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NIBE Climate Solutions

Pathways to Market Development for Geothermal: The European Experience

Focus on three core businesses



BUSINESS AREA NIBE CLIMATE SOLUTIONS



BUSINESS AREA NIBE ELEMENT



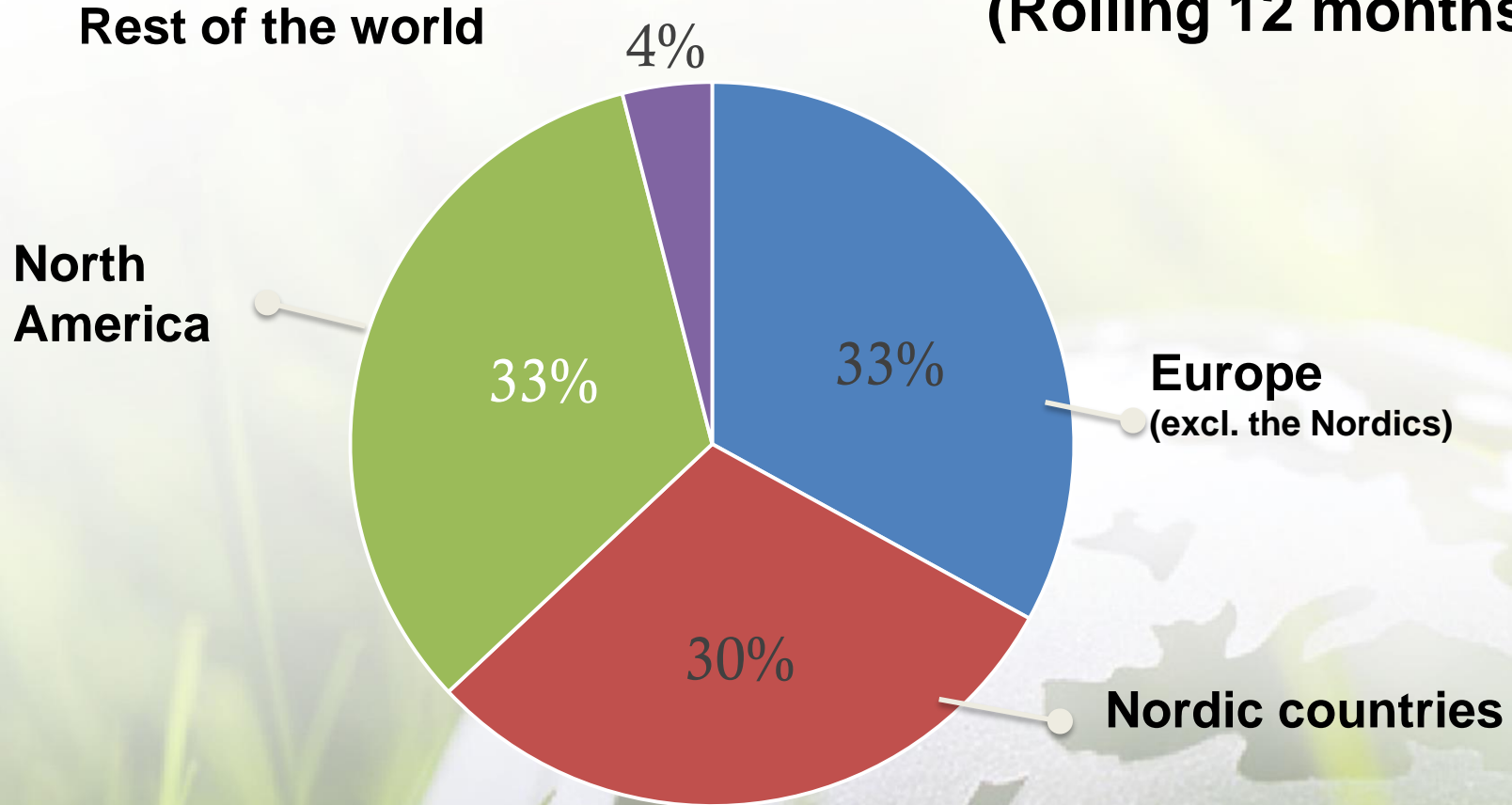
BUSINESS AREA NIBE STOVES



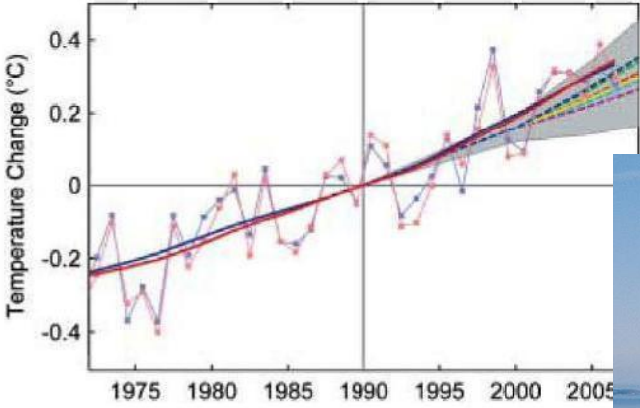
Operations and sales on five continents



Geographical distribution of Group sales (Rolling 12 months) 2017



A world in change – looking for solutions



20-20-20 by 2020



- Energy from renewable energy sources
20 % renewable energy in EU as a whole
- Reduction of emissions
20 % reduction of green house gas emissions
- Energy efficiency
20 % improved efficiency



Targets for 2030 adopted 23 October 2014



- 40% CO₂-reduction relative to emissions 1990
- 27% of renewable energy in EU
 - No sectorial targets*
 - No binding targets on MS level*
- 27% Improved energy efficiency
 - Indicative target*

Energy markets in transformation

Governing forces

- Energy price development
- Policies
- Technological development



Challenges

Security of supply

- Generation of electricity with low carbon footprint
- Renewable electricity Wind- and hydro power, PV
- Nuclear and Carbon capture and storage (CCS)

