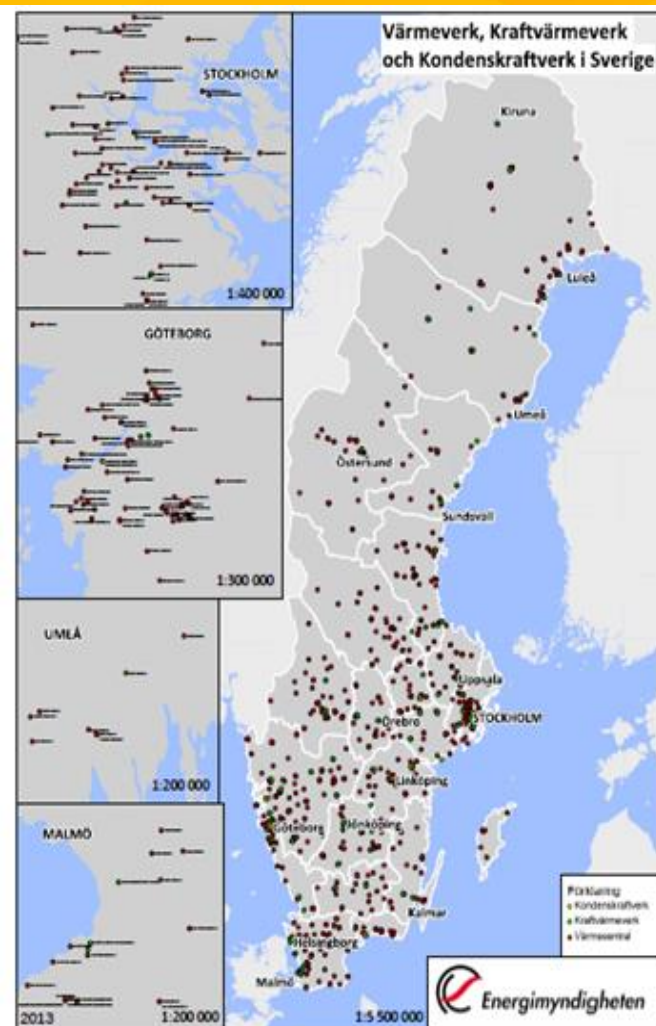


IEA Renewable Heating and Cooling Workshop – the Case of Sweden

Daniel Friberg, Swedish Energy Agency
IEA, Paris, February 7



What policies have been most effective in increasing renewable/low-carbon heat deployment?

What are the key success factors and remaining challenges?

Key success factor for building DH

- The Swedish DH networks were all built as a public good by the municipalities from the 1950s up till 1996.

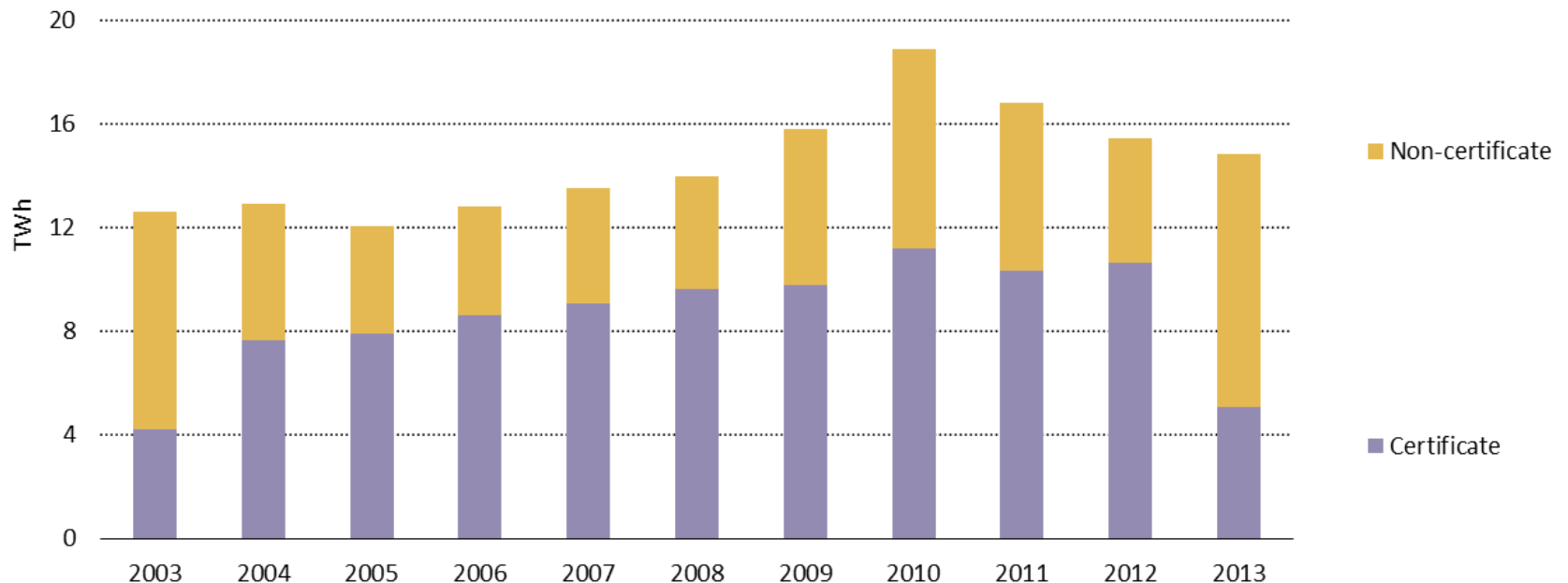
Key for increasing low carbon/renewable heat deployment

