## **Heat Pumps and Greener Buildings**



## How do heat pumps work?

https://www.dw.com/en/heat-pump-energy-crisis-how-do-they-worktechnology-what-are-they-climate-crisis-efficiency/a-62852353

Heat pumps are attractive, energy saving, sources of domestic heating and hot water. New builds are routinely fitted with air source heat pumps.

However, the retro fit of heat pumps in existing buildings is gaining market shares, both pulled by energy efficiency regulations and voluntary certification schemes.

In homes built before 1980s, heating systems were sized and operated with a supply water temperature in the range of 70°C to 80°C; a common *perception* is that heat pump solutions cannot cover heat loads with the necessary comfort provided to the inhabitants when operated at lower temperatures.

More recent research has shown that

domestic heating systems can be operated at maximum supply temperatures normally in the range of 50-55°C, fully compatible with the operation of a conventional heat pump.

In addition, several manufacturers are now moving in the direction of developing high temperature heat pumps with output temperatures of up to 65°C, exploiting natural refrigerants, such as carbon dioxide, hydrocarbon gases and ammonia.

As a group you have been selected to form a team. Within the team you will fulfil the roles of business development executive<sup>1</sup>, R&D manager<sup>2</sup> and technology analyst<sup>3</sup> The team reports to the CEO.

Your team works for a UK based company with a patent portfolio covering conventional heat pump technology. However, you do not have access to higher temperature heat pump technology based on natural refrigerants. You wish to partner with other companies in Europe to develop such heat pump products.

From the patent databases you want to identify relevant technology preferably which is freely available in the countries in which you can manufacture and plan to sell your heat pump product. Alternatively, you will have to consider a technical solution for which you might need to acquire the associated ownership rights (buy the patents) or usage rights (in-licensing). In the long run, you company plans to find partners to commercialise your products in Asia, aiming at Japan and South-Korea first.

## UKIPO

https://assets.publishing.service.gov.uk/media/6183d14de90e07197a68c454/Greener-buildingsand-heat-pumps.pdf

## EU

https://build-up.ec.europa.eu/en/resources-and-tools/articles/overview-article-integrating-heatpumps-existing-residential-buildings

- 1. The business development manager identifies new business opportunities in order to generate revenue, improve profitability and help the business grow
- 2. The R&D manager is responsible for conducting research, developing new products, processes, and technologies, and improving existing products.
- 3. A competitive intelligence analyst performs market research to provide information to executives or management who use it to craft a new sales project or business strategy.