Outlook of the European Heat Pump Market and The Success Factors Behind the Rapid Growth of the Heat Pump Market in Finland

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Heat pump market in EU
Stable market 2008 - 2013

Market development until 2005 - 2013\textsuperscript{e}
Accumulated: 6.8 million units installed

\begin{figure}
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\includegraphics[width=\textwidth]{chart}
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7 million Heat Pumps

Accumulated heat pump sales*

* Including sales before 2005 in DE, SE and AT.
European Trend: AWHP

Heat pump sales in Europe 2005-2013 by energy source
13% Ground Source Heat Pumps

Split of heat pump sales 2013: by type

- H-air/water: 18%
- H-ground/water: 13%
- Reversible air-air w/ heating: 51%
- Reversible other: 5%
- Sanitary hot water: 11%
- Exhaust air: 2%
50 000 man-years / a

Employment 2013 in man-years: 41 877

- Total employment is higher
- Technology leadership is in Europe
Finland 5 TWh/a RES

RES contribution depending on the approach used based on heat pump stock in 2012
FR, DE, IT, SE the biggest markets?

Heat pump sales 2013 by category
Finland has passed Sweden, passing Norway?
Heat pump market in Finland
The cumulative number of heat pumps in Finland reached a total of 600,000 in 2013.

They are already extracting 5 TWh/a of RES local renewable energy from the ground, the rock or the air from around the houses.

Finns are already investing 400 million Euros a year in heat pumps.
Success factors

The prerequisites for heat pumps in Finland are excellent.

- the utmost North East Country of the European Union
- cold climate
- a lot of energy needed.
- big country with a small population of 5 million,
- having e.g. a comprehensive gas network is unprofitable.
- relatively cheap electricity (13 c/kWh)
- good drilling conditions favour Ground Source Heat Pumps
- Over 0,5 million directly electricity heated houses favour Air to air HPs
- ROI > 10 %
Success factors

Behind the success story of heat pumps in Finland

• the impact of active lobbying
• incentive schemes
• system quality
• product and installer certification and training as well as
• IEA HPP annex forums from universities, polytechnic colleges, research institutes and financiers for the creation of national projects must not be forgotten when talking about the success story of heat pumps in Finland
Lobbying removes barriers, makes way for heat pumps and disseminates

- Far too often, the importance of lobbying is forgotten, even though it is a very essential aspect in creating the preconditions for a new industry.
- The heat-pump industry is a challenger, a change maker, an alternative to the traditional and conventional heating systems.
- More and more a threat and a surprising competitor to traditional heating systems (oil, electricity, district heating).

The branch organisation, The Finnish Heat Pump Association SULPU, has cleared the path for heat pumps into the heating market:
- the active role it has taken in the European Heat Pump Association EHPA
- lobbying to decision makers and opinion leaders
- dissemination
- measures in preparing rules and regulations
- incentive-scheme directives and education systems have been at the top of the strategy list of the association
- the fight against oil and electricity heating as well as the monopoly of district heating.
Practical examples of lobbying

– the active participation in the preparation of national construction codes
– subsidy programs
– drilling licensing codes
– the EU-wide F-gas Act
– heat pump customer-satisfaction surveys with amazingly positive results
Participation in surveys

• an independent expert consulting company to study the economic and environmental impacts of heat pumps.
• The study analyzed what would happen if 320,000 Finnish households were to switch from oil heating and electric heating to ground-source heat pumps.
• The study found that the switch would reduce the heating costs of these households by €2.3 billion during the next 20 years.
Technology and business models were available from Sweden

- Finland is the neighbour country of Sweden which in the nineties was the most developed heat pump market in the world.
- Heat pump branch in Finland cannot underestimate that it had the best heat pump market of the world next to us.
- For the Scandinavian climate conditions and houses developed heat pump models were available also for the Finnish market.
- As well as the working marketing, sales and business models.
- Thank to Swedes the Finnish heat pump market got almost a running start in the late nineties.
- Finland was able to pass the Swedish annual heat pump sales figures per capita in 2012.
Subsidy policy plays a role in, and makes a contribution to, the heat-pump industry. The industry has seen some good results during some subsidized years.