- Introduction of CO₂ tax in 1991
 - high for households and service
 - low for industry, forestry and CHP
 - CHP pays 0% CO₂ taxation since 2011, heat-boilers pay 80 % of default level
- Voluntary waste/excess heat co-operations
- The electricity certificate programme
- Ban against landfills of refuse/waste  Waste-CHP
- Swedish DH companies are part of the EU-ETS

Electricity certificate programme

- The 2003 market based electricity certificate programme incentivized biomass-based CHP
- Some plants reached the time limit on receiving certificates in 2013

CHP production receiving electricity certificates



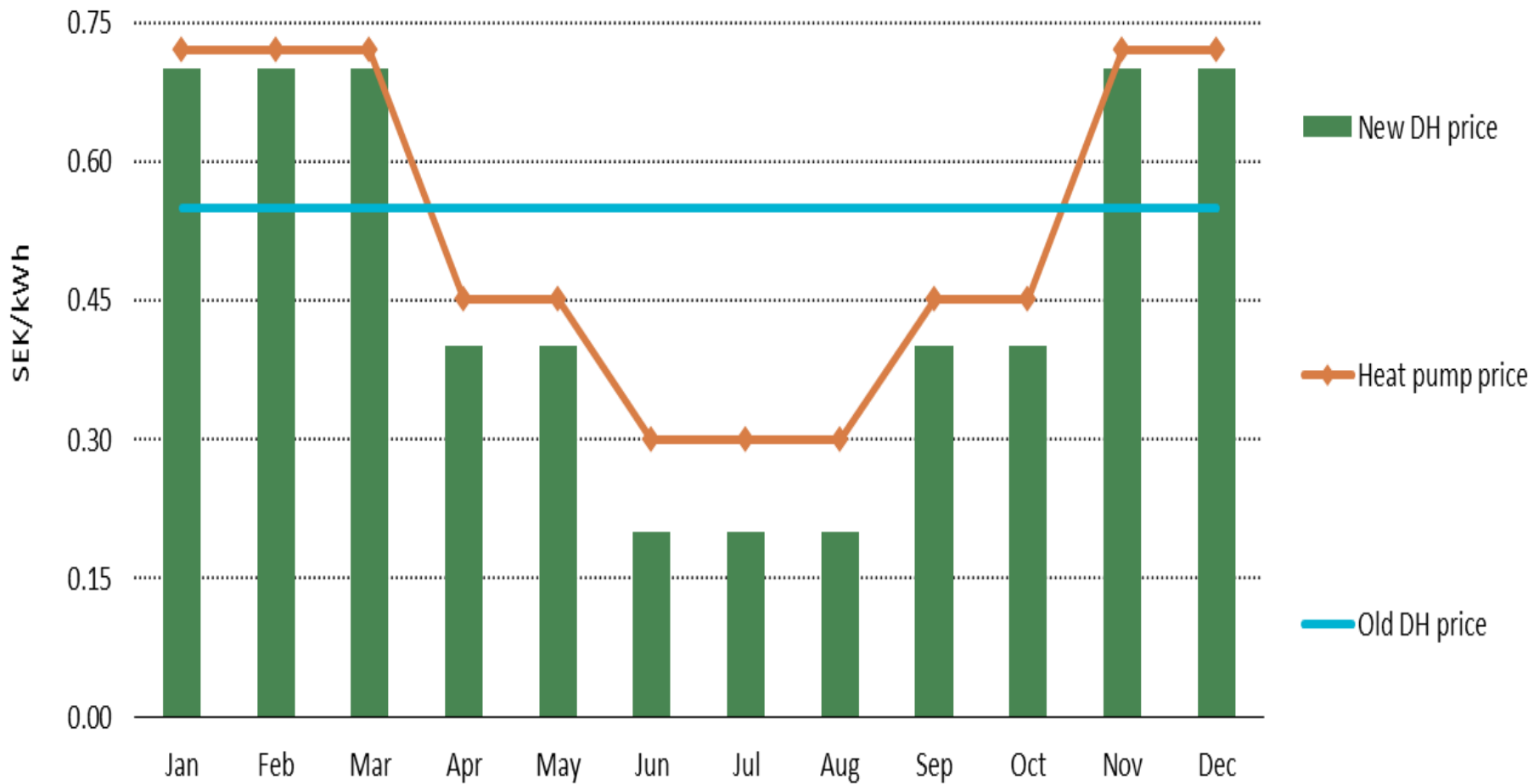
Challenges (for DH and CHP)

