Australian Paper
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MWRRG application for authorisation AA1000448 - consultation

Submission by Australian Paper

16 August 2019

Paper Australia Pty Ltd (**Australian Paper** or **AP**) appreciates the opportunity to provide a submission on the Metropolitan Waste and Resource Recovery Group's (**MWRRG**) application for authorisation to conduct a joint competitive tender process in order to investigate and potentially procure the provision of advanced waste processing services (**Proposed Conduct**).

Summary of Submission

Australian Paper <u>supports</u> the MWRRG's authorisation application to conduct a joint competitive tender process on behalf of 16 local government councils.

It is critical that the waste volume in any MWRRG joint tender is sufficiently large to warrant private sector investment in new technologies for waste processing. It is only with an aggregated waste volume beyond what any single council can supply that such technologies will become commercially viable and competitive. The MWRRG's tender is an important opportunity to establish a long-term, practical solution for the disposal and processing of waste from south-east metropolitan Melbourne, without utilising additional landfill. This is particularly important as the principal landfill for this area of Victoria (Hampton Park Landfill, also known as "Hallam Road Landfill") is expected to close by 2025. The reference in the MWRRG's application to this closure occurring in 2028 is based on outdated data. AP has separately advised the MWRRG that currently the modelled date is 2025.

Ultimately, Australian Paper considers that the public benefits arising from the Proposed Conduct will substantially outweigh any potential detriment. Indeed, aggregating the waste of 16 local councils as part of the procurement process is likely to increase competition in markets for the processing and disposal of waste materials by generating private sector investment in proven technologies (such as Energy from Waste (**EfW**)) for the processing of waste. It is also likely to have a range of environmental and other benefits including diverting waste from landfill.

Australian Paper has successfully obtained a works approval and a planning permit for the construction of a proposed $600 million EfW facility with the capacity to process 650,000 tonnes per annum (**tpa**) of residual municipal solid waste (**MSW**) and commercial and industrial (**C&I**) waste.

Without authorisation of the Proposed Conduct, AP would not have the opportunity to tender for 460,000 tpa in aggregated MSW volumes via a single tender process - a tender AP considers it is well placed to win. Without this opportunity, AP's proposed construction of an EfW facility would, at worst, not proceed and, at best, be subject to significant time delays and cost increases. Similar types of projects would also be in doubt.

As a potential future operator of advanced waste processing facilities, AP hopes that its insights in relation to the MWRRG authorisation application will be of assistance to the Australian Competition and Consumer Commission (**ACCC**).

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Australian Paper

Australian Paper is a manufacturer of pulp, paper, envelopes and stationary and a major contributor to the Victorian economy, contributing $819M to the gross state product per annum, employing 5,576 full time equivalents (**FTE**) and delivering associated flow on effects.

With major operations located in the Latrobe Valley, Australian Paper is the region's largest private employer with around 850 direct employees. Including flow on effects, AP supports 2,387 jobs and contributes $451M to the Latrobe Valley's economy.

AP manufactures approximately 600,000 tonnes of packaging, print and copy paper annually. Our products are used in homes and businesses all over Australia every day and many of our products are recyclable. We are also a major exporter from the Port of Melbourne and sell to around 75 countries.

Australian Paper has invested significantly in its business over the past decade and further investment is key to our future. We are part way through a five year commitment to invest $200M in key infrastructure at our pulp and paper mill in Maryvale, Victoria (the **Maryvale Mill**) to ensure our products remain competitive in a global market.

Due to the adverse effects of rising energy costs and energy supply risk, AP has been exploring alternative waste treatment facilities as an avenue to generate baseload energy in the form of steam and electricity to supply the Maryvale Mill.

AP has completed an exhaustive $7.5M feasibility study into the viability of constructing a thermal combustion EfW facility adjacent to the Maryvale Mill. Having studied the ongoing feasibility of developing EfW technology for use in its business, AP is in a position to assist the ACCC in its consideration of MWRRG's authorisation application with insights from a social, commercial, technical and environmental perspective. (see Annexure A – Energy from Waste Feasibility Report February 2019).

Australian Paper's proposed EfW facility

EfW technology creates energy from the controlled combustion of non-hazardous waste materials that would otherwise go to landfill. EfW is recognised as a proven and reliable technology which has been used in Europe, North America and Japan for decades. There are around 500 operational EfW facilities in Europe alone, many of which are in and around major cities such as Paris, Zurich, Vienna and London. Countries such as Germany, Austria and Sweden also utilise EfW as a key component in their waste management strategies, reducing their landfill to almost zero.

As noted above, AP is proposing to construct a $600M EfW facility that would process 650,000 tonnes per annum of residual MSW and C&I waste. This would allow Australian Paper to attain a sustainable, long-term and stable alternative baseload energy source to produce steam and electricity for the Maryvale Mill.

AP's proposed EfW facility would be integrated to provide both heat (steam) and power (electricity), that is, a combined heat and power (**CHP**) facility, which would yield a superior energy recovery of 58% versus a standalone electricity generation facility at 27%. For completeness, 'energy recovery' is the percentage of the energy, as measured by calorific value, that is contained within materials, including waste, and converted through a process into a useful form (in this instance, steam and

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electricity). The proposed facility would assist in securing AP's existing operations, make a significant economic contribution and create employment in the Latrobe Valley and Victoria more broadly.

The key projected benefits of AP's proposal are that it would:

- divert 650,000 tonnes per annum of non-hazardous MSW and C&I waste away from landfill;
- reduce greenhouse gases by over 540,000 tonnes per annum;
- support an estimated 1046 jobs during construction and 911 jobs on an ongoing basis;
- return up to 4 PetaJoules per annum of natural gas and up to 20MWh of electricity per hour back to the "grid";
- be consistent with circular economy principles as set out in the National Waste Policy[1] (as EfW is higher in the waste hierarchy that landfill); and
- provide energy security for the Maryvale Mill, an important employer in the Latrobe Valley.

The following table describes the economic impacts likely to results from a successful project implementation. (see Annexure B - "Economic Impacts Of Proposed Energy From Waste Plant - Update January 2019")

Table 1: Economic Impact of proposed EfW plant construction on Victoria

EfW plant construction impacts Victoria	GSP ($m)	Household Income ($m)	Employment (FTE Jobs)
Construction Phase Year 1			
Victoria (including Flow-on)	$140.2	$66.7	895
Construction Phase Year 2			
Victoria (including Flow-on)	$190.7	$89.9	1,247
Construction Phase Year 3			
Victoria (including Flow-on)	$152.3	$71.8	996
Construction Phase Overall Year 1 to 3	$483.2 total	$228.4 total	1,046 average jobs per annum over 3 years

Table 3: Economic impact of proposed EfW plant operations on Victoria

EfW plant operational impacts Victoria	GSP $m	Household Income $m	Employment FTE Jobs
Victoria (including Flow-on)	$198.7	$76.1	911

[2]

Extensive community consultation has been undertaken including public events, public submissions to the Environment Protection Authority (**EPA**) and a community conference (provided for under section 20(b) of the *Environment Protection Act 1970* (Vic)) which was attended by more than 60 community members, including local residents, representatives from not-for-profit organisations and businesses. A health impacts assessment of the facility commissioned by AP confirmed that the facility's impacts on community health would be negligible. There is strong community support for

[1] Department of the Environment and Energy, *National Waste Policy 2018,* https://www.environment.gov.au/system/files/resources/d523f4e9-d958-466b-9fd1-3b7d6283f006/files/national-waste-policy-2018.pdf

[2] Western Research Institute "ECONOMIC IMPACTS OF PROPOSED ENERGY FROM WASTE PLANT - UPDATE JANUARY 2019"

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the proposed facility as demonstrated by 84% of public submissions to the EPA Works Approval process expressing support for the project.

On 28 November 2018, the EPA issued a Works Approval for Australian Paper's EfW facility. On 19 June 2019, the EPA issued an amended Works Approval following an appeal that was successfully concluded in the Victorian Civil and Administrative Tribunal.

Australian Paper has also been granted a planning permit from Latrobe City Council to proceed with construction of the EfW facility.

We will now seek to secure long-term supplies of 650,000 tonnes per annum of residual MSW and C&I waste. Ongoing access to aggregated waste volumes generated by local councils is critical to the success of this important waste management opportunity because no single council generates sufficient waste to support the operations of AP's proposed plant. AP is also seeking to secure waste feedstock directly, including by committing its own C&I waste to the project, approaching Suez Recycling and Recovery Pty Ltd (**Suez**) for the supply of C&I waste and submitting an Expression of Interest in a similar tender process being conducted by the Gippsland Waste and Resource Recovery Group. However, without authorisation of the Proposed Conduct and AP (and its partner Suez) being the successful tenderer in any tender conducted by the MWRRG following that authorisation, it is highly unlikely that AP will be able to secure sufficient waste volumes for its project.

No material public detriments if authorisation is granted

AP does not envisage any material public detriments arising as a consequence of the ACCC authorising the Proposed Conduct.

AP recognises that the Proposed Conduct could be seen to have the potential to lessen competition between councils for the procurement of waste processing services. However, in our view, granting the authorisation, and the associated aggregation of waste volumes from the south east Melbourne metropolitan area it would facilitate, is likely to increase competition for the provision of waste processing services by encouraging new investment in alternative waste processing technologies and facilitating competition with existing landfill operations.

Without collective action by councils, it will be difficult or impossible for an investor like AP to obtain the necessary certainty in terms of access to sufficient waste volumes to secure funding and invest in new advanced processing facilities. Equally, without investment in advanced waste processing facilities, there is likely to be limited competition between existing landfill operators.

AP therefore submits that there is unlikely to be any material adverse impact upon competition as a result of the Proposed Conduct. If anything, there is likely to be a net increase in competition in markets for the supply of waste processing services.

Regardless of the competition implications of MWRRG's application, as discussed further below, the public benefits of approving the application far outweigh the public detriments.

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Potential harm to Melbourne's ability to process waste if authorisation is not granted

Overview of current waste processing

The estimated residual waste volumes in Melbourne being disposed into landfill include approximately 1.3 million tonnes per annum (**mtpa**) of MSW (i.e. household garbage),1 mtpa of C&I waste (i.e. non-construction business waste) and0.7 mtpa of Construction and Demolition waste (C&D) . This resulted in 3.064mtpa of waste being landfilled in metropolitan Melbourne during 2015/16. [3]

TABLE 4.6
MATERIALS MANAGED BY WASTE AND RESOURCE RECOVERY REGION IN (2015–16)

Region	Recovered[a] (t)	Landfilled[b] (t)	Total managed (t)	Total managed by region (% by weight) (%)
Barwon South West	542,000	177,000	719,000	6
Gippsland	376,000	137,000	513,000	4
Goulburn Valley	271,000	161,000	432,000	3
Grampians Central West	349,000	511,000	861,000	7
Loddon Mallee	381,000	111,000	492,000	4
Metropolitan	6,398,000	3,064,000	9,462,000	75
North East	170,000	24,000	194,000	2
Totals	**8,488,000**	**4,185,000**	**12,673,000**	

a Modelled data for 2015–16 financial year based on the Victorian Waste Projection Model 2015–16.
b Landfill levy data 2015–16.
Note: Discrepancies between totals and line items relate to rounding.

There are currently four putrescible landfills operating adjacent to the Melbourne metropolitan area. Their respective capacities in tonnes per annum are: Hampton Park 560,000, Ravenhall 1,200,000, Wyndham 300,000 and Wollert 450,000. During the course of AP's EFW Feasibility Study these waste disposal tonnages were determined from external sources and represented in Figure 1.

The MWRRG proposal seeks to aggregate 460,000 tpa of MSW. As can be seen from the figures above, this is less than the total volume of 550,000 tpa of waste that will enter the market with the closure of the Hampton Park Landfill, which is projected to close in 2025.

Victoria's population growth is also yielding an additional 30,000 tonnes per annum in MSW, and a similar volume for C&I. In five years' time, Victoria will have another 300,000 tonnes per annum of waste to dispose of and in 7.7 years it will be 460,000 tonnes per annum.

With the expected Hampton Park Landfill closure, Victoria needs a solution that can operate at the required scale while minimising gate fee charges and household impacts. In the absence of any new facility, this closure will reduce competition for the provision of waste processing services.

[3] Sustainability Victoria "Statewide Waste and Resource Recovery Plan - a 30 year roadmap for Victoria" 2018

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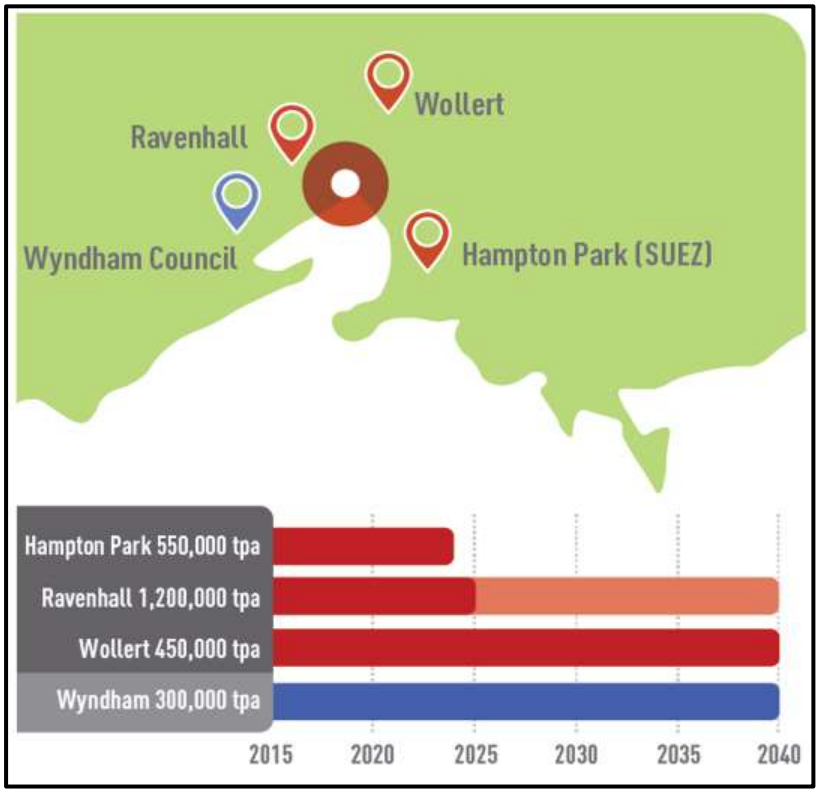
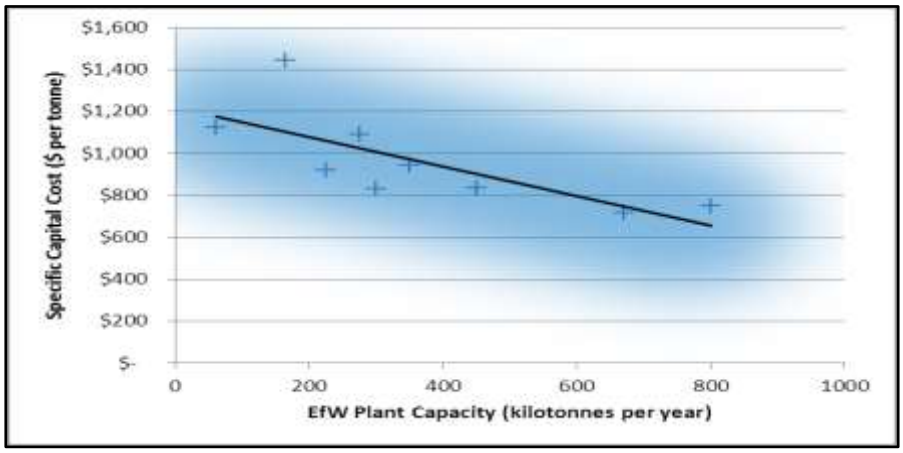
Figure 1: Locations of existing landfill sites adjacent to the Melbourne metropolitan area



Efficient scale of new entry will be hard to achieve without collective action by councils

In Victoria, sending residual waste to landfill remains very cheap. For new entrants to compete on the basis of more environmentally sustainable technologies, large-scale facilities, such as EfW facilities, are required to reduce the cost of capital and operation. The following figures demonstrate these economies of scale by comparing capital cost against volume.

Figure 2: EfW Combustion CAPEX (based on UK plants)[4]



[4] http://www.wasteauthority.wa.gov.au/media/files/documents/SWIP_Waste_to_Energy_Review.pdf

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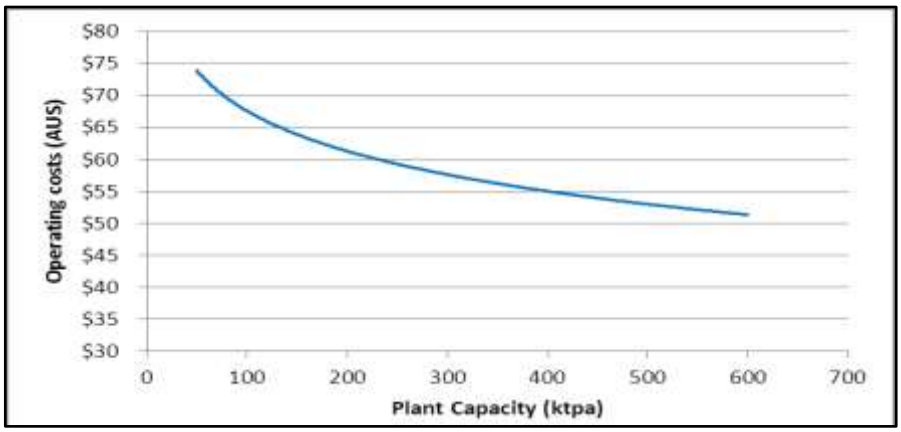
Figure 3: EfW Combustion OPEX per tonne [5]



Where sufficient waste feedstock is secured, an EfW facility would offer a long-term solution to the waste processing challenges of the south-east of metropolitan Melbourne with the benefit of diverting waste from landfill. A failure to aggregate sufficient volumes of waste through the proposed MWRRG tender process would mean the ability to secure adequate feedstock for an EfW facility becomes unpredictable. Specifically, without the coordinated procurement contemplated by the authorisation application, the only alternative for potential investors would be to negotiate with multiple individual councils to secure sufficient feedstock for large-scale facilities. This would potentially add significant uncertainty, cost and delay to any project or, in the worst case scenario, potentially cause the project to be commercially unviable.

Smaller-scale EfW facilities are likely to be less efficient in terms of both transport and processing. They are also likely to produce a smaller net reductions in greenhouse gas emissions. AP estimates its planned facility would generate a net reduction of $CO_{2\text{-}e}$ emissions of 543,000 tonnes per annum. This outcome would be difficult to achieve across several smaller EfW facilities at an equivalent cost.

The construction of a smaller EfW facilities based on lower secured feedstock volumes would also be likely to increase gate fee disposal charges and, therefore, the costs paid by local councils and ratepayers for the waste processing services.

Potential adverse impacts relating to traffic congestion

If constructed, AP's proposed facility would transport waste in compacted form using relatively fewer trucks, and travelling away from the city. In addition, a volume of inner-city waste is proposed to be transported via rail utilising the existing rail siding at Dynon Road from which trains travel directly to the Maryvale Mill six days a week. This would mean fewer trucks on the road per tonne of waste and fewer trucks travelling through the city and adding to traffic congestion. In contrast, following the closure of the Hampton Park Landfill, if no new facility is built in Melbourne's south east, waste would need to be transported by truck across the city to the remaining landfill sites in the north and west.

[5] http://www.wasteauthority.wa.gov.au/media/files/documents/SWIP_Waste_to_Energy_Review.pdf

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Likely public benefits if authorisation is granted

General comments

The elevation of waste to more preferable outcomes is specified in the *Environment Protection Act 1970* as one of eleven principles and described as the wastes hierarchy.

The wastes hierarchy is an order of preference and states that waste should be managed in accordance with the hierarchy, with avoidance being the most preferred option and disposal (to landfill) being the least.

Figure 4: Wastes Hierarchy

AP considers that the aggregation of waste processing from multiple sources that would be facilitated by the Proposed Conduct is likely to result in substantial public benefits by encouraging waste diversion from landfill and investment in new waste processing technologies and yielding environmental and other benefits, consistent with the wastes hierarchy.

Sufficient aggregation of waste sources will be important in establishing a new advanced waste processing sector, keeping costs low and facilitating competition with existing landfill services.

The long-term contracts proposed in the authorisation application (25 to 30 years) are also required to obtain cost effective finance (as per European model). C&I waste contracts typically run for one to two years, but an absence of long-term certainty will increase the risk premium applied by lenders and ultimately the gate fees and costs to ratepayers - future investment to meet the needs of a growing population may also be discouraged.

Encouraging large-scale, cost effective advanced waste processing solutions via the Proposed Conduct would minimise the negative consequences of landfill use, including odour, loss of amenity, litter, vermin, methane (a greenhouse gas) and the 30 year legacy cost to councils and rate payers post closure. By way of explanation, each local council has an obligation pursuant to State requirements for the ongoing management of landfills for a period of 30 years post closure, including the maintenance of roads, fences and methane recovery systems, the extraction and management of leachate water and the monitoring of emissions from the site.

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[redacted]

AP's proposed Latrobe Valley EfW facility: a case study

To assist the ACCC, AP proposes to address EfW advanced waste processing technology in detail in this submission because it is the technology it is most familiar with.

AP estimates that diversion of waste from landfill to EfW would reduce the volume of waste by 95% through processing, provide energy, produce 20% recycled aggregates and 3% recycled metals, supporting the circular economy principle set out in the National Waste Policy and the wastes hierarchy.

Sustainability Victoria reported "Waste to Energy options for recovering energy from residual waste showed a positive net benefit to the State. Modelling showed that with sufficient investment in infrastructure, a diversion rate of 45 to 50 per cent of the waste currently going to landfill could be achieved over the life of the SWRRIP."[6]

EfW facilities can efficiently process residues from recycling at material recovery facilities. This complementary effect will also benefit the recycling sector and the "circular economy".

A sufficient degree of waste aggregation facilitates efficient large-scale EfW solutions. AP's calculations indicate that, for a large-scale EfW facility, a minimum of 450,000 tonnes per annum is required.

Large-scale EfW facilities, when compared with smaller facilities, enable greater efficiency and optimised logistics, which potentially results in:

- reduced greenhouse gas emissions;
- greater energy efficiency from CHP; and
- decentralisation by enabling construction on a cost effective basis outside the Melbourne metropolitan area – generating jobs, adding to household incomes and introducing a new industry to the selected region, such as the Latrobe Valley.

In addition, large-scale EfW is efficient and, if correctly designed, incorporates suitable contingencies, including storage, to accommodate fluctuations in power needs and waste volumes. This in turn ensures services for the collection of waste from homes need not be affected by such fluctuations.

[6] Sustainability Victoria "Statewide Waste and Resource Recovery Plan - a 30 year roadmap for Victoria" 2018

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If AP can secure sufficient waste feedstock to allow its EfW project to proceed, the energy replacement at the Maryvale Mill will enable the return of gas (up to 4 PetaJoules per annum) and electricity (up to 20MWh per hour) to the market, easing supply side pressures on consumers.

Gippsland councils would also be able to access the solution at a similar or lower cost than their current arrangements. Gippsland councils currently send household waste to small landfills that are more expensive to operate than larger city landfills.

Leveraging AP rail logistics would ensure that a rail freight option is available to the Gippsland region. This would also support the passenger rail network through the cost sharing associated with shared infrastructure. Low cost rail passenger transport is particularly important in connecting regional communities internally and with Melbourne.

In general terms, AP's project would give rise to a significant capital inflow into Victoria, having a positive economic stimulus effect for the broader economy.

Even if AP did not emerge as the successful bidder in any MWRRG tender process, an alternative large-scale advanced waste processing facility would be likely to be capable of delivering many of the same or similar public benefits to those identified above.

Urgency of the authorisation application

Closure of the Hampton Park Landfill is projected to occur in January 2025.

The MWRRG procurement process was originally intended to commence in July 2018. MWRRG's latest timeline is a 30 month process with contract finalisation expected in April 2022. Adding to this timeframe the time required for any successful proponent to finalise financing (six months), construction (42 months) and start up (six months), the likely "go-live" point at which a new facility could commence operations would be no earlier than October 2026.

It is therefore critical that MWRRG is able to proceed with the preliminary stages of its proposed tender process as soon as possible. Otherwise further delays may cause investment in alternative waste processing facilities other than landfill to be rendered commercially unviable for the south-east of metropolitan Melbourne.

Further delays to MWRRG's tender process, may also affect AP's ability to secure sufficient feedstock for its proposed EfW facility in a timely manner. This would be likely to result in AP paying higher energy prices and potentially adverse flow-on impacts for the business and those supported by the business.

MWRRG has indicated that it would not enter into any formal contractual arrangements until its authorisation application is finally determined. As such, AP considers that granting an interim authorisation would not alter the market status quo.

----------Submissions ends ----------

creating energy from waste

Energy from Waste Feasibility Study Summary

February 2019

Australian Government

BUILDING OUR FUTURE

VICTORIA State Government

Australian Paper

a member of the Nippon Paper Group

creating energy from waste

PLANET ARK

Foreword

By Paul Klymenko, CEO of Planet Ark

During a study tour to Europe which informed this feasibility study, I asked an engineer working in the Swiss waste industry where their landfills were located. He replied there weren't any and that many countries in Europe had achieved this. Countries with a combined population of over 150 million have virtually eliminated their need for landfills including Germany, Sweden and the Netherlands as they are all landfilling 3 percent or less of their waste.* The European experience over more than a decade also shows that reducing waste to landfill increases both recycling rates and residual waste for energy production. Due to stringent environmental standards social acceptance is high with many plants in and around major cities such as London and Paris.

In stark contrast Australia currently puts 40 percent** of its waste into landfill, a total of 21.7 million tonnes. That is the weight of around 410 Sydney Harbour Bridges!

The very concept of landfill is strange when you think about it. As a society we spend so much effort in growing and mining the food and materials that enable us to live our lives. Then when we have no further use of these we send a significant portion to a big hole in the ground to be buried, out of sight and out of mind.

Landfills generate uncontrolled chemical reactions. In addition to emitting methane (a greenhouse gas over 20 times more powerful than C02) they require long-term management for many decades to ensure that they do not pollute the environment, especially our groundwater. This is why landfills are at the very bottom of the waste hierarchy. Landfills have little role in a sustainable society based on circular economy thinking.

Energy from Waste is a proven alternative to landfill in Europe; and Australian Paper's proposed Maryvale plant is an exemplar project. This is because both steam and electricity would be supplied to their Maryvale Mill via a Combined Heat & Power mode which delivers superior energy efficiency.

Also, diverting 650,000 tonnes of residual waste from landfill each year creates a net reduction in greenhouse gas emissions of more than 500,000 tonnes annually of CO_2 equivalent. This is like taking 100,000 cars off the road.

Australian Paper and the Victorian and Federal Governments are to be congratulated for funding this study which clearly demonstrates the project's environmental, social and economic benefits.

Paul Klymenko

* http://www.cewep.eu/2018/07/05/municipal-waste-treatment-2016/
**National Waste Report 2018 - pg 23 - http://www.environment.gov.au/system/files/resources/7381c1de-31d0-429b-912c-91a6dbc83af7/files/national-waste-report-2018.pdf

creating energy from waste

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Acknowledgements

Australian Paper would like to acknowledge and thank both the Australian and Victorian Governments for the support they have provided to this major study.

This not only includes their financial contribution, but also the recognition that, if successful, the plant would significantly reduce the company's energy costs, help address south east Melbourne's growing social and environmental landfill issues, secure existing employment opportunities and create valuable new construction and energy generation jobs in the Latrobe Valley.

Background

About Australian Paper

Australian Paper Maryvale is one of the largest employers in the Latrobe Valley with approximately 850 full time employees. When flow on effects are taken into account, we support 2,387 jobs and contribute $451 million to the economy of the Latrobe Valley region.

Our packaging, copy and printing papers are recyclable and made from renewable materials. Products made from paper produced in the Latrobe Valley are used every day in homes and businesses all over Australia, including the nation's favourite copy paper brand Reflex.

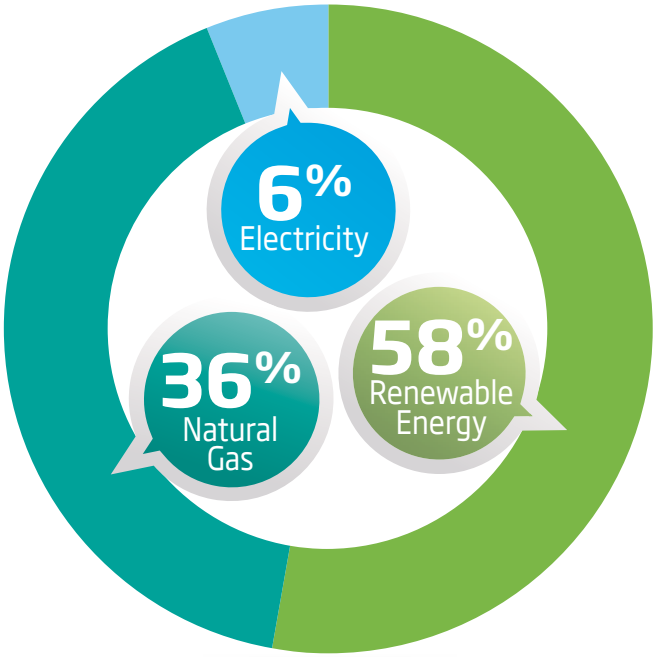
We also sell paper to around 75 countries as a major exporter from the Port of Melbourne.

Australia wide, our operations support 5,786 full time jobs and contribute $911 million to Australia's Gross Domestic Product with each ream of copy paper produced contributing $1.88 to government revenues.

Through our parent company Nippon Paper, Australian Paper has invested significantly over the past decade in our operations, and further investment is key to our future.

About the Feasibility Study

2018 Maryvale Mill Energy Mix



Like many local manufacturing businesses, Australian Paper is facing challenges. We're determined to address these efficiently and responsibly by harnessing innovative, proven technologies. One of our immediate priorities is to stabilise our costs and one of the most significant focus areas is energy.

Despite being Victoria's largest generator of baseload renewable energy, we are also the largest industrial user of natural gas in Victoria and use significant quantities of coal-fired electricity. In line with any other business or household in Australia, we are exposed to surges in energy prices and uncertainty of supply.

We need to address our future energy needs proactively, which is why in July 2017 Australian Paper announced that it would undertake a Feasibility Study into the development of a new baseload Energy from Waste (EfW) facility at our Maryvale Pulp and Paper Mill in the Latrobe Valley.

Funding and support

The Federal and State Governments each contributed $2.5 million towards this $7.5 million Feasibility Study, enabling critical pre-construction planning for the proposed development.

Australian Paper matched the commitment with $2.5 million of its own funding.

Both Federal and State Governments saw this investment as a priority project for the future success of the Latrobe Valley and part of a broader strategy to support economic growth in the region. This was particularly important at a time when the local economy was transitioning.

Australian Paper has been part of the Latrobe Valley for over 80 years. In that time we have employed thousands of people from Morwell, Traralgon, Moe and the surrounding areas. We are deeply connected with the people of the Latrobe Valley.

Community engagement has been at the centre of our $7.5 million Feasibility Study into building an EfW plant at the Maryvale site. The support of the community is crucial in our planning.

Study objectives

Following a competitive tender process Australian Paper engaged Jacobs Group (Australia) Pty Ltd (Jacobs) as Lead Engineering Consultant on the Feasibility Study for the proposed EfW plant at Australian Paper's Maryvale site in Eastern Victoria. A range of supporting consultants with extensive waste industry experience were also engaged on specific components of this comprehensive study.

During the course of the study, Australian Paper has partnered with Suez Recycling and Recovery Pty Ltd (Suez) to jointly investigate the development of an EfW plant. Australian Paper partnered with Suez because they brought significant global expertise in the development and operation of EfW facilities and would help test the project's viability.

The partnership was also formed with a view to Suez taking the role of operations and maintenance of the facility when constructed. Suez provided valuable peer review of the Feasibility Study plant design, and their experienced staff provided support during many of the engagement activities.

The overarching objectives of the Feasibility Study were to:

- Deliver a commercially sustainable and environmentally responsible business solution providing energy security for Australian Paper's Maryvale Mill
- Provide electricity and steam supplies to the mill at improved cost and strategic value
- Engage closely with the local community and other key stakeholders including Federal, State and Local Government, Unions, waste supply groups and our employees
- Ensure compliance with health, safety and environmental standards
- Improve standing in the community, attain and maintain a social licence to operate
- Deliver on time and on budget
- Maximise value from appropriate use of funds.

As part of the Feasibility Study, in October 2017 Australian Paper facilitated a tour to EfW plants in the United Kingdom and Switzerland.

The primary purpose of this was to introduce key stakeholders to the EfW process and provide an opportunity to understand the technical, community and regulatory issues surrounding such a project. The feedback from the tour participants has been used to inform the findings of the EfW Feasibility Study. This investment was considered essential in developing a real world understanding of EfW facilities. In the Victorian context future proponents should leverage industry associations in Europe such as the Environmental Services Association (ESA) and the Confederation of European Waste to Energy Plants (CEWEP) as well as Australian bodies such as the Waste Management Association of Australia (WMAA) to facilitate physical access to well run and reliable facilities.

