



Contribution to the European
energy transition with the world's
hottest close loop heat pump

HeatBooster – Introduction



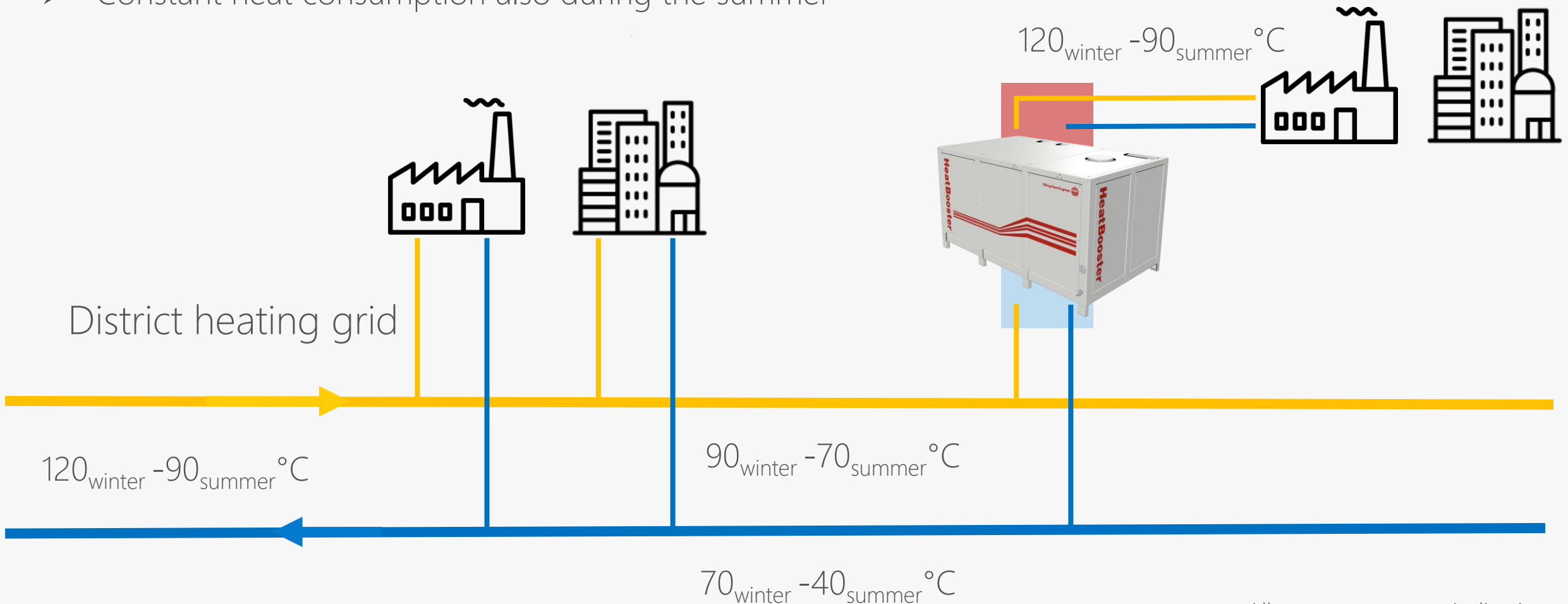
- Viking Heat Engines: Founded in 2009, Locations in Norway and Germany
- Technology: Unique piston compressor technology
- Products: Compressors and complete heat pumps
- Variants: Water/Water, Steam/Steam, Water/Steam, Steam/Water
- Working Fluids: All new HFOs e.g. R1234ze, R13336mzz(E), R13336mzz(Z)
- 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:



