5. Project objectives and need

5.1 Project objectives

The key objectives of the project are to:

- provide electricity at relatively short notice during periods of peak demand
- provide electricity using best available technology and with low greenhouse gas emissions
- optimise use of existing electricity supply infrastructure
- establish electricity supply that is market-competitive and consistent with current trends and future energy demands
- produce socially acceptable environmental outcomes
- locate the project in proximity to an existing electricity grid.

5.2 Strategic direction of the nation and the state in relation to energy supply and demand

5.2.1 Australia

The Commonwealth Government released the *Energy White Paper* (White Paper) in 2004, establishing the policy framework for development of the energy sector in Australia. The White Paper lists three main objectives: prosperity, security and sustainability. In order to achieve these goals, the Government has put in place policies to do the following (as outlined in the White Paper):

- attract investment in the efficient discovery and development of our energy resources for the benefit of all Australians
- deliver a prosperous economy while protecting the environment and playing an active role in global efforts to reduce greenhouse gas emissions
- encourage development of cleaner, more efficient technologies to underpin Australia's energy future
- develop effective and efficient energy markets that deliver competitively priced energy, where and when it is needed in the future
- minimise disruptions to energy supplies and respond quickly and effectively when disruptions occur
- establish an efficient energy tax base, restricting fuel excise to end use and applying resource rent taxes to offshore projects
- ensure Australia uses its energy wisely.

5.2.2 NSW

In 2004, the NSW Government released the *Energy Directions Green Paper* (Green Paper), which described the current and future trends for energy demand in NSW. The Green Paper was aimed at generating discussion and debate within relevant NSW Government agencies, energy generators, retailers and distributors, and the general community about potential energy supply strategies. These energy supply strategies could then be implemented to address the pending shortfalls in reserve energy capacity that are predicted to occur in the near future, unless new generation and demand management strategies are developed and implemented, particularly during peak demand periods (NSW Government 2004).

The Green Paper clearly states that peak energy demand in NSW is growing at a faster rate than average demand. This diverging trend between average (or base) load and peak load demand profiles can generally be attributed to the sustained period of strong economic growth and prosperity that has been occurring in Australia over the past 10–15 years (NSW Government 2004).

This trend has resulted in an increasing demand for electrical services across all sectors of the economy, in particular the residential sector, where increased affordability and affluence are expected to continue to drive demand for electrical goods, such as air conditioning units, which are considered to be one of the major contributors to the increasing peak demand loads experienced during hot summer days (NSW Government 2004).

The Statement of Opportunities (2007a) report produced by the National Electricity Market Management Company (NEMMCO) confirms the trends depicted in the Green Paper and forecasts that NSW is likely to experience a summer peak deficit or shortfall below the low reserve condition by 2013–14, unless additional generation capacity is provided to cater for this deficit.

In September 2007, the NSW Department of Premier and Cabinet released an inquiry into electricity supply in NSW ('the Owen Inquiry Report'). The report states that NSW currently uses more energy than any of the other states, with consumption at 79,030 gigawatt per hour (GWh) (2005-2006). It supports the Statement of Opportunities projections that demand for electricity in NSW will exceed supply by 2013–14. As such, the report suggests that new generation, primarily in the form of base load generation, be developed now in order to meet the expected future demand (Owen 2007).

Based on the forecasts provided in the Statement of Opportunities, ERM Power has identified the need to provide additional generating capacity to meet the likely short- to medium-term shortfall in electrical supply during peak demand periods.

5.3 Need for the project

NSW had approximately 12,800 megawatts (MW) of electricity generation capacity, as of 2004, at any point in time to meet market demand for electricity (NSW Government 2004). Energy consumption in NSW has, however, been increasing by approximately 1,700 GWh per year for the past 30 years. Over the last 15 years, NSW has had access to surplus generation capacity from other states, as well as locally. Energy consumption has continued to grow, however, and this surplus had decreased significantly (Owen 2007). New generation is, therefore, required in order to ensure that the consumption of energy does not exceed supply.

There are three types of electricity demand: base load demand, intermediate demand and peak demand. Base load demand is a measure of the demand that occurs most of the time. Intermediate demand occurs during 'shoulder' periods of reasonably high demand, which might occur up to 60–70% of the time. Base load and intermediate demand are collectively referred to as 'average demand'. Peak demand generally occurs when a large number of users demand energy at the same time, such as the widespread use of air conditioning or heating units during times of very high or very low temperatures. These peak demand periods tend to be of relatively short duration (3–4 hours), but with significantly higher loads than average demand periods (NSW Government 2004).

Average electricity demand in NSW is 8,787 MW, while maximum peak demand is 13,458 MW (NEMMCO 2007b). Current trends indicate that this peak demand is growing at a much faster rate than average demand. In NSW, summer peak demand has grown by 3.8% or 500 MW per year from 1999 to 2004, whereas average demand growth has been significantly slower at around 2.8%. This demand growth is predicted to continue for a number of years and is expected to reach a critical point in 2008/09, when demand forecasts indicate that there is likely to be a shortfall in reserve capacity (NSW Government 2004).

Failure to address the predicted supply-demand shortfall would have significant social and economic impacts to NSW, due to the increased unreliability of the electricity supply network during these critical periods, resulting in more frequent black outs and increased costs to electricity retailers and consumers.

Peak-load or peaking plants can supply electricity to the grid at very short notice during these relatively short, high intensity, peak demand periods. The Green Paper (NSW Government 2004) identified the use of these types of plants as one of the most effective short-term measures that could be implemented to avoid supply shortfalls during peak demand periods, until new base-load generation is able to meet the demand. The Green Paper further identified that peaking plants are known to have lower capital costs than base load and intermediate plants.

The gas-fired power station proposed by ERM Power would be based on an open-cycle gas turbine configuration with dry low oxides of nitrogen burners, which would be well suited to peak-load operation.