

EXPLAINED

Relevant for: Environment | Topic: Environmental Conservation, Sustainable Development, and EIA

The datacenters are designed to operate with 100% emission-free energy and will supply heat for the cities of Espoo and Kauniainen, and the municipality of Kirkkonummi, in a collaboration with Fortum | Photo Credit: Microsoft

The story so far :

[Microsoft has partnered with Fortum, a Finnish energy company to heat homes, services and businesses in Finland](#) with sustainable waste heat from a new datacentre region that Microsoft has planned to build in the Helsinki metropolitan area in Finland. The software giant claims the waste heat recycling concept from the datacentre region to be the world's largest scheme to recycle waste heat from data centres. The joint project takes place at the intersection of two megatrends: digitalisation and energy transition.

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What is a datacentre ?

A datacentre is a physical facility that organisations use to store their critical applications and data, process data and disseminate them to users. It is designed based on a network of computing and storage resources that enables delivery of shared applications and data. The key components of a datacentre are routers, switches, firewalls, storage systems, servers, and application-delivery controllers.

Many large datacentres are located in dedicated buildings. Smaller datacentres may be situated in specially designed rooms within buildings constructed to serve multiple functions. Since datacentres consume large amounts of energy, it's important to ensure the physical structures that house them are well-designed and insulated to optimise temperature controls and energy efficiency.

How much heat datacentres generate?

The temperatures recorded in the hot aisles of a datacentre hover between 80 and 115 degrees Fahrenheit, according to Lifeline datacentres, a provider of datacentre facilities and services.

Global cybersecurity firm Kaspersky estimates over 75% of a datacentre's electricity becomes waste heat. It noted that in winter, a datacentre can provide heating up to 85 degrees Fahrenheit, similar to a gas boiler, with better energy efficiency than a heat pump in a new house.

What's the scale of their carbon footprint?

On a global level, datacentres consume around 200 terawatt-hours (TWh) of electricity, which is more than 1% of the world's total electricity. They contribute to 0.3% of all global CO2 emissions, according to the International Energy Agency.

Datacentre energy usage in some countries could increase to 15% to 30% of their total domestic electricity consumption by the end of the decade, according to predictive models by Eric

Masanet and Nuoa Lei of Northwestern University. Ireland's energy regulator says datacentres could use almost 30% of the country's electricity by 2027, endangering climate goals.

What is Microsoft's plan to cut carbon emission in Finland?

According to Microsoft, the recycled waste heat, along with other carbon reduction measures, can help the city of Espoo and its neighbouring communities to reach their CO2 emission reduction targets. It can also help decommission Fortum's last coal-fired heat unit in the city.

The heat recycling system can provide clean heat to homes, businesses and public buildings in Helsinki, and can reduce up to 400,000 tons of CO2 emissions annually, according to estimates by Fortum.

The company highlighted that once the new data centre region's waste heat capture is in operation, a total of about 60% of the area's heating will be generated by climate-friendly waste heat. Of this, 40% results from the datacentre region and the rest from other waste heat sources like purified waste water.

How will this work?

Fortum will capture the excess heat generated by the new datacentre region and transfer the clean heat from the server cooling process to homes, services and business premises that are connected to the district heating system.

District heating is the most popular method of heating premises in Finland. It is a system of generating heat in a centralised location by capturing heat and then distributing it to buildings for residential and commercial heating needs. The heat is transferred to customers as hot water which is pumped through insulated underground pipes.

The new generation of district heating is based on replacing fossil fuels with flexible solutions like renewable electricity, heat pumps and waste heat utilisation. Artificial intelligence will help optimise operations of the entire system.

Which other countries recycle waste heat from datacentres?

District heating is popular in the Nordic and Baltic countries, as well as in Russia and China, which have high heat demands during winters. Datacentres thrive in cold climates. Their location in cold climates helps to cut down on the need to cool server rooms. Cold weather is also an asset as technology companies shift to selling their heat which doesn't have a lot of demand in hot weather.

Which other companies are doing this?

Facebook is putting its waste heat to use heating nearby homes in Odense, Denmark. The company claims that its servers can heat 6,900 homes in the area, according to a blog by Aquicore. Apple is building a datacentre in Denmark and plans to run it with renewable energy and use waste heat to warm up nearby office buildings.

Fast fashion retailer H&M has been distributing waste heat to nearby homes in Denmark since 2013 and has plans to build a new, 1 MW datacentre that will be capable of heating up to 2,500 apartments at full load.

An IBM datacentre in Switzerland is heating a nearby community pool. In Canada,

communications company Quebecor donates its heat to the editorial office of a local newspaper.

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