



## Further supplementary Submission

in response to

### Environment Protection Authority's Review of Latrobe Valley brown coal power station licences

Following the release of the power station operators' (**the Generators**) responses to the submissions made to the EPA and their air modelling report prepared by GHD dated August 2018 (**the GHD Report**), the EPA agreed to allow further submissions to be made in response to these reports.

We take the opportunity to make this further supplementary submission.

In response to the Generators' responses to community submissions and their joint GHD Air Modelling Report dated August 2018, Environmental Justice Australia obtained the following expert opinions, which we include and rely on as part of our submission:

- A. Bruce Buckheit dated September 2018 (**the Buckheit Report**);
- B. Dr Ranajit (Ron) Sahu dated 6 September 2018 (**the Sahu Report**); and
- C. Dr H. Andrew Gray dated 19 September 2018 (**the Gray Report**).

## Summary

- In circumstances where the Generators' have demonstrated non-compliance with the legislative framework, the *Environment Protection Act 1970 (the Act)* requires the EPA to provide specific guidance and update licence obligations to ensure compliance.
- Save to the extent that the GHD Report and modelling demonstrates that there is non-attainment of the standards, the EPA should not rely on the GHD Report or the modelling to inform their decision making with respect to the licence amendments.
- The State Environment Protection Policy (Ambient Air Quality) (**SEPP (AAQ)**) requires the PM 24-hour average to stay below the standard with *no allowable exceedances* – this is not being met and so further controls are required.
- When modelled in accordance with the US EPA Guidelines, the modelling supports the conclusion that the Power Stations actual SO<sub>2</sub> emissions cause exceedances of the 1-hour SO<sub>2</sub> standard.
- The EPA must include CO<sub>2</sub> limits in the licences to bring the Generators into compliance with the Act.
- In view of the actual exceedances of the standards, the modelled exceedances of the standards, and the Generators failure to continuously improve their environmental performance or apply Best Practice to the management of their emissions, the EPA has a statutory duty to amend licence conditions to reduce air pollution from the Power Stations under review.

## A. The Generators have failed to pursue continuous improvement and apply best practice management to their emissions.

Clause 18(3) of the SEPP AQM states that Generators must:

- a) Pursue continuous improvement in their environmental management practices and environmental performance; and
- b) Apply best practice to the management of their emissions or, if they emit Class 3 indicators, reduce those emissions to the maximum extent possible.

Clause 19 of the SEPP AQM states that a generator of a new or substantially modified source of emissions must apply Best Practice to the management of their emissions.

For the reasons discussed below, each of the Power Stations is substantially modified within the meaning of the SEPP (AQM).

The Sahu Report notes that a typical design life for a power plant is 30 years. However, over the period of 24 to 43 years of operation the Generators have failed to install any additional pollution reduction control technologies.

During the Section 20B conference, representatives of each of the Generators confirmed that the Generators mistakenly consider these obligations as limited to increasing efficiencies in their generation capacity, namely through turbine upgrades and reducing facility load demand.<sup>1</sup>

Turbine upgrades have the effect of prolonging the life of the power stations. As noted in the Buckheit Report<sup>2</sup>, these modifications, which have the effect of increasing their output and prolonging their lives, puts them within the definition of a 'substantially modified' source of emissions. The Power Stations are therefore subject to the more onerous obligations imposed by clause 19 of the SEPP (AQM).

Notwithstanding the above, it is obvious that the Generators have failed to comply with either clause 18 or clause 19 of the SEPP (AQM).<sup>3</sup>

EJA note the Generators' claims with respect to their contribution to pollution loads (in particular particulate matter), the technological barriers and the costs associated with installation of pollution controls. The Sahu Report and the Buckheit Report, both state that there are no barriers (aside from cost) to installing pollution reduction technologies which have been commercially available for decades and are required in (old or new) power stations across Europe and US.

