

Swedish model for fossil free, resource-efficient district heating – inspiration & success factors

Paul Westin

Senior Business Developer

International Markets, Swedish Energy Agency

Energy policy targets for Sweden

100 % renewable electricity production to 2040

No net emissions of greenhouse gases to 2045

50 % more efficient use of energy in 2030, compared with 2005



Three pillars for Sweden's energy policy

The target by 2040 is 100 per cent renewable electricity production. This is a target, not a deadline for banning nuclear power, nor does mean closing nuclear power plants through political decisions.

By 2045, Sweden is to have no net emissions of greenhouse gases into the atmosphere and should thereafter achieve negative emissions.

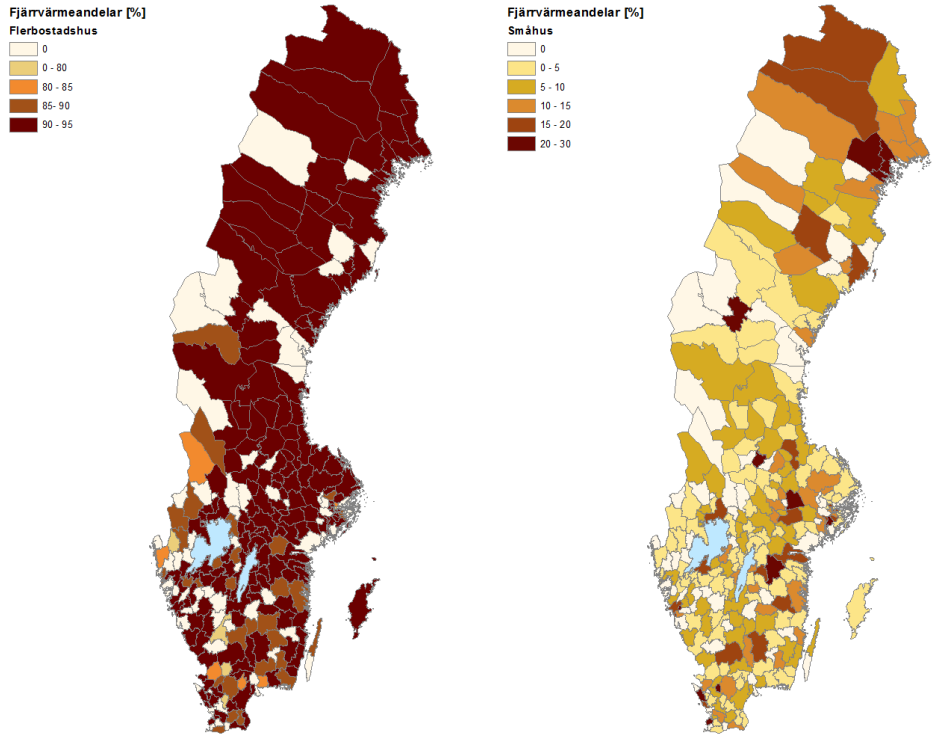
By 2030, the use of energy is to be 50 per cent more efficient (per GDP), compared with 2005.

The Swedish heat market

- The Swedish heating market amounts to ca 100 TWh (360 PJ) whereof DH is ca 60 TWh.
- Sweden has ca 200 DH-companies and 500 city/municipality networks.
- More than 60 % of the DH is from renewable energy sources
- The DH-market was deregulated in 1996
 - Today ca 65 % of are owned by municipal commercial companies and 35 % by private or state owned commercial utilities
 - Very few DH networks in Sweden are run as non-profit municipal operations.
- There is almost 2 million installed heatpumps producing ca 20 TWh of heating

District heating market shares

Market share of DH per municipality (290)

