



**COMMUNITY
POWER HUB
BALLARAT**

Renewable Energy Opportunities for the Ararat Fitness Centre

**A Report Prepared for Ararat Rural City on the Feasibility of Biomass
Heating for the Ararat Fitness Centre to Replace / Supplement Existing
Natural Gas Heating**



Photo: Daryl Scherger

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1. Purpose of Report

The Community Power Hub Ballarat (CPH Ballarat) was established with Victorian Government Funding to facilitate the uptake of community owned, operated and or funded renewable energy projects in the Ballarat region as a pilot project operating from July 2017 till June 2019. During this period CPH Ballarat has sought suitable sites to convert heating energy sources from natural and liquid petroleum gas to biomass heating. This report summarises findings of the following reports funded through Victorian Government initiatives that relate to the supply and management of energy for the Ararat Fitness Centre:

- *Ararat Fitness Centre Energy Audit Report* by Wood and Grieve Engineers (2019)
- *Woody Garden Organics – Waste or Energy Source?* by DragonNRG (2018)
- *Draft Ararat Aquatic Centre Biomass Feasibility Study* Daryl by Scherger (2019)

These are supported by the following reports commissioned by CPH Ballarat which relate to the supply, quality control and applicability of biomass heating units in Australia and suitable fuel sources:

- *Biomass Burning Equipment for Victoria* by Dale Boucher (2019)
- *Ensuring Woodchip Quality from Waste Wood* by Dale Boucher (2019)
- *Ensuring Woodchip Quality from Forest Residue, Dead Farm Wood and Tree Felling Residue* by Dale Boucher (2019)
- *Biomass Processing Equipment* by Dale Boucher (2019)

2. Key Findings of These Reports

The Ararat Fitness Centre Audit Report (Wood & Grieve 2019) assessed the historic electricity consumption and 30 minute interval meter data to determine the impact of two sizes of rooftop solar installations. The roof area and sunlight penetration characteristics suggested that a 65Kw photo voltaic system would be optimal in order to maximise consumption of solar generated electricity and minimise the export of electricity to the grid. This consideration was taken into account given the system size, roof constraints and additional application process required from Powercor to accept electricity into the grid for systems greater than 30kW. The 65kW system has been modelled to cost approximately \$120,000 with a payback period for between 5.4 and 6.4 years payback depending on the feed in tariff provided by the electricity retailer. The report also recommends seeking competitive power purchasing agreements, lighting retrofits, utilising pool blankets, rationalising gas meters and replacement of the heating, ventilation, and cooling (HVAC) system components with more efficient installations.

Biomass Burning Equipment for Victoria (Dale Boucher (2019) identifies biomass heating units have been successfully installed at the following similar applications in Australia:

- Hargassner woodchip at Beaufort Hospital; and
- Binder woodchip boiler at Mt Gambier Aquatic Centre;
- Moderator Boilers at Pyrenees Sawmill and Meredith Dairy; while
- A Herz wood boiler is currently being installed at Devenport Aquatic Centre.

The Woody Garden Organics – Waste or Energy Source? Report (DragonNRG 2019) researched the existing woody greenwaste stockpiles and processing methods at Ararat and 4 other regional materials recovery facilities (MRF's) in order to determine the suitability for use as biomass heating fuel sources and the associated costs. Key findings were that Ararat MRF's material could produce around 200 tonnes per annum of fuel that meets the moisture content and screened size for operation of a biomass boiler (this is from the current throughput of 1,800 to 2,000 cubic metres of greenwaste received). Suitable material could also be produced at Stawell and Horsham MRF's. The supply costs to the Ararat Fitness Centre would depend on the gate fee charged by the MRF's for greenwaste / timber disposal, any disposal costs to landfill avoided by the sale of woodchip and the cost for storage and transport to site.

