Development licence assessment report

Environment Protection Act 2017

Application No.	APP004462
Applicant Name	MONSBENT PTY LTD
Registered address	Tower 2 Darling Park, Level 16, 201 Sussex Street, SYDNEY, NSW, 2000
Development activity, address and proposal	F02 (Fibreboard); A08 (Waste to energy) 42 Benalla-Yarrawonga Road, Benalla, 3672 • Particleboard manufacturing plant to have a Wet Electrostatic Precipitator (WESP) and 10 MW Heat Plant installed

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Delegated decision maker (name, signature and date)	<signature and date> Quentin Cooke; TL, Approvals
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Executive summary

- MONSBENT PTY LTD (Applicant) operates the D&R Henderson Benalla facility, a particleboard, softwood timber and melamine-laminated products manufacturing facility at 42 Benalla-Yarrawonga Road, Benalla (Facility). The Facility, which has a workforce of almost 170 workers (118 of them working for Monsbent's particleboard plant, the rest for the adjoining sawmill), operates 24 hours a day, 7 days a week, producing engineered timber products, including particleboard, flooring and structural timber products. The Applicant has been operating the Facility since 1987 under EPA licence OL9379 under the activity type (previously "scheduled category") set out in item 49 (F02 – Fibreboard) in the table in Schedule 1 to the Environment Protection Regulations 2021 (Regulations).
- The Applicant applied for a development licence from the Environment Protection Authority Victoria (EPA) on 26/10/2021, under section 50(1)(c)(i) of the *Environment Protection Act 2017* (Act). The proposal is to install a Wet Electrostatic Precipitator (WESP) at the Facility to treat the air emissions from two wood chip dryers, as well as an associated 10 MW Heat Plant to recover energy from collected solid waste.

Permission Activity	Location	Description
F02 (Fibreboard); A08 (Waste to energy)	42 Benalla-Yarrawonga Road Benalla 3672	Particleboard manufacture.

- The development licence application (Application) was accepted on 4 November 2021.
- The Application) was referred to the NE Region, the local Traditional Owners group (the Yorta Yorta Nations Aboriginal Corporation - YYNAC) and to Benalla Rural City Council (BRCC) on 5 November 2011. Extensive comments were received from the NE Region but none from the YYNAC. The BRCC provided comments on the need for the Applicant to apply for a planning permit in relation to the buildings and works associated with the proposed new structures. The Application was advertised on the Engage Vic website from 24 November until 14 December 2021 and in the Benalla Ensign on 24 November 2021. No public comments were received as a result of either posting.
- The Application was referred to ASD for advice in November 2021 with multiple follow-up requests for comments and advice on the information provided by the Applicant, including in relation to the Applicant's responses to requests for information.

- On 4 March 2022 (subsequently amended on 29/4/22 then 17/5/22), the Applicant submitted a revised application and attachments, substantially increasing the size of the Heat Plant from 4 MW to 10 MW and upgrading some of the components of the WESP to a higher grade of stainless steel. This would mean considerably less fresh water would be needed and the WESP wastewater could be evaporated in the Heat Plant which would also combust any residual formaldehyde, flocculants and other combustible contaminants. These revisions were also referred to ASD.
- The Applicant has a long and extensive history of non-compliance at the Facility, including for breaching licence conditions relating to emissions to the atmosphere (that is, exceedances of its conditioned discharge limits) and, as a result, has been subject to multiple infringement notices, pollution abatement notices, environmental investigations (including stack testing and modelling) and official warnings. In response it has undertaken various amendments to its manufacturing practices, equipment upgrades and applications to amend its licence discharge limits. It is currently under investigation by the North-East Region for continuing licence breaches. It claims the risk control measures the subject of this application, if approved, will solve many of its ongoing non-compliance and air pollution issues.

This report recommends that the Authority approves the issue of the **development licence**, pursuant to section 69(1)(a) of the *Environment Protection Act 2017*, with the conditions set out in **Appendix B** below.

1 Background information

1.1 Applicant information

General

Monsbent Pty Ltd (Applicant) is a subsidiary of D & R Henderson Pty Ltd, a privately owned Australian company operating several retail and distribution outlets for its softwood timber particleboard products that are manufactured at the Monsbent site at 42 Benalla-Yarrawonga Road, Benalla (Facility). The sole director of the Applicant is David Walter Henderson (aged 49 and living in Double Bay, NSW). 100 percent of shares in the Applicant are owned by D & R Henderson Pty Ltd.

The Applicant's registered office is Tower 2 Darling Park, Level 16, 201 Sussex Street, Sydney, NSW, 2000.

1.2 Existing operations

Facility

The Facility is a particleboard and softwood timber and melamine-laminated products manufacturing facility. It makes engineered timber products – predominantly particleboard but also flooring and other structural timber products. The Facility operates 24 hours a day, 7 days a week.

The Applicant has been operating the Facility since 1987 under EPA licence OL9379 under the activity type (previously "scheduled category") set out in item 49 (F02 – Fibreboard) in the table in Schedule 1 to the Environment Protection Regulations 2021 (Regulations).

According to the application, particleboard manufacture requires wood chip to be dried to between 2–4%, depending on the product, before it is suitable to be combined with thermosetting resin and pressed into a board. The drying process involves directing both green and recycled wood chip, flake and fibre, typically of < 20 mm in size, into a large rotating drum dryer, which has an inlet temperature of around 600°C and a resultant outlet temperature of approximately 90^0-110^0C at the stack.

The heat for drying is provided by the combustion of natural gas (methane) and sawdust recovered from sanding processes. Combustion emissions from each dryer are drawn, via an extraction fan, through the rotating chamber and a bank of cyclones and then out the stack. Two dryers are operating at the D&R Henderson site – known as the Jet dryer and the Drum dryer (however, both are rotating drum type dryers). Each dryer has the capacity to process approximately 10 tonnes of chip per hour (wet weight), but the Facility typically processes 7-8 tonnes per hour, 24 hours a day.

Particleboard drying results in a release of the following principal air pollutants:

- Particulate matter: TSP (eg, PM_{100}) and fine particles (i.e., PM_{10} and $PM_{2.5}$);

- Volatile organic compounds (VOCs), principally pinenes, but the dryers can also generate Class 2 air toxics such as aldehydes, (eg, formaldehyde, acetaldehyde) and potentially toluene, benzene and acetone (although benzene has not previously been detected in stack tests done at the Facility, according to the Applicant);
- Blue Haze (a combination of fine particles and VOCs) displaying a blue-brown colour with a pungent burnt odour;
- Nitrogen oxides (NOx) and carbon oxides (CO and CO2) are typically generated by the combustion process, which uses methane gas or sander dust as fuel. Sander dust may contain residual urea-formaldehyde based resin which can contribute to NOx levels;
- NOx may also be released when drying recycled, previously resinated wood, such as shredded reject particleboard.

Controlling temperatures within the dryer can minimise the amount of volatiles released and mitigate blue haze, VOC loads and fine particles released during wood drying.

The dryers operate with post-drying cyclone air emission controls. However, these cyclones, while providing some control over particulate emissions, do not satisfactorily enable compliance with all EPA Licence OL9379 requirements for discharges to air, noting that condition LI_DA1 in the licence states that "Discharge of waste to air must be in accordance with the 'Discharge to Air' Table". **Table 1** sets out the discharge limits for all discharge points (DP). Note, the highlighted DPs are the ones to be removed and replaced with a single DP from the WESP as described below.

Table 1: Discharge to air table set out in OL9379 (highlighted DPs are proposed in this application for removal and replacement)

Discharge Point (DP) No.	Description of DP	Indicator	Limit Type	Unit	Discharge Limit
All	All Air Discharge Points	Formaldehyde	Bubble	g/min	22
16	Flash dryer exhaust stack	Carbon monoxide	Maximum	g/min	100
		Oxides of nitrogen (as NO2)	Maximum	g/min	150
		Particles	Maximum	g/min	60
		Total volatile organic compounds	Maximum	g/min	55
17		Carbon monoxide	Maximum	g/min	150

	Drum dryer exhaust stack	Oxides of nitrogen (as NO2)	Maximum	g/min	200
		Particles	Maximum	g/min	111
		Total volatile organic compounds	Maximum	g/min	168
21	Pressline #3 cyclone	Particles	Maximum	g/min	60
4	Jet dryer exhaust stack	Carbon monoxide	Maximum	g/min	50
		Oxides of nitrogen (as NO2)	Maximum	g/min	50
		Particles	Maximum	g/min	150
		Total volatile organic compounds	Maximum	g/min	70

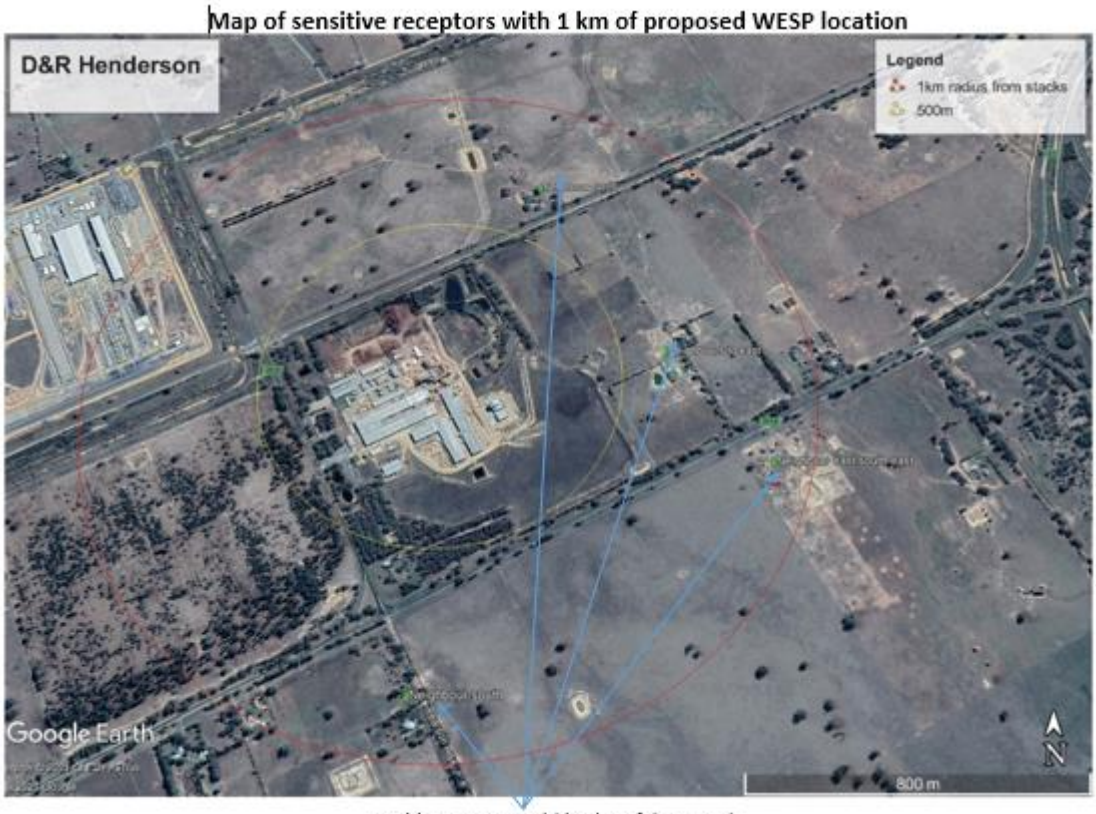
Locality

The Facility is located at the corner of Yarrawonga-Benalla Road and Benalla-Winton Road, about 5 km NE of city of Benalla in an industrial zone and is bordered by farming properties. Location information is set out in **Figure 1**. S

Figure 1 – Location of the Facility

There are three residential dwellings which are considered to be sensitive receptors located within 1 km of the existing dryer stacks (see **Figure 2**). EPA has previously received multiple complaints from neighbouring residential properties about the Facility and the pollution it emits 24 hours a day which has, on several occasions, blanketed neighbouring residences.

Figure 2 – Nearest sensitive receptors (Source: Application)



Sensitive receptors within 1km of dryer stacks.

1.3 Prohibited person and Fit and proper person assessment

An assessment was undertaken pursuant to sections 66 and 88 of the Act. The LAO is, on balance, satisfied that it would not be contrary to the public interest for the Applicant to be determined to be fit and proper persons for the purposes of Chapter 4 of the Act.

2 Proposal overview

2.1 EPA response to application submission

The Applicant applied for a development licence from the Environment Protection Authority Victoria (EPA) on 26/10/2021, under section 50(1)(c)(i) of the Act. The proposal is to divert air emissions from two existing woodchip dryer emission points - Jet Dryer (DP4) and Drum Dryer (DP17) - to one emission outlet being a Wet Electrostatic Precipitator (WESP) which will remove contaminants from the gas stream by a combination of water scrubbing and electrostatic absorption. The WESP will produce solid waste, consisting of the particulate material it removes from the gas stream from the dryers. This solid waste will be transferred to a 4 MW Heat Plant (later revised to 10 MW) where it will be burnt as fuel, providing hot air to help heat the dryers.

EPA received the application for assessment on 03/11/2021 after an initial request for further information.

An incomplete list of documents submitted as part of the application, as well as email correspondence with Applicant, NE Region, Benalla Council and others, can be found in **Appendix A**.

Multiple requests for further information were sent to the Applicant. Some replies from the Applicant were, after review, sent on to ASD and NE Region colleagues for comment. See section 3 below for further details on consultation, both by the Applicant and EPA.

A formal request for information was forwarded via Dynamics (and email) on 16/12/21 which stopped the statutory clock on the application. During that time, the Applicant submitted a revised application which proposed the installation of a much larger 10 MW Heat Plant. This revised proposal was also forwarded to ASD for comment.

2.2 Activity summary

Process overview

As mentioned above, the Applicant has historical and ongoing issues involving pollution, predominantly due to its inability to comply with the emissions limits set out in its operating licence. This has resulted in multiple complaints from neighbours and enforcement action from EPA. To address these ongoing air emission issues, its proposal is to install a WESP and associated 4 MW Heat Plant. This was later revised to a 10 MW Heat Plant. This will reduce two emission outlets (stacks) - Jet Dryer (DP4) and Drum Dryer (DP17) - to one emission outlet - the WESP.