Case study: Ferrybridge, United Kingdom

In October 2017, Australian Paper facilitated a visit to the Ferrybridge 1 and 2 EfW plants in Leeds in the north of the UK. The purpose of the visit was to explore the technical, community and regulatory issues that can impact these projects.

The visit gave some of our key stakeholders from Nippon Paper, the CFMEU, Planet Ark, Jacobs and Federation University an opportunity to see the EfW process first hand. Their experience helped inform Australian Paper's EfW Feasibility Study for Maryvale.

The Ferrybridge 1 and 2 EfW plants provided a valuable opportunity to tour an operational plant and see another under construction. These plants were favourably viewed by the local community for the jobs and economic benefits they brought to the region, especially as the Ferrybridge coal fired power plant closed in 2016.

Ferrybridge 1 has been operational since 2015. It has a waste input capacity of 675,000 tpa and a thermal capacity of 2 x 117 Mw. Most of the plant operates automatically but requires highly skilled operators to monitor plant conditions and respond as needed. Waste deliveries use a mix of road and rail transport.

Start-up of Ferrybridge 2 is planned for this year and it will have a waste input capacity of 556,000 tpa at a higher calorific value and a thermal capacity of 2 x 117 Mw.

It was a well-managed construction site, with large lay-down areas to allow for assembly of the plant in modules on site. The modules were then lifted into place inside the building structure. We understand this approach allowed for a high level of safety and build quality at a lower cost.

Pre-fab crew huts, wet area change rooms, dining rooms and streamlined site entry all contributed to good amenity for the workers and focused on safe movement about the site.

What is the project?

Australian Paper is proposing to develop a thermal combustion EfW plant adjacent to the existing Australian Paper Maryvale Pulp and Paper Mill site on land owned by Australian Paper in the Latrobe Valley, Victoria. The aim of the proposed $600 million EfW plant is to allow Australian Paper to attain a sustainable, long-term and stable alternative baseload energy source to provide steam and electricity for the existing Maryvale Mill, which has been manufacturing paper since 1938.

The 225 Megawatts of thermal energy (MWth) to be generated by the EfW plant would be baseload energy required to run Australian Paper's Maryvale Mill – the Mill requires thermal energy (steam) and high voltage (HV) electricity. Currently, steam is produced by on-site natural gas fired boilers and used in the manufacturing process (e.g. by the paper machines). Steam is also used by four on-site electrical generators to produce about 45 Megawatts of electricity (MWe) each hour. Additional HV electricity demand is supplied from the electricity grid. Maryvale Mill is already Victoria's largest generator of baseload renewable energy, producing approximately 600,000 tonnes of biofuel from its pulping process each year.

In addition, the Maryvale Mill purchases approximately 6 million Gigajoules (GJ) of natural gas annually and 30MWe per hour of electricity. Significant effort has been invested to improve the energy efficiency per tonne of pulp and paper manufactured by Australian Paper. However, due to recent substantial cost increases in the market price of natural gas and electricity, an alternate baseload energy source is being sought to enable the Mill to continue to operate in a reliable, sustainable and cost effective manner.

Having regard to total cost (capital and operating), environmental impacts, employment benefits, plant performance and reliability, there is a clear group of technologies that have been identified as appropriate for Australian Paper to consider and are also proven on a global scale – that is the EfW combustion technologies using residual waste as fuel. Most importantly, unlike renewable energy sources such as solar and wind technologies, EfW facilities generate baseload thermal energy in the form of steam which is required by Maryvale to run the majority of its operation on a continuous basis.

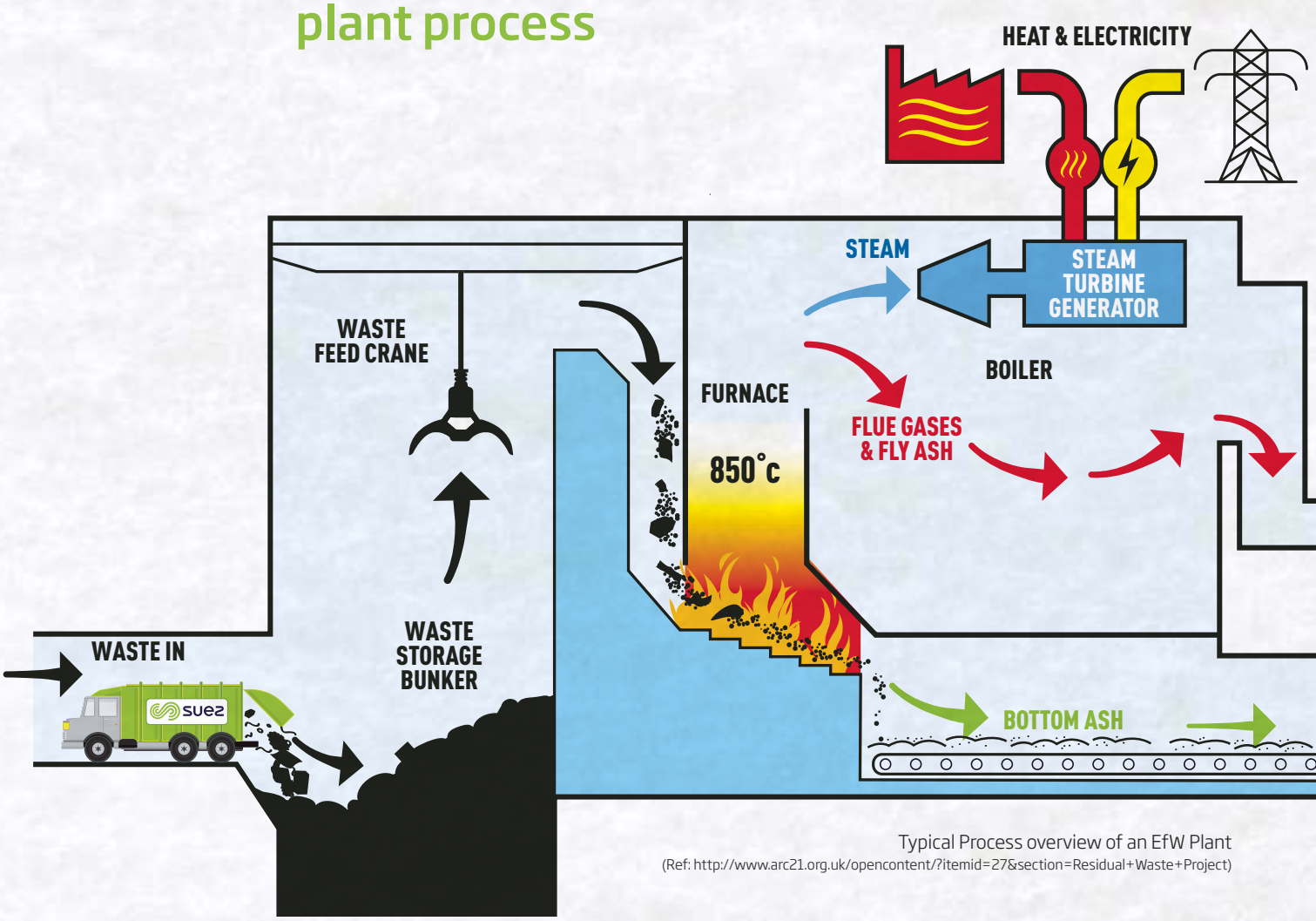
For this 225MWth EfW plant the operating waste feed requirement is estimated to be 650,000 tonnes per annum of non-hazardous residual waste which would otherwise be sent to landfill. It is proposed to use Municipal Solid Waste (MSW) for approximately 80 percent of the fuel input to the EfW plant, sourced from long term contracts with councils. MSW is waste from household rubbish collections (not recyclable collections).

Some Commercial and Industrial (C&I) waste (approximately 20 percent of fuel input) would also be used, with the non-hazardous C&I waste being similar to MSW, but sourced mostly from manufacturing facilities, shopping centres and office buildings.

The waste would be sourced from Melbourne (primarily the south east of Melbourne) and Gippsland and transported to the facility via road and rail logistics.

creating energy from waste

Energy from Waste plant process

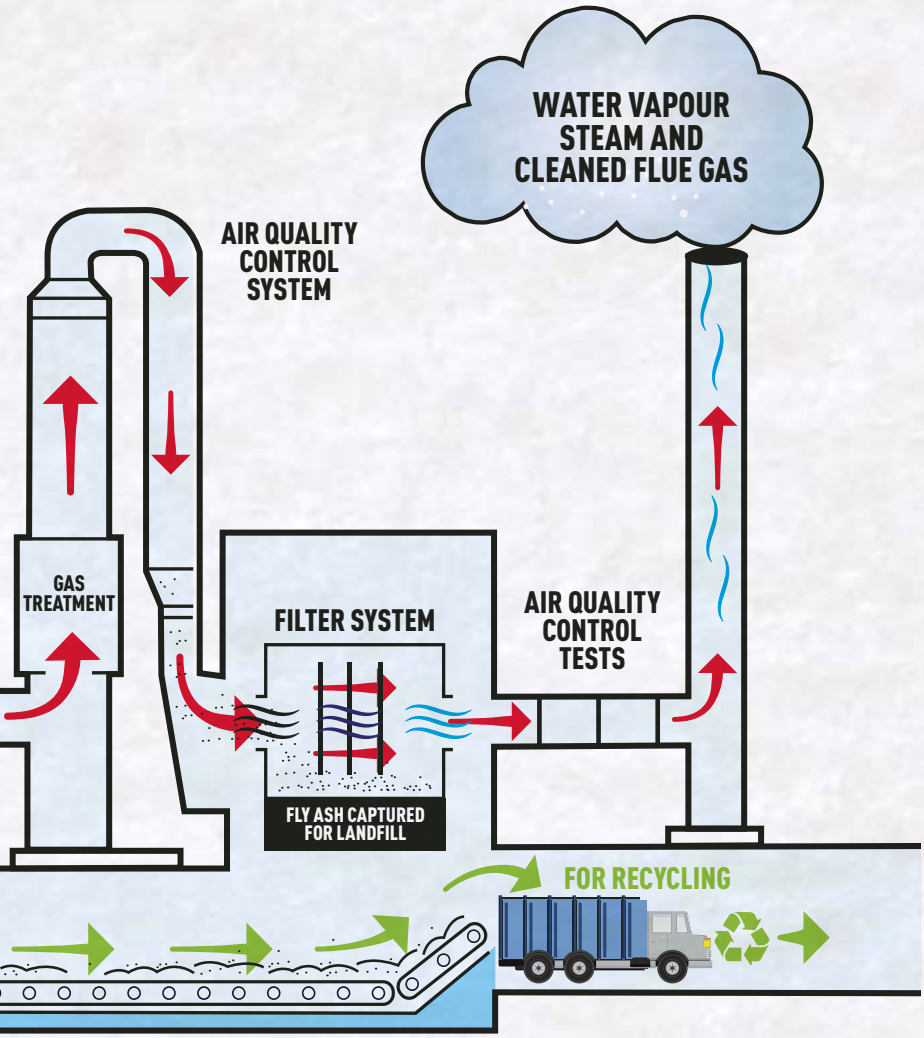


Typical Process overview of an EfW Plant
(Ref: http://www.arc21.org.uk/opencontent/?itemid=27&section=Residual+Waste+Project)

The EfW process

The key steps in the EfW process are as follows:

- Waste is transported to the EfW plant via train and truck
- Waste is combusted in a furnace (or furnaces)
- The furnace(s) produce heat generated as hot gases by the combustion of waste
- The hot gases enter a boiler (or boilers) to convert boiler water into steam
- Some steam is transferred to the Maryvale Mill
- Some steam is used in turbine generators to produce electricity for use in the Maryvale Mill
- Gases from the combustion process are treated to very high cleaning specifications, through combustion control, gas treatment and filter bags
- Cleaned combustion gases are discharged through the stack, while being continuously monitored
- Ash residues from the boiler and filter bags are collected and disposed of.



Waste is transported to the site via train and truck and placed within the waste bunker, which is enclosed in a large building. Air is drawn into the building and put through the boiler to minimise the escape of odour to the outside air.

The combustion process occurs on a moving grate floor allowing for mixing and more complete combustion by providing air directly through the grates. As the combustion occurs, temperatures will reach over 850°C for at least two seconds to destroy dioxins and furans. The combustion gases then cool slightly before entering the boiler tubes section to generate steam. Ammonia or Urea is spray injected to convert nitrogen oxides (NOx is a common unwanted combustion by-product) back to elemental Nitrogen and Oxygen.

Following this section the cooled gases then pass through the flue gas treatment system where lime and activated carbon are mixed to absorb trace heavy metals, acid compounds and trace dioxins and furans. These materials are then removed through a process of filtration as solid residues, before the cleaned air passes inline emissions monitoring equipment and is released out of the stack.

Bottom Ash, a solid post combustion material is collected from the furnace floor. Typically bottom ash is an inert material containing metals suitable for recycling, glass, sand, gravel and un-combusted materials.

The intention is that bottom ash from the combustion process would be collected, the metals recycled, and the remaining ash reused into road base and construction materials such as concrete.

Fly Ash is collected along with Flue Gas treatment residues for disposal to prescribed waste landfill.

In many facilities 100 percent of the steam generated is converted to electricity for supply into the electricity grid network. In the situation where both steam (heat) and electricity (power) are supplied then this is termed combined heat and power (CHP). Both steam and electricity would be supplied to Maryvale Mill in this CHP mode delivering superior energy efficiency of 58 percent versus standalone electricity generation at 27 percent. In the Victorian context, future applications may struggle to demonstrate best practice if they are configured as electricity only generation facilities.

Why Energy from Waste?

EfW is recognised as a proven and reliable technology which has been used in Europe, North America and Japan for decades. There are over 500 operational EfW plants in Europe alone, many of which are in and around major cities such as Paris, Zurich, Vienna and London. Countries such as Germany, Austria and Sweden support EfW as a key component in the waste management hierarchy, reducing their landfill to almost zero.

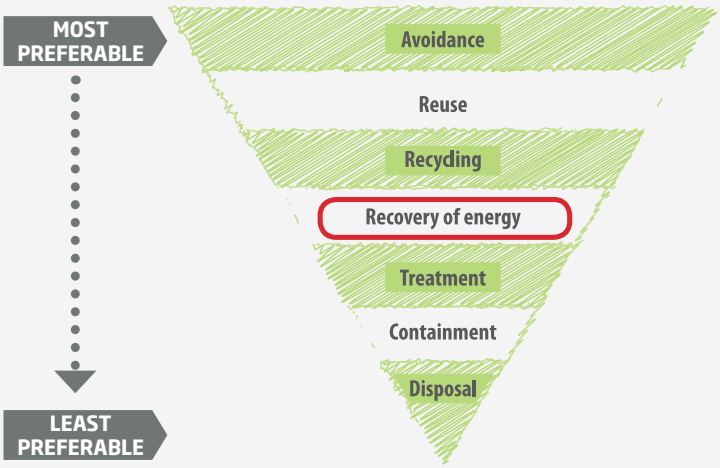
The technology generates energy from the controlled combustion of non-hazardous waste materials that would otherwise go to landfill. EfW plants can capture and convert the released heat into steam and electricity, with sophisticated filtering technology ensuring compliance with stringent EPA stack emissions standards.

EfW plants can provide energy as steam or electricity and can interchange between the two during the plant's operation, providing improved flexibility and efficiency. The use of waste as fuel also enables an EfW plant to be a reliable baseload source of energy.

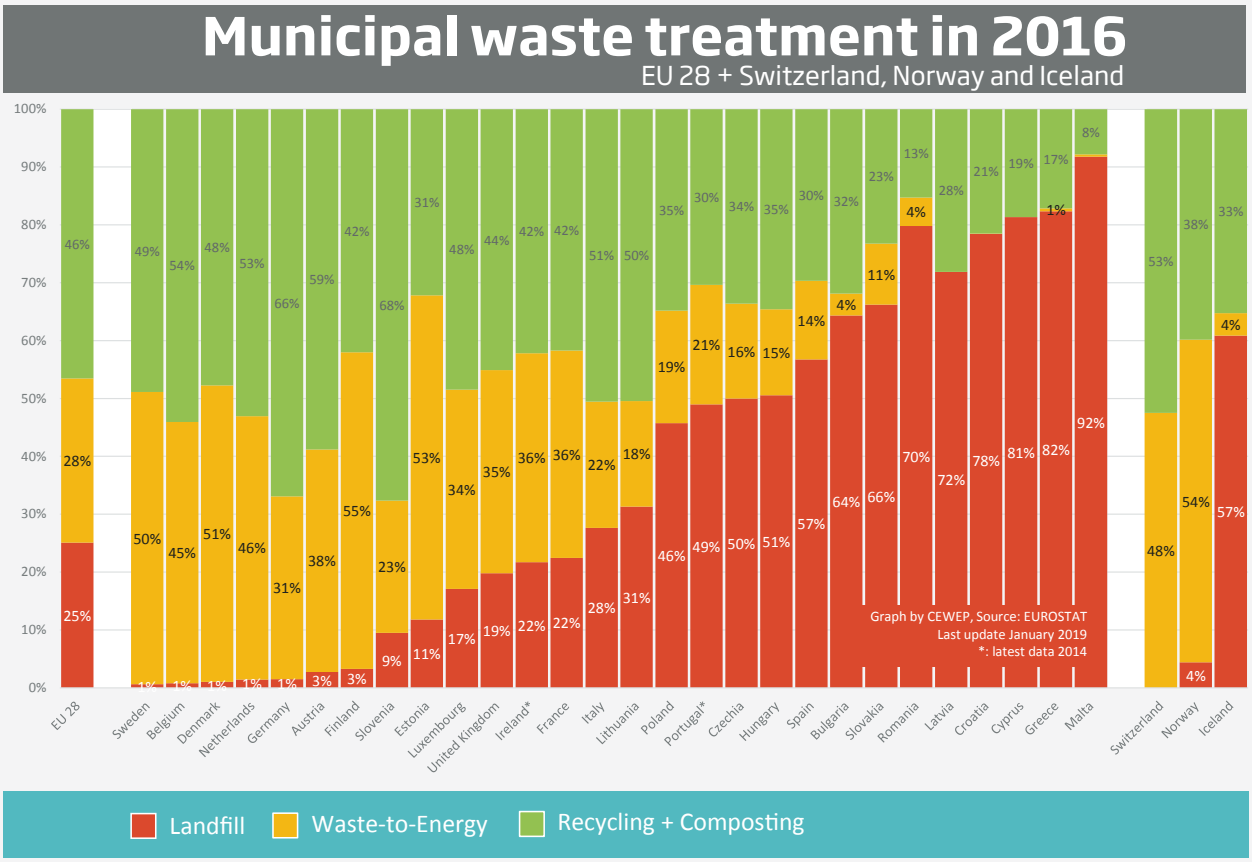
The Maryvale plant would process MSW as well as C&I waste sourced from the Gippsland region and the greater Melbourne metropolitan area. This would greatly reduce pressure on existing landfill sites in Gippsland and Melbourne at a time when existing sites are reaching capacity and closing.

The EfW plant would divert an estimated 650,000 tonnes of waste from landfill each year. Due to the variable nature of residual waste the EfW waste throughput will vary to create a steady energy output. Air quality modelling has been evaluated based on the maximum continuous rated thermal capacity of the plant.

According to the Environment Protection Act (1970) Waste Hierarchy, the recovery of energy from waste is preferred after recycling as a method for managing waste (see below).



Waste Hierarchy showing the order of preference and where EfW is placed (Environment Protection Act 1970, p.4)



Disposal to landfill is the least preferred method of waste management, yet it is the most widely used in many countries, and many locations around Australia. Leading countries such as the UK have identified EfW technology as a key solution in conjunction with recycling, to significantly reduce waste sent to landfill.

By generating energy from waste in conjunction with recycling, Sweden, Belgium, Denmark and Germany have almost completely eliminated waste being sent to landfill. Additionally these countries have developed significant secondary industries such as bottom ash processing, logistics and maintenance to service their EfW industry.

Victoria's annual waste generation is projected is expected to approach 20 million tonnes by 2046 – an increase of 60 percent on 2015-16 figures. While landfill is recognised as a critical component of managing residual waste, the EPA's Waste Management Policy seeks to limit the use and development of landfills and promote higher order waste management alternatives.

Recovery of energy from waste is recognised as an alternative waste management option that could divert 45 to 50 percent of waste currently going to landfill, providing the critical component to achieving the goals and objectives of Sustainability Victoria's Statewide Waste and Resource Recovery Infrastructure Plan.

The Australian Paper EfW project Works Approval Application has been considered by the Metropolitan Waste and Resource Recovery Group (MWRRG), the Gippsland Waste and Resource Recovery Group (GWRRG) and Sustainability Victoria. The proposal broadly meets the intent of their respective Implementation Plans and the Statewide Waste and Resource Recovery Infrastructure Plan (SWRRIP).

Why Maryvale?

The Maryvale Mill currently purchases approximately 6 million GJ of natural gas pa (approximately 8 percent of Victoria's total industrial consumption) and 30 MWe per hour of electricity from the Electricity Network. Despite considerable investment and effort in recent years to improve its energy efficiency, substantial price increases in the market price of both natural gas and NEM supplied electricity have put significant pressure on the Maryvale Mill's ability to operate competitively.

Australian Paper has deemed EfW to be the most appropriate alternative baseload energy source for its business, after considering:

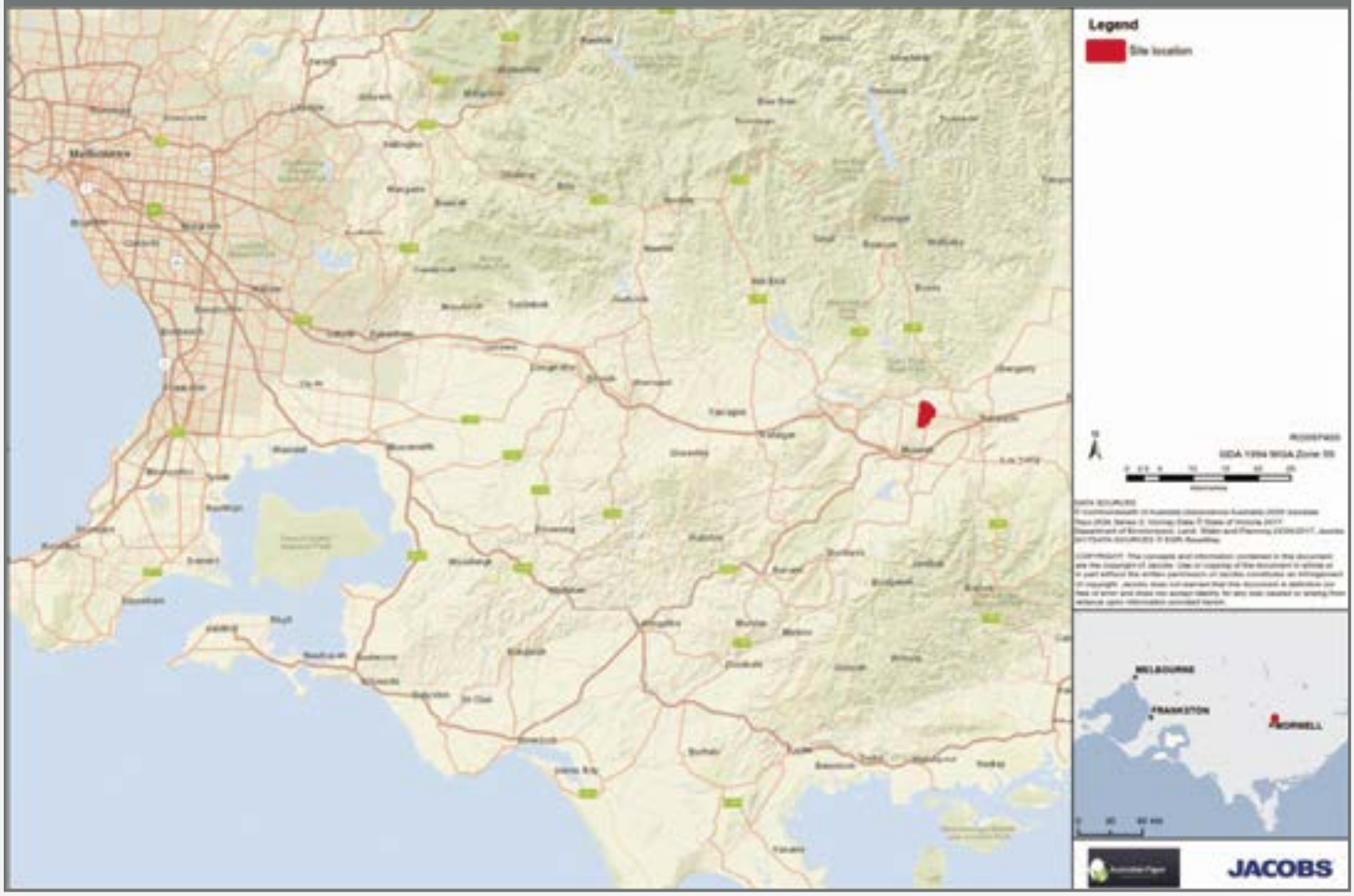
- Total potential cost (capital and operating)
- Best fit technology for generating significant and variable volumes of steam
- Minimising environmental impacts
- Maximising social benefits
- Employment effects
- Plant performance and reliability, as compared with alternative energy sources
- EfW combustion technologies (using non-hazardous residual waste), which are currently being successfully utilised on a global scale.

By providing energy (electrical and steam) for the Maryvale Mill, the project is expected to enable up to 4 million GJ of natural gas pa and up to 30 MWe of electricity to be returned for use by the broader market, helping to improve energy security for both the local region and state. Electricity that is produced in excess of Maryvale Mill requirements will be provided back to the NEM, which would increase supply for the broader market.

Siting an EfW plant adjacent to the Maryvale Mill has a range of advantages compared to other potential locations:

- The Maryvale Mill will use the steam and electricity generated by the EfW plant, which would maximise the EfW plant's efficiency
- The Maryvale Mill has existing rail infrastructure which may enable waste to be transported to the plant by train
- The road infrastructure to the Mill is well established for truck traffic and there are no residential areas from major arterials (Princes Freeway east or west) to the Mill
- Grid electricity connections are available on-site with sufficient spare capacity
- It is located in an existing Industrial 2 Zone (for planning) which is ideal for this type of industrial development
- There is an existing suitable buffer (Amenity Rural Buffer in the Latrobe Planning Scheme) around the Mill of approximately 3km
- Existing good quality water supply capacity available from Gippsland Water
- Existing on site waste water treatment facility with sufficient capability and capacity
- Access to a skilled local workforce.

Maryvale site location



Technical specifications

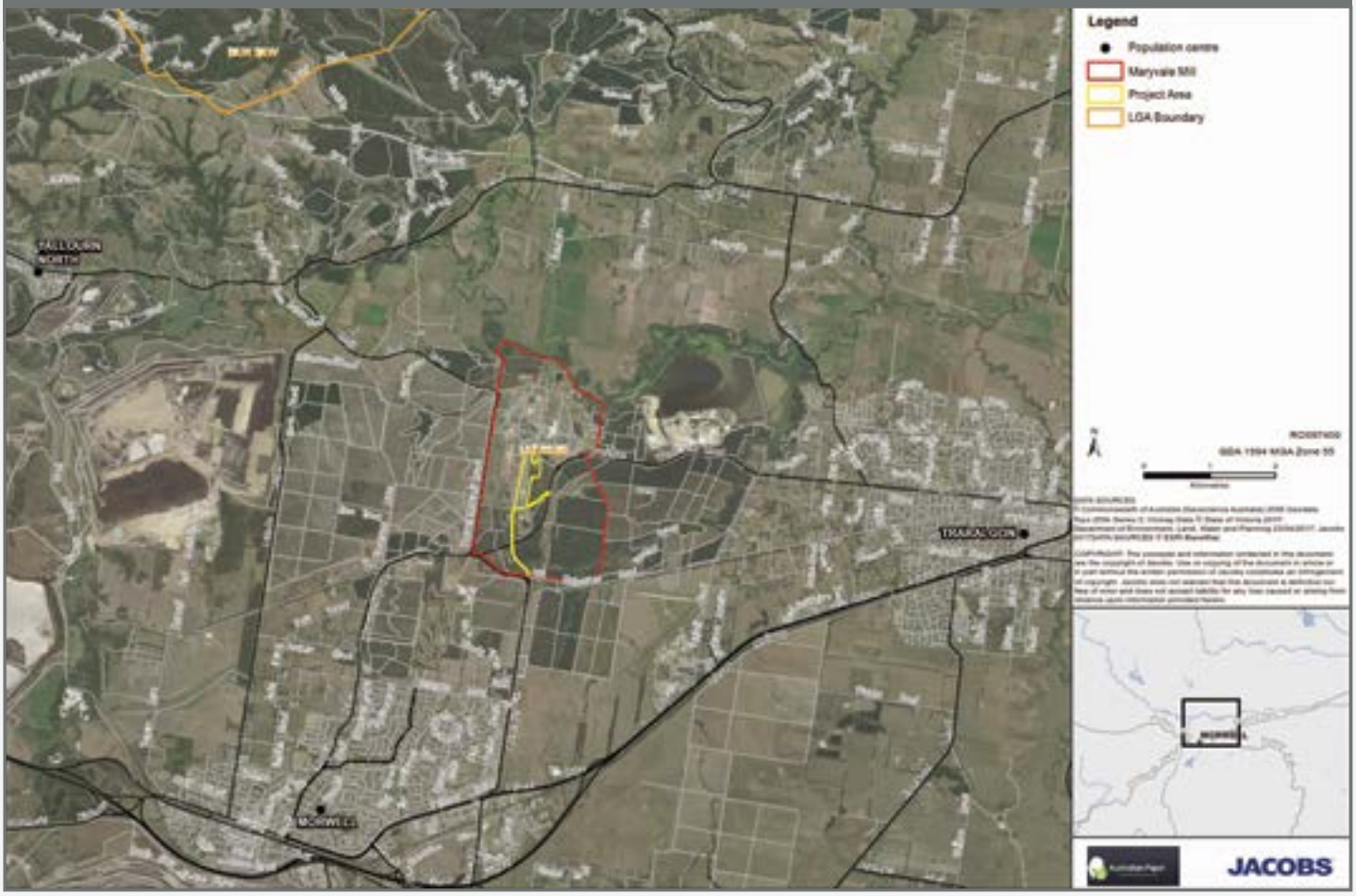
Project location

The project is situated in Maryvale (north of Morwell), approximately 150 kilometres east-southeast of Melbourne's central business district. The proposed EfW plant is to be located on the existing Maryvale site as its primary purpose is to provide steam and electricity to the existing Australian Paper manufacturing facility.

Being in the Latrobe Valley, the project is in the vicinity of heavy industrial facilities including coal and gas fired power stations, dairy production, steel fabrication, water processing and heavy and light industrial premises. Gippsland also has surplus electrical grid capacity following the closure of Hazelwood Power Station in 2017.

The Latrobe Valley is largely rural-residential with an approximate population of 72,000. The operational footprint of the EfW plant will be approximately 7-10 hectares. The construction footprint of the EfW plant including laydown,

Project Area for the EfW plant within the existing Maryvale Pulp and Paper Mill site



parking, access / egress, construction and crib areas will be approximately 18.8 hectares, and is within the existing Maryvale Pulp and Paper Mill site, owned by Australian Paper.

The site is adjacent to Australian Paper's existing paper train rail facility and container handling area and has good access from roads. Extensive geotechnical investigations have been undertaken as part of the Feasibility Study and this has established a baseline for the proposed site. The location of the proposed plant on the site was developed in a siting workshop undertaken with Australian Paper at the Maryvale Mill. The land proposed is owned by Australian Paper and is presently utilised as a eucalypt plantation.

