



Adapting waste-to-energy interventions for seasonal demand

Elgin Fruit Juice

Elgin, Western Cape Province

By utilizing biogas as an alternative fuel solution, Elgin Bio-digestion will improve the year-round viability of the anaerobic digester at Elgin Fruit Juice. Biogas is used to replace coal as a fuel source within the EFJ's steam boilers.

CaseStudy

Challenge

Elgin Fruit Juice, a leading fruit processor in Grabouw, South Africa, installed an anaerobic digester to convert wet pomace (30t), waste fruit (7200t) and biomass from surrounding farms (600t) into methane rich biogas, and then into 527 kW electricity and 650 kW thermal energy in a combined heat and power (CHP) unit. This provides improvements in plant efficiency, 30-40% savings in operational energy costs and reduced demand on the service provider's grid. However, during the off crop season (Jul-Dec) on-site demand for energy is very low which forces flaring of the gas in the absence of a utilisation intervention.

Solution

Initially, Elgin Fruit Juice pursued a generating license to feed the excess electricity produced back into the grid. The intention was to set up an annual power purchase agreement (PPA) with Eskom at the very attractive wholesale energy price (WEP). However, at the time of writing this case study (September 2020), this had not been granted – resulting in a significant opportunity cost. As a result, a new business, Elgin Bio-digestion, has been formed with the intention to acquire, operate and maintain the biogas plant. Elgin Bio-digestion has implemented a proactive use of the excess biogas as a coal fuel replacement by supplementing Elgin Fruit Juice's coal based boilers with biogas boilers, which reduces the need for, and expense of coal and which reduces Elgin Fruit Juice's carbon footprint.

Business benefits

Normal Operation Period (Biodigester):

Operational energy savings	30-40%	Landfill waste reduction	18250 tonnes per annum
Carbon footprint reduction	36 540 tonnes CO ₂ e per annum through landfill diversion	Savings in waste disposal	Between R150 – R600/ton depending on type of waste
Job creation	8 in total: 4 operators, 2 General Workers , 1 supervisor and 1 manager		

Biogas as a coal fuel replacement:

Coal cost savings	R2.2 million per annum
Carbon footprint reduction	Approximately 2600 tonnes CO ₂ e through coal fuel replacement only.
Job creation	6 temporary jobs. 8 permanent jobs saved



Lessons learned and plans for the future:

Anaerobic digestion and biogas remains a sustainable method of extracting value from waste in the food processing/agriculture sector, particularly when there are reliable market usages for the biogas produced. Seasonal demand should not be seen as a deterrent to implementing such solutions, as various alternative utilisation pathways are available. Though the regulatory process relating to obtaining a generating license and grid feed-in proved a hurdle in this case, such agreements are mutually beneficial and thus can be expected to become more efficient in the rapidly changing energy landscape. The implementation of biogas as an alternative fuel also showcases the ongoing technological innovation within the realm of extracting value via waste-to-energy.

For your business to also benefit

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