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***RE: Economic Assessment of the Closure of Coal Fire Power Generation***

Dear Scott,

Lucid Economics Pty Ltd (Lucid Economics) is pleased to present this analysis of the economic impact of the future closure of coal fired power generation in the Latrobe City Council area.

This analysis uses the most up to date, publicly available information, but as such represents only a high-level, desktop analysis. The analysis also does not consider the scheduling of the closures and rather represents the cumulative loss of the cessation of coal fired power generation in the Latrobe Valley.

The assessment shows the significant negative economic impact that the closures will have on the local economy.

If you have any questions or wish to discuss this assessment, please don't hesitate to contact me directly.

Best regards,



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lucid: /'lu:sid/ *adjective* 1. expressed clearly; easy to understand. 2. bright or luminous.

## Approach

The economic impact assessment of the future closure of coal-fired power generation was conducted using the REMPLAN impact tool, which leverages an input-output (IO) framework. The IO framework allows for consideration of not only the direct impacts but also the indirect, flow-on effects. For indirect effects, both the supply chain impact (Type I multiplier) as well as the consumption effect (Type II multiplier) have been considered. These indirect effects are defined as (REMPPLAN, 2023):

- **Supply-Chain Effects:** the increased output generated by servicing industry sectors in response to the direct change in output and demand.
- **Consumption Effects:** as output increases, so too does employment and wages and salaries paid to local employees. Part of this additional income to households is used for consumption in the local economy which leads to further increases in demand and output.

The analysis identifies a number of metrics (REMPPLAN, 2023) including:

- **Output:** output data represents the gross revenue generated by businesses/organisations in each of the industry sectors in a defined region. Gross revenue is also referred to as total sales or total income.
- **Employment:** employment data represents the number of people employed by businesses/organisations in each of the industry sectors in a defined region. Employment data presented by REMPLAN is destination of work data.
- **Wages and salaries:** the total wages and salaries paid by businesses/organisations in each of the industry sectors in a defined region.
- **Value-added:** represents the marginal economic value that is added by each industry sector in a defined region.

IO modelling has limitations (refer **Appendix A**).

For more information on the modelling approach refer to [www.rempplan.com.au](http://www.rempplan.com.au) and associated materials.

## Assumptions

Direct employment was used as the key driver for this assessment.

The coal-fired power generation in Latrobe is based on local coal mines and the prolific supply of brown coal in the region. The coal is mined adjacent to the power plant and used to generate electricity. Brown coal from Latrobe is used exclusively for power generation and is not exported overseas, like much of the black coal from the Hunter region and Central Queensland (Geoscience Australia, 2017).

According to REMPLAN, there were 758 direct jobs in electricity generation and 336 direct jobs in coal mining. The closure of coal fired power generation in Latrobe will include the cessation of coal mining in Latrobe (as it is currently structured), so the closure of the coal-fired power plants in Latrobe will directly impact an estimated 1,094 jobs directly.

Using the REMPLAN economic impact tool, 11 indirect coal mining jobs were identified supporting the 758 direct jobs in electricity generation, so these jobs have been subtracted from the direct coal mining employment total of 336 so as not to double count these job losses. As such 758 direct jobs in electricity generation and 325 direct jobs in coal mining were used as the key drivers for this modelling.

### Overestimation of Impacts

The above approach and assumptions will contribute to an overestimation of the impacts of the closure of coal-fired power plants in Latrobe. The Energy Australia Jerralang Power Station is a 450MW gas-fired electricity generation plant and is not set to close in the future and will be unimpacted by policy decisions to close coal-fired power stations in Victoria.

In the data available from REMAPLAN, it is not possible to separate coal-fired power generation and gas-fired power generation in terms of employment. Employment in REMPLAN is provided as ‘electricity generation’, which is due to the ABS provided IO industry definition of the same name.

Additionally, even at the detailed, four digit ANZSIC description in the ABS 2021 Census, the detailed employment industry is ‘fossil fuel electricity generation’, which by definition includes coal, gas, oil or other mineral fuels.

As such, employment at the Jerralang Power Station is included in the identified impact. In terms of capacity, the Jerralang Power Station makes up 8.4% of total electricity generation capacity in Latrobe, so any overestimation will be somewhat limited.