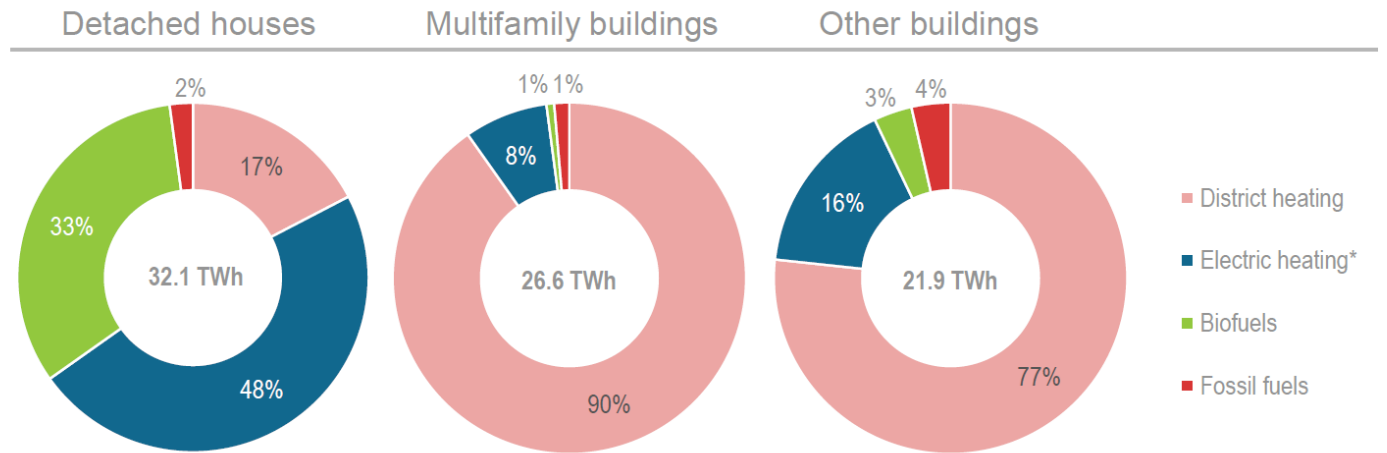


Multifamily buildings
scale 0-95%

Detached houses
scale 0-30%

Source: Swedish Energy Agency

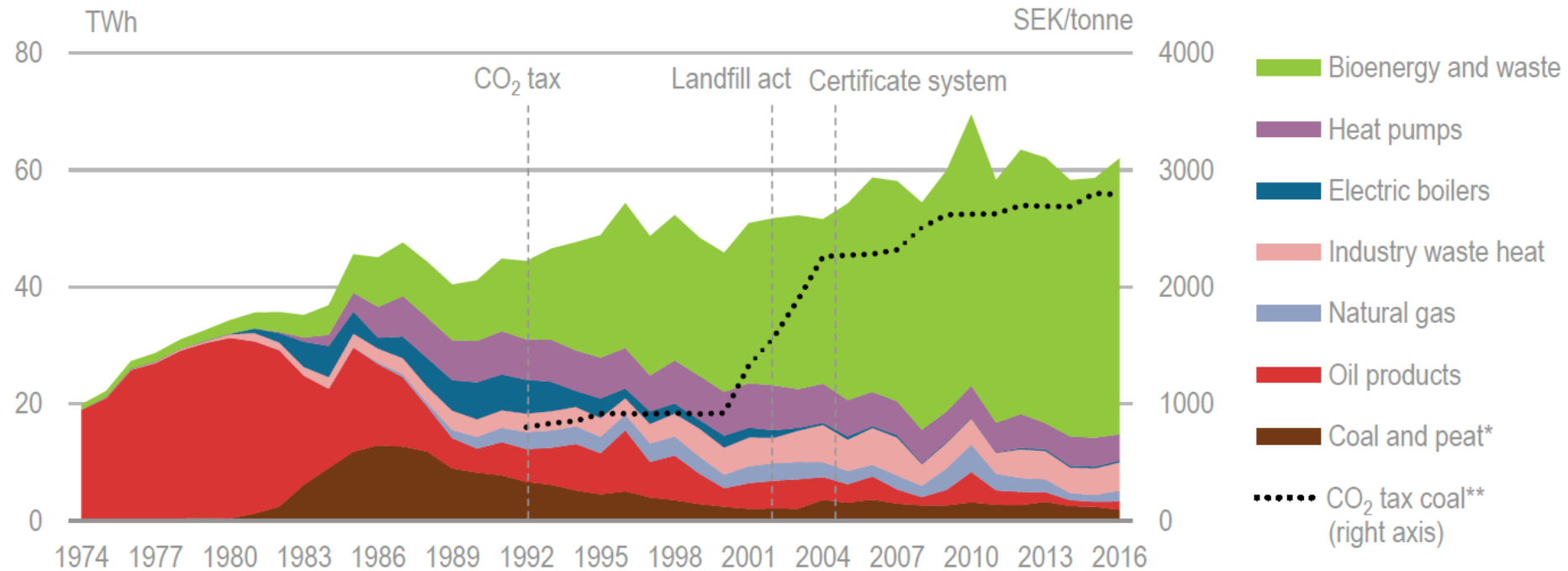
Figure 5.2 Energy consumption for heating by fuel and building type, 2016



