Thermal Micro Grid – A European Solution for Smarter Cities
Forward to zero

Urbanization and sustainability are drivers in shaping the new decentral energy landscape.

The ectogrid™ technology is a key enabler for energy efficiency and reducing CO2 emissions from heating and cooling.
Heat pumps are the most effective individual technology, but require competitive pricing of electricity vs. gas to win.

Heat grids are (where available / new build in dense areas) the best option (scale effect ...)

Biomass, waste and independent Micro-Grids will play a niche role for local solutions.

Due to slow change rate, available infrastructure, and price gas will stay in the market for a long time.

Oil becomes obsolete.

Oil and direct electricity heating will fade out.

Green Gas

District Heat

Biomass

Combined H/P

The heating future

The bi-polar world

The era of oil and gas

Source: Pöyry, prognos AG, team analysis
Heating grids development

**System temperature**

- **1st gen (>200°C)**: Steam, Pressurized hot water systems, Heavy equipment, Large stations.
- **2nd gen (>100°C)**: Pre-insulated pipes, Industrialized compact substations (insulated), Metering and monitoring.
- **3rd gen (80-100°C)**: Low energy demands, Smart grid (optimum interaction of energy sources, distribution and cons.), 2-way DH.
- **4th gen (<60(70)°C)**: Bi-directional.
- **5GDH™ (Flexible temp.)**: Cooling and heating in one grid, Active components in buildings, Flexible temperatures, 2nd generation smart grid, Recycles all thermal flows, Bi-directional.

**Timeline**

- **1880**: Steam equipment.
- **1930s**: Pressurized hot water systems, Heavy equipment, Large stations.
- **1970s**: Pre-insulated pipes, Industrialized compact substations (insulated), Metering and monitoring.
- **2010s**: Low energy demands, Smart grid (optimum interaction of energy sources, distribution and cons.), 2-way DH, Bi-directional.
How ectogrid™ works

Buildings connected to the same system provide each other with heating and cooling.

- The most energy efficient heating and cooling solution
- Cheaper to build - one grid serves 2 utilities
- Cheaper to operate
- Highly flexible (DH, DC, Geothermal, Data Center, Industry, Gas CHP, HP, etc.)
Energy optimization as a Service - ectocloud™
ectocloud™ creates and captures flexibility

Renewable production and consumption in defined area

- Charging possible
- Discharging wanted

Power (MW):
- Wind energy
- Solar energy
- Overall Demand
- ectogrid™ consumption

Time of the day:
- Night
- Sunrise
- Noon
- Sunset
- Night
Full scale commercial demonstration project
RESULT

ectogrid™ at Medicon Village results in a reduction of the:

Supplied Energy - 78.5 %
Energy bill for customer - 20 %

This is a zero emission energy system
Local conditions determines type of ectogrid™
Heat pumps and DH in a perfect combination – leveraging the best properties of each

Similar to the power grids
- High voltage
- Low voltage

Heating and cooling is offered to the customer
Business model designed for global scalability

The ectogrid™ business model drives CO2 efficient solutions for heating and cooling globally.
ectogrid™ – A thermal Microgrid solution delivering a zero carbon solution for the worlds heating and cooling needs

✓ The most energy efficient heating and cooling solution
✓ Cheaper to build - one grid serves 2 utilities
✓ Makes use of low temperature surplus heat
✓ Energy optimization as a service
✓ Creates and captures flexibility
✓ Available for all ectogrid™ partners