



Mount Alexander Bioenergy

Community Briefings
29 July 2021

For further information contact MAB on www.bioenergy.net.au

Presenters

Michael Lewin – MA Bioenergy Chair, MASG;
Manufacturing Consultant (retired), Energy Rater

Deane Belfield – MA Bioenergy Project Mgr,
ECO2Sys CEO, and MASG Committee Member

Bill Grant – MA Bioenergy Board Member,
Environmental Waste Consultant

Gerry Egan – chat monitor





AGENDA

- Overview
- Project History
- Pre-construction Phase
- Planning Process
- Facility Technology
- Community Benefits
- Site Selection
- Ownership and Operation
- Traffic
- Noise
- Odour and Emissions
- Current Activity
- Community Engagement
- Questions and Resources



About Mount Alexander Sustainability Group

- Voluntary organisation with a committee of management and 3 part time paid staff
- Established in 2005, with an objective to see the shire greenhouse neutral or better by 2025, and was a key driver of Castlemaine 500, wash against waste, roof top/community solar, energy efficiency audits, community garden, Castlemaine garden guide, battery and e-waste recycling, soft plastic recycling, repair cafe, community compost, regenerative agriculture, Z-net, etc.
- Current Goal – Zero Net Emissions for Shire by 2030
- In 2006-2007 undertook Maine's Power project looking at how local industry could reduce energy intensity and reduce emissions by 30%. This CSIRO supported project focused on the Baco, The Carpet mill, the foundry and hospital.
- MASG undertook a Renewable Resource Mapping project for the shire in 2014/15. From this it became evident that there was potential for renewables from Bioenergy

Overview



- Planned bioenergy from waste plant represents first community-led integrated bioenergy initiative of its kind in Victoria
- Embracing a ***circular economy*** zero waste approach, the project led by Mount Alexander Sustainability Group (MASG) will help the shire reach its Zero Net Emissions (ZNET) target by 2030
- An exemplar of how a communities can respond to Vic Government's circular economy goals (waste, recycling and renewable energy)