DH dominates in multifamily buildings, whereas electricity and biofuels are the main heat sources in detached houses.

Source: IEA In-Depth Review of Sweden 2019

Input of energy to district heating production



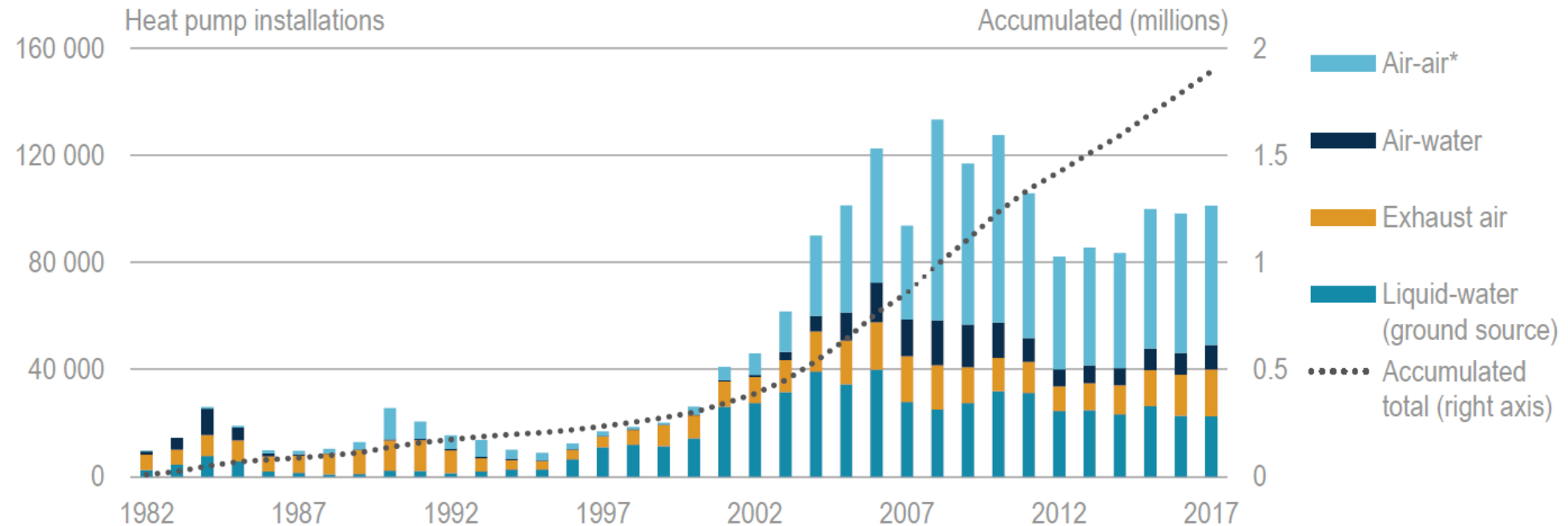
Since the introduction of the CO₂ tax, the landfill act and the green certificate system, biofuels and waste have become the dominant energy sources in DH.