The Applicant arrived at this proposed course of action after commissioning a study of several alternative control measures including high efficiency multi-cyclones, wet scrubbers, regenerative thermal oxidisers, ceramic baghouses and more (See "Selection of

abatement equipment matrix" spreadsheet prepared by EnviroRisk– Attachment 2 to the application). EnviroRisk prepared this pros and cons strategies matrix in accordance with the following instructions given it by the Applicant:

- Aim: Apply Best Practice Control(s) For Dryer Emissions Pollutants of Concern i.e. TSP particulates; Blue Haze [VOCs (incl. formaldehyde) & fine particles (PM10 & PM2.5)]; Odour & Visible emissions. Technology is to be capable of controlling both the 'Jet' and 'Drum' dryer emissions to achieve compliance and reduce emission to as low as reasonably practicable
- Base design specifications:
    - Handle flow requirements for both dryers concurrently
    - Function during either or both recycled wood and green woodchip inputs
    - Capable of removing particulates from a range of sizes eg, 5mm length down to sub PM10
    - Lower formaldehyde emissions to < 0.5 ppm.
    - Reduce blue haze to non-visible levels before the site boundary when viewed from any vantage point.

From that assessment (including examination of other similar facilities around Australia), the Applicant decided to pursue the WESP option with associated Heat Plant based on the following advantages over most other technologies:

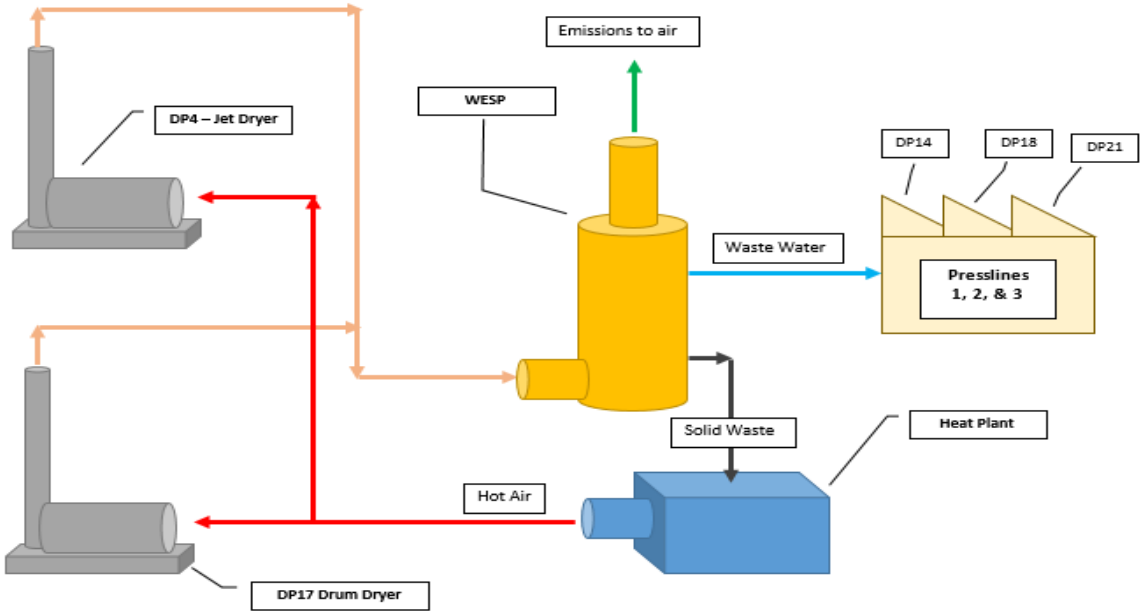
- It can handle varying particulate loads (including high loads of up to 900 mg/m3) and is capable of achieving reductions in particulate emissions of over 95% (as advised by the supplier).
- The WESP is capable of handling the total air flow and emissions loadings from both dryers, and is capable of readily controlling the emissions from both dryers; with consideration of the Heat Plant emissions being coupled with one or both of the dryers.
- It is efficient in removing PM_{10} and $PM_{2.5}$ particle size factions.
- It provides control over water soluble volatile organic compounds - including formaldehyde - within the scrubbing liquor.
- It essentially removes blue haze and significantly reduces visible emissions (over 95%, as advised by the supplier).
- Offensive odours will be controlled by the reduction in VOCs and particles. Remaining non-water-soluble VOCs (pinenes) are, for the most part, not considered offensive smelling and are not air toxics.
- It has a lower fire risk than alternative technologies due to the high humidity environment created by the internal water sprays.
- Cost is competitive when compared to alternative technologies.

- The WESP proposal has been presented to the local community at recent community engagement meetings and has had a positive reception.
- WESPs have been installed at other particle plants in Australia. D&R Henderson has been able to obtain stack test results from these other manufacturers and where WESPs have been installed they have significantly reduced emissions and largely resolved community concerns.
- Monsbent considers that the installation of a WESP will resolve non-compliances with licence conditions.

The Applicant advised that other technologies (including Regenerative Thermal Oxidisers - RTO) were considered. Regarding the installation of an RTO, this was apparently not progressed because RTOs are not commonly in use by Australian particleboard manufacturers and so are not considered a proven technology. Regarding use of pre-treatment plants (such as multicyclones) this was rejected as the WESP will be able to handle the particulate loading from the Jet and Drum dryers and the 10 MW Heat Plant and, accordingly, the Applicant argued that the additional cost of installing multi-cyclones was not justified.

Under the original application the Heat Plant was to be 4 MW and the process would be as set out in **Figure 3**.

Figure 3: Proposed new process flow under original application (4 MW Heat Plant) (Source: Original application)



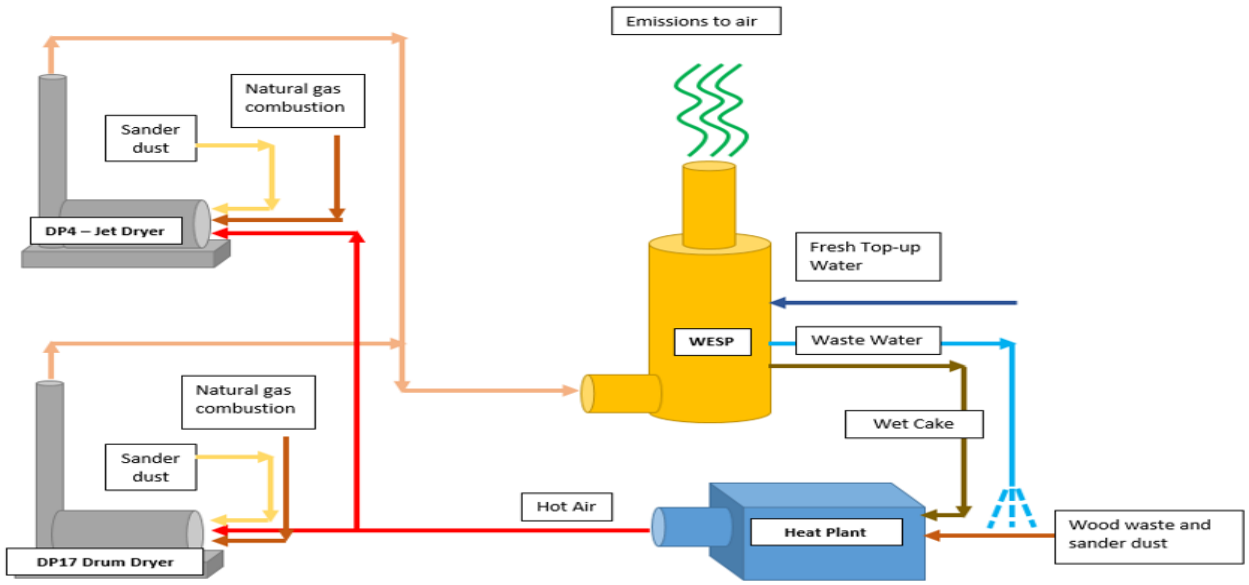
After ASD raised issues (see below) concerning the disposal of wastewater, the Applicant revised its initial application and suggested it would include a 10 MW Heat Plant rather than the 4 MW.

The revised process description is as follows (see **Figure 4**): Air emissions from existing discharge points Jet Dryer stack (DP4) and Drum Dryer stack (DP17) will be diverted into the inlet of the WESP which will use a combination of scrubbing water sprays and electrically charged plates to capture particulates and condensable gases, thereby removing the majority of contaminants from the gas stream.

The WESP will produce solid waste, consisting of the particulate material and other contaminants removed from the gas stream from the dryers. This solid waste will be transferred to a 10 MW heat plant where it will be burnt as fuel, providing hot air to heat the Jet dryer, thus reducing the need for additional gas. The Drum dryer will continue to be heated by gas; however, the Applicant intends to prioritise using the Jet dryer over the Drum dryer. In summary:

- untreated flue gas from the dryers (crude gas) is drawn by existing dryer fans into the crude gas ducting which connects the dryers and the main body of the WESP;
- the gas is treated ("cleaned") in the WESP by water scrubbing absorption and electrostatic removal of contaminants and then exits the WESP stack to the atmosphere;
- wastewater containing contaminants is filtered and the solids collected as a "wet cake" which is then transferred to the Heat Plant and burnt as fuel;
- approximately 6-8 m3 of wastewater is dumped from the WESP each day and topped up with fresh water. This wastewater is sprayed onto fuel going to the Heat Plant, evaporating the water and combusting any residual contaminants in the water.
- as the Jet dryer is heated directly by flue gases from the Heat Plant, contaminants in these flue gases pass through the Jet dryer and are cleaned by the WESP.

Figure 4: Proposed new process flow under revised application (10 MW Heat Plant) Source: Revised application)



Input conditions

To allow the supplier to correctly specify the WESP, the Applicant calculated the highest average particulate loading the WESP was likely to receive from the Jet and Drum dryers, based on their historical data, as follows:

$$C_{Wi} = \frac{(C_D V_D + C_J V_J)}{(V_D + V_J)}$$

C_{Wi} = Particulate concentration at WESP inlet

C_D = Particulate concentration at Drum dryer outlet

C_J = Particulate concentration at Jet dryer outlet

V_D = Volumetric flow rate of air at Drum dryer outlet

V_J = Volumetric flow rate of air at Jet dryer outlet

Highest particulate concentration recorded for Drum dryer = 341 mg/m3 @ 997 m3/min.

Highest particulate concentration recorded for Jet dryer = 750 mg/m3 @ 720 m3/min.

$$C_{Wi} = \frac{(C_D V_D + C_J V_J)}{(V_D + V_J)} = \frac{(341)x(997)+(750)x(720)}{(997+720)} = 512.5 \text{ mg/m}^3$$

An input particulate loading of up to 900 mg/Nm3 (dry) was specified to allow for any fluctuations in operating conditions. Based on historic test data provided to Fujian, a formaldehyde input loading of 35 mg/Nm3 (dry) was specified.

A gas volumetric flow rate of 220,000 Am3/h was allowed for which, the Applicant claims, will provide sufficient capacity for the exhaust gases from the two dryers (currently around 103,000 m3/hr) coupled with the proposed 10 MW Heat Plant (which will be fed through the Jet Dryer).

Supplier guarantee

The Applicant advised that Fujiian (the WESP supplier) had guaranteed the following conditions for the WESP outlet:

- Particulates: < 15 mg/m^3 (dry), with an input loading of up to 900 mg/m^3.
- Formaldehyde: < 5 mg/m^3 (dry)
- VOC: < 120 mg/m^3 (dry)
- Blue Haze: reduction of > 95%

While the WESP is very effective at removing particulates and formaldehyde, it is less effective at removing VOCs (particularly those that are not water-soluble) and it is not expected to reduce NOx or carbon monoxide (CO) to a significant extent.

Proposed infrastructure

Wet electrostatic precipitator (WESP)

The WESP (see **Figure 5** and subsequent figures, not numbered) consists of a number of process operations contained within an outer casing that treat flue contaminated gases from the Jet and Drum dryers prior to the gases exiting from the WESP stack. Its components are:

(a) Water quench

(b) Scrubber

(c) Wet electrostatic precipitator

(d) Water recycling system

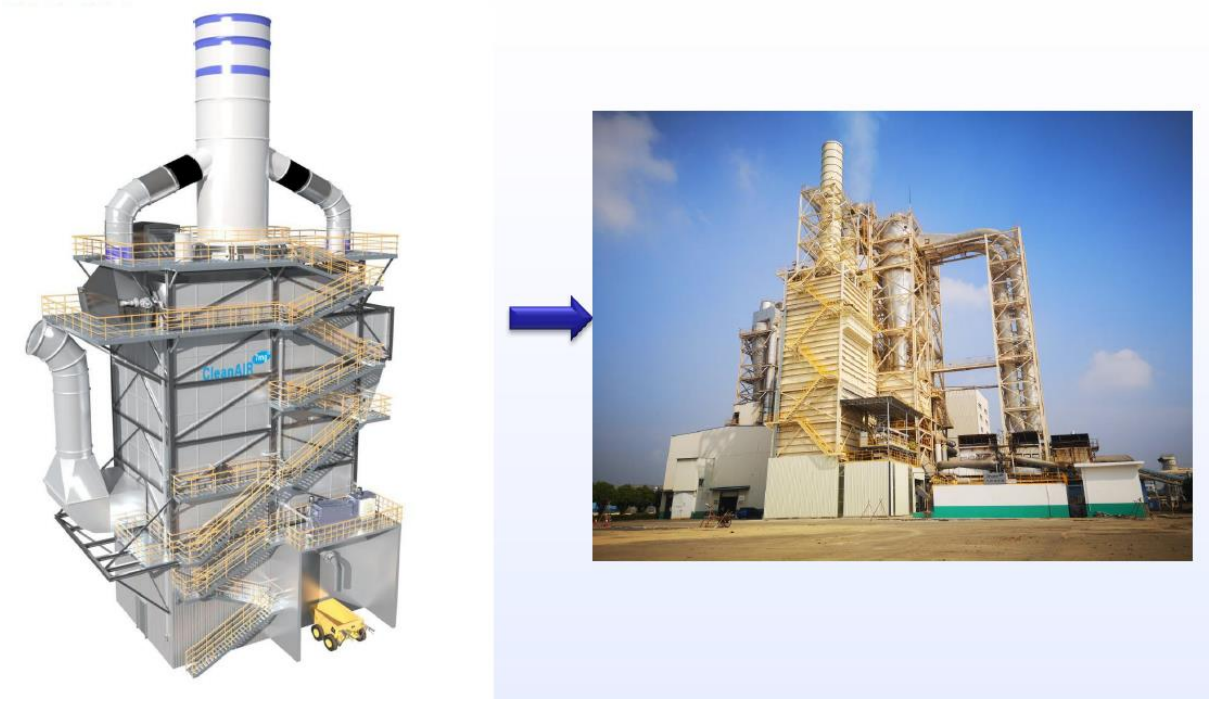
(e) Defogging system

(f) Firefighting system

(g) Operator interface and control system.