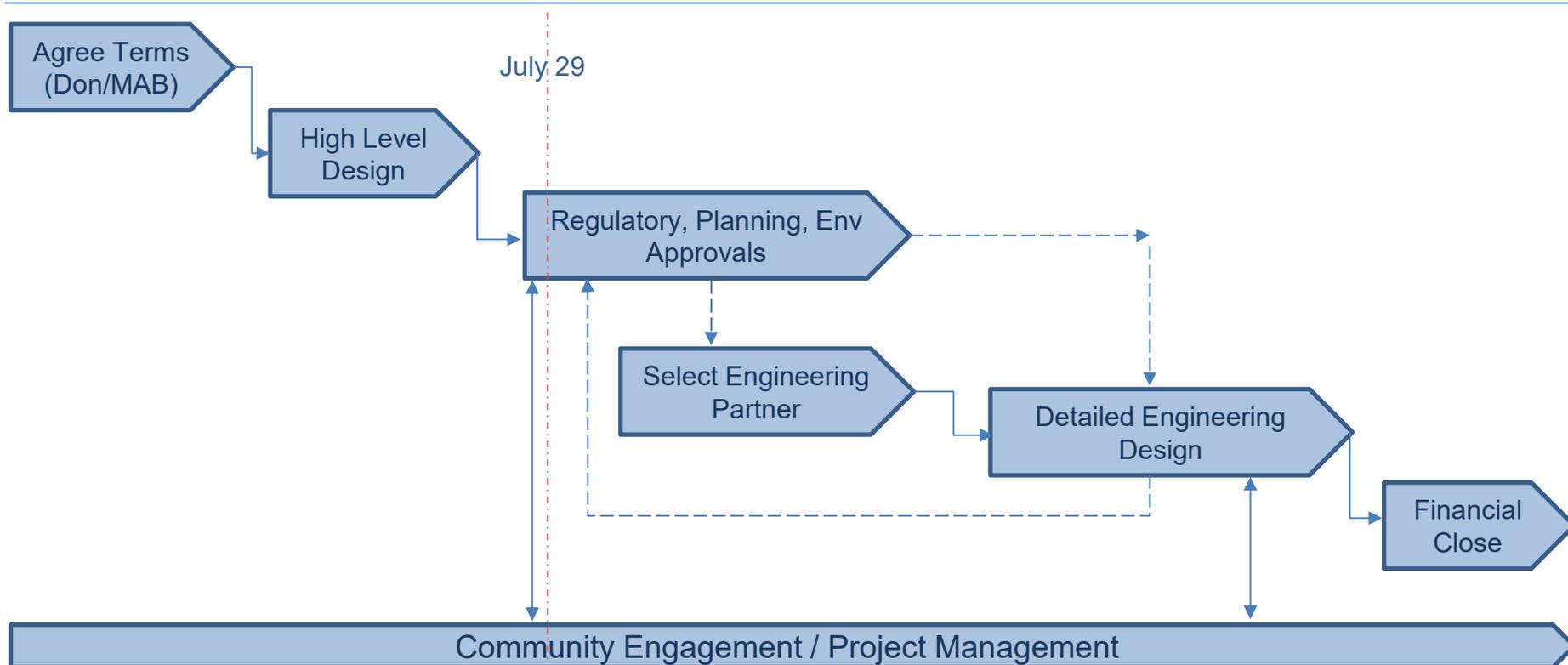
Project History



- MASG first explored the practicality of a Bioenergy from Waste facility in the shire in 2015 and subsequently embarked on a Pre-feasibility Study, funded with Philanthropic support.
- With the support of the Shire Council, Coliban Water, DON Smallgoods, and funding from State and Federal government along with the McKinnon Family Foundation, a Feasibility Study was conducted in 2018 and Business Case presented
- The concept of the project was shared with Council, presented at a town hall community event and discussed in the media
- 8 potential sites identified, outstanding among those was that adjacent to DON Smallgoods because of cost benefit to supply “behind the meter” energy



Pre-construction Phase 2021





Planning Process

1. Pre-application community consultation and planning
2. Applications to Mount Alexander Shire Council (planning approval) and EPA (works approval and licensing). These will go to referral authorities (CFA, DELP, Coliban Water, VicRoads, EnergySafe Victoria, etc.), AQIS
3. Public formal consultation processes as part of council and EPA processes.
4. Conditions placed on development and operation of the site – including what can be received, hours of receipt, emissions and continual improvement.
5. Construction and commissioning – must show compliance with EPA approval conditions
6. Site will be EPA licensed – with on-going monitoring and reporting.



We are here

Facility Technology



The planned facility comprises two clean energy technologies – **anaerobic digestion** (AD) and **biomass** (thermal) from clean organic waste streams:

AD technology [~1 MW] - provides biogas (mostly methane) to produce heat and some electricity

Biomass thermal technology [3 to 4 MWt] – pyrolysis and gasification to provide fuel (syngas), heat (water, steam) and biochar as bio-fertiliser



Anaerobic Digester



Converts liquefied wasted organics (Don's waste, other food, beverage, greasetrap, wet garden organics) into biogas (methane) which will be used by Don Smallgoods as a substitute or natural gas.

- 20% of the feedstock will be sourced from Don Smallgoods
- Other materials will be transported in accordance with EPA prescribed waste transport regulations, meaning they will be in sealed and odour-containing vehicles.
- Fully contained/airtight management of liquid inputs.
- Negative pressure receival hall with capture and treatment of all air from the hall.
- Organics are being sourced externally to reduce organics to landfill and generate more renewable energy
- Greenhouse gas emissions from the transport are minor compared to the benefits – e.g. a load of food diverted from Patho landfill would reduce emissions equivalent to a round trip of that load to Broome via Perth.
- The facility will upgrade Don Smallgoods wastewater and organic waste systems, reducing odour from existing management facilities.
- The nutrient-rich sludge (digestate) from the AD tanks can be converted into fertiliser by blending with biochar or being dried and used in the pyrolysis plant.