* Coal includes coke oven and blast furnace gases.

** The CO₂ tax levels are per tonne of coal, but the tax has been increased at the same rate for natural gas and oil.

Notes: *Biofuels and waste* includes the category *other fuels* from the statistics, assumed to be non-renewable waste.

Heat pumps in Sweden

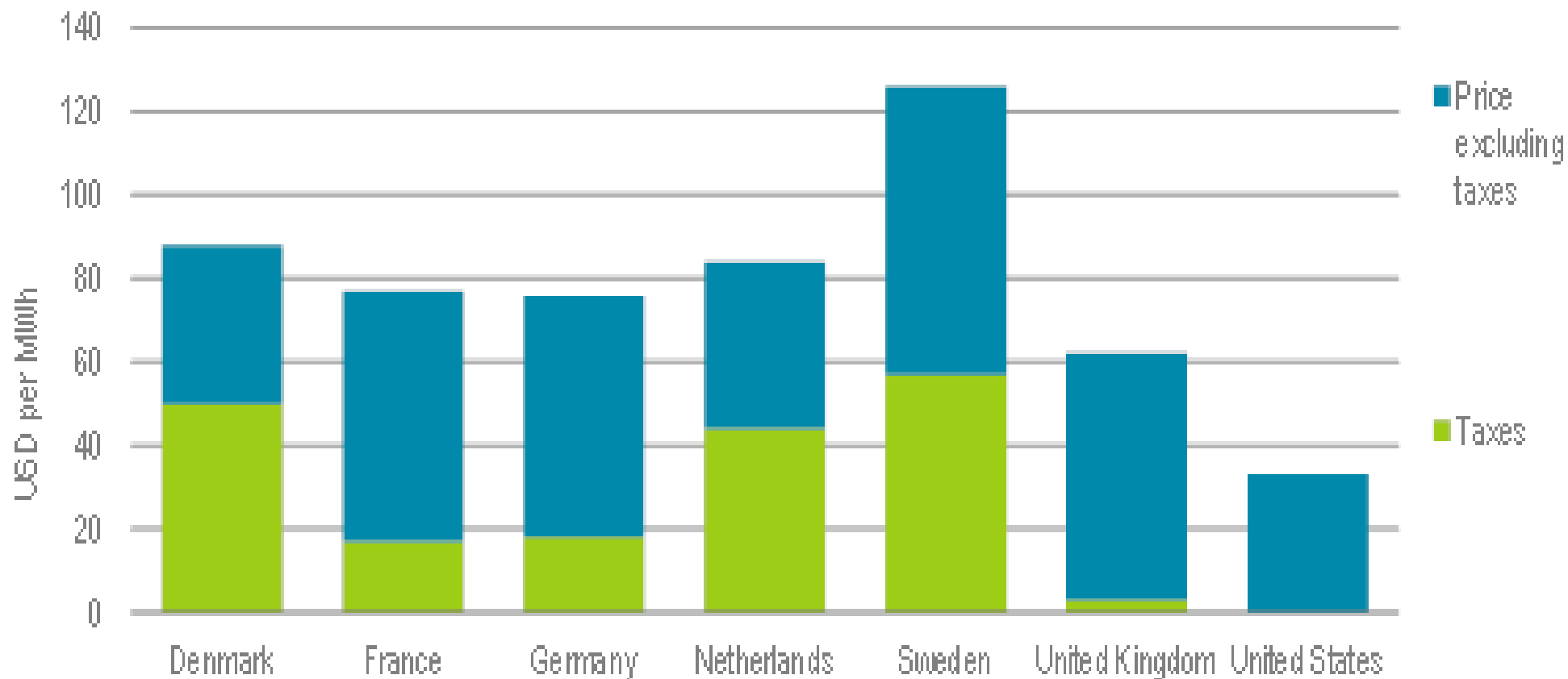


Heat pump installations increased rapidly in the early 2000s, and they have remained at high levels owing to investment support schemes and low electricity prices.

