

Submission No: 68



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14 June 2007

The Committee Secretary
House of Representatives Standing Committee
on Industry and Resources
PO Box 6021
Parliament House
CANBERRA ACT 2600

Dear Mr Chafer

CASE STUDY INTO RENEWABLE ENERGY IN AUSTRALIA

Ergon Energy is pleased to provide the attached submission to the Standing Committee's Case Study into Renewable Energy in Australia.

We believe that renewable energy will play an increasingly important role in the electricity supply systems of the future. Ergon Energy is seeking to adopt a forward stance on promoting, developing our understanding of and investing in renewable energy technologies.

Please contact Mr Glenn Walden on 07 3023 2524 if you wish to discuss our submission further.

Yours sincerely

A handwritten signature in black ink, appearing to read 'A G Bellas'.

A G Bellas
CHIEF EXECUTIVE

Enc.:

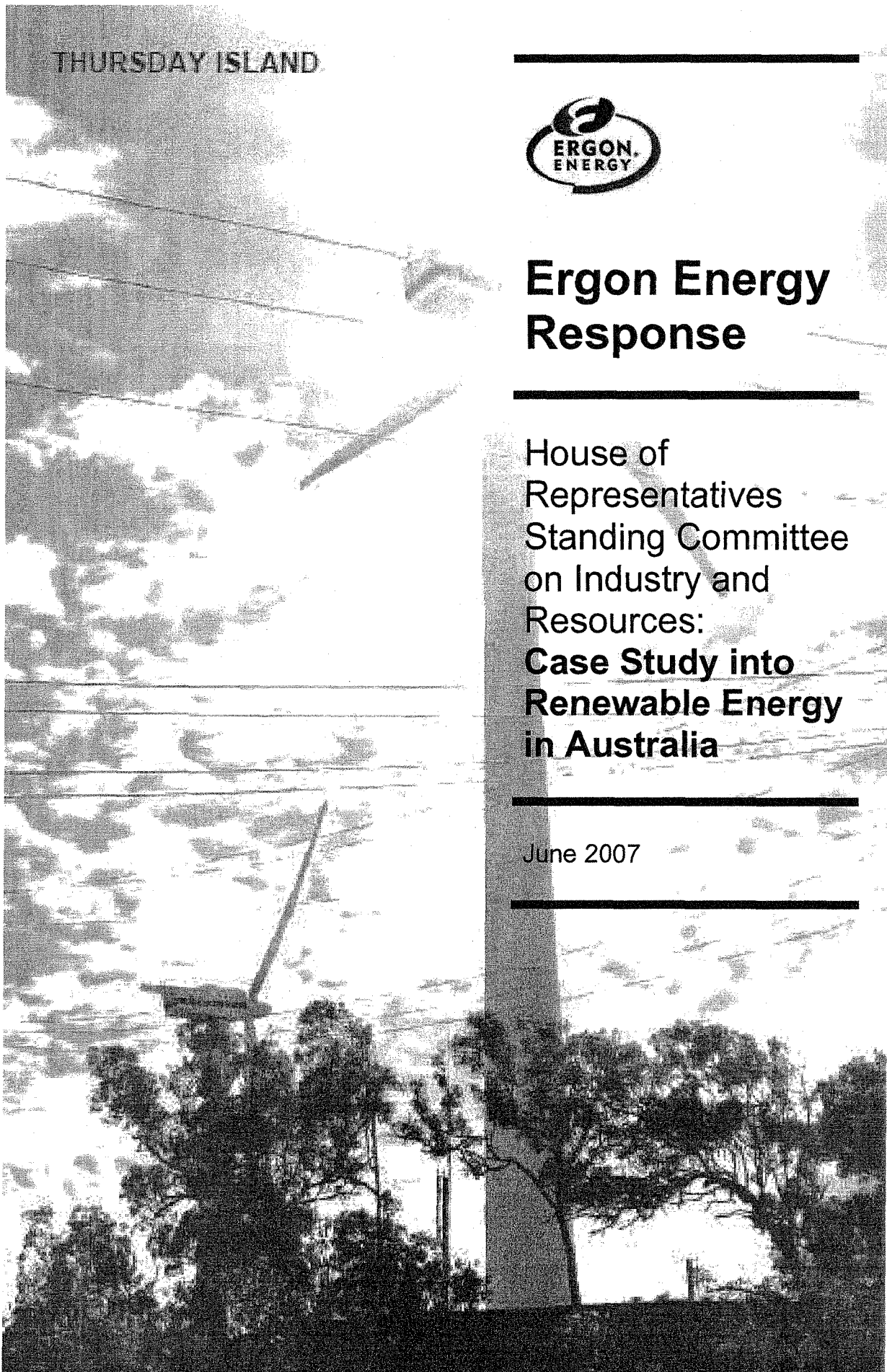
THURSDAY ISLAND



Ergon Energy Response

House of
Representatives
Standing Committee
on Industry and
Resources:
**Case Study into
Renewable Energy
in Australia**

June 2007



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Submission by Ergon Energy to the House of Representatives Standing Committee on Industry and Resources

Case Study into Renewable Energy in Australia

Scope

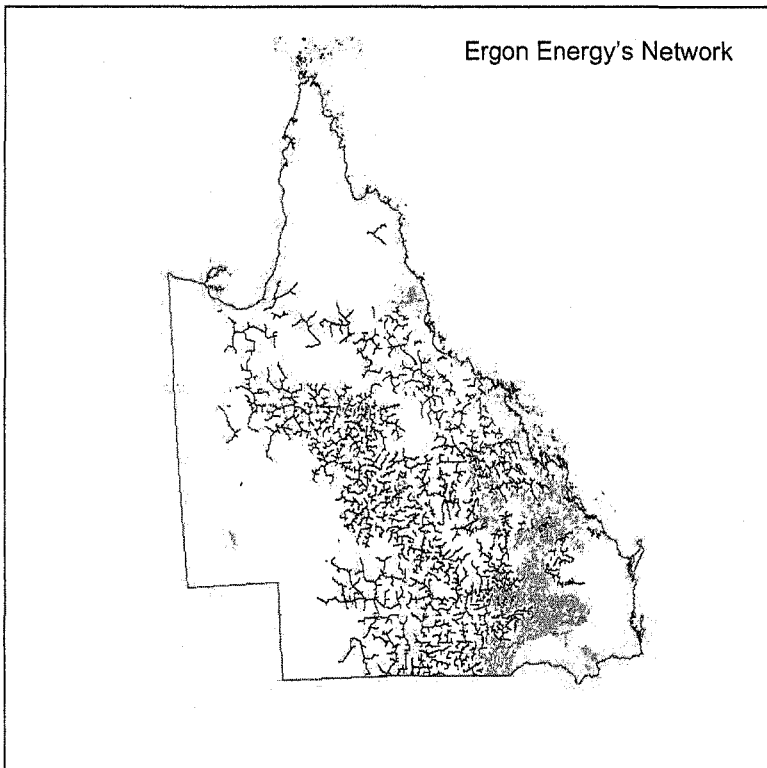
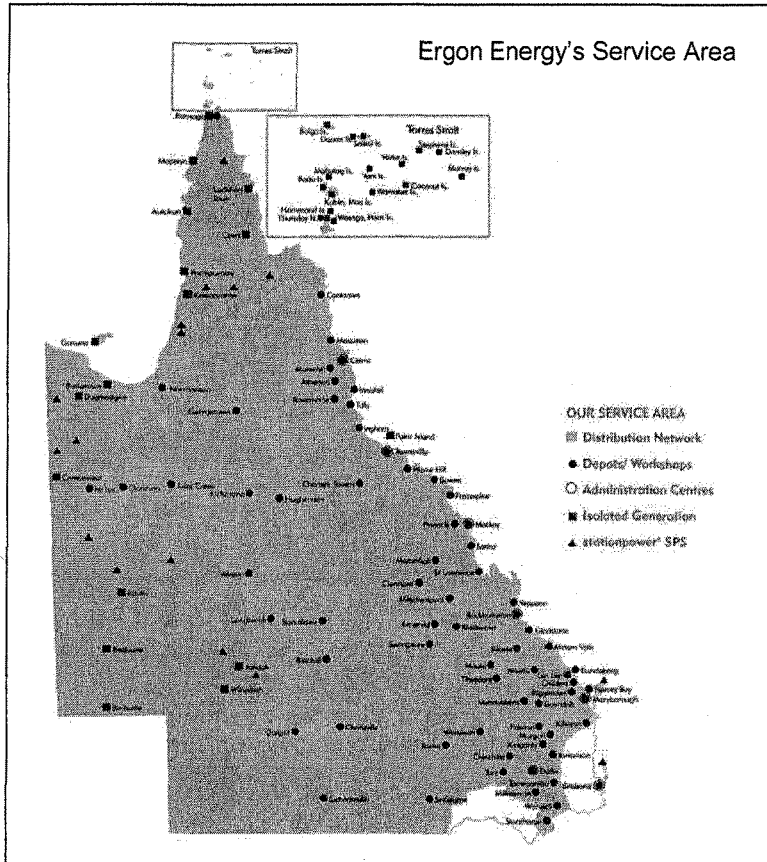
- The development of non-fossil fuel energy industry in Australia
- Comparative study of solar, wave, tidal, geothermal, wind and hydrogen fuel sources
- Relative state of development and their prospects for economically viable electricity generation, storage and transmission.