Challenges

Road transport

- Electric & Plug-in hybrid cars
- Bio fuels



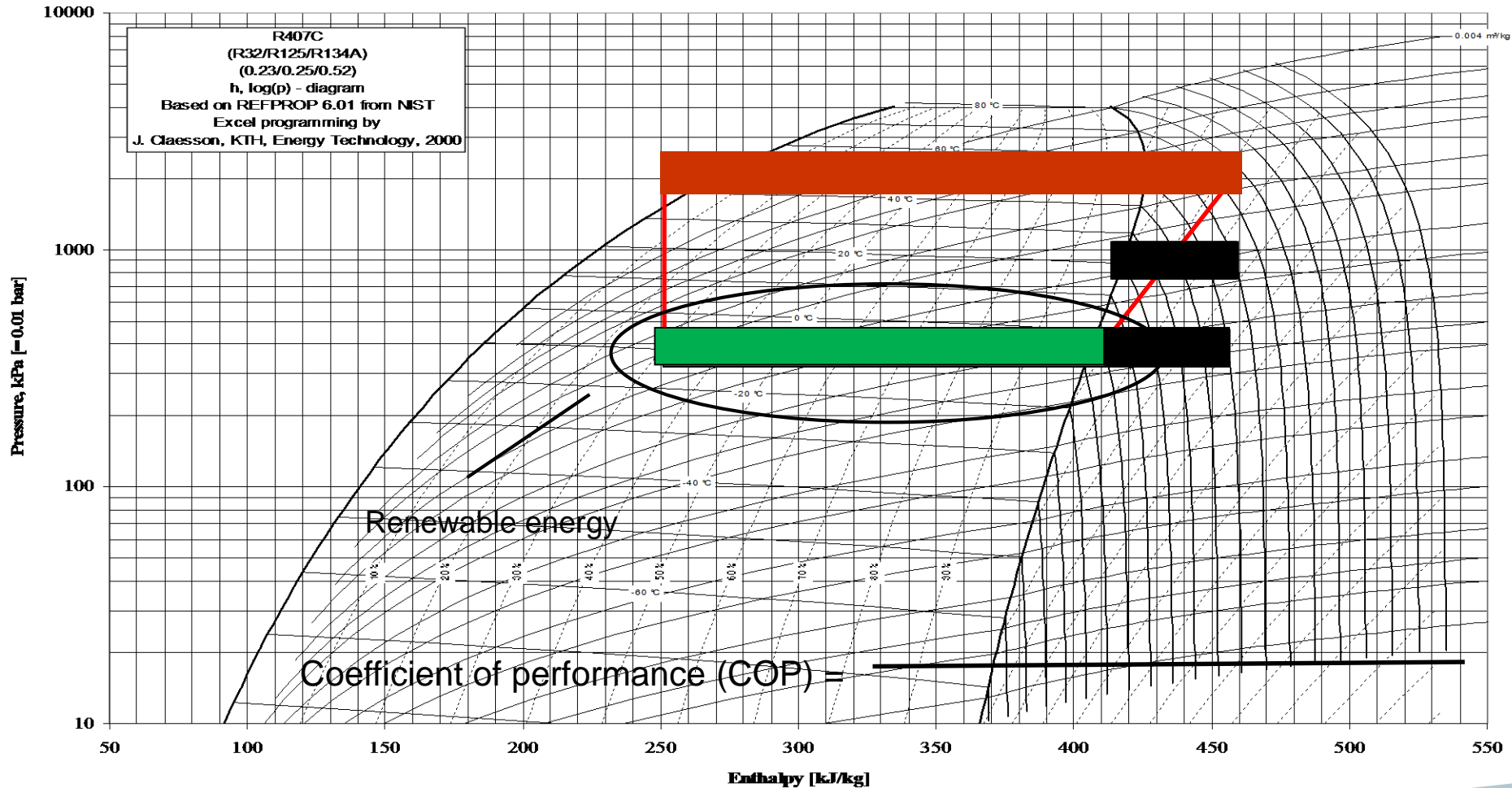
Third industrial revolution

- Focus on energy efficiency
- Renewable energy
- Low carbon technologies



Threefold benefits with heat pumps

- Renewable energy
- Reduction of green house gas emissions
- Improve energy efficiency



Renewable energy provided by heat pumps

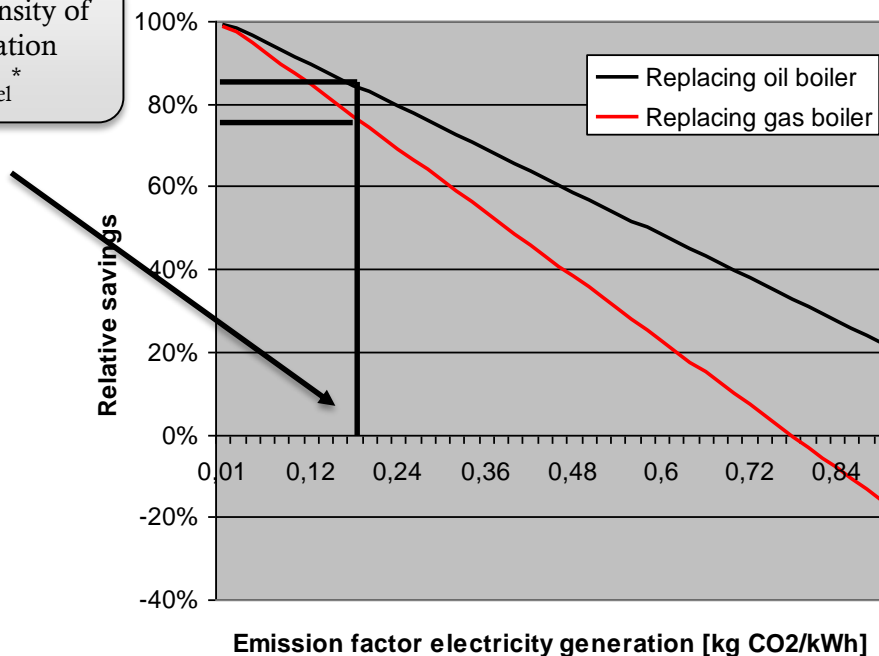
$$E_{\text{RES}} = \text{[Red Box]} - \text{[Black Box]}$$

or

$$E_{\text{RES}} = Q_{\text{usable}} \times (1 - 1/\text{SPF})$$

Relative emission savings gained by heat pump retrofit

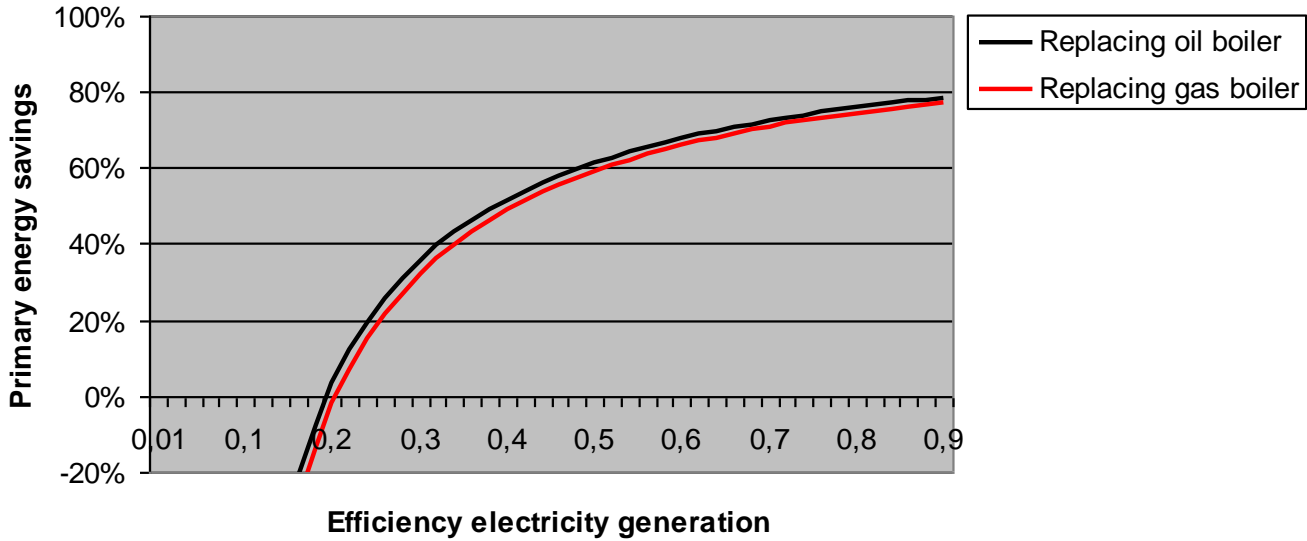
Canadian CO₂ intensity of
Electricity generation
150 gr/kWh_{el}*



Conditions used for the example
gas boiler efficiency 95%, oil boiler efficiency 90%,
monovalent heat pump operating with SPF 4.

