

VOLT

Sector

Cogen / CHP

Type

Integrated CHP

Module

Planning & Live

CASE STUDY

Maximise gross margin of biomass energy generation with optimal steam and power dispatch

The Customer

The client is a multi-site sugar producer on Australia's east coast that utilises biomass (including crushed sugar cane) to produce steam for wholesale electricity generation and also process heat for co-located sugar mills.

The Challenge

The client has multiple complex operational and financial constraints to consider when dispatching the sites. While there is a steady supply of biomass during the sugar crush season, for the rest of the year, the client must procure and manage fuel stockpiles carefully. Within each site, there are demands for different steam types and multiple ways of supplying this steam. Furthermore, the sites share a common financial position which is managed by coordinating the power generation of each facility.

Before engaging Polymathian, dispatch decisions were based on rules of thumb and ad-hoc modelling of asset ramping to follow power price forecasts. During the sugar crush season, steam demand was paramount and would often impact power production. For the rest of the year, power generation was timed to approximately align with periods of high power prices.

About VOLT

VOLT uses numerical optimisation to provide quick and accurate planning and dispatch decision support for the Industrial CHP sector.



The Value



Profitability

13% increase to gross margin



Responsiveness

Operate with optimal real-time information



Planning

Generate optimal tactical plans to manage day ahead planning





The Solution

Using historical data to model the client's operations, it was demonstrated how the use of a continuous, real-time optimisation platform would have resulted in a gross margin increase of 13% during the crush season and 28% during the non-crush seasons. This was achieved through:

- Separating power and steam production during high demand periods to allow more power to be exported
- More dynamic electricity production during the crush season with a more precise understanding of the trigger prices of the assets and coordinating the sites during periods of low pricing

Following on from the sizing study, the client is currently evaluating the following VOLT modules:

1. VOLT Planning: For medium term dispatch planning and management of asset outages
2. VOLT Live: To empower plant operators with real time dispatch recommendations and enable rapid responses to market signals

In effect, the VOLT platform is capable of becoming a single source of truth for the business. This will reduce key person risk, allow stakeholders to run scenarios rapidly and operators to dispatch efficiently.

Optimal Planning Decisions:

The planning module provides mathematically optimal answers for questions such as:

- Given the day's power price forecast, does it make sense to ramp down energy generation?
- During this time, is it preferable to use biofuel or fossil fuel for steam production?
- What is the impact of wet fuel on the generation plan?
- What is the interaction between power price forecasts and biomass stockpile levels?
- What spot prices warrant use of fossil fuels for generation?
- What is the value of a dedicated boiler for the on-site steam customer?