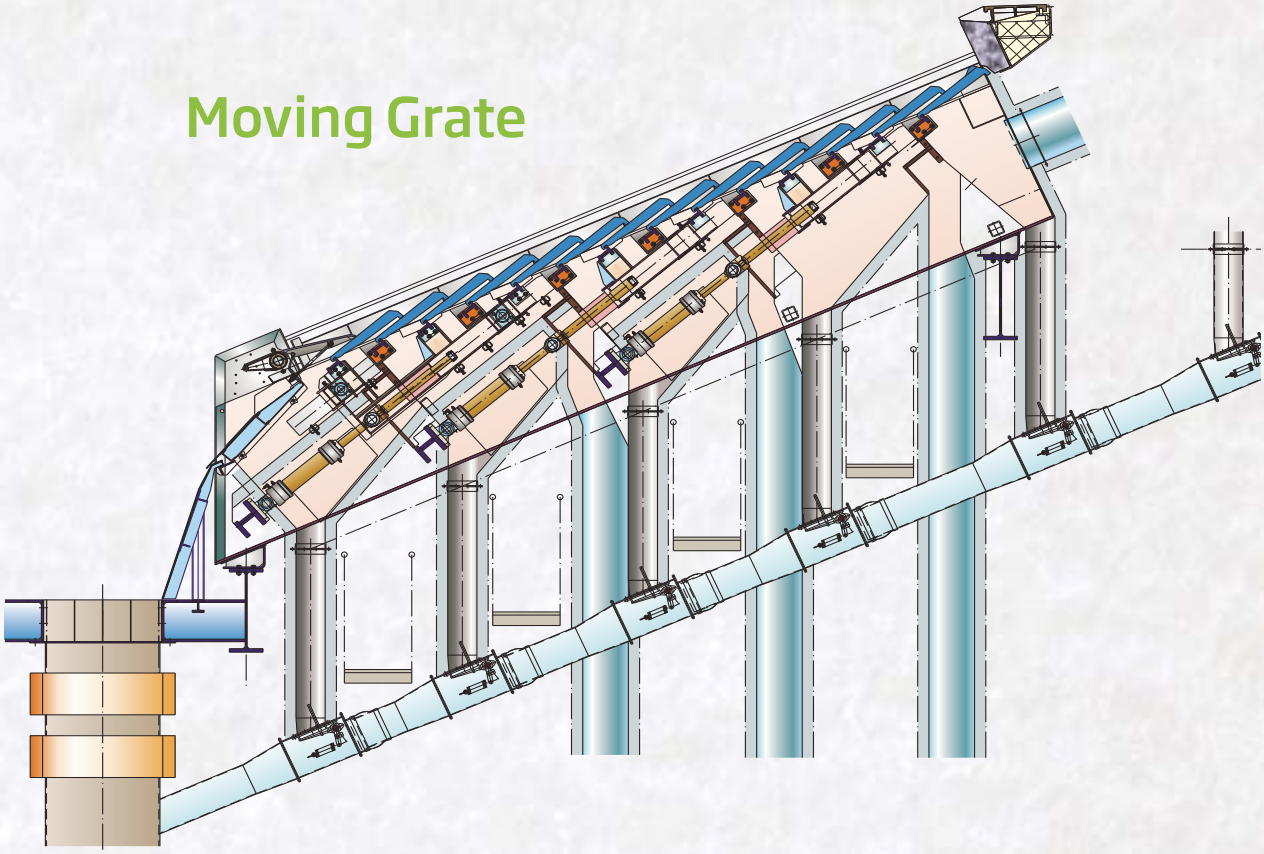
Project configuration

Proposed EfW Plant at Maryvale Mill site

The key technical characteristics proposed for the facility are:

- Two x 112 MWth boiler lines are anticipated. Each line is at the upper end of the main manufacturers' size range for proven designs creating economies of scale for Australian Paper's energy needs while processing a high proportion of waste from the eastern Melbourne and Gippsland catchments.
- The annual throughput of waste targeted is 650,000 tonnes processed in a typical equivalent of 8,000 hours per year.
- A condensing / extraction steam turbine generator (70 MWe) converts the steam energy that is not sent to Australian Paper into electricity. The electricity generated is integrated into the Australian Paper Mill's electricity needs.
- The EfW plant can operate independently of the mill and can process waste when Australian Paper is not able to take electricity and/or steam from the EfW plant or when the EfW steam turbine is unavailable.

Moving Grate



Best available technology

The proposed EfW plant will use modern, reliable technology and techniques. Moving grate EfW technology has been selected for the project as it is an environmentally and commercially proven low emissions technology that complies with the most stringent European Union standards. It is also the dominant worldwide thermal combustion technology because of its proven and reliable performance.

The EPA is responsible for regulating industrial and waste management activities. To be granted an EPA Works Approval, the EfW project needed to:

- demonstrate that the siting, design, construction and operation of the facility uses best practice measures for the protection of land, water and air environments
- demonstrate superior energy efficiency and greenhouse gas emissions management, and
- provide evidence of how pollutants, odour, dust, litter, noise and residual waste are to be minimised and managed.

Australian Paper followed the EPA's best practice methodology to determine the EfW plant's suitability for the region. This involved conducting a project risk assessment, reviewing available alternative energy solutions and analysing the project's predicted emissions, economic, social and environmental considerations.

The plant design, after benchmarking of installations in the UK, Europe and Singapore, will include the following features:

- moving grate technology to ensure waste and air mixing to optimise combustion
- flue gases will achieve a minimum temperature of 850°C for at least two seconds to completely combust organic compounds and destroy dioxins and furans
- flue gas cooling via the economiser section is designed to reduce potential for dioxins to re-form
- flue gas recirculation to minimise nitrogen oxide generation in the furnace and assist with complete combustion

- online flue gas oxygen measurement to ensure sufficient oxygen for complete combustion, including a carbon monoxide analyser for further combustion tuning
- selective Non-Catalytic Reduction methods with Ammonia or Urea injection and air mixing to reduce nitrogen oxide emissions
- burnt or hydrated lime injection systems to neutralise acid gases (HCl, HF and SO2)
- activated carbon injection to absorb trace heavy metals and trace hydrocarbons such as dioxins and furans in the flue gases
- single stage bag filters to collect fly ash particulates, lime and activated carbon solid residues
- recirculation of the air pollution control residues to optimise reagent use and minimise solid waste
- a modern certified continuous emissions monitoring system installed on the stack linked to emission control variables, with an installed live spare
- odour minimisation, including the tipping hall being a fully enclosed building maintained under negative pressure, with odorous air combusted in the boiler to minimise escape from the facility
- recovery of metals from the bottom ash residues to promote recycling
- superior energy recovery efficiency from the residual waste fuel through the generation of combined heat and power (steam and electricity) when compared to standalone electricity generation
- capability to reuse Bottom Ash as a replacement for natural aggregates such as sand and gravel following an appropriate treatment and approval process.

Technology evaluation

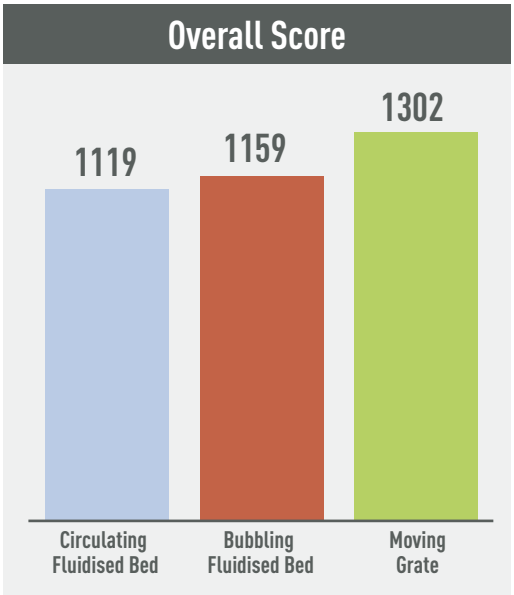
Australian Paper established that there are two primary thermal technology options for boiler plants that can be used for their Energy from Waste (EfW) Project. They are:

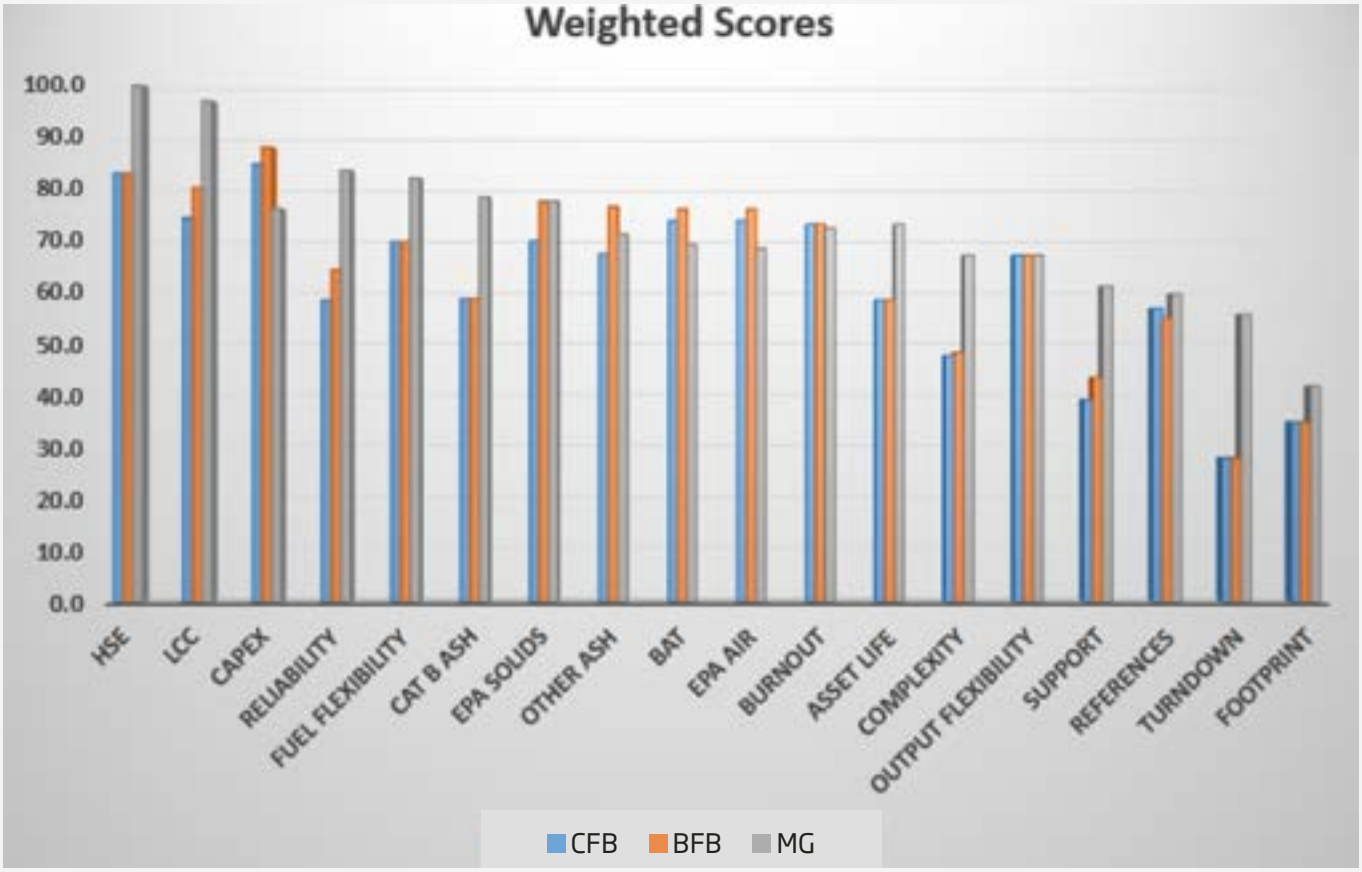
- Moving Grate Boiler Technology
- Fluidised Bed Combustion Technology. Within this technology there are two variations termed 'Circulating Fluidised Bed' and 'Bubbling Fluidised Bed'.

A thorough investigation needed to be carried out that aimed at establishing the most suitable MSW combustion technology to be used for the EfW project. Following a competitive tender process, GHD was engaged to undertake an investigation to determine the best technology options for the project.

Based on the evidence available, the various analyses carried out, and the results of the scoring against a weighted criteria, GHD has concluded that the Moving Grate is the best technology option for the proposed Energy from Waste facility for Australian Paper.

While the scoring showed all positive and negative results for both technology options, on an overall basis, the Moving Grate score was more than 10 percent higher than for either alternative option. This evaluation is indicative of some of the unique factors relevant to the Australian Paper proposal and was not solely a reflection of the technical capability of the respective technologies.





Against many of the other criteria the Moving Grate was superior, including:

- Health & Safety, particularly as there is no pre-sorting required that would require manual contact in respect of handling the MSW even in an automated plant.
- Life Cycle Cost
- Superior reliability and availability
- Much less complexity
- Reduced generation of Category B ash
- Greater tolerance to fuel variability
- Projected longer asset life.

In the case of environmental performance and Best Available Technology, all options scored similarly, having proven their ability to meet the European Directives and are accepted as suitable technology.

In addition, web research confirmed that Moving Grate dominates the EfW market worldwide, with over 87 percent of European plants and over 80 percent worldwide being based on this technology. In Australia, Moving Grate has also been widely used for industrial power generation in industries such as paper and sugar. This means that there is a body of local experience available to support this technology.

In terms of the size of plant proposed for Australian Paper, Moving Grate has more than double the number of installations than either of the Fluidised Bed options.

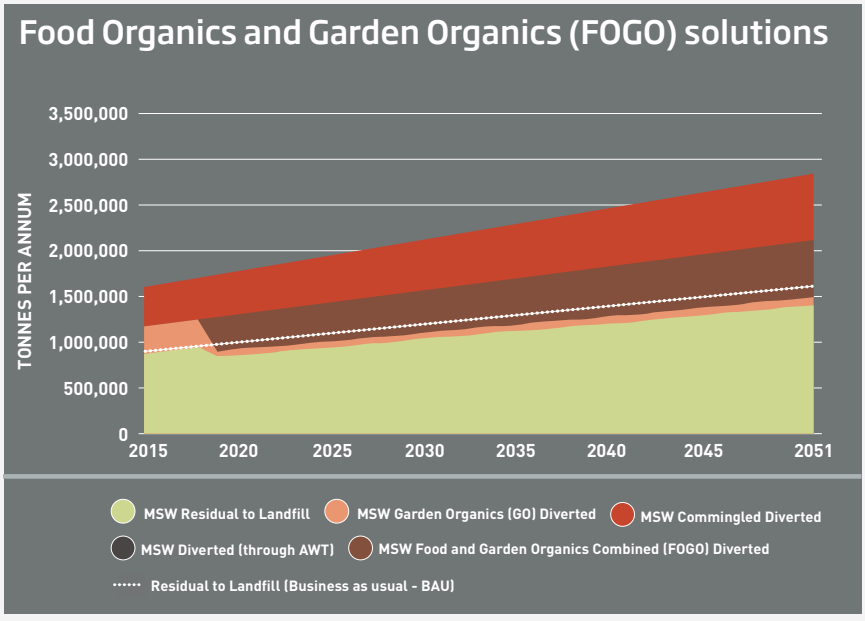
With all of these factors taken into account, the Moving Grate was recommended by GHD as the option to take forward. Australian Paper reviewed and accepted this recommendation.

Waste supply and characteristics

The project is targeting 650,000 tonnes per annum of residual waste (as outlined in the table below). This includes 520,000 tonnes of residual MSW collected by councils in eastern Melbourne and Gippsland. MSW (red lidded bin) is source-separated by the house-holder with recyclables diverted into the co-mingled recyclables stream (yellow lidded bin). The project is not targeting recyclables nor green waste.

Up to 130,000 tonnes of C&I would be used to "top-up" the waste volumes to the project on more flexible, short-term agreements.

Source: 2021	MSW	C&I	Total
South East Melbourne	377,000	70,000	447,000
Inner Melbourne (CBD)	88,000	35,000	123,000
Gippsland	55,000	25,000	80,000
Australian Paper		None assumed, but potential modest volume	
TOTAL	520,000	130,000	650,000



Metropolitan Waste and Resource Recovery Group: Advanced Waste and Resource Recovery Technologies- Metropolitan Regional Business Case and Procurement Strategy, September 2018

These are also likely to come from eastern Melbourne and Gippsland. Given the project's location it would target maximum waste from Gippsland (the six Gippsland councils /shires).

Extensive sampling and testing was undertaken to determine waste characteristics for utilisation as fuel and the level of contaminants and residues. Accurately assessing the waste properties is a key consideration to the project and further testing has been planned for 2019. The extensive data collected to date is considered to be the most comprehensive waste database in Victoria, and potentially Australia. It provides a significant competitive advantage to the project and will therefore remain confidential.

Extensive modelling was also undertaken to determine the impact of existing and potential government waste management initiatives including increased collection of garden and food organics, container deposit schemes, more infrastructure for diverting recyclables from landfill, and a ban on E-waste going to landfill.

The sampling, testing and modelling represents a significant investment in time and effort and provides extremely valuable input into the project design, risk evaluation and commercial viability.

The Feasibility Study concluded that while potential future initiatives would have a positive effect on reducing waste volumes, this would be easily exceeded by the impact of population growth. At best these initiatives would slow the growth of waste volume for a period before the upward trajectory once again continues.

This is reinforced by analysis by the Metropolitan Waste and Resource Recovery Group (MWRRG) in its September 2018 report Advanced Waste and Resource Recovery Technologies - Metropolitan Regional Business Case and Procurement Strategy (graph left).

The Study envisaged that at least two Waste Transfer Stations (WTSs) in Melbourne will be required to aggregate the waste into sufficient transport volumes. Council roadside collection vehicles (RCVs) are necessarily small to navigate suburban streets (about 7.5 tonnes each) and this is not a practical logistics option for delivery from Melbourne to Maryvale.

Further, the Melbourne waste volumes should be divided between at least two WTSs to avoid long RCV cycle times and to avoid severe traffic concentrations in the vicinity of the WTS if all Melbourne waste were directed through one WTS. One WTS is envisaged in the South East Melbourne area and another (preferably) in the inner city area.

Long term waste supply contracts with councils will need to be secured before the logistics network analysis and design can be finalised.

Logistics

Initial community consultation undertaken by Australian Paper around the EfW project identified early that how the waste would be transported to the plant was a key area of interest and would need to form an important element of the project evaluation.

A logistics study was undertaken to estimate the logistics modes, costs and likely infrastructure required to transport the waste and residues. In summary the base-case comprises:

- Road transport of waste from South East Melbourne to site in sealed 40ft containers or trailers, compacted in an A-double truck format. Additional work investigating site procurement and approvals for another site in South East Melbourne might provide a rail transport option also from that area.
- Rail transport of waste from the Central Melbourne area in sealed, compacted 40ft containers carried on additional wagons added to the Australian Paper paper train, which operates daily from the Maryvale Mill to the North Dynon rail terminal area where Australian Paper handles its paper.
- Road transport of waste from Gippsland delivered directly to the EfW plant with the costs borne by the local councils / waste collectors.
- Air Pollution Control Residue would be transported in sealed, pneumatic discharge vehicles to a suitable prescribed industrial waste landfill site.
- Bottom ash has been modelled to be backhauled to Melbourne to a suitable landfill site until potential reuse options can be developed.

This approach provides flexibility including multiple WTSs, capability to transfer rail freight to road freight options, and ability to source from alternative council areas if necessary.

During this process, Australian Paper engaged closely with various agencies and authorities on key aspects of the proposed project. This has included discussions with VicRoads and Latrobe City Council on the proposed use of roads and the potential impacts. Over a period of several months, meetings were held with VicRoads and Council officers where the requirements for the analysis of potential traffic impacts were discussed.

This led to the scoping of the Traffic Impact Assessment (TIA) which forms part of the Planning Permit application for the project. Prior to conducting the TIA, the scope was agreed with VicRoads and council to ensure that the relevant issues were analysed and assessed.

The findings of the TIA indicate that the modelled traffic volumes and swept paths will have minimal impacts on the road network.

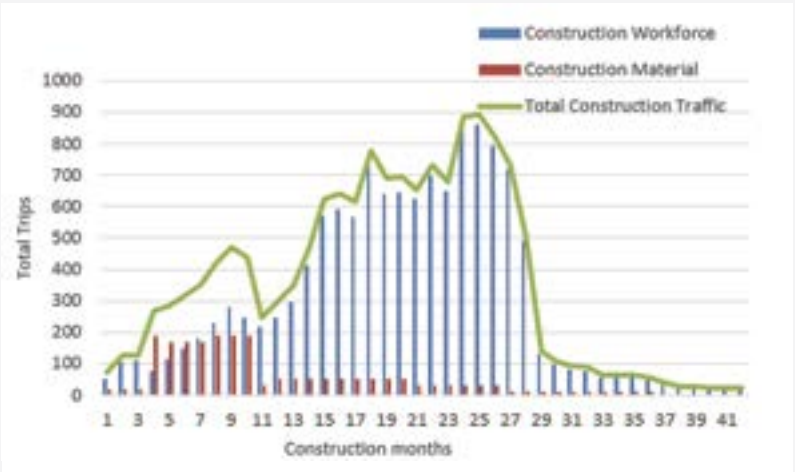
This TIA details the current traffic conditions and the expected traffic generation and distribution during the peak construction phase and the operational phase of the proposed project, as well as the potential traffic impacts when the site is fully operational ten years post construction of the EfW development at the nominated key intersections.

Diagram 1 –
Existing road networks showing intersections of interest

Diagram 3 –
EfW Project passenger vehicle access (construction and operational phases)

Diagram 2 –
EfW Project truck access (construction and operational phases)

Construction phase



Based on predicted data (which was provided by a construction contractor as typical construction workforce numbers for the construction of a large EfW plant), a total of 446 vehicles are expected to arrive and depart the site each day during the peak construction month (month 25 of 42). Of these 446 vehicles, only 15 of these movements are heavy vehicles, associated with construction material and equipment deliveries.

Peak construction materials and equipment deliveries are expected to occur for 3 months (month 7 to 9 of the 42 months) with 80 vehicles while the workforce associated trips are relatively low at that time.

The total daily trips associated with the construction phase are summarised in the graph left.

Operations phase

During the operational phase, the traffic volumes for the EfW plant will be much less than the construction phase. The traffic volumes will also be more regular. Operational phase traffic includes:

- passenger vehicles for employees and visitors
- Roadside Collection Vehicles (RCVs – standard garbage trucks)
- 30 tonne residual waste trucks
- A-Double trucks with waste containers
- tray trucks; and
- miscellaneous delivery trucks.

It is estimated that a total of 110 vehicles will arrive and depart the site during an average workday which equates to 220 trips per day over a 12-hour period. Therefore, the operation phase is anticipated to generate 22 trips during the am and pm peak respectively. The operational trips associated with the proposed EfW plant will be minimal when compared to the construction traffic.

Based on the analysis undertaken, the traffic generated by the workforce to/from the proposed EfW plant will not have any significant adverse impact on the traffic operations at any of the five key intersections during the construction phase or the ten-year scenario operational phase. On this basis, no intersection capacity upgrades are required.

Approvals

The EfW project requires a number of extensive and formal approvals which, along with relevant supporting information, were submitted during the Feasibility Study. The major approvals consist of the Environmental Effects Statement (EES) Referral, Environment Protection Authority Victoria (EPA) Works Approval, and a Planning Permit.

EES Referral

The *Environmental Effects Act 1978* provides for assessment of proposed projects that may have a significant effect on the environment. It does this by allowing the Minister administering the Act to review and make a decision as to whether an EES should be prepared.

A detailed referral outlining the project and its environmental credentials was submitted to the Minister for Planning for consideration. It was determined by the Minister that no further actions were required under the Environmental Effects Act, and the project could proceed via the existing statutory approvals pathways.

EPA Works Approval

Works Approvals are issued by EPA Victoria under the Environment Protection Act 1970. They are required for industrial and waste management activities that have the potential for significant environmental impact.

Works Approval applications are publicly advertised and may be accessed on the EPA's website. Members of the public may lodge comments with the EPA within 21 days of advertising and applications are also referred to other relevant agencies for their review and advice.

This process is designed to proactively raise awareness of the project with interested parties and identify any issues the community may have. The EPA will complete its assessment taking into consideration any public comments received and applicant responses during the consultation processes. The EPA will then decide whether to issue a works approval and whether to attach any conditions to the approval.

On 25 May 2018, Australian Paper submitted a Works Approval Application for the EfW project to the EPA, as per section 19B(c) of the Environment Protection Act 1970. This application was over 270 pages (excluding attachments and appendices) and included detailed analysis and modelling of:

- the EfW processes and technology
- environmental best practice
- air quality energy and greenhouse gas emissions
- noise emissions
- water use and surface water management
- waste
- historical aboriginal and cultural heritage
- environmental management.

The application was subject to detailed review by the EPA and other relevant government agencies with a number of clarifications and further analysis including the preparation of a detailed Health Impact Assessment.

In addition, the application was subject to extensive community consultation (see 'Social Licence' below) including public comment and submissions as well as a Section 20B community conference. As a result of this process, Australian Paper prepared responses to the submissions received as well as any new questions raised at the Section 20B conference.

This process of engagement with regulators and the community all led to a more rigorous Works Approval Application by Australian Paper and a more thorough assessment of the project's environmental, social and economic merits. On 28 November 2018, the EPA issued a Works Approval with a range of Conditions. The Works Approval is currently subject to a VCAT appeal.

Planning Permit

A detailed Planning Permit application was submitted to Latrobe City Council as part of the approvals process. This included extensive analysis of the Latrobe Planning Scheme including relevant zoning and overlays. The planning assessment component also included analysis and assessment of site access and traffic, truck movement on site, cark parking as well as noise, air and light emissions.

The application required the preparation of a detailed Traffic Impact Assessment (see "Environmental and amenity issues" section for further details) which included extensive assessment of road conditions, and modelling of traffic flows in an around the proposed site. The application also required a detailed Bushfire Management plan that was prepared with extensive consultation with the Latrobe City Council and CFA.

Throughout the process, Australian Paper and its consultants met regularly with Council representatives to discuss the permit and additional information was subsequently provided in response to queries to improve the application.

On 7 January 2019, the Latrobe City Council issued a Planning Permit for the proposed project. This Permit allows Australian Paper to begin developing the land for the project. There are a number of conditions that must be met before construction can commence.

These conditions include outlining processes for key aspects of the development phase, like bushfire management, and stormwater, waste and emergency management plans for the site, before any works can begin. There are also conditions regarding protecting, removing and replanting a native vegetation offset.

Project approvals have required a major investment in time and effort to scope, prepare, analyse, evaluate and finalise the project design to meet the unique circumstances of Maryvale Mill and its location within Gippsland. The thorough nature of the application evaluations conducted by all associated authorities provided further opportunities to clarify, address consultative feedback, and improve the proposal.

Economic, Social and Environmental Considerations

The investigations for the design and technology used have considered a range of economic, social and environmental factors in determining a preferred technical solution.

In addition to the best practice analysis described below, examples of broader economic, social and environmental considerations for the project include:

- Improving energy security by returning up to 4PJ of natural gas to the broader market, helping to improve energy security for the state and country
- Helping to secure future investment at the Australian Paper Maryvale site and the jobs of approx. 850 employees who work there
- Supporting an additional 1,046 full-time equivalent jobs per annum across Victoria for each year of the three years of construction and 911 full-time equivalent jobs thereafter
- Diverting 650,000 tonnes of residual waste from landfill each year, to a higher order use as per the Waste Hierarchy
- A net reduction in greenhouse gas emissions of more than 500,000 tonnes per year of Co_2e, the equivalent of taking 100,000 cars off the road.

Social licence

Australian Paper and its operations are an integral part of the Latrobe Valley, having existed on the Maryvale site since 1937. Australian Paper understands the importance of its relationship with the local community and this is why an extensive community engagement and consultation process has been at the core of the Feasibility Study. To date the community has shown significant interest in the project and what it means for the region and to the long-term viability of one of the region's largest employers. A number of independent observers including government agencies have commented positively on the extensive program implemented by Australian Paper and in particular for the early community engagement through focus groups and the establishment of the "Creating Energy from Waste" information centre in Morwell. Australian Paper formed the view early in the project lifecycle that high stakeholder engagement standards would need to be achieved to successfully establish a social licence for this major project.

Australian Paper consultation

The potential for an EfW project was first discussed with community members through the 'Maryvale Community Consultation Committee' in May 2017, which has been long established by Australian Paper to provide a regular interface between it and representatives of the community.

Since then, Australian Paper has undertaken a series of engagement activities to inform the community of the proposed project, to take stock of the opinions of stakeholders, and address any issues raised. This initially involved a series of community focus groups held in Traralgon, Morwell and Moe to gauge the community views and attitudes on an EfW plant for Maryvale Mill.

Further stakeholder engagement activities undertaken by Australian Paper and Suez to support the Feasibility Study have included:

- The establishment of an Information Centre and Project Office in Morwell for local people to visit, find out about the project, and ask questions of the project team
- The development of a project website https://www.australianpaper.com.au/about-us/creating-energy-from-waste/
- The production of regular stakeholder newsletters to provide interested parties with project updates
- Conducting 'Open House' sessions as part of the EPA's public consultation process
- Regular advertisements in the local newspaper with information about the project and Australian Paper
- "Pop up" information centres in Traralgon, Morwell and Moe (at the shopping centres and library)
- Regular updates with the Maryvale Community Consultative Committee
- Maryvale Mill open day.

To date the Information Centre and Project Office has had 242 visitors and over 50 delegations received a tour. The "pop up" information centres undertaken in Moe, Morwell and Traralgon attracted more than 190 visitors.

Australian Paper has also engaged with a wide range of community and business groups, including:

- Latrobe City Council
- Traralgon Chamber of Commerce
- Committee for Gippsland
- Advance Morwell
- Gippsland Local Government Network
- Latrobe Valley Sustainability Network
- Traralgon Central Rotary Club
- Voices of the Valley
- Latrobe Health Assembly
- Latrobe Health Advocate.

Learning from our community

Australian Paper's community consultation program demonstrated a high level of interest and broad support for the proposed EfW facility. Australian Paper encouraged feedback throughout this process and, as a result, a number of key questions were identified as being particularly important to the local community and needing to be addressed as part of the Feasibility Study.

1. Would an EfW facility increase the number of trucks on our roads?

A full traffic Impact Assessment for the project was undertaken as part of the Feasibility Study. This assessment found that modelled traffic volumes and swept paths will have minimal impacts on the road network.

For more information see the "Logistics" and "Traffic" section of this report at pages 22 and 34 respectively.

2. Could creating energy from waste undermine or reduce recycling efforts?

Ensuring maximum recycling of waste is an important aspect of this technology. The waste from the facility will come only from non-hazardous residual waste streams diverted from landfill such as municipal solid waste (MSW) streams, not recycling bins. Further we expect that in future, more organics and plastics will be diverted from the MSW waste streams and have fully factored this into our future planning.

The evidence from Europe demonstrates that high recycling rates can be achieved alongside high energy recovery rates. For greater detail on waste supply and Australian Paper's modelling of this, see "The Waste Management Challenge in Victoria" section of this report at page 38.

3. How do EfW facilities manage potential air pollution?

Modern EfW facilities are specifically designed with best practice operating systems to protect health and safety. A detailed Air Quality Impact Assessment was undertaken as part of the EPA's Works Approval Application.

The assessment demonstrated that emissions from the EfW plant will meet all SEPP (AQM) and IED stack emission limits. You can read about this assessment in the "Environment and amenity issues" section of this report at page 32.

4. How will the issue of noise and odour be addressed?

A key design feature of the facility will be noise control to minimise the impact of the facility. A Noise Assessment was conducted as part of the EPA's Works Approval Application which found that the noise contribution from the proposed plant would meet EPA limits.

The main source of odour from an EfW plant will be the tipping hall and waste bunker. All waste will be stored, handled and processed in a closed environment which effectively traps odours within the facility.

The "Noise" (page 35) and "Odour" (page 36) sections of this report have more information on these issues.

5. Does EfW reduce Co_2?

A comprehensive assessment of greenhouse gas emissions was undertaken as part of this study. This showed a significant environmental benefit of the project with a net reduction of 543,000 tonnes of CO_2e emissions per year. You can read about this assessment in the "Greenhouse gas emissions" section of this report at page 33.

6. Are there dangers posed by this technology?

The by-product of modern EfW facilities is captured and treated by sophisticated pollution control equipment to ensure the vast majority of particulate matter is captured within the facility. A Health Impact Assessment was prepared as part of this Feasibility Study and found negligible impacts in terms of community health. This is covered in detail in the "Health impacts" of this report at page 31.

EPA consultation

As part of its consideration of Australian Paper's Works Approval Application, the EPA conducted a public consultation process between 30 May and 6 July 2018. The EPA received 115 submissions with 84 percent of respondents supportive of the project going ahead, including 7 percent support with conditions.

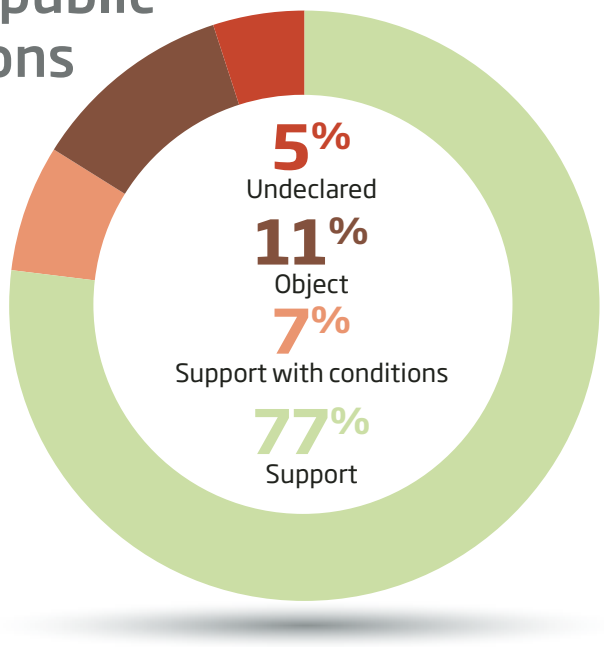
As noted above, the consultation process also included a series of 'Open House' sessions in June 2018, run by Australian Paper and attended by the EPA, held in Traralgon and Morwell. These were designed to give the Latrobe Valley community an opportunity to find out what the project means for the local area, to ask questions, and find out more about the Feasibility Study. The EPA attended these sessions to provide information on the Works Approval process to interested parties.

On 25 July, the EPA conducted a Section 20B Community Conference in Traralgon to discuss Australian Paper's proposed EfW project.

The session was independently chaired with more than 60 community members, including local residents, representatives from not-for-profit organisations and businesses gathered to discuss the proposed EfW works application.

The independent chair prepared a report detailing key issues and possible solutions raised in written submissions and at the Conference. This was made publicly available on 10 August 2018. The recommendations are listed below.

