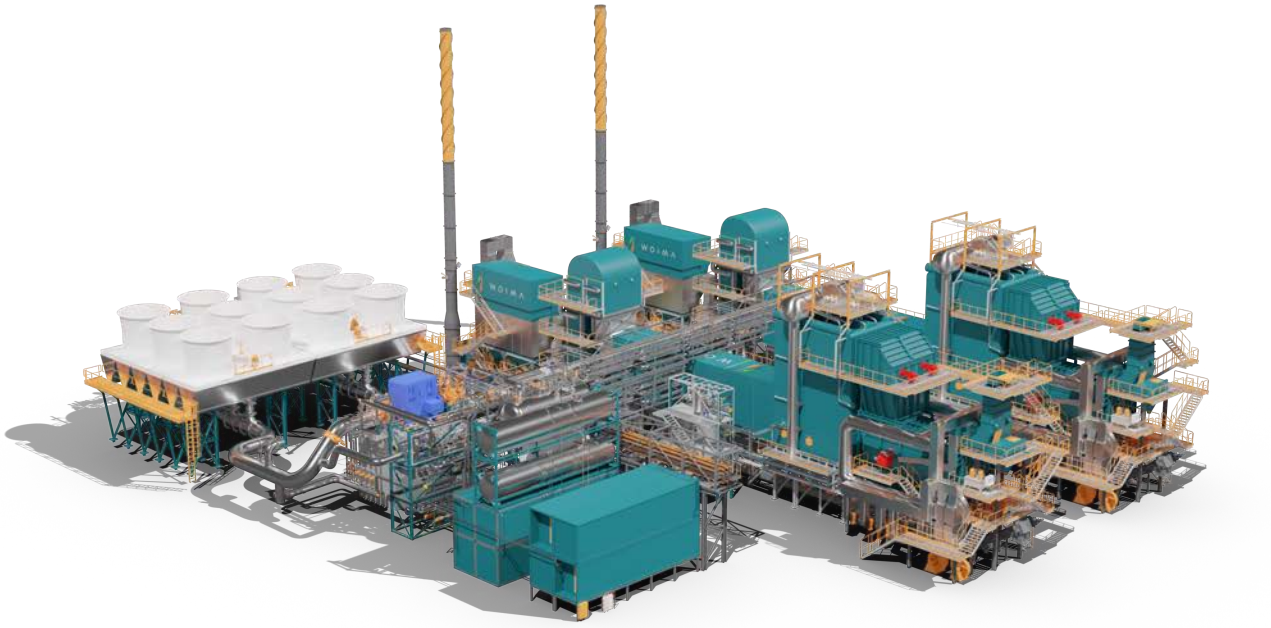
WOIMA

CORPORATION

USE CASE

DISTRICT HEATING
AND COOLING



DISTRICT HEATING AND COOLING

Although electricity may well be the most sought after commodity in energy generation, it is not the most efficient way of transforming waste fuel into energy. A Combined Heat and Power (CHP) plant has an efficiency ratio of up to 85%, while in electricity generation the ratio drops down to around 25%. Thus, giving up some electricity generation capacity will yield abundant thermal energy. And the thermal energy is available in both heating and cooling mode.

District heating and cooling is the most efficient way of utilizing the energy generated in a power plant. Centralized power generation has a much higher efficiency ratio that smaller localized equipment. It also utilized the "residual" thermal energy component, whereas typical local cooling and heating solutions, the so-called heat pumps, use electricity, which is often a scarce resource. The thermal energy capacity in the district heating and/or cooling network ensures that the buildings stay cool or warm even during the most extreme weather conditions.

The Nordic Countries, Finland in particular, have decades of experience in building and utilizing district heating and cooling networks, as well as in centralized power generation to keep our homes and offices cool in the summer and warm during winter. The in-house heating radiators and cooling convectors are low-tech long-life-span piping components that will offer huge savings in maintenance over the years.

The *waste*WOIMA® power plant has several levels of flexibility, one of them being its ability to generate several different types of energy commodities. Maximizing the *waste*WOIMA® power plant's power generation capacity means utilizing most of the energy in heating or cooling. A back-pressure turbine is used to extract some of the energy for electricity generation, while letting most of the steam to flow through as thermal energy, enough for a city of 20,000 people. And even the ratio between electricity and thermal energy is flexible to support load variations.

The heating component can be saturated steam for industrial purposes or hot water for a district heating network. Or a combination of both. The cooling component is in the form of cold water that is typically utilized in keeping cold storages cool or distributed via a district cooling network to apartment buildings and offices. A single network can be used to distribute all the thermal energy, even if both cooling and heating is required.

The *waste*WOIMA® power plant uses non-toxic municipal, institutional, commercial, industrial and/or agricultural waste streams to produce saturated steam, electricity, thermal energy and/or potable water. The required waste quantity is roughly 170 tons per day, which translates to

- 3.7 MW_e of electrical power or
- 2.4 MW_e / 10 MW_{th} in heating mode or
- 2.4 MW_e / 6 MW_{th} in cooling mode

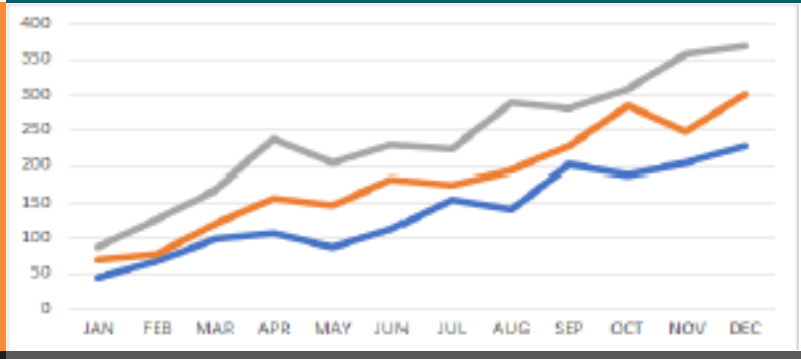
The plant is easily delivered, quick to install, cost-efficient to run and simple to maintain offering all stakeholders significant benefits.

BENEFITS:

WASTE MANAGEMENT
- Creating new business potential
- Simplifying waste logistics
- Reducing environmental impacts
- Matching future regulations
- Postponing landfill investments
- Green image benefits

POWER & UTILITY
- Decentralizing power generation
- Enabling off-grid solutions
- Offering fuel & production flexibility
- Harnessing endless fuel source
- Utilizing carbon credit schemes
- Fast plant delivery

INVESTORS
- Excellent return on investment (ROI)
- Scalable business model
- Diversified investment portfolio
- Vendor arranged funding
- Fast project roll-out
- Plant relocation option



OTHER STAKEHOLDERS
- Turning waste into local welfare
- Health & environmental benefits
- Local reliable energy supply
- Educational & job opportunities
- Improving living conditions
- Implementing development funding

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