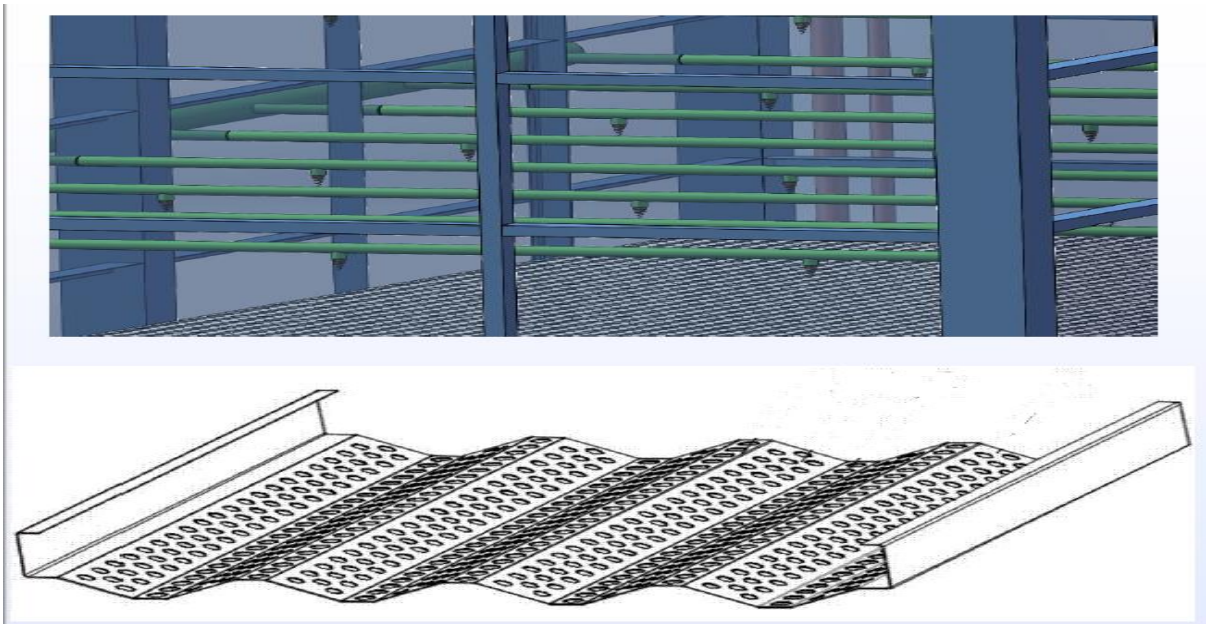
There will also be stack testing conducted from the top-level access platform.

Figure 5 (and subsequent figures, not numbered): Wet electrostatic precipitator (WESP) (Source: Application)



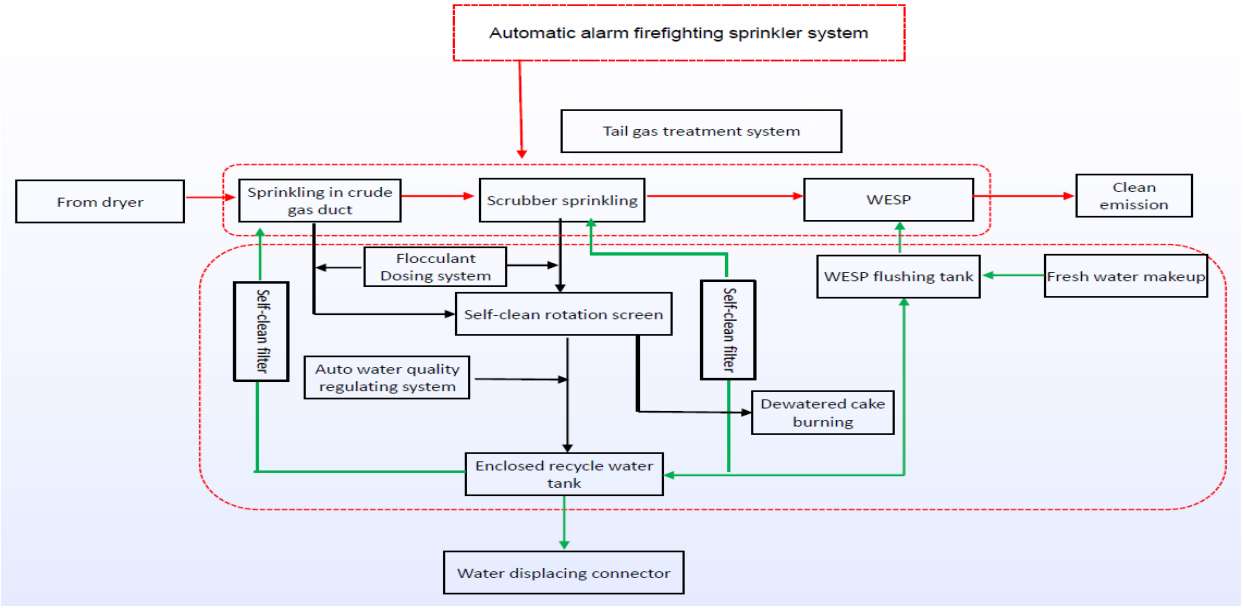
(a) Water quench - Crude gas exiting the dryers is cooled by an initial water quench located in the crude gas ducting between the dryers and the WESP.

(b) Scrubber - A water scrubber located within the main body of the WESP separates out larger particulates and ensures a uniform flow of gas over the entire cross section of the WESP.

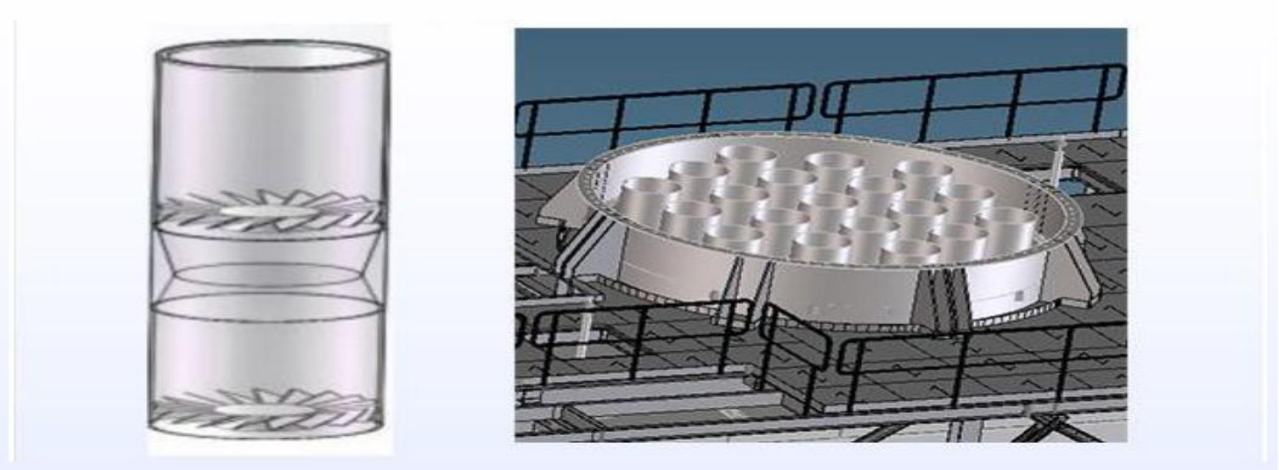


(c) Wet electrostatic precipitator - Plate-type electrodes are maintained at high voltage generating an electrical field which causes particulates to become charged and attracted to the collectors. The collectors are intermittently washed by water to remove the particulate build-up.

(d) Water recycling system - Water from the crude gas scrubbing, main scrubbing and WESP flushing operations is collected, filtered and screened to remove solid material in the form of a 'wet cake'. Fresh water is added and contaminated water bled off as required to ensure optimum operation of the WESP and removal of contaminants from the dryer flue gas. The wet cake is transferred to the Heat Plant where it is burnt as fuel.



(e) Defogging system - The stack outlet is fitted with around 20 miniature, self-cleaning cyclones which remove additional condensables in the flue gas, thus reducing the visibility of the plume and increasing the overall efficiency of the WESP.



(f) Firefighting system - The WESP has provision for emergency water supply in case of fire, connected to the internal water spraying system.

(g) Operator interface and control system - The WESP is a mostly automatic system that will be controlled by an operator computer interface which will be located in the Pressline control rooms and monitored by the Pressline Supervisor and Operators. The dryer operation will be interlocked to the WESP to prevent the dryers running without emissions control (except for commissioning, trouble-shooting and emergency situations).

Heat plant

According to the Applicant, the Heat Plant will likely be the Quingshan Energy 7200 Combustion system originally to have a capacity of 4 MW, then this was increased to 10 MW. It will be used to provide energy by the combustion of waste wood (bark, sander dust, recycled wood, etc) to produce heat. The hot flue gas from the Heat Plant will be directly supplied to the wood chip drying system at a nominal 650°C. Fuel consumption will depend on the wood mix, moisture content, and heating demand.

As part of the assessment of the WESP technology, the 'wet cake' was identified as a solid waste stream which would need to be disposed. Options that were considered were:

(a) Dispose of solid waste as a priority waste to landfill; or
(b) Combust solid waste to produce energy; or
(c) Reuse solid waste in product.

The Applicant advised that option (b), the "waste to energy" Heat Plant, was selected because:

- it will reduce the amount of solid waste going to landfill or priority waste handling.
- it will enable the site to reduce its consumption of fossil fuels.
- reusing solid waste in product was not considered feasible from a technical and quality perspective.
- waste to energy is a known and proven technology throughout the world.
- it meets the intent of the waste hierarchy approach to waste management.
- the use of the solid waste for fuel is an efficient re-use of material that is consistent with the waste hierarchy and circular economy principles.

Specifically, a 'moving or reciprocating grate' type heat plant has a good track record for similar plants throughout the world, can achieve a high energy efficiency, and has emissions that can be treated via the WESP.

The Applicant advises that ash recovered following combustion will be analysed to confirm chemical impurity concentrations. This is appropriate as the ash will need to be classified under Part 4.2 (Industrial waste and priority waste) of the EP Regulations for treatment, disposal or reuse depending on whether it is reportable priority waste, priority waste or industrial waste. It is noted that this waste ash is likely to be pre-classified in the table in Schedule 5 to the EP Regulations as RPW: either N205 (Residues from industrial waste treatment/ disposal operations) or N210 (Residues from pollution control operations).

As set out by the Applicant, there will be two methods of delivering fuel to the Heat Plant:

(a) Sanding dust combustion system

Dust recovered from the line 1 and line 3 sanders is currently burnt directly in the combustion chambers of the Drum and Jet dryers. Some of this dust will be diverted to the Heat Plant via a blow line and fed into the combustion chamber by a dosing screw and an injection nozzle.

The dust combustion system has a maximum capacity of 500 kg/hr, so the total amount of sander dust generated on site will be burnt using a combination of the Heat Plant's combustion chamber and the Drum dryer's combustion chamber. The amount of sanding dust being burnt for fuel will not change as a result of the WESP/Heat Plant project, however it can change with increased or decreased particleboard production.

Some of the sander dust that was previously burnt in the dryers will now be burnt in the Heat Plant, while the overall amount of dust being burnt will remain the same. Differences in emissions could occur due to differences in combustion efficiencies between the heat plant and the dryer combustion chambers.

(b) Solid wood waste combustion system

Recycled wood waste and wet cake from the WESP will be delivered to the Heat Plant by existing front-end loaders, or forklifts using skips or other appropriate containers, and loaded into the fuel bin. The fuel belt conveyor then delivers the fuel from the bin to the fuel feeder and from there into the combustion chamber.

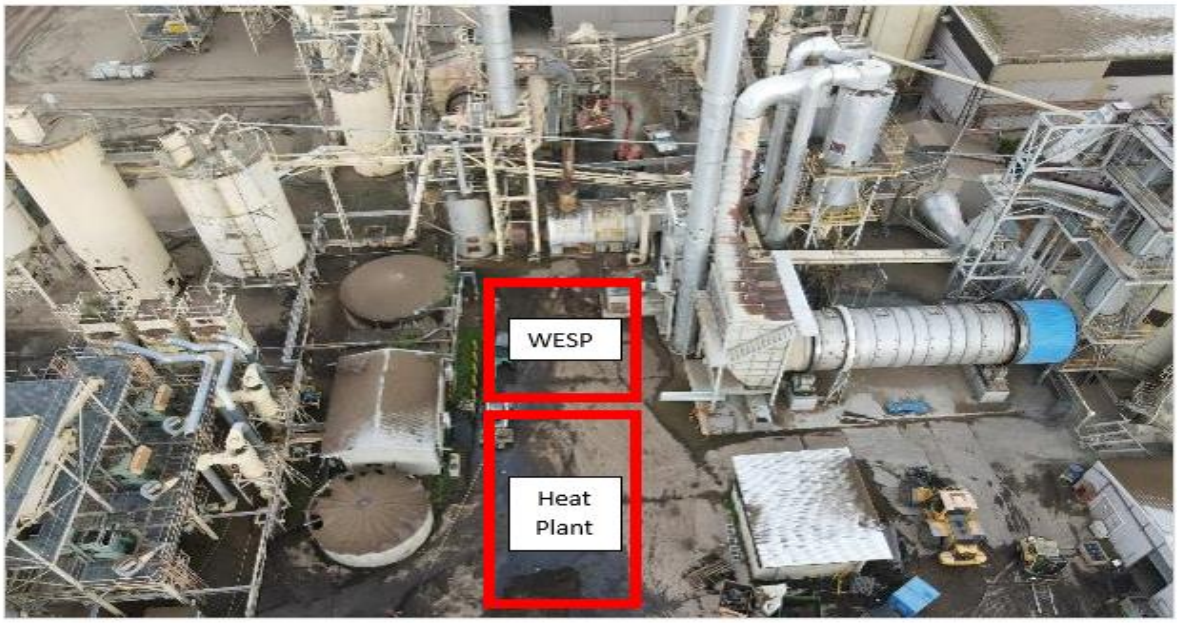
The combustion chamber uses an air-cooled, hydraulically-driven reciprocating grate, which will allow it to use both wet and dry fuels, improve fuel mixing and thereby ensure optimised combustion. The amount of incoming recycled wood that Monsbent receives could potentially be increased, with some of this wood being burnt in the Heat Plant, replacing some of the current natural gas usage.

An increase in combustion of recycled wood could increase emissions (NOx, CO) which is offset by a reduction in CO_2 emissions compared to natural gas combustion. Detailed plant drawings are expected to be developed as part of the design and construction process.

Figures 6 and **7** show the proposed location of the new WESP and Heat Plant.