Each gas boiler that is replaced by a geothermal heat pump in Canada reduce GHG-emissions by more than 75%

Primary energy savings



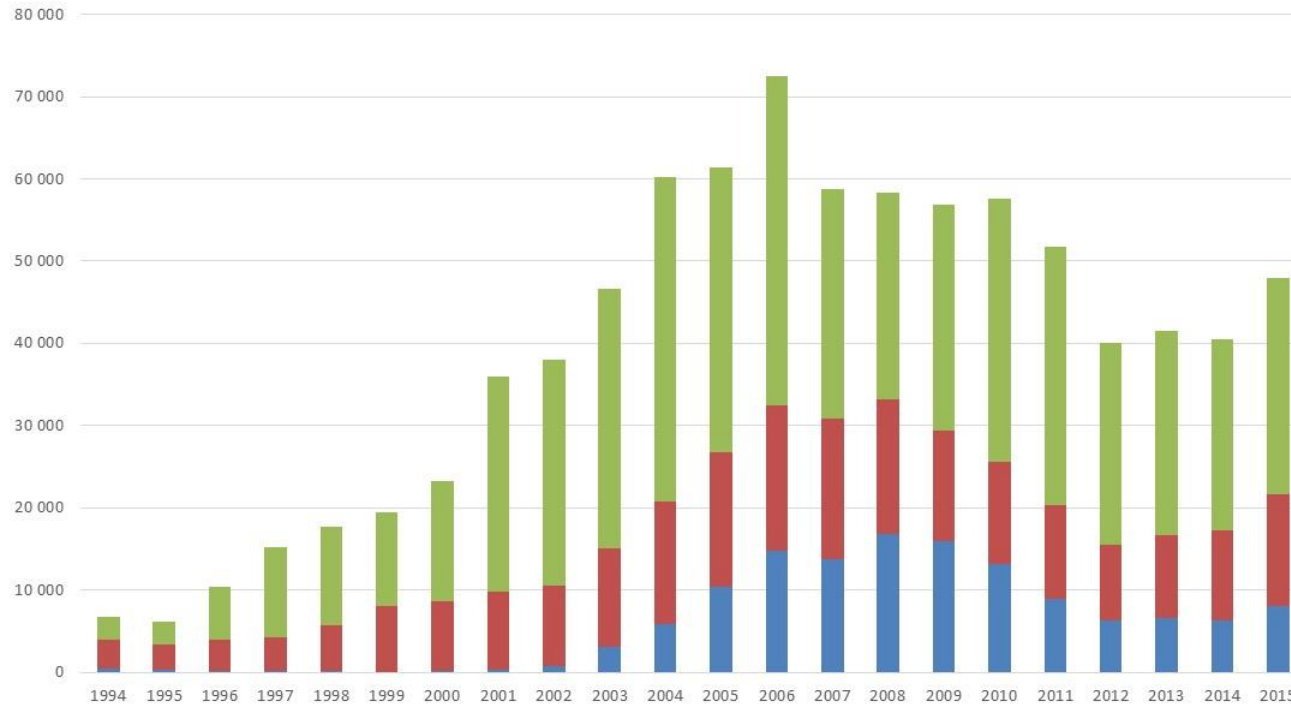
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National consequences of a large scale implementation of heat pumps