* Air-air heat pump data are estimated and uncertain.

Source: SKVP (2018), *Värmepumpsförsäljning (Heat Pump Sales)*, <https://skvp.se/aktuellt-opinion/statistik/varmepumpsforsaljning>.

Gas prices for residential consumers including taxes (2016)

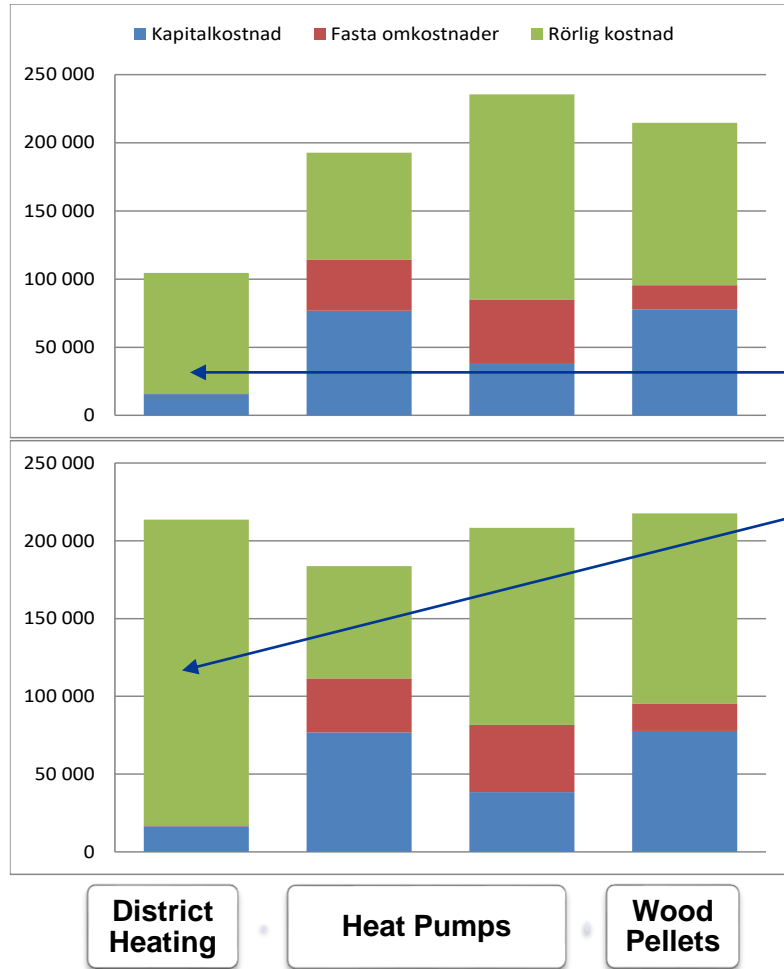


Source: IEA