Figure 6: Aerial view of Facility with proposed location of the WESP and Heat Plant (Source: Application)

Fig 7: Close-up view of 2 options for location of the WESP and MW Heat Plant (Source: Revised application)



Operational and Maintenance Costs

An estimation of maintenance and operating costs was made in conjunction with the WESP supplier, and also using data from existing site operations.

- Parts - Water pump: $700/3y; Sprinklers: $2100/3y; HV insulator bracket: $490/5y; Valves & sensors: $700/y; total parts costs: ~$2,000/y
- Labour costs ~$10,000/y
- Chemical costs ~$ 10,000/y
- Utilities costs - Water: 8 m3/d; $2,500/y; Power: $110,500/y.
- Approximate total annual operating costs - $127,000.

The Applicant also advises that there are potential cost savings from burning recycled wood in the Heat Plant, rather than burning natural gas directly in the dryers. However, further work is required to estimate these savings. In order to off-set the operating costs of the WESP and Heat Plant, Monsbent has entered into discussions with Corporate Carbon to investigate if the project can be used to create Australian Carbon Credit Units (ACCU) under the Emission Reduction Fund Carbon Credit scheme. Initial advice from Corporate Carbon is that the project would create between 5,000 and 6,000 ACCUs per annum, depending on how much sander dust was being burnt directly in the dryers. At current carbon prices, that is worth $160k - $200k per annum, which would off-set the operating costs.

Applicant's estimates of air emission reductions (including greenhouse gases - GHG) due to new WESP and 10 MW Heat Plant

A comparison was made between current emissions limits specified in the EPA licence and expected emissions after the installation of the WESP and the 10 MW Heat Plant (see **Error! Reference source not found.**), based on supplier guarantees, which shows that the installation of the WESP and Heat Plant will result in a significant reduction in emissions to air for certain pollutants, compared to current licence limits (see also **Table 1** above for current licence limits), but an increase for others. The Applicant advised that the historical average combined emission rates (column 5 of **Table 2**) are calculated using stack testing data from 6/07/2005 – 18/5/2021.The Applicant's figures for the historical maximum recorded emission rates (shown in column 6 of **Table 2**) are based on the stack testing results show in **Table 3**.

Table 2: Comparison of discharge limits and historic maximum and average air emissions against supplier guarantees for emissions after installation of WESP and 10 MW Heat Plant (Source: Revised application 18/5/22)

Discharge Point (Current)	Description	Indicator	Current Combined Discharge Licence Limit (g/min)	Historical Average Combined Emission Rate (g/min)	Historical Maximum Combined Emission Rate (g/min)	Discharge Point (Future)	Description	Indicator	Estimated Maximum Emission Rate (g/min)
All	Jet dryer exhaust stack Drum dryer exhaust stack Presslines 1 & 2 Pressline 3 Resin Plant scrubber vent	Formaldehyde (Bubble limit)	22	63.2	122.37	All	WESP exhaust stack Presslines 1 & 2 Pressline 3 Resin Plant scrubber vent	Formaldehyde (Bubble limit)	22 (WESP/Heat Plant contribution is 12)
DP4 + DP17	Sum of existing discharge points	Carbon Monoxide	200	177	545	DP1 (Proposed)	WESP exhaust stack - Heat Plant - Jet dryer - Drum dryer	Carbon Monoxide	84 (WESP 49 Heat Plant 35)
		Oxides of nitrogen (as NO2)	250	285	490			Oxides of nitrogen (as NO2)	309 (WESP 259 Heat Plant 50)
		Particles	261	606	900			Particles	37
		Total volatile organic compounds	238	151	430			Total volatile organic compounds	295
All	All	Visible emissions	None, other than steam.	N/A	N/A	All	All	Visible emissions	Reduced by > 95%
All	All	Odour	No offensive odours.	N/A	N/A	All	All	Odour	Compliant with ERS.

Table 3: Recent maximum recorded emission rates for the Jet dryer (DP4) and Drum dryer (DP17) and dates of stack testing (Source: Revised application)

Indicator	Maximum recorded emission rate (g/min)	Date recorded
Drum		
Particulates	340	11/4/2016
Formaldehyde	69	18/6/2019

VOCs	230	9/8/2006
CO	482	30/06/2011
NOx	190	18/05/2021
Jet		
Particulates	560	17/06/2021
Formaldehyde	29	20/06/2019
VOCs	200	10/06/2020
CO	63	10/06/2020
NOx	300	19/06/2019

Note: The Jet Dryer (DP4) has only been operating in its current format since late 2018. Data for the old Jet dryer that was operating prior to this time is not included. Also, the dryers have only been tested for formaldehyde for the last three years.

Table 2 shows that emissions for particulates will be significantly reduced compared to historical maximums and averages.

The Applicant stressed that, although the technology is not expected to significantly reduce VOCs, NOx and CO, emissions modelling has shown that compliance with the air quality assessment criteria (including the ERS) design criterion for CO and for NO_2 will be readily achieved, and odour from VOCs will be well below a perceptible intensity at and beyond the site boundary. Additionally, the majority of VOCs will be pinenes, which are not considered offensive smelling and are not air toxics, nor do they have Air Pollution Assessment Criteria (APACs) specified.

The Applicant provided some results from 2 other engineered wood manufacturing facilities in Australia with installed WESPs, to check the supplier's guaranteed emission levels (see **Table 10** below). The figures suggested the supplier's guaranteed emission levels will be readily achieved. In particular, they indicated that the guaranteed emission concentration for formaldehyde of < 5 mg/m3 is likely to be conservative, as lower emissions are being achieved using the same technology at the other facilities.

CO_2 and NO_x Generation from Heat Plant Combustion

The Applicant notes that CO_2 will be generated by combustion of biomass in the Heat Plant in the form of approximately 7,920 tonnes of sander dust plus approximately 594 tonnes (wet weight) of wet cake from the WESP per year (estimated based on current sander dust quantities). Combining the wet cake, sander dust and incoming recycled wood, the Heat Plant can consume approximately 34,214 t of waste wood material per annum, and produce

286,303 GJ of energy. The increase in recycled wood combustion will allow a reduction in non-renewable fossil fuel use (natural gas) and also in sander dust being burnt directly in the dryers.

The Applicant advises, perhaps optimistically, that, as the Heat Plant has the capacity to provide up to 10 MW of heat, this could achieved by increased combustion of wood waste, which has the potential to completely replace the fossil fuel usage for one of the dryers. (For example, the Jet dryer has a heating requirement of 10 MW at maximum capacity.) As the waste wood combustion will be in place of fossil fuel combustion (and not in addition to it) CO_2 generated by gas combustion will now be generated by wood combustion, and as the CO_2 from the heat plant increases, there will be a corresponding decrease in the contribution from natural gas combustion.

The Applicant also pointed out the Heat Plant will use the wood residue from the WESP for combustion, as opposed to sending the material to landfill. As such, the CO_2 and CO generated by combustion will be off-set by the reduced CO_2 and CH_4 that would have been created by natural gas combustion in the existing dryer arrangement, and reduced CH4 production in a landfill. This accords with the hierarchy of waste management.

The Applicant also provided the following information regarding the fuel consumption and CO_2 emissions after installation of the new WESP and 10 MW Heat Plant (**Table 4**):

- The WESP will have a total installed power consumption of 320 kW, and a typical operating power consumption of 75 kW, which approximates to an annual energy consumption of 2,300 GJ. The 10 MW Heat Plant will have a total installed power consumption of 153 kW, and a typical operating power consumption of 137 kW, which approximates to an annual energy consumption of 3,750 GJ.
- The combined emissions are a 1.3% increase to the site's current annual energy consumption of 462,000 GJ, so presents a low risk of harm from GHG production.
- Additional methods to reduce the site's carbon footprint to offset any increased CO_2 generation from the WESP and Heat Plant will be investigated.

The Applicant contends that the increase in GHG emissions created by WESP and Heat Plant electricity use (and the Heat Plant emissions) are considered off-set against the benefits of the considerably improved local air quality that will be evident (less particulate emissions and blue haze).

Table 4 (and subsequent tables, not numbered): Summary of WESP and 10 MW Heat Plant annual fuel consumption and CO2 emissions (Source: Revised application)

Scope 1 CO_2 calculations (natural gas and wood combustion)

Activity	Quantity	Energy Value (GJ/Unit)	Energy Consumption (GJ)	Emission factor (kg CO_2-e / unit	t CO_2-e
Dryers gas combustion, current	178,116 GJ	1	178,116	51.4	9,155
Dryers dust combustion, current	9,269 t	12.2	113,077	0	0
Total energy consumption, dryers, current	-	-	291,193	-	9,155
Heat Plant potential annual biomass combustion, at 10 MW heat generation, including 7,920 t sander dust and 594 t wet cake.	34,214 t	8.368	286,303	0	0
Dryer dust burning post install	1,349 t	12.2	16,458	0	0
Total energy available with Heat Plant and dryer dust combustion	-	-	302,761	-	-
Potential reduction in energy usage from natural gas.	178,116 GJ	1	178,116	51.4	9,155

Scope 2 CO_2 calculations (electricity usage)

Activity	Quantity (kWh)	Emission factor (kg CO_2-e / unit	Emissions (t CO_2-e)
Particleboard electricity usage	26,317,774	0.98	25,791
Sawmill electricity usage	3,211,806	0.98	3,148
Site total electricity usage	29,529,580	0.98	28,939
Electricity usage from WESP & Heat Plant	1,680,420	0.98	1,647
Total electricity usage post install	31,210,000	0.98	30,586
Percentage increase in electricity usage and CO_2.	5.7%	-	5.7%
Current site energy usage (gas, electricity, fuel, etc.)	482,918 GJ	-	42,898
Site energy usage post install.	488,968 GJ	-	44,545
Percentage increase in energy usage and CO_2.	1.3%	-	3.8%

Calculation of net change in annual CO_2-e emissions

Activity	Quantity	Energy Value (GJ/Unit)	Energy Consumption (GJ)	Emission factor (kg CO_2-e / unit	t CO_2-e
Potential reduction in energy usage from natural gas.	178,116 GJ	1	178,116	51.4	9,155
Electricity usage from WESP & Heat Plant	1,680,420 kWh	0.0036	6,050	0.98	1,647
Potential net reduction in CO_2 generation following install of WESP and Heat Plant.	-	-	-	-	7,508

Assumptions

- All 'Quantity' and 'Energy Consumption' values in the above tables are on a per annum basis.
- Theoretical heat generation from heat plant is 10 MW, or 10,000 kJ/s.
- Designed fuel Lower Heating Value (LHV) = 2,000 kcal/kg (8368 kJ/kg) (from Fujian documentation). For the purposes of calculating an energy value, the LHV is assumed to be the average energy value for all fuel fed to the Heat Plant.
- Energy and emission factors are as per NGER technical guidelines.
- Fuel feed rate requirement to produce 10 MW = 1.2 kg/s, or 34,214 t per annum, assuming 24 hr operation, 330 days per year.
- Maximum wet cake quantity is 1.8 t/day, or 594 t per annum (wet weight).
- Maximum dust burning capacity of 10 MW Heat Plant is 1 t/h, or 7,920 t per annum (Fujian item 7160).
- Assuming future sander dust generation is similar to 2020-2021, fuel usage will be 7,920 t sander dust, 594 t wet cake, and 25,700 t waste wood.

Applicant's claims regarding wastewater

WESP water system supplies water to the crude gas scrubber, main scrubber, and WESP flushing system. The water is then recovered from these processes, filtered and reused.

In order to prevent excess contaminants building up in the recycled water, a quantity of recycled water is dumped periodically, and the system topped up with the same quantity of fresh water. Initially, water change-over was estimated at 30-50 m^3 per day by the supplier, Fujian, however by upgrading the internal stainless-steel components of the WESP to handle more concentrated recycled water, the daily water change-over was able

to be reduced to 6-8 m^3 (**Table 5**), which now is low enough to be handled within the Heat Plant fuel load. The WESP supplier advised that: "It's possible for us to reduce the wastewater volume down to 6-8m3/d only, and we think the heating plant can handle this small volume of wastewater. So, we must further increase the corrosion resistance of whole WESP, which means replacing SS304 parts by SS316 material, and all parts of HV cathode and anode will be replaced by duplex stainless steel 2205".

Table 5: Summary of WESP and Heat Plant wastewater evaporation (Source: Revised application)

Activity	Quantity (t/d)
Water recirculation within WESP	50
Wastewater displaced from recycled water system	~6-8
Clean water added to recycled water system	~6-8
Water contained in wet cake and sent to Heat Plant	~0.9
Wastewater sent to Heat Plant for evaporation	~6-8
Wastewater released to environment (other than evaporation)	0

The Applicant undertook an evaluation of options for treatment and reuse of the wastewater resulting from the WESP after ASD raised issues in relation to the original proposal. The evaluation was based on the WESP supplier's advice regarding the typical composition of the WESP wastewater being: Suspended Solids = 3000 mg/L, Chemical Oxygen Demand = 25,000 mg/L, Biological Oxygen Demand = 4500 mg/L, Nitrates = 950 mg/L.

The maximum formaldehyde concentration in the WESP wastewater was estimated by the Applicant at 15,000 mg/L, assuming input levels are at historic highs for both dryers, wastewater change-over is 8,000 L per day and all, except 5 mg/m^3 of formaldehyde, is removed from the air stream into the water. The evaluated options and their pros and cons are set out in **Table 6**.

Table 6: Evaluation of WESP wastewater treatment and reuse options

#	Option	Risks	Benefits

1	Store water in existing evaporation ponds.	Contaminants in water could leach into the ground. Ponds would need to have liners installed. Rate of evaporation depends on wind, air temperature, and may not be able to keep up with operational requirements. Water would need to meet internal limits for irrigation prior to discharge to paddock. Ponds would require periodic clean-out of accumulated solids.	Can make use of existing infrastructure. Low cost.
2	Spray water onto wet-chip belt and evaporate in dryers.	Water-soluble contaminants captured by the WESP – such as formaldehyde – would be re-evaporated in the dryers and have to be re-treated by the WESP. This would reduce the contaminant removal efficiency of the WESP. Contaminants in water may affect the quality of particleboard products.	Can make use of existing infrastructure. Low cost.
3	Use water to make up hardener solution for use in particleboard.	Contaminants in water may affect the quality of particleboard products. Potential to introduce a source of emissions to the hardener system.	Can make use of existing infrastructure. Low cost. Replaces potable water use in hardener.
4	Use water to make batches of resin.	Contaminants in water may affect the quality of resin and particleboard products. Additional filtering or treatment may be required. Additional piping will be required to transport water to resin plant.	Replaces potable water use in resin batches. Relatively low cost.
5	Spray WESP wastewater onto wood waste as it is fed into the Heat Plant	Adds to heating load of Heat Plant. Additional infrastructure required. Increased cost of stainless steel for WESP components.	Combustion will destroy contaminants in water. Heat Plant has emissions control (WESP). Amount of make-up water can be reduced.
6	Process water through a reverse osmosis (RO) treatment plant	High cost; supplier quoted A$1.3–1.6 M for an RO plant to treat 30-50 m^3 of waste water per day, plus the cost of installation. Creation of additional waste streams that will require disposal; i.e. brine.	Can remove high percentage of contaminants.