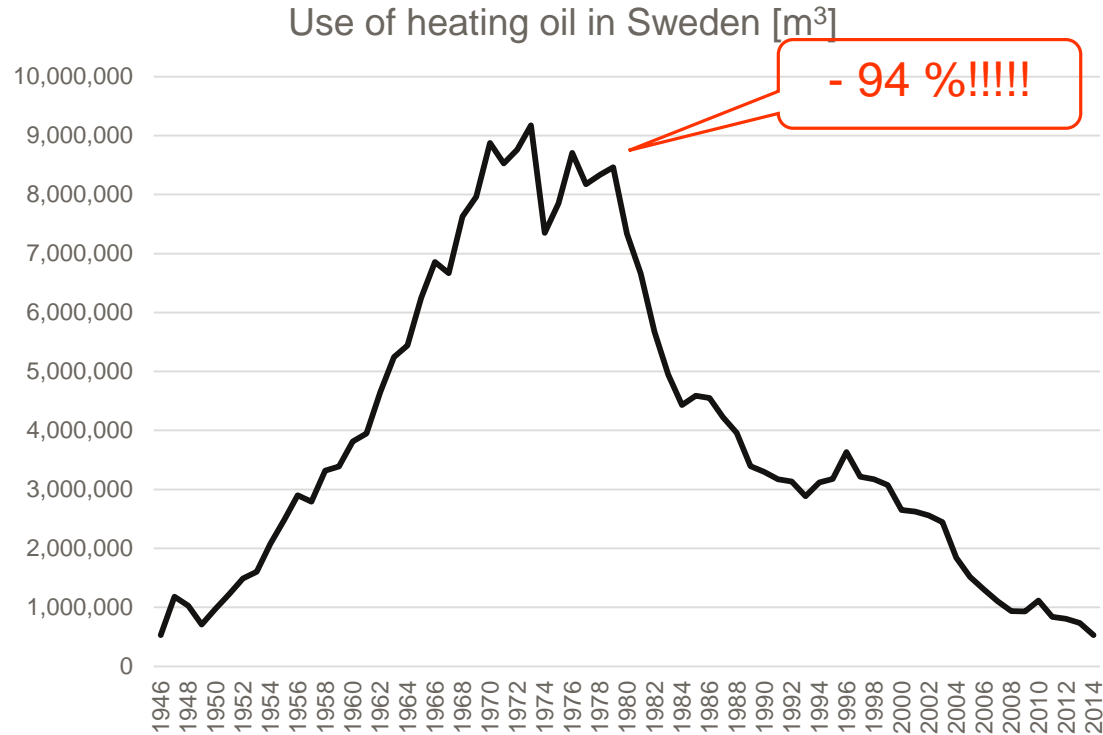
The example of Sweden

Heat pump sales in Sweden

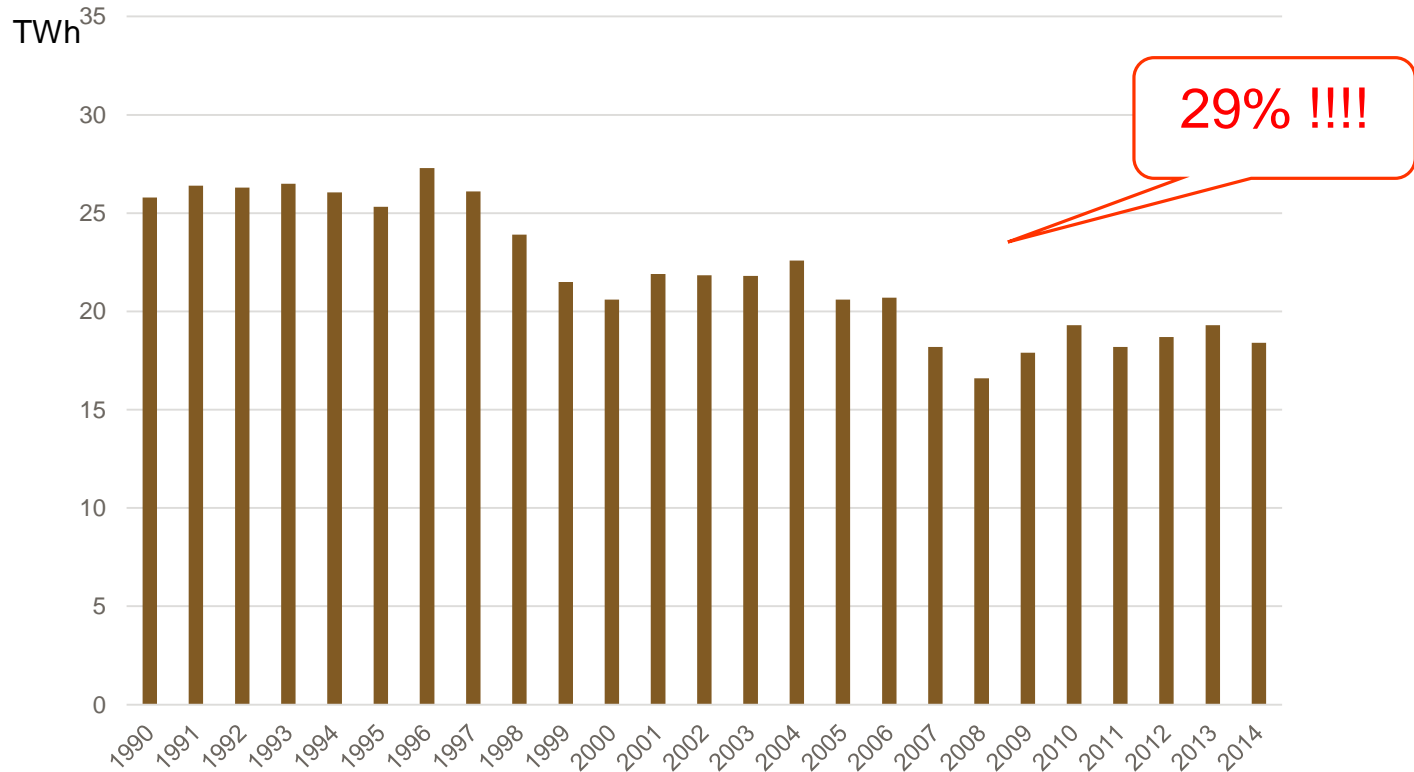


Ground source, Exhaust air and Air to Water (excluding Air to air)

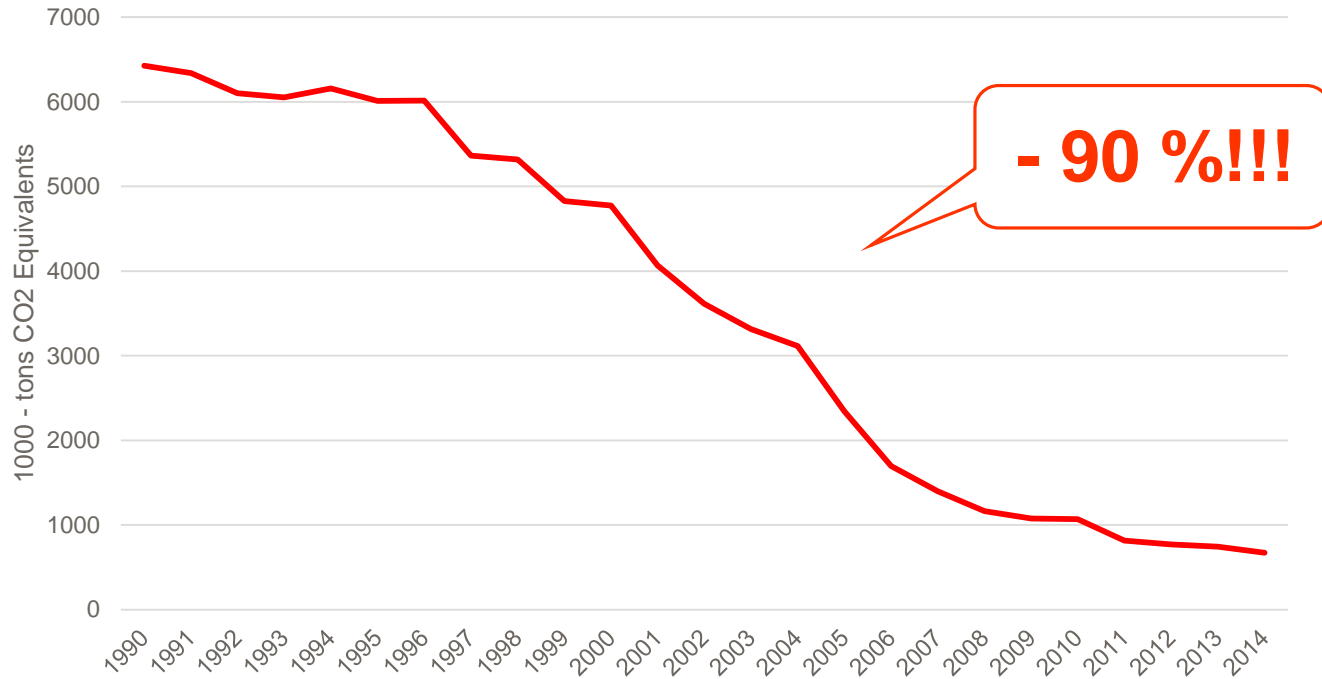
Consequences of the use of heat pumps in Sweden