By way of example, Loy Yang A was commissioned in 1984 and has a notional closure date of 2048. It is therefore currently 34 years old and will be 64 years old in 2048, when it is slated for closure. The Sahu Report states that as at the present time Loy Yang A is one of the most poorly controlled coal-fired power stations in the world.<sup>4</sup>

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<sup>1</sup> See also AGL's response in News.com.au article on 21 September 2018 <<https://www.news.com.au/national/breaking-news/experts-slam-vics-power-plant-pollution/news-story/e1efe2d574e8b62797e504e11848ba12>>

<sup>2</sup> p 7 of the Buckheit Report

<sup>3</sup> The Sahu and the Buckheit Report

<sup>4</sup> p 8 and 9 of the Sahu Report

Similarly, Loy Yang B was commissioned in 1993 (Unit 1) and is currently 27 years old, and Yallourn was commissioned in 1972 (to 1982) and is currently 46 years old, with a notional closure date of 2032. As with Loy Yang A, neither of these power stations have installed any modern post combustion pollution reduction technologies.

It is not possible to suggest (and disingenuous to do so) that the Victorian Power Stations have complied with their obligations under the SEPP (AQM) and undertaken a program of continuous improvement or have implemented best practice.

**In circumstances where the Generators' have demonstrated non-compliance with the legislative framework, the Act requires the EPA to provide specific guidance and update licence obligations to ensure compliance.**

## B. GHD's air modelling

Dr Gray identifies numerous technical deficiencies in GHD's modelling and analysis. We provide some commentary with respect to several of the issues identified by Dr Gray.

### *Failure to include background and other sources of PM and SO<sub>2</sub>*

At page 8.1 of the GHD report, GHD represents that background data was compared and included as part of the modelling. Dr Gray's analysis of the modelling files and associated spreadsheets revealed that background data for SO<sub>2</sub> and PM were not in fact included in the modelling. In circumstances where GHD's report represents that background data were included, GHD should have disclosed and explained why the background data were in fact not included in the modelling.

While Dr Gray considers that background sources of SO<sub>2</sub> are likely to be low, the failure to incorporate other sources of PM represents a significant flaw in GHD's analysis.

Further, given GHD's contention that Power Stations contributions to PM are minor, it follows that GHD necessarily considers that there are other major sources of PM in the air shed. The failure to then incorporate these sources into the modelling defies explanation and impugns the credibility of GHD's analysis.

### *Use of maximum emission rates*

At page 30 of the GHD report, GHD states that the adopted modelling methodology follows US EPA Guidelines. The US EPA Guidelines require that the maximum 24 hour emission rate be used as the input for every hour of the model simulation.<sup>5</sup>

Given that the SEPP (AAQ) requires the 1-hour SO<sub>2</sub> concentration to be below 523 ug/m<sup>3</sup> with one exceedance, Dr Gray considers that compliance with the US EPA Guidelines would require the maximum input value to be the second highest daily peak 1-hour SO<sub>2</sub> standard.

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<sup>5</sup> p 11 of the Gray Report.

Dr Gray is critical of GHD's approach of adopting the 9<sup>th</sup> highest value without providing any disclosure, explanation or justification for adopting this value, which also has the effect of significantly reducing the 'maximum' average SO<sub>2</sub> concentrations.

Further, GHD represents the 9<sup>th</sup> highest maximums as the predicted maximum concentrations, which in fact they are not, and has the effect of significantly understating the maximum values absolutely or under the US EPA Guidelines.

This misrepresentation was replicated with respect to PM in the GHD modelling.

#### *Presentation of 2014 SO<sub>2</sub> metrics as the peak year*

On page 30 of the GHD Report, GHD states that "2014 plots for SO<sub>2</sub> are shown in Figure 22 as they produced the highest on-hour impact, while all other years produced lower predictions."

At page 25 of the Gray Report, Dr Gray summarizes Modelled SO<sub>2</sub> metrics for each modelled year in Table 2. Table 2 shows that 2014 did not produce the highest 1-hour impacts. If, adopting GHD's own declared maximum value of the 99.9<sup>th</sup> percentile or 9<sup>th</sup> highest value, the modelled peak 9<sup>th</sup> highest 1-hour average SO<sub>2</sub> concentration was 614 ug/m<sup>3</sup> in 2017. Further, the daily grid maximum for 2017 was 218 ug/m<sup>3</sup> which is not compliant with the SEPP (AAQ). Further the annual grid maximum in 2017 is 15% higher than the 2014 value presented by GHD.

**Save to the extent that the GHD Report and modelling demonstrates that there is non-attainment of the standards, the EPA should not rely on the GHD Report or the modelling to inform their decision making with respect to the licence amendments.**

### C. Particulate matter

Dr Sahu and Mr Buckheit both reject GHD's assertion that there no commercially available continuous measurement options for stack PM<sub>10</sub> and PM<sub>2.5</sub> stack emissions.