The Applicant, in its revised proposal, opted for Option 5 which was suggested by the proposed WESP supplier as "a popular way that people are doing in China". The Applicant suggested it had the lowest environmental risk and greatest over-all benefits. The wastewater sprayed onto the waste wood will be evaporated in the Heat Plant with any residual contaminants in the wastewater, such as formaldehyde, flocculants and wood particulates, being almost completely combusted in the Heat Plant. Based on results from other similar facilities (eg, Borg (Panels in Oberon, NSW)), formaldehyde destruction in the Heat Plant is estimated to be at least 99%. Residual flocculant retained in either the wet cake or the wastewater it is expected to be completely combusted within the Heat Plant, resulting in NO_2 emissions of ≈ 285 mg/min, which is less than 1 % of the predicted NOx stream generated at the Heat Plant and < 0.02% of the total WESP NOx emissions.

As a result, no wastewater from the WESP will be released off-site, other than as evaporation.

Applicant's claims regarding solid waste from the WESP and Heat Plant

As mentioned above, solid waste will be generated in the form of particulates removed from the dryer flue gas (called "wet cake"), produced by filtering and dewatering the recycled water recovered from the WESP. Approximately 2 tonne per day (dry weight) of solid waste will be generated, with a water content of < 75%. The waste will be collected in a skip bin and transported to the Heat Plant where it will be burnt as fuel. Emissions from the Heat Plant will be directed back through the WESP.

Ash and slag produced by combustion in the Heat Plant will be collected and analysed as part of the commissioning process, to determine if it is suitable for landfill or reportable priority waste handling. As mentioned above, it is likely is likely the ash would be either N205 (Residues from industrial waste treatment/ disposal operations) or N210 (Residues from pollution control operations) as set out in the table in Schedule 5 to the EP Regulations. According to the Applicant, the risk of harm from the solid waste resulting from the activity will be low, but this needs to be definitively confirmed through testing.

Applicant's estimates of additional noise pollution due to new WESP and 10 MW Heat Plant

As the WESP and Heat plant will operate 24 hours per day (ie, during day, evening and night noise limit periods) the risk of noise impacting local residents was considered as part of the planning process. The Applicant advised that, to minimise off-site impacts, the WESP and Heat Plant will be located in an enclosed shed close to the centre of the site, at least 500 m from the closest neighbour (see **Figures 2** and **6**).

The sound power data provided by the supplier of the WESP is:

- Fans: 105dB (existing Jet and Drum dryer fans will be used)

- Water pumps: 80 dB
- Discharge from stack: 85 dB

The Applicant, in its revised application, provided the following table:

Table 7: Qualitative noise risk assessment of WESP and Heat Plant

Risk	Mitigation
Noise from pumps, motors and other plant located at the WESP.	Pumps and motors will be enclosed in a plant room located at the base of the WESP, which will reduce the sound level outside.
Noise from changes to dryer exhaust stacks (two dryers stacks will be replaced by a single WESP stack).	Noise level from WESP stack will be 85 dB (A) (supplier provided). A computed noise model was generated for site noise sources and the effect of adding the noise from the WESP was assessed. (Refer attachment 4.) The noise model shows that the increase in site noise from the installation of the WESP produces negligible contribution to current noise levels at the site boundaries.
Noise from WESP and Heat Plant causes increase to overall noise from site.	Experience with WESPs at other sites is that noise from WESP will not be significant compared to overall site noise. No experience of noise complaints relating to WESPs or Heat Plants at other sites.
Increased noise from changes to fan discharges/ducting paths.	Existing Jet and Drum fans will be used as the primary method to transport exhaust gases, and were included in noise model. Change in discharge path from plant will be re-routing two dryer stacks into single WESP stack. Computed noise model shows that this does not increase noise at sensitive receptors.
Noise from water scrubbing system.	Located inside ducts and WESP casing so not expected to be a significant source of noise.
Noise from Heat Plant (feed system, combustion chamber, fans, etc.)	Heat Plant fans are smaller than the main dryer fans (which have been included in the computed noise model), so noise from the Heat Plant fans is not expected to significantly increase noise at sensitive receptors. Other plant items, such as the feed system (a type of 'live floor'), conveyor belt, and combustion chamber, are similar to plant already in use on site. These types of plant have not previously been identified as significant noise sources. Additionally, the combustion chamber of the Jet will not be operating when the Heat Plant is operating.

Risk	Mitigation
Noise from extra movements of loaders, loading waste wood into Heat Plant.	Broadband reverse 'squawkers' have been installed on loaders in place of 'beepers' to reduce impact of noise.

Based on the above, the Applicant stated that the risk of harm from noise from the WESP and Heat Plant is low risk.

ASD experts had some issues with the noise calculations and requested further information. The Applicant then commissioned WMG Acoustics to:

- Conduct a noise assessment for the Facility;
- Compare the results of the assessment to EPA noise limits;
- Develop a computed noise model which includes the WESP and 10 MW Heat Plant and determine the effect on noise from the site;
- Make recommendations for noise mitigation measures if required.

This report had not been provided at the time of finalisation of this report, but noise monitoring is addressed in the proposed conditions (see **Appendix B**).

3 Consultation

3.1 Community engagement and public comments

The Applicant identified potentially impacted and interested stakeholders as part of its Permission Pathways application process. These were identified as:

- Local community (local and regional residents, townsfolk and the Benalla Rural Shire Council)
- LS Precast concrete facility (neighbouring industrial facility).

As part of the abatement equipment technology selection process, a number of factors were considered, including the likelihood of community acceptance, the impact on water and electrical supply capacity and the likelihood that the technology would achieve the required reduction in emissions, as a means to address concerns of interested stakeholders.

The Applicant advised it has been holding regular online meetings (via Zoom) to engage with stakeholders and discuss their concerns. At these meetings, the Applicant discussed the abatement equipment options (including a WESP) with stakeholders and explained how different abatement equipment works and the expected impact on emissions from each option.

During the August 2021 community meeting, the Applicant provided further details regarding the operation of a WESP, noting that it was the preferred abatement equipment option. Information was also provided on the expected reduction in specific emissions such as dust and smoke. The information package was also emailed to members of the community that were unable to attend the virtual meeting.

The response of stakeholders to the proposal has been positive, as air emissions (specifically, wood particles and blue haze) are a particular concern to some local residents. Noise was raised as a concern by one local resident, however Monsbent was able to determine the noise level of the WESP from the supplier's technical proposal and was able to advise stakeholders that the WESP will not increase the site's overall noise level. This was confirmed by a computed noise model (sent with the original application – Attachment 4) compiled by an audiometric consultant.

The Applicant advised it made enquiries concerning water availability and electricity supply to verify these could be accommodated to operate the WESP and contacted the local council to discuss the requirements around planning and building permits with Planning Coordinator Joel Ingham. It has obtained the appropriate forms and will progress the planning and

building applications and will continue to engage with the local council as the project progresses.

In accordance with section 52 of the Act, a notice of application for the development licence was published on the EPA Vic website (via Engage Vic), as well as in the Benalla Ensign newspaper, on 24 November 2021. The notice was published on Engage Vic for 15 business days, ending on 14 December 2021. Staff from the NE Region also personally letterboxed notice of the application to all the residences and businesses with a 1 km radius of the Facility, comprising approximately 20 sites.

No submissions were received through the EPA Portal or via Engage Vic from the public during the consultation period.

3.2 External referral comments

Responsible authority

Under section 69(2) of the Act, the development licence application was formally referred to the Benalla Rural City Council (BRCC) as the relevant responsible authority, on 5 November 2021. Mr Nilesh Singh, Manager Development, for BRCC, responded by stating aplanning permit is required but not yet obtained.

In accordance with section 71 of the Act, one of the proposed draft conditions set out in **Appendix B** is DL_G4.

Traditional Owners

As the Facility exists on the traditional lands of the Yorta Yorta Traditional Owners, the development licence application was referred for comment to the Yorta Yorta Nations Aboriginal Corporation on 5 November 2021. No response was received. No sacred sites are impacted as the activity is all located within the boundaries of the Facility. Under the revised proposal, no wastewater is proposed to be discharged off-site.

3.3 Internal referral comments

NE Region

The NE Region has been kept abreast of all matters raised as part of this application. They have been vocal in their concerns, raising many important points with regard to the evidence and reports being relied on by the Applicant, as well as the Applicant's history of non-compliance. A major concern was doubt over the claims by the Applicant regarding the

maximum input concentrations for the WESP (discussed further below). All concerns raised by the Region were communicated to the Applicant for a response and resulted in the revised application (increasing the size of the proposed Heat Plant from 4 MW to 10 MW to, among other things, address the wastewater issue). As mentioned, the supplier guarantees included that the design input would be 900mg/m^3.

ASD

A formal request for ASD advice was lodged with AS Connect. Several follow-up emails were sent, informing ASD experts of the concerns expressed by the NE Region and responses from the Applicant. The following advice was received.

Noise
ASD examined the DL application and the Hear Data P/L Report (21 Sept 2021) provided by the applicant. While identifying some shortcomings with the limited measurements taken to obtain background levels, the conclusion was that the proposed WESP is not predicted to change the overall noise levels from the premises or affect compliance with the noise limits.

With the revised application, increasing the size of the Heat Plant from 4 MW to 10 MW, a new noise report was requested from the Applicant. This report had not been provided at the time of finalisation of this report, but noise monitoring is addressed in the proposed conditions (DL_R1 and DL_R4: see **Appendix B**), which reflect the suggestions made by ASD Noise experts.

Air emissions
ASD examined the DL application and responded to several questions asked by the LAO, including whether the technology represented best available techniques and technology (BATT). Overall, it was considered the technology proposed should be consistent with what is considered BATT though it will come down to how well it is operated.

Concerns about the inlet concentration (being 300mg/m3 in the original proposal) for the WESP were expressed. As mentioned above, this issue was addressed in the revised application where the Applicant confirmed, with specifications provided by the supplier, the inlet concentration for the WESP was actually 900mg/m^3.

Monitoring of stack emissions was seen as vital. The monitoring originally suggested in the Application was not continuous. The use of a continuous emissions monitoring system (CEMS)

was put to the Applicant by the LAO (the ASD Air expert confirmed it need only be for particulates) and the Applicant undertook to get some quotes to include a CEMS on the WESP. A requirement for a CEMS on the new WESP stack DP has been included in the proposed conditions set out in **Appendix B** below.

Wastewater

ASD was concerned at the proposed use of water and suggested that the Applicant investigate use of recycled water. The LAO had already put this to the Applicant who advised that sufficient recycled water could not be supplied by the nearest water treatment facility.

ASD also wanted further details regarding the proposal that wastewater removed from the WESP would be used/treated. They were satisfied by the revised proposal that would require significantly less fresh water use and no wastewater needing to be disposed of off-site as all would be burned in the Heat Plant. As such, there should be no wastewater treatment/management other than evaporation.

ASD concerns regarding an increased corrosion risk in the WESP due to the more concentrated water were communicated to the Applicant. Upgrades to steel components and assurances from the WESP supplier, Fujian, were added to the proposal.

4 Assessment of proposal

4.1 EPA assessment methodology

EPA undertakes an evidence and risk-based approach to its regulatory functions and decision-making while having regard for the object and principles of the *Environment Protection Act 2017* (EP Act) and all relevant regulations and frameworks. For this assessment, the application has been assessed against section 69 of the EP Act (and provisions referenced in that section, including any environmental values in the ERS), section 17 of the *Climate Change Act 2017* and the *Charter of Human Rights and Responsibilities Act 2006*.

4.2 Statutory matters for assessment - section 69 of the *Environment Protection Act 2017*

Any measures the applicant has taken or proposes to take to comply with the general environmental duty when engaging in the activity that is the subject of the application (s69(3)(a))

Without limiting the general duty set out in section 25(1) of the Act, section 25(4) states that a person who is undertaking a business or undertaking contravenes the GED if the person fails to do any of the following in the course of conducting the business or undertaking, so far as reasonably practicable:

(a) use and maintain plant, equipment, processes and systems in a manner that minimises risks of harm to human health and the environment from pollution and waste

The proposed new plant additions (WESP and 10 MW Heat Plant) in combination appear likely to minimise the risks of harm to human health and the environment that are significant from the current operation of the Facility (as evidenced by the numerous complaints and enforcement action over the years and ongoing). However, whether the new additions without other controls (such as reducing the hours of operation of the Facility from 24 hours a day, 7 days a week, to something less than that), represent a minimisation of risks of harm so far as reasonably practicable, is contentious. The Applicant has indicated it will upgrade the baghouse controls on DP21, which is likely to further assist in reducing emissions and overall risks of harm.

On balance, the proposed changes the subject of this application evidence an intention by the Applicant to comply with this requirement.

(b) use and maintain systems for identification, assessment and control of risks of harm to human health and the environment from pollution and waste that may arise in connection with the activity, and for the evaluation of the effectiveness of controls

The Applicant has agreed, after suggestion from EPA, as part of this Facility upgrade to install a CEMS to continuously monitor particulates levels being discharged from the new DP1 (the WESP outlet). This will be a useful system to identify any ongoing risks of harm and may lead to further prosecution if the new plant is not operating as suggested in the (revised) application. This may, in turn, lead to the need for further controls (and,

potentially in the future, require the Applicant to limit hours of operation of the Facility). The addition of a CEMS will be included as a proposed condition on the DL approval (see **Appendix B**).

The Applicant has also pointed to the Facility's Risk Management and Monitoring Program (RMMP) and Environmental Management System (EMS) as the primary systems which are used to assess and control risks at the Facility. The RMMP and EMS are maintained by periodic reviews and updates and the Applicant has stated that they will be updated as part of the commissioning process for the WESP and Heat Plant.

(c) use and maintain adequate systems to ensure that if a risk of harm to human health or the environment from pollution or waste were to eventuate, its harmful effects would be minimised

Again, the Facility's RMMP and EMS will be key to meeting this requirement.