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

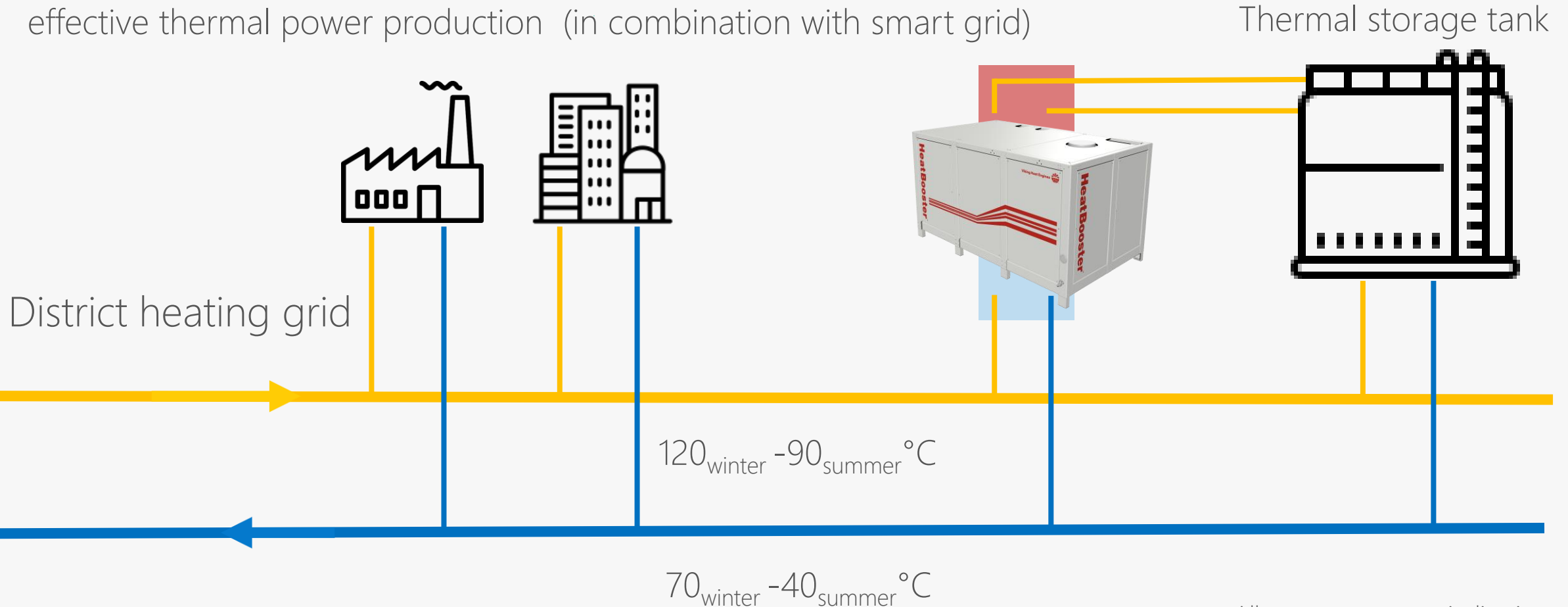


All temperatures are indicative

District heating using **HeatBooster**

The **HeatBooster** could be used in combination with a thermal storage tank.