Use of electricity for heating purposes in Sweden



GHG-Emissions related to heating in buildings

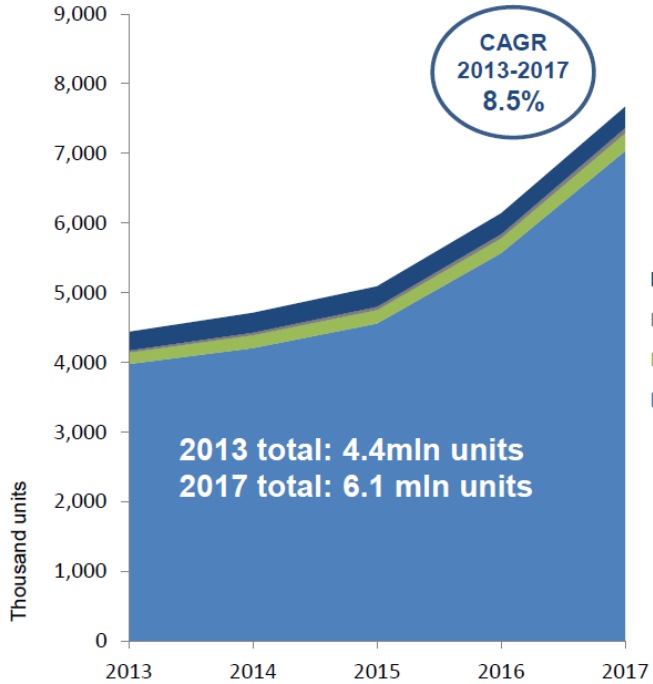


Source: Naturvårdsverket

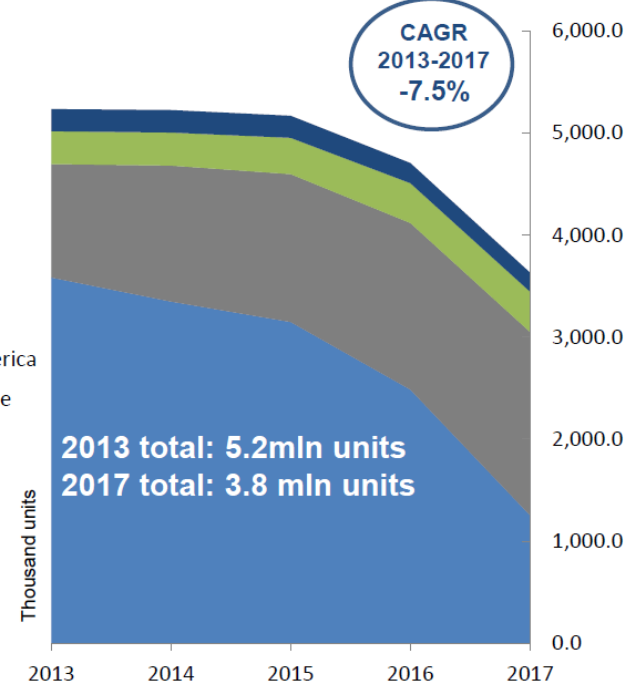
World Domestic Boiler Technology overview



Sales of Condensing units

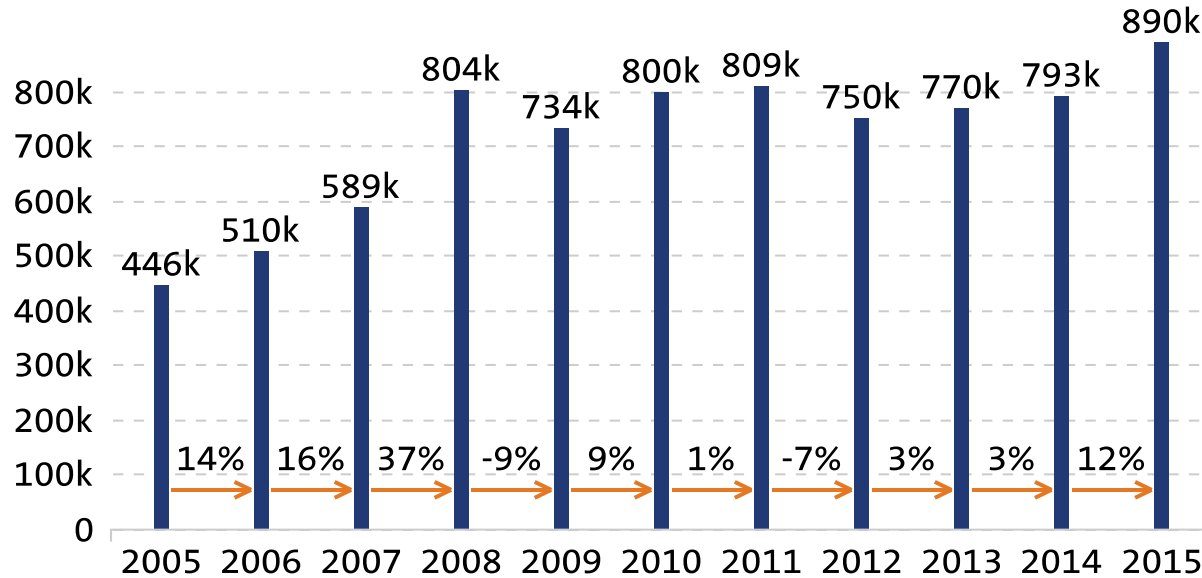


Sales of Non-Condensing units



Heat Pump Market Development 2005 – 2015

Accumulated: 8.4 million units installed



Countries



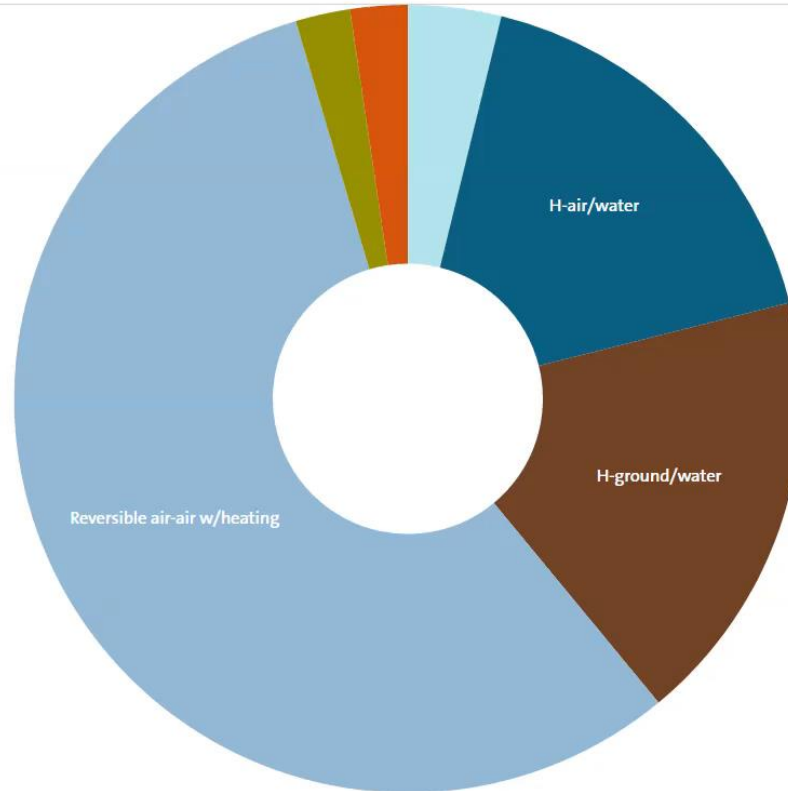
The share of GSHP is decreasing

Air is the dominant source

■ year: 2007

[download csv](#) [download pdf](#)

- District heating
- Exhaust air
- H-air/water
- H-ground/water
- Hybrid HP
- Industrial heat pumps
- Other
- Reversible air-air w/heating
- Reversible other
- Sanitary hot water