EPA WAA public submissions received



The following topic specific recommendations relate to future actions, if a works approval is granted:

Recommendations

Topic 1 – Air emissions monitoring and control technology to prevent health impacts:

EPA to consider:

- supporting Australian Paper to undertake specific community consultation in relation to establishing an appropriate monitoring, evaluation and reporting regime as part of considering potential future licence conditions.

Topic 3 – Waste Hierarchy and waste composition

EPA to consider:

- outlining in its detailed assessment report for this works approval application (or some other appropriate communication channel) how it expects Australian Paper to manage each of these issues through environmental management plans and the types of licence conditions that it might consider imposing.

Topic 4 – Management of incoming waste and residual waste generated

EPA to consider:

- outlining in its detailed assessment report for this works approval application (or some other appropriate communication channel) how it expects Australian Paper to manage each of these issues through environmental management plans and the types of licence conditions that it might consider imposing.

Topic 5 – Greenhouse Gas Emissions and odour from the site

EPA to consider:

- the need for expert review of any emissions and odour modelling information relied upon in its detailed assessment.

Topic 6 – Track record and public consultation

EPA to consider:

- the benefits and appropriateness of providing access to engagement advice (from EPA's Communications and Engagement Group) to Australian Paper to support their continued engagement approaches.

EPA to consider:

- encouraging Australian Paper to better engage with external stakeholders (agencies and community representatives) specifically around health impacts.

The following general recommendation relates to future action regardless of whether an approval is granted:

Recommendations

EPA to consider its role in:

- improved external communications and access to information.

Health impacts

A Health Impact Assessment (HIA) was prepared as part of the Feasibility Study to identify and evaluate the impacts of the proposed project on the health of the surrounding community.

The HIA considered the operation of the proposed project and potential impacts to the health of the off-site community. The risk assessment process uses conservative (worst-case) scenarios and then compares these results to accepted health standards. These standards aim to protect the most vulnerable members of the relevant community.

It considered a range of issues that have the potential to affect the health of the community (either positive or negative), which relate to changes to air quality, odour, noise, water, traffic, hazardous materials and the economic and social environment.

Based on the assessment undertaken, the project is associated with some benefits to the community, particularly in relation to employment. Where negative impacts have been identified, these are considered to be negligible in terms of community health.

In consultation with the EPA the HIA was publicised and made available for public review and comment. The EPA reviewed these further public comments as part of the Works Approval Application.

Environmental and amenity issues

Air quality

It was identified early that air emission impacts and their management were key focuses and areas of concern for local stakeholders. A detailed air quality impact assessment has been undertaken as part of the EPA's Works Approval Application. This included emissions from the now closed Hazelwood Power Station, Morwell Power Station, Energy Brix and Carter Holt Harvey saw mill in the background assessment, which means the assessment is considered to be conservative in terms of its cumulative effects.

The assessment covers a topographical area over 15km x 12.5km and utilises meteorological data over a five year period taking account of the unique characteristics of the Latrobe Valley including the inversion layer. The assessment also examines specific locations and also a grid matrix of 100 x 100 metres, resulting in 19,040 locations analysed every hour over the five year period.

The air quality impact assessment was conducted in accordance with EPA requirements (State Environmental Protection Policy for Air Quality Management – "SEPP AQM") and European Union Industrial Emissions Directive 2010/75/ EU ("IED"). The IED is one of the world's most stringent assessment benchmarks that leading EfW designers must meet. The Maryvale EfW facility has been designed to meet these rigorous European emissions standards.

The computational model used for the assessment was the EPA's preferred model AERMOD and the methodology was discussed and agreed with the EPA prior to commencement.

A range of substances were analysed and modelled in accordance with EPA Victoria and EU procedures. These included:

- Carbon monoxide (CO_2)
- Nitrogen dioxide (NO_2)
- Sulphur dioxide (SO_2)
- Particulate matter 2.5µm
- Hydrogen fluoride (HF)
- Hydrogen chloride (HCl)
- Ammonia (NH3)
- Polycyclic aromatic hydrocarbons, as benzo(a) pyrene (PAHs as B(a)P)
- Hexavalent Chromium (Cr (VI))
- Cadmium (Cd)
- Mercury (Hg)

The assessment demonstrated that emissions from the EfW Plant will meet all SEPP (AQM) and IED stack emission limits. The assessment also demonstrated that emissions of the above substances from the EfW Plant will not cause exceedances of SEPP (AQM) ground level concentration (GLC) limits (known as 'Design Criteria'), with the exception of PM2.5. For PM2.5, the assessment demonstrated that the infrequent cause of GLC exceedances was due to occasional high background levels of PM2.5 typically due to fires and not due to the EfW plant emissions.

To further demonstrate that the EfW Plant was not the cause of PM2.5 exceedances, modelling was conducted on a range of PM2.5 emission scenarios, including:

- Zero emissions from the EfW plant (i.e. only background air quality)
- PM2.5 emissions at the maximum stack emissions limit allowed by the IED (30 mg/m3)
- PM2.5 emissions at a representative stack emissions value which is an average of UK EfW Plants (0.02 mg/m3)[i]

The HIA specifically assessed PM2.5 and concluded the EfW facility would make a negligible contribution to existing concentrations and would only make up a very small fraction of the NEPM/SEPP guideline.

[i] Ricardo-AEA Ltd (Buckland, Thomas), Assessment of particulate emissions from energy-from-waste plant, National Atmospheric Emissions Inventory, Report for DEFRA, 14/10/2015. https://ukair.defra.gov.uk/assets/documents/reports/cat07/1511261133_AQ0726_PM_EfW_emissions_report_Issue1_Final_including_appendices.pdf

Greenhouse gas emissions

A comprehensive assessment of greenhouse gas emissions was undertaken as part of the Works Approval Application to the EPA. This showed that a significant environmental benefit of the project is the substantial reduction in overall greenhouse gas emissions, predominately from avoidance from landfill.

The net benefit of CO_2 reduction is calculated to be 543,000 tonnes of CO_2 emissions per year. By comparison, landfill of the waste alone would result in emissions of 500,000 tonnes of CO_2 per year. The following table presents calculated emissions from the construction phase, the operational phase for energy and non-energy related impacts (including transport emissions).

This will be a measurable impact on Victoria's (and Australia's) emissions profile and help to achieve targets outlined in the Climate Change Act 2017 (VIC) and Protocol for Environmental Management (PEM) - Greenhouse Gas Emissions and Energy Efficiency.

Cumulative emission summary

	Construction emissions (tCO_2e)	Operation Energy related emissions (tCO_2e)	Operation Non-energy related emissions (tCO_2e)	Total emissions (tCO_2e)
Construction	14,606			14,606
Years 1-25		-20,400	-523,531	-543,931
Total (25 years)	14,606	-510,001	-13,088,284	-13,583,678

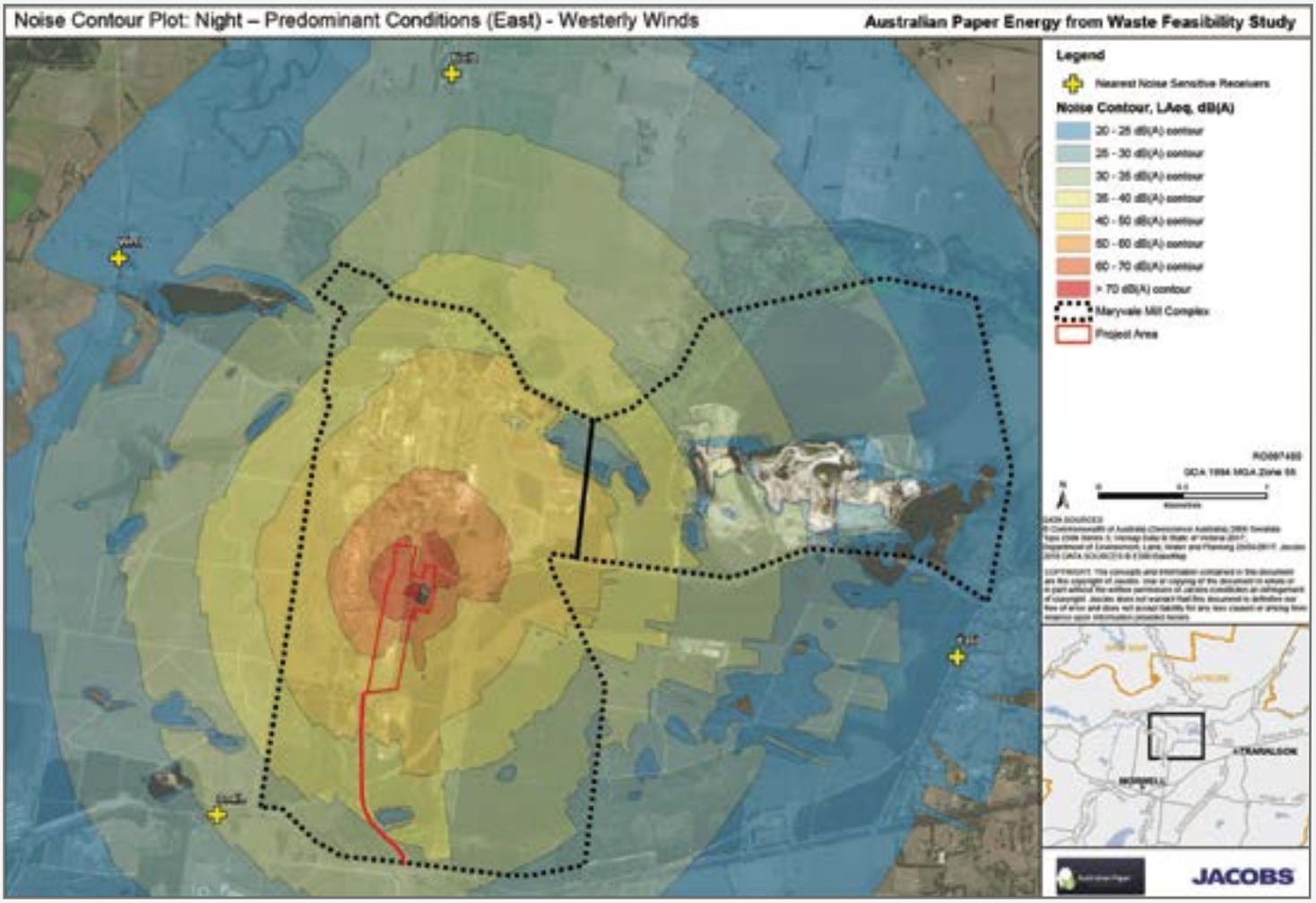
Traffic

A full Traffic Impact Assessment (TIA) for the project has assessed the existing traffic conditions of the roads that will be used for construction and operation of the EfW facility and assessed the potential impacts of the EfW project development on these roads.

The findings of the TIA indicate that the modelled traffic volumes and swept paths will have minimal impacts on the road network (see 'Logistics' section).

Vehicles accessing the Maryvale site throughout the construction and operation phases of the project will use Alexanders Road and Tramway Road to connect to the Princes Freeway (M1), south of the project site, which provides access to the site from Melbourne and elsewhere in Victoria.

East of Princes Drive in Morwell, the M1 carries a two-way total of around 29,000 vehicles on an average day according to the VicRoads Open Data website. Trucks make up around 9 percent of this volume. To the west of Miners Way in Morwell, the traffic volume reduces to around 24,000 vehicles (two-way) per day and trucks make up around 13 percent of this number.



Noise

Noise emissions from the project during operations will occur from activities including blowers, fans, cooling towers, turbines and boilers. All of the high noise output equipment will have point source noise limits (dBA) and the majority will be enclosed to minimise noise impacts.

The applicable EPA guideline is Noise for Industry in Regional Victoria (NIRV). A noise assessment was conducted as part of the Works Approval Application in accordance with NIRV, which included the calculation of noise limits and design targets over three time periods.

The assessment found that the noise contribution from the proposed EfW plant would meet EPA limits at receptors, particularly the nearest residential receptors to the north, south, east and west of the site.

During the detailed design phase, there will be further opportunities to consider additional mitigation measures to reduce potential noise impacts. This would include dominant noise sources, including:

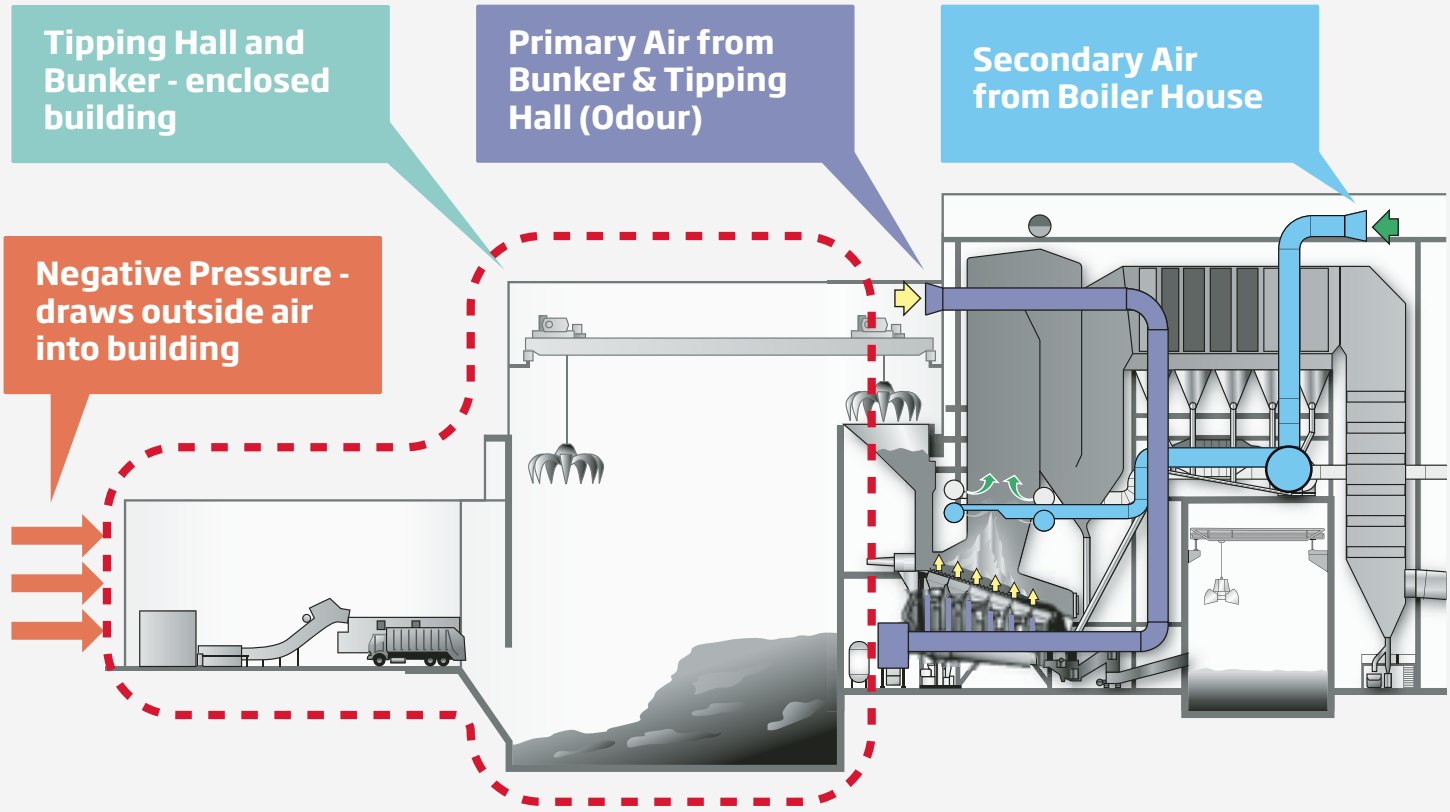
- Noise from the boiler house
- Water Cooled Condensers
- Train and truck noise.

Odour

The main sources of odour from the EfW plant will be the tipping hall and waste bunker. To control fugitive odour emissions, the EfW tipping hall, which will receive waste by train and/or truck, will be entirely enclosed and operated under negative pressure – where the outside air is drawn into the tipping hall and air inside the tipping hall is not permitted to escape to the outside atmosphere.

Odorous molecules and hydrocarbons / VOCs are expected to be destroyed in the EfW's processes; i.e., foul air from the tipping hall will be used as combustion air in the EfW boiler.

The expectation and experience from the European plants visited is that there will be negligible fugitive odour and other air pollutant emissions from the site.



Water use and wastewater discharge

The addition of the EfW Plant will not significantly alter the management of wastewater, trade waste and stormwater at the Maryvale Mill and the EfW Plant water systems will be designed to integrate with the existing Mill systems.

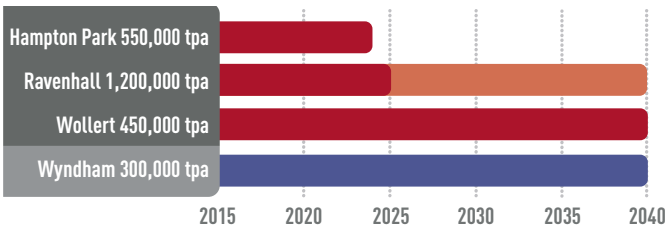
The existing Maryvale Mill sources 70-80 ML/day of water from the Gippsland Water Moondarra Reservoir (via the Pine Gully Reservoir) and discharges approximately 55-65 ML/day of treated wastewater. It also discharges 15-20 ML/day to Gippsland Water as treated trade waste. The design concept assumes that the water supply for the project will be from Moondarra reservoir.

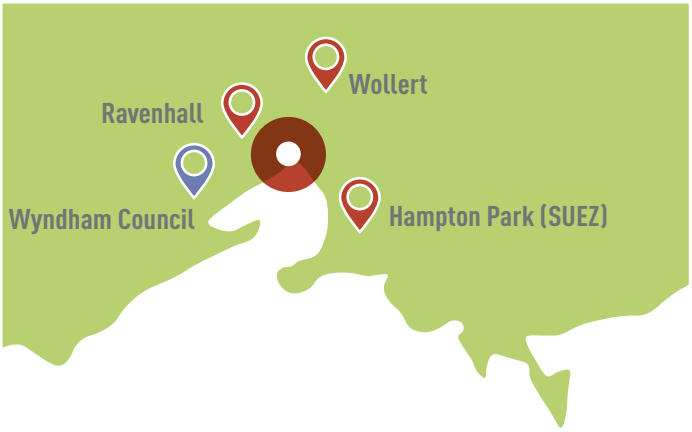
Potable water is sourced from the local water authority (Gippsland Water). Domestic sewage is discharged to the Gippsland Water Factory. The design concept assumes that the potable water supply for the project will be from a connection to the existing water supply line to the Mill and the domestic sewer discharge will be via the existing domestic sewer main from the site.

The estimated demand of the EfW Plant is expected to be 5-6 ML (less than 8 percent of the current Mill demand) of raw water per day, depending on the load and operating mode of the EfW plant, and 30 kL/day of potable water from Gippsland Water.

The design concept assumes the water effluent discharged by the EfW Plant will be to the existing Mill effluent treatment systems.

The Waste Management Challenge In Victoria





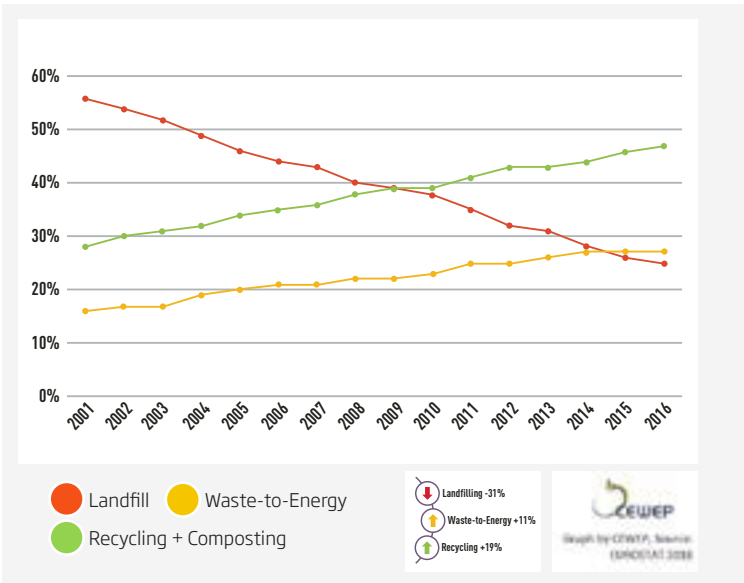
With a number of landfills closing in the next 5 to 10 years, and the fastest rising population in Australia, Victoria needs a solution for the amount of waste being generated. Lowering the levels of waste generated, and increasing the amount of waste that is being recycled is crucial to meeting this challenge.

With the impending closure of the Hampton Park landfill site, there will be no putrescible landfill capacity in south east Melbourne as soon as 2025, creating a shortfall off 550,000 tonnes per annum in Melbourne's disposal capacity. Continued population growth in Victoria is predicted to exacerbate this situation.

This will have the effect of reducing competition, resulting in a higher cost risk for local councils. It will also put pressure on remaining landfill options and significantly increase cross-city traffic with trucks forced to move 550,000 tonnes of waste each year from the south east to landfill sites in the west.

This will leave councils in the south east of Melbourne with the options of trucking waste across the city, opening a new landfill in the east, or exploring alternative waste treatment options as a solution to landfill.

Evidence from the countries which have decreased the amount of waste being sent to landfill demonstrates that a significant EfW industry is needed in addition to an effective recycling industry. This is the case in leading countries such as Germany, Sweden, and Denmark. Successful waste policy deployment in Europe has resulted in significant reductions in waste going to landfill with corresponding increases in recycling and energy from waste.



By diverting approximately 650,000 tonnes of non-hazardous residual waste each year from Victorian landfills, the EfW plant at Maryvale would effectively be the missing link in Victoria's waste hierarchy.

For an EfW plant to be successful in Victoria, there are a number of critical factors which are required, all of which Australian Paper's project has:

- ✓ Desire to divert waste from landfill by local and state governments
- ✓ Long term energy off-take contracts (25 years)
- ✓ Suitable site, appropriate zone and buffers
- ✓ Strong community engagement and acceptance
- ✓ Credible developers and operators to guarantee performance
- ✓ EPA Works Approval and Latrobe City Council Planning Permit.

All that is required now is a long term commitment to MSW supplies (25 years) from:

- MWRRG south east (>400,000tpa);
- Melbourne inner city (>70,000tpa); and
- GWRRG (>50,000tpa).

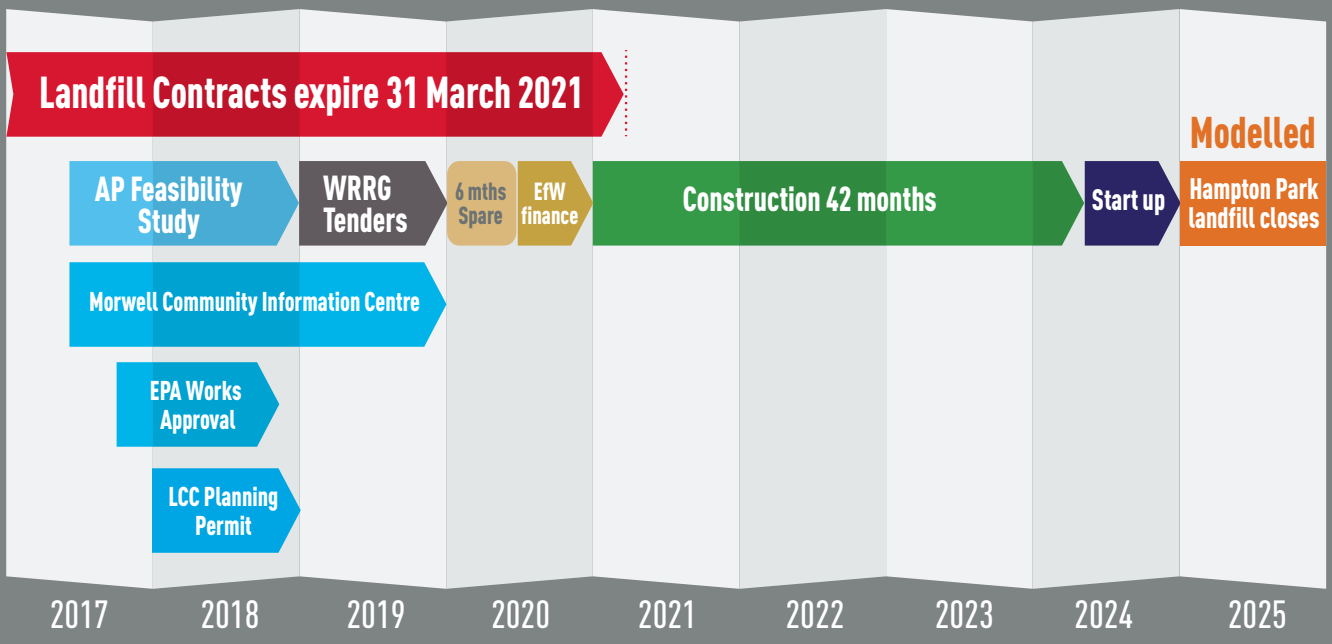
The benefits of this commitment would be:

- a viable solution to south east Melbourne's waste crisis
- long term competitive waste disposal pricing at low risk
- improved environmental stewardship supporting Council sustainability strategies
- adding the missing component to Melbourne's waste management infrastructure
- supporting investment and jobs for Victoria and the Latrobe Valley.

The following chart on Project timing demonstrates that the modelled closure of Hampton Park landfill combined with the Metropolitan Waste and Resource Recovery Group (MWRRG) waste tender timeline results in only a 6month timeline contingency. Any delays in the tender process will mean 550,000tpa of waste in south east Melbourne won't have a place for disposal.

As noted in the Metropolitan Waste and Resources Recovery Group's (MWRRG) Advanced Waste and Resource Recovery Technologies – Metropolitan Regional Business Case and Procurement Strategy of September 2018, by 2046, Melbourne's municipal residual waste (garbage collected from households) will grow by 65 percent and over half a million extra tonnes will go to landfill each year.

Project timing



The economic, social and environmental cost of landfill means that increasingly it is being seen as an unviable disposal method for the future. Councils are now looking at ways they can recover more resources from waste so they do not have to invest in new landfills and they can better manage existing landfills to dispose of waste that can't be avoided or recycled.

MWRRG's report concludes that advanced waste processing (such as EfW) can limit the amount of household waste being sent to landfill and achieve the State's 25 percent recovery objective. It also finds that advanced waste processing will deliver better environmental and social benefits compared to landfill.

As an advanced waste processing technology, the Australian Paper EfW plant would play an important role in helping Melbourne and Gippsland Councils to meet their recovery objectives and minimise the long term pressure on existing landfill sites.

A key consideration for any alternative treatment of waste is the Landfill Levy set by the State Government. This is currently the main mechanism by which to encourage waste away from landfill.

Presently, only a large scale EfW plant (> 600,000 tonnes per annum) would have the volumes and economies of scale capable of competing with Victoria's low cost of landfilling.

Councils have a stated objective to deliver better environment and community outcomes compared to landfill, but must also do this against the backdrop of delivering the least-cost outcome for their constituencies. They require low risk and certainty of pricing over the long term, both of which can be delivered through long term waste supply contracts to the EfW plant.

Advanced Waste and Resource Recovery Technologies - Metropolitan Regional Business Case and Procurement Strategy.

Metropolitan Waste and Resources Recovery Group - September 2018

	Limit waste to landfill (2016 levels)	25% recovery of residual waste	$ (over 25 years)*	CO_2e emissions reduced (tpa)	Power produced MW**	Jobs
SCENARIO 1 FOGO only	✗	✗	$211m cost	122,700	0	55
SCENARIO 2 Combustion only	✓	✓	**$119m saving**	170,300	17 37% renewable	300-445
SCENARIO 3 FOGO + combustion	✓	✓	$92m cost	287,770	18 35% renewable	400-500
SCENARIO 4 Mechanical biological treatment + gasification	✓	✓	$45m cost	173,970	17 37% renewable	455
SCENARIO 5 Mechanical biological treatment only	✗	✗	$36m cost	92,806	0	455

Based on one facility to process around 300,00 tonnes of residual waste each year
* Additional costs or savings compared to Business As Usual (in today's dollars)
** Power generation capacity

As can be seen from the the MWRRG table above, EfW (Scenario 2) is the only alternative waste treatment option that delivers on the key criteria as well as delivering a net long term saving to councils.

However, as can be seen from this GWRRG chart below, medium scale (up to 300,000 tonnes per annum) EfW plants are not currently cost competitive.

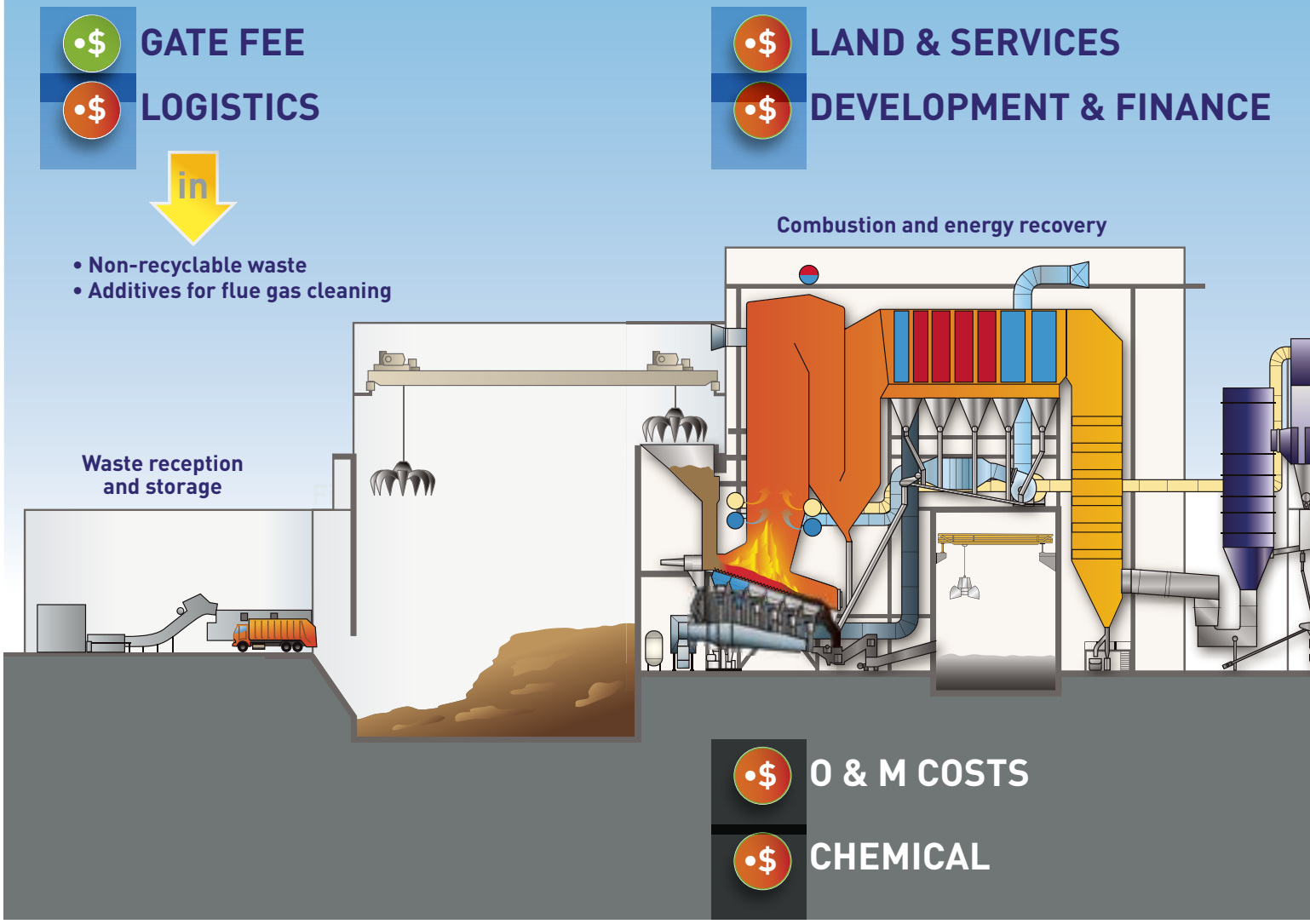
Overview of costs (in 2018) associated with processing of general (residual) waste.

Gippsland Collaborative Resource Recovery Business Case. Gippsland Waste and Resource Recovery Group - April 2018

Technology	Minimum tonnes per annum for viability	Gate rate range ($/t) - low / hight		Bulk Transport ($/t)	Mid-range gate rate plus bulk transport $/t	Total approx. costs ($/ annum, processing)*	Approx Diversion rate
Landfill ouside Gippsland region		$110	$130	$35	$155	$8,088,000	0%
Dirty MRF	50,000	$163	$221	$20	$212	$11,074,000	45%
MBT	50,000	$194	$263	$20	$248	$12,956,000	55%
WtE	100,000	$230	$311	$20	**$290**	$15,132,000	95%
Landfill Councils Business As Usual	**$211m**	**$134**		**$0**	**$163**	**$8,497,000**	**0%**

Based on mid-range gate rate plus bulk transport $/t and the kerbside collected tonnes per annum (52,000 tonnes in the 2015-16 financial year).

