[youtube:http://www.youtube.com/watch?v=pmlhtkaQI6E]

Heat pumps are a very important way for business to save up to 50% of their energy, yet most people have never heard of them and they are hardly used.

How do you use heat pumps to warm or cool buildings?

Pump heat or cold from 1-2 metres underground more cheaply than burning gas, coal or oil or using traditional air conditioners. Use energy from under the soil surface to heat or cool your home, office or factory. 30% of global carbon emissions are heating and cooling buildings. We can halve fuel bills in many buildings by using heat pump and pipes into the ground.

Most people think that geothermal heat pumps means using hot springs gushing from deep in the earth's crust, to heat homes or produce electricity. But such hot springs are rare and drilling down to hot rock is not usually cost-effective.

70% of new homes in Sweden, 45% in New Zealand and 30% in Switzerland are already heated by heat pumps, saving each household up to half normal fuel bills. UK government is hoping for around 500,000 systems to be installed in 5 years. We can expect many developed countries to require heat pumps to be used on most new building projects, with new regulations in the next five to ten years.

Payback period for average home: 15-18 years – installation cost adds capital value

How heat pumps work

Replace boilers with heat pumps. Each has three circuits. One runs into the hot water tank with a coil to heat the cylinder. One runs the radiators. And one is a long pipe coiled a metre deep under the soil in the garden, under the drive, or if not enough space, diving deep down into the ground (more expensive). The pipes underground get very cold, and pipes in home get hot. If cooling is needed, reverse the pump, heat up underground and cool the building (different system needed, usually with fans and air ducts).

Heat pumps operate like fridge motors. A fridge gets cold as the compressor sucks heat out of the inner compartment, making the radiator at the back hot at the same time. If such motors are operated in reverse, a fridge becomes like an oven, with a huge block of ice covering the radiator at the back.

Running costs can be up to half that of heating a building by burning oil. Cooling can also be more efficient, and uses the same system so traditional air conditioning is not needed.

Why heat pumps matter

Here is a way to reduce heating bills at zero cost over the longer term and help save the world. While better insulation, better design and more efficient ventilation can all save energy, we can also improve the efficiency of the heating or cooling process itself. Heat pumps systems are proven, reliable, pay for themselves in a few years in reduced fuel bills and add value to properties. Heat pumps offer huge benefits and can be installed relatively easily in most new buildings.

Geothermal challenges

Some sites are more suitable than others. A high rise development built on granite will require expensive pipe drilling to create long enough runs for the underground system. The cheapest installations are in gardens or fields where a small trench around a meter deep can be run rapidly over a long distance.

Heat pumps mean that building owners stop burning oil or gas on their own premises. They use more electricity instead. While the net energy saving is significant, it does place an extra strain on the distribution system and power stations have to work harder. If hundreds of thousands of properties convert rapidly to heat pumps, it can place a huge extra burden on power companies. And of course if we want to calculate the exact carbon use of heat pumps, we have to look at how the electricity in that nation is produced in the first place. In France, 80% of heat pumps are in effect nuclear powered, because that is the proportion of nuclear energy in the country, while in the UK almost all are powered indirectly by gas or coal.

The business opportunity

Expect government regulations to force many new buildings to use heat pumps. Economies of

scale will drive down costs. Many old buildings will be retrofitted. A wide range of businesses will benefit such as manufacturers of heat pumps, piping, controls as well as consulting services, installation companies (many specialist niche markets).
The first large heat pump installation company in a nation will be well placed to win economies of scale, media coverage and brand recognition. Large pump manufacturers will supply global markets. Local teams are likely to consolidate into national networks of supply and fit services. In early stages new orders tend to be scattered across a large area and efficient installation and support is hard to provide on national basis.

Size of Market

Expect potential sales of at least £6bn a year in UK alone, £30bn a year across EU. Assume in the UK alone just half new homes planned over next 20 years have heat pumps (building regulations could require this). That's 1 million households or 50,000 a year. Add retrofits of 1% per year of 25m homes – 250,000 a year – and that gives us a market per year of around 300,000 systems a year with average sales value of £20,000. This works out as a potential UK market of £6bn per year. Expect rapid growth to get to this annual figure. New Zealand installations for example have doubled from 22.5% to 45% new builds in 3 years.

Across EU as a whole, we can assume take-up will be less in warmer countries (main need is cooling), with maybe total value of £30bn a year. Heat pump sales as proportion of total spend could be around £10-15bn. Global annual heat pump sales per year could be at least a further £15-25bn, depending on government regulations and energy prices.

Many more Global Warming Videos by Futurist Dr Patrick Dixon and Sustainagility book.

Articles and Videos on Global Warming

Here are more resources on this site that you may find helpful.

True Cost of Global Warming
How business will help solve global warming with green technology

CARBON DIET to save the World
Global Warming - Science Summary
Future of Oil Prices: Middle East, global economy
Roof Gardens Impact on Energy Saving
Biofuels Controversy and Climate Change
Iceland Volcano Eruption - Geothermal Power Potential
Energy Use Consulting - Boom Industry
Smart Power Regulation - Energy Saving
Green Technology Innovation Awards Chaired by Patrick Dixon
Product Exchanges and Climate Change
Wind Turbines and Global Warming
Solar Cell Roofing and Climate Change
Low Energy Streetlights and Global Warming
Polymer Cement - to save 2% global CO2
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Future of Oil Industry when will oil run out? Kuwait and region
Heat Pumps - to prevent global warming
Cost of global warming - practical answers
The $40 trillion climate change business
Impact of Global Warming on Human Life
The Future of the Environment
Green Technologies innovation will help with climate change
Sustainability, climate change and crazy biofuels policy
Sustainagility: innovation will help save world. Sustainable business future
Sustainable business: $40 trillion green tech boom will help save world
How Green IT saves money and energy, improves image and environment - keynote
Water Wars Risk? Futurist Q&A with Patrick Dixon
Global Warming: green technology will help world
Economic Growth Limits? Sustainability. FUTURIST Q&A