

**“We strongly believe in biomass combustion. It represents the future.”**

**Gasifier integrated into the existing boiler**

Valmet delivered the biomass gasification plant that was built as part of the existing coal-fired power plant and integrated with the pulverized coal boiler. The gasifier feeds the boiler with product gas that is combusted together with coal.

The 140 MW gasification plant delivery included a fuel yard, a large-scale belt dryer, a circulating fluidized bed (CFB) gasifier, modification and integration on the existing coal-fired boiler, and an extension to the Valmet DNA automation system with advanced applications. Having everything from one supplier ensured a perfect match of solutions.

Only minor modifications were needed in the existing Benson-type boiler, although it had originally been built for coal firing only. Nothing old needed to be dismantled,” says **Juhani Isaksson**, Product Manager, Gasification, Valmet.

**Local biomass utilized**

The gasifier is fueled with forest residues, stumps and round wood. Peat is used as a backup fuel. The utilization of biomass that comes from a radius of 100 km around the plant has created new jobs in the area, and thus boosted the local economy.

As the moisture content and heat value in various bio-fuels vary a lot, more detailed information about them is needed. As each fuel load arrives, it is registered into the Valmet Fuel Data Manager application, which is integrated with the plant's Valmet DNA automation platform that has automated and facilitated all tasks related to bio-fuels. Valmet DNA offers a real-time monitoring window to the control room and office.

**Also fueled solely with product gas**

“We have succeeded very well in reaching our targets, and the outcome has exceeded our expectations,” states **Matti Loukonen**, Plant Manager at Vaskiluodon Voima. “Most importantly, product gas has become a new fuel in our fuel range.”

Thanks to biomass gasification, the company now has the capability to replace about 25–50% of the coal with local biomass, depending on the boiler load.

In fact, the figures are higher. Trial runs carried out in September 2014 proved that the boiler can be fueled solely with product gas. Since then, the boiler has been run purely on product gas when the load is low during autumn and spring. Despite the modification, also the original coal-firing capacity of the boiler is still available when needed. For Vaskiluodon Voima, this was a risk-free solution.

Vaskiluodon Voima has been very satisfied with Valmet's gasification technology. “The availability of 98–99%

has been very high. We are currently increasing the gasifier capacity from 140 to 180 MW in cooperation with Valmet. It is about fine-tuning the equipment and finding new ways to run it. No new investment is needed for this capacity increase.”

**Emissions significantly reduced**

Another main target for the investment was to reduce emissions – and this has been achieved, too. Through biomass gasification, the plant has been able to lower its CO<sub>2</sub> emissions by approximately 230,000 tonnes per year. SO<sub>2</sub> emissions are also lower.

To monitor emissions, the plant uses the Valmet DNA emission monitoring tool. The application provides all necessary information for emission monitoring and reporting.

“Our future challenge lies with NO<sub>x</sub> emissions. We need to decide how to stay under the new EU limit values after the transition period. We are currently considering options such as a SCR (selective catalytic reduction) or SNCR (selective non-catalytic reduction) method – or perhaps another gasifier,” Loukonen says.

The cooperation between Vaskiluodon Voima and Valmet has been mutually fruitful. “We have been very pleased with Valmet. It has been a proactive partner for us in developing cleaner combustion and now in increasing gasifier capacity.”

Vaskiluodon Voima intends to further increase its use of biomass. “We have a strong belief in biomass combustion. It represents the future,” Loukonen adds. ■

**→ BIOMASS REPLACING COAL**

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**CONTACT PERSON**

**Juhani Isaksson**  
Product Manager, Gasification  
juhani.isaksson@valmet.com  
Tel. +358 40 830 4402

**GASIFICATION INCREASES IN POPULARITY**

Over the past few years, Valmet's gasification technology has made a true breakthrough.

In addition to Vaskiluodon Voima, the technology has been successfully applied to gasifying waste at Lahti Energy in Lahti, Finland. In 2012, the company started up the Kymijärvi II solid recovered fuel (SRF) gasification power plant as the first of its kind in the world. With the new 160 MW gasification plant, Lahti Energy has halved its need for coal by using SRF.

Valmet is currently supplying two biomass gasifiers for OKI Pulp & Paper Mills' new pulp mill in South Sumatra, Indonesia. The commercial production at the mill is expected to begin in 2016.

