JOIN THE SOLUTION

An eco initiative eco

DIGITALISATION AND SUSTAINABILITY

BASELINE/CHALLENGE:

The slow-moving roll-out of renewable energies, the shortage of fossil energy sources such as gas, coal or oil, not to mention rising energy demands and costs: all of these pose major challenges for the economy and society. Industry, private households, commerce: they all need energy – as do data centres. At the same time, the operation of server farms also produces a large amount of waste heat. Heat that can be used sustainably, for example to heat buildings and for vertical farming. A pilot project by Telehouse and Mainova in Frankfurt shows how climate protection and server farms go hand in hand.

"By 2030, all residential and office spaces in Frankfurt could receive a climate-neutral heat supply through the utilisation of waste heat. Policymakers must provide greater support for operators in the expansion of waste heat systems. This calls for streamlined approval procedures for new construction, as well as the modernisation of data centres."

Dr. Béla Waldhauser, CEO Telehouse Germany, Spokesperson for the eco Alliance for the Strengthening of Digital Infrastructures in Germany

"The heat supply from waste heat from data centres ensures a secure and sustainable heat supply in the long term. The combination of waste heat and environmentally friendly district heating to cover peak loads would save at least 400 tonnes of CO_2 per year compared to conventional heat generation."

Dr. Constantin H. Alsheimer, Chair of the Board at Mainova AG

SOLUTION

HEATING VIA THE INTERNET – HOW FRANKFURT'S WESTVILLE RESIDENTIAL DISTRICT STANDS TO BENEFITS FROM WASTE HEAT FROM DATA CENTRES

INTELLIGENT ENERGY FOR CITIES – HEATING FROM THE DISTRICT

Instone Real Estate Development GmbH is currently building the new "Westville" on 96,500 square metres in Frankfurt. By 2025, 1,330 residential units for 3,000 people, three day-care centres and commercial units are to have been established. Mainova is providing the district's heat supply under a multi-year contracting agreement. With its pioneering heating concept, used in the process, constitutes Westville a flagship project.

According to estimates by Mainova, the district's heating consumption will amount to about 4,000 megawatt hours per year. At least 60 % of this energy will be generated 500 metres further south: at the data centre of Telehouse Deutschland GmbH. In a 25,000 square-metre area, Telehouse runs one of the largest data centres in Frankfurt.

CLEVER SECONDARY UTILISATION OF WASTE HEAT FROM DATA CENTRES

The computational work of the processors in server farms produces a large amount of waste heat that, up until now, has often been left unused. From 2023, Telehouse will transmit the waste heat from the data centre via an approximately 500-metre-long heat pipe into the neighbouring residential district, offering benefits to people, companies and institutions in the form of heating or hot water. This will simultaneously save costs and energy.

Since the waste heat from the data centre has a constant temperature of around 35 degrees Celsius, two large heat pumps raise the temperature to the 70 degrees Celsius needed for heating systems and, especially, for hot water. Compared to conventional heat generation, combining the utilisation of waste heat and district heating in Westville will eliminate a total of at least 6,000 tonnes of CO_2 over the 15-year period.

INFORMATION

Heat from the data centre: Westville at a glance

- 96,500 square metres of living space
- 1,330 residential units for 3,000 people, 3 day-care centres and commercial units to be established
- Completion 2023 (phase 1)/2025

Waste heat concept:

- Mainova builds and operates the heat supply facilities under a long-term contracting agreement
- Projected heat demand: ~ 4,000 MWh/a, with at least 2,400 MWh/a from waste heat
- Construction of the waste heat pipeline from the Telehouse data centre to the main technical centre: approx. 500 metres
- Construction of the local heating network in the residential quarter: approx. 580 metres
- Two large heat pumps with 320 kWth each raise the waste heat from a good 30 degrees Celsius to about 70 degrees Celsius

LABELS WITH INTEGRATED TECHNOLOGIES

SUSTAINABLE UTILISATION OF WASTE HEAT FROM DATA CENTRES

Each day, data centres produce a very large amount of waste heat. However, the waste heat is often simply left aside, even though it could be utilised in other ways. There are many possible uses for waste heat from data centres. They range from utilising the waste heat for adjacent office buildings, to connecting data centres to local and district heating networks, to utilising it for greenhouses and vertical farming. In cooperation with eco – Association of the Internet Industry, NeRZ has presented innovative technical approaches to waste heat utilisation in a white paper. This paper is available for download free of charge.

The further utilisation of waste heat from data centres saves resources in the form of fossil fuels and, at the same time, reduces energy costs.

NUMBERS ON THE CASE

Based on calculations, the demand of all private households and office buildings in the city of Frankfurt could be covered by waste heat from data centres from 2030 onwards.[1]

In comparison to conventional heat generation, the Westville flagship project will save at least 400 tonnes of CO_2 per year.[2]

Mainova calculates the heating requirement of the district to be around **4,000 megawatt hours per year**. At least **60 % of the heating requirement** will be generated by utilising waste heat from the adjacent Telehouse Deutschland data centre.[3]

Mainova's heating concept for Frankfurt's Westville district

https://www.youtube.com/watch?v=-TjG9UMUBUk

ECO MEMBERS

TELEHOUSE

mainova

[1] Model Calculation of the DC Heat Consortium (Data Centre Heat Exchange with AI-Technologies) – German (https://www.borderstep.de/2021/04/12/projekt-dc-heat-bringt-waermewende-ins-rechenzentrum/)

[2+3] mainova Sustainability Study 2021 – German (https://www.mainova.de/resource/blob/90704/06bdeaccaf439e3233f2594497b144b9/nachhaltigkeitsbericht-2021-data.pdf)