Executive Summary

The introduction of programs, targets and incentives would all lead to the higher uptake of non-fossil fuelled energy generation sources for the Ergon Energy business. There are numerous renewable energy technologies that exist currently that are suitable for use on the Ergon Energy existing network and can contribute to the overall sustainability of the network. These technologies are not generally economically viable based on current circumstances. There are numerous technologies that require some development and trialling to determine their value or ability to contribute to the distribution business. There is a need to foster both uptake of existing technologies and to develop further technologies to improve the long term prospects for renewable energy sources. The economic viability and technological development in renewable energy technologies will follow a much slower path without incentives and targets.

Background

Ergon Energy is a Queensland Government owned electricity distribution company with a non-compete retail arm in regional Queensland. The electricity distribution company has an asset base of approximately \$6 billion comprised of 134,000km of distribution and sub-transmission lines as well as 33 power stations which provide generation capacity in isolated parts of Queensland. The current customer base is 600,000 which is comprised of residences and businesses in Queensland which are outside of the south-east corner of the state (Appendices 1 and 2). The next 3 years will see an investment of approximately \$2.1 billion in assets and their maintenance to ensure the provision of quality and reliable power to our electricity customers in our service areas.



Ergon Energy is a strong supporter of non-fossil fuelled electricity supply. Prior to the sale of Ergon Energy's contestable retail business, Powerdirect Australia, Ergon Energy was involved in many renewable energy and clean energy power generation projects, such as Suncoast Gold Macadamia – using macadamia nut shells, Isis sugar mill – using sugar mill by-products, Moranbah – using coal seam methane and Castlemaine – Cogeneration using natural gas. These projects were chosen for their environmental merits as well as their economic viability. In addition to these projects, which are now part of the Power Direct Australia asset base within AGL, Ergon Energy still owns and operates two wind turbines which are connected to the remote Thursday Island power station, a geothermal Rankine cycle engine which supplements the Birdsville power station and a series of photovoltaic concentrator dishes which will supply the Windorah power station, which is about to commence construction. Ergon Energy also has a separate business unit which specialises in renewable hybrid stand alone power supplies for sites requiring electricity which are not able to be economically serviced by the extensive distribution network of the business. Townsville: Queensland Solar City is a key project will install approximately 1MW of flat plate photovoltaic (PV) arrays through a distributed area of Magnetic Island.

One of the most significant issues the Ergon Energy network faces is network utilisation efficiency, the increasingly peaky demands and increasing overall demand for electricity. The capacity of the network must continue to be augmented to meet peak demand using predominantly traditional technologies. Without ongoing augmentation the customers will experience reduced power quality and reliability. Another key issue for the business is the cost to deliver power; given the remote and diverse region that the network supplies, the cost of supply is high and results in ongoing costs to the Queensland government to provide equity and quality of living across the state.

The 33 remote power stations all have a base fuel requirement of diesel. A significant proportion of these power stations are in regions of environmental sensitivity; such as the Torres Strait islands, or where road access is restricted for significant parts of the year. This is considered as a key long term risk in the supply of electricity to these remote regions. Ergon Energy has a long term strategy in place to eliminate fossil fuel usage for these power stations, but the economic impact of implementing and the limited technically viable solutions at this time are the most significant impediments.

A large area of Queensland does not receive grid power from the Ergon Energy networks. One of the most significant proportions is the pastoral group, which, due to the nature of their business, are often too far from the network to access power at an economically viable price.