Biomass Plant

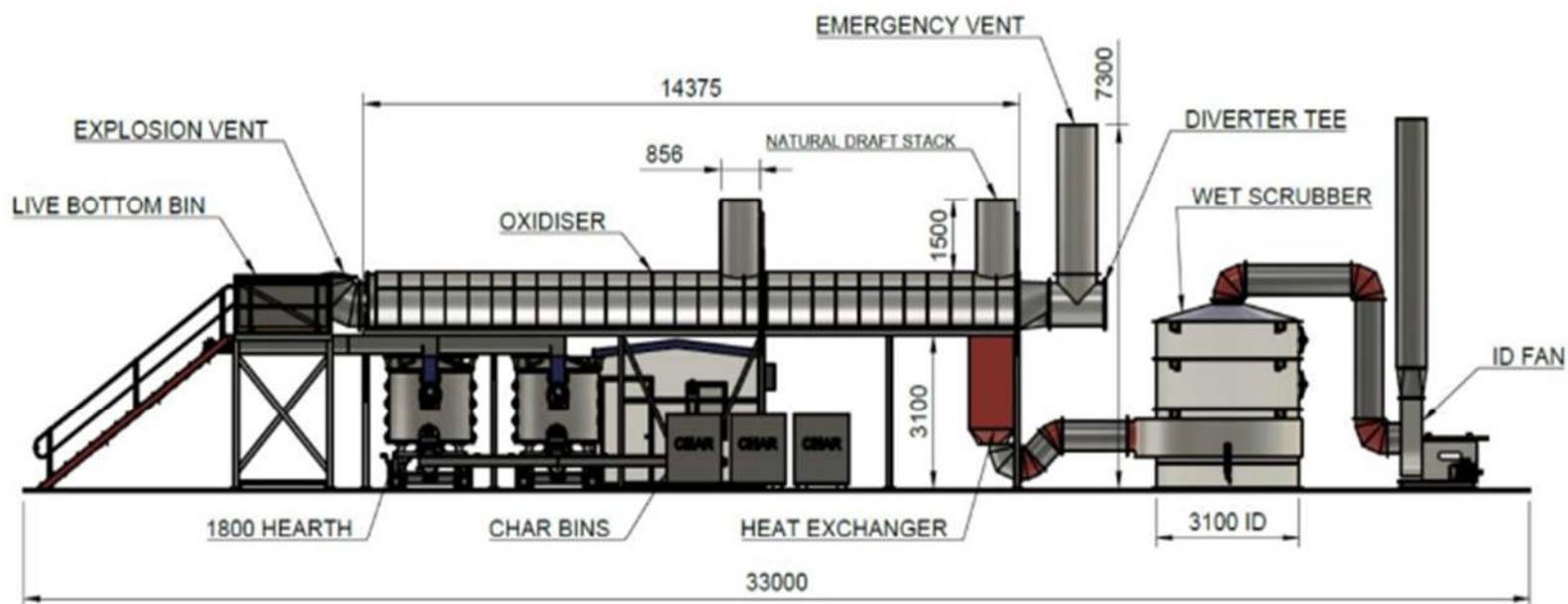


Uses a gasification/pyrolysis process that heats organics in a low/no oxygen chamber to produce biochar and a synthetic gas (syngas) consisting on CH₄ (methane) and H₂ (hydrogen).

- Gas will be scrubbed/cleaned and then used as gas substitute by Don Smallgoods natural gas use.
- No waste materials are **burnt**
- Feedstock streams - clean untreated wasted timber and woody waste, some unrecyclable cardboard from Don Smallgoods, 'oversize' material from composting facilities, some incidental unrecyclable (non toxic) plastic wrap from Don Smallgoods.
- 20% - 30% will be provided by Don Smallgoods.
- Digestate from the Anaerobic Digester can be processed as a feedstock.
- No mixed waste, no 'toxic waste' and no other plastics will be used.
- The final mix of feedstock that can be received will depend on the technology selected and EPA requirements.
- Biochar can be supplied to the agricultural / garden supplies market. Biochar can also be 'activated' with nutrients from AD digestate to make a valuable fertiliser.
- When biochar is ploughed into topsoil it can help retain moisture and sequester carbon. It can also be added to feedstock to reduce cattle's methane emissions.
- Stack height will be a maximum of 10m but probably considerably less.

Pyrolysis- Gasifier Heat Plant (steam, biogas)

Technology selection pending final detailed design



Stack height is proportional to quality of input material (from 5-10m) for clean to dirty waste (organic to MSW)