(d) ensure that all substances are handled, stored, used or transported in a manner that minimises risks of harm to human health and the environment from pollution and waste

Again, the Facility's RMMP and EMS will be important in meeting this requirement. In addition, the Applicant points out that the Facility will be on concrete and water systems will be contained and bunded. Chemicals used in the WESP will be a flocculant or coagulant, to assist with recovering solids from the reticulation water and an alkali solution to adjust pH, most likely sodium hydroxide which is already handled on site. Estimated usage will depend on the operational status of the WESP but is likely to be:

- Sodium hydroxide 50% solution: 50-100 L/h.
- Flocculant/coagulant: 1-3 L/h.

The Applicant advises these chemicals, which are not volatile, will be present in the recycled water in relatively low concentrations, so the risk of air pollution is low. Any waste chemicals that cannot be used on site will be stored within the bunded area of the WESP compound or at the site's chemical storage area (also bunded to prevent accidental release to the ground or waterway) prior to transport off site by an accredited waste transport contractor. Updated work instructions will include response to spills, PPE, and handling, transport and storage procedures, minimising the risk of exposure to a person. Any spills or other incidents will be reported and investigated as per current procedures.

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(e) provide information, instruction, supervision and training to any person engaging in the activity to enable those persons to comply

The Applicant advises that updated work instructions, training and supervision will be provided to personnel responsible for operation of the WESP and Heat Plant as part of the commissioning process.

Impact of the activity on human health and the environment, including on any environmental values identified in any relevant ERS, taking into account any other activities being or proposed to be engaged in by the applicant or any other person (s69(3)(b))

The Applicant has detailed in its revised application how its activity (items 49 (F02 – Fibreboard works) and 12 (A08 – Waste to energy) in the Table in Schedule 1 to the Regulations, as modified by the matters set out in its proposal, ie, installation of WESP and 10 MW Heat Plant) will likely impact on human health and the environment.

(1) Class 1, 2 and 3 Air Quality Substances and Odour

(a) Nitrogen oxides (NOx) and Carbon monoxide (CO)

Nitrogen oxides (NOx)

Nitrogen Oxides are formed during the combustion of wood as fuel for the heat plant that provides hot air for the dryers. The Applicant advises that some fuel-based NO_x will also be emitted from the use of a proportion of recovered sander dust used as fuel for the energy plant. Some NOx may also be released from recycled particleboard that is used within the wood flake mix. Recycled wood makes up approximately 10-20% of the total wood feed. Particleboard contains cured urea-formaldehyde based resin, which is the glue that holds the wood particles together in the board. This resin would be oxidised in the combustion chamber during burning, releasing NOx. The contribution within the dryer is expected to be negligible compared to the thermal NO_x load.

The Applicant confirmed that the WESP installation is not expected to significantly impact NOx emissions from the existing energy plant nor the dryers. Current NOx limits are specified as 50 g/min (Jet dryer) and 200 g/min (Drum dryer) (see **Table 1**), equating to a combined discharge limit of 250 g/min. However, the Heat Plant, which will create energy from the WESP collected residues (and other site residues) will add a NOx load that will be discharged via the new WESP stack. Data from the supplier reveals NOx emissions at the WESP stack outlet will not be reduced compared to the combined emissions from the two operational dryers (see **Table 2** above).

The Applicant provided the following modelling to support the contention that proposed expected maximum ground level concentrations of NOx will be readily compliant with design criteria:

- The proposed WESP stack is 40-45 m in height (Fujian option) and therefore considerably higher than the existing Jet dryer (32 m) and Drum dryer (30 m) stacks. This height - coupled with no reduction in discharge velocity - will aid dispersion.
- Modelling of the WESP stack discharge (with a 4 MW Heat Plant) reveals peak hourly average NO_x concentration of 18 µg/m^3 at ground level at the site boundary, or 69 µg/m^3 with background, which is readily compliant with the air pollution assessment criteria (APAC) (in this case the ERS) of 151 µg/m^3 (1hr averaging period), and comprises only 12% of the criteria. (Ektimo modelling report, Attachment 6, refers to a criteria of 226 µg/m^3, which was the value given in the ERS at the time Ektimo's report was issued).
- Based on supplier information, increasing the capacity of the Heat Plant from 4 MW to 10 MW will result in an increase in total NOx emissions (Heat Plant and Dryers) from 289 g/min to 309 g/min, or around 7%. Assuming NOx concentrations at ground level at the site boundary increase by the same amount, emissions will be approximately 13% of the ERS criteria, and so will still be readily compliant. Refer to Table 8 below.
- NOx from feedstock can be managed by limiting the amount of reject particleboard, which contains urea-formaldehyde-based resins.
- Flame temperature management – lower combustion temperatures produce less NOx.

Carbon monoxide (CO)

Current licensed limits for CO are 50 g/min (Jet dryer) and 150 g/min (Drum dryer) (see **Table 1**) equating to a combined rate of 200 g/min from these two adjacent sources. The Applicant advised that modelling for emissions from the WESP and 4 MW Heat Plant predicted that the peak 8-hour average concentrations of CO with the Fujian WESP at the nearest rural dwellings was 0.008 mg/m3 which is not notably different to the adopted background and insignificant compared to the APAC of 10.4 mg/m3. (Refer Ektimo modelling report, Attachment 6.).

Based on updated information from the Heat Plant supplier, the Applicant advised that CO emissions from the **10 MW** Heat Plant are predicted to be 350 mg/Nm^3 but, as the modelling was based on a conservative figure of 1849 mg/Nm^3, ground level concentrations of CO at the site boundary are expected to be less than predicted by the modelling.

Predicted emissions from the WESP and the Heat Plant are included in **Table 8**.

The Applicant advised that it will be requesting that EPA alter the Facility's licence limits for NOx and CO.

Table 8: NOx and CO emissions from WESP, 4 MW Heat Plant and 10 MW Heat Plant

	CO		NOx	
Source	mg/Nm3	g/min	mg/Nm3	g/min
WESP	0.36	49	1.9	259
Heat Plant (4 MW)	1849	185	300	30
Heat Plant (10 MW)	350	35	500	50
Total (WESP + 4 MW)		234		289
Total (WESP + 10 MW)		84		309

(b) Volatile organic compounds (VOCs)

A number of VOCs that potentially can be emitted through the WESP are Class 2 and 3 indicators under the EP Regulations (eg, Aldehydes, Ketones and Monocyclic aromatic hydrocarbons), while others are captured as an indicator in the Environment Reference Standard as having odour eg, Pinenes.

The Applicant provided Ektimo testing results for a similar particleboard manufacturing facility (Carter Holt Harvey, Gympie) showing the typical VOC composition after a WESP was installed (**Table 9**).

Table 9: Typical VOC composition of particleboard dryer emissions after installation of WESP

VOC substance	Form	Make Up %
Pinenes	α- & β-Pinene, D-limonene	90-95% eg, 80 mg/m^3
Aldehydes	Formaldehyde, Acetaldehyde	< 2% eg, 1 mg/m^3
Ketones	Acetone	< 8% eg, 6 mg/m^3
Monocyclic aromatic hydrocarbons	Benzene, toluene, xylenes	< 5% eg, 4 mg/m^3
Other	Eg, Decanes, 3-Carene, trimethylbenzene	< 1%

Source: Ektimo Report N87816, CHH Gympie WESP, August 2011

- **Pinenes**

According to the Applicant, pinenes ($C_{10}H_{16}$) are the principal VOC likely to be emitted through the WESP. These compounds are widely found in nature, particularly as

constituents in pine tree resin. Pinenes have a range of uses in common products including household fragrances, as pain relief and within a range of pharmaceuticals. Pinenes originating in pine tree timber are released during the drying process at the Facility. They are colourless, insoluble in water, and have boiling points of around 157–167°C.

Due to the above properties, pinenes are not effectively removed by the water scrubbing process in the WESP. However, droplets can form during condensation and particles, being charged, can be removed by the electrostatic precipitator.

Modelling of odour from the WESP, which was based on the maximum in stack VOC and the odour threshold concentration of the most odorous substance detected during testing, alpha-Pinene. The highest predicted odour concentration was 0.4 OU compared to the assessment criterion of 1OU, typically applied in residential areas.

- **Aldehydes (formaldehyde and acetaldehyde)**

Formaldehyde

Formaldehyde is a solvent used in the resin in the particleboard manufacture process. It is a carcinogenic, flammable, colourless and reactive gas with a pungent odour and has been associated with nose and throat irritation in humans after short-term exposure at even low levels.

Limits for formaldehyde are not listed in the ERS. EPA Publication 1961 *Guideline for assessing and minimising air pollution in Victoria*, February 2022, provides air pollution assessment criteria (APAC) in Table 3 Table of health-based APACs. The APACs listed for formaldehyde are (cumulative):

- 30 mins = 0.08 ppm (100 µg/m^3)
- 24 hours = 0.04 ppm (49 µg/m^3)
- 1 year = 0.008 ppm (9.8 µg/m^3)

The Applicant advises that formaldehyde concentrations at the WESP discharge point are guaranteed by the supplier to be <5 mg/m^3 and that this is consistent with obtained stack test results that reveal formaldehyde concentrations of up to 1 mg/m^3.

Modelling of the stack discharge of formaldehyde at a discharge rate of 12 g/min (5 mg/m^3) results in maximum ground level concentrations at the nearest rural dwelling of 0.1-1 µg/m^3, which is at most 3% of any assessment criteria (regardless of averaging time) and 23% when all site sources of formaldehyde are included. At and beyond the site boundary the peak predictions represented up to 85% of any criterion.

As such, the Applicant advises that the cumulative impact of the abated emissions from the WESP and the tested emissions from the other sources will be compliant with the APAC figures.

Acetaldehyde

Acetaldehyde is formed as a product of many processes, including the incomplete combustion of wood in fireplaces and woodstoves, the roasting of coffee beans, the combustion of gasoline and diesel fuel in motor vehicles, refining and waste processing in coal plants, the combustion of fossil fuels in power plants, the photo-chemical oxidation of hydrocarbons in the atmosphere.

Acetaldehyde concentrations at the post WESP discharge point are guaranteed by the supplier to be <5 mg/m3. As per formaldehyde, stack test results on other WESPs reveal acetaldehyde concentrations of below 1 mg/m^3.

EPA Publication 1961 sets out the APACs for acetaldehyde as:

- 1 hour (cumulative) = 0.3 ppm (470 µg/m^3)
- 1 year (cumulative) = 0.005 ppm (9 µg/m^3)
- 1 year (incremental) = 0.003 ppm (4.5 µg/m^3).

The Applicant extrapolated acetaldehyde emissions based on modelling of the stack discharge of formaldehyde at a discharge rate of 12 g/min (5 mg/m^3), concluding that maximum ground level concentrations at the nearest rural dwelling would be around 0.1-1 µg/m^3, which is at most 3% of any assessment criteria (regardless of averaging time) for acetaldehyde. Again, the impact of the abated emissions from the WESP is expected to be compliant with the above APACs.

- **Ketones (acetone)**

Acetone is a clear, colourless, highly volatile, flammable liquid with a characteristic aromatic odour. It finds widespread use as a solvent (eg, nail polish remover). Inhalation of acetone vapours in high concentrations (ie, >500 ppm, or >1,200 mg/m^3) produces dryness of the mouth and throat, dizziness, nausea, uncoordinated movements, loss of coordinated speech, drowsiness and, in extreme cases, coma.

EPA Publication 1961 sets out the APACs for acetone as (cumulative):

- 24 hours = 26 ppm (61,763 µg/m^3)
- 1 year = 13 ppm (30,882 µg/m^3).

The Applicant advises that concentration at the discharge point will be <10 mg/m^3 so concentrations at ground level will be insignificant in terms of risks to human health or the environment.

- **Monocyclic aromatic hydrocarbons (Benzene, toluene, xylene)**

Benzene is the most significant monocyclic aromatic hydrocarbon in terms of human health impact. Other MAHs such as toluene and xylene are less toxic and generally found in lower concentrations than benzene in WESP emissions. The Applicant advises the benzene has not previously been detected in stack testing at the Facility.

Benzene is a clear, colourless, highly flammable liquid that has a sweet petroleum like odour. It is an aromatic hydrocarbon and is a natural component of crude and refined petroleum. Benzene can also be used as a solvent in manufacturing, paints, varnishes, lacquer thinners and gasoline. It is highly toxic, carcinogenic and mutagenic and a Class 3 substance in the EP Regulations. Again, no limits are set out in the ERS for benzene, so we need to look at EPA Publication 1961. The APACs listed for benzene are:

- 1 hour (cumulative) = 0.18 ppm (580 µg/m^3)
- 24 hours (cumulative) = 0.009 ppm (29 µg/m^3)
- 1 year (cumulative) = 0.003 ppm (9.6 µg/m^3)
- 1 year (incremental) = 0.0005 ppm (1.7 /m^3).

Again, the Applicant extrapolated the likely benzene emissions based on its similar, but lower, concentration of formaldehyde stating that, with an air emissions rate of 12 g/min (5 mg/m^3), concentrations at ground level will likely be insignificant in terms of risks to human health or the environment (eg, < 0.1 µg/m^3 as an annual average and < 1 µg/m^3 as a 24-hour average).

- **Others**

The other substances listed in **Table 8** are likewise modelled by the Applicant as unlikely to pose a risk of harm to human health or the environment following installation of the WESP and Heat Plant.

(c) Odour (General)

Ektimo modelling provided by the Applicant showed that the highest predicted odour concentration was 0.4 OU compared to the assessment criterion of 1OU, typically applied in residential areas (again, noting this modelling does not include the Heat Plant but **Table 2** above does). As such, the ERS objective of an "air environment that is free from offensive odours from commercial, industrial, trade and domestic activities" is unlikely to be contravened for the odorous VOC emissions from this stack, abated by

the WESP design. Following dispersion, concentrations likely to be present at ground level will be of no health or environmental consequence. As such, this indicates a low risk of harm from odour.

In addition, the Applicant advises that experience with WESP operations at the particleboard site in NSW (Tumut, Oberon) where neighbours are within 500 m, and in South Australia (Mt Gambier) where neighbours were within 200 m identified no objectionable odours were observed. Occasionally pinenes were detected but it was not clear whether this was from yard storage of timber or from the WESP discharge. As the closest residential neighbour to the Applicant is ~500 m from the proposed location of the WESP, the Applicant assumes no odour impacts will occur.

(2) Particulates and visible impact ("blue haze")

As set out in section 2.2 above, the supplier's guarantees for particulates is: < 15 mg/m^3 (dry), with an input loading of up to 900 mg/m^3.

(a) Total suspended particles (TSP – ie, >10 μm)

TSP is generally seen as affecting amenity via visible pollution (expressed through dust deposition or visible plumes). The Applicant provided Ektimo modelling of TSP for the Fujian WESP indicating the highest predicted increment was 140 μg/m^3 for a total of 212 μg/m^3 compared to the assessment criterion of 330 μg/m^3 over a 3-minute averaging period (See p29 of the Ektimo report (R011332)) The highest predicted increment at any rural dwelling was 15% of the assessment criterion. There are no indicators and objectives for TPS in the ERS but, according to the Ektimo report, the emissions are readily compliant with the AQAC – noting this is now referred to as APAC in the recently published EPA Publication 1961, which also does not have limits for TSP).

