

This heat pump can last 10 000 years

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A miniature pump is a cubic millimeter.

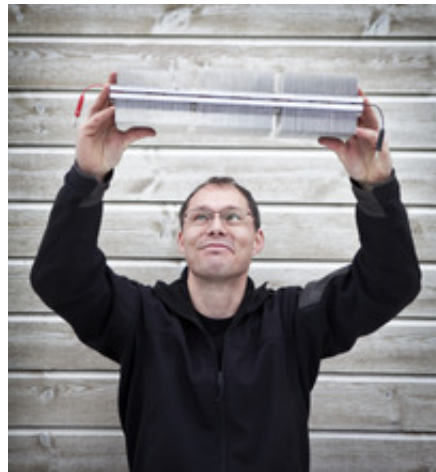
(PhysOrg.com) -- Researchers now are testing an entirely new heat pump. While those we use today last ten to twenty years, the new one will last almost forever.

The new [heat pump](#) consists of many miniature heat pumps as small as one cubic millimeter. To heat a house one needs several thousand of them. They are put together into larger units that can be tall and thin or short and wide.

"The most important advantages of the new heat pump is that you can regulate its size and form and that it is more durable than heat pumps are today. It is also more environmentally friendly," Doctor of Physics Jan Kåre Bording says, who is Chief Engineer at the University of Stavanger in Norway.

Together with his colleague, Professor of Materials Science Vidar Hansen, he is developing a new heat pump that is thermo-electric. They investigate its disadvantages and advantages compared with the heat pumps we use today.

The project is a collaboration project with the Department of Physics, University of Oslo. According to the researchers the heat pump will be fully developed and ready to be launched on the market in five to ten years.



Jan Kåre Bording shows the new heat pump. The invention is much more environmentally friendly than those in use today.

A heat pump that lasts

The new heat pump has a longer life than today's heat pumps.

"The heat pumps we use today consist of several moveable parts. After some time different parts break down and will have to be changed," Bording says.

"The new heat pump consists of several miniature heat pumps and these have a very simple design. In opposite to today's heat pumps, these miniature heat pumps consist of only one part. Because they consist of only one metal part it's easier to avoid wear and tear. You can compare the heat pump to a golden ring. A golden ring won't be broken. The miniature pumps will just continue to pump. We stick fans on them, and they must be replaced, but the heat pump itself will stay and be equally effective after 10 000 years," Bording continues.

The heat pumps used today deteriorate after one year. Then they need to be inspected and that costs 1500 NOK for an air-to-air heat pump. After ten to twenty years larger parts of the pump will fail,

for instance the compressor.

Thousands of pumps in a house

The small heat pumps can be put together and form larger units. The researchers also envisage that it may be possible to place several thousand of the small heat pumps at different places in the house.

"We don't want a large wood-burning stove in the middle of the house as in the old days. It's better with more, smaller heat sources," Hansen says.

Initially, however, researchers will create units that can be placed at one or two locations in the house. The new heat pumps offer great flexibility as to where in the house you want them. It would be an advantage to have them in places where it is extra cold.

" For example, it may be a good idea to put them under the floor, so that the floor will heat the room. When the heat pump has a large surface, it produces more heat," Bording says.

General manager of the Norwegian Heat Pump Association, Bård Baardsen, wishes the new heat pump welcome.

"Heat pumps have not changed much over the years. The first was made 150 years ago. If something revolutionary happens to them, it's great news," he says.

Illegal gases

The new heat pumps will be more environmentally friendly than those in use today. One problem with them is, in fact, that they can leak cooling gas. Cooling gas is usually Freon gas, which destroys the ozone layer. One does not have that problem with cooling gas in thermoelectric heat pumps, since gas has been replaced with clean electricity.

"We have seen that several of the gases used in heat pumps, have become illegal, such as Freon 12. Gradually gases that are in use today can also become illegal, so that we can no longer use the heat pumps we have today," Bording says.

Generating electricity on the moon

Thermoelectric materials can also be used to generate electricity. Today, this is done on the moon. Electricity is used in everything from space stations to cars there.

" Thermal Electricity has long been used to generate electricity," Bording says.

Physicists have known for a long time that one may use thermal electricity to pump heat.

"The phenomenon of thermo-electricity has been known for more than a hundred years. Still, it is only now we are trying out how we can use this phenomenon to pump heat in the house," Bording says.

Provided by University of Stavanger

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