

N412 Global Environmental Issues

Pilbara Project – Energy (Phase 1)

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Pilbara Project – Energy (Phase 1)

Introduction

Situated in the North West of Western Australia, the Pilbara is a mineral rich region of spectacular scenery thought to be around 2.8 billion years old. The Pilbara region covers more than 500,000 square kilometers. More than 39,000 people live in the Pilbara enjoying the relaxed community life style, the magnificent climate and unique environment it provides. While most residents live in the region's towns, many choose the rugged lifestyle of the pastoral stations. The region is well known for its heritage assets and especially for Aboriginal rock art, of which there are spectacular examples throughout the Pilbara. (Pilbara Development Commission)

Electricity is the only form of reticulated energy supply available in Pilbara. (Pilbara 21 Final Strategy Report, 1992) Energy has significant impact on not only economic but also the daily life and the environment. As the draft of State Sustainability Strategy (WASSS, 2002) described, *'The use of household electricity and gas, renewable fuels, transport fuels, commercial and industrial fuels are all opportunities for addressing sustainability through providing an efficient service to the economy, helping build communities and not harming the environment.'* Because the Pilbara is a mineral rich region, it is no doubt that there is a highly energy dependent nature in its mining and energy sector. Therefore, the need of sustainable energy is about assisting local business to remain competitive with other regions, and enabling the Pilbara's communities and industrials growth. In addition, not harming the environment and its heritage assets. In the phase, will have a brief discussion on the current situation of the energy used in the Pilbara. Because it is hard to find useful data and information about this particular topic, although I will keep trying to find more useful and reliable data for the next phase, the discussion will not provide enough evidences or data which essential for the project and will focus on some crucial issues of sustainable energy.

Current energy situation

With more than three quarters of Australia's natural gas reserves, Western Australia has enough gas to last well into the 21st century. The North West Shelf Gas Project — which comprises a domestic gas supply plant and a major liquefied natural gas (LNG) export facility — is operated by Woodside Energy on behalf of itself and other partners, and is Australia's single largest resource development. The project taps enormous underground gas fields 135 km off Western Australia's coastline. In 2002, it exported around 413 petajoules of LNG, mainly to Japan. The project is also the main supplier to Western Australian gas users. (Gas in Western Australia, 2003)

The gas system is dominated by the Woodside natural gas development on the Burrup Peninsula. Alinta Gas owns and operates the 1,500km pipeline from Dampier to the South West. (Pilbara Regional Profile, 1996) The generation plants are predominantly fuelled by natural gas transmitted by the Pilbara Energy Pipeline (PEP), which runs for 219kms from Karratha to Port Hedland and has a gas free flow of 170TJ per day, and also by local lateral pipelines. (Pilbara Infrastructure) In 1998, Epic Energy completed the construction of a 24 km pipeline extension, from the North West Shelf Venture facilities on the Burrup Peninsula to the inlet for the Karratha to Port Hedland Pipeline. This has allowed natural gas to be supplied to BHP's hot briquetted iron plant at Port Hedland. (Gas in Western Australia, 2003)

The North West Interconnected System (NWIS), the interconnected electricity grid linking Karratha to Port Hedland and with lines extending to Paraburdoo, Pannawonica and Yarrie, has a total generation capacity of 400MW. Western Power, through its Pilbara Power Division, is responsible for the transmission, distribution, marketing and sales of electricity to customers through the NWIS. It provides electricity to residential and commercial customers (excluding resource companies) in the Pilbara by purchasing power from private generators in the region. (Pilbara Infrastructure) The price for both residential and business also listed below:

Residential Customers:

Supply Charge	A2	D2
Cents per day	25.57	25.57
Cents per day (each additional residence*)	19.86	19.86
Energy Charge		
Cents per unit	13.94	13.94

http://www.westernpower.com.au/html/home/your_account/pricing_and_fees/home_pilbara_pricing.html#for_residential_customers

Business Customers:

Supply Charge	L2	M2	P2	C2	K2
Cents per day	26.57	26.57	31.31	25.57	25.57
Energy Charge					
Cents per unit for first 20 units per day	17.47	16.88	20.77	13.94	13.94
Between 20 - 1650 units per day	17.47	16.88	20.77	17.47	17.47

More than 1650 units per day	15.76	15.16	20.77	15.76	15.76
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http://www.westernpower.com.au/html/business/your_account/pricing_and_fees/business_pilbara.html)

Appendix A shows the areas serviced by the Western Power. As can be seen, there are non- Western Power owned Generating stations in the Pilbara.

The private generators are Hamersley Iron Pty Ltd, whose generation plant is located at Dampier; Robe River Iron Associates located at Cape Lambert and Duke Energy Limited located at Boodarie (Port Hedland). Towns in the Pilbara not connected to the NWIS include Marble Bar, Newman, Nullagine and Onslow. These towns run on isolated electricity generators maintained or operated by Western Power. Newman’s electricity is maintained and operated by Duke Energy Limited.(Pilbara Infrastructure)

Crucial sustainability issues

Brown (2001) pointed out in his book that

‘Historically, the twentieth century was the century of fossil fuels. Coal, already well established as a major fuel source in 1900, was joined by oil when the automobile came on the scene. It was not until 1967, however, that oil finally replaced coal as the workhorse of the world energy economy. Natural gas gained in popularity during the closing decades of the century as concern about urban air pollution and global climate change escalated, moving ahead of coal in 1999 the most polluting and climate-disrupting fossil fuel, to oil, which is somewhat less environmentally disruptive, and then to natural gas, the cleanest and least climate-disrupting of the three. It is this desire for clean, climate-benign fuels—not the depletion of fossil fuels—that is driving the global transition to the solar/hydrogen age. In addition to world coal use peaking in 1996, oil production is expected to peak either in this decade or the next. Natural gas use will keep expanding somewhat longer because of its generous reserves and its popularity as a clean-burning, carbon-efficient fuel. Because it is a gas, it is also the ideal fuel

for the transition from a carbon-based energy economy to one based on hydrogen.'