(b) PM_{10} and $PM_{2.5}$

As set out in EPA Publication 1961, current health research indicates that the smaller size fractions have a greater influence on human health. PM_{10} ("thoracic" particles smaller than 10μm in diameter) can penetrate into the lower respiratory system, while $PM_{2.5}$ ("respirable" particles smaller than 2.5μm in diameter) can penetrate into the gas-exchange region of the lungs and the bloodstream. The Applicant advised that the majority of particulate matter exiting the WESP is expected to be in the PM_{10} range.

The ERS lists the maximum concentration indicators and objectives for these particulates as:

- PM_{10} = 50μg/m3 (1 day) or 20 μg/m3 (1 year)
- $PM_{2.5}$ = 25μg/m3 (1 day) or 8 μg/m3 (1 year)

Ektimo modelling provided by the Applicant for PM_{10} shows that the maximum predicted daily average ground level concentrations of PM_{10} at the nearest sensitive receiver rural dwellings, was 1.6µg/m^3, or 3% of the assessment criterion. The highest annual average increment at these rural dwellings for all assessment years was 0.4µg/m^3, or <2% of the assessment criterion.

Modelling for $PM_{2.5}$ shows that the maximum predicted daily average ground level concentrations at the nearest sensitive receiver rural dwellings, was 0.4µg/m^3, or less than 2% of the assessment criterion. The highest annual average increment at these rural dwellings for all assessment years was 0.1µg/m^3, or <1% of the assessment criterion.

As such, the Applicant suggests the WESP emissions for PM_{10} and $PM_{2.5}$ will be readily compliant with the above ERS indicators and objectives.

While the above assessment, carried out by Ektimo, was prior to inclusion of the 10MW Heat Plant, the figures in **Table 2** above show that particulates and visible emissions ("blue haze") are expected to be very significantly reduced by the addition of the WESP and Heat Plant, this being touted as the main benefit accruing as part of this application.

Principles of environment protection

The principles of environment protection are set out in Part 2.3 of the Act. Dealing with each in turn:

Section 13 – Principle of integration of environmental, social and economic considerations

The Applicant undertook a reasonably comprehensive assessment of available technologies for upgrading the Facility (see Attachment 2 to the application, both original and revised). The considerations encompassed, to a greater or lesser extent, each of the 3 limbs of this principle. The Applicant was endeavouring to find the best technology to reduce both the environmental impacts of its operations as well as the associated social impacts on the neighbouring properties (impacts on those neighbours enjoying their property with friends and family), while also ensuring the proposed upgrade was cost effective. Another aspect of the social limb is that, if the Applicant does not upgrade its Facility to reduce its impacts, it will likely continue to be prosecuted for pollution offences and may ultimately have to shut down, resulting in dozens of lost jobs and affecting the regional economy around Benalla. As such, it can be seen that environmental, social and economic considerations are being integrated to at least some extent.

Section 14 – Principle of proportionality

The actions being proposed in this application (installation of pollution controls in the form of a WESP and Heat Plant) are directed towards minimising the risks of harm to human

health and the environment from the activity. In a similar vein to the above principle, these actions are arguably proportionate to the real harms sought to be addressed. While the upgrades are expensive, they are nonetheless a proportionate response to deal with the ongoing pollution from the activity, as evidenced by the multiple and ongoing enforcement action. The draft conditions proposed in **Appendix B** are also proportionate to the environmental risks from the ongoing activity. It is expected that, with the proposed upgrades, the activity of fibreboard (particleboard) manufacture at the Facility will be more proportionate to the harm caused.

Section 15 – Principle of primacy of prevention

This proposed amendments to the Facility set out in the application seek to prevent harm to human health and the environment by significantly reducing, predominantly, the particulate and "blue haze" emissions from the Drum and Jet dryers, which are highly polluting in their current form. Whether this approach will be successful without additional controls (such as reduced operating hours which might be seen as a better example of prevention over mere mitigation) remains to be seen, particularly given the increased emissions for certain other pollutants, including greenhouse gases, expected from the inclusion of the larger Heat Plant (see **Table 2** above).

Section 16 – Principle of shared responsibility

The Applicant has estimated the WESP and Heat Plant additions will cost in excess of $6,000,000, plus yearly operating and maintenance costs of around $127,000. In order to off-set the ongoing costs of the upgrades, the Applicant advised it asked an organisation called Corporate Carbon to investigate if the project can be used to create Australian Carbon Credit Units (ACCU) under the federal government's Emission Reduction Fund Carbon Credit scheme. Initial advice from Corporate Carbon is that the project would create between 5,000 and 6,000 ACCUs per annum, depending on how much sander dust was being burnt directly in the dryers and, at current carbon prices, that is worth $160 - $200,000 per year, which would off-set the operating costs. If this funding is secured, then protection of the environment from the impacts of this activity can be seen, to some extent, as a responsibility shared by industry (the Applicant paying for the upgrades), government (ERF funding plus ongoing regulation and enforcement by EPA and local council - BRCC) and the public (neighbours subject to ongoing pollution from the activity, albeit expected to be lower than currently, at least for particulates and haze), which addresses this principle.

Section 17 – Principle of polluter pays

It is the Applicant that is bearing the bulk of the considerable costs of the upgrades to the activity at the Facility (set out above). As the entity creating the pollution, this is appropriate.

Section 18 – Principle of waste management hierarchy

As the Applicant advises, waste management is integral to the particleboard process because it uses waste wood, thereby reusing rather than disposing of that wood. In addition, the Applicant, by upgrading its plant to install a WESP, seeks to avoid the greater pollution currently being created by the Drum and Jet dryers. "Avoidance" is at the top of the waste management hierarchy. The installation of a large Heat Plant will be recovering energy and, it is intended, replacing use of gas to fuel at least one of the dryers by utilising the solid material recovered ("wet cake") and, again, avoiding or minimising another waste stream. Spent scrubbing water will be sprayed onto wood waste being fed into the Heat Plant as fuel and, ultimately, only minimal waste is expected to require disposal. As such, the proposed upgrades further ensure that wastes being used in, or generated by, the particleboard activity are being managed in accordance with the waste hierarchy set out in this principle.

Section 19 – Principle of evidence-based decision making

As mentioned above in relation to the section 13 principle, the Applicant undertook a relatively comprehensive, evidence-based, assessment of options for the upgrades. This included obtaining testing results for several comparable facilities using WESPs around Australia. In addition, the decision on this exemption application has been made after considering all the evidence provided by the Applicant (including from formal RFIs and multiple emails seeking additional information), undertaking further research and seeking the expert opinions of ASD staff who based those opinions on the best available evidence, of which they are aware, in circumstances that are relevant and reliable.

Section 20 – Precautionary principle

As indicated by the multiple complaints from neighbours and ongoing EPA Region enforcement activity due to the Applicant's non-compliance with operating licence emission limits, it is clear that there currently exists a threat of (or actual) serious harm to human health or the environment from the particleboard activity undertaken at the Facility. It is fair to say that EPA does not have full scientific certainty that the proposed installation of the pollution controls (WESP and 10 MW Heat Plant) will sufficiently reduce the emission of pollutants from the new DP1, compared to DP4 and DP17, so that all emissions limits are met. EPA is confident that particulates and blue haze will reduce but as mentioned above, other pollutants are actually predicted to increase and may require amendments to the limits in the Applicant's OL. Nevertheless, this principle works to ensure risk control measures are not postponed simply because there is no full scientific certainty regarding the risks of harm that will or may remain after installation of the control measures.

Section 21 – Principle of equity

Currently, the neighbours living around this facility are disproportionately subject to the pollution being emitted. These people are entitled to live in a safe and healthy environment, despite living where they live. If this application is not granted, the high levels of pollution (particularly particulates and blue haze) will certainly continue at all hours (although, as mentioned, this may ultimately lead to the Facility being shut down due to multiple prosecutions, which may be a better outcome for the neighbours). It is of concern that, if the Applicant's estimates of reduced GHG emissions via use of waste rather than natural gas, then GHG emissions will increase due to the larger Heat Plant now being proposed (and noting any addition of GHG into the atmosphere adds to climate change) but, again, this is offset by reduced freshwater usage and the other benefits discussed above.

Section 22 – Principle of accountability

The Applicant advises it has endeavoured to provide the public, particularly those living closest to the Facility, access to reliable and relevant information on the proposal. Online stakeholder meetings have explained the initial proposal (WESP and 4 MW Heat Plant) and canvassed the benefits. It is unclear whether the revised proposal has been consulted on.

Section 23 – Principle of conservation

Biological diversity and ecological integrity should not be threatened by this proposal.

Best available techniques or technologies

As identified by the Applicant, a WESP is in use to several other similar facilities around the country, notably Borg in NSW and CHH, Gympie, Queensland. **Table 10** sets out the comparison provided by the Applicant, to verify its supplier's guarantees, detailing emissions from those 2 facilities.

Table 10: Emissions from WESPs at other engineered wood product manufacturers (Source: p15, Revised application)

Site	WESP Type	TPM (mg/m^3)	Formaldehyde (mg/m^3)	VOCs (mg/m^3)	Blue Haze	NOx (mg/m^3)	CO (mg/m^3)
Borg	Scheuch	9.4	0.44	Not reported	None visible	210	Not reported
Carter Holt Harvey - Gympie	Unknown	10-14	0.16	~ 20-130	None visible	340-520	1400-1600

Conclusions from the Applicant based on the above were that its supplier's guaranteed emissions will be readily achieved but also that the guaranteed emission concentration for formaldehyde of <5 mg/m^3 is likely to be conservative, as lower emissions are being achieved using the same or similar technology at the above facilities. As set out in section 2.2 above, the Applicant has listed a range of advantages to the use of a WESP to support its contention that a WESP is BATT or a reasonable approximation of BATT.

The LAO contact the European Commission - the European Integrated Pollution Prevention and Control Bureau (EIPPCB), part of the Circular Economy and Industrial Leadership Unit, in particular - to check whether a WESP is considered among BAT for particleboard manufacturing and received the following response on 13/12/21:

"The technique mentioned in your email (wet electrostatic precipitator) is among the techniques listed in the WBP BREF to prevent or reduce emissions to air from dryers and presses (BAT 17 and BAT 19, in section 5.2 of the WBP BREF and section 1.2 of the BAT conclusions). However, please note that the techniques listed and described in BAT conclusions are neither prescriptive nor exhaustive. Other techniques may be used that ensure at least an equivalent level of environmental protection.".

Confirmation of the above is set out at this link: https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32015D2119&from=EN

As mentioned above, ASD Air expert also confirmed he considered the technology proposed should be consistent with what is considered BATT though, "as always, it comes down to how well it is operated".

Proposal consistency with Act and Regulations

Whether the activity, as modified by the addition of the proposed WESP and 10 MW Heat Plant, ends up being otherwise consistent with the new EP framework, remains to be seen. However, if all the conditions are met, the plant is operated as per the manufacturer's and supplier's instructions, and the proposed upgrade to the DP21 baghouse (mentioned above in section 4.2) goes ahead, it is expected the activity will be compliant (though discharge limits and the relevant DP will need to be amended on the operating licence - OL 9379).

Prescribed referrals

Comments from prescribe external and internal referrals are referred to above (section 3.2). All comments have been taken into account in preparing this Assessment Report. No external referee has indicated the application should be refused outright, all appreciating that the intention behind the application is to reduce pollution emanating from the Facility and better ensure compliance with current emission limits (again noting some changes to those limits will be sought), thereby reducing or eliminating future complaints from neighbours about being blanketing by particles and haze.

Other submissions

Again, all comments from internal referrals (ASD and Region, among others – section 3.3 above) have also been taken into account in preparing this Assessment Report. Multiple RFIs and informal emails were generated based in large part on comments and advice received from ASD experts and the Region, the latter being very experienced in dealing with this Applicant and, accordingly, providing useful information on compliance and other issues. Internal referees have been kept in the loop of this assessment throughout its entirety.

Any prescribed matter

Regulation 19 of the EP Regulations sets out prescribed matters for the refusal of a permission. This regulation states that EPA must refuse a DL if the application specifies an activity involving a wastewater discharge or deposit to surface waters in a "special water supply catchment". As the revised Application means there will be no wastewater discharge offsite, this regulation is not relevant (and, in any event, the Facility appears not to be located in such a catchment).

4.3 Statutory matters for assessment - section 17 of the *Climate Change Act 2017*

Section 17 of the **Climate Change Act 2017** (CC Act) requires specified statutory decision-makers, when making specified decisions, to have regard to the following, as set out in section 17(2) of the CC Act—

(a) the potential impacts of climate change relevant to the decision or action; and
(b) the potential contribution to the State's greenhouse gas emissions of the decision or action; and
(c) any guidelines issued by the Minister under section 18.

Schedule 1 to that Act states that such decisions include a decision by EPA relating to licences and permits under the EP Act.

In having regard to the potential impacts of climate change, the relevant considerations are the following, as set out in section 17(3) of the CC Act—

(a) potential biophysical impacts; and
(b) potential long and short term economic, environmental, health and other social impacts; and
(c) potential beneficial and detrimental impacts; and
(d) potential direct and indirect impacts; and
(e) potential cumulative impacts.

In having regard to the potential contribution to the State's greenhouse gas emissions, the relevant considerations are the following, as set out in section 17(4) of the CC Act—

(a) potential short-term and long-term greenhouse gas emissions; and
(b) potential direct and indirect greenhouse gas emissions; and

(c) potential increases and decreases in greenhouse gas emissions; and
(d) potential cumulative impacts of greenhouse gas emissions.

In accordance with section 17 of the CC Act, the LAO has regard to the matters set out in that provision in deciding whether to recommend approval of this application.

In relation to section 17(2)(a) of the CC Act, while the impacts of climate change are already affecting almost all areas of the planet and most people and industries, it is difficult to predict how they might impact this proposal, in particular. The Facility does not appear especially prone to flooding or bushfire risk, both of which are increased with increasing global temperatures. More extreme heat days may impact production at certain times, but this is not guaranteed.

Regarding section 17(2)(b) of the CC Act, the Applicant estimates the potential net reduction following installation of the new WESP and 10 MW Heat Plant (see 3rd table in **Table 4** above) is 7,508 tonnes CO_2-e. This is despite the fact that the new installations will use more fuel and is based, predominantly on reduction of natural gas use due to the Heat Plant burning the waste and heating one of the dryers. As such, these figures are somewhat dubious.

