

## Heat Pump Investments up to Half a Billion a Year in Finland

Heat-pump sales figures saw a growth last year, both in numbers as well as particularly in euros. The trade of large heat-pumps continued to get busier. The investments in the more than 60 000 installed heat pumps was up to as much as half a billion euros per year. The thermal output of the installed heat pumps in 2017 was 500 MW. The heat pumps that were installed last year hauled out more than half a terawatt-hour worth of energy from around houses per year. More than 800 000 heat pumps have now been installed in Finland, and they produce 6-7 TWh of renewable energy per year. It is noteworthy that this huge investment in the environment and in climate-change prevention has been made mainly by home owners using their own money. The excellent profitability of heat pumps has, of course, made consumers' decision-making easier.

### 60.000 heat pumps per year for 5 million people

According to Finnish Heat Pump Association statistics, 62 000 heat pumps were sold in 2017, which is over 3% more than the previous year. Air-source heat pumps reached sales of 47 000, ground-source heat pumps 8 000, air-to-water heat pumps 4 000, and exhaust-air heat pumps 3 000. Apart from geothermal heat, the number of heat pumps increased from the previous year. The numbers in geothermal heat went down approximately five percent. However, the sizes of these delivered systems grew considerably. This is why the sales figures increased in euros in this sector, too. The breakthrough of inverter-regulated ground-source heat pumps also made its own contribution to the increase in sales in euros, says Executive Director Jussi Hirvonen from the Finnish Heat Pump Association SULPU.

### House owners invest half a billion a year in heat pumps

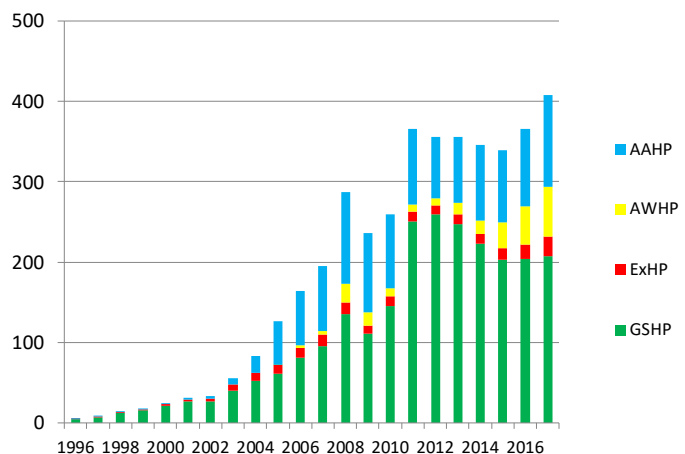
The value of the 62 000 heat-pump system deliveries is more than 400 million. When adding the megawatt-level heat-pump system deliveries that are not included in the SULPU statistics, e.g. for district heating/cooling production, industry, shopping centres, and other service buildings as well as other ancillary operations such as planning, delivery, supervision, maintenance and other services, the heat-pump industry reached annual investment levels as high as half a billion in 2017.

### 70% new builders choose Heat Pump

More than 70% of new builders of single-family houses decide to choose a heat-pump solution, and they mainly choose geothermal heat or an exhaust-air heat pump. Approximately 5 000 oil-fired boilers are replaced by geothermal heat. This replacement rate is still annoyingly low, even though the profitability of a replacement is excellent for a homeowner. Most often, the return on capital investment of this eco-friendly act is more than 10%. Oil is still billowing out of chimneys from 200 000 houses. Air-source and air-to-water heat pumps most often replace oil-fired and electric-boiler systems, or they operate alongside them. Air-source heat pumps are mainly installed to save electricity in direct-electricity heated houses. It is also pleasing that a niche in the market has opened up for air-to-air and air-to-water heat pumps in, e.g., industrial halls and service buildings.

**Annual Heat Pump investments**

Private end-users are investing 500 M€ annually  
(MW size district heating/cooling, shopping center, service building, industrial HPs as well as planning, service, etc. are missing from figures below)



### **Exhaust Heat Pumps save 50% district heating**

The number of exhaust-air heat pumps in apartment buildings is increasing rapidly. As many as a few hundred apartment buildings have had exhaust-air recovering heat pumps installed, which reduces as much as 50% of the district-heating consumption or other energy consumption of an apartment building. The potential of these solutions is truly considerable, in the range of 3 to 5 TWh/a. More than 30 000 apartment buildings release over 20-degree Celsius exhaust air into outdoor sub-zero temperatures through ventilation. Increasingly many apartment buildings have decided once and for all to replace district heating with a heat-pump based solution.

### **End customer need not invest**

New business models also took their first steps in the industry. The heat-pump heat-sales model, or the so-called service model, means that the actual service-provider company is the one that makes the heat-pump investment and then delivers the thermal energy, as well as cooling when desired, to the customer. The customer is invoiced for the energy in the same way as for electricity or district heating. This service model became more common not only in service buildings and industrial sites but also in apartment buildings in the form of exhaust-air and geothermal heat. This is an easy and lucrative choice for apartment buildings. It requires no investments, it merely means sitting back and enjoying lower energy costs.

### **Profitability excellent, major impacts on employment, trade balance, employment**

The profitability of heat-pump investments is excellent. Strong arguments that are also in favour of heat pumps include usability, ease, minimal need of space, and cooling features. The impact of the saved fuel and electricity that heat pumps have had on the Finnish trade balance is already in the region of one hundred million. The heat-pump industry offers employment to as many as approximately 3 000 people by now. Furthermore, the reduction in CO<sub>2</sub> emissions in Finland is in the region of a megaton.

### **Heat Pumps decrease electricity power peak and energy consumption**

Will there be enough electricity in future for this huge and increasing number of heat pumps? Yes, there will, since heat pumps reduce the overall need for electric energy and electric power, says Jussi Hirvonen. This was also confirmed by the SULPU survey conducted by Gaia Oy. Heat pumps are installed in houses that are heated by electricity, oil and district heating. Every time an electricity-heated house has a full-power heat pump installed, two oil-heated and district-heated houses can be heated with the power and energy that have been saved. There are approximately 700 000 to 800 000 electricity-heated houses in Finland, Jussi Hirvonen goes on to say.

### **Heat Pumps optimal bridge technology for electricity-grid power-demand management**

Perhaps even more importantly when thinking about the future, heat pumps provide an excellent means for demand-side management and electricity-grid power-demand management. A heat pump is a unique bridge technology between heat and electricity, and it can use water volumes, buildings, geothermal wells as well as bidirectional cooling/heating features as energy resources. Already now, heat-pump thermal power, when linked to demand-side management, can provide approximately 4 000 MW and, indeed, it already provided an additional 500 MW last year. Controllable electric power provides, as in the operational principles of heat pumps, approximately one third of the thermal power. After all, the remaining two thirds are the cost-free energy and power from around buildings that this brilliant apparatus recovers.