SUBMISSION COVERSHEET

Submissions may address any key issues related to the Infrastructure Australia agenda and/or in specific response to the topics raised in the discussion papers.

Please complete and submit this form with your submission. Where possible, *Infrastructure Australia* requests submissions are submitted electronically. Contact us:

Via email Write 'Submission' in subject field of the email and send to: mail@infrastructureaustralia.gov.au	**Via post** Address your submission to: The Infrastructure Coordinator Infrastructure Australia GPO Box 594 Canberra ACT 2601 AUSTRALIA

Organisation: Penrose Club Holdings Ltd

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Submission title: Line Upgrade Marulan to Moss Vale

Author(s): Julia McKay

No. of pages: 6

Date: 11/10/2008

Please indicate if your submission:

☒ contains NO confidential material

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Please indicate which of the following your submission covers:

☐ Issues Paper 1 — Australia's Future Infrastructure Requirements

☐ Issues Paper 2 – Public Private Partnerships

AND/OR

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- ☐ Water Infrastructure
- ☐ Transport Infrastructure
- ☒ Climate Change
- ☒ Public Private Partnerships
- ☐ Infrastructure Audit
- ☐ Infrastructure Law
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- ☐ Telecommunications Infrastructure
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- ☐ International issues
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The Infrastructure Coordinator
Infrastructure Australia
GPO Box 594
CANBERRA ACT 2601
AUSTRALIA

October 11, 2008

Dear Sir

I write this brief submission as a landholder in the Wingecarribee Shire, NSW and also as a shareholder in a company (Penrose Club Holdings Ltd) that proposes the development of a base load, combined-cycle, gas fired power station within that Shire. Major Project and Critical Infrastructure status has been accorded this project by the NSW Department of Planning and it has been entitled the "Hanging Rock Power Station". The output from this facility will be at least 300MW and, if required, could be expanded to 600MW.

Research undertaken by Penrose Club Holdings Ltd ("PCHL") reveals that Wingecarribee Shire Council is promoting a new Enterprise Corridor (Development Control Plan, August 2008) under which an area to the west of Moss Vale has been designated for light and general industrial purposes. Discussions with the Council's Economic Development Officer, Mr. Carl Pemberton, have confirmed that this Enterprise Corridor will require the supply by Integral Energy of an additional 130MW to enable industry to operate there.

The problem arises from the lack of capacity in the joint Country Energy/Integral Energy feeder line originating at the Marulan Sub-Station and terminating at the Fairfax Lane distribution sub-station.

PCHL and its partners in the Hanging Rock Power Station would be prepared to assist Wingecarribee Shire with its requirement for additional base load power. At present, the plan involves the installation of a sub-station on the PCHL property to enable an interconnect with the 330KV Transgrid system. This will involve significant expenditure by our consortium amounting to some $30 million. The power generated will by-pass the Wingecarribee Shire and feed directly into Southern Sydney and Wollongong.

Should Infrastructure Australia consider the upgrading of the Marulan to Moss Vale feeder line as a desirable project, PCHL and its partners would be prepared to offer power to the Enterprise Corridor and to the Wingecarribee Shire at large. The requirement for 130MW, of course, makes no provision for anticipated development of industrial and commercial sites in Bowral and Mittagong, nor for the increased residential development anticipated in the Shire.

The issue for Wingecarribee Council is one of demand and supply. Without the necessary electricity infrastructure, the Enterprise Corridor is unlikely to attract the industrial development that Council desires and without the industrial development, Integral Energy will not undertake the capital expenditure in the necessary infrastructure.

PCHL and its partners are not dependent upon 130MW of off-take to develop the Hanging Rock Power Station but the upgrade of the feeder line would be commercially advantageous and would also reduce the capital cost of the facility.

For this reason, the involvement of Infrastructure Australia in this project would be beneficial to all parties. The upgrade of the feeder line has not been fully costed by Integral as the corporation has told Mr. Pemberton that it lacks the resources to commit to the project at present and it does not appear to be included in any of the NSW Government agendas. However, in the general scope of infrastructure projects, this would be a minor commitment, probably less that $20 million.

This proposal could fall comfortably within any of the Guidelines published by your department – Australia's Future Infrastructure Requirements, Public Private Partnerships and General Energy Infrastructure Projects.

In conclusion, I have spoken recently with Professor Will Steffen, Director, Climate Change Institute at the Australian National University to seek confirmation of the environmental benefits of a facility such as the Hanging Rock Power Station. He concurred that, for base load power, nothing compares favourably with natural gas, particularly a co-generation plant utilizing steam for 1/3 of the power output.

Therefore, to encourage the development of the Hanging Rock Power Station through assistance to Country and Integral Energy will benefit the nation from an environmental/greenhouse gas viewpoint while simultaneously permitting the progress of industrial landuse in the Wingecarribee Shire.

I attach some references that support this submission.

Yours truly,

J.R. McKay

Julia McKay B.A., LL.B.