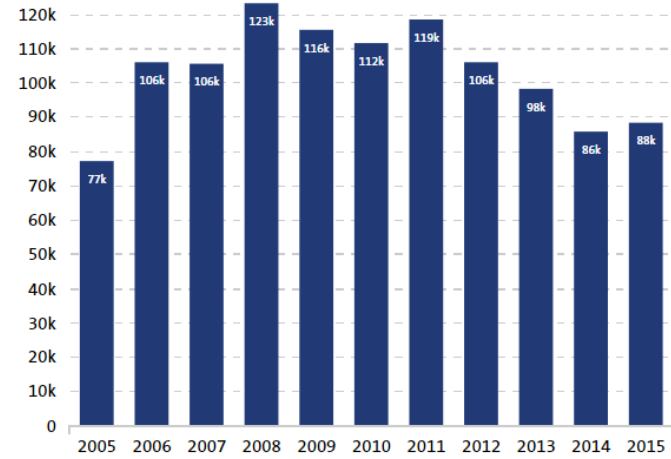
Reasons behind decreasing market share

- High costs
- Improved performance of air-water heat pumps
- Less fuss with authorities
- Less dependence of subcontractors

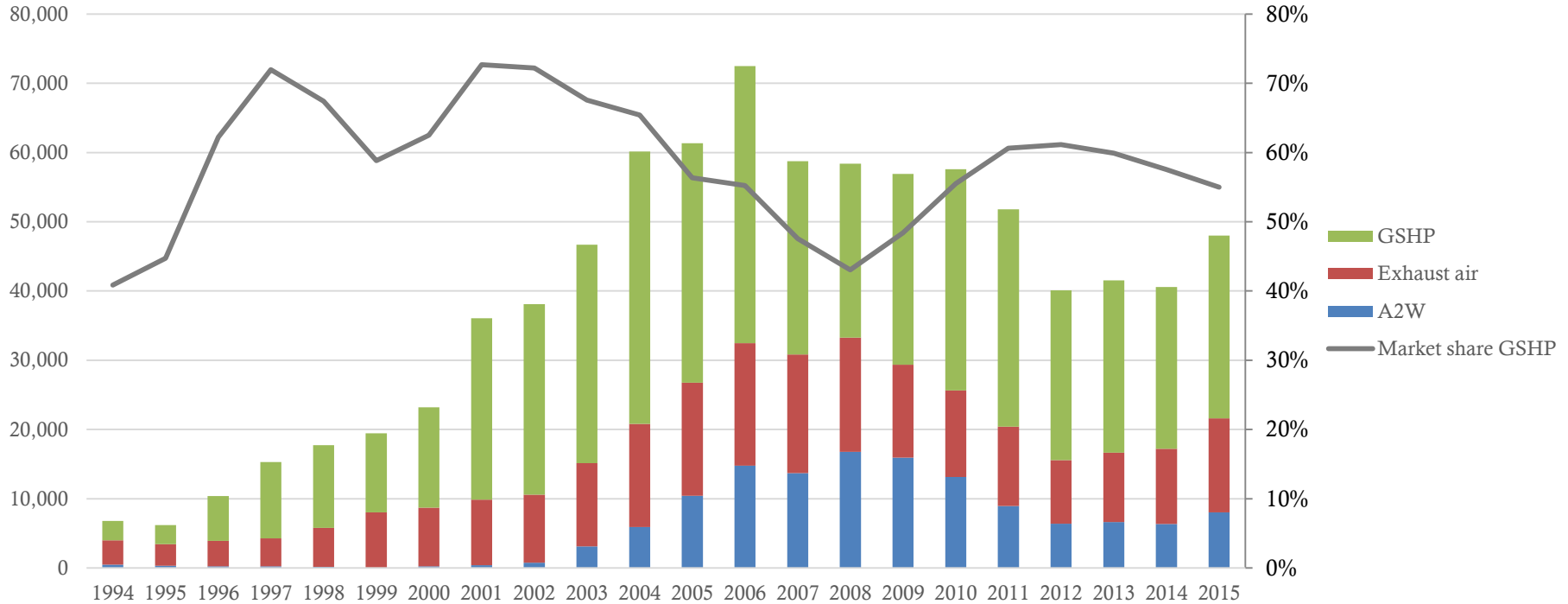


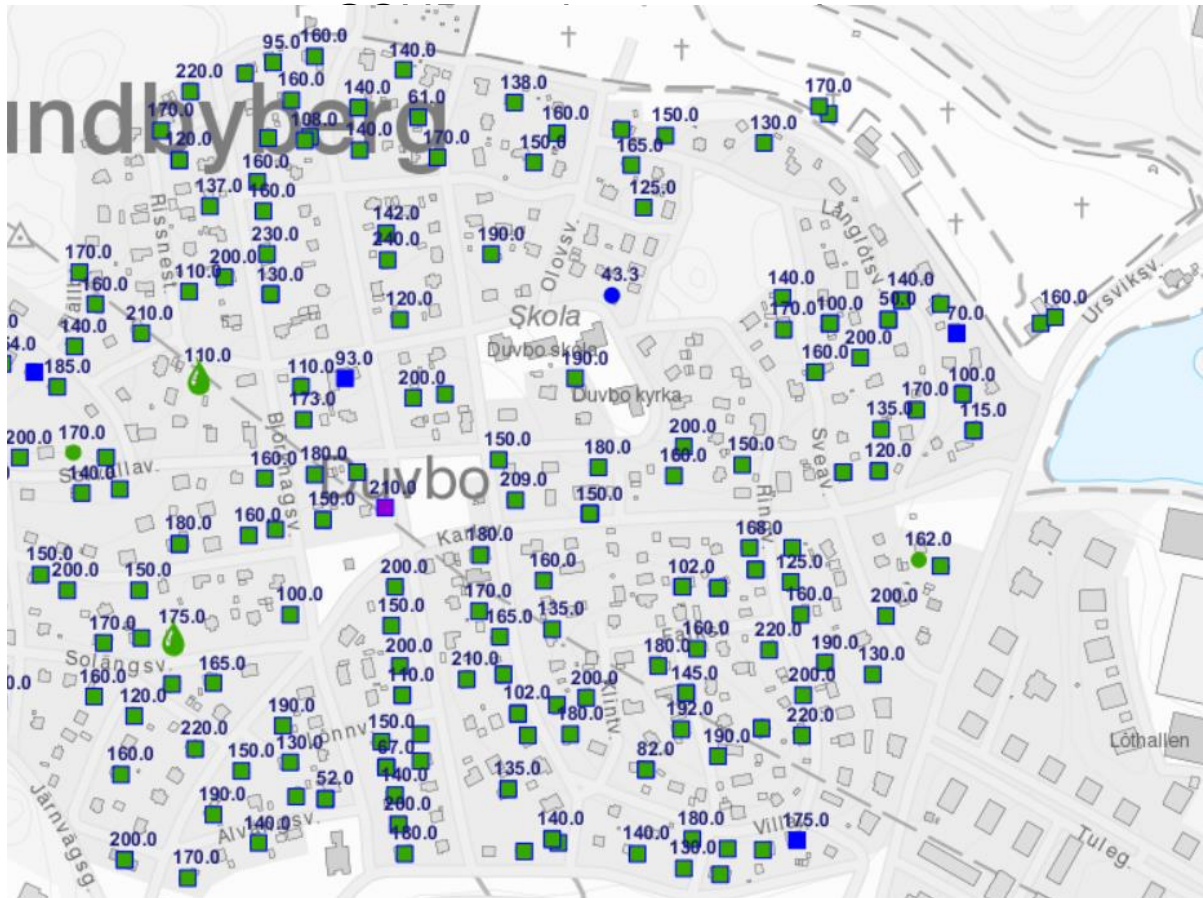
Source: FWS

Sales of GSHP in Europe



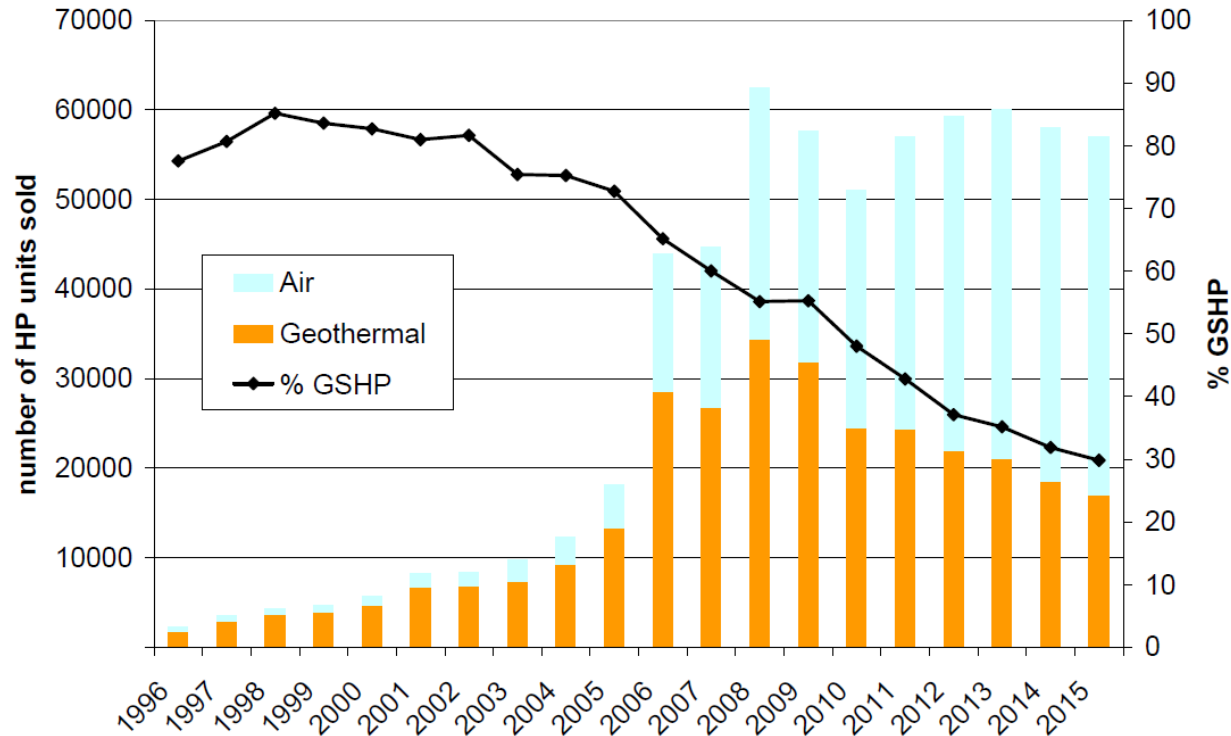
Swedish heat pump market development 1994-2015