Community Benefits

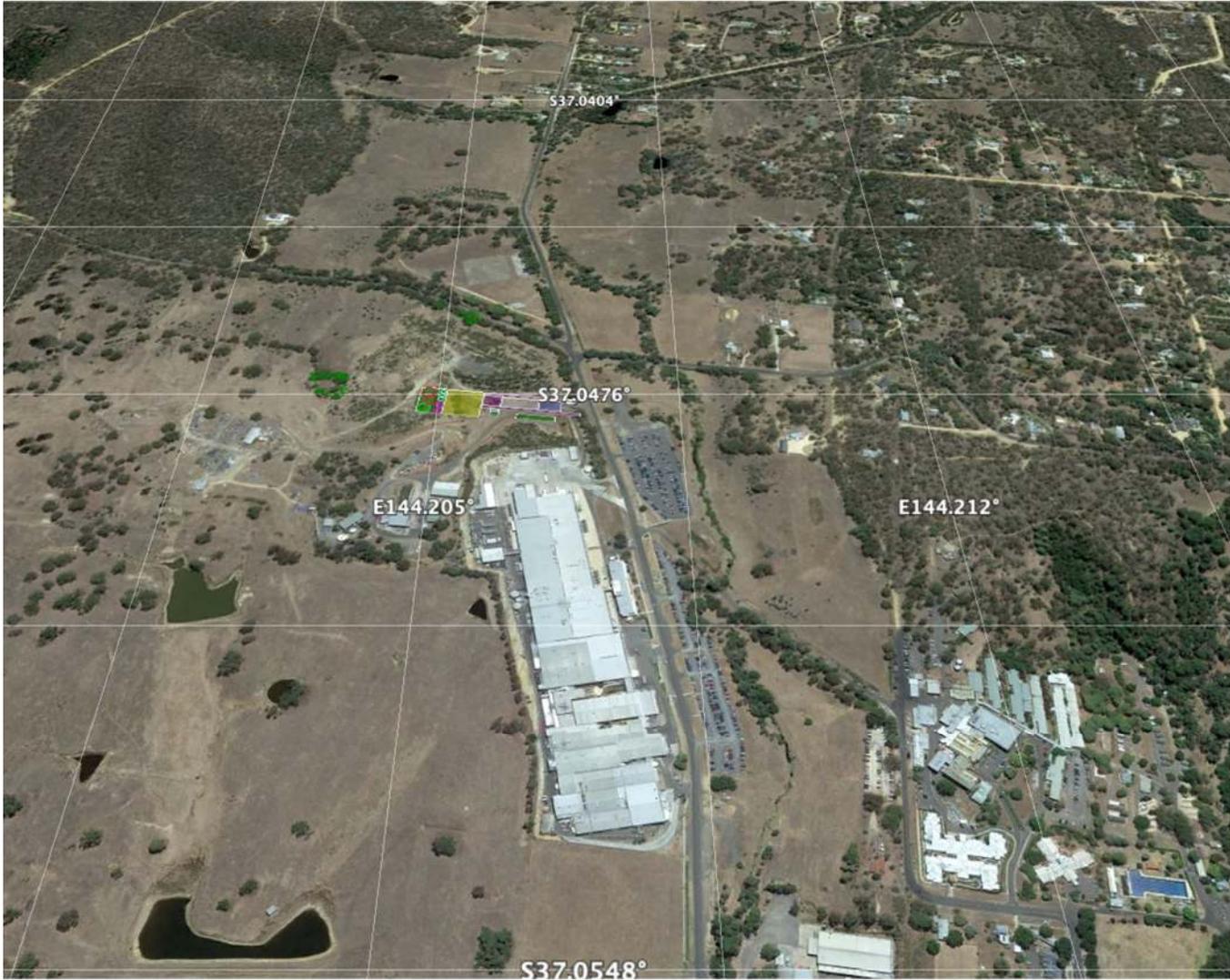


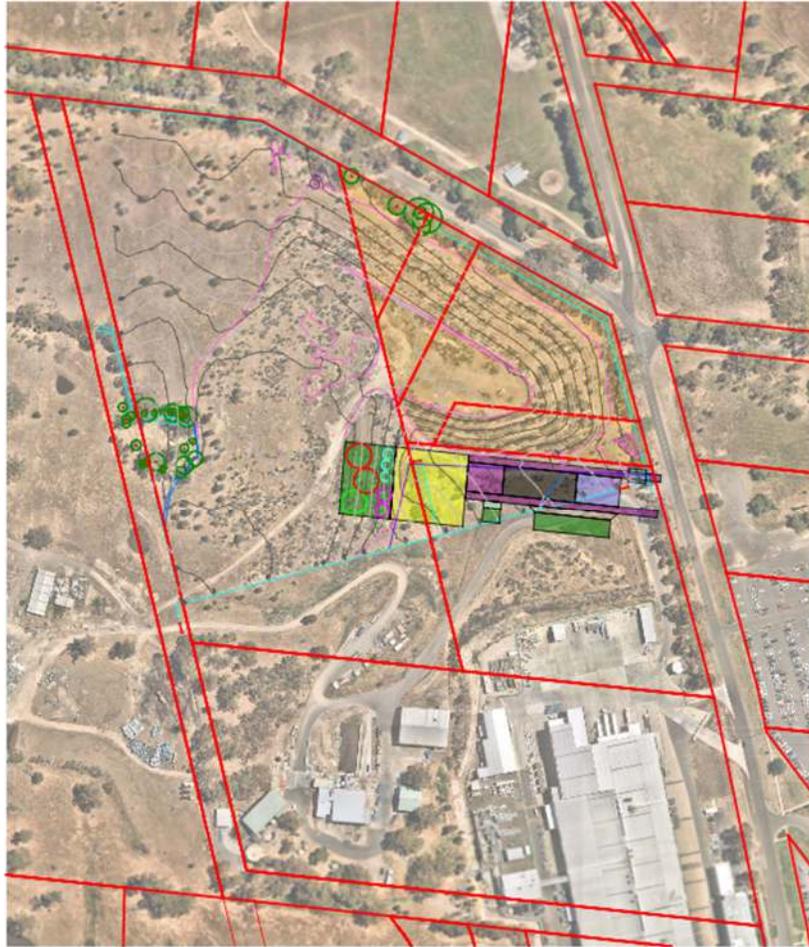
1. Expected to drive an emissions reduction of 88,500 tonne CO₂e per annum to ZNET
2. Divert ~36,000 tonnes (20% from Don KRC) of organic waste from landfill annually
3. All of Don Smallgoods Organic – non toxic Waste
4. 270,000 GJ of Renewable Energy produced
5. Expected reduction in noise and odour
6. Provide secure local employment opportunities in the shire
7. Anticipated future savings on waste costs for local rate payers, by avoiding landfill
8. Agricultural community to benefit through bio-fertiliser products
9. Contribution from profits to help fund future community projects
 - Community Bank type support of community projects
 - MASG Projects supported

Site Selection



- The external consultants who did Feasibility Study listed 8 sites (see Appendix)
- This was narrowed to 4 that were potentially available
- The leader of these were the Coliban Water / council landfill industrial zone, and Don Smallgoods as they shared some waste and both were the sources of other wastes.
- Industrial Zoned land (I1Z) required
- Don Smallgoods stood out if they could be convinced to participate:
 - They could use all of the energy generated
 - They could take the energy in raw form (gas or heat) and not require it to be converted to electricity
 - They were a source of a significant amount of organic waste