Finances behind Energy from Waste



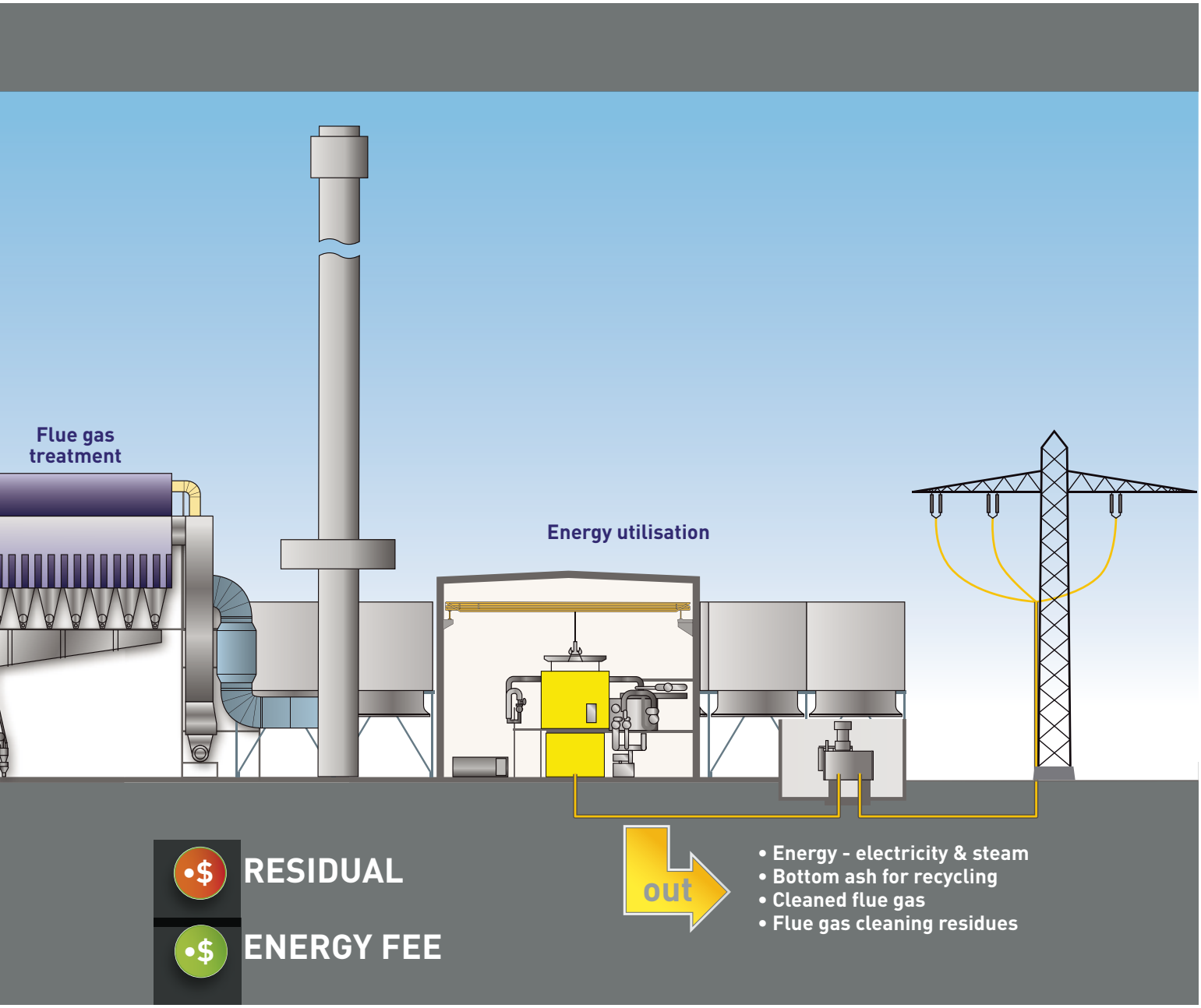
Commercial Evaluation

A critical component of assessing the feasibility of an EfW facility in the Latrobe Valley is the financial and commercial considerations.

The Feasibility Study concluded that the project is commercially credible. However, it does require further development to realise a fully viable project. A summary of this work is outlined below. Due to the commercially sensitive nature of this information, the full details of this analysis are not included in this public report.

Financial and commercial considerations

The diagram above outlines the key areas of revenue and expense for an EfW facility. The majority of revenue from such a plant is generated via a gate fee – a charge levied on waste received at a waste processing facility to dispose of it – with the remainder coming from the value of the energy created.

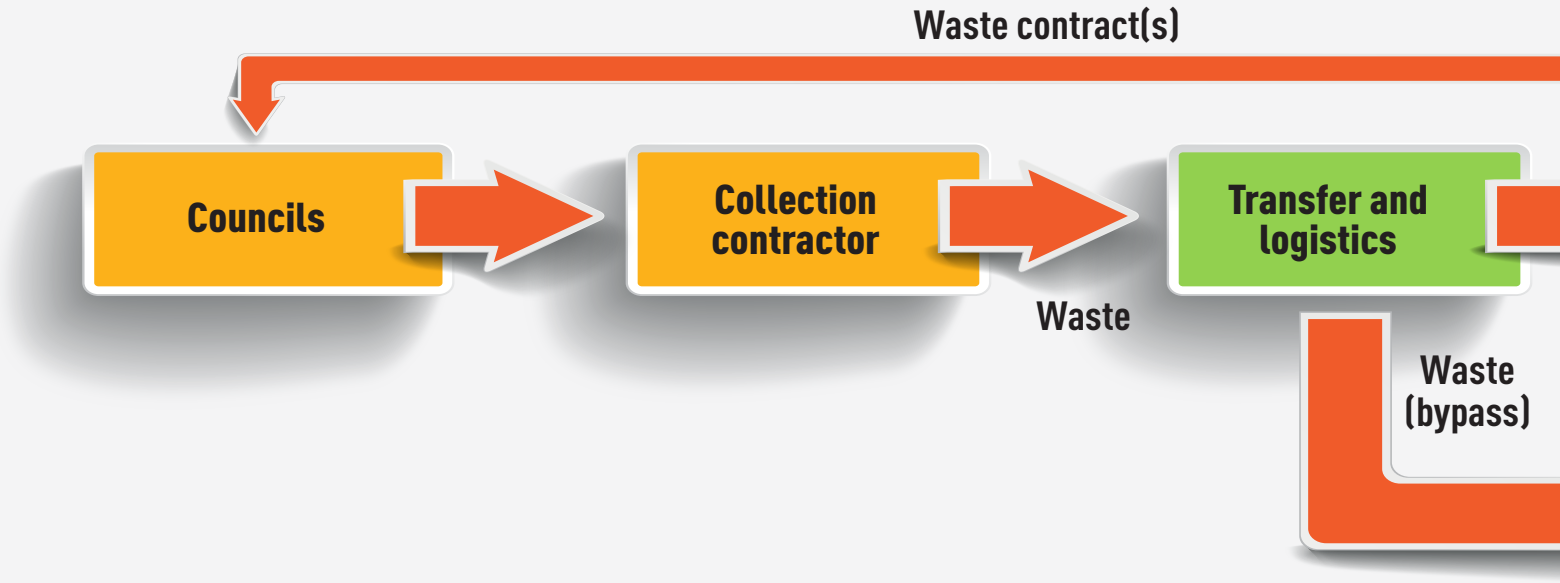


The key costs incurred are the capital expenditure (capex) associated with securing a suitable site and developing and financing the facility, along with ongoing operational expenditure (opex) on logistics, operations and maintenance, treatment inputs and disposing of any residues. Typical debt financing as demonstrated in Europe can extend up to 80 percent of the total capital costs.

In Europe, where EfW facilities are an integral part of the waste management hierarchy, the foundation of the commercial model is generally built on long term waste disposal and energy offtake contracts. These long term contractual arrangements, typically 25 years, are required to provide investment confidence and to secure finance. Short term contracts increase the finance risk premium, and ultimately result in higher gate fee costs.

Additional revenue can be generated from carbon abatement policies including Emissions Reduction Fund and Renewable Energy Targets through Commonwealth and/or State-based incentive schemes.

Commercial framework

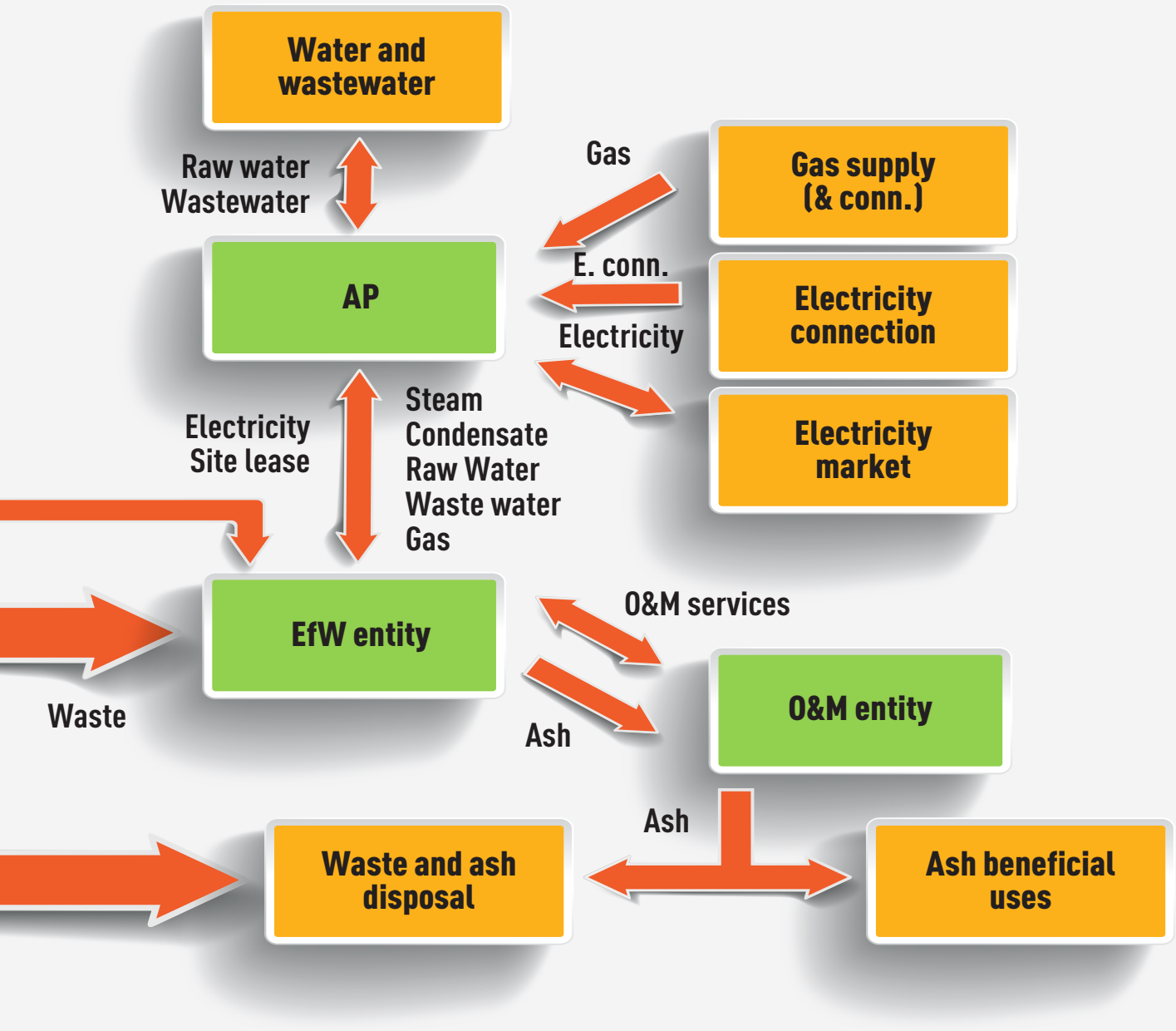


Carbon reduction and associated revenue is likely to be achieved from upstream sources (diversion from landfill) and downstream sources (substitution of fossil fuels). These revenues are expected to play an important role in the viability of the business case for this project. More detailed analysis will be developed during the preparation of the business case.

Capex and Opex estimates for the plant were necessary for the financial modelling process to determine the likely viability of the project. For the purposes of defining the scope of the proposed Engineer – Procure – Construct (EPC) contract for tendering during the study, the battery limits were taken as the fenceline of the EfW process area at the Maryvale site.

Capex for works required at Maryvale outside of this boundary has been separately estimated (as Mill balance of plant and interconnections).

Opex included the operating and maintenance costs for the EfW plant and interconnections to the fenceline. It may be that the final termination points for operations are adjusted beyond the fence line to capture a logical point



to change responsibilities (for example, based on the detailed siting of metering and isolation valves). However the impact on the Feasibility Study assessments of such changes should be negligible.

Capex and opex impacts on Australian Paper's operations at the mill were not included and have been assessed separately.

Contractual arrangements

Given the inherently complex nature of establishing and running an EfW facility, detailed preparation and management are required to ensure robust contractual relationships.

The proposed structure, as outlined in the diagram above, envisages that Australian Paper will manage the relationship with the external electricity market. Residue / ash flows would be handled by Suez, as the operator of the O&M entity, which would be responsible for disposal, beneficial uses and logistics.

Currently the EfW entity would be wholly -owned by Australian Paper. However, this will require further consideration to provide

a suitable mix of investment returns and risk management. Further development is still required including exploring the interest of potential equity stakeholders and expectations on investment returns.

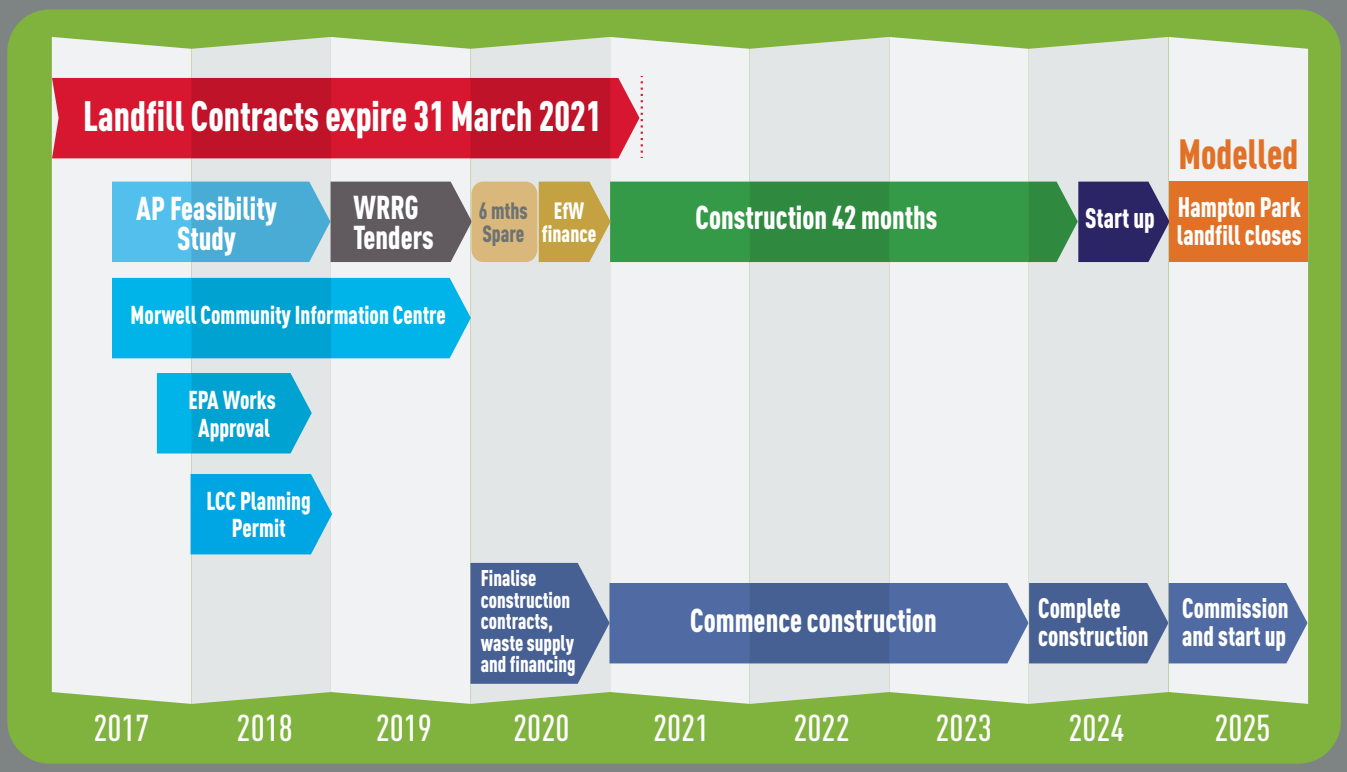
During the Feasibility Study, full life cycle costing to identify and document all the costs involved over the life of the asset, together with a variations / sensitivities analysis to test assumptions and a range of potential future circumstances was undertaken. This analysis will be subject to ongoing review and updating. At this time the commercial outcome has determined the project is credible and would provide a suitable return on investment consistent with typical infrastructure returns.

NEXT STEPS

With completion of the Feasibility Study, Australian Paper will now move into the Development Stage which will cover those activities which will need to be addressed before construction could proceed. This will include:

- Manage participation in the tender process for waste supply with nominated Melbourne Councils and the Metropolitan Waste and Resources Recovery Group, and Gippsland Councils by the Gippsland Waste and Resource Recovery Group
- Select a preferred Engineer – Procure – Construct (EPC) contractor to work with to optimise the design contract terms and pricing
- Undertake detailed financing analysis to support Financial Close
- Continue community engagement
- Develop relationships with organisations that may be able to take Bottom Ash for a secondary beneficial use
- Develop external contract forms or term sheets
- Complete a final risk review and revise mitigation plans.

Timetable



Conclusion

Australian Paper Maryvale is one of the largest employers in the Latrobe Valley with approximately 850 full time employees. When flow on effects are taken into account, we support 2,387 jobs and contribute $451 million to the economy of the Latrobe Valley region.

We need to address our future energy needs proactively, which is why in July 2017 Australian Paper announced that, with the support of the Federal and Victorian State Governments, we would undertake a Feasibility Study into the development of a new baseload EfW facility at our Maryvale paper mill in the Latrobe Valley.

Both Federal and State Governments saw this investment as a priority project for the future success of the Latrobe Valley and part of a broader strategy to support economic growth in the region. This was particularly important at a time when the local economy was transitioning.

Community engagement has been at the centre of this $7.5 million Feasibility Study into building an EfW plant at the Maryvale site. The process has taken approximately 18 months and represents a thorough investigation into creating a commercially sustainable and environmentally responsible business solution delivering energy security for Australian Paper's Maryvale Mill.

The Feasibility Study has confirmed that an EfW plant at the Maryvale Mill would be:

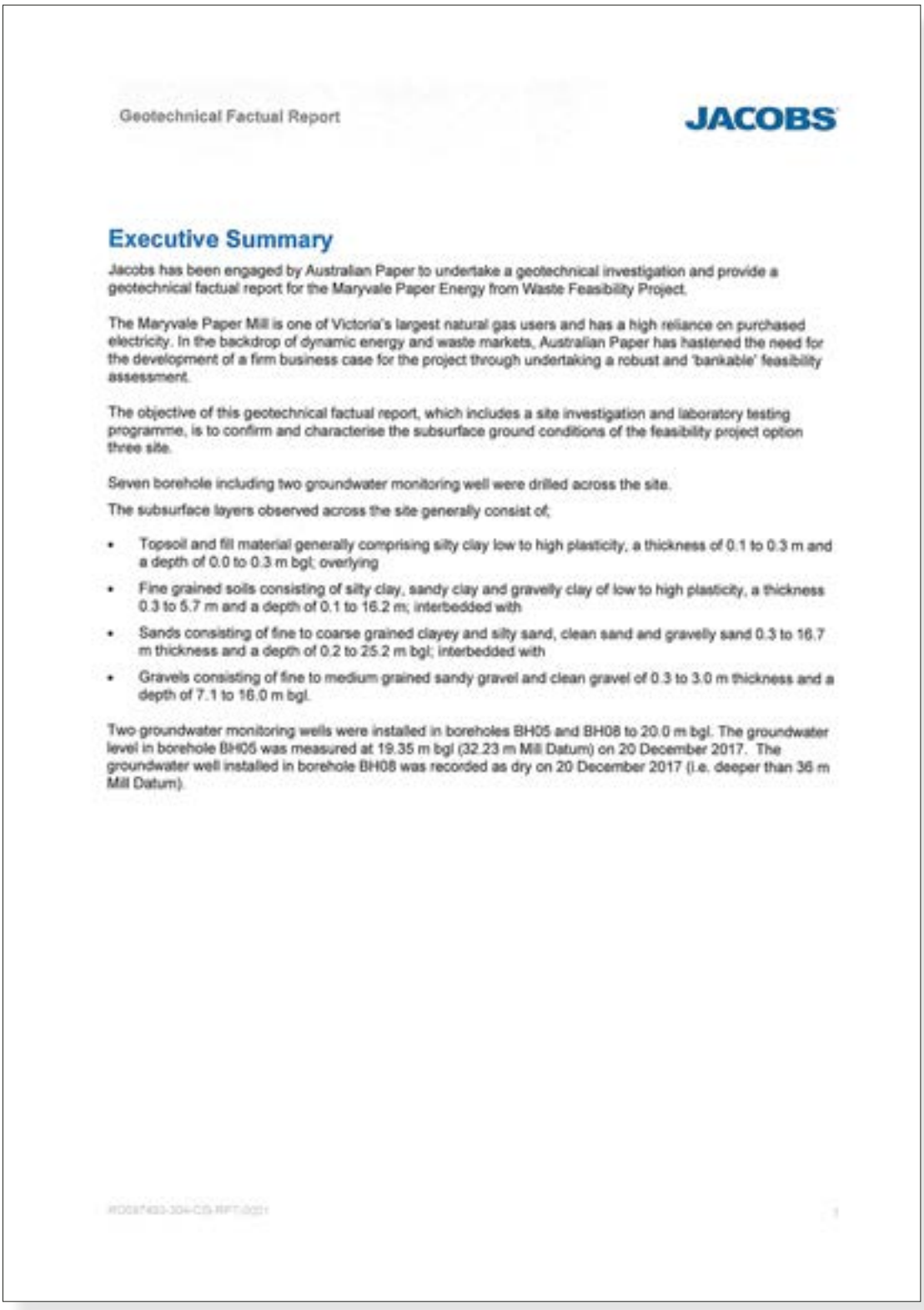
- ✓ economically positive;
- ✓ socially acceptable
- ✓ safe for the community
- ✓ environmentally sound
- ✓ technically proven
- ✓ beneficial for Melbourne's waste management
- ✓ commercially viable.

creating energy from waste

APPENDICES

Executive Summary, Geotechnical Factual Report

Prepared by Jacobs



Geotechnical Factual Report

JACOBS

Executive Summary

Jacobs has been engaged by Australian Paper to undertake a geotechnical investigation and provide a geotechnical factual report for the Maryvale Paper Energy from Waste Feasibility Project.

The Maryvale Paper Mill is one of Victoria's largest natural gas users and has a high reliance on purchased electricity. In the backdrop of dynamic energy and waste markets, Australian Paper has hastened the need for the development of a firm business case for the project through undertaking a robust and 'bankable' feasibility assessment.

The objective of this geotechnical factual report, which includes a site investigation and laboratory testing programme, is to confirm and characterise the subsurface ground conditions of the feasibility project option three site.

Seven borehole including two groundwater monitoring well were drilled across the site.

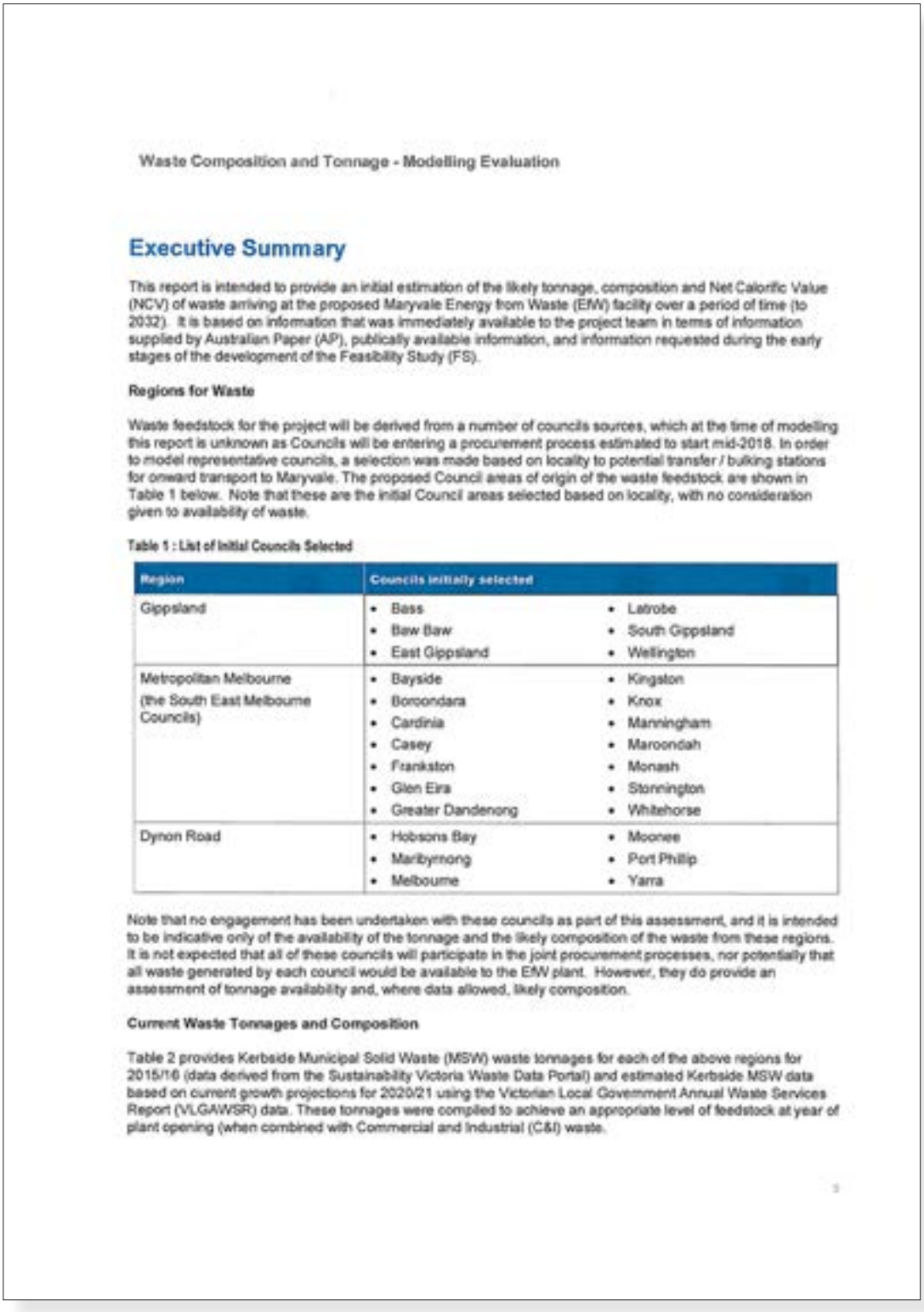
The subsurface layers observed across the site generally consist of;

- Topsoil and fill material generally comprising silty clay low to high plasticity, a thickness of 0.1 to 0.3 m and a depth of 0.0 to 0.3 m bgl; overlying
- Fine grained soils consisting of silty clay, sandy clay and gravelly clay of low to high plasticity, a thickness 0.3 to 5.7 m and a depth of 0.1 to 16.2 m; interbedded with
- Sands consisting of fine to coarse grained clayey and silty sand, clean sand and gravelly sand 0.3 to 16.7 m thickness and a depth of 0.2 to 25.2 m bgl; interbedded with
- Gravels consisting of fine to medium grained sandy gravel and clean gravel of 0.3 to 3.0 m thickness and a depth of 7.1 to 16.0 m bgl.

Two groundwater monitoring wells were installed in boreholes BH05 and BH08 to 20.0 m bgl. The groundwater level in borehole BH05 was measured at 19.35 m bgl (32.23 m Mill Datum) on 20 December 2017. The groundwater well installed in borehole BH08 was recorded as dry on 20 December 2017 (i.e. deeper than 36 m Mill Datum).

Executive Summary, Waste Composition and Tonnage

Modelling Evaluation – April 2018, prepared by Jacobs



Waste Composition and Tonnage - Modelling Evaluation

Executive Summary

This report is intended to provide an initial estimation of the likely tonnage, composition and Net Calorific Value (NCV) of waste arriving at the proposed Maryvale Energy from Waste (EfW) facility over a period of time (to 2032). It is based on information that was immediately available to the project team in terms of information supplied by Australian Paper (AP), publically available information, and information requested during the early stages of the development of the Feasibility Study (FS).

Regions for Waste

Waste feedstock for the project will be derived from a number of councils sources, which at the time of modelling this report is unknown as Councils will be entering a procurement process estimated to start mid-2018. In order to model representative councils, a selection was made based on locality to potential transfer / bulking stations for onward transport to Maryvale. The proposed Council areas of origin of the waste feedstock are shown in Table 1 below. Note that these are the initial Council areas selected based on locality, with no consideration given to availability of waste.

Table 1 : List of Initial Councils Selected

Region	Councils initially selected	
Gippsland	• Bass • Baw Baw • East Gippsland	• Latrobe • South Gippsland • Wellington
Metropolitan Melbourne (the South East Melbourne Councils)	• Bayside • Boroondara • Cardinia • Casey • Frankston • Glen Eira • Greater Dandenong	• Kingston • Knox • Manningham • Maroondah • Monash • Stonnington • Whitehorse
Dynon Road	• Hobsons Bay • Maribyrnong • Melbourne	• Moonee • Port Phillip • Yarra

Note that no engagement has been undertaken with these councils as part of this assessment, and it is intended to be indicative only of the availability of the tonnage and the likely composition of the waste from these regions. It is not expected that all of these councils will participate in the joint procurement processes, nor potentially that all waste generated by each council would be available to the EfW plant. However, they do provide an assessment of tonnage availability and, where data allowed, likely composition.

Current Waste Tonnages and Composition

Table 2 provides Kerbside Municipal Solid Waste (MSW) waste tonnages for each of the above regions for 2015/16 (data derived from the Sustainability Victoria Waste Data Portal) and estimated Kerbside MSW data based on current growth projections for 2020/21 using the Victorian Local Government Annual Waste Services Report (VLGAWSR) data. These tonnages were compiled to achieve an appropriate level of feedstock at year of plant opening (when combined with Commercial and Industrial (C&I) waste.

Waste Composition and Tonnage - Modelling Evaluation

Table 2 : Waste Tonnages for Kerbside MSW for Gippsland, South East Melbourne and Dynon Road (selected Councils only)

Council area	Kerbside MSW (tonnes)	
	2015/16	2020/21
South East Melbourne	380,023	416,485
Gippsland	50,867	55,317
Dynon Road	119,860	138,231
Totals	**550,930**	**610,034**

The future waste tonnages and compositions were modelled using the naus waste modelling platform – an online waste modelling tool. For modelling purposes, two scenarios were developed with 10 options for each scenario. The two scenarios are shown in Table 3 below. The two scenarios are termed B1 and B2 and relate to the tonnage sourced from the three different regions. Scenario B1 is based on 70% Kerbside MSW and 30% C&I split of the total tonnage available from the selected councils.

Scenario B2 is based on 80% Kerbside MSW and 20% C&I split of waste, and was developed based on:

- Capturing all tonnage available in Gippsland;
- Targeting 70ktpa Kerbside MSW from Dynon Road; and
- Making up the remainder needed (for 80% MSW split) from SE Melbourne.

Table 3 : Scenarios B1 and B2 - Kerbside MSW Tonnages and Percentages from Targeted Areas

Area	Scenario B1 Details Kerbside MSW	Scenario B2 Details for Kerbside MSW
Gippsland	6 LGAs 100% Kerbside MSW Target of 55,000 tonnes	6 LGAs 100% Kerbside MSW Target of 55,000 tonnes
South East Melbourne	14 LGAs 91% of Kerbside MSW Target of 400,000	14 LGAs 90% Kerbside MSW Target of 395,000 tonnes
Dynon Road	No waste targeted	6 LGAs 51% Kerbside MSW Target of 70,000 tonnes

For naus modelling of the Commercial and Industrial (C&I) waste, only the largest five waste producing target sectors were included for the C&I sector. These were:

- Manufacturing;
- Retail Trade;
- Wholesale Trade;

- Education and Training; and
- Healthcare and Social Assistance.

These sectors produce an estimated 55% of the C&I waste across the Council areas selected. Shown in Table 4 below are the estimated tonnages available for C&I waste for the selected Council areas.

Table 4 : Waste Tonnages for C&I, Gippsland and South East Melbourne and Dynon Road (selected Councils only)

Council area	2015/16 Estimated Target C&I (tonnes)	2020/21 Estimated Target C&I (tonnes)
South East Melbourne	280,649	297,861
Gippsland	26,969	28,644
Dynon Road	124,503	132,138
Totals	**432,142**	**458,644**

Jacobs used the compositional data from the HRL report, the Statewide Garbage Bin Audit and various council compositional audits to create a composition table for the Gippsland, South East Melbourne and Dynon Road Councils for Kerbside MSW to use as an input for the naus model. Composition of C&I waste varies depending on the economic activities that are present in each local government area. The analysis of the C&I sector the following information was used:

- www.economicprofile.com.au;
- http://economy.id.com.au/;
- Waste flows in the Victorian commercial sector: Final report, Sustainability Victoria (Sustainable Resource Use), 2013;
- C&I South East Melbourne Disposal Market Analysis, A Submission to Australian Paper, MRA, 18 August 2017.

