A GOOD NOSE FOR ENERGY SAVINGS

A comprehensive heat recovery system is turning previously wasted energy into monetary savings for a Canterbury vineyard and improving the quality of the wine.

St Helena Winery, north of Christchurch, has installed a chilled water plant complete with two heat exchangers or 'desuperheaters'. As an energy-saving innovation, part of the plant upgrade received a grant under Energy Efficiency and Conservation Authority's (EECA) Energy Intensive Business (EIB) grants programme.

As well as making significant efficiency gains by reusing the waste energy generated by the refrigeration system; the new system also provides improved temperature control during the fermentation process.

According to St Helena CEO, Don Hayes, being energy-efficient is not only part of the philosophy at the winery – it is also a growing industry trend.

"There is quite a big thrust in the wine industry towards sustainability," he says.

"The clean green image of New Zealand is very much a part of our wine-making."

About St Helena Wine Estate

A family-owned company established in 1978, St Helena was the first winery in Canterbury. It produces more than 1.3m litres of wine per year, and has its own bottling plant and despatch facility. There are 25 hectares in vines planted at the estate, with the bulk of the grapes being grown off-site by contract growers.

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St Helena produces mainly sauvignon blanc from Marlborough; as well as pinot noir, riesling, pinot gris, chardonnay and gewürztraminer.

Since 1996, the winery has concentrated on export markets, under various wine labels. Current overseas markets include the UK, Ireland, Germany, the Netherlands and the USA.

"Our export sales are steadily increasing and we're moving into new markets," says Don Hayes.

"We're targeting an increase of up to $1.5 million in export sales for the coming year."

As wine-making is a fairly energy-intensive process, it was these increased processing loads that highlighted the need to reconfigure the plant's energy sources.

"It was quite a big project for our company. Our annual electricity spend rose from $15,000 to $25,000 with the extra processing," explains Don Hayes.

The technology

During the wine production process, there is demand for both hot and chilled water – for heating and washing tanks, sterilisation, storing wine and fermentation.

The chilled water plant was designed and installed by the Canterbury branch of York New Zealand Limited in April 2007. It also required a new transformer and switchboard, at a total cost of about $150,000.

The plant comprises of a Copeland 40HP semi-hermetic compressor, discharging hot gas through a desuperheater and then into a remote air-cooled condenser for condensing refrigerant.

The purpose of the desuperheater is to use superheated refrigerant gas to heat hot water. This is stored in a 5,000-litre insulated tank with a storage temperature of 50 degrees Celsius.

The system supplies chilled water on a common water reticulation system to seventeen 45,000 litre wine storage tanks. Hot water is pumped to wine storage tanks as required during the wine fermentation or stabilizing process, which is controlled on demand by the wine-maker.

When the chilled water plant is operating at 100%, it supplies approximately 13 kilowatts of high grade heat – which becomes available at no cost.

Improved wine quality

According to St Helena's wine maker Hamish Kempthorne: "Originally this energy was lost out into the atmosphere – so there's been remarkable efficiencies gained. Also from a wine-making point of view it delivers very good results in terms of wine quality."

Temperature control plays a critical role in wine-making, particularly during one of the final stages of fermentation known as 'cold stabilisation'. The purpose of cold stabilisation – which requires a considerable amount of refrigeration – is to remove any tartrate crystals in the finished product.

During cold stabilisation the wine is plunged to near-freezing temperatures of minus 2 degrees Celsius, then bought back up to 14 degrees. The wine then becomes bottle-ready, or is stored in tanks heated at between 10-12 degrees.

Don Hayes says the heat recovery system provides St Helena's wine-makers with improved temperature control. It is particularly important to avoid what's known as a 'stuck ferment', where the fermentation stops before it is complete.

"If we need to increase heat to a particular tank, it does give us better temperature control," says Don.

Support from EECA

The original installation by York Refrigeration was funded solely by St Helena.

However a follow-up project – a second desuperheater unit installed on the existing glycol refrigeration system in January 2008 – was the subject of an EECA grant.

The project involved installing a desuperheater and hot water reticulation system, and to reposition the condenser unit for better air flow for forced draught cooling of the condenser coils.

The total cost of this retrofit project was $10,822. The system runs for approximately 220 days per year, with daily energy savings calculated at 40kW per day. This equates to annual savings of $1,296.

With the EECA grant covering 40% of the capital cost, the project will pay for itself within 5 years.

Capital Investment	**$10, 822**
EECA Grant	$4,329
Annual Energy Savings	$1,296
Annual reduction in energy consumption	8,760kW
Project payback period	5 years

Don Hayes says dealing with EECA and applying for the grant was "a simple process" from application to contract. The decision to install the second desuperheater would have been marginal without the subsidy.

"Being a small company, capital projects have quite an impact on our cashflow. So EECA's support is certainly appreciated."

In terms of future energy-saving projects, the winery's next plan is to build a roof across the wine storage tanks for improved heat conservation.

ST HELENA WINERY

Energy Intensive Businesses – Project Grants

EECA has grants available of up to 40% of the capital cost of a project, with a maximum of $100,000 for each grant. Projects that implement new or under utilised technologies to New Zealand are encouraged to apply.

The implemented technologies should:

- be capable of reducing the energy intensity of an organisation's operation
- have the potential to be applied to a majority of businesses across their industry sector
- be commercially available and offer an acceptable payback period.

Businesses who receive a grant must be willing for their project to be used as a case study, so others can learn from their experiences. Other businesses can look to you as an example of good energy management making you a leader in your field.

Contact: Phone: 0800 358 676
email: eib@eeca.govt.nz

Other energy grants

Emprove

EECA offers the following services and funding for businesses energy efficiency projects:

Energy Achiever

- Hour-long session with EECA Emprove Account Manager to scope current energy usage
- Free for businesses spending more than $500,000 a year on energy.

Energy Audit

- Comprehensive energy audit carried out by an independent consultant
- Funding available through Emprove programme towards the cost of an energy audit for businesses with energy bills of more than $100,000 a year.

Contact: Phone: 0800 358 676
email: emprove@eeca.govt.nz

Supporting the use of wood residue

The Wood Energy Grant Scheme offers help, by way of funding and information, to businesses interested in using wood residue as an energy source.

EECA can provide:

1. Funding for demonstration projects
2. Funding for feasibility studies that review the use of wood residue as a fuel
3. Relevant information to sawmills, forestry owners and the general public on the use of wood residues via the Bioenergy Knowledge Centre (www.bioenergy-gateway.org.nz).

Funding available for business grants

Business grants for capital/demonstration projects may be up to 40% of the capital cost of the project, with a minimum of $10,000 and maximum of $200,000.

Funding is available for projects involving technologies that:

- Have the potential for widespread industry adoption
- Have an acceptable payback period or ROI.

Applicants must be willing to have their project monitored by a third party and allow the results to be published to help promote energy efficiency.

Funding available for feasibility studies

Grants for feasibility studies are available up to a maximum of 75% of the feasibility study costs and the applicant must be willing to have the results of the studies publicised as a case study.

Funding is available for feasibility studies involving technologies that:

- Have the potential for widespread industry adoption
- Are capable of saving energy or have potential for increased use of renewable energy.

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