Contribution to the European energy transition with the world’s hottest close loop heat pump
HeatBooster – Introduction

- **Viking Heat Engines**: Founded in 2009, Locations in Norway and Germany
- **Technology**: Unique piston compressor technology
- **Products**: Compressors and complete heat pumps
- **Variants**: Water/Water, Steam/Steam, Water/Steam, Steam/Water
- **Working Fluids**: All new HFOs e.g. R1234ze, R13336mzz(E), R13336mzz(Z)
- **Max. source/sink temperature**: Up to 120°C/Up to 160°C
- **Scalable**: 50 to 4,000 kW (in the near future up to 20 MW)
- **Service and Maintenance**: Less than once a year (monitored 24/7)
- **Experiences**: Proven technology due to various field experiences
- **Professional partners**: Chemours™, gwk
District heating using **HeatBooster**

The HeatBooster could be used for supplying high temperature heat where it is needed.

- The whole district heating grid could be operated on a lower temperature level
- Constant heat consumption also during the summer

All temperatures are indicative.
District heating using **HeatBooster**

The **HeatBooster** could be used in combination with a thermal storage tank.
- Allows a better control of the different thermal power demands
- Could be used for frequency control of the electrical grid and allows cost-effective thermal power production (in combination with smart grid)

All temperatures are indicative.
A recent evolution of Heat Pumps output temperature

- **Wasted heat**
  - **Standard HP**
    - About 150 k€ / MWth
    - More than 20 providers
  - **High Temperature HP**
    - From 2014, about 200 k€ / MWth
    - 5 providers
  - **Very High Temperature HP**
    - From 2016, about 350 k€ / MWth
    - 2-3 providers

- **Heat needs**
  - With T>70°C, these HP's open new markets in industry
  - Possible use in industry to produce steam

Cost level for industrial Heat Pumps installed (EDF)
Cost level for industrial Heat Pumps

Heat pump technology
State of the art

Market available heat pump technology:
- Maximum sink temperature: 130 °C (Prototypes 170 °C)
- Maximum temperature lift: 50 K per stage
- Specific investment incl. planning and installation:
  - small (0.1 MW_th to 1 MW_th): 350 to 900 EUR/kW_th
  - large (1 MW_th to 20 MW_th): 250 to 500 EUR/kW_th
- Efficiency

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Sources:
Our vision is to accelerate the world’s energy transition towards a sustainable future

www.vikingheatengines.com