The GHD Report concludes that Power Station emissions are a minor contributor to the ambient levels of particulates.<sup>6</sup> The Gray Report demonstrates that the Power Stations are in fact significant contributors to particulate emissions and that the GHD modelling shows the power stations are in fact a significant contributor to peak ambient PM levels and major contributors at many locations in the basin during peak modelled PM<sub>2.5</sub>.<sup>7</sup>

Figures 15 through 18 of the GHD Report record that PM<sub>10</sub> and PM<sub>2.5</sub> concentrations have either been above or below, but close to both the National Environment Protection (Ambient Air Quality) Measure (Air NEPM) 24-hour and annual average standard levels.<sup>8</sup> Dr Gray's analysis of the GHD modelling also identified that no background or other sources of particulates were included in the modelling.<sup>9</sup>

Dr Gray's analysis demonstrates that the particulate emissions from the Power Stations alone record both PM<sub>10</sub> and PM<sub>2.5</sub> Air NEPM 24-hour and annual standards to be exceeded or approaching the standards and

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<sup>6</sup> p 24 of the GHD Report.

<sup>7</sup> P 17 and 18 of the Gray Report

<sup>8</sup> p 4 of the Gray Report

<sup>9</sup> p 20 pf the Gray Report

that the Power Stations are contributing about 35% of PM10 and 50% of PM2.5. Further, if all sources of PM were included, then it is likely that the standards would be exceeded.

PM2.5 24-hour average concentrations exceed the SEPP (AAQ) in Traralgon every modelled year and the four other monitoring sites in at least two of the four years shown. Dr Gray agrees that PM in most urban areas is made up of a variety of sources, however this does not obviate the need for improvement.

**The SEPP (AAQ) requires the PM 24-hour average to stay below the standard with *no allowable exceedances* – this is not being met and so further controls are required.**

## D. Power stations are currently operating in breach of the Act

Section 20 of the Act prohibits the discharge of emissions or waste by the Power Stations unless licenced under the Act.

Waste is defined in the Act to include Greenhouse Gas substance discharged into the environment.

The current licences do not permit the Generators to emit greenhouse gasses, including CO2. Each of the Generators is therefore operating their respective Power Stations in breach of the Act.

**The EPA must include CO2 limits in the licences to bring the Generators into compliance with the Act.**

## E. EPA's statutory duty to reduce air pollution

The EPA has issued a notice for the review of the Power Stations' Licenses pursuant to s20(9) of the *Environment Protection Act 1970 (the Act)*.

The EPA has power to revoke or amend any condition to which the licence relates (s20(9)(b)) and attach new conditions to the licence (s20(9)(c)).

The EPA's Variation to SEPP (AQM) and (AAQ) Policy Impact Assessment<sup>10</sup> (**the Policy Impact Assessment**) states that '*Generators of emissions should be seeking to employ what is regarded as the best approach in their industry sector or activity to the minimisation of emissions.*'<sup>11</sup>

Schedule B of the State Environment Protection Polic (Air Quality Management) (**SEPP (AQM)**) provides the Intervention Levels for Class 1, 2 and 3 Indicators. The Policy Impact Assessment states that the *"intervention levels" are air quality standards that have been developed for a set of pollutants that have many sources. They are intended to be used in neighborhoods where the cumulative impact of a variety of sources may be causing local air quality problems.*

The Explanatory Notes to the SEPP (AQM) provide further context with respect to the Intervention Levels, stating that the Intervention Levels should not be considered as acceptable levels, but rather, if not met, would trigger action to improve local air quality.

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<sup>10</sup> EPA Publication 826, January 2002

<sup>11</sup> Ibid p 45

The Power Stations are major contributors to pollutants in the Latrobe Valley. For example, Dr Gray at page 20 of his report states that there is unlikely to be many large sources of SO<sub>2</sub> in the region other than Power Stations. This indicates that assessing ambient air quality against the Intervention Levels is inappropriate because, as articulated in the Gray report, the Power Stations are a major source of pollutants in the Latrobe Valley in circumstances where it is likely that SO<sub>2</sub> standards are likely to be exceeded.<sup>12</sup>

There is nothing in either the SEPP (AQM) or the Act to suggest that the EPA is unable to impose licence conditions to improve air quality unless the Intervention Levels and or Ambient Air Quality standards are breached.

