

EFFICIENCY STANDARDS FOR POWER GENERATION IN AUSTRALIA

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I would like to thank the UNFCCC for inviting me to speak here today at your workshop on best practice in policies and measures.

In my presentation today I will be covering key issues relating to the Efficiency Standards for Power Generation measure. These are:

- Objectives of the measure
- Technical advice
- The technical working group
- Recommendations of the working group, incorporating:
 - coverage of the measure
 - performance based standards
 - standards for new plant
 - the implementation model
 - additional benefits of the measure

Prior to focussing on the measure, I would like to provide a short background on the role of the Australian Greenhouse Office and the importance of power generation in addressing greenhouse reduction in Australia.

The AGO Context

The Efficiency Standards for Power Generation measure was announced by the Australian Prime Minister in November 1997 as part of the 'Safeguarding the Future' statement. The Statement included a \$180 million package of greenhouse response measures, a comprehensive range of initiatives focusing on major greenhouse sources, sinks and solutions. Efficiency Standards for Power Generation is one of 86 measures subsequently incorporated into the National Greenhouse Strategy. The Statement included the establishment of the AGO, a world first, responsible for coordinating Australia's domestic climate change policy and delivering key domestic greenhouse response measures.

The Commonwealth Government has recently reinforced its greenhouse commitment, announcing an increase in funding to almost a billion dollars during 2001-2004 for addressing greenhouse issues.

The Greenhouse Implications of Power Generation in Australia

Australia produces just over 400 million tonnes (excluding land use change) of greenhouse gas emissions a year. According to expert advice, in calendar year 1998, fossil fuel based power generation accounted for about 160 million tonnes of greenhouse gases. In other words, power generation accounts for over one third of Australia's total emissions.

Therefore, reducing emissions from fossil fuel power generation is central to reducing Australia's overall greenhouse gas emissions.

Objectives of the Measure

The key objectives of the Efficiency Standards for Power Generation measure are to:

- Achieve movement towards best practice in the efficiency of fossil-fuelled electricity generation; and
- Deliver reductions in the greenhouse intensity of energy supply.

The best practice performance that can be achieved depends largely on the fossil fuels used, the latest proven technology that is available and improving the performance of existing power generation assets.

Technical Advice

In 1999 the Australian Greenhouse Office engaged international and domestic experts to provide technical advice on potential standards and analysis of the economic implications of the measure. The experts covered all the fossil fuel types and focussed on:

- Identifying world's best practice generating efficiency
- Benchmarking Australian plants likely to be affected by the measure
- Recommending potential efficiency standards for Australian fossil fuel generators.

Their reports identified potential annual greenhouse savings of about 4 million tonnes that was achievable under the measure, which represents approximately 3% of current generator emissions. This savings figure is supported by industry.

The Efficiency Standards Working Group

The Australian Greenhouse Office recognises the importance of effective consultations with key stakeholders and the wider community in the development of equitable and workable programs.

In this context, an Efficiency Standards Working Group (ESWG) was established during 1998 to develop recommendations to government on the measure. This group comprised representatives from the Commonwealth, State and Territory Governments, industry associations and energy users. The ESWG has recently completed its final report on the recommended model for the measure.

Coverage of the measure

The Efficiency Standards measure covers businesses that:

- use brown coal, black coal, natural gas and other fossil fuels
- generate power using existing, refurbished or new plant
- sell power to the grid or are self generators that use it internally
- have a total installed plant capacity of 30MW electrical or above
- output of 50 Giga Watt hours per year (sent out electricity) or above each year over three successive years
- an annual capacity factor of 5% or above each year over three successive years.

The threshold of 30MW captures approximately 98.5% of power generation in Australia, whilst the output of 50GWhr/yr and 5% capacity factor leads to the exclusion of emergency and standby plant. Many of the plants not captured tend to be small and operate on less carbon intense fuels such as natural gas.

Performance based standards

The technical guidelines for the measure will play an important role in successfully implementing the measure. Consequently, the AGO undertook a rigorous process to ensure that the guidelines are technically sound.