Nevertheless, incentive schemes have also caused a lot of fluctuation and uncertainty in the market, and in the long run their impact can even be seen as questionable.

The best results have been achieved from the tax-deduction scheme that applies to renovation and extension work that is done in private households. 2 000 to 3 000 Euros of the labour costs.

There was a subsidy programme in which a subsidy of up to 20% of the investment was available when oil and electric-heating systems were replaced by a heat pump, biomass or a district-heating system. This program ended in 2012. Caused a lot of fluctuation in the market.
Finland joined the IEA HP Programme in 2009. This opened the channel to international forums and to information and, in particular, to annexes and the national work surrounding them.

After becoming a member, we in Finland have witnessed unparalleled forums from universities, polytechnic colleges, research institutes and financiers for the creation of national projects to participate in the IEA HPP.

Finland already participates in:
- Annex 38 “Systems using solar thermal energy in combination with heat pumps”
- Annex 39 “A common method for testing and rating of residential HP and AC annual/seasonal performance”
- Annex 40 “Heat-pump concepts for near zero-energy buildings”.

In the making:
- Annex 42 “Heat Pumps in Smart grids” and
- Annex proposal “Heat Pump in District Heating Systems”
## Renewable Energy Source (RES) targets 2020

<table>
<thead>
<tr>
<th>Renewable</th>
<th>More RES 2020</th>
<th>In practice</th>
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</thead>
<tbody>
<tr>
<td>Bio</td>
<td>18 TWh/a</td>
<td>A lot of heat and power plants from fossil fuels to wood chips and pellets</td>
</tr>
<tr>
<td>Wind</td>
<td>6 TWh/a</td>
<td>1000 windmills 3 MW each</td>
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<tr>
<td>Heat Pumps</td>
<td>6 TWh/a</td>
<td>Heat pumps 300,000 -&gt; 1,000,000 pcs (2 TWh/a =&gt; 8 TWh/a)</td>
</tr>
<tr>
<td>Others</td>
<td>2 TWh/a</td>
<td>Additional hydropower, usage of wood chips and pellets in small houses, solar, bio gas</td>
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<tr>
<td>Traffic</td>
<td>6 TWh/a</td>
<td>Adding ethanol and biodiesel in traffic fuels up to 20%</td>
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<td>Total</td>
<td>38 TWh/a</td>
<td>RES from 28.5% to 38%. Corresponds annual energy production of 10 Loviisa nuclear power plant units (470 MW)</td>
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Renewable Energy Source (RES) targets 2020 by the Ministry of Employment and the Economy in Finland
In 2012, 11.6 % of space heating in Finnish residential, commercial and public buildings was produced by heat pumps.
Scenario of the heat-pump stock (VTT)

Scenario of the heat-pump stock and the heating capacity of the heat pumps
Estimate of energy saved by heat pumps (VTT)

Estimate of energy saved by heat pumps in 2010-2020. For heat pumps other than exhaust air, it also represents renewable energy production.
CONCLUSION

• The heat-pump branch has experienced huge growth
• The prerequisites are excellent
• Nevertheless, the impact of active lobbying, incentive schemes, system quality, product and installer certification and training as well as IEA HPP annex forums from universities, polytechnic colleges, research institutes and financiers for the creation of national projects make the success story
• The outlook for the heat-pump industry is promising
• Heat pumps will have a very good competitive advantage in the upcoming, almost zero-energy construction
• It can be predicted that in 2020, in a country with a population of 5 million, one million heat pumps will be producing more than 8-10 TWh/a of renewable energy,
• Active lobbying will eliminate the obstacles
• Strong, genuinely active and sufficiently resourced branch organisation

We are not waiting for the market – we are making it