Plant Location
Scale 1:3,500





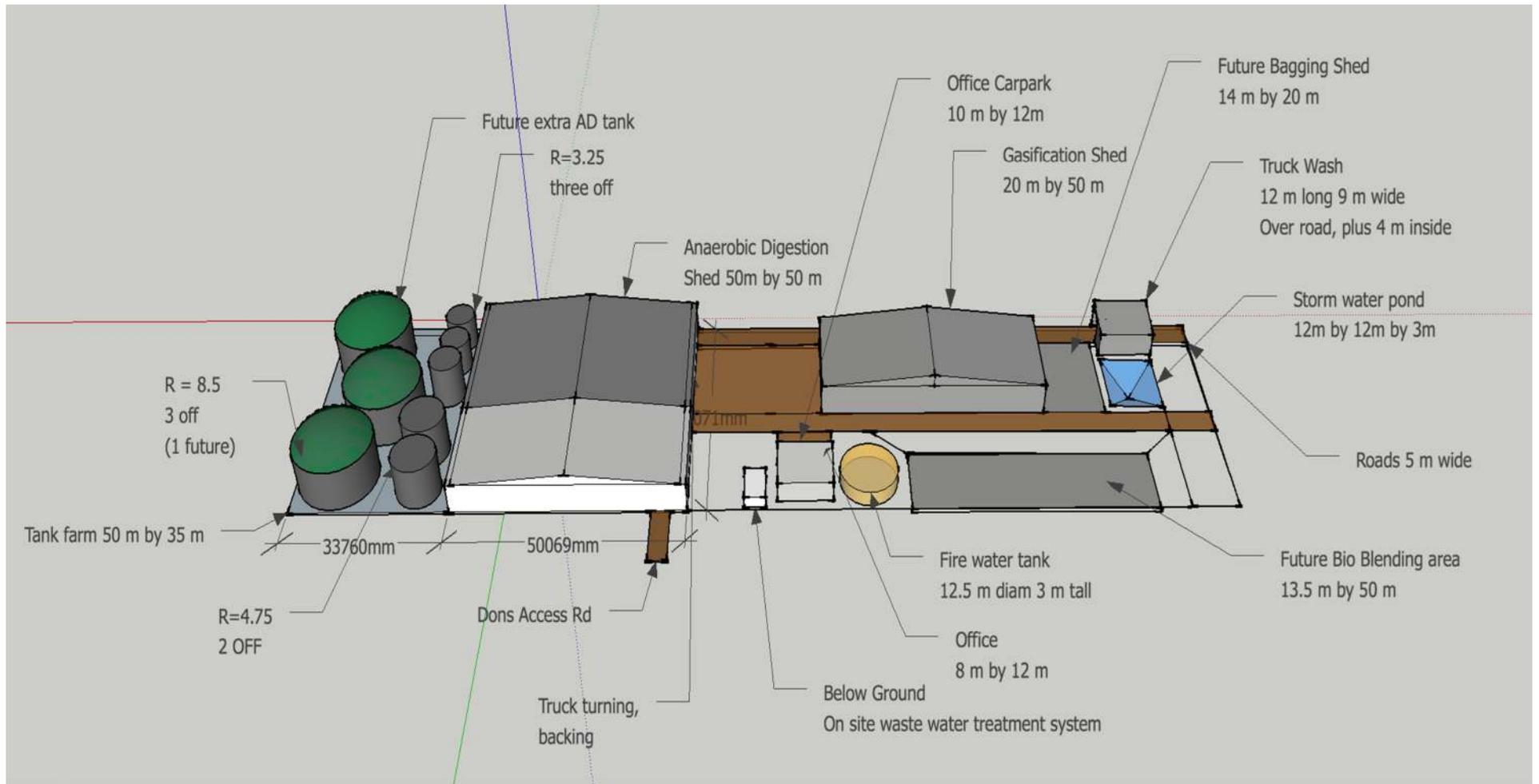
Bioenergy Site

Legend



Google Earth





(indicative only; technology selection has not been undertaken)



Ownership and Operation

- MAB is currently 100% owned by MASG
- As investors come on, this will diminish and be a minor holding.
- MASG will seek a guaranteed seat on the MAB board, with a social dividend to support future projects. Any revenue to MASG will support future activities
- MAB will be responsible for operation but may take on contractor
- MAB and EPA will set conditions on any contract with regard to traffic movements, feedstock types and quality allowed, noise and emissions

Traffic



- Operating Staff, expected to be 3 to 5 on site, will be essentially working a day shift only, between 8am and 6pm. This is insignificant compared to the shift change volumes at Don Smallgoods
- The expected net additional truck movements of 3 to 5 per day by contracted parties
(This is a net 2 to 3 as there will be a reduction in Don Smallgoods)
- Contracted companies, most probably from companies such as Cleanaway, Veolia, Suez, JJ Richards., etc. will be have enforced conditions that they approach and leave from the South.
- Trucks will be large sealed bulk transports and not garbage trucks as associated with kerbside pick up.
- During construction we would expect some 30 odd deliveries over a 6 month period. We can stipulate that these come from the south
- Numbers of construction workers would vary between 5 and 15 over the 6 months and equally can be requested to approach from the south.