A study into the Ergon Energy network has identified that the most significant exposure the business has to climate change and carbon costs is our network losses which equate to over 75% of the business's carbon risk footprint.

New Directions

Ergon Energy has established the following as new core directions within the business:

Sustainability – we recognise that to continue practising business as usual will not align to our vision of being a “world class, customer focussed energy business”. Sustainability considers the five dimensions; fiscal, environment, culture, community and governance as part of the way we do business into the future.

Innovation – as a business we need to challenge existing paradigms to ensure that we meet our vision and the expectations of our customers

Technology – specifically in the technology area we need to determine new options and think and work smarter to provide our services into the future

These directions are in addition and complimentary to our existing essential drivers of safety, the environment and customer service.

Prospects

The nature of electricity demand suggests that the value of distributed electricity storage, distributed energy generation and non-fossil fuelled resources could be significant for Ergon Energy. Technical and non-technical barriers are challenges to realising the values that renewable energy generation have to offer.

Some of the barriers to renewable energy from Ergon Energy's perspective are:

- The significant knowledge base and culture that exists in traditional generation and distribution technologies
- Connection technologies to ensure reliable and safe connection
- Renewable energy resource availability
- Economic viability in current market
- Rules that impede growth of distributed energy connections and govern energy usage
- Suitably skilled personnel
- The customers perception of the low cost of electricity which implies electricity is low value, as such this does not encourage energy awareness and demand management nor place a real value on distributed renewable energy

In addition there are other factors that could be considered as value drivers towards the increased usage of renewable energy technologies:

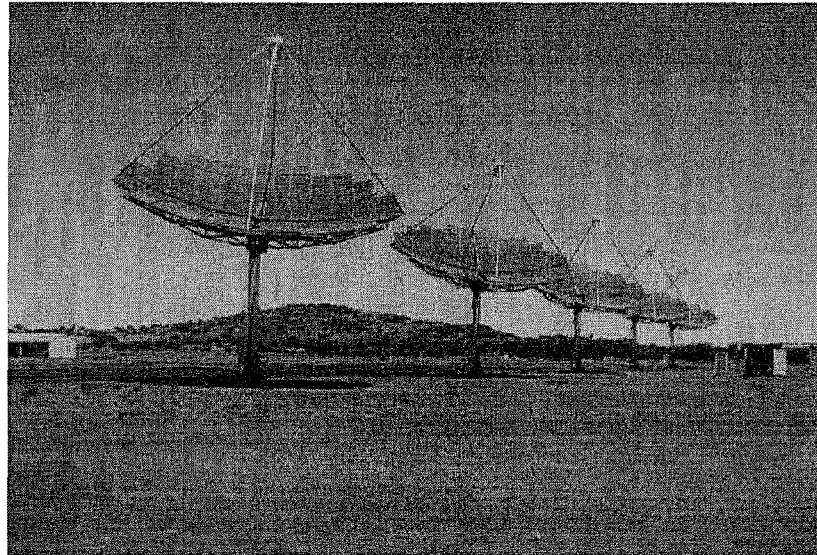
- Increased daytime peak loading on the network principally due to increasing prevalence of air-conditioning
- Overall increases in electrical loading throughout the network
- Increasing expectations in quality of supply
- Increasing use of diesel fuel for remote power stations
- Decreasing availability of wooden poles throughout Australia and the world

- Increasing prices in copper and aluminium cable
- Low availability of skilled people throughout regional Australia

Comparative Values of Renewable Energy Sources

There are a range of barriers to the uptake of renewable energy and in the current business environment renewable energy is commercially marginal. The higher operating costs in Ergon Energy's isolated systems make some renewable energy options closer to commercial viability. Ergon Energy has assessed the renewable energy resources and technologies available, particularly with reference to our isolated systems. Broadly:

