FACTSHEET

AUSTRALIAN ELECTRICITY GENERATION TECHNOLOGY COSTS – REFERENCE CASE 2010

A technical report commissioned by the Australian Government as part of the Energy White Paper process.

This report provides a data set to examine the cost and performance of globally available electricity generation technologies in Australia.

KEY POINTS

- This report provides a publicly available reference set of Australian electricity generation technology cost curves.
- The Reference Case 2010 was prepared for the Australian Government by the Electric Power Research Institute (EPRI).
- The report reviews a range of expected electricity generation technologies in Australia in 2015 and 2030.
- This report provides a commonly agreed reference set of cost and performance data for a range of globally available and emerging electricity generation technologies that can be used when modelling the Australian stationary energy sector.
- The Reference Case 2010 finds that the costs of electricity generation technologies will change in coming years. In particular, emerging low emission technologies may experience fairly significant cost reductions in coming decades.
- It is the Government's intention that the technology cost estimates as part of this report will be regularly updated and released to ensure the public remains well informed. It is intended that the next update will be in 2011.

BACKGROUND

Australia has access to low cost, reliable energy resources that, historically, have underpinned Australia's economic growth and prosperity.

Reducing greenhouse gas emissions presents a challenge for our energy sector, particularly electricity generation, and the need to reduce emissions is already changing the way we produce, transport and use energy.

EPRI was commissioned by the Australian Government as part of the Energy White Paper process to undertake a technical and economic evaluation of a range of electricity generation technologies and their development status in Australia.

The Reference Case 2010 is the third document published in the series of technical reports developed as part of the Energy White Paper process.

The other two key analytical reports developed as part of the Energy White Paper process, published to date include:

- The **Australian Energy Resource Assessment** (AERA), that was prepared by Geoscience Australia and the Australian Bureau of Agricultural and Resource Economics, and was released on 1 March 2010. The AERA brings together, in one place and for the first time, a comprehensive understanding of Australia's rich energy resource endowment.
- The **Report of the Prime Minister's Task Group on Energy Efficiency** that was released on 8 October 2010. The report provides advice on the development of policy that can increase energy efficiency outcomes in the Australian energy context.

The Reference Case 2010 establishes a piece of work that will enable data and information on electricity generation technologies in the Australian energy sector to be revised and published periodically. In light of the changing costs and performance of these technologies, this will ensure the latest information on new and emerging technologies is available in Australia to inform policymakers and the public.

It is the Government's intention that the technology cost estimates as part of this report will be regularly updated and released publicly. It is intended that the next update will be in 2011.

The Report is already being used as a key input to the work of the Australian Energy Market Operator, including:

- The National Transmission Network Development Plan – to be released on 15 December 2010;
- Electricity Statement of Opportunities; and
- Gas Statement of Opportunities.

The report and periodical updates on progress will be available at www.ret.gov.au.

The Government intends to release further work in coming months as part of the Energy White Paper process.

REFERENCE CASE 2010 APPROACH

The report provides two data sets in the Australian context:

- Technology cost and performance data, providing a common information set, agreed by a reference group of Australian stakeholders, which can be used when undertaking stationary energy sector modelling and analysis; and
- The levelised cost of electricity technology analysis, enabling a comparison of a basket of globally available technologies using a common set of assumptions in 2015 and 2030.

The results of the report are dependent on input data, parameters and assumptions, and interpretation of the results should take into account the assumptions and inputs outlined in the body of the report at the time of preparation.

Also of importance in interpreting the results is the implication of the relative position of each technology on the capital cost learning or 'Grubb' curve. As a technology matures the accuracy of performance and cost estimates tends to improve.

