At War with Waste

In addition to the environmental benefits, waste incineration has also become a hot topic in terms of reducing Europe's dependence on imported fuel.

Waste incineration is known to effectively reduce environmental risks by destroying toxic substances and converting components into gases that pollute the climate much less than their products of uncontrolled decomposition. With Europe's current drive to diversify its energy resources and become less dependent on fuel imports, energy-from-waste has also gained attention from a geopolitical perspective. Although the incineration of non-recyclable waste is already common practice in many countries, there is still enormous potential to expand the installed capacity, but also to improve the use of waste energy for the provision of electricity and heat.

Optimizing energy usage from waste incineration is a complex task.

The primary focus of the incineration process is and remains minimizing the impact on the environment. Furnace design and combustion control must ensure sufficient flue gas residence time at specific temperatures to complete destruction of toxic substances followed by quenching steps to mitigate their reformation. Subsequent flue gas cleaning processes involve separation and recovery of specific compounds in filters, scrubbers and absorbers. Compared to the classic CHP plant, achievable system pressures and temperatures are therefore much lower, but the fact that the plant doesn't pay for the fuel (on the contrary) still outweighs the low efficiency. Regarding the goal of significantly increasing the role of waste as energy source, however, new ideas and concepts for increasing capacity and conversion efficiency are required. For example, the combination with heat pumps to use low-temperature waste heat from scrubbers and flue gas condensation for district heating offers great potential for substituting fossil fuels.

If you don't know your fuel exactly, how can you predict and control the processes?

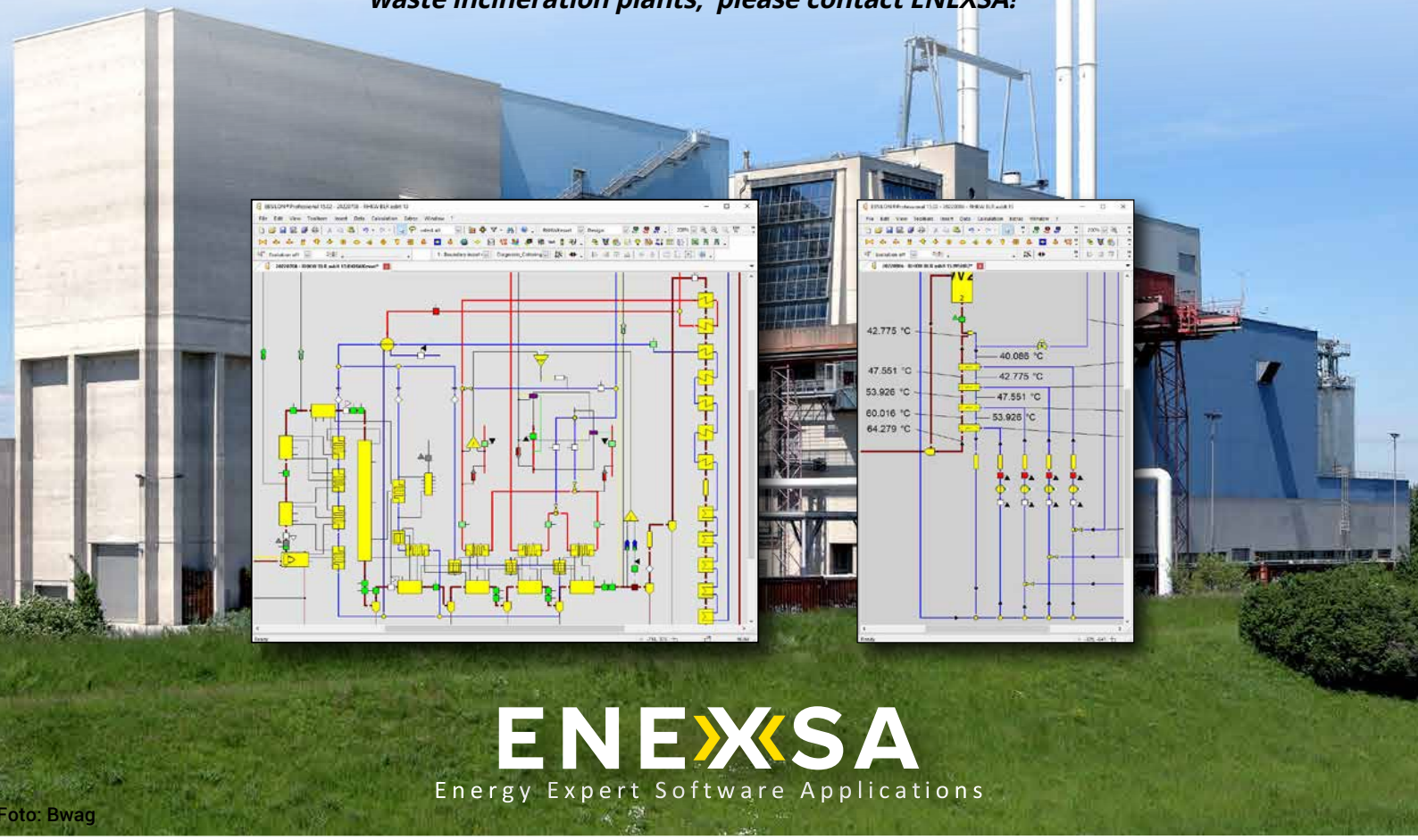
In practice, the composition and calorific value of municipal waste cannot be accurately measured on-line, but are constantly changing with seasons, weather, and consumer behaviour. A system-wide thermodynamic model allows determination from other process parameters, since the energy absorbed by the water-steam cycle and the energy content of all other streams exiting the system boundaries must be equal to the energy introduced to the process, corresponding to the commonly used output/loss method for efficiency evaluation.

A flexible and comprehensive process simulation tool is needed

The EBSILON® *Professional* heat balance software allows for both, overall mass and energy balancing to back-calculate the fuel composition, and detailed modelling of all equipment involved in the process.

ENEXSA's engineering team combines in-depth know how in thermodynamic simulation with expertise in process engineering.

If you want to learn more about EBSILON and simulation services for waste incineration plants, please contact ENEXSA!



ENEXSA
Energy Expert Software Applications

Foto: Bwag

Contact Information: Josef Petek, Manager Commercial Operations, ENEXSA GmbH, Parkring 18, 8074 Raaba-Grambach, Austria ■ www.enexsa.com
josef.petek@enexsa.com