Notwithstanding that the Gray Report and the GHD Report both agree, to varying extents, that the air quality modelling demonstrates that there are exceedances of the SEPP (AAQ), the legislative framework makes it clear that the aims of the SEPP (AQM) are to drive continuous improvement in air quality and achieve the cleanest air possible.

**In view of the actual exceedances of the standards, the modelled exceedances of the standards, the Generators failure to continuously improve their environmental performance or apply Best Practice to the management of their emissions, the EPA has a statutory duty to amend licence conditions to reduce air pollution from the Power Stations under review.**

## F. The (Dr) Sahu Report – summary of main points

1. The Generators have failed to properly respond to the submissions made. The EPA has failed to provide its position and or response with respect to the submissions.
2. The Generators' cannot rely on current ambient monitoring data as definitive proof the SEPP (AAQ) standards are being met because the location of the monitoring stations are not guided by robust modelling studies.
3. The Power Stations have all exceeded or are about to exceed their design life and therefore the Power Stations will have, in effect, run for a full life time without modern air pollution controls.
4. AGL is not meeting its own environmental policy and can point to no improvements in air pollution controls.
5. Victoria's Power Stations are amongst the most poorly controlled in the world, including not only US and European Power Stations, but also China's.
6. The Generators have demonstrably failed to comply with continuous improvement and best practice requirements (EPA publication 1517) of the legislative framework, taking into account both the costs associated with retro-fitting the power stations and the fact that they are expected to run for decades into the future.

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<sup>12</sup> p 8 and 27 of the Gray Report

7. EnergyAustralia's statements in response to best practice and continuous improvement are factually insupportable and a study in misdirection.
8. Despite the Generators' assertion that further pollution controls would not significantly improve ambient air quality, it is not logical to assert that further reductions of pollutants will not improve air quality, particularly for those pollutants for which there is not threshold below which there is not harm, such as PM2.5.
9. Electrostatic Precipitators can be effective, however fabric filters are superior and have been available for about 20 years.
10. The moisture content of the coal is irrelevant for ESP performance; it is the moisture content of the exhaust gas which is the relevant factor.
11. PM Continuous Emissions Monitoring Systems (**CEMS**) are widely available and have been for at least 18 years.
12. Mercury CEMS are widely available.
13. Current licensing conditions surrounding dust emissions from the mines are not verifiable, measurable or effective and that the current limited dust monitoring locations are merely surrogates for best practice.
14. Many pollutants from ash that impact groundwater cannot be attenuated without remediation, and AGL's claim that natural attenuation is occurring is disingenuous.
15. Wastewater monitoring at Energy Australia's discharge into the Morwell River is grossly inadequate. There is no monitoring and no treatment of discharges.

## G. The Buckheit Report – summary of main points

1. The Generators' responses contain assumptions and factual assertions which are not supported by the underlying facts and the legislative framework.
2. GHD's assertion that PM CEMS are commercially unavailable is incorrect. The USEPA investigations in the 1990's demonstrated that ESP's performance to control PM relies on adequate maintenance which was frequently not undertaken, resulting in increased emissions. PM CEMS are essential to ensure that the maintenance is carried out and to avoid increased PM emissions.
3. Low cost technologies exist for continuous monitoring of CO, CO<sub>2</sub>, NO<sub>x</sub>, SO<sub>2</sub>, Mercury, PMs and the costs for transmitting data to the public is minimal.
4. Technical advances remove any limits to transparency of emissions data. There are no cost or technical barriers to releasing real time data and such transparency serves as a low cost means of reducing risk.
5. Limiting pollution from large coal-fired Power Stations is the most cost effective option for managing pollution from stationary sources – far more cost-effective than attempting to limit pollution from small business or individuals.

