ENERGY SUFFICIENT MEAT PROCESSING FACILITY

Project Report Reference: 2018 - 1014 **Date: 1 December 2018**

Project Description
This project looked to demonstrate that meat processing plants can become energy sufficient using technologies that are reliable and available as well as identifying gaps and further research required.

The activity was based around an industry partner facility to demonstrate feasibility, scalability and application to the red meat industry. It also shows how processors can reduce or eliminate reliance on volatile energy markets, enhance industry sustainability while also increasing social license to operate.

The project scope included a roadmap for implementation accompanied by full business (case including ROI) and explainer video.

Project Content
The Australian economy has been exposed to a rapid escalation of energy prices over the past decade, primarily for electricity and natural gas. Both have an impact on high volume, low margin businesses within the red meat industry. Energy price escalation is a complex issue attributed to several events and market failures.

To help combat this changing environment and better position the industry, Smart Business Hub was engaged by AMPC to research and develop options for a meat processing facility to become energy sufficient.

The objective was to demonstrate that a "real-world" processing facility can be energy sufficient using a range of technologies that are commercially available, reliable and supported in Australia. With a focus on technologies that are deployable, scalable and flexible to suit the range of operators in Australia.

Project Outcome
There were insufficient waste products at the industry partner facility to be energy sufficient without importing other materials or fuels; however, it is technically feasible to significantly reduce energy risk through uptake of renewable technologies, as well as enhance sustainability and increase social license to operate.

Using the industry partner site as an example, the objectives can be achieved by sourcing alternative fuels such as biomass to service most of the steam load, integration of biogas cogeneration, solid waste digestion, solar PV, and energy storage to get the plant to 100% energy sufficient at the cost of just over $44m at an IRR of 6% (conservatively).

While this is likely to be unattractive to most processors, there are several different commercial models available, and a number of the project are attractive when considered insolation:

Technology name	Capacity (kW or *GJ p.a.*)	Turn-key capital cost ($)	Capital intensity ($/kW or $/GJ)	IRR (%)	Simple payback (years)
Biogas cogeneration (1 x 1.2MW$_e$)	1,200	2,923,332	2,436	31%	2.9
Biomass boiler	10,998	6,409,034	583	21%	4.7

Tank based biogas plant with 1.2MW_e cogeneration	73,369	9,121,492	7601	12%	7.3
Solar PV 7.5 MW_e	7,465	14,411,530	1,931	7%	9.1
Tank based biogas plant to existing boiler (all product)	88,835	6,198,160	70	6%	9.6
Roof top solar PV 1.6 MW_e	1,558	3,654,629	2,346	6%	9.6
AD to boiler (some product)	48,359	6,198,160	128	4%	14.2
10.0 MW solar +10MWh_e Battery	9,022	25,675,172	2,579	3%	12.0

Benefit for Industry
The R&D project and associated findings demonstrate the benefit to meat processors by capturing capital requirements, commercially available technology options, and how they can be implemented in a phased approach to complement broader business activity and investments.

Other benefits include an improved social license to operate, sustainability credentials, and brand positioning as the industry transitions to carbon neutrality by 2030. Additional tangible benefits related to the adoption of new technology (in addition to energy and carbon savings) such as reduced operating and maintenance costs, improved reliability, and improved control will be realised: “an efficient plant is a reliable plant”.

USEFUL RESOURCES

Biomass Boiler Technology fact sheet
Solar and batteries technology fact sheet
Energy Sufficient Meat Processing Facility Full report Pdf
SmartHub video