



FULL STEAM AHEAD

HITACHI ZOSEN INOVA HAS DELIVERED A NEW ENERGY-FROM-WASTE PLANT IN CENTRAL SWITZERLAND THAT IS MAXIMISING ENERGY DELIVERY TO THE REGION AND A BUSINESS – A BLUEPRINT FOR A PROJECT THAT COULD WORK IN AUSTRALIAN CONDITIONS.

When the Renergia energy from waste (EfW) plant successfully passed its commissioning phase and achieved its primary acceptance certificate this past December, it marked the end of a long project to replace the original plant that had been generating heat and power for almost 45 years.

Renergia is a cutting edge and environmentally-friendly municipal EfW plant located close to the Perlen Papier paper factory near Lucerne, Switzerland.

Hitachi Zosen Inova (HZI), an internationally-renowned leader in

turnkey EfW plants and local to Lucerne, was contracted to supply the chute to stack part of the project, comprising an innovative complete combustion system, boiler and flue gas treatment section.

Processing municipal waste from council and industrial collections, the plant runs on two lines and is designed to operate at a capacity of 200,000 tonnes a year, or 12.5 tonnes per hour and line.

Continuing a long history of EfW

The municipal association for recycling, disposal and waste

water in Lucerne (REAL) has been operating the EfW plant at Lucerne-Ibach as a heat and power generating plant since 1971. Over time, the plant had been added to and extended several times, most recently in 1996.

In 2009, a consortium of waste management associations from six cantons (regional areas) in central Switzerland and the paper manufacturer, Perlen Papier, came together and decided to invest in a new plant. Their objectives were to construct a future-fit waste processing facility to deliver maximum energy

efficiency combined with low emissions. They submitted their development plan in October 2010.

The new plant needed to use municipal, commercial and industrial, and construction and demolition residual waste streams, sources that had long been successful in central Switzerland as the region collects glass, metals, paper, cardboard and green waste separately, while plastic bottles are taken back by shops.

It also had to supply enough electricity to meet the energy requirements of 38,000 homes and provide 320,000 MWh steam to the Perlen Papier paper factory to help it achieve significant and future-proof operational cost savings.

Prime location

With the primary aim of the Renergia plant being maximum energy efficiency, the successful outcome of this depends on several factors. HZI Managing Director – Australia Marc Stammbach believes the most important one is the location, which should allow a maximum export of steam or heat.

“Energy from waste is like real estate – it’s all about location, location, location!” says Marc.

The site for Renergia plant was chosen due to the energy off-take of steam to the paper factory next door and access to the local heating network.

Part of its remit was to deliver a substantial amount of electricity and heat that is necessary for the production of paper around the clock, every day of the year. Being located next to the paper factory allows a safe and constant heat supply with environmentally-sound, carbon-neutral heat from waste.

“It is difficult to think of a better location for the performance and impact of an energy from waste facility than that of the Renergia plant, with its direct proximity to the paper factory and the district heating connection point,” adds Marc.



Waste being unloaded in the tipping hall at the Renergia plant near Lucerne.

HZI RENERGIA PLANT, LUCERNE, SWITZERLAND: FAST FACTS

- Plans for new plant submitted October 2010
- Contract for HZI’s supply of boiler and flue gas treatment sections agreed April 2012
- Construction started August 2012
- First waste feed January 2015
- Enters full commercial operation December 2015
- The facility will:
 - produce 155,000 MWh of electricity a year
 - supply enough energy for nearly 38,000 households
 - supply 320,000 MWh of steam to the Perlen Papier paper factory
 - will save Perlen Papier the cost of buying more than 40 million litres of oil and cut its CO₂ emissions by 90,000 tonnes.

Another advantage of its location is that it is a central point for waste from the municipalities to flow into. Any increase in local traffic for the nearby community has also been avoided, as most waste deliveries to the facility arrive directly by the freeway. A local railway line opens opportunities for deliveries by rail as well.

High energy efficiency

The second important aspect Marc identified is to make energy recovery from the combustion flue gases as complete as possible. HZI accomplished this at the Renergia plant by keeping the flue gas flow and the chimney outlet temperature as low as possible, and by excluding water injection from the flue gas flow.

The facility also has an efficient and thorough flue gas treatment system, as EfW plants are bound to keep their emissions to strict low levels. The multiple stage flue gas treatment at the

Renergia plant ensures that the strict requirements of the Swiss Clean Air Directive (LRV) are not only met, but improved on.

“Emissions are also lower now because the waste to energy process for generating steam produces less emissions than was previously the case when heavy oil was used as the fuel source for the paper factory,” Marc explains.

By using the new plant as its source for steam, Perlen Papier will cut its heating oil consumption by 40 million litres a year and its CO₂ emissions will decrease by 90,000 tonnes!

Future-fit design, less CO₂

HZI’s contribution to the Renergia plant ensured it would benefit from a number of updated technologies to make it easier to maintain and, furthermore, be able to control the operation of the plant well, enabling combustion of waste with little excess air.



State-of-the-art technology within the Renergia plant.

The water-cooled Inova grate used in Lucerne is built to be robust and is designed to deliver a reliable, cost-efficient operation. The grate runs in two rows with four zones per row, with the first two water cooled. It is easy to service, meaning improved occupational safety for the maintenance personnel, and provides stable, well controlled combustion.

HZI's sections included the provision of an innovative water-cooled grate and the new integrated combustion concept that allows both highly efficient combustion and maximum energy recovery. In addition, the five-stage flue gas treatment process depollutes the flue gases to the lowest emission values.

"The dry flue gas stage to separate the acid pollutants is done with

sodium bicarbonate, which is recycled," adds Marc. "This dry flue gas treatment allows a higher energy efficiency which is around 55 per cent with production of electricity and steam to the paper factory next door."

Forecasted benefits

Following processing and energy recovery, any ferrous and non-ferrous metal product is recovered from the bottom ash. The remaining residue is appropriately landfilled to avoid any accumulation of toxic material in the environment, as Switzerland and its neighbours rely on ground water use.

Explaining the forecasted benefits of its new plant, the Renergia organisation published the following on its website: "The times of pure

waste disposal are over. Waste is a source of energy and has energy content like wood."

"The advantages are obvious. The distance for delivery transport to the [plant] will be severely reduced, whereas the environment is preserved and costs are lowered. Additionally, over decades, the plant guarantees a high safety of disposal for the cantons of Central Switzerland."

The new plant is now up and running smoothly, with the capacity to process 200,000 tonnes of waste each year, enough to handle the MSW from the entire central Switzerland area.

"The Renergia plant is an example of how energy-intensive manufacturing industries, such as paper and cardboard production, can lock in their energy at stable prices," concludes Marc.

"The environmental benefits are multiple. First, we avoid the emissions from landfills. We achieve the production of steam and electricity while avoiding the use of heating oil. Finally, and importantly, the energy produced is around 50% renewable."

More information about HZI's projects is available from www.hz-inova.com or by sending an email to info@hz-inova.com. ■



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