- Largely a saturated market
- Energy efficiency in buildings
- Increased competition from heat pumps (increased COP)
- Low electricity prices (hampering CHP development)
- Ownership issues (profit requirements)
- Costs of infrastructure development and reinvestments
- Ability to use waste heat
 - Right time
 - Right place
 - Right temperature

Possibilities

- Increasing competitiveness
 - Seasonally adjusted prices
 - Price on effect and energy
 - Increased service and competitive sales-packages (e.g. including broadband etc.)
- Finding new usages (roads, boats, drying processes, white goods etc.)
- 4th Generation DH-heating using low temperature heat.
- Using DH for "storing" electricity when prices are low through heat pumps (e.g. in Denmark).

Seasonally adjusted prices



How essential are district heating networks for the roll-out of renewable heat?

- The entire Swedish heating market amounts to ca 100 TWh whereof DH is ca 60 TWh.
- Bio-DH is ca 36 TWh (+ big heatpumps ca 3 TWh)
 Renewable DH comprises ca 40 % of the heating market!
- Sweden has ca 200 companies and 500 networks producing ca 55-60 TWh with 60 % biomass (with heatpumps renewables amount to ca 68 %).

What policy approaches have worked to incentivize district heating?

- **Fjärrsyn** – A DH research programme, researching waste CHP, waste heat, infrastructure developments, economics of DH etc.
- **Cooperation programme for bioenergy-based electricity and heat production** – R&D support mechanism for efficient and renewable CHP, heat plants, and industrial CHP.
- **Conversion subsidies** (2006-2008) to DH or Heat pumps from Oil or direct electric heating
- **Local Investment Programme** (LIP) 1998-2002 and the **Climate Investment Programme** (KLIMP) 2003-2012 sponsored the initiation of 260 DH-projects.
- For a full list of subsidies/ research programmes see: *The IEA CHP and DHC Collaborative (Sweden)* <https://www.iea.org/publications/insights/insightpublications/the-iea-chp-and-dhc-collaborative---chpdhc-scorecard-sweden.html>

What role can local authorities & local energy companies play? What instruments do they have at their disposal?

- Companies operate on a competitive deregulated market since 1996
- **Swedish District Heating Authority** (voluntary mediation between market actors since 2008)
- The Price Dialogue
- Energy planning/feasability studies (Climate grants)
- Regulated access to the DH-grid