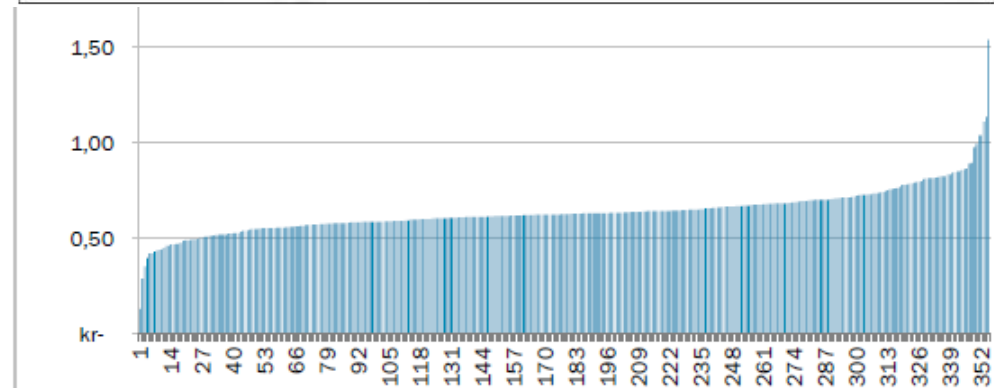
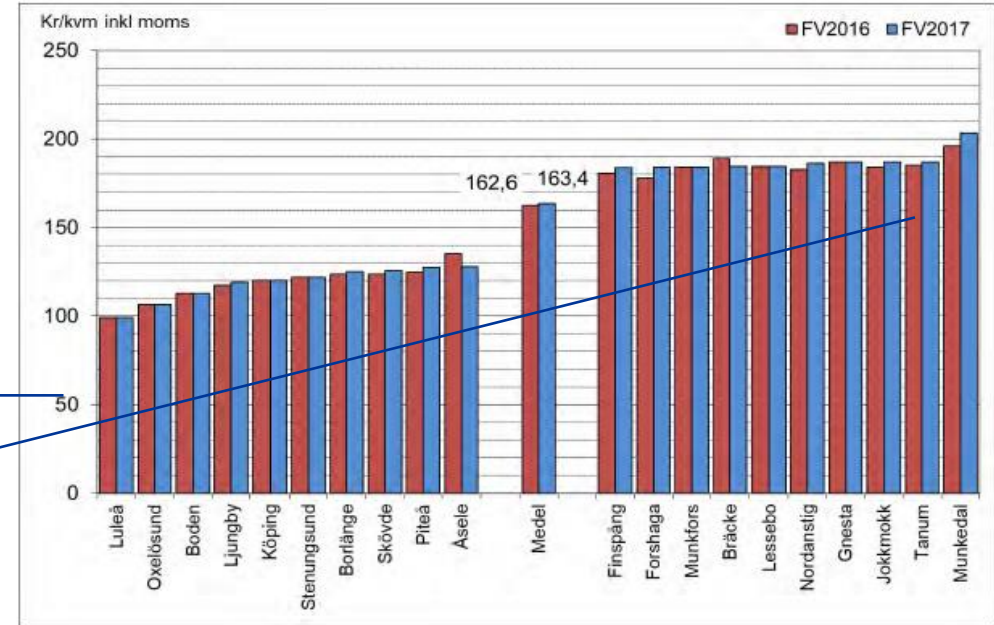
Sweden's households pay by far the highest natural gas prices in the EU (€0.114 per kWh), with 45% of the price made up by taxes in 2016, compared to for example taxes of just 7% in the UK, Sources: IEA and Eurostat, 2017