The Australian Greenhouse Office commissioned independent experts to develop technical guidelines for the measure. The development process for these guidelines included peer review, a roundtable with fossil fuel power experts from across Australia, review by an independent consultant and a field trial at a major power station.

The guidelines will be used by businesses affected by the measure to determine their plant performance. They provide a common methodology for all the fossil fuels and take into account plant specific factors such as the age and type of plants. From this

the best practice performance and actual performance of the individual plant is determined.

The ESWG considered two options for measuring the performance of plant – emissions efficiency and thermal efficiency – and recommended an emissions efficiency standard. It is calculated as tonnes of carbon dioxide equivalent per megawatt hour sent out. This approach provides:

- a clear indication of the business' greenhouse performance; and
- affected businesses with a wider scope to undertake actions to reduce their greenhouse intensity.

Up to 10% of electricity generated by a power plant is used internally. As the emissions based approach is calculated on electricity sent out by the plant, this should encourage a power plant to minimise its internal usage of electricity.

Standards for new plant

Standards were set for Australia by looking at world's best practice in power generation and then adjusting that performance to Australian conditions. For example the natural cooling water conditions of the Baltic Sea cannot be reproduced in Australia. Hence thermal efficiencies will be lower in Australia than in some other locations.

The starting point for determining standards for new plant is:

- black coal - CO₂ equiv of 42% HHV (Higher Heating Value) (supercritical)
- brown coal - CO₂ equiv of 31% HHV (supercritical)
- gas plant
 - Combined Cycle Gas Turbine - CO₂ equiv of 52% HHV
 - Open Cycle Gas Turbine - CO₂ equiv of 36% HHV
- other fossil fuels – based on best practice for type of other fossil fuel

Australia has extremes in climate that impact on the performance of power stations, more so than is the case in Europe. Factors such as access to cooling water and ambient temperatures differ markedly across regions, and these need to be taken into consideration in determining standards for new plant. For example, were a combined cycle gas plant constructed in Darwin it might achieve a thermal efficiency of about 40%. Were the same plant constructed in South Australia, it could achieve an efficiency of about 50% due to average air temperature.

Implementation model

The ESWG considered both regulatory and voluntary options for implementing the measure. It has recommended that the measure be implemented as a voluntary

program based on legally binding five year contracts between the Commonwealth and affected businesses incorporating plant specific standards. Further development has provided an outline for the process including specific timeframes:

- Businesses agree to determine their current performance within 6 months
- Undertake feasibility studies and identify agreed options to improve the plant within 24 months.

If the plant is currently performing at best practice, the contract will include an agreement to maintain the performance of the plant.

Government is currently considering this model.

Audits

To ensure that the credibility of the measure is maintained, businesses are expected to be audited by an independent third party at least once during the five year contract period.

Review of Standards

Emission efficiency standards need to be reviewed as a demonstration of commitment to continuous improvement. This will ensure their application responds to external and internal influences that may include technological advances, commercial pressures and changes in social and political factors. The standards are to be reviewed every 5 years to encompass these developments.

Additional benefits

The implementation of the Efficiency Standards measure will provide a number of benefits for industry:

- A greener image for the power generation industry as a whole and for the individual businesses
- Potential fuel savings from increased efficiency in the operation of plants
- Best practice in measuring the performance of plants
- Strategic information to assist businesses in determining the medium and longer term
- Early positioning in the event of an emissions trading scheme.

Conclusion

In closing, Australia faces significant challenges and opportunities to address greenhouse, and particularly in energy. The Efficiency Standards measure represents a crucial part of this challenge. Thanks to the ongoing efforts of the Commonwealth, State and Territory Governments and industry, a framework has been recommended that contribute to meeting our share of the global burden in greenhouse gas abatement. Australia needs to focus on achieving world's best practice in efficient use of our fossil fuels. This measure provides a technically sound approach that balances both economic and environmental outcomes.

Through measures such as Efficiency Standards, Australia is at the forefront of greenhouse gas abatement into the new millennium.