In relation to section 17(2)(b) of the CC Act, while the proposal would still see the emission of a significant amount of GHG each year from the Facility (30,568 t CO_2-e/yr per 2nd in **Table 4** above), in comparison, in 2019 Victoria's total net emissions were 91.3 million tonnes of CO_2-e (creatively taking into account -20 Mt CO_2-e from forests and plantations that, currently, are not being logged, cleared or burnt in bushfires: https://www.climatechange.vic.gov.au/victorias-greenhouse-gas-emissions-and-targets). As such, this Facility represents just 0.033% of the State's total net emissions. While not insignificant for a single particleboard manufacturer, arguably the Applicant is not a major contributor to climate change. In addition, the Applicant has undertaken to carry out future reviews of its operations to identify any further opportunities to minimise GHG emissions. This is appropriate under the GED, a concept based in large part on ensuring continual improvement from duty holders.

4.4 Other matters for assessment

Human Rights Charter

Section 38 of the *Charter of Human Rights and Responsibilities Act 2006* (Charter Act) states that: "Subject to this section, it is unlawful for a public authority to act in a way that is incompatible with a human right or, in making a decision, to fail to give proper consideration to a relevant human right.". In the context of EPA deciding whether to grant a permission, this section requires that the decision maker:

(a) understand which Charter human rights are relevant to the decision;

(b) identify any interference or limitation the decision might place on those rights (ie, understand whether and how the decision will interfere with or limit those rights);

(c) consider what possible impact the decision will have on those rights in relation to all people affected by the decision; and

(d) justify the decision, having balanced any competing interests or obligations, including whether any interference or limitation on the rights is reasonable, justifiable and proportionate.

Regarding the decision whether to grant the development licence sought under this application, the most relevant right is probably section 20 (*A person must not be deprived of his or her property other than in accordance with law*). A decision to refuse the application, eg, on the basis the Applicant is not a fit and proper person, might have the effect that the Applicant ultimately loses its licence (OL9379) to operate the Facility (holding a licence is a form of property). The reasoning is that if a person is a not fit and proper person to obtain a DL, then arguably that person is also not a FAPP to hold any permission under the EP framework and, as such, should have its existing OL revoked. As such, the decision would have to be well justified on the evidence (of which there is plenty to suggest the Applicant regularly contravenes the conditions of its operating licence and, arguably, the GED). On the other hand, allowing the Applicant to continue polluting the neighbouring properties may arguably amount to a limitation on those neighbours' rights to enjoy their property. In relation to both the above considerations, it seems clear that a decision to approve the DL application - to install greater pollution controls at the Facility - would benefit both the Applicant and the long-suffering neighbours. It would reduce the pollution being emitted, while allowing the Applicant to continue operating under its OL.

It should be noted that the Human Rights Charter rights apply only to natural persons (that is, humans), not bodies corporate. The Applicant (Monsbent Pty Ltd) is a body corporate, so it would be incumbent on the sole director of the Applicant, D Henderson, to seek to assert any breach of the Charter as against himself, as set out above, in the event he loses his licence to operate. The LAO considers this scenario as both unlikely to eventuate or, if it did, unlikely to succeed.

Another relevant Charter right is that set out in section 9 of the Charter Act (*Every person has the right to life and has the right not to be arbitrarily deprived of life*), while the Charter Guidelines state, at p59:

'In international human rights law, the right to life requires a government to refrain not only from the intentional and unlawful taking of life but also to take appropriate steps to safeguard the lives of those within its jurisdiction. This means that the government is required to put in place a system for the administration of criminal law that aims to deter the commission of offences against the person. This must be supported by law enforcement machinery for the prevention and punishment of breaches of the criminal law. More specifically, the government has an obligation to take action where it is aware that someone's life may be at risk.'.

So, as the EP Act is criminal legislation (like OHS legislation), it may be argued that the decision-maker is breaching this Charter right if it approves a DL/OL while aware that this might endanger the lives of nearby residents. The pollution incidents suffered by the residents neighbouring the Facility, fortunately, do not appear to reach this high standard and, in any event, this application should reduce the pollution emanating from the Facility.

4.5 Financial assurance

N/A

4.6 Activity risk mapping

The following table (**Table 10**) outlines all the risks associated with the application, the proposed control measures and whether the risk can be covered by the GED alone or by a condition, whether standard or bespoke.

Table 10: Proposed EPA management of activity risks

Source	Risk	Pathway	Control	Covered by GED alone (Y/N)	Existing standard condition (Y/N)	Condition code or bespoke condition required
Contaminated groundwater		Leaching	Using 10 MW Heat Plant to avoid any wastewater	N	Y: DL_G3	
Contaminated surface water		Surface water runoff	Using 10 MW Heat Plant to avoid any wastewater	N	Y: DL_G3	
Noise		Dryers, WESP and Heat Plant	Noise monitoring, ensuring all operators are below the exposure standards	N	Y: DL_R1, DL_R4	
Air pollution		WESP and Heat Plant	CEMS on WESP stack; interlock; alarm	N	Y: DL_W6, DL_W7, DL_W8	

4.7 Summary of assessment

This application is from a licence holder with an extensive history of non-compliance with the old EP framework and its licence conditions. That non-compliance has now been extended to the new EP framework, with ongoing remedial notices and enforcement action from the North-East Region. Much of the non-compliance relates to emissions of particulates and blue haze from the discharge points attached to the particleboard dryers, resulting in significant pollution issues for neighbouring properties.

This application has been touted by the Applicant as a (or, in fact, the) solution to its non-compliance woes. The Applicant has clearly done some research into finding a solution, examining various options to manage the pollution before finally landing on the WESP as an example of BATT in this field. As mentioned above, the initial application was for a WESP with a 4 MW Heat Plant. When EPA raised issues regarding how the Applicant would deal with the contaminated water from the WESP, it revised its application to increase the size of the Heat Plant to 10 MW. This has the dual benefit of considerably reducing the amount of fresh water needed to replenish the system and ensuring no wastewater needs to be discharged offsite (other than as evaporation). However, it also requires more energy and can result in greater emissions of certain pollutants, including GHG.

It is clear something needed to be done to improve the environmental performance of the Applicant's Facility. On balance, the LAO is satisfied that the current proposal – WESP and 10 MW Heat Plant (in addition to the proposed baghouse upgrade to DP21 and the use of a CEMS to monitor particulates discharging from the new DP1) – will, at least, significantly reduce the levels of particulates and blue haze being emitted which should improve both the Applicant's ongoing compliance with its licence emission limits (noting the Applicant has flagged future request for changes to those limits) and the right of its neighbours to enjoy their properties, relatively free from the risk of being blanketed in pollution.

5 Recommendation

The conclusions of the assessment are that if the Applicant is granted this development licence as proposed, installs the new WESP and Heat Plant, operates them according to the manufacturers' specifications and complies with the proposed conditions set out in **Appendix B**, the Applicant will likely be discharging significantly less pollution, particularly in the form of particulates and blue haze. On balance, it is considered that the Applicant will then be meeting its GED, other requirements under the EP framework and its emissions limits (as likely revised under a future amended OL), however, this is not certain and may require additional risk controls or measures, such as reduced operating hours.

Nevertheless, it is recommended that the application for the development licence is approved under Section 69(1)(a) of the *Environment Protection Act 2017*, subject to the proposed conditions of approval, as per **Appendix B** of this report.

Appendix A List of application documents and information

- DL Application received on 26/10/21, including the following Attachments—
  - Attachment 1 - Pathways Application 2021-08-16
  - Attachment 2 - Selection of abatement equipment matrix.xlsx
  - Attachment 3 - Fujian WESP Technical proposal.pdf
  - Attachment 4 - Noise Model including WESP.pdf (Hear Data P/L)
  - Attachment 5 - WESP & Heat Plant - Plant and Process Description.docx
  - Attachment 6 - Emissions Modelling Report R011332.pdf
  - Attachment 7 - WESP & Heat Plant Qualitative Risk Assessment.xlsx
  - Attachment 8 - Heat Plant Specification.pdf
  - credit check.pdf
  - F1017 - Fit & Proper Person.pdf
  - F1018 - Prohibited Person.pdf
  - IGN-00001339.pdf
  - infringements_prosecution.pdf
  - MONSBENT Development Licence Application and Risk Assessment - WESP & Heat Plant.docx
  - prosecution court orders.pdf
  - prosecution.pdf
  - WESP operating costs.pdf
- Revised application received on 4/4/22, including the following Attachments—
  - MONSBENT WESP DL Application UPDATE 29 March 2022
  - Attachment 1 - Pathways Application 2021-08-16 (no change)
  - Attachment 2 - Selection of abatement equipment matrix.xlsx (no change)
  - Attachment 3 - Fujian WESP Technical proposal.pdf. Changes:
    - Particulate infeed loading increased to 900 mg/m3.
    - Gas volumetric capacity increased to 220,000m3/annum.
    - Water recycling system updated and daily top-up/change-over volume reduced to ~6-8 m3 per day.

    - Electrodes upgraded from SS316 to duplex 2205 and increased in size and power.
- Attachment 5 – process descriptions now incorporated into main document (MONSBENT WESP DL Application UPDATE 29 March 2022)
- Attachment 6 – Emissions Modelling Report R011332.pdf (no changes)
- Attachment 7 – WESP & Heat Plant Qualitative Risk Assessment.xlsx; Changes: references to modelling (attachment 6) and odour surveys; minor changes to phrasing of recommendations to reduce NOx and CO.
- Attachment 8 – multiple technical documents describing the new (10 MW) heat plant.

Appendix B Draft conditions

DL_G1	A copy of this licence must be kept at the site and be easily accessible to persons who are engaging in an activity conducted at the site. Information regarding the requirements of the licence and the Act duties must be included in site induction and training information.
DL_G2	The development activities must be constructed, installed and commissioned in accordance with the approved plans and documents referenced in TABLE 1. In the event of any inconsistency between the approved documents and the conditions of this permission, the conditions of this permission shall prevail.
DL_G3	Subject to the following conditions, this development licence allows you to: install and commission a Wet Electrostatic Precipitator (WESP) to treat the air emissions from two existing wood chip dryers (Drum Dryer and Jet Dryer), as well as an associated 10 MW Heat Plant to recover energy from collected solid wood waste
DL_G4	This permission does not take effect until a copy of any planning permit or amendment to a planning scheme required under the **Planning and Environment Act 1987** (Vic) and related planning schemes has been provided to the Authority by the applicant.
DL_G5	This permission expires on the earlier of: (a) on the issue or amendment of an operating licence or permit relating to all activities covered by this permission; or (b) when the Authority advises in writing that all activities covered by this permission have been satisfactorily completed and the issue or amendment of an operating licence or permit is not required; or c) on the expiry date listed on the front page of this permission.
DL_C1	Commissioning activities must be undertaken in accordance with the commissioning plan approved by the Authority.
DL_C2	You must immediately notify the Authority by calling 1300 EPA VIC (1300 372 842) in the event of: a) a discharge, emission or deposit which gives rise to, or may give rise to, actual or potential harm to human health or the environment; b) a malfunction, breakdown or failure of risk control measures at the site which could reasonably be expected to give rise to actual or potential harm to human health or the environment; or c) any breach of the licence.

DL_C3	Construction and Commissioning must not cause or result in any breach of any permission issued by the Authority for the permission activity, except where authorised by a condition of this licence.
DL_C5	1. You must develop a risk management and monitoring program for your activities which: (a) identifies all the risks of harm to human health and the environment which may arise from the activities you are engaging in at your activity site; (b) clearly defines your environmental performance objectives; (c) clearly defines your risk control performance objectives; (d) describes how the environmental and risk control performance objectives are being achieved; (e) identifies and describes how you will continue to eliminate or minimise the risks in 1(a) (above) so far as reasonably practicable; and (f) describes how the information collated in compliance with this clause, is or will be disseminated, used or otherwise considered by you or any other entity. 2. The risk management and monitoring program must be: (a) documented in writing; (b) signed by a duly authorised officer of the licensed entity (c) made available to the Authority on request.
DL_C6	Within 45 days of the expiry of this permission, you must provide to EPA a report detailing the results of the commissioning monitoring program.
DL_C12	Waste from the activity site must not be discharged or disposed of to the environment except in accordance with this permission and with any other permission issued by the Authority that may relate to the activity site.
DL_R1	At least 60 days before the commencement of any commissioning, you must provide to the Authority a commissioning plan that includes: (a) stack testing monitoring program which must be conducted during typical operating conditions, including the maximum emission levels under normal conditions (b) noise testing to show that the noise objectives informing the detailed design can be achieved during typical operating conditions (c) monitoring of wastewater generation rate and contaminant levels and assessment of the effectiveness of the proposed wastewater disposal method

DL_R2	You must not commence commissioning of the operating components of the development activities until you have received the Authority's written approval of the commissioning plan which is required pursuant to condition(s) DL_R1.
DL_R4	At least 45 days before the commencement of any construction, you must provide to the Authority a report that includes: noise assessment for the detailed design based on the actual sound emissions for the final selection of all equipment and plant (including the 10 MW Heat Plant) and considering all noise pathways (including potential noise pathways for the Drum Dryer and Jet Dryer). The noise assessment report must evidence that: (a) all reasonably practicable noise control measures have been incorporated in the design; and (b) the residual noise will neither result in an exceedance of the noise limits set by Part 5.3 of the EP Regulations, nor unreasonable noise being otherwise emitted.
DL_W2	You must notify the Authority in writing when the development activity authorised by this permission has commenced.
DL_W3	You must notify the Authority when the construction associated with the development activities covered by this approval has been completed.
DL_W4	You must not commission or use the operating components of the development activities without the written approval of the Authority.
DL_W6	You must install on the WESP discharge stack a device capable of continuously and accurately measuring and recording the particulate, carbon monoxide and nitrogen dioxide emissions.
DL_W7	You must install a device capable of activating an alarm that warns the operator whenever the continuous monitoring exceeds your Operating Licence discharge limits.

DL_W8	You must install an interlock device that can and will shut down the Drum Dryer and the Jet Dryer if the WESP ceases operating as intended
DL_W9.1	You must install all exhaust stacks so that provisions for sampling are included in accordance with “A Guide to the Sampling and Analysis of Air Emissions and Air Quality” (EPA Publication 440.1, released December 2002), or as approved by the Authority.
DL_W10	You must implement all liquid storage containment and handling measures in accordance with “Liquid storage and handling guidelines” (EPA Publication 1698, released June 2018).
DL_W13	During construction, you must ensure that all activities are carried out in accordance with “Civil construction, building and demolition guide” (EPA Publication 1834, released 26 November 2020).