The composition values for C&I waste differ slightly for each Council and region due to the difference in commercial and industrial activities present in each.

Waste Modelling - Options

In order to forecast the change in composition and volume (tonnage) of waste over time, 20 models were run based on the different options for Scenarios B1 and B2. These options are listed in Table 5 and are based on assumptions of possible changes in waste stream tonnages, characteristics or population growth changes (higher or lower than predicted) as a result of a range of system and policy changes.

Table 5 : Options for Modelling of Scenarios B1 and B2

Option	Description
Baseline	Baseline tonnages at 2021

Waste Composition and Tonnage - Modelling Evaluation

Option	Description
Waste Stream W1	Widespread introduction of kerbside organics collections (including food and garden organics). Increase in organics processing capacity at public drop off facilities.
Waste Stream W2	Ban on E-waste to landfill
Waste Stream W3	New infrastructure built to increase capacity for recycling more materials prior to going to landfill.
Waste Stream W4	Introduction of container deposit scheme and improved systems/increase capacity for plastic recycling
Waste Stream W5	Combination of Options W1, W2 and W3 all occurring
Sensitivity Option G6	Growth projection 2% above baseline in 2018/19
Sensitivity Option G7	Growth projection 2% below baseline in 2018/19
Sensitivity Option G8	Growth projection 1% above baseline in 2018/19
Sensitivity Option G9	Growth projection 1% below baseline in 2018/19

Waste Tonnage Modelling Outcomes -

From the 20 modelled scenarios and options there are scenarios and options that have a larger impact than others. Table 6 below provides a list of the scenarios and options and a summary of their impact on tonnage at years 2020/21 and 2025/26. Also listed is the waste tonnage at year 2032/33 (the last year modelled) with the options ranked according to the tonnage at year 2032/33 (1 being lowest the lowest tonnage). Note that Option G6 and G7 are not included in this table, as the outputs from modelling of the tonnages showed that a 2% increase or decrease in population growth is unrealistic.

Waste Composition and Tonnage - Modelling Evaluation

Table 6 : Summary of Waste Tonnage Modelling Scenarios and Options

Option	Scenario	Impact on Kerbside MSW tonnage at 2020/21	Impact on C&I tonnage at 2025/26	Tonnage at 2032/33	Influence rank for Scenarios and Options
Baseline	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]
Option 1 Introduction of increase Organic collection					
Option 2 Ban on E-Waste					
Option 3 New infrastructure for Recycling					
Option 4 - CDS Scheme					
Option 5 - Combination of Options 1, 2 and 3					
Option 6 - Option 5 with growth 1% above predicted					
Option 9 - Option 5 with growth 1% below predicted					

- If Option 5 does occur, a source of additional waste tonnage will need to be considered;
- There is the possibility to consider options to increase waste from the C&I waste sector of South East Melbourne;
- There may also be the ability to increase the amount for MSW and C&I waste from the Dynon Road area; and
- Evaluate the options in detail during the procurement phase.

Waste Fuel Quality Parameter Results

Waste Net Calorific Value Forecast

[redacted]

Moisture

The modelling results show that the average waste moisture content for the two scenarios B1 and B2 and various options is estimated to vary between 41-45% moisture content which is not considered a major change from a waste combustion perspective, and so does not pose a challenge or risk to the plant design. The changes in moisture content on a scenario and option breakdown basis are essentially the inverse impact as those observed for NCV, which is to be expected, as when moisture content increases, NCV will decrease, and vice versa.

Ash

The range of ash contents that are predicted are between 14.4% and 17.0% of the incoming waste volume, whereas in Europe figures of the order of 20-30% are not uncommon. In terms of an annual volume of ash generated (summing annual IBA and APC residues), for 650,000 tons of waste processed, the residues may vary between 93,000-110,000 tons per annum, excluding moisture and spent residues introduced in the flue gas cleaning process.

The increase in ash levels observed under the various future scenarios and options is not considered a significant impact to the plant design as the EPC contract specifies that the plant shall be capable of handling inert levels up to 32 %. A more significant impact will be the disposal costs of the additional IBA and APC residues.

Appendix 2 *cont.*

Chlorine

The modelled range of total chlorine level is from 0.35-0.40% are considered low when compared with other western countries municipal waste feedstocks which are typically 0.6-1.0% total chlorine.

In the scenarios and options where organics were reduced (Scenario B1 and B2 Option 1), the chlorine content is increased, as the organics have lower levels of chlorine. For the other scenarios and options involving reduction in e-waste, plastics and papers (Scenarios B1 and B2 options 2, 3, 4), these all result in a decrease in chlorine content, as they are components with above the chlorine levels of the average mixed waste. Option 5 in Scenarios B1 and B2 includes a combination of organics removal and increased recycling, (Options 1, 2 and 3), and it is evident that the removal of recyclables outweighs the effect of organic removal, such that a net chlorine content reduction is observed.

Waste Data Quality

The waste composition data available to inform the feasibility study is generally of poor quality, a fact acknowledged by the Melbourne Waste and Resource Recovery Group (MWRRG), prompting it to commission its own study in advance of its procurement of waste disposal services. In addition, NCVs for individual waste components representative of Victorian waste are not available and have been inferred from other regions.

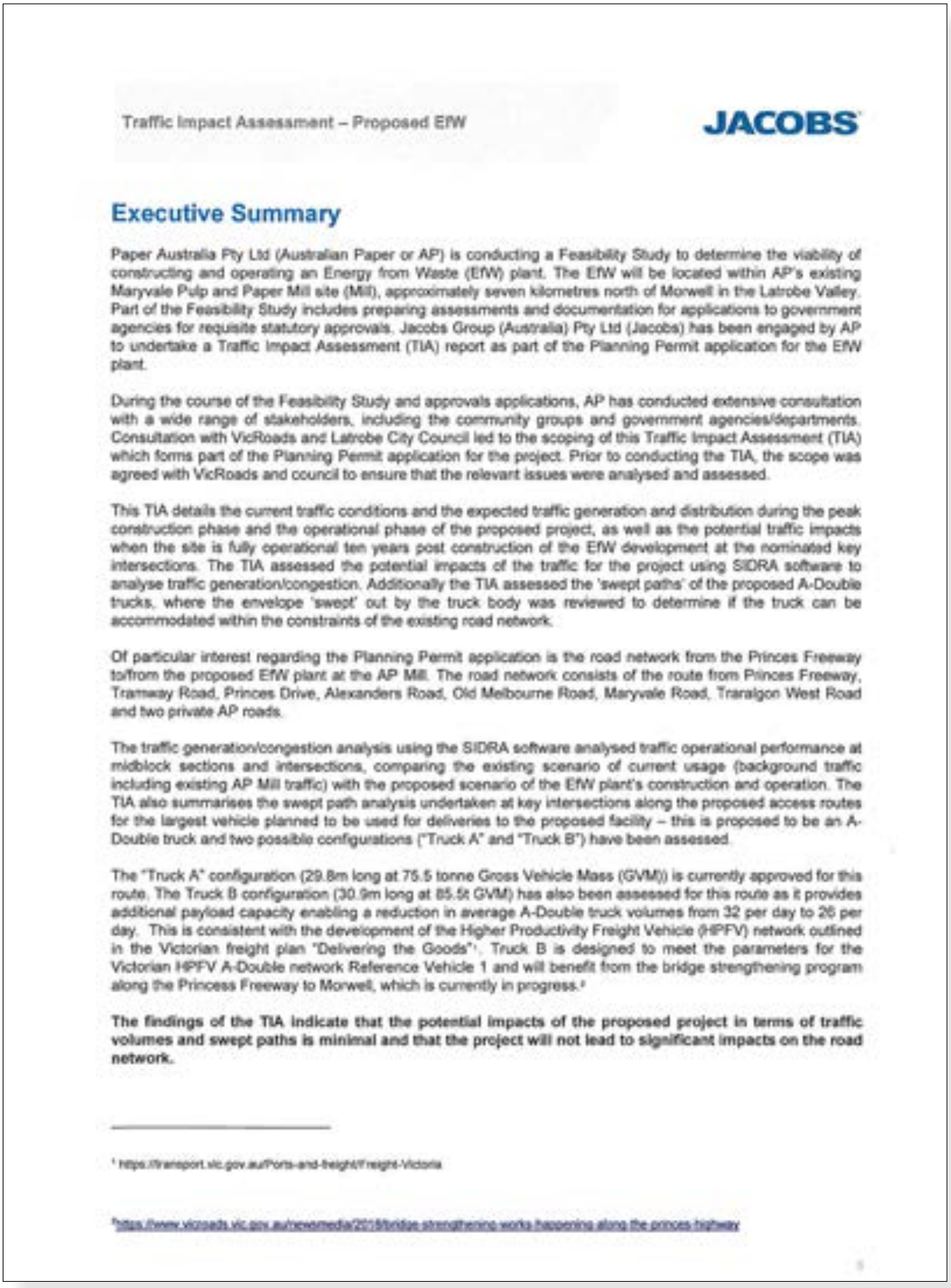
As such AP has commissioned HRL to gather and present better waste compositional data, including analysis of NCV, from multiple locations in Victoria over multiple seasons. This data will be used when available to provide potential technology providers with a more accurate projection of the NCV of the waste feedstock (likely in Q2 2018, and then as seasonal studies are completed).

As a measure to provide additional confidence over the potential impacts of waste compositional, volume and fuel quality parameter changes of the waste, Jacobs would recommend that selected scenarios and options from the above analyses are input as sensitivity cases into the project financial model, to estimate the NPV/IRR impact on the project. In particular, Options 1, 3, 4 and 5 are expected to have the most significant economic impact on the project (for both Scenarios B1 and B2). Changes in waste growth rate expectations should also be modelled in the financial model (Options 6 to 9), but these do not have an impact on the waste composition

Appendix 3

Executive Summary, Traffic Impact Assessment

Prepared by Jacobs



JACOBS

Executive Summary

Paper Australia Pty Ltd (Australian Paper or AP) is conducting a Feasibility Study to determine the viability of constructing and operating an Energy from Waste (EfW) plant. The EfW will be located within AP's existing Maryvale Pulp and Paper Mill site (Mill), approximately seven kilometres north of Morwell in the Latrobe Valley. Part of the Feasibility Study includes preparing assessments and documentation for applications to government agencies for requisite statutory approvals. Jacobs Group (Australia) Pty Ltd (Jacobs) has been engaged by AP to undertake a Traffic Impact Assessment (TIA) report as part of the Planning Permit application for the EfW plant.

During the course of the Feasibility Study and approvals applications, AP has conducted extensive consultation with a wide range of stakeholders, including the community groups and government agencies/departments. Consultation with VicRoads and Latrobe City Council led to the scoping of this Traffic Impact Assessment (TIA) which forms part of the Planning Permit application for the project. Prior to conducting the TIA, the scope was agreed with VicRoads and council to ensure that the relevant issues were analysed and assessed.

This TIA details the current traffic conditions and the expected traffic generation and distribution during the peak construction phase and the operational phase of the proposed project, as well as the potential traffic impacts when the site is fully operational ten years post construction of the EfW development at the nominated key intersections. The TIA assessed the potential impacts of the traffic for the project using SIDRA software to analyse traffic generation/congestion. Additionally the TIA assessed the 'swept paths' of the proposed A-Double trucks, where the envelope 'swept' out by the truck body was reviewed to determine if the truck can be accommodated within the constraints of the existing road network.

Of particular interest regarding the Planning Permit application is the road network from the Princes Freeway to/from the proposed EfW plant at the AP Mill. The road network consists of the route from Princes Freeway, Tramway Road, Princes Drive, Alexanders Road, Old Melbourne Road, Maryvale Road, Traralgon West Road and two private AP roads.

The traffic generation/congestion analysis using the SIDRA software analysed traffic operational performance at midblock sections and intersections, comparing the existing scenario of current usage (background traffic including existing AP Mill traffic) with the proposed scenario of the EfW plant's construction and operation. The TIA also summarises the swept path analysis undertaken at key intersections along the proposed access routes for the largest vehicle planned to be used for deliveries to the proposed facility – this is proposed to be an A-Double truck and two possible configurations ("Truck A" and "Truck B") have been assessed.

The "Truck A" configuration (29.8m long at 75.5 tonne Gross Vehicle Mass (GVM)) is currently approved for this route. The Truck B configuration (30.9m long at 85.5t GVM) has also been assessed for this route as it provides additional payload capacity enabling a reduction in average A-Double truck volumes from 32 per day to 26 per day. This is consistent with the development of the Higher Productivity Freight Vehicle (HPFV) network outlined in the Victorian freight plan "Delivering the Goods"[1]. Truck B is designed to meet the parameters for the Victorian HPFV A-Double network Reference Vehicle 1 and will benefit from the bridge strengthening program along the Princess Freeway to Morwell, which is currently in progress.[2]

The findings of the TIA indicate that the potential impacts of the proposed project in terms of traffic volumes and swept paths is minimal and that the project will not lead to significant impacts on the road network.

[1] https://transport.vic.gov.au/Ports-and-freight/Freight-Victoria

[2] https://www.vicroads.vic.gov.au/news/media/2018/bridge-strengthening-works-happening-along-the-princes-highway

Ministerial reasons for decision under Environment Effects Act 1978

REFERRAL NUMBER 2018R01

Attachment 2

For Public Notice via Internet

REASONS FOR DECISION UNDER *ENVIRONMENT EFFECTS ACT 1978*

Project name: **Australian Paper Energy from Waste**

Proponent: **Australian Paper Pty. Ltd.**

Description of Project:

Australian Paper Pty Ltd (the proponent) proposes to install an 'Energy from Waste' Plant at the existing Australian Paper Maryvale Pulp and Paper Mill Site located in the Latrobe Valley. The project will alter the baseload power source from a reliance on natural gas and grid-bought electricity and change to the predominant baseload power to be generated from Moving Grate 'Energy from Waste' model (EfW). This type of incineration is undertaken by the movement of waste via a moving grate for incineration. Municipal Solid Waste and Commercial and Industrial waste will be used as fuel, which will be incinerated to create electricity and steam. The project infrastructure includes:

- Site roads and weighbridges
- Waste reception, tipping hall and bunker where waste is delivered stored and mixed respectively
- Furnaces for combustion of residual waste
- Energy recovery boiler/steam generators
- Continuous emissions monitoring system
- Condensing extraction steam turbo-generator of circa 70 MWe maximum generation capacity without steam extraction
- EfW plant buildings and structures
- Laydown and minor access roads on the existing AP Maryvale Site
- A black start emergency diesel generator of capacity approximately 6 MWe
- An emergency shutdown diesel generator of capacity circa 200 kWe

Decision:

The Minister for Planning has decided that an Environment Effects Statement (EES) is not required for the Australian Paper Energy from Waste Project, as described in the referral accepted on 22 March 2018.

Reasons for Decision:

- The project has potential for effects particularly in relation to air emissions, greenhouse gas emissions and waste, although these are unlikely to be significant. Existing statutory processes, in particular the Works Approval process under the *Environment Protect Act 1970*, will readily enable appropriate examination of both these effects and necessary mitigation measures.
- The proponent will be required to demonstrate that they have identified best practice in relation to energy use and greenhouse gas (GHG) emissions associated with the proposal as part of the EPA Works Approval process. A GHG Action Plan will need to be implemented in accordance with EPA's 'Protocol for Environmental Management: GHG and Energy Efficiency in Industry'.
- Residual effects on amenity (such as noise and odour) and cultural heritage are also unlikely to be significant and can be readily addressed via existing statutory requirements.
- The effects on native vegetation and other biodiversity values are minor due to the siting of the project on developed land with very limited ecological values.

Date of Decision: **2 May 2018**

EPA Works Approval Summary

Australian Paper waste to energy works approval decision

EPA VICTORIA | Environment Protection Authority Victoria

Publication 1717 November 2018

Summary report

Paper Australia Pty Ltd (trading as Australian Paper) has proposed construction of a 'moving grate' waste to energy facility at its Maryvale site, in Victoria's Latrobe Valley (Figure 1). The facility will process residual municipal solid waste, and industrial and commercial waste.

The proposed facility requires a works approval from the Environment Protection Authority Victoria (EPA) under the *Environment Protection Act 1970* (the Act). A works approval is required for industrial and waste management activities that have the potential for significant environmental impact. The approval permits the construction of a plant, the installation of equipment or the modification of processes.

On 24 April 2018, EPA received an application for works approval from Australian Paper. EPA requested additional information before accepting the application as complete. On 25 May 2018, EPA received the updated application and commenced its assessment. On the statutory decision due date of 28 November 2018, EPA approved the works proposal, subject to conditions.

Figure 1: Map showing the location of the Australian paper facility (source – Australian Paper Works Approval Application, Jacobs 2018).

This publication summarises the key aspects of EPA's assessment and the decision-making process for the works approval application. The full works approval application assessment report is available via EPA's website.

EPA decision on the works approval application

On 28 November 2018, EPA approved the works approval application, subject to conditions.

What was proposed in the works approval application?

Australian Paper proposed building and operating a waste to energy facility adjacent to the pulp and paper mill on its Maryvale site. The proposed facility will be capable of producing steam for the operation of the mill, and electricity for the mill or for export to the grid. The facility will thermally treat approximately 650,000 tonnes (+/- 10%) per year of residual municipal solid waste and industrial and commercial waste.

Activities to follow works approval

Activities that Australian Paper will need to undertake following works approval include:

- obtaining other permits (for example, a planning permit)
- completion of final detailed designs
- securing waste contracts consistent with the works approval conditions
- a construction phase (approximately 2 years)
- a commissioning phase
- obtaining an EPA operating licence

The facility has an expected operational lifetime of 25-years.

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Australian Paper waste to energy works approval decision

Works approval application process

The diagram below shows some of the key steps in the works approval application and assessment process.

Background: waste to energy

There are over 1,600 operational waste to energy facilities globally. Modern, well-run facilities are commonly found throughout countries of Europe (Sweden, France, United Kingdom) and East Asia (Japan, South Korea).

The technology generates energy as heat from the combustion of waste materials that would otherwise go to landfill. Heat is converted to steam, which can be used to generate electricity and/or in operational processes.

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Victoria has a number of EPA-approved and licensed waste to energy facilities. However, these operate at a smaller scale and use different waste feedstocks from those proposed by Australian Paper.

Works approval application details

Australian Paper's Maryvale paper and pulp mill requires a significant amount of operational steam and energy. In 2016, the mill used 30 MW of electricity and approximately 6.7 PJ (6.7 million GJ) of natural gas (which represents approximately 5 per cent of Victoria's total annual gas consumption). The proposed waste to energy facility would reduce the mill's gas consumption to approximately 2 PJ per year, and generate almost all its electricity needs.

Australian Paper has conducted an international search and shortlisted three contractors with a strong track record of designing, building and commissioning waste to energy facilities which are capable of meeting the European Union's Industrial Emissions Directive and Best Available Techniques requirements.

The proposed design is based on eight equivalent operational facilities in the United Kingdom.

The facility will have capacity to treat a total annual residual waste volume of approximately 650,000 tonnes (+/- 10%), coming from Melbourne and Gippsland. The facility will not treat waste which is prescribed industrial waste, hazardous waste or pre-sorted recycling waste.

Construction is set to commence in November 2019, commissioning to commence in 2022 and project completion expected in 2023.

Proposed key design controls

The proposed key design controls include:

- continuous emission monitoring of pollutants
- continuous monitoring of crucial operating parameters (for example temperature, pollutants in flue gas) to enable optimisation of plant operation (for example waste combustion, energy generation and flue gas treatment efficiency)
- flue gas treatment system optimised to remove acidic gases, heavy metals and complex halogenated compounds (e.g. dioxins and furans)
- hazardous waste and waste that does not comply with waste acceptance criteria to be segregated and rejected

Australian Paper waste to energy works approval decision

- moving grate combustion process with sufficient temperature, residence time and turbulence to destroy harmful pollutants
- waste bunker and tipping hall operated under negative pressure to capture and prevent escape of odorous gases from waste
- storage of chemicals (such as water treatment chemicals and pollution control chemicals) in an area with containing walls and impervious floor to reduce potential for chemicals to escape into soil, groundwater and surface waters.

EPA assessment process

Relevant legislation and policies

A works approval application is required to comply with the Act and subordinate legislation. Other legislation also needs to be considered, such as the *Climate Change Act 2017*.

The Act, regulations, and state environment protection policies (SEPPs) establish a framework to ensure that waste treatment infrastructure is appropriately located, designed, constructed, operated and managed to minimise risks to the environment and public health.

EPA considers that the following SEPPs and protocols for environmental management are particularly relevant for this proposal:

- SEPP (Waters of Victoria) now SEPP (Waters)
- SEPP (Groundwaters of Victoria) now SEPP (Waters)
- SEPP (Prevention and Management of Contamination of Land)
- SEPP (Air Quality Management)
- The Protocol for Environmental Management: Greenhouse Gas Emissions and Energy Efficiency in Industry (Publication 824)

Departmental and agency consultation

In assessing the application, EPA consulted with several other departments and agencies including:

- Country Fire Authority
- Department of Environment, Land, Water and Planning
- Department of Health and Human Services
- Gippsland Waste and Resource Recovery Group
- Latrobe City Council
- Latrobe Health Advocate
- Metropolitan Waste and Resource Recovery Group
- Sustainability Victoria
- West Gippsland Catchment Management Authority
- WorkSafe Victoria.

Determination of best practice

The proposed development must meet international best practice. Integrated within the SEPPs is the requirement to meet best practice. This includes '*the best combination of eco-efficient techniques, methods, processes or technology used in an industry sector or activity that demonstrably minimises the environmental impact of a generator of emissions in that industry sector or activity*'. In determining best practice, EPA has considered the application against the following international standards:

- European Union – Industrial Emissions Directive
- Best available techniques reference document - incineration

In addition, members of EPA's assessment team inspected operational waste to energy facilities in the United Kingdom, France and across Scandinavia; and met with environmental regulators of these facilities and organisations associated with thermal treatment of municipal solid waste. The team reviewed European directives and member state legislation that govern the approval and oversight of waste to energy facilities.

Community engagement

Engagement by Australian Paper

Australian Paper engaged with stakeholders (including local community and business groups) prior to making its submission, including: focus group meetings held in Traralgon, Morwell and Moe; establishment of an information centre in Morwell; production of stakeholder newsletters; advertising in local newspapers; information booths in Traralgon, Morwell and Moe; and regular updates with the Maryvale Community Consultative Committee.

Australian Paper waste to energy works approval decision

Engagement by EPA

As required by the Act, the works approval application was advertised in newspapers, and communicated on a dedicated EPA webpage and the Engage Victoria website.

There was an extended period of public comment, from 30 May to 6 July 2018, with dedicated public information sessions held on 5, 6 and 19 June.

EPA received 115 submissions during the consultation period. Of the 109 submissions received though Engage Victoria, 84 supported the application, 8 supported it subject to conditions and 8 objected to it (9 submissions did not specify an opinion).

Following a review of these responses, EPA organised a community conference, held on 25 July 2018 in Traralgon. The conference, hosted by an independent chair, provided an additional opportunity for the community to raise concerns and, where possible, attempt to reach a just resolution of them, consistent with section 20B of the EP Act.

The chair subsequently published recommendations, which have been considered as part of EPA's determination.

EPA assessment

What did EPA assess?

This section summarises the findings relating to the most important issues as part of EPA's assessment. For more information on how EPA assessed all the key issues of concern, see Section 6 of the full report.

Regulatory compliance

EPA has determined that the proposal:

- is protective of human health and the environment
- is consistent with the SEPPs
- meets the Environment Protection Principles of the Act
- is consistent with the Statewide Waste and Resource Recovery Infrastructure Plan and two relevant regional plans
- will contribute to meeting waste disposal needs for Victoria, is compliant with the relevant resource recovery implementation, plans and does not undermine recycling
- has comprehensively considered potential climate change impacts in accordance with EPA's obligations
- Australian Paper meets the 'fit and proper person' requirement of the Act.

Key issues

Air emissions

Why is it a concern?

Combustion of waste generates emissions of a range of air pollutants. EPA received a number of submissions raising concerns specifically about the potential environmental and health impacts of emissions from the facility. Air quality modelling was performed according to the requirements of the SEPP.

Conclusions of the assessment

The application complied with the requirement to achieve best practice and continuous improvement for all relevant indicators and reductions to the 'maximum extent achievable' for hazardous air pollutants.

How will it be managed?

There will be a flue gas treatment system and best practice controls will achieve compliance with the SEPP.

There will be continuous monitoring of air pollutants, with the results governing treatment of the flue gas to achieve best practice emission control. EPA will require monitoring data to be made publicly available.

Best practice

Why is it a concern?

Best practice is a requirement of the SEPPs. New sources of emissions must apply best practice to manage those emissions. EPA considers best practice one of the most important requirements of the policy as changes over time will place stricter controls and requirements on new sources of emissions.

Conclusions of the assessment

Waste to energy is an established disposal method that is used globally, with international best practice standards available and used in this assessment. Accordingly, the potential environmental risks and impacts are well known, with evolving improvements in containment, control and monitoring technologies. The European Union's Industrial Emissions

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Australian Paper waste to energy works approval decision

Directive (IED 2010/75/ EU) and the Best Available Techniques reference document, are key compliance policy documents that the facility will need to meet. These directives and policies are regularly updated to reflect international best practice. The applicant has committed to comply with international best practice.

How will it be managed?

The requirements of EPA approval conditions will ensure the operation of the plant is managed in accordance with best practice.

Health impacts

Why is it a concern?

Protecting human health is integral to the intent of the Act, subordinate legislation and policies. The EPA assessment process specifically considers the potential impacts to human health and how these impacts are controlled.

To supplement its application Australian Paper submitted a health impact assessment.

In addition to an assessment of the works approval application, EPA commissioned an independent literature review of publicly available research on human health impacts from air emissions from modern waste to energy facilities. The objective was to determine the possible impacts on the health of residents living close to the facility and across the Latrobe Valley region.

Conclusions of the assessment

The EPA review of literature concluded that there was little potential for health impacts or risk from exposure to emissions from modern waste to energy facilities, noting the few studies available.

The contribution of emissions from the proposed activity were found to be very low and the technology of the facility design combined with conditions of operation, capable of ensuring protection of human health.

How will it be managed?

Management will largely be through the implementation of the key design controls and operation of the facility to meet Best Practice. Conditions of EPA approvals will require routine review of the operations and emissions to ensure the necessary protections of health.

Waste feedstock

Why is it a concern?

It is critically important to understand the waste that is targeted and received at the site to ensure that the facility has the capability of treating that waste. The composition of kerbside collected waste varies both over time and across councils. The design of the facility needs to be adjusted to account for this variation.

If waste at the site is detected via onsite operational controls (e.g. visual inspection) to contain material unsuitable for combustion, that waste will be quarantined and handled in accordance with Victorian waste regulations.

Conclusions of the assessment

Twelve months of Victorian waste composition data was compared to waste composition data from the operational facility in Suffolk (UK). It was demonstrated that the wastes are comparable.

Before the final detailed design are completed, further investigation and verification of targeted kerbside waste will be performed to ensure it is fully understood.

How will it be managed?

During the operation of the plant Australian Paper will be required to perform regular audits on the waste feedstock to ensure that the facility is operated in accordance with EPA approvals.

Waste hierarchy

Why is it a concern?

The waste hierarchy is one of the eleven principles of the Environment Protection Act. The EPA needs to give consideration of how an application and a decision aligns with these principles.

Conclusions of the assessment

The waste hierarchy preferences recovery of energy from waste after recycling as a method for managing waste over sending the waste to landfill. Landfilling is currently the dominant option available in Victoria for residual waste. This proposal targets only residual wastes and so does not undermine recycling options.

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Australian Paper waste to energy works approval decision

At the time of approving this works approval, it is not considered feasible to viably recover material from the residual waste feedstock prior to burning the waste.

How will it be managed?

The EPA has required the facility maintains capacity to install a system capable of higher waste recovery and an investigation reviewing the feasibility of building such a pre-sort facility every 5 years.

Other issues assessed

Waste generated by the facility

Incineration creates three types of ash: incinerator bottom ash, boiler ash, and air pollution control residue (also known as fly ash). Incinerator bottom ash will be stored onsite pending reuse or disposal. Boiler and fly ash will be stored in a silo pending treatment prior to being disposed of in a suitable landfill. Any waste generated by the facility will need to be disposed of in accordance with the framework of the Act, including the Environment Protection (Industrial Waste Resource) Regulations 2009. Any reuse will require EPA approval.

Wastewater

EPA has investigated the capability of the site's existing system and has concluded that it can treat the additional wastewater generated by the new facility. The existing wastewater treatment system can accommodate the additional wastewater without exceeding the EPA licence discharge limits.

Energy use and greenhouse gas emissions

EPA has determined that the proposal will result in a net reduction in greenhouse gas emissions through its lifetime. This takes into consideration the offset of GHG emissions from the current energy use at the Australian Paper mill and through the diversion of waste from landfill.

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Noise

Operational noise will meet the noise levels set in the Noise from industry in regional Victoria (publication 1411) guideline at all times. Measurements will be taken during the operation of the facility to confirm that the actual noise of operations reflects the application predictions.

Odour

Controls will be sufficient to reduce the risk of odour beyond the site boundary. The waste bunker will be constantly under negative pressure, with air injected to the combustion chamber to destroy odorous gases.

Land

To enable the construction of the facility, land will need to be cleared on the site. EPA does not regulate land clearing in Victoria. Australian Paper will perform a thorough assessment of potential existing contamination of that land and manage any contaminated material in accordance with Victorian waste regulations.

Groundwater

The facility will be built on concrete, which will minimise the risk of pollution to groundwater. The existing groundwater has been correctly assessed and described in the application, and the impact from the proposed facility is compliant with policy.

Conditions of approval

The works approval is subject to conditions. Some conditions must be met prior to commencement of construction; others relate to commissioning of the facility. In addition, operation of the facility will be regulated through an EPA-issued licence. The works approval conditions include:

- The final detailed design must be verified by an EPA-appointed industrial facilities auditor (or alternative expert approved by EPA).
- The facility is to be verified at commissioning stage by an EPA-appointed industrial facilities auditor prior to issue of an operating licence. The auditor will assess whether the facility has been constructed and is operating (in the commissioning stage) in accordance with the conditions of the approvals from EPA.
- Verification that the facility can treat the waste in a safe manner.
- Australian Paper must clearly describe the waste

Australian Paper waste to energy works approval decision

streams that will be accepted at the premises, including the waste categories, volume and sources.

- Australian Paper must develop a comprehensive commissioning programme that includes verification of stack emissions and ongoing monitoring.
- Australian Paper must make monitoring data publicly available at daily, monthly and quarterly intervals.
- An independent auditor appointed during the first three years of operation to verify that the material received onsite is compliant with the works approval and operating licence.
- Annual audits during the first three years of operation, with timing of subsequent audits determined by the auditor to verify operational performance.
- Provision for future incorporation of options to improve material recovery from the waste feedstock prior to incineration, if this becomes viable.

Appeal process

If you object to the issuing of the works approval or its conditions, you may have the decision reviewed by applying in writing within 21 days of the date of issue to:

Registrar, Planning and Environment Division
Victorian Civil and Administrative Tribunal (VCAT)
7th Floor, 55 King Street, Melbourne, 3000

An application fee may be applicable when lodging an appeal with VCAT. Contact VCAT on (03) 9628 9777 for further details on fees associated with an appeal. A copy of the appeal should also be forwarded, within seven days of lodgment, to:

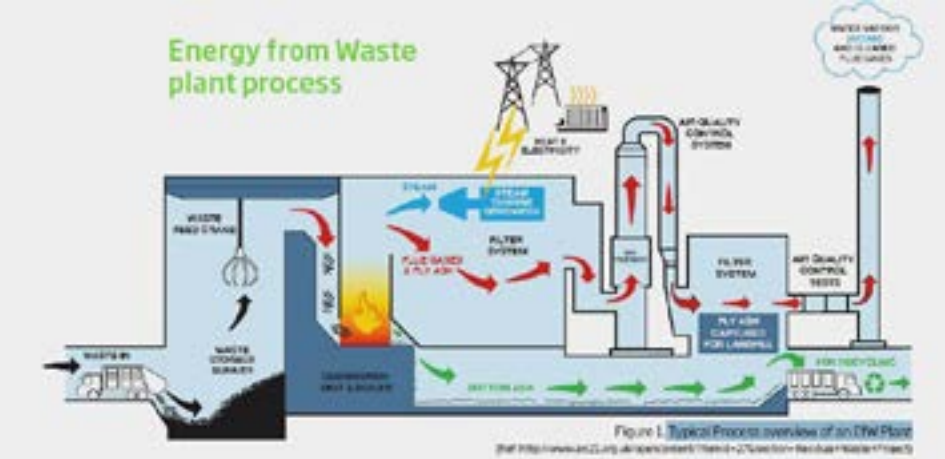
Director, Development Assessments Unit
Environment Protection Authority Victoria
GPO Box 4395, Melbourne, 3001

If you would like further information, please contact us by emailing contact@epa.vic.gov.au or calling 1300 372 842 (1300 EPA VIC).