Metsä Fibre has chosen Valmet's biomass gasification technology for its **Äänekoski** bioproduct mill in Finland. The gasification plant will dry bark and gasify it to product gas. The mill is scheduled to go on stream in 2017.

A biomass gasification plant has been ordered for the pulp mill project of Huanggang Chenming Pulp & Paper Co., Ltd. in Hubei province, China. The new mill is expected to start up in 2017.

**Ready for tighter emission reporting requirements**

Vaskiluodon Voima uses Valmet's emission monitoring and reporting application.

**A**fter taking Valmet's biomass gasifier into use, the Vaskiluodon Voima CHP plant in Vaasa, Finland has been able to lower its emissions significantly. In 2014, the plant invested in Valmet's emission monitoring and reporting solution. The Valmet DNA emission monitoring application provides all necessary information for the plant's in-house monitoring and for the authorities.

**Quick and reliable reports whenever needed**

“To date, we have used the solution for our in-house monitoring purposes. It has made our lives much easier and helped us minimize human errors. We no longer need to spend time collecting data from spreadsheets and transferring it from one place to another,” **Melina Kallio-Könnö**, Operational Engineer at Vaskiluodon Voima explains.

# "We no longer need to spend time collecting data from spreadsheets."

"The application provides us with follow-up trends and analyses of emissions for efficient in-house monitoring. It has also helped our R&D activities. We can now quickly go back to the history information and see, for example, why the limit values have been exceeded and what kind of fuel mixture was used at a particular time. Whatever our reporting need is, we quickly get a reliable report on it," she says.

## All process information on the same platform

Vaskiluodon Voima has been using Valmet's automation system to run its plant operations for a long time. The new Valmet DNA emission monitoring solution is a perfect fit with the existing automation platform as it is based on the Valmet DNA information system. Integration with the process control system brings a major benefit for the entire plant. It enables

online and even proactive emission management through access to real-time emission data, cumulative values and emission forecasts.

"Having all the systems and solutions on the same platform enables seamless communication between them," Kallio-Könnö points out. "We have had good experience with Valmet in earlier projects. The company has been a reliable partner for us."

## Fulfilling EU requirements

Valmet's emission monitoring and reporting solution fulfils all the requirements of EU's Industrial Emissions Directive and can be tailored to meet each plant's specific needs.

"The solution features both real-time and long-term emission reporting as well as the follow-up of

trends. It enables a quick reaction and efficient analyses of disturbance situations. In short, it saves time and makes the emission data more usable and reliable," says Tiina Stenvik, Solution Manager, Performance & Sustainability Solutions, Valmet.

The results are reported in a clear format as browser reports, displays and automatic trends. The data can be further analyzed in MS Excel.

The calculation package also includes the emission forecasts and the cumulative moving averages as support tools for effective power plant emission control. Additionally, continuous maintenance and expert support for the application as well as a wide range of reporting services are available through Valmet's customer service agreement. ■

**CONTACT PERSON**  
Nina Mört-Happonen  
nina.mort-happonen@valmet.com  
Tel. +358 40 741 2952



## VASKILUODON VOIMA IN A NUTSHELL

Vaskiluodon Voima Oy operates two combined heat and power (CHP) plants in western Finland, one in Vaasa and the other in Seinäjoki. The Vaasa power plant has a capacity of 230 MW of electricity and 175 MW of district heat. It runs a pulverized coal boiler with an integrated biomass-fired gasifier by Valmet. Before the installation of the gasifier, the plant consumed from 320,000 to 600,000 tonnes of coal per year, of which about 25–50% can now be replaced with local biomass. For emission reporting, the plant utilizes emission monitoring and reporting tools supplied by Valmet.

Last year Valmet DNA Emission Monitoring and Reporting system was awarded MCERTS product conformity certificate granted by SIRA Certification Service (UK).

(MCERTS = United Kingdom Environment Agency's Monitoring Certification Scheme)

## ← EASIER DATA MONITORING

"Our main goal for the investment was to be ready when the new Industrial Emissions directive is implemented. At that point, the authorities will require our monitoring data on a 48-hour basis instead of getting it on a monthly basis. This solution will make things easier for us," says Operational Engineer Melina Kallio-Könnö.