Draft Ararat Aquatic Centre Biomass Heating Feasibility Study (D. Scherger 2019). The report is still marked draft as CPH Ballarat Project Control Group has reviewed the report and had revisions provided by the author but is yet to be independently reviewed by Aaron Izzard the engineer at Mt. Gambier City Council responsible for the procurement of a biomass heating system for Mt Gambier Aquatic Centre. Key findings of the report are that biomass heating unit can be provided by a Bendigo based company in shipping containers that are automated, can run on woodchip and / or straw pellets and could allow the existing gas heating systems to be bypassed, but remain installed as backup heating systems. The estimated capital cost including site works and connections is \$411,200, annual operating costs of \$51,044 and annual savings on gas bills estimated to be approximately \$92,000.

3. Discussion of Findings

- a. The estimated costs for the supply and installation of the 65kW PV system appear to be high by current industry standards at \$120,000 after consideration of the Renewable Energy Certificate rebates, however may reflect costs associated with limited access or non standard mounting hardware. (Average indicative prices in Victoria \$1.06 per watt source solarchoice.net.au)
- b. The biomass heating system proposed in providing the base load heating for pools and space heating would greatly reduce the operation time of the existing gas boiler heaters, therefore reducing their maintenance and repairs and extending their life. The biomass heating system has an identified maintenance requirement of 12 person days per annum, meaning these two factors need consideration in a business case evaluation. A critical decision will be required to be made on whether to replace existing HVAC components with more efficient comparable components or to invest in the biomass heating system.
- c. The simple return on investment modelling provided in the *Draft Ararat Aquatic Centre Biomass Heating Feasibility Study* provides some initial indications on the capital

investment and energy bill savings based on current known gas, woodchip and straw pellet prices. The savings are significant over the 20 year projected life of the proposed configuration, however a more robust business case may be required to better quantify the full project costs (including procurement and site preparation), depreciation, opportunity cost, projected gas tariff escalations, repairs and maintenance. Some allowance has been made within the feasibility study for these items, however there may need to be more due diligence before arriving at an investment decision.

- d. The decision to move to a renewable energy alternative to natural gas heating impacts positively on the Ararat Rural City's greenhouse gas emissions profile and potentially utilises a constant waste stream delivered to its MRF. While the annual amount of woodchip required to fuel the proposed biomass boiler system is more than twice the current potential yield from the Ararat MRF, Council may have access to other sources of suitable timber waste associated with its operations that can be utilised. The identified cost of processing timber to make woodchip meeting the boiler specification is identified in the *Woody Garden Organics – Waste or Energy Source?* report as being between \$46 and \$62 per tonne which is significantly less than the cost of straw pellets identified at \$135 per tonne. Additional consideration needs to be given to the storage and transport costs for any new source outside the Ararat MRF.
- e. CPH Ballarat is undertaking another feasibility study and potentially a business case for investment in an enterprise that could harvest dead windbreak trees from our region's farms, produce milled timber, woodchip fuel and biochar for bulk sale in our region. The timeframe for this work is end of July 2019.

4. Recommendations

- I. As the decisions associated with implementing a conversion from natural gas energy source to a waste to energy solution impact on a number of business units of Ararat Rural City, further investigation is considered warranted into the potential expansion of woody waste processing at Ararat MRF with assistance from GCWWRG with reference to:
 - *Woody Garden Organics – Waste or Energy Source?* by DragonNRG (2018)
 - *Ensuring Woodchip Quality from Waste Wood* by Dale Boucher (2019)
 - *Ensuring Woodchip Quality from Forest Residue, Dead Farm Wood and Tree Felling Residue* by Dale Boucher (2019)

- II. If Ararat Rural City wishes to proceed with procurement of the recommended PV system, CPH Ballarat has produced a technical specification for East Grampians Health Services which can be adapted to your needs.

- III. If Ararat Rural City needs a detailed business case prepared for the biomass heating system, CPH Ballarat and BREAZE have an excel workbook template in which we can submit your energy costs, capital investment details , depreciation, opportunity costs and other inputs and produce figures for levelised energy cost, return on investment and payback period. If you would like CPH Ballarat to do this additional work this is possible before 30 June 2019.