Figure 1: Capital Cost Learning Curve or 'Grubb' Curve

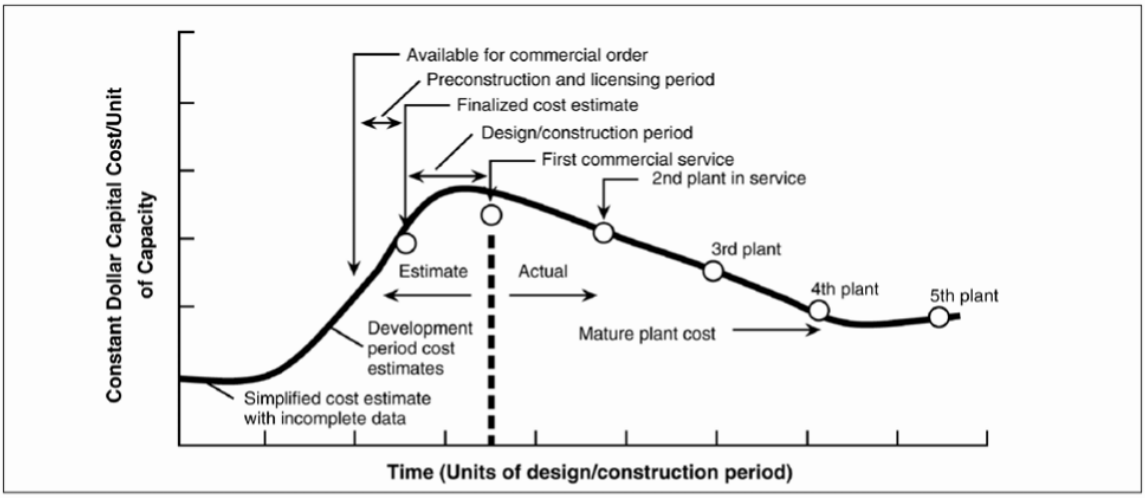

Figure 1 above illustrates the sequence of steps in the development of technologies, and the potential impact on cost. According to this curve, technology costs generally fall as deployment occurs through both learning and through economies of scale.

Electricity generation technology cost estimates are always subject to uncertainty. This is typically an area where different industry participants can often have very different views.

At the research and development (R&D) level, technologies face a higher degree of both technical and estimation uncertainty than mature technologies. The degree of the uncertainty depends on the number of new and novel parts in a technology and the degree of scale up required for commercial deployment.

The technologies analysed in the Reference Case 2010 have different levels of technical maturity, resulting in different levels of cost and performance uncertainty, and hence different levels of potential learning related cost reductions.

KEY FINDINGS

Costs for new and less mature renewable and low emission technologies are expected to decline more rapidly than mature technologies that typically emit higher levels of greenhouse gas emissions.

Global market conditions and supply and demand for individual technology components are a significant source of uncertainty, and are expected to continue to have a significant influence on all technology costs into the future.

The levelised cost provides a mechanism to rank the cost of different generation technologies, based on a common set of assumptions. The levelised cost and technology performance data for 2015 and 2030 are summarised in Figures 2 and 3. These figures also show the relative CO2 emissions intensity of different technologies. The levelised costs do not model the implications of a carbon price.

It should be noted that the inclusion of particular technologies in the basket shown below does not reflect Government policy decisions regarding the deployment of particular generation technologies.

Figure 2: Technology Cost Ranges (2015)