6. Waste oils may contain extremely hazardous chemicals<sup>13</sup> as the product of incomplete combustion and tend to be used when pollution controls are not in operation. The use of waste oil is highly risky, especially at such poorly controlled facilities.
7. The air quality monitors are poorly positioned to properly characterise the air quality impacting the Latrobe Valley population. The reported data demonstrates that the NEPM (AAQ) standards are not universally met.
8. Current licence discharge tables do not reflect any application of any form of best practice. Rather, they permit discharges far larger than the plants would emit without any effort to achieve best practice.
9. Victorian Power Stations have existed for decades without any constraint of SO<sub>2</sub>, NO<sub>x</sub>, PM<sub>2.5</sub> or Mercury emissions or any tightening of PM<sub>10</sub> emissions. It is therefore difficult to see how a finding could be made that the current operating conditions reflect compliance with continuous improvement in environmental performance or best practice obligations.
10. The barriers to installing pollution controls articulated by EnergyAustralia are 'nonsense'.
11. Major internal components of Power Stations have a life span of 25-30 years old. It follows that some of the units under review will therefore have undergone substantial, capital intensive and life extending modifications – or soon will. These changes meet an engineering and common sense definition of a substantial modification. The Power Stations are therefore subject to the more rigorous requirements of Clause 19 of the SEPP (AQM).
12. Flue-gas de-sulphurisation, selective catalytic reduction, upgraded particulate controls and activated carbon injection are all mature technologies which are both cost-effective and feasible.
13. Yallourn is scheduled for a major outage in 2020-21 and this represents a perfect opportunity to install a suite of pollution controls.
14. There is no data or evidence provided to show that Victorian coal is uniquely low in Mercury. Dr Sahu's calculations show that each Latrobe Valley unit emits about 1 ton per year. By comparison US stations emit approximately 100grams per year.

## H. The (Dr) Gray Report – summary of key points

1. The GHD Report states that the agreed methodology follows the US EPA guidelines for assessing emissions from multiple sources.<sup>14</sup> The US EPA Guidelines require the maximum 24-hour emission rate (allowing for the single daily exceedance) to be used as the input for every hour of the model simulation. The modeled concentrations in the GHD modelling are the 9<sup>th</sup> highest 1-hour SO<sub>2</sub> concentrations. No explanation or justification for the departure from the US EPA Guidelines has been provided. This was replicated for the PM modelling, resulting in a maximum emission rate 3-4 times higher than the GHD modelling.

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<sup>13</sup> Including Class 3 Indicators which clause 19 of the SEPP (AQM) requires the Power Stations to reduce to the maximum extent achievable.

<sup>14</sup> p 28 of the GHD Report

2. When modelled in accordance with the US EPA Guidelines, it could be concluded that the 1-hour SO<sub>2</sub> standard would be exceeded based on the Power Stations actual emission rates.
3. The GHD air modelling did not include any background air pollution for PM<sub>2.5</sub>, PM<sub>10</sub> or SO<sub>2</sub>, despite GHD's representation that '*various techniques to include and compare background data*' was apparently undertaken.
4. GHD's claim that the Power Stations are only minor contributors to the exceedances of PM is not supported by evidence. The modelling demonstrates that the Power Stations are in fact a significant contributor to PM concentrations.
5. The PM bottom up modelling is severely flawed because it did not include any other sources and assumed that the Power Stations emissions were the only contributors.
6. The failure of GHD to consider regional background levels of PM sources represents a significant inadequacy in GHD's analysis.
7. If background SO<sub>2</sub> levels had of been included in the modelling (as represented by GHD), then 24-hour average SO<sub>2</sub> concentrations would likely have exceeded the SEPP (AAQ) standards during all modelled years.
8. GHD's resulting emission rate of 9g/s of Mercury (313 tons per year) for each unit at each power station represents an enormous amount of Mercury. At this rate, individually, each of the five units would emit more Mercury than all sources in the US combined.
9. Long term ambient mercury concentrations of 3.3ug/m<sup>3</sup> would likely lead to extremely high mercury deposition rates.

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**Environmental Justice Australia**

### **About Environmental Justice Australia**

Environmental Justice Australia (formerly the Environment Defenders Office, Victoria) is a not-for-profit public interest legal practice. We are independent of government and corporate funding. Our legal team combines technical expertise and a practical understanding of the legal system to protect our environment.

We act as advisers and legal representatives to community-based environment groups, regional and state environmental organisations, and larger environmental NGOs, representing them in court when needed. We also provide strategic and legal support to their campaigns to address climate change, protect nature and defend the rights of communities to a healthy environment.

We also pursue new and innovative solutions to fill the gaps and fix the failures in our legal system to clear a path for a more just and sustainable world.

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