BUZ-CC 234905 Application Centers factsheet

Energy Recovery Center (ERC)

Operated in partnership with Vyncke

Application & Training Center Factsheet

Head: Konstantinos Lanaras

Location: Bühler AG, Uzwil, Switzerland

Area: 300 square meters

Operational since: 2023

Energy Recovery Center

Considering the great number of side streams generated in our industry, it's critical to find optimum ways to utilize every part of the raw material and move towards a closed-loop economy with less waste and optimal energy yield. That is why Bühler and Vyncke built the Energy Recovery Center (ERC), a unique facility showcasing an alternative way to reuse side streams and reduce CO_2 footprint, waste production, and energy costs.

First, in a move to help achieve our own sustainability targets, the ERC will provide heating for Bühler offices at the Uzwil site by using the biomass generated from other Application & Training Centers. Suitable fuels such as cocoa shells, rice husks, and barley roots are collected throughout the summer season and then used as biomass energy during the cold days.

Second, it is the world's only application center of this kind and size open for customer trials to explore the potential of side stream combustion on-site and ensure ecological and economic benefits. The fuel, the yield of combustion, the ash quality, the flue gas emissions, and the CO_2 reduction are examples of parameters that could be measured, evaluated, and optimized during the R&D tests.

What is unique about it?

The ERC offers a unique environment for customers to explore the combustion potential of their production side streams and close the sustainability circle. Indeed, the ERC combines Bühler's expertise on biomass fine grinding and preparation (resulting in the most optimum fuel) with the Vyncke combustion knowledge and the latest technology (optimizing the energy yield).

It is also the first time that the technology of the multi-staged pyro gasification turbix combustion for agricultural fuels is used. The fuel injection system combined with the injection of the primary and secondary combustion air will lead to better combustion, and therefore, lower emissions.

There are still a lot of biomass by-products/waste streams that no one considers yet to energize but with the ERC, real-life tests are possible, and more knowledge is gathered compared to typical lab tests and desk research. The quick interaction with the Bühler knowledge on grinding and preparation ensures quick anticipation of combustion behavior.

Moreover, the ERC is scientifically supported by the Swiss Federal Laboratories for Materials Testing and Research (EMPA) to evaluate R&D results and further applications of boiler ash (i.e. as fertilizer or building material production).

Key figures:

- Net heat output: 1MW
- Medium: Superheated water
- Water temperature: up to 140°C
- Fuel consumption: 0.25 t/hr
- CO_2e reduction: up to 600 t/year
- 24/7 operation during the winter period

Raw materials:

Raw materials are the by-products that Application & Training Centers in Uzwil generate during customers' trials. These side streams could be: wheat bran, rice husks, cocoa shells, dry extrudates, dry proteins. The by-products will be combusted either individually or in a mixture with a test and learn approach.

End-product categories:

Thermal energy in the form of hot water is one output. With the hot water, the buildings in Uzwil will be heated during the winter. Another end product is fly and bottom ash. It can be used as a cement additive, fertilizer, among others.

Technology solutions available:

Equipment encompasses:

- Storage silos as a fuel battery
- Pneumatic transport
- Particle size reduction with hammermill
- Additives station
- Scales for weighing and dosing
- NIR (Near Infrared) analysis of the fuel
- Combustion chamber – multistage pyro gasification turbix
- Combustion air staging
- Flue gas recirculation
- Automated deashing
- Automatic cleaning
- Hot water heat exchanger
- Baghouse filter
- Flue gas emissions measurement (CEMS)

Automation includes:

- Bühler Manufacturing Execution System Mercury (MES)
- Bühler Insights
- Bühler Replay
- Vyncke SMARTplant

Services:

ERC serves as an R&D facility to be used by customers as a demonstration and testing platform and as a center for further development of integrated energy efficiency solutions.

Different parameters such as type of fuel, mixtures of several fuels, the particle size of the fuel, the quality of the final ash, and combustion variables can be tested.

Collaborate with other Application & Training Centers to provide extended end-product value streams as fuel:

- Grain Innovation Center & Milling Academy
- Extrusion Application Center
- Pasta Application Center
- Food Creation Center
- Flavor Creation Center

Scan to learn more from the website:

Take a virtual tour through the Energy Recovery Center:

Bühler AG
CH-9240 Uzwil, Switzerland T +41 71 955 11 11
buhlergroup.com F +41 71 955 66 11