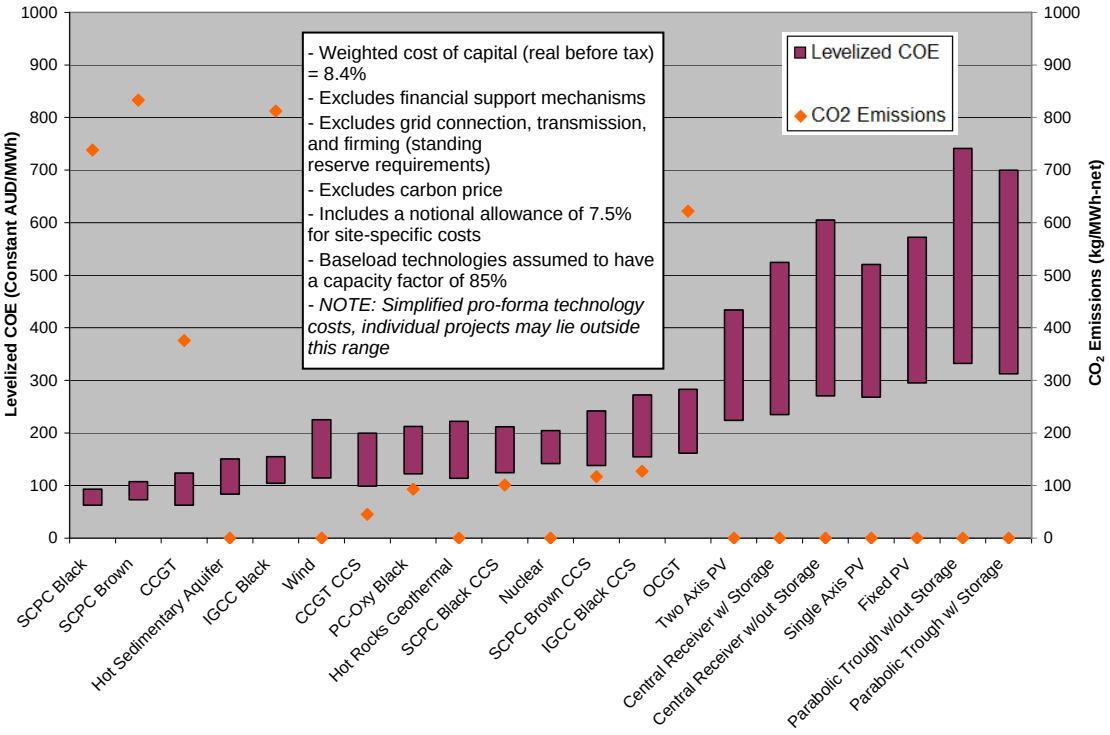

Figure 2 above shows that in 2015 mature technologies are generally at the low end of the cost range with the exception of Open Cycle Gas Turbines (OCGT). Also of note is a significant jump in costs between OCGT and solar technologies - which are unlikely to be able to compete in the absence of other supporting measures.

Figure 3: Technology Cost Ranges (2030)

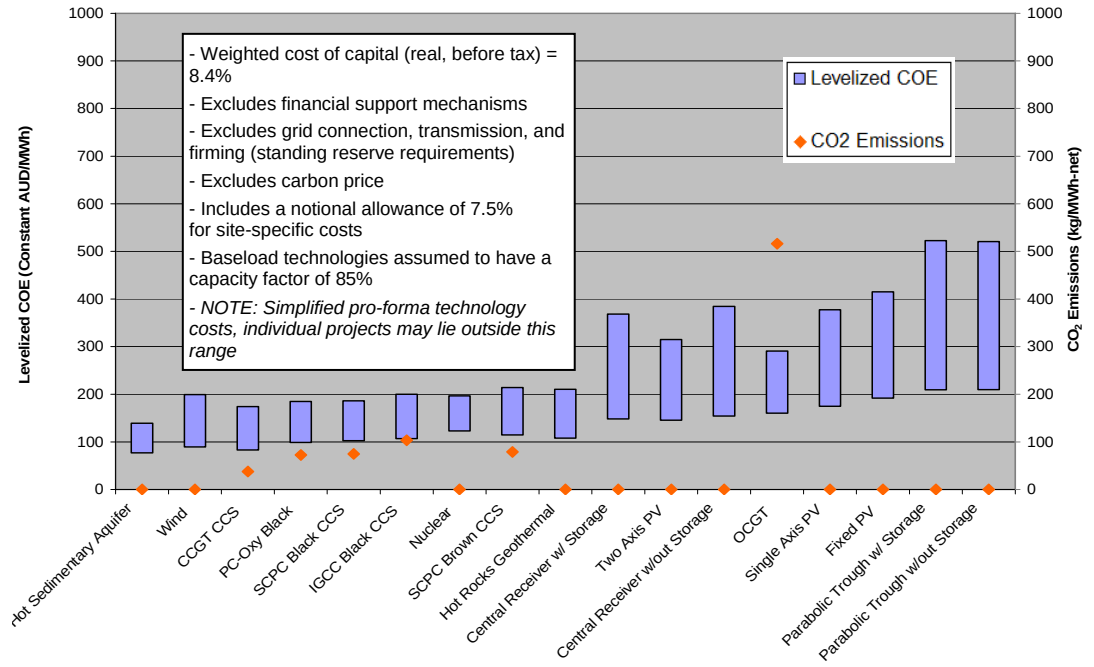

Figure 3 above shows that the overall band of levelised costs across all technologies narrows considerably by 2030. This is largely driven by the fact that the emerging technologies at the top end of the range in 2015 have more significant cost reduction opportunities than the more mature technologies.