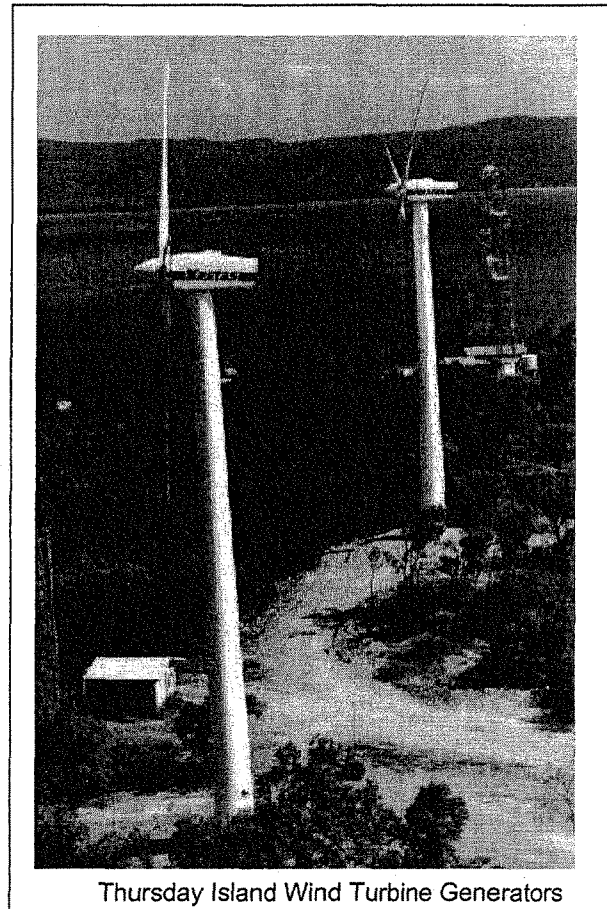
- **Solar** – Solar resource is abundant throughout Queensland particularly in western parts; however thundercloud days increase in coastal and northern zones. Solar photo-voltaic and thermal technologies are well established but continued development is required particularly in reducing production and net-output costs. Grid connected solar is not generally commercially viable, Ergon Energy is investing in solar photo-voltaic concentrator technology at Windorah and is investigating its use at other locations. Ergon Energy is looking to enhance our understanding of concentrated, distributed, grid-connected solar photo-voltaic systems through its investment in the Townsville: Queensland Solar City project.



Solar Photo-Voltaic Concentrators

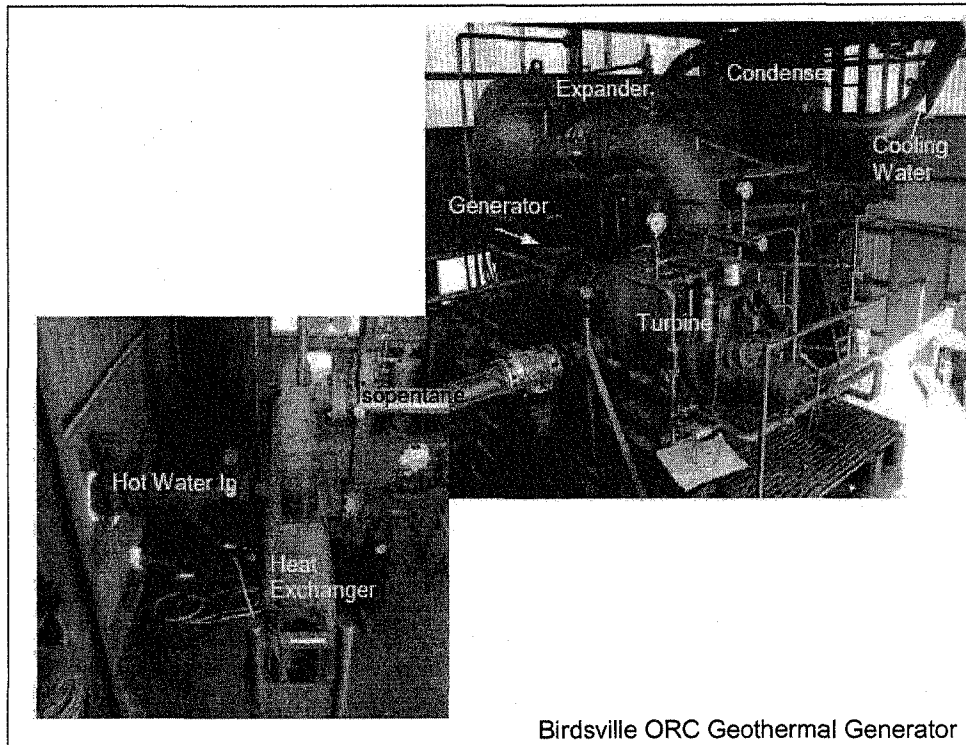
- **Wind** – Quality wind resource is limited to a few geographic sites in Queensland, wind speeds in Torres Strait are better on average but vary dramatically seasonally with the low point being the tropical summer doldrums. Wind technologies are well advanced but development has predominantly focussed on larger scale plant aimed at achieving economies of scale for large-scale grid connection. Ergon

Energy has wind turbine generators at Thursday Island and is investigating the extension of wind energy use at Torres Strait.