District heating prices can vary alot

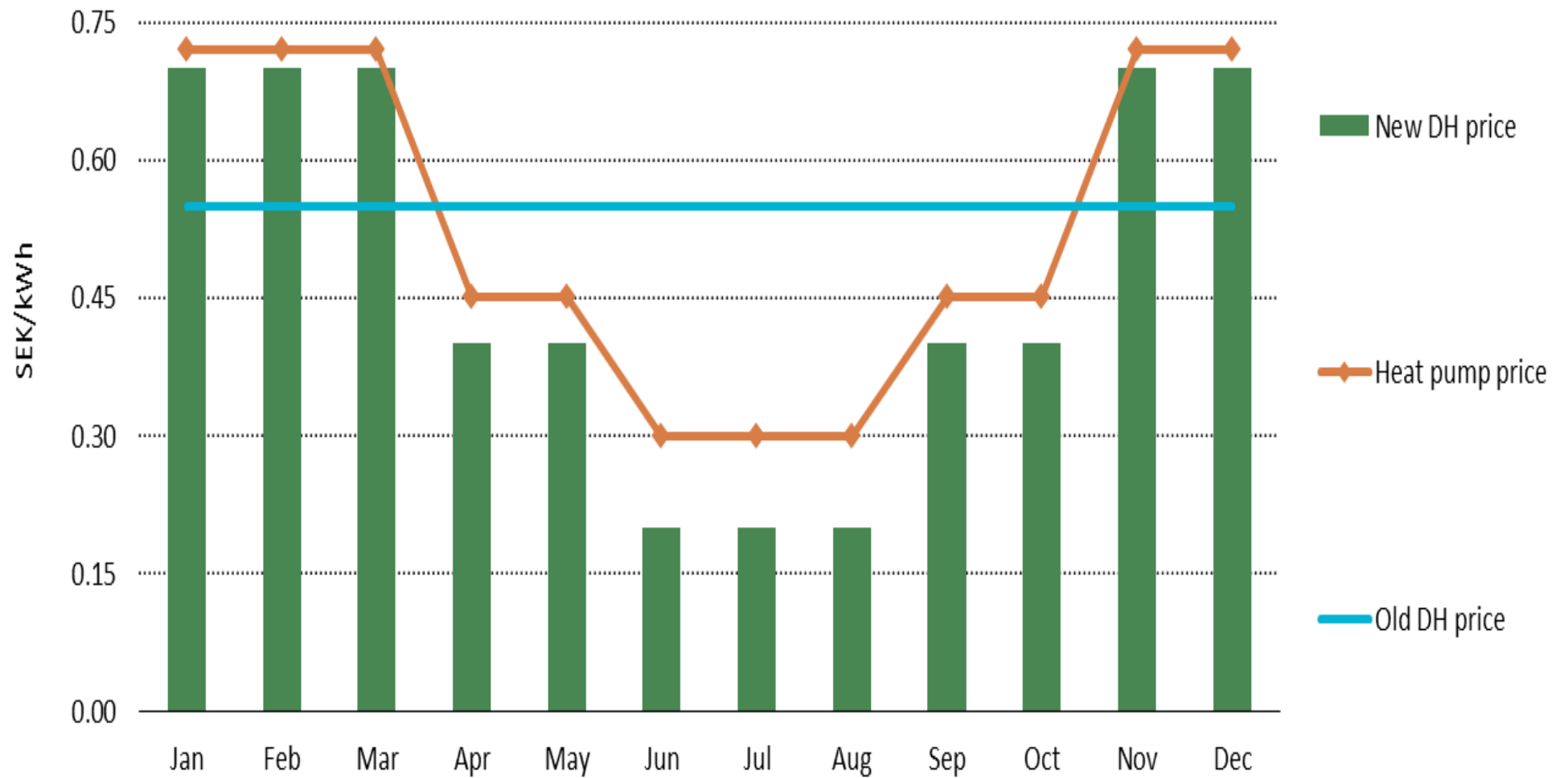
Yearly heating cost, cheapest vs most expensive municipality, multidwelling house 193 MWh



