NATIONAL GENERATORS FORUM

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EEO Review
Energy and Environment Division
Department of Resources, Energy and Tourism
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Lodged via energyefficiencyopportunities@ret.gov.au

Dear Mr Lewis

Energy Efficiency Opportunities Program Review

The NGF welcomes the opportunity to make this submission to the Review of the Energy Efficiency Opportunities (EEO) program.

As you know, the NGF believes that should the Government introduce a carbon price this measure will make the EEO program redundant.

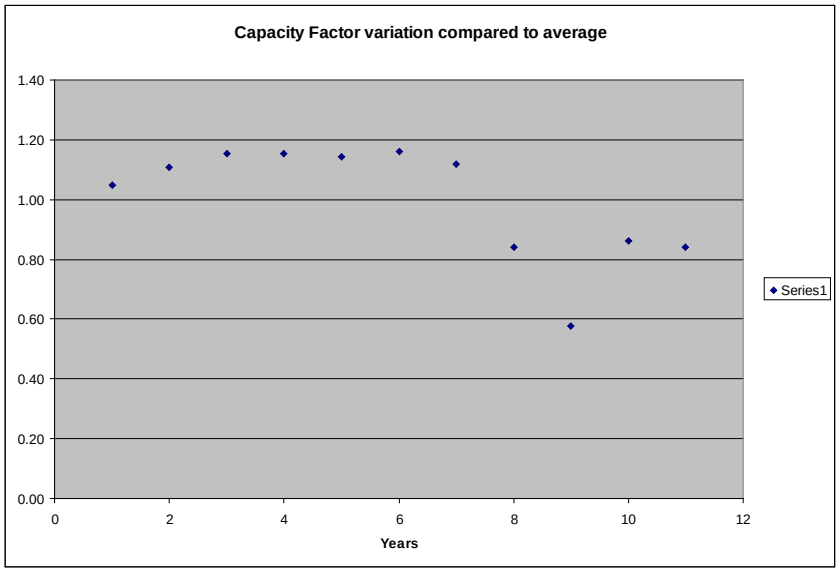
With the extension of the EEO program to the electricity generation sector for the program's second cycle, the NGF wishes to address two matters which would aid the application of the program to the sector – the need for flexibility in the baselines for assessments and the threshold for exemption of marginal processes from assessments.

Baselines for assessments

The generation sector would support flexibility in the development of baselines for reporting. The current requirement for 24 months of data may be appropriate on some sites but, in other cases, it may be more accurate for businesses to provide data over a longer period. To avoid producing a misleading baseline, the NGF proposes that generators be given the option to choose either the 24 month baseline or a longer timeframe (48 months or more) to achieve a baseline that is not unduly influenced by large variations in electricity production caused by internal and external factors.

The following case study provides the rationale for this proposal.

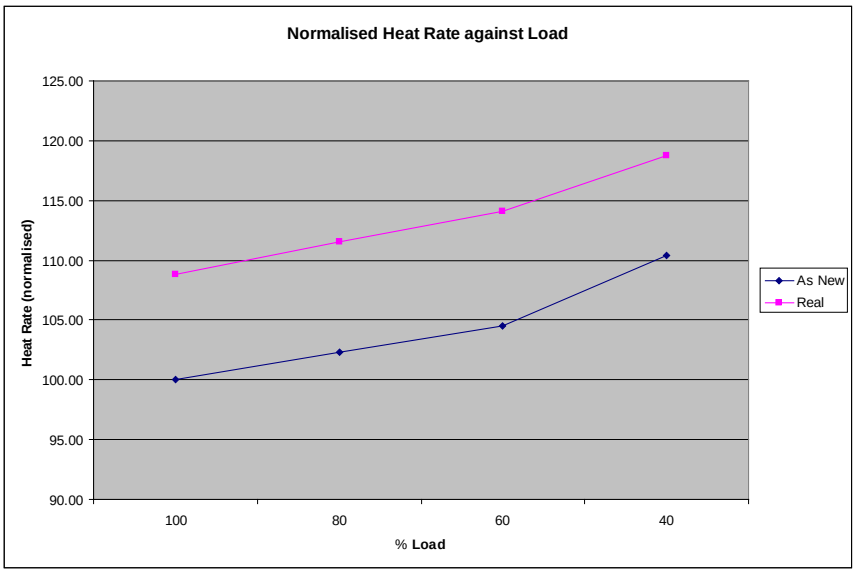
The graph below shows the variation in capacity factors of Tarong Power Station over the last 11 years. The data has been normalised using the average capacity factor over the period. During the first seven years of operation within the NEM the power station operated at close to full output, with units taken offline for overhauls according to maintenance schedules. Over the next two years, output was severely impacted by the drought (years 8 and 9). The last two years show the impact of a change in operating regime which resulted in reduced output.



