Parabolic Troughs over 2 km x 3 km
 - Solar Field Mirror Area: 1.5 million m²
- ▶ **Thermal Energy Storage**
 - Two tank molten salt storage
 - 1¼ hr storage at full plant output
- ▶ **Power Block**
 - Export Power 250 MWe
 - Conventional Steam Cycle

250 AFL football fields







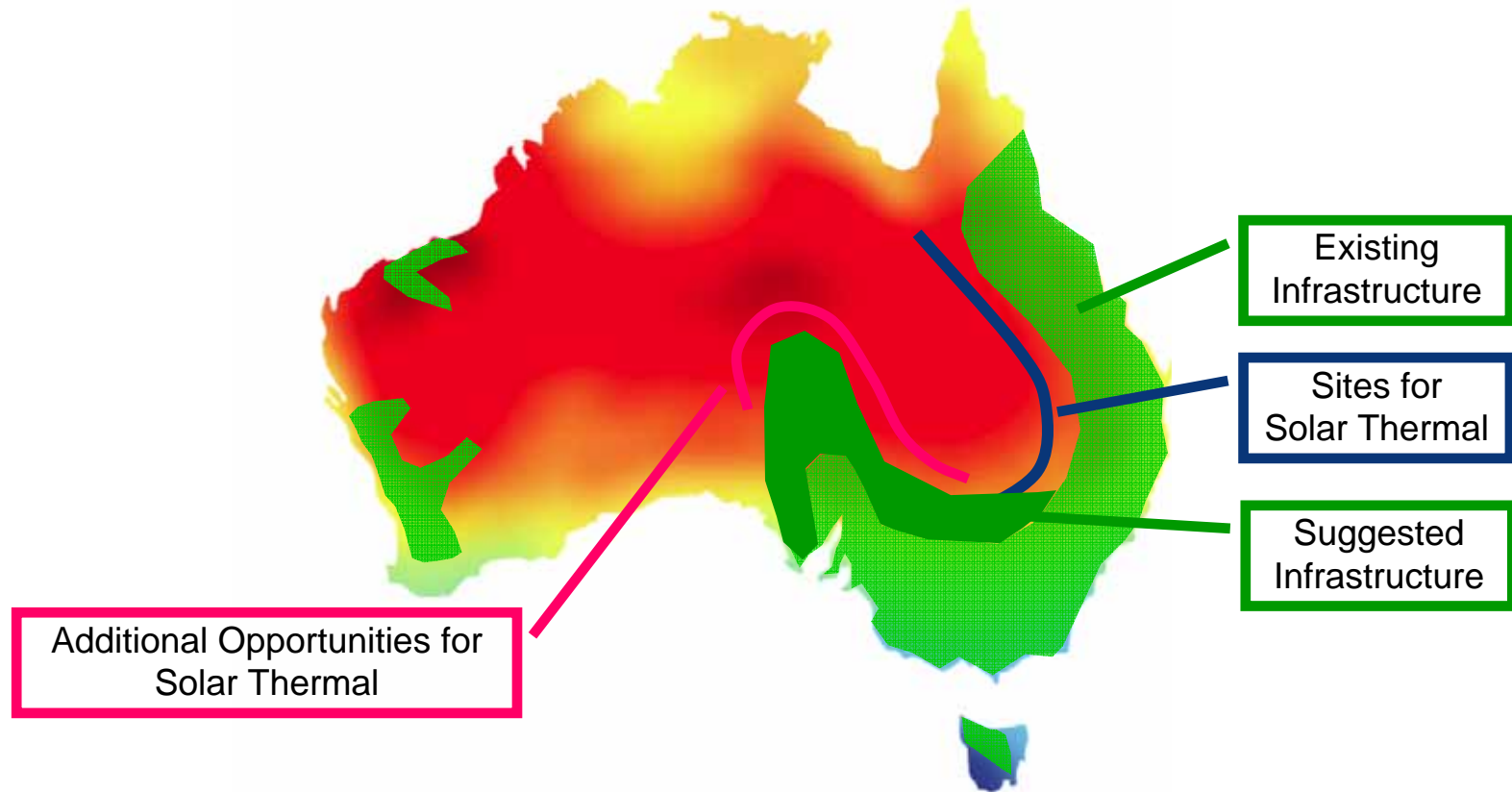


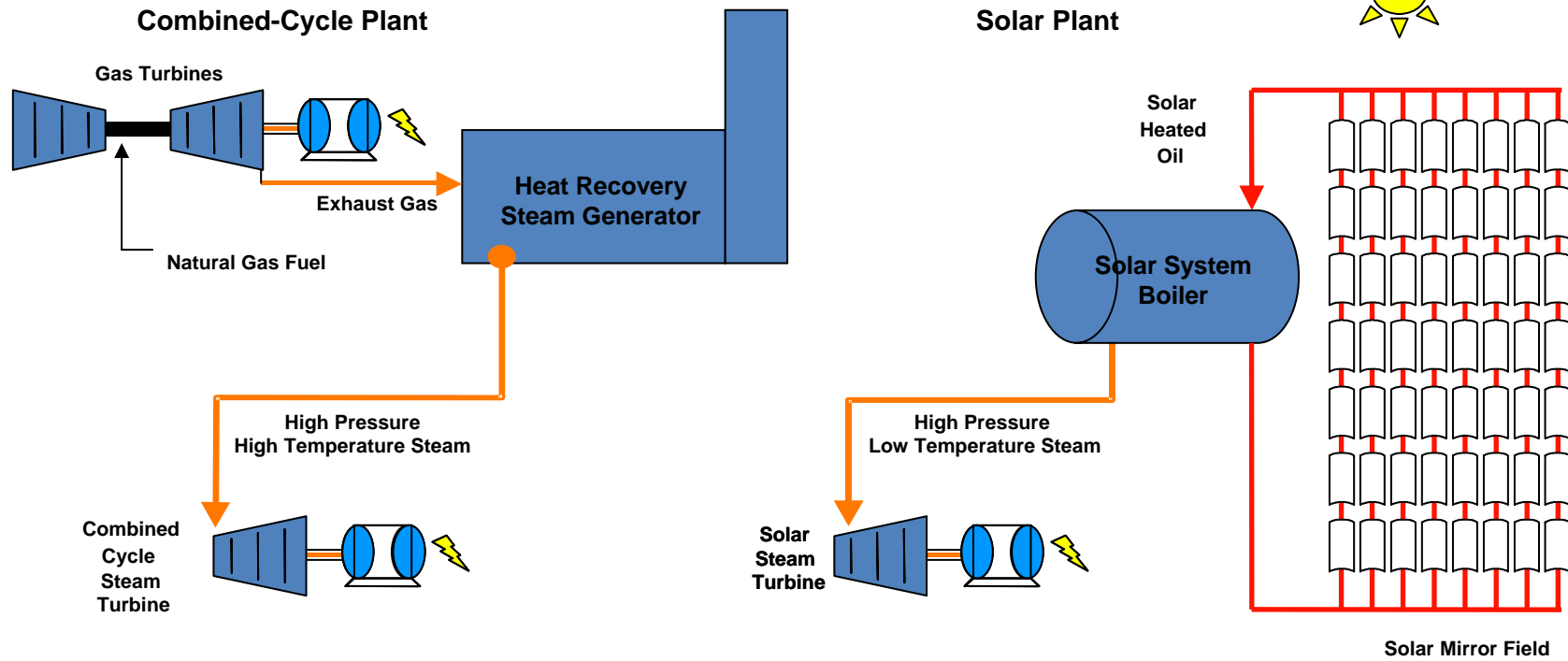
▶ AST has

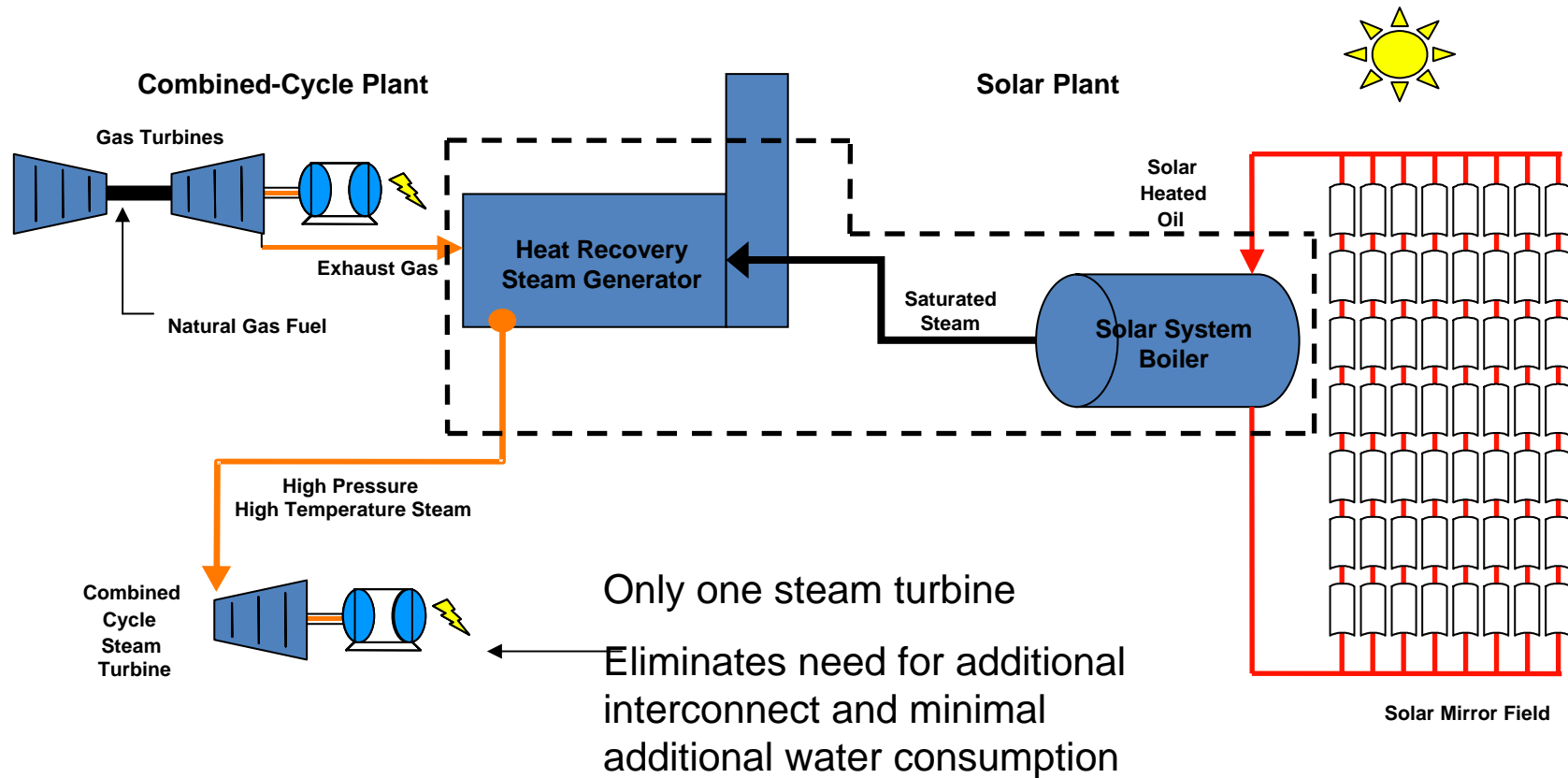
- Peak load coincidence
- Output predictability
- Ability to store energy as heat rather than electricity
- Renewable Energy Certificate eligibility
- Steam based generation offers potential for integration with gas/coal based power generation
- Competitive against diesel fuelled power generation

▶ Challenges:

- Still expensive but long term capital cost reduction potential
- Best supply locations are remote from infrastructure and markets









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Future Opportunities



Higher Operating Temperatures
- Increased thermal efficiency

Alternative Collector Designs
- Lower Costs





- ▶ Solar thermal power generation is proven
- ▶ Australia is an ideal place for solar thermal power generation
- ▶ Initial developments will be located close to infrastructure
- ▶ Initial developments may be integrated with other power generation facilities



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End – Thank You

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