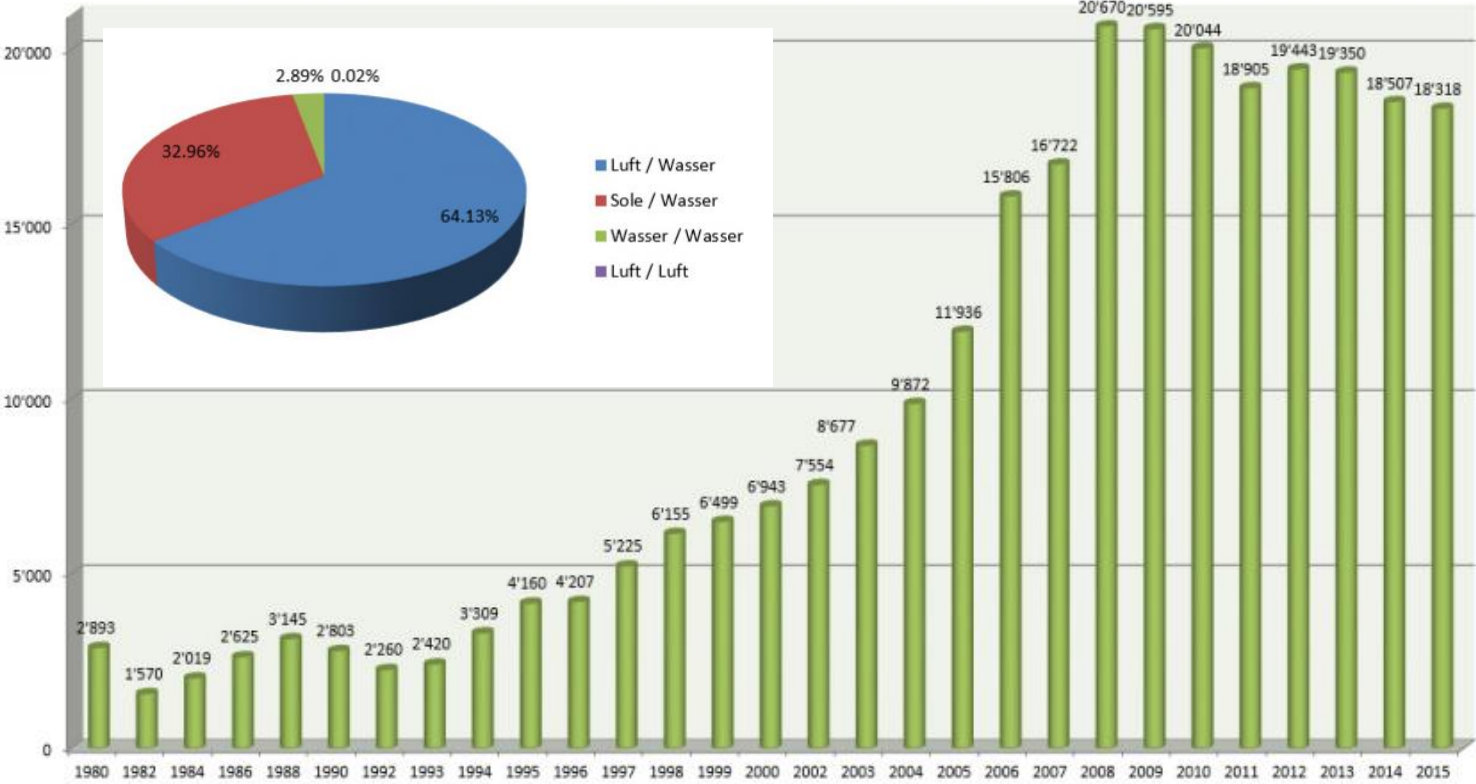


German heat pump market development 1994-2015

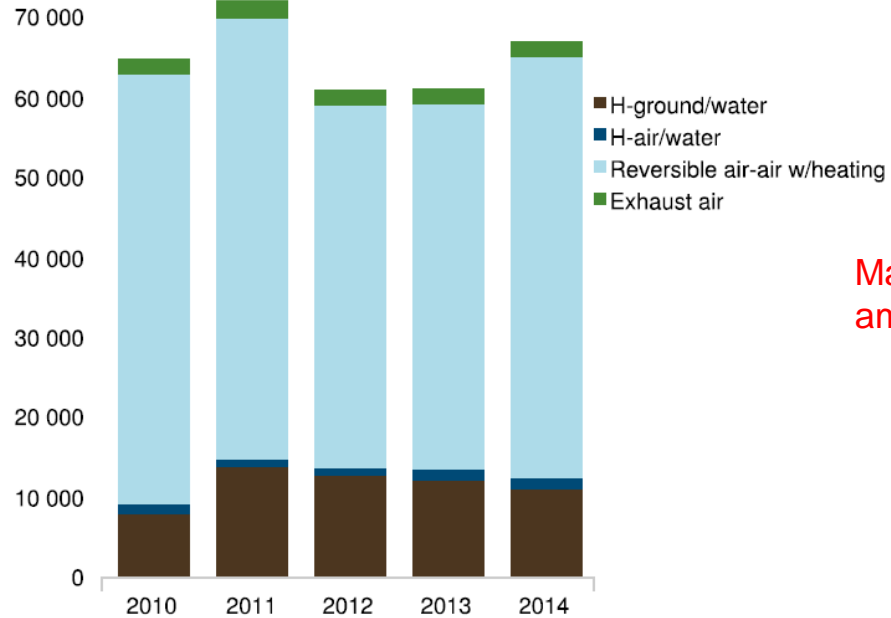


Source: Weber, J., Ganz, B., Sanner, B., Moeck, I., Geothermal Energy Use, Country Update for Germany, European Geothermal Congress 2016

GSHP share in Switzerland

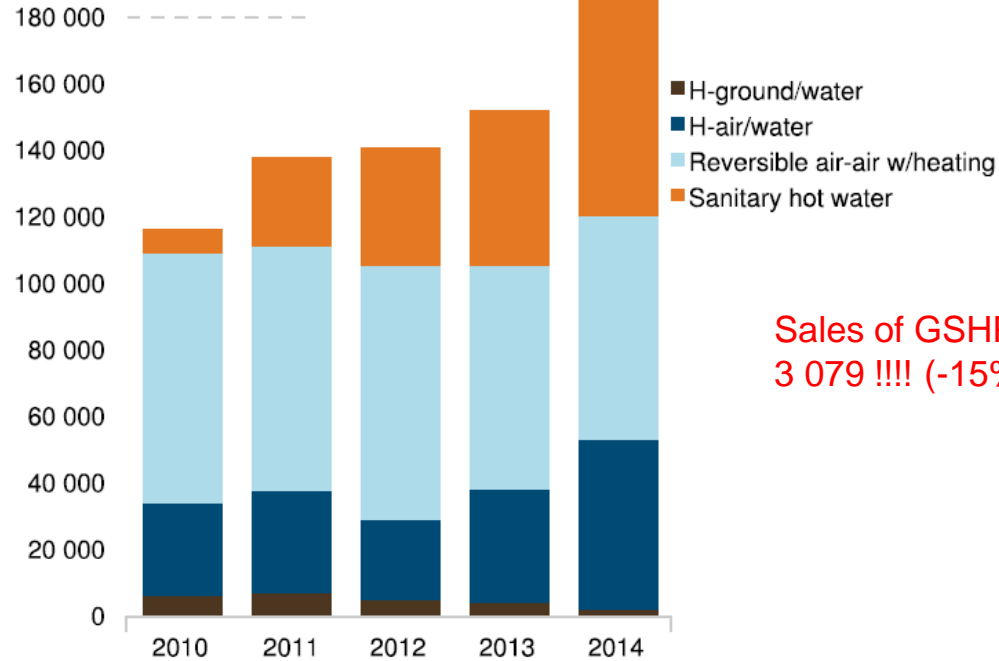


Sales development in Finland



Market share for GSHP
among hydronic HP 75%

GSHP share in France