Noise



- Anaerobic Digestion is near silent
- Biomass Pyrolysis and Gasification
 - Day operation Monday to Friday (8am to 6pm)
 - Within the Vic EPA threshold guidelines for a bioenergy facility.

EPA Noise limits – Day = 48 dBA, Evening = 42 dBA, Night = 41 dBA

- Reduction anticipated on Don Smallgoods noise levels
- Baffles and acoustic insulation will be fitted to work facilities and equipment
- Testing will be done to verify this before commissioning

Odour and Emissions

- Odour must be contained within the facility boundaries under the EPA regulations
- Precinct emissions will decrease as will odour.
- Wet organics, such as food waste, will be held in enclosed, negative pressure, storage facilities and cannot be held for more than 24-48 hours. Higher odour risk streams will need to be processed almost immediately
- The pyrolysis- gasification process will have little if any noticeable emissions as this is determined by the feedstock. In MABs case timber, saw dust, crop stubble, etc. Water vapour and non-fossil CO₂ will be the main emissions.
- Storage of these materials does not produce odour and may be held outside
- There maybe a limited supply of soiled imported cardboard and plastic wrap that currently goes from Don Smallgoods for deep burial landfill. This plastic will only be accepted if it can be established it will produce no toxic emissions. It is believed to be polyethylene and thus would break down to carbon dioxide and water vapour only. No other cardboard or plastic will be accepted.



Current Activity



- Pre-construction phase is currently underway including regulatory approvals
- Submit a Planning application during late 2021, includes:
 - Community Engagement
 - Traffic Management
 - Fire Management
 - Odour, Noise and Emissions thresholds – as per EPA guidelines
- Submit an EPA application during late 2021
- Seek AQIS approval for handling of prescribed waste
- Community Engagement is on-going

Community Engagement Timeline



- 2015 - Presented concept at Town Hall MASG event (following Resource mapping project)
- 2016 - Pre-feasibility Study presented to stakeholders
- 2017 - Earlier press releases before site nominated, notably in Midland Express and 9 News
- 2017 - Community Engagement Plan developed
- 2018 - Feasibility Study and Business Case
- 2017-21 Stage 1 – Before Site Chosen
- 2021-22 Stage 1 – When Site Chosen
- 2021-22 Stage 2 – Broad and Continuing Communication



Community Engagement



STAGE 1 - BEFORE SITE CHOSEN

- Presented concept at Town Hall MASG event in 2015 (following Resource mapping project)
- Pre-feasibility Study presented to stakeholders in 2016
- Community Engagement Plan developed in 2017
- Earlier press releases before preferred site nominated, notably in Midland Express and 9 News in 2017
- Biogas Feasibility Study and Business Case presented in 2018
- While negotiating with Don Smallgoods, had to maintain confidentiality until site agreed

Community Engagement



STAGE 1 – WHEN SITE CHOSEN

- Created and released a MAB Website
- Created MAB Facebook page
- June 3 - Presented concept to Neighbours June 3
- June 4 - Presented to Stakeholders, - Government, business and community organisation
- June 4 – Issued Media Release
- June 4 – Presented to invited Media
- Developed Q&A response document and distributed

Community Engagement

Stage 2 of Community Engagement



	Activity	Community	Timeframe	Engagement
Bioenergy from Waste Facility Project Development and Approvals	Community meetings (public meetings, information sessions, workshops)	<ul style="list-style-type: none"> Local residences and community members Local businesses and industry operators General public 	<ul style="list-style-type: none"> From commencement of project development process in 2018. 	<ul style="list-style-type: none"> Neighbourhood informal meetings Facilitated meetings Site Visits
	Community Survey	<ul style="list-style-type: none"> Local residences and community members Local businesses and industry operators 	<ul style="list-style-type: none"> From commencement of project development process in 2018. 	<ul style="list-style-type: none"> Online and/or offline survey
	Statutory Notice of Development Application	<ul style="list-style-type: none"> Local residences and community members Local businesses and industry operators General public 	<ul style="list-style-type: none"> With lodgment and assessment of development application 	<ul style="list-style-type: none"> Newspaper advertisement (via EPA)

Community Engagement



STAGE 2 – ON GOING

- Followup Meeting with neighbours July 1
- Q&A document and Fact Sheets available through www.bioenergy.net.au
- Broader Community engagement will be embraced with a Town Hall meeting August 12
- Town Hall Meeting August 27 (tba) with broad panel
- Shared information through MAB web site (www.bioenergy.net.au)
- Local businesses are also being engaged for collaboration opportunities
- Engagement will be ongoing, throughout the project's phases

Questions & Resources



The screenshot shows the website header with the logo and navigation menu. The main content area has a large "RESOURCES" title over a background image of trees. Below this, a paragraph explains the purpose of the resources. Two resource cards are visible: "Neighbourhood Meeting presentation" with a "DOWNLOAD" button, and "Community Q+A (revision 3 v2)" with a "DOWNLOAD" button and an "UPDATED 15/7/21" date. A blue arrow points to the second "DOWNLOAD" button. The footer contains contact information and a "CONTACT US" form.