The need for sustainable energy is about the transition from fossil fuels to renewable energy sources, including wind, waves, solar photo-voltaic, solar thermal (such as solar water heaters), geothermal and various biomass based fuels, (such as bio-diesel). (WASSS, 2002) It is obvious that using alternative energy resources is the trend for sustainability. Fossil fuel can be replaced by natural gas in the Pilbara. The North West Shelf Gas Project has been supplying natural gas to the Western Australian market since 1984. It ensures the state has reliable, secure, long-term energy resource. Moreover, it reduced the dependence on imported fuel and increased the security of energy supply. As mentioned, the generation plants are predominantly fuelled by natural gas transmitted by the Pilbara Energy Pipeline (PEP). In addition, *'when compared to the emissions of other fossil fuels that produce acid rain, carbon monoxide pollution, ozone pollution and photochemical smog, natural gas is cleaner would reduce urban air pollution, especially in major cities, and bring about benefits in public health such as reduced incidents of asthma and other respiratory ailments.'* (Combes & Garrity) Natural gas is sold to Western Australian consumers in the Pilbara region and in the South West via the 1540 km pipeline connecting Dampier to Bunbury. Additional pipelines that service Port Hedland and the Goldfields service other parts of the State. (Combes & Garrity) Western Power is on the way to produce efficient generation technologies such as cogeneration. These plants simultaneously produce heat and electricity from a single fuel source, natural gas. In 1999/2000, natural gas was the most common fuel used for electricity generation in W.A., representing 51% of the total fuel used (coal makes up 46%). Apart from domestic and industrial uses, electricity is generated for mining and mineral processing operations. The use of nature gas has its benefits compared to other fossil fuels. It produces far lower level of carbon dioxide and negligible amounts of oxides of nitrogen. Thus, contribute in the reduction of regional air pollution, human and environmental health, and at larger scale global warming. Moreover, the

use of nature gas also has benefits in the creation of jobs in WA as well as the revenue from exports of LPG and LNG around the world. (Combes & Garrity)

Appendix B shows the energy resources and infrastructure in WA. It seems that in the Pilbara region, there is less use of the renewable energy for electricity generation. The renewable energy such as bagasse, biogas, hydro, landfill gas, photovoltaic, and wind are not widely used in not only the Pilbara but also the WA. As Brown pointed out in his book that *'The transition from a fossil-fuel- or carbon-based economy to a high-efficiency, hydrogen-based economy will provide enormous investment and employment opportunities across the globe.'* (Brown, 2001, pp.118) Renewable energy is clean and less harm to both human and environmental health. Thus it is sustainable. Therefore, as mentioned, the WASSS addressed that sustainable energy is about the transition from fossil fuel to renewable energy resources. (WASSS, 2002) Since renewable energy has significant benefits on human and environmental health, as well as on economic scale, therefore, finding a way access to renewable energy resources seems is a crucial issue in the Pilbara.

To sum up, the two crucial issues in the Pilbara for energy use are:

- The utilisation of nature gas for energy production; industrial and commercial processes; domestic heating and transportation purposes. In addition, such utilization can lead to the decrease of green house gas emission and increase the efficiency of energy use.
- The development and infrastructure on renewable energy resources. Technologies are being involved in this stage. Moreover, environmental health and cultural heritages needed to be taken into account in the construction level.

Conclusion

The data and information about energy use and resources in the Pilbara are rare. Western Power is not playing the dominant role in the region. (Appendix A) Moreover, most of the information can be found in the libraries are more likely out-of-date; some of them were published at the late 1980s or early 1990s. The lack of

up-to-date report, data, or statistics makes it more difficult to find out the crucial sustainable issues beyond the data and information.

Moreover, the information and data has its gaps when related to other sustainability issues. How the construction of pipeline affects the nature environment and cultural heritage? What are the impacts on the local economy and the local community when talking about renewable energy and infrastructure? How can we link the dominant private power generation plants with Western Power or the sustainable aims? More effort on the information collection is needed at the following step.

References

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APPENDIX A Areas Serviced by Western Power

Areas serviced by Western Power



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|--|---|
| North West Interconnected System | Hydro Electric Generating Station |
| South West Interconnected System | Wind Farm |
| Thermal Generating Station (Western Power Owned) | Gas Turbine Generating Station |
| Regional Power Station (Western Power Owned) | Solar (Photovoltaic) Generating Station |
| Generating Station (Non-Western Power Owned) | |

(Source: http://www.westernpower.com.au/downloads/pdf/annual_report_2001.pdf)

Appendix B Western Australia Energy Resources and Infrastructure

Because the map is in PDF file, and set as cannot copy. So I can provide the URL on the digital version of the project.

The URL is: <http://www.ncc.gov.au/pdf/REGaGGPAp-004.pdf>