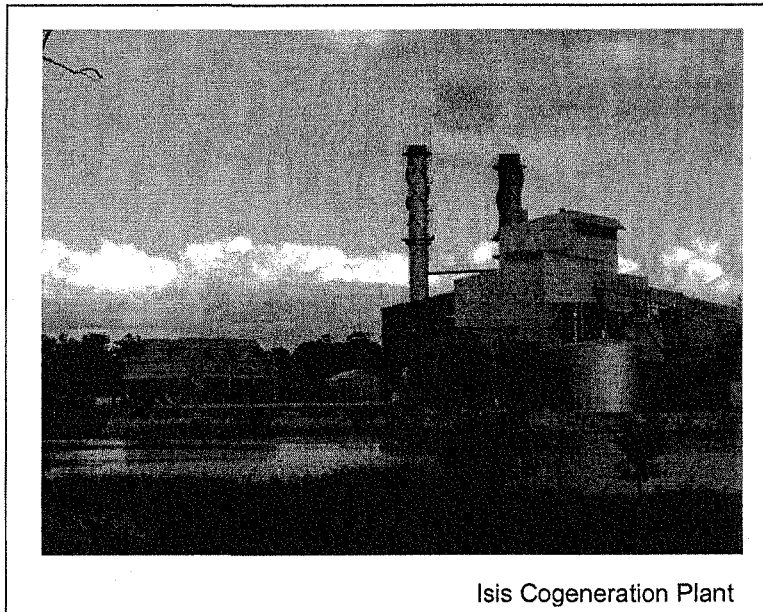
- **Geothermal** – There are two geothermal resources available in Queensland, wet (hot water from the Great Artesian Basin) and hot dry rock (geological formations deep underground). Wet geothermal resource extends from remote South-Western Queensland toward the Great Dividing Range and north in a narrow band to Cape York Peninsula. While this resource is reasonably assessable its quality in terms of power generation potential is not well known. Maximum temperatures circa 98oC in Central Australia generally drop toward the north and discharge pressures are variable and appear to be dropping with continued pastoral and community use. The upper end of temperature and pressure available are required for technically effective power generation. Ergon Energy has a small Organic Rankine Cycle system using wet geothermal energy operating in association with the Birdsville water supply. Wet geothermal is may not be regarded as a renewable resource and the uncertainty around resource quality needs to be addressed before uptake is considered. Hot dry rock exists in ‘patches’ around Western Queensland but is a very great depths which require large scale plant to provide economies of scale to

be viable to cover resource recover costs. Both wet and hot dry rock technologies are well advanced and continue to be developed, particularly in the area of resource recovery for hot dry rock. Ergon Energy is investigating extending the use of wet geothermal at Birdsville.



- **Wave/Tidal** – Wave resource is limited to the lower half of the Queensland coast, the geography of Torres Strait creates significant, regular, tidal flow resource. There are significant ecological issues to be addressed with wave and tidal energy resources. The technologies for harnessing wind and tidal energy are being developed with promising prospects emerging.

- **Biofuel** – Biofuels are produced from renewable organic sources for biomass co-generation and liquid biofuels have the potential to displace diesel fuel use. Blends of these fuels can be used in some existing diesel engines, though moderate to high fractions require some plant modification. Various sources of biofuels are being developed. Ergon Energy has previously developed two biomass cogeneration plants and is investigating the use of biofuels in our isolated system power stations.



Isis Cogeneration Plant

- **Hydrogen** – Hydrogen shows prospect as a broad-base, clean energy source of the future but significant development is required to establish it as the base of an energy economy. Ergon Energy is trialling hydrogen fuel cells as a small scale distributed energy source.

These renewable energy sources and technologies represent a value to the network business, however further development in the following areas would increase their value proposition:

- Reliable storage technologies that are cost effective, long life, high efficiency and not space intensive
- Appropriate network connection technologies to ensure safety and continued quality of supply
- Regulatory incentives and targets to foster increased usage efficiency and uptake of renewable energy
- Qualitative understanding of the value proposition of distributed energy sources and the cost of supply to the customer

Unlike many other prospects for generation of electricity, many of the renewable energy technologies have overwhelming positive public support. In particular, PV is one of the technologies that is eagerly accepted “in my backyard”.