MT ALEXANDER BIOENERGY HOME ABOUT BIDENERGY MAB STORY RESOURCES FAQs CONTACT US

RESOURCES

Here you will find resources to keep you best informed of the Bioenergy project's history and up-to-date on the current status. We will continue to add documents and other resources on a regular basis so please be sure to visit regularly. If you have any feedback or questions please don't hesitate to contact us.

Neighbourhood Meeting presentation
1/7/2021 [DOWNLOAD](#)

Community Q+A (revision 3 v2)
UPDATED 15/7/21 [DOWNLOAD](#)

MT ALEXANDER BIOENERGY CONTACT US
email: info@masg.org.au Your name here
0492 913 967

Questions from the floor

Q&A register and EPA *Energy from Waste* Guidelines can be downloaded from the website <https://www.bioenergy.net.au/resources/>



Appendix

For further information contact MAB on www.bioenergy.net.au



2. Pyrolysis – Gasifier (indicative figures only; technology selection has not been undertaken)

The Gasification systems are a staged oxidation process designed to provide optimal energy and environmental performance.

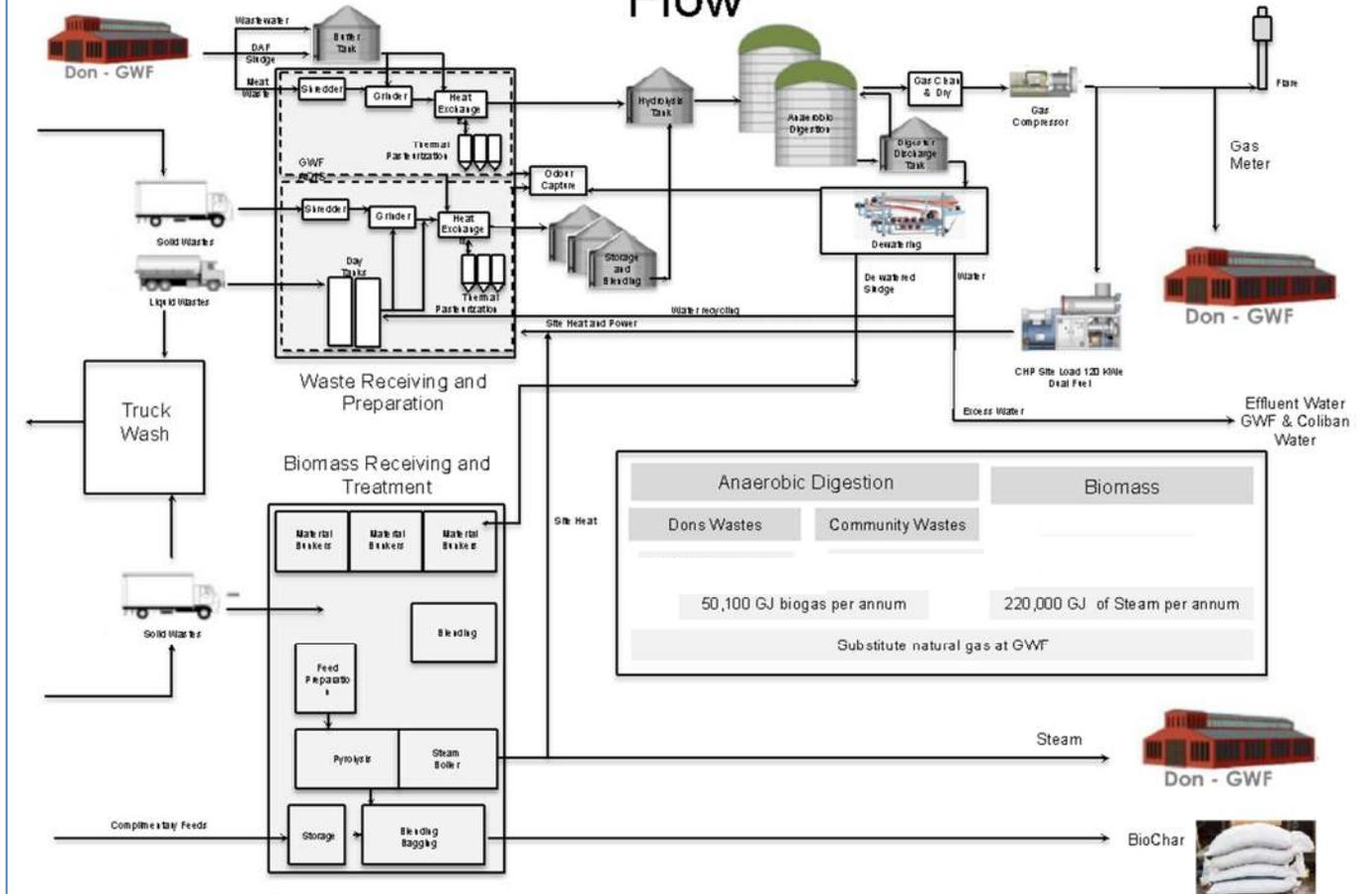
The process reactions take place in two locations:

- The Primary Gasification Chamber
- The secondary Oxidation Chamber

- Flue gas is 35C at the stack
- Minimal CO (carbon monoxide)
- 4-6 ppm; 12% is similar to human breath. Air (80%)
- Stack height (5 to 10m) is set by the EPA and dependent on the material combusted. If MSW it is ~12m; if clean organics it is ~5m
- Total particulate emissions (mg/Nm³) is reduced from 190mg to less than 5mg (per Billion mg) after scrubbing; wood ash is re-used in agriculture; there is no 'fly ash' which is a byproduct of burning coal for electricity
- Building Code requires 3.6m above highest structure
- Emissions profile for atmospheric air is determined by ground modelling to determine min height
- Much cleaner than your car exhaust or wood stove
- Pyramid Hill demo site available for visit from Sept'21



MASG Process Flow



Indicative Only

This diagram does not constitute an engineering design

Zero waste goal

Site Selection



Initial List of Prospective Sites and Analysis												
Criteria	OVERALL WEIGHTED SCORE	INPUTS			OUTPUTS			INFRASTRUCTURE			POLITICAL & COMMUNITY	
		Substantial feed available to support significant project throughout year	Access to higher yielding co-digestion	Cleanliness of the wastes, reflecting the difficulty to achieve A Class bio solids and prescribed wastes	Site electrical need and waste potential balanced	Site thermal need and waste potential balanced	Site's ability to utilise value in digestate	Proximity to Castlemaine	Suitable existing roads	Power grid suitable for embedded generation and exporting power	Overall likelihood of community and political support	
Don KR - External Waste Streams (with Hospital)	7.94	6	5	7	10	10	0	10	5	5	7	
Don KR - External Waste Streams	7.54	6	5	7	10	10	0	10	5	5	5	
Coliban Water Epsom WWTP - External Waste Streams	6.47	8	7	7	7	1	0	4	5	5	8	
Tarrengower Prison, Maldon - External Waste Streams plus VDJR Energy Crops	6.17	10	7	7	5	1	0	5	10	5	6	
Loddon Prison Castlemaine - External Waste Streams plus VDJR Energy Crops	6.02	10	7	7	5	1	0	9	3	5	6	
Tarrengower Prison, Maldon - External Waste Streams	4.54	2	5	7	5	1	0	5	10	5	6	
Loddon Prison Castlemaine - External Waste Streams	4.39	2	5	7	5	1	0	9	3	5	6	
Harcourt Coldstores	3.36	3	5	5	1	2	0	7	3	5	6	
Castlemaine Landfill	3.26	3	5	5	0	0	0	10	8	5	6	

A detailed independent study was undertaken during the feasibility study that ranked 8 possible sites.

EPA Guideline



Guideline: Energy from waste



Environment
Protection
Authority Victoria

Publication 1559.1* July 2017.
*This publication replaces 1559 released December 2013.

Noise limits – Day = 48 dBA, Evening = 42 dBA, Night = 41 dBA
Odour – Must not be emitted beyond the boundary
Discharge to air – limits most likely captured in permission.

Introduction

As outlined in Getting Full Value: the Victorian Waste and Resource Recovery Policy, ('Getting Full Value Policy') the Victorian Government is committed to an integrated, statewide waste and resource recovery system that protects the environment and public health, maximises the productive value of resources, and minimises the long-term costs to households, industry and government.

The Victorian Government also outlined that it welcomes investments in energy from waste and other alternative technology that can convert waste into useful products, if it can be demonstrated that investment will deliver strong environmental, public health and economic outcomes.

This guideline outlines how the Environment Protection Act 1970 ('the Act') and associated statutory policies and regulations are applied to the assessment of proposals that recover energy from waste. The document provides high-level guidance for industry, government and the community on EPA Victoria's (EPA) expectations and requirements for the siting, design, construction and operation of such facilities.

Efficient recovery of energy from the thermal or biological processing of waste is considered a resource recovery as opposed to a waste disposal option. Recovery of energy should not compete with avoidance, reuse or recycling.

Legal status of this guideline

This guideline provides a summary of the Act's key principles and environment protection requirements as well as subordinate legislation. The technical details in this guideline describe measures to assist in meeting these requirements.

The guideline does not represent a comprehensive statement of the law as it applies to either particular problems or individuals or serves as a substitute for legal advice.

What is 'energy from waste'?