## Findings

The findings of this assessment are highlighted in the table below.

**Table 0.1. Economic Impacts of the Closure of Coal-Fired Power in Latrobe**

	Direct Impact	Supply-Chain Impact	Consumption Impact	Total Impact
Output (\$m)	\$1,693.7	\$904.5	\$295.5	\$2,893.7
Employment (No.)	1,083	1,521	1,068	3,672
Wages and Salaries (\$m)	\$173.1	\$147.4	\$66.4	\$386.9
Value-added (\$m)	\$475.6	\$358.2	\$168.7	\$1,002.5

Source: Lucid Economics; REMPLAN (2023).

To put the above numbers in perspective, the direct impacts equate to:

- 7.6% of current Gross Regional Product
- 3.1% of total current employment
- 5.7% of total current wages and salaries

The total impacts above equate to:

- 16.1% of current Gross Regional Product
- 10.4% of total current employment
- 12.8% of total current wages and salaries

One of the potentially most significant and unforeseen impacts from the closure of the coal-fired power stations in Latrobe is the loss of the relatively high wages from the local market. Directly, the closure is estimated to result in a reduction of \$173.1 million in local wages and salaries, which will equate to the same loss in local household expenditure. This loss in household expenditure will greatly impact local retail and associated businesses. A high level of socio-economic disadvantage already exists in the region. Removing these relatively high salary jobs will remove a proportionally significant amount of local household expenditure from the market. These impacts are estimated in the above consumption impact, however, the scale of the impact may not be immediately noticeable in the figures.

Furthermore, many of the people associated with coal-fired power production are very skilled and these skills are transferable to other industries. However, in order for these workers to secure a similar wage, there is a high probability that they must move away from the area. As the population declines it is likely that there would also be a decrease in local services as well as in the retail offering, producing additional negative community impacts. At the same time, if these highly skilled residents were to leave, the socio-economic disadvantage of the region would worsen. At the same time, those residents experiencing socio-economic disadvantage will have less opportunities to improve their quality of life due to the lack of employment prospects.

Finally, the additional impacts associated with the closure of coal-fired power production in Latrobe would be the detrimental impact it would have on local business confidence as well as the negative perception it will deliver for the region. Future business investment (into any business or into property), depends on these investors having the confidence in the region (to produce the required return on investment to justify the investment and risk associated with it). Once these issues emerge, a significant amount of time is required in order to counter them and create confidence and a positive perception.

## References

- Geoscience Australia (2017). Australian Resource Reviews – Brown Coal 2017. Geoscience Australia. Available from: <https://www.ga.gov.au/scientific-topics/minerals/mineral-resources-and-advice/australian-resource-reviews/brown-coal#:~:text=Smaller%20amounts%20of%20brown%20coal,from%20Australia%20to%20overseas%20destinations>. Accessed 3 November 2023.
- REMPLAN (2023). *Latrobe Economic Profile*. Available from <https://login.remplan.com.au/economy/>. Accessed 3 November 2023.

## Appendix A: Assumptions of Input-Output Modelling

REMPPLAN incorporates an input–output methodology and the underlying assumptions of this approach need to be kept clearly in mind. The assumptions are listed below:

- **Fixed production coefficients:** That is to say that if we wanted to double output of a particular industry sector, we would have to double all of its inputs with no evidence of scale economies. This assumption implies constant returns to scale.
- **Regional performance matches national and state average performance:** While this can vary between industries these differences are usually apparent in other aspects of the economy.
- **Input proportions will remain the same and there will be no change in technology:** As long as the model is kept up to date this latter concern should not pose a threat to its effectiveness, except as a tool for long-term forecasting.
- **Homogeneity among industries:** It is assumed that each industry sector produces a fixed set of products that are not produced by any other sector. It is however possible to have some overlap e.g. liquor sold in bottle shops (the Retail sector) and in cafes (the Accommodation, Cafes and Restaurants sector).
- **No supply constraints:** It is assumed that the intermediate and household sectors are able to service any increases in final demand. This assumption could weaken the predictive capacity of the model in those cases where increases in overall demand could bring about input shortages and raise their prices in the short term. However in most day-to-day cases increased input demand should not present a problem.