Recommendations

To support the longer term prospects for the use of renewable energy technologies for economically viable electricity generation, storage and transmission, the following concepts are recommended:

1. Regulatory arrangements that support private and utility investment and reduce barriers to renewable energy connection
2. Incentivisation within the electricity industry to value renewable energy and distributed energy through targets directly related to renewable energy sources including minimum contribution values
3. Investment in the development of associated supporting products and structures – from suitable inverters, storage and metering technologies through to supporting standards development and regulatory programs
4. The introduction of a nationally regulated feed-in tariff for small scale distributed energy sources which incentivises the public and utilities
5. Fostering and supporting community understanding of renewable technologies
6. Linkage to best practice approaches in energy efficiency and demand management programs to ensure best value of electricity that is generated is critical
7. Incentives program must be long term to provide a suitable investment environment. Programs of at least fifteen to twenty years would need to be developed, as is similar in the investment in any large scale energy generation facilities such as coal fired power generation and nuclear power generation
8. Provide a basis for a rational comparison of traditional and renewable energy sources from end to end in the supply chain.
9. Demand behaviours and cultures have developed and been fostered to suit the base load nature of large scale coal generation. Demand behaviours and culture must be developed to suit the nature of renewable energy. That is less focus on whether or not renewable energy is base load suitable and more focus on matching demand to renewable energy availability.
10. Adoption of time of use and cost reflective retail tariffs.
11. The Business Council for Sustainable Energy (BCSE) has assembled a strong industry collective to standardise and set benchmarks for the renewable energy industry. Their involvement must be supported into the future. There will need to be independent audit or watchdog programs to best ensure the appropriate compliance with any new regulations, targets or standards, which the BCSE is well positioned to undertake.
12. Review the structure and rules of the Electricity Regulators and market controls to ensure suitability for fair play within the electricity industry of all generation sources, small and large including a regulatory regime that does not treat small generators at the same level as large scale generators
13. Review the value of the off-grid electricity industry – a significant proportion of Australia's export income comes from the pastoral industry (5th in rank) and yet this industry faces the most significant issues relating to long term livelihood, from drought and soil erosion to reliance on diesel fuel for power and remoteness from communications

and medical facilities. The Federal Government's Remote Renewable Power General Program (RRPGP) program addresses this issue to an extent, however long term access to maintenance and reliable service needs support or governance.

14. Ensure the foundation of a national information resource pool linked with international groups also working towards similar long-term objectives.
15. The possible introduction of carbon bonds to fund the long term projects that are suggested in the above points (the concept of carbon bonds is analogous to the war bonds issued in the Second World War, which was one of the last major disruptive threat to civilised society).

Conclusion

As a whole, the fostering of renewable energy technologies will result in long term advantages for the Australian economy and the people. The benefits of this support would not only be valued in our own country, but also in the many surrounding nations that can look to us for guidance. Ergon Energy believes that current renewable energy technologies can be employed to assist in our electricity generation, storage and transmission but financial incentives are required. There are significant development opportunities to increase their prospects and hence value to the electricity network of Queensland.

Addendum

Ergon Energy appreciates the valuable support that the Federal Government has already given with projects such as;

Townsville: Queensland Solar City project – Ergon Energy has commenced the Townsville: Queensland Solar City project and consider there is considerable value in the learnings it will offer to distribution businesses

Remote Renewable Power Generation Program (RRPGP) – Ergon Energy's Energy Solutions group has worked with numerous remote pastoral properties and aboriginal communities to reduce their reliance on diesel fuel through the provision of stand alone renewable hybrid power supply systems

Photo Voltaic Rebate Program (PVRP) – Ergon Energy's Energy Solutions group has worked with grid connected private customers to assist them in installed roof-top PV systems which contribute to the network – at this stage this area is only just starting to move in Queensland

Advanced Energy Storage Technologies (AEST) fund – Ergon Energy is working with a prospective project including co-funding

Renewable Energy Development Initiative (REDI) grants – Ergon Energy has supported an initiative for the development of a grid connect inverter suitable for use with storage and renewable energy input based on Australian technologies.