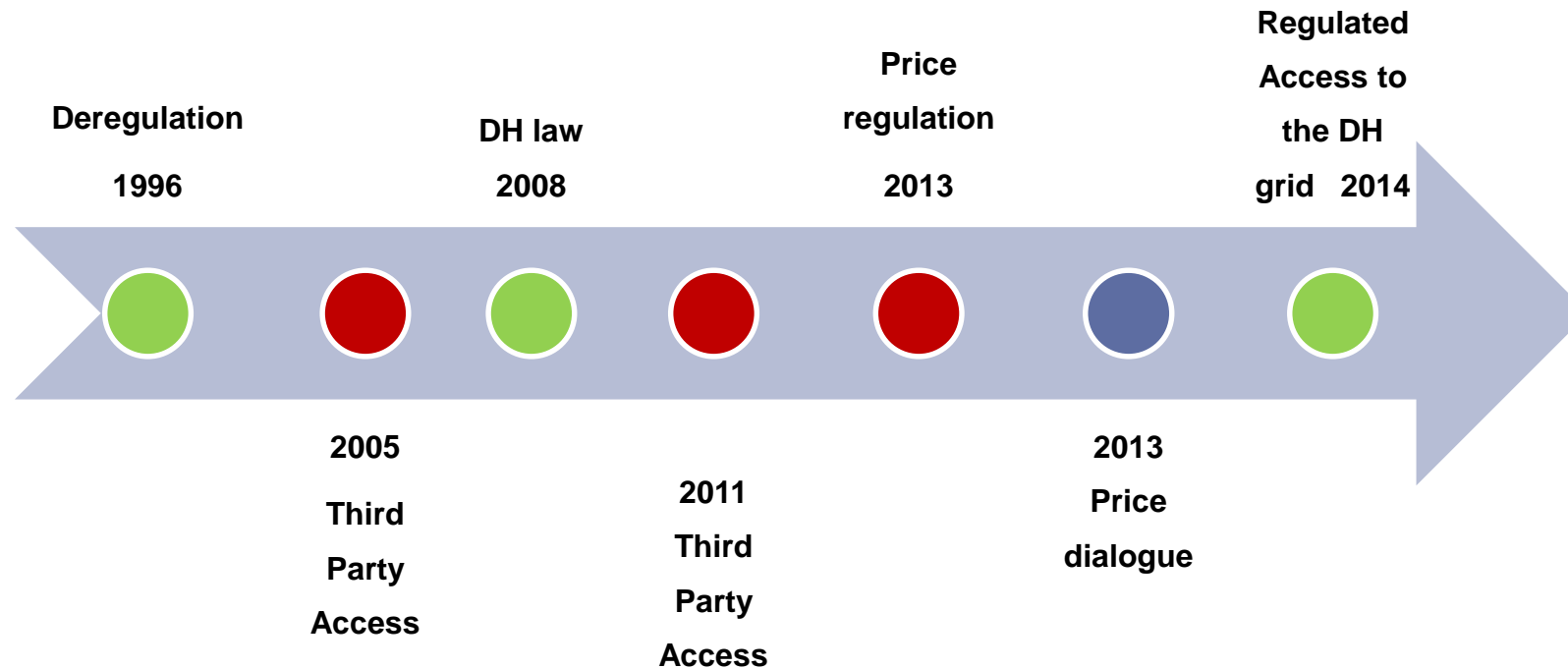
District heating price ranges, selected cities, Kr/m2 inkl VAT (100 kr ca 10 Euro)



Seasonally adjusted prices



Attempts at regulating the DH-market



Current key issues

IEA In-depth review Sweden 2019

– Recommendations for the government (Heat and DH):

- Closely monitor the market development for DH and its impact on the electricity system
- Clarify the long-term role for waste incineration in DH and align strategies for DH development
- Encourage the use of the Price Dialogue system to increase transparency in price setting and assess the need for support to expand the system further.
- Promote both R&D on efficient 4GDH systems and the integration of DH and electricity systems in smart grid developments.



DHC Challenges

- Increased CO₂- and energy taxes introduced on very short notice for DHC-plants already included in EU-ETS
- Waste incineration tax introduced
- Building code still based on bought energy instead of used energy – favouring individual heating eg. heat pumps
- Plastics in waste going to incineration must be reduced for fossil free heating – however DHC-business not in control

DHC Opportunities

- DHC increasingly important when power capacity problems are growing in Sweden
 - CHP provides locally produced electricity when and where mostly needed
 - DH provides 50 TWh heat which is not produced from electricity (DC 1 TWh)
- Increased cooperation with customers and other actors on heat market, via roadmap for fossil free heating, phases out remaining fossil fuels (4,5%)
- DHC aims to be a carbon sink through BECCS – development ongoing, some funding provided from government
- District cooling developing rapidly – 50% capacity increase expected 2030
- “Climate dialogue” with customers and others introduced – aiming to reduce GHG-emissions even further

Thank you for your attention!

E-mail: paul.westin@swedishenergyagency.se

Tel: +46 (0)16-544 20 58 Mobile phone: +46 (0)73-660 20 07

www.swedishenergyagency.se



YouTube