Sales of GSHP 2015
3 079 !!!! (-15%)

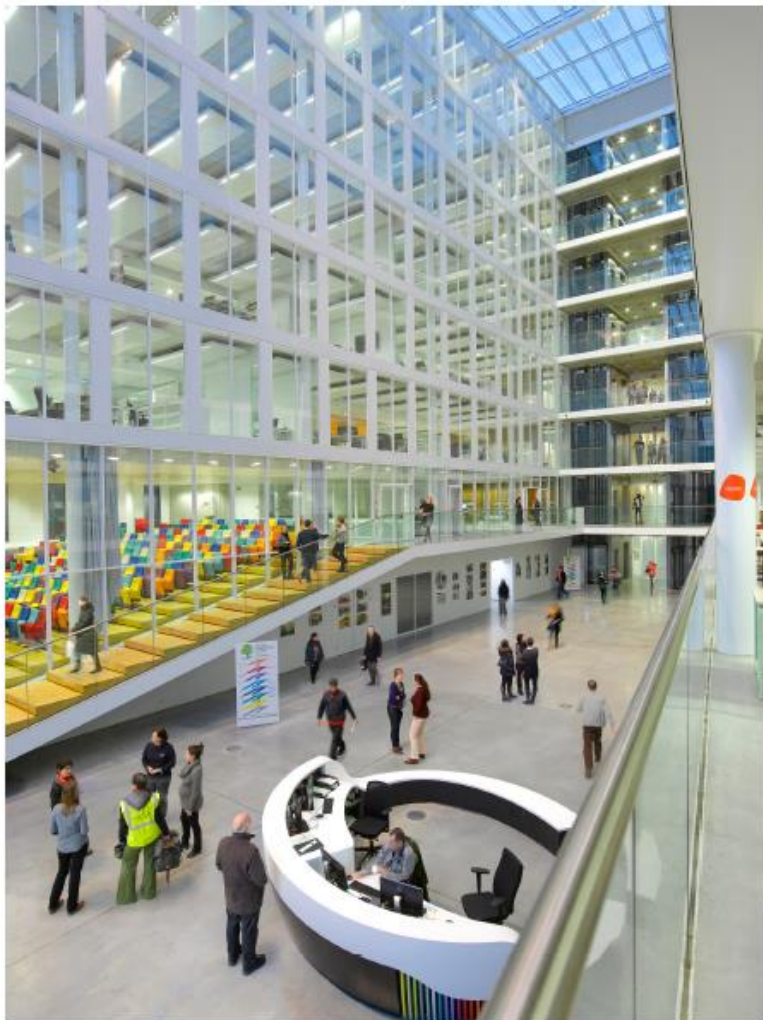
Governing force for renewable energy



Common success factors for GSHP

- Hydronic heating systems
- Larger heating loads
- Liberal drilling regulations
- High share of electric heating
- Strategic Utility allies





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at the BEL, Brussels

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