More information

Read EPA's full assessment report on Engage Vic.

Please contact EPA on 1300 372 842 (1300 EPA VIC) or via email on contact@epa.vic.gov.au



Conclusions, Economic Impacts of Proposed Energy from Waste Plant

Prepared by Western Research Institute

The combined EfW plant operations and construction are estimated to make significant contributions to both the Victorian and Latrobe Valley economies and help Australian Paper improve its social and economic contribution to its employees and the communities in which it operates.

In Victoria, the contribution is estimated to be:

- An average of $161 million per annum for each of the 3 years of construction and $198.7 million per annum added to GSP
- An average of $76.1 million per annum for each of the 3 years of construction and $76.1 million per annum in household income
- An average of 1,046 full-time equivalent jobs per annum for each of the 3 years of construction and 911 FTE jobs thereafter.

In the Latrobe Valley region, the combined contribution is estimated to be:

- An average of $67.9 million per annum for each of the 3 years of construction and $95.8 million per annum in GRP
- An average of $29.6 million per annum for each of the 3 years of construction and $20.2 million per annum in household income
- An average of 454 FTE jobs per annum for each of the 3 years of construction and 265 FTE jobs thereafter.

The proposed EfW Plant has the potential to provide other social, economic and environmental benefits alongside those discussed in this report, including wider benefits to the Australian economy.

It is recommended that a full business case be developed to gain greater insight into the full impact of the EfW Plant.

Executive Summary, Works Approval Application 20B Conference Report

Australian Paper Energy from Waste proposal

Executive summary and recommendations

Paper Australia Pty Ltd (trading as Australian Paper) (AP) submitted a works approval application (WAA) to the Environment Protection Authority (EPA) for an Energy-from-Waste (EfW) plant at its Maryvale paper mill site in the Latrobe Valley. EPA formally accepted the application on 25 May 2018.

Following a review of the 115 submissions received, EPA determined a Section 20B Conference would useful to further explore community views and concerns about the proposal.

The conference provided an opportunity for:

- AP to provide an overview of its EfW WAA
- EPA to provide an update on the WAA and assessment process
- Participants to hear about issues raised in submissions, ask questions of AP and EPA and express their views about the proposal.

The role of the Chair is to collate the information from the 20B Conference and provide a report. This report documents the perspectives and questions raised by conference participants. As Chair and author of this report I have included participant contributions in good faith without endorsement or judgment as to their accuracy or veracity.

The following recommendations are made in response to participant concerns as outlined at the conference and have their basis in participant comments made during the conference or in submissions. Additional detail is contained in Section 3 of this report in relation to the Chair's observations and how EPA might deliver the recommendations contained in Tables 1-1 to 1-4 below.

Table 1-1: The following general recommendations relate to actions prior to works approval application determination:

RECOMMENDATIONS
EPA to continue raising awareness about where Works Approval Applications sit in the overall approvals and licensing process, that it is concept approval vs detailed design approval the EfW plant (including approved design for construction and commissioning).
EPA to facilitate the provision of responses to the collated list of questions at Section 2.7 of this report.

Table 1-2: The following topic specific recommendations relate to actions prior to works approval application determination:

RECOMMENDATIONS
Re Topic 1 – Air emission monitoring & control technology to prevent health impacts: EPA approvals unit to seek advice from its Chief Scientist / Public Health Unit about: • AP's statement that "By complying with particular clauses in SEPPs (e.g. SEPP Air Quality Management – "SEPP AQM"), compliance with human health exposure is also achieved"
EPA approvals unit to seek advice from its Chief Scientist / Public Health Unit about: • when a Health Risk Assessment might be a relevant consideration in the works approval assessment process.

RECOMMENDATIONS
Topic 2 – Best practice handling of waste and European Standards: EPA to consider: • Obtaining further information from AP about proposed pre-treatment options if in their detailed assessment of the proposal this is not sufficiently addressed.

Table 1-3: The following topic specific recommendations relate to future actions, if a works approval is granted:

RECOMMENDATIONS
Topic 1 – Air emission monitoring and control technology to prevent health impacts: EPA to consider: • supporting AP to undertake specific community consultation in relation to establishing an appropriate monitoring, evaluation and reporting regime as part of considering potential future licence conditions.
Topic 3 – Waste Hierarchy and waste composition EPA to consider: • outlining in its detailed assessment report for this works approval application (or some other appropriate communication channel) how it expects AP to manage each of these issues through environmental management plans and the types of licence conditions that it might consider imposing.
Topic 4 – Management of incoming waste and residual waste EPA to consider: • outlining in its detailed assessment report for this works approval application (or some other appropriate communication channel) how it expects AP to manage each of these issues through environmental management plans and the types of licence conditions that it might consider imposing.
Topic 5 – Greenhouse Gas Emissions and odour from the site EPA to consider: • the need for expert review of any emissions and odour modelling information relied upon in its detailed assessment.
Topic 6 Track record and public consultation EPA to consider: • the benefits and appropriateness of providing access to engagement advice (from EPA's Communications and Engagement Group) to AP to support their continued engagement approaches.
EPA to consider: • Encouraging AP to better engage with external stakeholders (agencies and community representatives) specifically around health impacts.

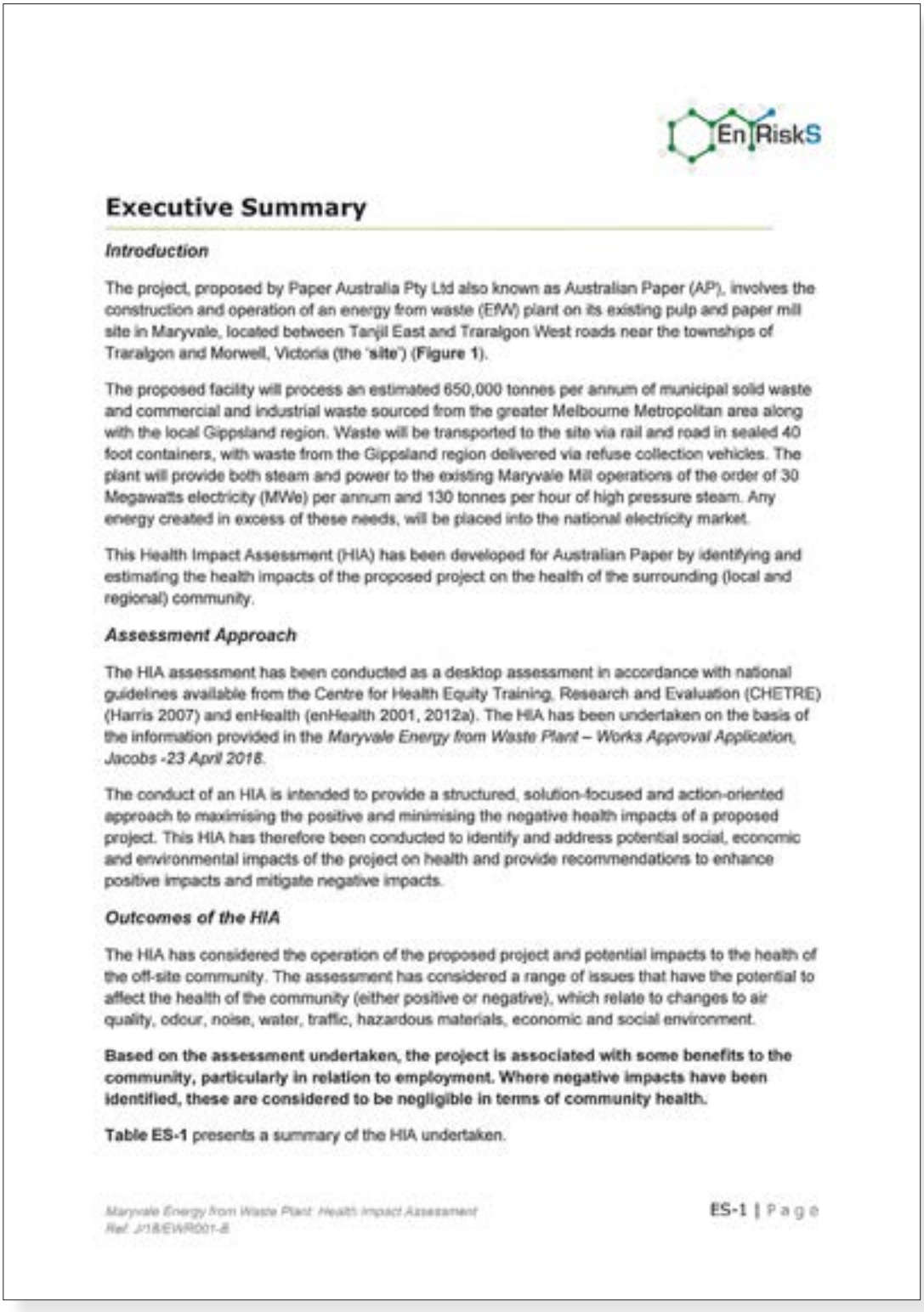
Table 1- 4: The following general recommendation relates to future action regardless of whether an approval is granted:

RECOMMENDATIONS
EPA to consider its role in:
• improved external communications and access to information.

As stated above additional detail is contained in Section 3 of this report in relation to the Chair's observations and how EPA might deliver the recommendations in the tables above.

Executive Summary: Maryvale Energy from Waste Plant: Health Impact Assessment

Prepared by EnRisks



EnRiskS

Executive Summary

Introduction

The project, proposed by Paper Australia Pty Ltd also known as Australian Paper (AP), involves the construction and operation of an energy from waste (EfW) plant on its existing pulp and paper mill site in Maryvale, located between Tanjil East and Traralgon West roads near the townships of Traralgon and Morwell, Victoria (the '**site**') (**Figure 1**).

The proposed facility will process an estimated 650,000 tonnes per annum of municipal solid waste and commercial and industrial waste sourced from the greater Melbourne Metropolitan area along with the local Gippsland region. Waste will be transported to the site via rail and road in sealed 40 foot containers, with waste from the Gippsland region delivered via refuse collection vehicles. The plant will provide both steam and power to the existing Maryvale Mill operations of the order of 30 Megawatts electricity (MWe) per annum and 130 tonnes per hour of high pressure steam. Any energy created in excess of these needs, will be placed into the national electricity market.

This Health Impact Assessment (HIA) has been developed for Australian Paper by identifying and estimating the health impacts of the proposed project on the health of the surrounding (local and regional) community.

Assessment Approach

The HIA assessment has been conducted as a desktop assessment in accordance with national guidelines available from the Centre for Health Equity Training, Research and Evaluation (CHETRE) (Harris 2007) and enHealth (enHealth 2001, 2012a). The HIA has been undertaken on the basis of the information provided in the *Maryvale Energy from Waste Plant – Works Approval Application, Jacobs -23 April 2018.*

The conduct of an HIA is intended to provide a structured, solution-focused and action-oriented approach to maximising the positive and minimising the negative health impacts of a proposed project. This HIA has therefore been conducted to identify and address potential social, economic and environmental impacts of the project on health and provide recommendations to enhance positive impacts and mitigate negative impacts.

Outcomes of the HIA

The HIA has considered the operation of the proposed project and potential impacts to the health of the off-site community. The assessment has considered a range of issues that have the potential to affect the health of the community (either positive or negative), which relate to changes to air quality, odour, noise, water, traffic, hazardous materials, economic and social environment.

Based on the assessment undertaken, the project is associated with some benefits to the community, particularly in relation to employment. Where negative impacts have been identified, these are considered to be negligible in terms of community health.

Table ES-1 presents a summary of the HIA undertaken.

Maryvale Energy from Waste Plant: Health Impact Assessment
Ref: J18/EWR001-E

ES-1 | Page

Table ES-1: Summary of HIA outcomes and enhancement/mitigation measures

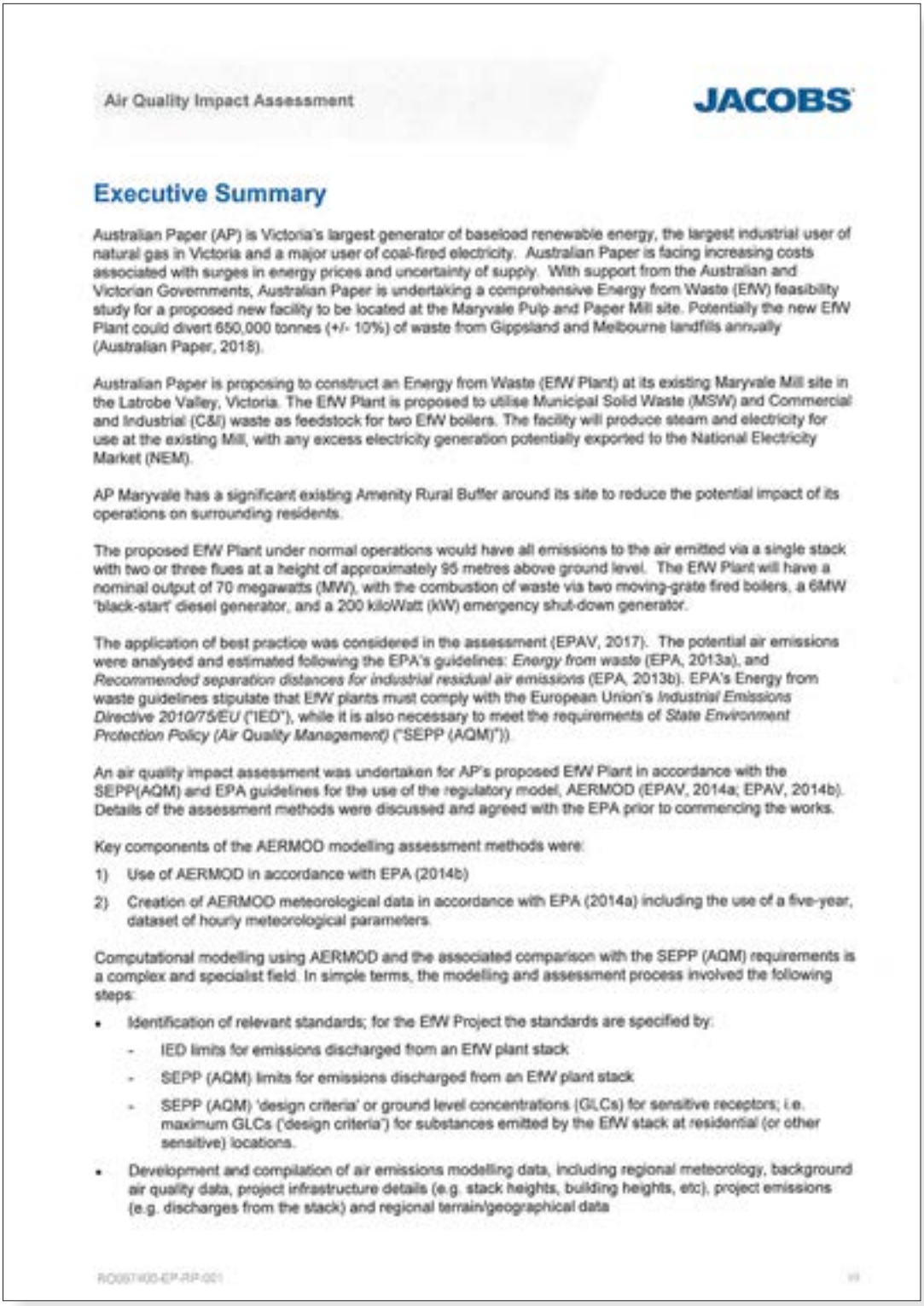
Health Aspect/Issue	Reference in HIA	Potential Health Impacts Considered	Impact Identified (positive or negative and significance)	Types of measures that could be implemented to enhance positive impacts or mitigate negative impacts
Air quality – Inhalation exposures	Section 5.4	Range of health effects associated with exposure to pollutants released to air from the proposed facility	**All exposures: Negative but negligible** More specifically: ■ No acute risk issues of concern ■ No chronic risk issues of concern Particulate exposures are negligible and essentially representative of zero risk ■ Incremental carcinogenic risks are negligible and essentially representative of zero risk	The proper operation and maintenance, and monitoring, of the pollution control/flue gas equipment.
Air quality – Multiple pathway exposures	Section 5.5	Range of health effects associated with exposure to pollutants released to air from the proposed facility, that may then deposit and accumulate in soil, homegrown fruit and vegetables and other farm produce (eggs, beef and milk)	**All exposures: Negative but negligible** More specifically: ■ No chronic risk issues of concern for multiple pathway exposures ■ All calculated risks for individual exposure pathways are negligible and essentially representative of zero risk ■ All calculated risks for combined multiple pathway exposures are negligible and essentially representative of zero risk	The proper operation and maintenance, and monitoring, of the pollution control/flue gas equipment.
Odour	Section 5.6	Annoyance, stress, anxiety	**Not significant and negligible**	The proper operation of the tipping hall as proposed to ensure fugitive odour emissions are effectively managed.
Noise	Section 6	Sleep disturbance, annoyance, children's school performance and cardiovascular health	**Modelled noise impacts: negligible potential for health impacts**	Additional assessment of the project detailed design is required, and application of appropriate and reasonable mitigation measures is required so as not to increase noise levels at the nearest sensitive receivers from current levels.
Economic Environment	Section 7	Reduction in anxiety, stress and feelings of insecurity	**Positive improvements in health and wellbeing**	The identified positive outcomes in the local community can be enhanced by encouraging employment of people who live within the local community

Health Aspect/Issue	Reference in HIA	Potential Health Impacts Considered	Impact identified (positive or negative and significance)	Types of measures that could be implemented to enhance positive impacts or mitigate negative impacts
Traffic and transport	Section 7	Injury or death, stress and anxiety.	**Negative but minimal**	Details to be determined at the detailed design phase of the project
Discovery and disposal of hazardous waste	Section 7	Possible injury if incorrectly disposed of	**Negative but minimal**	Further development of the feedstock delivery protocol into an operational management plan to address the discovery and proper disposal of this material
Community and social	Section 7	Wellbeing, changes in levels of stress and anxiety	**Positive outcomes** enhancing feelings of wellbeing for aspects such as sustainability **Negative outcomes** for potential changes to amenity and community feelings of control related to perceived risks rather than actual risks	These health impacts relate to community perceptions and trust. It is therefore important that the positive impacts associated with the project are enhanced within the local community and community consultation is continued and uses a range of techniques that are tailored to the various sub-populations that have particular areas of concern or particular characteristics that make normal methods of communication less effective. It is important that an effective communication/ community consultation program is maintained throughout the construction, commissioning and operational phases of the project.

Appendix 9

Executive Summary - Air Quality Impact Assessment

Prepared by Jacobs



JACOBS

Executive Summary

Australian Paper (AP) is Victoria's largest generator of baseload renewable energy, the largest industrial user of natural gas in Victoria and a major user of coal-fired electricity. Australian Paper is facing increasing costs associated with surges in energy prices and uncertainty of supply. With support from the Australian and Victorian Governments, Australian Paper is undertaking a comprehensive Energy from Waste (EfW) feasibility study for a proposed new facility to be located at the Maryvale Pulp and Paper Mill site. Potentially the new EfW Plant could divert 650,000 tonnes (+/- 10%) of waste from Gippsland and Melbourne landfills annually (Australian Paper, 2018).

Australian Paper is proposing to construct an Energy from Waste (EfW Plant) at its existing Maryvale Mill site in the Latrobe Valley, Victoria. The EfW Plant is proposed to utilise Municipal Solid Waste (MSW) and Commercial and Industrial (C&I) waste as feedstock for two EfW boilers. The facility will produce steam and electricity for use at the existing Mill, with any excess electricity generation potentially exported to the National Electricity Market (NEM).

AP Maryvale has a significant existing Amenity Rural Buffer around its site to reduce the potential impact of its operations on surrounding residents.

The proposed EfW Plant under normal operations would have all emissions to the air emitted via a single stack with two or three flues at a height of approximately 95 metres above ground level. The EfW Plant will have a nominal output of 70 megawatts (MW), with the combustion of waste via two moving-grate fired boilers, a 6MW 'black-start' diesel generator, and a 200 kiloWatt (kW) emergency shut-down generator.

The application of best practice was considered in the assessment (EPAV, 2017). The potential air emissions were analysed and estimated following the EPA's guidelines: *Energy from waste* (EPA, 2013a), and *Recommended separation distances for industrial residual air emissions* (EPA, 2013b). EPA's Energy from waste guidelines stipulate that EfW plants must comply with the European Union's *Industrial Emissions Directive 2010/75/EU* ("IED"), while it is also necessary to meet the requirements of *State Environment Protection Policy (Air Quality Management)* ("SEPP (AQM)").

An air quality impact assessment was undertaken for AP's proposed EfW Plant in accordance with the SEPP(AQM) and EPA guidelines for the use of the regulatory model, AERMOD (EPAV, 2014a; EPAV, 2014b). Details of the assessment methods were discussed and agreed with the EPA prior to commencing the works.

Key components of the AERMOD modelling assessment methods were:

1) Use of AERMOD in accordance with EPA (2014b)
2) Creation of AERMOD meteorological data in accordance with EPA (2014a) including the use of a five-year, dataset of hourly meteorological parameters.

Computational modelling using AERMOD and the associated comparison with the SEPP (AQM) requirements is a complex and specialist field. In simple terms, the modelling and assessment process involved the following steps:

- Identification of relevant standards; for the EfW Project the standards are specified by:
  - IED limits for emissions discharged from an EfW plant stack
  - SEPP (AQM) limits for emissions discharged from an EfW plant stack
  - SEPP (AQM) 'design criteria' or ground level concentrations (GLCs) for sensitive receptors; i.e. maximum GLCs ('design criteria') for substances emitted by the EfW stack at residential (or other sensitive) locations.
- Development and compilation of air emissions modelling data, including regional meteorology, background air quality data, project infrastructure details (e.g. stack heights, building heights, etc), project emissions (e.g. discharges from the stack) and regional terrain/geographical data

- Conducting computational air emissions modelling using the EPA designated modelling software ("AERMOD") and including the required data inputs. The AERMOD modelling predicts the ground level concentrations of substances due to the behaviour of the emissions plume combined with the existing background ground level concentrations, local/regional meteorology and the geography of the Latrobe Valley
- Assessment of proposed emissions and air emissions modelling results with IED and SEPP (AQM) limits and design criteria.

A number of conservative assumptions were built in to the modelling data in order to provide suitable factors of safety to ensure that the proposed EfW Plant will meet the IED and SEPP (AQM) requirements. These assumptions include:

- Inclusion of already-closed industrial facilities into the background air quality data, such as Hazelwood Power Station, Morwell Power Station and the Energy Brix briquette factories
- Inclusion of the existing Australian Paper gas-fired boilers into the background air quality data – this is conservative because the purpose of the EfW Project is to reduce the use of these boilers
- Modelling the particulate matter 2.5 ($PM_{2.5}$) as 100% of the entire mass fraction of total particulate matter being emitted from the EfW Plant at the maximum IED limit of 30 mg/Nm³. Modelling of $PM_{2.5}$ was also performed using a more realistic figure of 0.02 mg/Nm³, which itself is still a conservative value given that the Ricardo-AEA report[1] states this figure (0.02 mg/Nm³) is the average maximum emission from sampled UK EfW plants.

The assessment concludes that the emissions to air from the proposed EfW Plant are minimal, with no adverse air quality impacts anticipated. **Table E.1** shows the key emissions from the EfW Plant and the compliance with SEPP (AQM). Emissions from the EfW Plant will meet all IED and SEPP (AQM) emission limits.

The AERMOD results for the EfW Plant's operating scenario demonstrated there were no predicted exceedances of SEPP(AQM) Design Criteria for the 99.9th percentile, with the exception of $PM_{2.5}$ when combined with background concentrations. AERMOD results demonstrate that there are no exceedances of the SEPP(AQM) design criteria for any modelled substances at any of the discrete receptors.

The exceedances for $PM_{2.5}$ are due to the existing high background levels of $PM_{2.5}$. The peak $PM_{2.5}$ exceedances are highly likely to be associated with elevated smoke levels that may have originated from bushfires, landholder burning off, forest regeneration burns and planned burning. Smoke is often persistent in the Latrobe Valley in autumn due to the stable atmospheric conditions at that time of year as demonstrated in the time series plots. The time-series plots show that the contribution of the EfW Plant to $PM_{2.5}$ ground level concentrations is minimal in comparison to the periodic high $PM_{2.5}$ background levels.

The assessment showed that existing background $PM_{2.5}$ levels are above the design criterion for some periods as shown in a time-series plot analysis. AERMOD modelling was also conducted on a scenario where there were zero EfW Plant $PM_{2.5}$ emissions (i.e. only background) which showed exceedances of SEPP(AQM) Design Criteria. Additionally, AERMOD modelling was conducted using a high in-stack $PM_{2.5}$ emissions concentration (30 mg/m³) and a low in-stack $PM_{2.5}$ emissions concentration (0.02 mg/m³). The difference in resultant GLCs between the 30 mg/m³ case, the 0.02 mg/m³ case and the zero emissions case was negligible providing further confirmation that the $PM_{2.5}$ exceedances are due to the high background $PM_{2.5}$ levels.

It should also be noted that the assessment included an evaluation of total particulate emissions (PM_{total}) and these emissions from the EfW Plant, as measured at the stack, are compliant for the IED Limit of 30mg/Nm³. The air quality assessment concludes that for steady state normal operating conditions, the worst case $PM_{2.5}$ contribution to the overall $PM_{2.5}$ levels beyond the Amenity Rural Buffer is below 0.1 µg/m³ of the overall $PM_{2.5}$ levels (approximately 0.2% of the SEPP AQM Design Criterion). This is based on the 99.9 percentile 1 hour

[1] *Ricardo-AEA Ltd (Buckland, Thomas), Assessment of particulate emissions from energy-from-waste plant, National Atmospheric Emissions Inventory, Report for DEFRA, 14/10/2015. https://uk-air.defra.gov.uk/assets/documents/reports/cat07/1511261133_AQ0726_PM_EfW_emissions_report_Issue1_Final_including_appendices.pdf, assessed*

Appendix 9 *cont.*

average – i.e. the 0.1 µg/m³ contribution to the overall worst case $PM_{2.5}$ levels would occur for only 9 hours in the given meteorological year. It is also based on a very conservative figure for the emissions rate.

The conclusion of the air quality modelling assessment is there is a low risk of air quality impact from the Project's EfW emissions. Although the Project has only a very small effect on the high $PM_{2.5}$ background levels, $PM_{2.5}$ should be monitored to confirm compliance of the Project's predicted very minor effect on $PM_{2.5}$ levels.

Emissions of air toxics such as IARC Group 1 carcinogens chromium VI (Cr(VI)), cadmium (Cd) and mercury (Hg) were investigated for this assessment. Model results for all of the carcinogens showed that the GLCs due to the EfW Plant are below the relevant SEPP(AQM) design criteria and most are 100 – 1,000 times below their Criterion. Monitoring of the elemental composition of the in-stack pollutant concentrations should be considered to confirm that the proposed EfW operation will not cause significant air quality impacts at any sensitive receptors.

Table E.1 : Statistical summary of AERMOD results for 99.9 percentile hourly averages, GLCs (µg/m³)

Substance & assessment	AP Maryvale 2016	BoM LVA 2016	BoM LVA 2015	BoM LVA 2014	BoM LVA 2013	BoM LVA 2012
Carbon monoxide: SEPP(AQM) CO Design Criterion – 29,000 µg/m³						
Summary of CO results – all GLCs substantially less than the SEPP(AQM) design criterion						
CO, 99.9% 1h; 9th-highest from 'Top 100 Table'	2,527	2,559	2,036	6,343	ND	ND
CO, 99.9% 1h; grid maximum	1,607	1,616	1,490	3,432	ND	ND
CO, 90th percentile grid result	1,489	1,490	1,264	3,432	ND	ND
CO, 99.9% 1h; discrete receptor maximum	1,488	1,497	1,258	3,432	ND	ND
Nitrogen dioxide: SEPP(AQM) NO_2 Design Criterion – 190 µg/m³						
Summary of NO_2 results – all GLCs substantially less than the SEPP(AQM) design criterion						
NO_2, 99.9% 1h; 9th-highest from 'Top 100 Table'	95.6	79.3	93.4	84.1	84.3	69.1
NO_2, 99.9% 1h; grid maximum	66.2	64.4	71.9	67.85	70.1	62.8
NO_2, 90th percentile grid result	50.8	50.8	55.6	50.76	54.5	49.0
NO_2, 99.9% 1h; discrete receptor maximum	50.8	51.2	56.4	50.8	54.5	49.3
Sulfur dioxide: SEPP(AQM) SO_2 Design Criterion – 450 µg/m³						
Summary of SO_2 results – all GLCs substantially less than the SEPP(AQM) design criterion						
SO_2, 99.9% 1h; 9th-highest from 'Top 100 Table'	167.0	169.7	155.7	122.4	192.5	230.5
SO_2, 99.9% 1h; grid maximum	72.5	81.1	96.4	92.9	76.0	64.4
SO_2, 90th percentile grid result	70.6	70.9	85.2	89.1	70.6	60.9
SO_2, 99.9% 1h; discrete receptor maximum	70.6	72.9	87.2	90.9	70.6	62.8
Particulate matter 2.5 ($PM_{2.5}$), at emission rate of 30 mg/m³(IED limit): SEPP(AQM) $PM_{2.5}$ Design Criterion –50 µg/m³						
Summary of $PM_{2.5}$ results – 9th highest GLCs above SEPP (AQM) design criterion, due to high background $PM_{2.5}$ levels						
$PM_{2.5}$, 99.9% 1h; 9th-highest from 'Top 100 Table'	61.1	60.1	155.7	84.2	ND	ND
Background contribution	59.9	59.9	155.6	84.0	ND	ND
EfW contribution	1.2	0.2	0.3	1.6	ND	ND

Substance & assessment	AP Maryvale 2016	BoM LVA 2016	BoM LVA 2015	BoM LVA 2014	BoM LVA 2013	BoM LVA 2012
$PM_{2.5}$, 99.9% 1h; grid maximum	49.2	47.7	38.4	42.9	ND	ND
$PM_{2.5}$, 90th percentile grid result	47.1	47.1	37.6	40.3	ND	ND
$PM_{2.5}$, 99.9% 1h; discrete receptor maximum	47.1	47.1	37.7	40.3	ND	ND
Particulate matter 2.5 ($PM_{2.5}$), at emission rate of 0.02 mg/m³, as per the average maximum in the Ricardo-AEA Report: SEPP(AQM) $PM_{2.5}$ Design Criterion – 50 µg/m³						
Summary of $PM_{2.5}$ results – 9th highest GLCs above SEPP (AQM) design criterion, due to high background $PM_{2.5}$ levels						
$PM_{2.5}$, 99.9% 1h; 9th-highest from 'Top 100 Table'	61.1	60.1	155.7	84.1	ND	ND
$PM_{2.5}$, 99.9% 1h; grid maximum	49.2	47.7	38.4	42.9	ND	ND
$PM_{2.5}$, 90th percentile grid result	47.1	47.1	37.6	40.3	ND	ND
$PM_{2.5}$, 99.9% 1h; discrete receptor maximum	47.1	47.1	37.6	40.3	ND	ND
Particulate matter 2.5 ($PM_{2.5}$), for background $PM_{2.5}$ (i.e. EfW Plant emission rate of zero mg/m³): SEPP(AQM) $PM_{2.5}$ Design Criterion – 50 µg/m³						
Summary of $PM_{2.5}$ results – 9th highest GLCs above SEPP (AQM) design criterion						
$PM_{2.5}$, 99.9% 1h; 9th-highest from 'Top 100 Table'	59.9	59.9	155.6	84.0	ND	ND
$PM_{2.5}$, 99.9% 1h; grid maximum	47.1	47.1	37.6	40.3	ND	ND
$PM_{2.5}$, 99.9% 1h; discrete receptor maximum	47.1	47.1	37.6	40.3	ND	ND
Ammonia: SEPP(AQM) NH_3 Design Criterion – 600 µg/m³						
Summary of NH_3 results – all GLCs substantially less than the SEPP(AQM) design criterion						
NH_3, 99.9% 1h; 9th-highest from 'Top 100 Table'	26.6	15.7	15.6	15.5	15.6	14.9
NH_3, 99.9% 1h; grid maximum	10.0	14.4	13.8	13.7	14.0	13.2
NH_3, 90th percentile grid result	4.2	4.2	4.4	4.9	4.4	4.3
NH_3, 99.9% 1h; discrete receptor maximum	4.6	5.1	5.1	5.6	5.2	4.8
Dioxins and Furans: SEPP(AQM) DF Design Criterion – 3.7E-06 µg/m³						
Summary of DF results – all GLCs substantially less than the SEPP(AQM) design criterion						
DF, 99.9% 1h; 9th-highest from 'Top 100 Table'	8.9E-08	5.2E-08	5.2E-08	5.2E-08	5.2E-08	5.0E-08
DF, 99.9% 1h; grid maximum	3.3E-08	4.8E-08	4.6E-08	4.6E-08	4.7E-08	4.4E-08
DF, 90th percentile grid result	1.4E-08	1.4E-08	1.5E-08	1.6E-08	1.5E-08	1.4E-08
DF, 99.9% 1h; discrete receptor maximum	1.5E-08	1.7E-08	1.7E-08	1.9E-08	1.7E-08	1.6E-08
PAHs as B(a)P: SEPP(AQM) DF Design Criterion – 0.73 µg/m³						
Summary of B(a)P results – all GLCs substantially less than the SEPP(AQM) design criterion						
B(a)P, 99.9% 1h; 9th-highest from 'Top 100 Table'	0.012	0.007	0.007	0.007	0.007	0.007
B(a)P, 99.9% 1h; grid maximum	0.004	0.006	0.006	0.006	0.006	0.006
B(a)P, 90th percentile grid result	0.002	0.002	0.002	0.002	0.002	0.002

Substance & assessment	AP Maryvale 2016	BoM LVA 2016	BoM LVA 2015	BoM LVA 2014	BoM LVA 2013	BoM LVA 2012
B(a)P, 99.9% 1h; discrete receptor maximum	0.002	0.002	0.002	0.002	0.002	0.002
Hexavalent chromium (highest risk metal): SEPP\AQM) Cr(VI) Design Criterion – 0.17 µg/m³						
Summary of Cr(VI)results – all GLCs substantially less than the SEPP\AQM) design criterion						
Cr(VI), 99.9% 1h; 9th-highest from 'Top 100 Table'	0.136	0.080	0.080	0.079	0.080	0.076
Cr(VI), 99.9% 1h; grid maximum	0.051	0.073	0.070	0.070	0.071	0.067
Cr(VI), 90th percentile grid result	0.021	0.022	0.023	0.025	0.023	0.022
Cr(VI), 99.9% 1h; discrete receptor maximum	0.024	0.026	0.026	0.029	0.026	0.025
Cadmium (2nd-highest risk metal): SEPP\AQM) Cd Design Criterion – 0.033 µg/m³						
Summary of Cd results – all GLCs less than the SEPP\AQM) design criterion						
Cd, 99.9% 1h; 9th-highest from 'Top 100 Table'	0.027	0.016	0.016	0.015	0.016	0.015
Cd, 99.9% 1h; grid maximum	0.010	0.014	0.014	0.014	0.014	0.013
Cd, 90th percentile grid result	0.004	0.004	0.004	0.005	0.004	0.004
Cd, 99.9% 1h; discrete receptor maximum	0.005	0.005	0.005	0.006	0.005	0.005
Mercury: SEPP\AQM) Cd Design Criterion – 0.33 µg/m³						
Summary of Hg results – all GLCs substantially less than the SEPP\AQM) design criterion						
Hg, 99.9% 1h; 9th-highest from 'Top 100 Table'	0.044	0.026	0.026	0.026	0.026	0.025
Hg, 99.9% 1h; grid maximum	0.017	0.024	0.023	0.023	0.023	0.022
Hg, 90th percentile grid result	0.007	0.007	0.007	0.008	0.007	0.007
Hg, 99.9% 1h; discrete receptor maximum	0.008	0.009	0.008	0.009	0.009	0.008

Air Quality Modelling Results

creating energy from waste

Feasibility study outcomes This series of fact sheets provides an update on the initial findings from Australian Paper's Energy from Waste (EfW) feasibility study.