Energy use, or efficiency, is measured by a generator's heat rate[1] and depends on the generator's output level. A plant operating at reduced load will have a higher heat rate (lower efficiency) than when operating at full load, where it is usually most efficient.

If a baseline is chosen using a period of unrepresentative operation, the efficiency of the plant may be misrepresented and efficiency improvement assessments may in turn be distorted.

The following example demonstrates the variation of heat rates at different loads and how the actual heat rate differs from the acceptance test (as-new plant design) level[2]. The figures in the graph have been normalised using the acceptance test heat rate at full load as the base.



[1] Heat rate is a measurement used in the energy industry to calculate how efficiently a generator uses heat energy. It is expressed as the number of BTUs of heat required to produce a kilowatt-hour of energy. Operators of generating facilities can make reasonably accurate estimates of the amount of heat energy a given quantity of any type of fuel will produce, so when this is compared to the actual energy produced by the generator, the resulting figure indicates how efficiently the generator converts that fuel into electrical energy.

[2] Acceptance testing generally involves a number of tests at various loads over a period when the plant is operating as stably as possible. Ideally, ambient conditions will be as per design but usually some correction has to be made to the tests result to account for any variation. The tests are normally done to a Standard and will often have been the subject of a contractual agreement.

The large variation between acceptance test and actual practice results is due to many factors. Acceptance tests are generally performed on a particular part of the plant only and do not include other components such as coal, ash and water treatment operations. Plant performance also deteriorates over time and cannot be brought back to new conditions without uneconomic capital expenditure.

A baseline based on a longer timeframe than 24 months will normalise the above mentioned irregularities that typically occur in the generation industry.

Assessment threshold
Under the current program, activities using less than 0.01PJ/year are not required to be included in a site assessment. The NGF submits that while this threshold may be appropriate for businesses that have participated in the program to date, it is not appropriate for electricity generation businesses.

The combustion of coal represents about 99% of a typical coal fired power station's energy use. Energy use from other sources is not significant in the overall context of electricity production. An assessment of the remaining energy use and potential savings from this area would come at a disproportionately high cost with little gain and will not be cost-effective, as required under the EEO Act.

Moreover, EEO assessment of a multitude of minor systems at a power station, even if they were to result in the potential saving of 50% or even 100% of their respective component energy consumption in aggregate will never amount to a saving which exceeds the uncertainty of measurement of the generator's main fuel stream energy consumption. Consequently, it is the efficiency of energy consumption in the main fuel process stream which ought to be the focus of EEO assessment for generators.

Some examples relating to a 0.01PJ energy use at a power station include:

1. A four unit power station of 1,400MW capacity will produce 11,773GWh of electricity per year if operated at 96% capacity factor. At an assumed heat rate of 10GJ/MWh this represents 117PJ of energy consumed. An energy usage of 0.01PJ is thus less than 0.01% of the station's yearly energy usage.

2. A typical budget for fuel oil (used for plant and mill starts) is 1,000 tonnes per annum. Fuel oil (diesel) has an energy content of approximately 43MJ/kg, so this represents 0.04PJ of energy use per annum. This is greater than the current threshold but still represents only 0.03% of the station's energy usage.

3. Many power stations will import power directly from the external electricity grid to operate specific station equipment. A typical power station may use around 50GWh of power from this source. At an equivalent heat rate of 10GJ/MWh this represents 0.05PJ for the year, or 0.04% of the station's energy use.

4. Power stations also use internally generated electricity to operate auxiliary plant such as fans, pumps and electric motors. At a conversion rate of 10GJ/MWh, 0.01PJ of coal is equivalent to a 114kw electric motor operating for one entire year. A 1,400MW station described above will have around 120 motors greater than this size, many of which operate whenever the plant is in service. Of these motors 40 will be greater than 1MW capacity. Ancillary plant such as coal conveyors will have a similar number of motors greater than the 114kw, approximately 150 motors in total. Moreover, almost all motors installed in a power station are sized and rated to last the full life of the station; that is, it is not intended to ever replace them.

Assessing each of these individual items would be costly, intensely time consuming and would not produce cost effective energy savings.

A more cost effective approach, which would guarantee assessment of virtually all energy use in generation, would be to require participating business to assess 98% of their energy use. This would ensure resources and attention are focused on main fuel use where the potential to achieve cost effective efficiency gains is greatest.

The NGF appreciates the opportunity to make this submission to the review of the EEO program. If you have any queries in respect of this submission, please contact me on (02) 6232 7789.

Yours sincerely

Malcolm Roberts
Executive Director