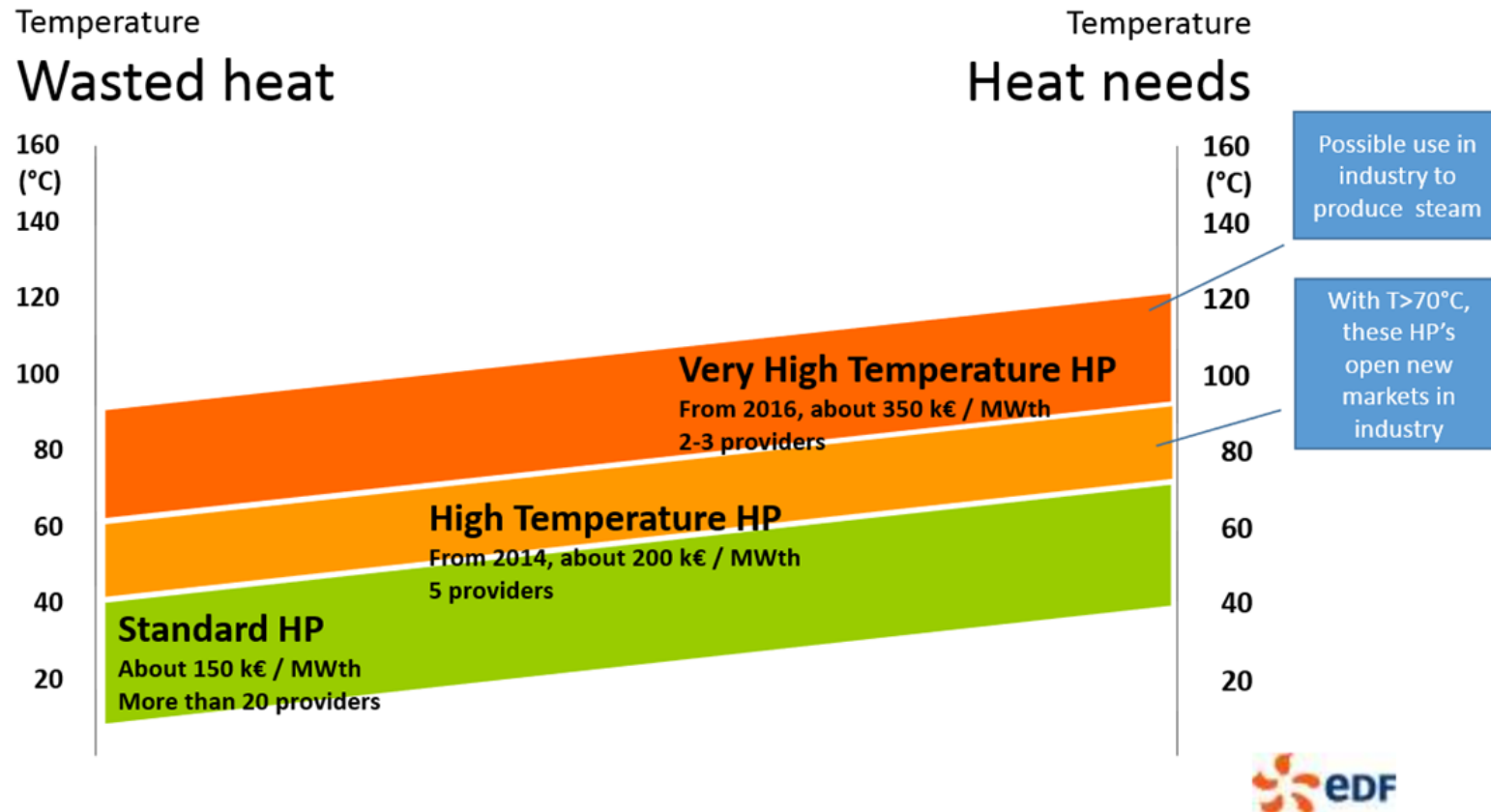
- Allows a better control of the different thermal power demands
- Could be used for frequency control of the electrical grid and allows cost effective thermal power production (in combination with smart grid)



All temperatures are indicative

Cost level for industrial Heat Pumps installed (EDF)

A recent evolution of Heat Pumps output temperature



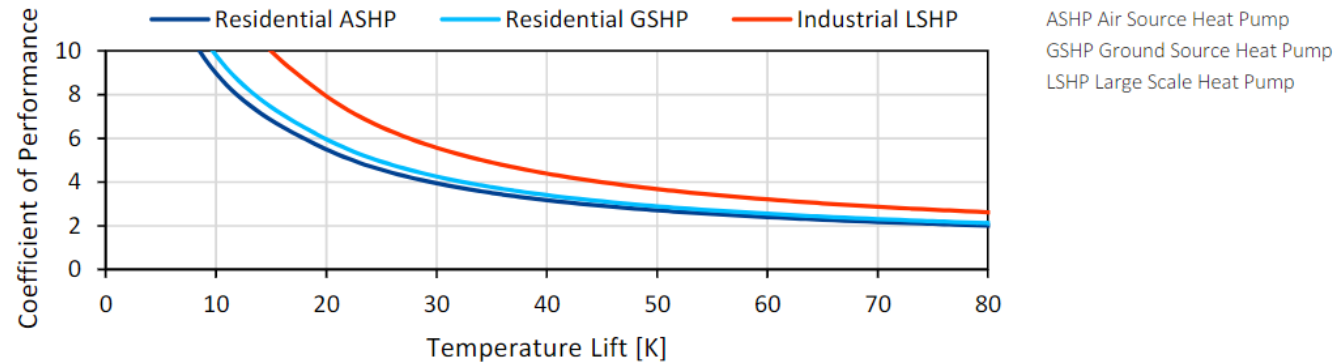
Heat pump technology

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





Our vision is to accelerate the world's energy transition towards a sustainable future

www.vikingheatengines.com

Norway

Tel: +47 38 10 41 00

norway@vikingheatengines.com

Germany

Tel: +49 2191 4489510

germany@vikingheatengines.com