FACT SHEET 16

Australian Paper Energy from Waste Feasibility Study - Air Quality Modelling Results

Air Quality Monitoring Results

This table details the results of the air quality impact assessment undertaken as part of the feasibility study into the adoption of Energy from Waste technology at Australian Paper's Maryvale Pulp and Paper Mill. A separate Air Quality fact sheet explaining key aspects of the assessment is also available.

Substance & assessment	AP Maryvale 2016	BoM LVA 2016	BoM LVA 2015	BoM LVA 2014	BoM LVA 2013	BoM LVA 2012
Carbon monoxide: SEPP(AQM) CO Design Criterion - 29,000 µg/m³						
Summary of CO results - all GLCs substantially less than the SEPP(AQM) design criterion						
CO, 99.9% 1h; 9th-highest from 'Top 100 Table'	2,527	2,559	2,036	6,343	ND	ND
CO, 99.9% 1h; grid maximum	1,607	1,616	1,490	3,432	ND	ND
CO, 90th percentile grid result	1,489	1,490	1,264	3,432	ND	ND
CO, 99.9% 1h; discrete receptor maximum	1,488	1,497	1,268	3,432	ND	ND
Nitrogen dioxide: SEPP(AQM) NO_2 Design Criterion - 190 µg/m³						
Summary of NO_2 results - all GLCs substantially less than the SEPP(AQM) design criterion						
NO_2, 99.9% 1h; 9th-highest from 'Top 100 Table'	95.6	79.3	93.4	84.1	84.3	69.1
NO_2, 99.9% 1h; grid maximum	66.2	64.4	71.9	67.85	70.1	62.8
NO_2, 90th percentile grid result	50.8	50.8	55.6	50.76	54.5	49.0
NO_2, 99.9% 1h; discrete receptor maximum	50.8	51.2	56.4	50.8	54.5	49.3
Sulfur dioxide: SEPP(AQM) SO_2 Design Criterion - 450 µg/m³						
Summary of SO_2 results - all GLCs substantially less than the SEPP(AQM) design criterion						
SO_2, 99.9% 1h; 9th-highest from 'Top 100 Table'	167.0	169.7	155.7	122.4	192.5	230.5
SO_2, 99.9% 1h; grid maximum	72.5	81.1	96.4	92.9	76.0	64.4
SO_2, 90th percentile grid result	70.6	70.9	85.2	89.1	70.6	60.9
SO_2, 99.9% 1h; discrete receptor maximum	70.6	72.9	87.2	90.9	70.6	62.8
Particulate matter 2.5 ($PM_{2.5}$), at emission rate of 30 mg/m³(IED limit): SEPP(AQM) $PM_{2.5}$ Design Criterion -50 µg/m³						
Summary of $PM_{2.5}$ results - 9th highest GLCs above SEPP (AQM) design criterion, due to high background $PM_{2.5}$ levels						
$PM_{2.5}$, 99.9% 1h; 9th-highest from 'Top 100 Table'	61.1	60.1	155.7	84.2	ND	ND
Background contribution	59.9	59.9	155.6	84.0	ND	ND
EfW contribution	1.2	0.2	0.3	1.6	ND	ND
$PM_{2.5}$, 99.9% 1h; grid maximum	49.2	47.7	38.4	42.9	ND	ND
$PM_{2.5}$, 90th percentile grid result	47.1	47.1	37.6	40.3	ND	ND
$PM_{2.5}$, 99.9% 1h; discrete receptor maximum	47.1	47.1	37.7	40.3	ND	ND

Appendix 10

Substance & assessment	AP Maryvale 2016	BoM LVA 2016	BoM LVA 2015	BoM LVA 2014	BoM LVA 2013	BoM LVA 2012
Particulate matter 2.5 ($PM_{2.5}$), at emission rate of 0.02 mg/m³, as per the average maximum in the Ricardo-AEA Report: SEPP(AQM) $PM_{2.5}$ Design Criterion – 50 µg/m³						
Summary of $PM_{2.5}$ results – 9th highest GLCs above SEPP (AQM) design criterion, due to high background $PM_{2.5}$ levels						
$PM_{2.5}$, 99.9% 1h; 9th-highest from 'Top 100 Table'	61.1	60.1	155.7	84.1	ND	ND
$PM_{2.5}$, 99.9% 1h; grid maximum	49.2	47.7	38.4	42.9	ND	ND
$PM_{2.5}$, 90th percentile grid result	47.1	47.1	37.6	40.3	ND	ND
$PM_{2.5}$, 99.9% 1h; discrete receptor maximum	47.1	47.1	37.6	40.3	ND	ND
Particulate matter 2.5 ($PM_{2.5}$), for background PM2.5 (emission rate of zero mg/m3): SEPP(AQM) $PM_{2.5}$ Design Criterion – 50 µg/m³						
Summary of $PM_{2.5}$ results – 9th highest GLCs above SEPP (AQM) design criterion						
$PM_{2.5}$, 99.9% 1h; 9th-highest from 'Top 100 Table'	59.9	59.9	155.6	84.0	ND	ND
$PM_{2.5}$, 99.9% 1h; grid maximum	47.1	47.1	37.6	40.3	ND	ND
$PM_{2.5}$, 99.9% 1h; discrete receptor maximum	47.1	47.1	37.6	40.3	ND	ND
Ammonia: SEPP(AQM) NH_3 Design Criterion – 600 µg/m³						
Summary of NH_3 results – all GLCs substantially less than the SEPP(AQM) design criterion						
NH_3, 99.9% 1h; 9th-highest from 'Top 100 Table'	26.6	15.7	15.6	15.5	15.6	14.9
NH_3, 99.9% 1h; grid maximum	10.0	14.4	13.8	13.7	14.0	13.2
NH_3, 90th percentile grid result	4.2	4.2	4.4	4.9	4.4	4.3
NH_3, 99.9% 1h; discrete receptor maximum	4.6	5.1	5.1	5.6	5.2	4.8
Dioxins and Furans: SEPP(AQM) B(a)P Design Criterion – 3.7E-06 µg/m³						
Summary of DF results – all GLCs substantially less than the SEPP(AQM) design criterion						
DF, 99.9% 1h; 9th-highest from 'Top 100 Table'	8.9E-08	5.2E-08	5.2E-08	5.2E-08	5.2E-08	5.0E-08
DF, 99.9% 1h; grid maximum	3.3E-08	4.8E-08	4.6E-08	4.6E-08	4.7E-08	4.4E-08
DF, 90th percentile grid result	1.4E-08	1.4E-08	1.5E-08	1.6E-08	1.5E-08	1.4E-08
DF, 99.9% 1h; discrete receptor maximum	1.5E-08	1.7E-08	1.7E-08	1.9E-08	1.7E-08	1.6E-08
PAHs as B(a)P: SEPP(AQM) B(a)P Design Criterion – 0.73 µg/m³						
Summary of B(a)P results – all GLCs substantially less than the SEPP(AQM) design criterion						
B(a)P, 99.9% 1h; 9th-highest from 'Top 100 Table'	0.012	0.007	0.007	0.007	0.007	0.007
B(a)P, 99.9% 1h; grid maximum	0.004	0.006	0.006	0.006	0.006	0.006
B(a)P, 90th percentile grid result	0.002	0.002	0.002	0.002	0.002	0.002
B(a)P, 99.9% 1h; discrete receptor maximum	0.002	0.002	0.002	0.002	0.002	0.002
Hexavalent chromium (highest risk metal): SEPP(AQM) Cr(VI) Design Criterion – 0.17 µg/m³						
Summary of Cr(VI)results – all GLCs substantially less than the SEPP(AQM) design criterion						
Cr(VI), 99.9% 1h; 9th-highest from 'Top 100 Table'	0.136	0.080	0.080	0.079	0.080	0.076
Cr(VI), 99.9% 1h; grid maximum	0.051	0.073	0.070	0.070	0.071	0.067
Cr(VI), 90th percentile grid result	0.021	0.022	0.023	0.025	0.023	0.022
Cr(VI), 99.9% 1h; discrete receptor maximum	0.024	0.026	0.026	0.029	0.026	0.025
Cadmium (2nd-highest risk metal): SEPP(AQM) Cd Design Criterion – 0.033 µg/m³						
Summary of Cd results – all GLCs less than the SEPP(AQM) design criterion						
Cd, 99.9% 1h; 9th-highest from 'Top 100 Table'	0.027	0.016	0.016	0.015	0.016	0.015
Cd, 99.9% 1h; grid maximum	0.010	0.014	0.014	0.014	0.014	0.013
Cd, 90th percentile grid result	0.004	0.004	0.004	0.005	0.004	0.004
Cd, 99.9% 1h; discrete receptor maximum	0.005	0.005	0.005	0.006	0.005	0.005
Mercury: SEPP(AQM) Hg Design Criterion – 0.33 µg/m³						
Summary of Hg results – all GLCs substantially less than the SEPP(AQM) design criterion						
Hg, 99.9% 1h; 9th-highest from 'Top 100 Table'	0.044	0.026	0.026	0.026	0.026	0.025
Hg, 99.9% 1h; grid maximum	0.017	0.024	0.023	0.023	0.023	0.022
Hg, 90th percentile grid result	0.007	0.007	0.007	0.008	0.007	0.007
Hg, 99.9% 1h; discrete receptor maximum	0.008	0.009	0.008	0.009	0.009	0.008

- "SEPP (AQM): State Environment Protection Policy (Air Quality Management)"
- "ND: no data – no data available for this time period"
- "GLC: ground level concentration"
- "ug/m3: micrograms per cubic metre (1 microgram is one millionth of a gram)"

Australian Paper
Maryvale

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ECONOMIC IMPACTS OF PROPOSED ENERGY FROM WASTE PLANT - UPDATE JANUARY 2019

Australian Paper

DOCUMENT ACCEPTANCE AND RELEASE NOTICE

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AUSTRALIAN PAPER ENERGY FROM WASTE PLANT UPDATE

Contents

INTRODUCTION

Australian Paper is a vertically integrated manufacturer of pulp and paper. The company strives to achieve sustainable practices throughout its operations in a way that aims to minimise its impact on the environment and improve its social and economic contribution to its employees and the communities in which it operates.

Australian Paper has indicated its vision to deliver an Energy from Waste (EfW) plant to be situated at its Maryvale Mill site, within the Latrobe Valley region of Victoria. To realise Australian Paper's vision of a sustainable and reliable energy source, the company has indicated the need for a high level economic impact analysis to be conducted to support the initial stages of funding.

In 2017, Australian Paper commissioned WRI to prepare an economic impact analysis for the pre-feasibility stage of the proposed EfW plant. Australian Paper has also engaged WRI in past projects to measure the organisation's economic impacts in 2012, 2013 and 2016. This report is for the feasibility stage of the EfW plant and is an update of the 2017 pre-feasibility study. The scope of the work undertaken in this study specifically covers the economic impacts on the Victorian State economy and the Latrobe Valley regional economy associated with the proposed EfW plant construction and future operation.

Energy from Waste plant

Over the past few years there has been an increasing interest in Energy from Waste (EfW) facilities across Australia. EfW plants have the potential to contribute to Australia's renewable energy targets, reduce carbon emissions and divert waste away from landfill. They also have the potential to improve the energy mix in Australia by supplementing wind and solar production through base load generation[1].

The proposed EfW plant at Maryvale will assist Australian Paper in its commitment to managing waste responsibly and ensure future sustainability and reliability in energy production. The EfW plant will promote low carbon network emissions, economic development and employment growth in the Latrobe Valley region of Victoria.

[1] PricewaterhouseCoopers Australia, Energy from Waste in Australia, April 2017. https://www.pwc.com.au/publications/pdf/energy-from-waste-april-2017.pdf. Accessed 4 October 2018.

Reporting

The economic impact of the proposed EfW construction and operation has been reported as the sum of:

- **Initial impacts**: defined as the value of the immediate changes in the respective region resulting from the proposed EfW operations
- **Flow-on impacts**: defined as the value of changes in the regional economy resulting from an additional round of spending after the initial impact occurred.

The economic impact of the proposed EfW plant on each of the study areas have been estimated in terms of:

- **Gross Regional Product (GRP)**: is the local equivalent of Gross Domestic Product (GDP) and is the amount the value of an article is increased at each step of its production exclusive of its initial cost. Also known as value added, the Australian Bureau of Statistics (ABS) defines GDP as *"the total market value of goods and services produced in Australia within a given period after deducting the cost of goods and services used up in the process of production, but before deducting allowances for the consumption of fixed capital".*[2] At the state level the relevant term is **Gross State Product (GSP).**
- **Household Income**: Household income consists of all current receipts, whether monetary or in kind, that are received by the household or by individual members of the household, and which are available for, or intended to support, current consumption.[3] Examples include employee wages and salaries, salary sacrificed income, non-cash benefits, bonuses and termination payments, government pensions and allowances, profit/loss from own unincorporated business, investment income, superannuation, workers' compensation, income from annuities, child support, etc.[4]
- **Full-time equivalent employment (FTE)**: a measure of the workload of an employed person in a location that makes workloads comparable across different types of employment (part-time and full time) by measuring hours worked and equating to how many full time positions the hours make up.

[2] ABS Release No. 1345.0, Key Economic Indicators, 2018.
[3] ABS Release No. 6523.0 - Household Income and Wealth, Australia, 2015-16.
[4] ibid.

CONSTRUCTION PHASE

Victorian impacts

When flow on effects are taken into account it is estimated that the proposed EfW plant to be constructed at Australian Paper's Maryvale site will contribute approximately $483 million in total to Victorian GSP and approximately $228 million in total to Victorian Household Income during the 3 year construction phase. This represents an average of 1,046 FTE jobs per annum in the Victorian economy over 3 years.

Table 1 illustrates the project impacts over the projected 3 years modelled that underpin the averages listed above.

Table 1: Economic Impact of proposed EfW plant construction on Victoria

EfW plant construction impacts Victoria	GSP ($m)	Household Income ($m)	Employment (FTE Jobs)
Construction Phase Year 1			
Victoria (including Flow-on)	$140.2	$66.7	895
Construction Phase Year 2			
Victoria (including Flow-on)	$190.7	$89.9	1,247
Construction Phase Year 3			
Victoria (including Flow-on)	$152.3	$71.8	996
Construction Phase Overall Year 1 to 3	$483.2 total	$228.4 total	1,046 average jobs per annum over 3 years

The main industry sectors likely to be impacted by the flow-on from the EfW plant construction in terms of FTE employment in the Victorian economy are:

- Construction
- Machinery and Equipment Manufacturing
- Professional, Scientific and Technical Services
- Retail Trade
- Chemical and Non-metallic Mineral Product Manufacturing
- Finance and Insurance Services

Latrobe Valley regional impacts

The construction impacts of the proposed EfW plant are estimated to contribute over $203 million to Latrobe Valley GRP and just under $89 million in household income in total to Latrobe Valley regional Household Income during the 3 year construction phase. This represents an average of 454 FTE jobs per annum in the Latrobe Valley regional economy over 3 years.

Table 2 illustrates the project impacts over the projected 3 years modelled that underpin the averages listed above.

Table 2: Economic impact of proposed EfW plant construction on the Latrobe Valley Region

EfW plant construction impacts Latrobe Valley	GRP ($m)	Household Income ($m)	Employment (FTE Jobs)
Construction Phase Year 1			
Latrobe Valley (including Flow-on)	$54.6	$23.4	360
Construction Phase Year 2			
Latrobe Valley (including Flow-on)	$83.5	$36.6	561
Construction Phase Year 3			
Latrobe Valley (including Flow-on)	$65.4	$28.8	442
Construction Phase Overall Year 1 to 3	$203.5 total	$88.8 total	454 average jobs per annum over 3 years

The main industry sectors likely to be impacted by the flow-on from the EfW plant construction, in terms of FTE employment in the Latrobe Valley region economy, are:

- Construction
- Retail Trade
- Machinery and Equipment Manufacturing
- Chemical and Non-metallic Mineral Product Manufacturing
- Electricity Generation
- Professional, Scientific and Technical Services
- Metal and Metal Product Manufacturing

OPERATIONAL PHASE

Victorian impacts

The operational impacts based on the cost data provided of the proposed EfW plant are estimated to contribute annual impacts of just under $199 million in Victorian GSP, approximately $76 million in household income and 911 FTE jobs when flow-on effects are considered.

Table 3: Economic impact of proposed EfW plant operations on Victoria

EfW plant operational impacts Victoria	GSP $m	Household Income $m	Employment FTE Jobs
Victoria (including Flow-on)	$198.7	$76.1	911

The main industry sectors likely to be impacted by the flow-on from the EfW plant operations, in terms of FTE employment in the Victorian economy, are:

- Waste Collection, Treatment and Disposal Services
- Professional, Scientific and Technical Services
- Repair and Maintenance Services
- Retail Trade
- Transport, Postal and Warehousing

Latrobe Valley regional impacts

The operational impacts based on the cost data of the proposed EfW plant are estimated to contribute annual impacts close to $96 million in Latrobe Valley GRP, $20 million in household income and 265 FTE jobs when flow-on effects are considered.

Table 4: Economic impact of proposed EfW plant operations on the Latrobe Valley Region

EfW plant operational impacts Latrobe Valley	GRP ($m)	Household Income ($m)	Employment (FTE Jobs)
Latrobe Valley (including Flow-on)	$95.8	$20.2	265

The main industry sectors likely to be impacted by the flow-on from the EfW plant operations, in terms of FTE employment in the Latrobe Valley regional economy, are:

- Repair and Maintenance Services
- Waste Collection, Treatment and Disposal Services
- Transport, Postal and Warehousing

- Machinery and Equipment Manufacturing
- Retail Trade

CONCLUSION

The combined EfW plant operations and construction are estimated to make significant contributions to both the Victorian and Latrobe Valley economies and help Australian Paper improve its social and economic contribution to its employees and the communities in which it operates.

In Victoria, the contribution is estimated to be:

- **Gross State Product** – an estimated $483.2 million in total from construction impacts and $198.7 million per annum added from operational impacts.
- **Household income** – an estimated $228.4 million in total from construction impacts and $76.1 million in per annum from operational impacts in household income
- **Employment** – an average of 1,046 full-time equivalent jobs per annum for each of the 3 years of construction and 911 full time equivalent jobs thereafter.

In the Latrobe Valley region, the combined contribution is estimated to be:

- **Gross Regional Product** – an estimated $203.5 million in total from construction impacts and $95.8 million per annum added from operational impacts.
- **Household income** – an estimated $88.8 million in total from construction impacts and $20.2 million in per annum from operational impacts in household income
- **Employment** – an average of 454 full-time equivalent jobs per annum for each of the 3 years of construction and 265 full time equivalent jobs thereafter.

The proposed EfW plant has the potential to provide other social, economic and environmental benefits alongside those discussed in this report, including wider benefits to the Australian economy.

It is recommended that a full business case be developed to gain greater insight into the full impact of the EfW plant.

METHODOLOGY

The economic impacts were assessed at state and Latrobe Valley regional levels. Modelling was undertaken through input-output analysis, which provides a detailed picture of the structure of an economy at a point in time and can be used to estimate the contribution or impact of a sector of the economy or an individual organisation including flow-on or multiplier effects. The impacts are measured in terms of GSP, GRP, household income and full-time equivalent jobs. All impacts are expressed in either dollar terms or full-time equivalent (FTE) employment terms and as a percentage of the national, state or regional economy.

Constructing the tables

The input-output table for this project was extracted from the Australian Bureau of Statistics (ABS) 2015-16 national input-output table (released 15/6/2018) using the Generation of Regional Input-Output Tables (GRIT) technique. The national table was adjusted to represent Victoria using detailed ABS data from the State Accounts (ABS cat no. 5220.0) and Labour Force, Australia, Detailed Quarterly (ABS cat. no. 6291.0.55.003) publications. Subsequently a regional table was built for the Latrobe Valley region (aggregation of Statistical Area level 3 (SA3 regions as defined in the Geographical scope section below) using total employment data, ratio of full-time and part-time employment and income levels sourced from the 2016 ABS Census and growth rates calculated from the ABS Labour Force Release No. 6291.0.55.003, Employed Persons by Region, Gender and Industry, using the most appropriate Labour Force Region data (ABS Cat.).

The GRIT technique derives regional input-output tables from the national input-output table using location quotients and superior data, such as primary source data (in this case, information regarding the proposed construction and operation of the EfW plant as well as regional employment and income data) at various stages in the construction of the tables. Appendix 1 provides a detailed description of the input-output methodology utilised in this analysis.

It should be noted that in the construction of economic tables for modelling, the Australian Bureau of Statistics applies a confidentiality technique to its Census data tables. The technique involves small random adjustments to the data which help prevent the disclosure of any identifiable data. Whilst unavoidable, these random adjustments can be expected to have a small impact on modelled outcomes.

Geographical scope

The economic impacts from the proposed EfW operations and construction were assessed at the Victorian state level and at the Latrobe Valley regional level, where the EfW plant is to be located. For this report the Latrobe Valley region is the aggregation of SA3 regions from the Australian Statistical Geographical Standard. Table 5 outlines the regions included in this report that make up the Latrobe Valley region.

Table 5: Broader Region Definitions

Broader regions	Statistical Area Level	State within which the Latrobe Valley region is located
Latrobe Valley	Baw Baw (SA3) Latrobe Valley (SA3) Wellington (SA3)	Victoria

Data collection

To estimate the economic contribution of the EfW construction and operations, WRI was supplied with high level information about Australian Paper's proposed expenditure, location of expenditure, employment, and revenues. This information was used to construct a new sector in the input-output table representing the operations of the EfW.

Revenue

Revenue data was supplied by Australian Paper and was allocated to the region from which it is likely to be paid within the relevant state or statistical area or from outside the local area. Any income made within the area of interest is considered local and revenue received outside of the local area is deemed to be an export to the region.

Wages and Salaries

Estimated human resource information including number of FTE and associated wages and salaries was supplied by Australian Paper.

Other Expenditure

Australian Paper supplied high level information regarding other estimated expenditure by type and location where the purchase is likely to be made. Any expenditure made within the region being modelled is considered local and anything made outside of this area is deemed to be an import to the region.

Capital Expenditure

Australian Paper has supplied information regarding construction costs for the proposed EfW plant by type of expenditure and the location where the purchase is likely to be made. This one-off capital expenditure was treated as a final demand impact in the relevant tables.

Impact Analysis

Final Demand Impacts

The final demand impact analysis calculates the impacts (measured by GRP, GSP, household income and employment) across all sectors in response to changes in industry final demands. Construction related expenditure was allocated to the relevant sectors to give the estimated impacts of this expenditure including both initial and flow-on effects.

Industry Shutdown Impacts

The impacts from operational expenditure were measured by creating a new sector in the relevant Input-Output tables reflecting the operations of the EfW plant. The economic impacts are measured by shutting down the sector by comparing the economy with and without the industry in question in terms of both direct and flow-on impacts.

APPENDIX 1: INPUT-OUTPUT ANALYSIS

Input-output tables are part of the Australian national accounts. An input-output model provides a detailed picture of the structure of an economy at a particular point in time. It includes all the transactions that occur during a specific period, usually one year.

The rows of an input-output table show the disposal of the output of an industry to itself and to other industries as well as final demand categories (e.g. exports and household consumption).

The columns show the origin of inputs into production, whether they are intermediate inputs (i.e. intra- and inter-industry purchases) or primary inputs (e.g. labour and capital).

The main use of input-output tables is economic impact analysis where the tables are used to estimate the benefits generated by new initiatives on each sector of an economy. For example, if there is a change in the purchasing or sales pattern of any industry, the flow on, or multiplier effects on upstream industries can be calculated. An input-output table is also very useful for estimating the direct and indirect contribution of final demand as with the proposed construction expenditure associated with the EfW plant operations.

One of the main attractions of input-output models is their relative ease of use and the level of detail obtained concerning the structure of the economy. The Australian Bureau of Statistics (ABS) notes the usefulness of input-output tables:

> *"Input-output tables provide detailed information about the supply and disposition of commodities in the Australian economy and about the structure of, and inter-relationships between, Australian industries. Detailed data on supply and use of commodities, inter-industry flows and a range of derived data, such as input-output multipliers, are provided for economic planning and analysis, and construction of models for forecasting purposes." (ABS Introduction to Input-Output Multipliers, Cat. 5246.0)*

The application of input-output analysis to estimate the economic impact of the proposed EfW plant operations and construction on Victoria and the Latrobe Valley region involves five basic steps:

- Construction of appropriate state and regional input-output tables
- Analysis of the value of expenditure by type and origin (local, imported and total)
- As it will be a new plant, data has been added to expand the economies reflected in the regional and state economies
- Assessment of final demand impacts (construction) and shut down impacts (operations)
- Using marginal coefficients to overcome the problem of over-estimation associated with linear coefficients.

The input-output table for this project was extracted from the Australian Bureau of Statistics (ABS) 2015-16 national input-output table using GRIT technique.

The national table was adjusted to represent Victoria using detailed ABS data from the State Accounts (ABS cat no. 5220.0) and Labour Force, Australia, Detailed Quarterly (ABS cat. no. 6291.0.55.003) publications. Subsequently a regional table was built for the Latrobe Valley region) using total employment data, ratio of FTE and income levels sourced from the 2016 ABS Census and the proportional FTE and growth rates calculated from the ABS Labour Force Catalogue, Employed Persons by Region, Gender and Industry, using the most appropriate Labour Force Region data (ABS Cat. No. 6291.0.55.003).

The GRIT technique derives regional input-output tables from the national input-output table using location quotients and superior data, such as primary survey data, at various stages in the construction of the tables. The GRIT procedure was developed by Associate Professor Guy West and Professor Rod Jensen of the University of Queensland and is a widely used method of constructing regional input-output tables in Australia.

GRIT uses a series of non-survey steps to produce a prototype regional table from the national table but provides the opportunity at various stages for the insertion of superior data, in this case data on proposed expenditure obtained from Australian Paper for the EfW plant. The system is variable interference in that the analyst can determine the extent to which they interfere with the mechanical processes by introducing primary or other superior data.

The GRIT system is designed to produce regional tables that are:

- Consistent in accounting terms with each other and with the national table
- Capable of calculations to a reasonable degree of holistic accuracy
- Capable of being updated with a minimum effort as new data becomes available.

The final input-output tables were balanced using the RAS technique. The RAS technique is a bi-proportional iterative adjustment method designed to modify a base input-output matrix to fit new row and column totals. The rows and columns are simply adjusted proportionally to the new row and column totals in turn and the cycle repeated until the actual row and column totals converge to the specified values. After the tables are balanced they are checked to ensure that the final tables are consistent and to identify any large discrepancies.

Marginal Coefficients Model

One of the main limitations of input-output tables is the assumption of linear coefficients. To address this problem and the associated problem of overestimation, the input-output analysis undertaken for the proposed EfW plant operations and construction incorporates the marginal coefficients model which attempts to overcome the limitations of traditional input-output analysis by removing the assumption of linear coefficients for the household sector.

The household sector is the dominant component of multiplier effects in an input-output table so using marginal, rather than average income coefficients for the household sector only, provides a more accurate estimate of the multiplier effects and provides results closer to those of a computable general equilibrium (CGE) model. This provides more accurate estimates of the significance of impacts associated with the proposed EfW plant operations and construction than would be possible with traditional input-output analysis.

The impacts are measured in terms of GRP, household income and FTE. All impacts are measured in either dollar terms or FTE terms and as a percentage of the regional economy.

Final Demand

The impact of one-off capital expenditure was estimated as a final demand impact. Specifically, expenditure was allocated to the relevant sectors to give the estimated impacts of this expenditure including both initial and flow-on effects.

Industry Shutdown

The impact of operational expenditure was estimated as a shutdown impact measuring the difference in economic activity with and without the EfW plant. This measures the flow of direct expenditure by the EfW plant across the supply chain including the resultant flow-on impacts from industrial support and consumption-induced expenditure.

WESTERN RESEARCH INSTITUTE

WRI is a regional development research organisation located in Bathurst, New South Wales. WRI holds a wealth of knowledge on employment, business development and investment issues affecting regional Australia. Over the past 19 years WRI has worked with Commonwealth, State and Local Governments and industry groups on numerous investment and development programs in regional areas.

Ms Kathy Woolley – Chief Executive Officer

GAICD, MIIA, Change Management Qualification (AGSM), Public Participation Certification (IAP2) BComm (Economics-with merit) (UWO), CertIV Training and Assessment.

Kathy joined the WRI team in February 2018 having previously worked on a variety of boards and in senior management roles across sectors including media, health, education, regional development, government, event management, research and sales.

For a number of years Kathy also ran a consultancy specialising in services for not for profit entities, focusing on best practice techniques in management and governance.

With formal qualifications in change management, company directorship, community engagement, economics and training, and well developed skills in human resources, information technology, finance and economic development, Kathy offers a unique skill set to assist with most business needs.

This is the second time Kathy has worked for WRI, previously fulfilling the role of Business Development Manager. A position as a research officer for a similar organisation in the Illawarra rounds off the experience in economic modelling and research.

Mr Alistair Maclennan – Senior Research Consultant
BA Political Economy, First Class Honours (UNE)

Having served in a variety of parliamentary, public service and private sector roles, Alistair brings research experience to WRI. Alistair has well developed skills in data analysis, economics and business and has a wide understanding of government. He also has experience in policy development in the energy sector where he engaged with industry, government agencies and Non Government Organisations to inform policy.

Alistair's experience in engaging with clients, stakeholders and the public assists WRI to fully understand its clients' needs and provide tailored research.

Mr Chris Mullen – Research Officer
BEcon UNE

Chris is an Economics graduate from the University of New England currently undertaking a Master of Economics course.
Chris has a great interest and passion for macro and microeconomics, policy analysis, and development economics. Throughout his degree, Chris has gained skills in benefit-cost analysis, business statistics and economic modelling.
Having grown up on a property on the mid-north coast, Chris has a strong understanding of life in regional Australia and the issues rural communities face.

Ms Dale Curran – Executive Officer BA ANU
Dale is responsible for all administrative processes at WRI including executive support, finance, management of the Board of Directors, maintenance of policies and also assists with project work.
She has worked in a variety of roles at WRI, including Fieldwork Supervisor and Research Assistant, and has worked on several community and business surveys.
Dale brings a high level of organisational skill to her role as Executive Officer.

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