Excerpt from DCP August 13th 2008:

"The Moss Vale Enterprise Corridor is to be developed as a sustainable employment area in accordance with the Development Concept Plan. The Enterprise Corridor will cater for conventional light and general industrial development to meet local and regional demands for industrial land. It is also anticipated to accommodate business park commercial development and larger scale freight storage and distribution operations associated with existing rail infrastructure and a possible intermodal freight terminal. "

Comparison of Pollutants – Natural Gas, Oil and Coal:

Fossil Fuel Emission Levels
- Pounds per Billion Btu of Energy Input

Pollutant	Natural Gas	Oil	Coal
Carbon Dioxide	117,000	164,000	208,000
Carbon Monoxide	40	33	208
Nitrogen Oxides	92	448	457
Sulphur Dioxide	1	1,122	2,591
Particulates	7	84	2,744
Mercury	0.000	0.007	0.016

Source: EIA - Natural Gas Issues and Trends 1998

Definitions of Co-Generation and Combined Cycle Generation as applicable to the Hanging Rock Power Station:

- **Cogeneration -** the production and use of both heat and electricity can increase the energy efficiency of electric generation systems and industrial boilers, which translates to requiring the combustion of less fuel and the emission of fewer pollutants. Natural gas is the preferred choice for new cogeneration applications.
- **Combined Cycle Generation** - Combined cycle generation units generate electricity and capture normally wasted heat energy, using it to generate more electricity. Like cogeneration applications, this increases energy efficiency, uses less fuel, and thus produces fewer emissions. Natural gas fired combined cycle generation units can be up to 60 percent energy efficient, whereas coal and oil generation units are typically only 30 to 35 percent efficient.

An extract from a relevant German scientific article is reprinted below for the purpose of illustrating compliance with the recently published Garnaut Report Targets.

(Steam and Gas) Power Stations? [1]

by Klaus Kasper
email Klaus.Kasper@energie-fakten.de

September 2005

1 Introduction

In the middle of the 1990's, very efficient (over 38%) gas turbines with high power output entered the market. Their exhaust gases had a high temperature and could be used to produce steam in a subsequent vaporizer.

Simultaneously, natural gas prices were continuously dropping since the beginning of the 1990's and had moved close to hard coal prices. Finally, for economical and competitive reasons, big gas turbine manufacturers offered attractive prices.

As a result, it became possible to construct so-called steam-and-gas or combined cycle (CC) power stations with high ratings at low investment costs and operate them with low power generation costs.

2 Description of a power station design

Such power stations use a combination of gas and steam turbines. The fuel is natural gas (sometimes also light heating oil), which is ignited in the combustion chamber of the gas turbine. The hot combustion gases drive the gas turbine (along with the compressor) and enter a subsequent boiler while they are still very hot. This boiler is usually (except for small gas turbines) designed as a so-called waste heat boiler, i. e. without additional combustion equipment. This boiler produces steam to drive a turbine. As a rule of thumb for the gas to steam turbine power rating, an approximate ratio of two (gas turbine) to three (steam turbine) can be used. Hence, the typical ratings of CC stations vary from 350 to 400 megawatts electrical power (MWel), in case a single gas turbine is installed, or up to 800 MWel in a combination of two gas turbines with one steam turbine.

[1] www.sealnet.org in cooperation with www.energie-fakten.de; originally published January 15, 2005 in the German language by www.energie–fakten.de; English translation and editing by SEAL

The net electrical efficiency of large CC power stations can be more than 58%. The fuel – natural gas is therefore used very efficiently.

This high efficiency, in combination with the low carbon content in the fuel results in power plants with low greenhouse gas emissions – especially CO2. In this area, only nuclear power plants perform better.

The further development of gas turbine technology with respect to the achievable exhaust gas temperature promises efficiencies well above 60%. For comparison: the efficiency of state-of-the-art coal fired power stations is around 43% for lignite and 46% for hard coal.

The power generation costs of modern CC plants, vary between 3 to 3.5 cents per kilowatt hour. They are about the same to those of modern coal fired stations. Their CO2 emissions are significantly better than those of the coal fired stations but of course not comparable to those of the CO2 free nuclear plants.

3 Advantages and risks of CC power stations

CC power plants have both economical and environmental advantages, in addition to their simple design and their wide application potential.

The share of capital cost and fixed operating costs in the total power generation cost is very low – not least on account of the low staff cost (about one fifth of those in coal fired stations are needed). They are about half of those of a conventional coal fired power station.

The specific CO_2 emission per kWh, too is about 50% lower than with hard coal. In addition to the high efficiency, the low carbon content of the fuel contributes to this.

Initially, all significant gas turbine producers (ABB, today ALSTOM, Siemens, General Electric) had problems with the advanced big gas turbines, but these have meanwhile been overcome. The remaining risk with CC plants is of an economic nature. It arises from the high share of fuel cost in the total power generating cost and therefore from the gas price level and its development.

However, this risk may reduce in the future when other fuels become more expensive through a higher cost for emission certificates[2]. Then CC plants would achieve the lowest power generation costs after nuclear power stations, and substantially lower than lignite and hard coal fired stations, not to speak of wind and especially - extremely expensive solar power plants (photovoltaic installations).

[2] higher than with the present allocation plan

4 Market and investment perspective

Depending on natural gas price, CC power plants can operate in a versatile manner. Natural gas prices are varying heavily with an upward tendency, other than the price for imported hard coal. For instance, from 1991 onwards they have varied[3] between e6 and 17 per megawatt hour MWh (1 MWh = 1,000 kilowatt hours), while within the same time range coal prices have stayed within a narrow span of e4 to 7 per Mwh.

A CC plant also provides advantages with respect to heat supply[4] because the so-called electricity factor, i. e. the ratio of the electricity produced to the amount of heat generated is about 1 (i. e. 1 kilowatt kW of power comes along with 1 kW of heat, instead of 0.2 or 0.3 for a power plant operating only with a steam turbine.

For the corresponding heat supply, however, a demand for a sufficient amount of heat must be ensured in the long run.

Therefore the application field for CC installations varies from peak load reduction (few 100 full load equivalent hours per year h/a) to the upper medium load operation (up to about 4 000 h/a), to heat-controlled operation (about 5 000 h/a) right up to industrial full year operation and hence also into the base load range of power supply.

Typical of the last case was the decision for the construction of almost 20 000 MW capacity in the UK during the second half of the nineties. The prime objective was to replace the old, environmentally damaging coal fired power plants quickly, economically and in a competitive manner. The availability of cheap North Sea natural gas facilitated this strategy.