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Dutch Data Center Association
• National Trade Association
Dutch Data Center Association
• Foundation, established 2014
• Voice of the industry
• Promoting the sector
• 91% of Dutch data center floor
• 34 data center operators
• 60+ data center suppliers
• 5 FTE, 6 events PY, 10+ reports PY
• Cooperation National/International

DDA participants represent 91% of the Dutch data center market

www.dutchdatacenters.nl
Go Digital, Act Sustainable

86% GREEN OF ALL DDA DATA CENTERS USE GREEN ENERGY SOURCES

90% CONVERSION NEARLY ALL POWER CONVERTS INTO REUSABLE HEATING

1626 MW TOTAL POWER CAPACITY OF DUTCH DATA CENTERS

50% OF DDA MEMBERS ARE LINKED OR ARE PLANNING TO LINK TO A HEATING SYSTEM WITH RESIDUAL HEAT

1 MILLION HOUSEHOLDS CAN BE HEATED BY DATA CENTER WASTE HEAT

100% RENEWABLE THE HEAT IS CLASSIFIED AS RENEWABLE ENERGY SINCE 2018

www.dutchdatacenters.nl
Short time line overview residual heat

• **Over the past few years**
  • Most data center use aquifiers to preserve heat and cold
• **From 2016**
  • Start using residual heat for data center facilities (preheating of genset, office heating etc)
• **From 2017**
  • Industry offers residual heat to Dutch government
• **From 2018**
  • Data center residual heat recognized as industrial residual heat significant intake of potential project as result
  • First small scale pilot projects, often organized by local stakeholders
• **From 2019**
  • Large scale plans at various data center rich cities, often sealed with LoI’s
• **From 2020**
  • First large scale projects launched where data center residual heat is used as heat source for district heating for household
Realized projects

Eindhoven High Tech Campus
Over 35 large office buildings

Energy hub Aalsmeer
Swimming pool & Various buildings

Groningen Warmtestad
Over 2000 homes and buildings

Amsterdam Science Park
1300 student apartments

Data center + Event center BIT Ede
Re-use for own building and facilities
Typical data center residual heat characteristics

- **Constant temperature and availability**
  - 30 degrees often multiple MW (slowly but surely rising)

- **Relative easy to convert warmwater flow to heat exchange**
  - Data centers always want to be in control

- **Data center residual heat is all electric and free of any emission**
  - Provided sufficient green electricity available

- **Return cold can be used to save on energy consumed for data center cooling**
  - Reducing load of energy grid

- **Approx 15PJ (yearly) available today and growing**
  - Not all data centers run on full load and data center capacity in the Netherlands is still expanding
Typical set-up

Solar and Wind → Data Center

Data Center → Heatpump

Heatpump → Building and Houses

Building and Houses → Aquifyer

Multiple variations possible

Green Energy

30°C

70°C

20°C
Data center residual heat strengths

- Already available (fast deployment)
  - Currently wasted into the air
- Free from emissions
  - CO2, N, and small particles
- Growing industry, long term commitment
  - Digitization won’t stop, it accelerates
- Financial healthy industry
  - Solid business partner
Data center residual heat weaknesses

• **Low temperature**
  • Requires additional energy for heat pumps in the system

• **Centered around data center hubs**
  • Often outside urban area’s, longer transport required resulting in energy loss

• **Not their primary business model**
  • Investment needs to be covered by subsidies or business case on energy savings

• **Risk averse**
  • Should never impact their primary business
Data center residual heat opportunities

• 15PJ of CO2 free energy available
  • Significant CO2 reduction -> approx 600KT/year

• Reduction of energy need for data center cooling
  • Extend the lifetime of the current grid

• Decrease energy consumption at households vs all electric heating by factor 4
  • Avoid heavy investments in energy grid in urban area’s

• Restart with a sustainable digital economy
  • Digitization and circularity can go hand in hand, many new jobs (source IAE)
Data center residual heat threats

- Slow decision progress on district heating projects by municipalities
  - Many stakeholders in the DMU, complexity of design
- Uncertainty about district heating rules and laws
  - Discussions in public domain about costs, investments, open market etc
- Decreasing prices of fossil fuels and resources
  - Due to Covid-19
- Significant amount of grants already promised to bio mass systems
  - Can not be reversed hence strong pressure to monetize investments
- Public opinion
  - Due to lack of green energy there is a debate about the use of green energy by datacenters
3 Key messages

• Improve availability (generation and grid capacity) of sustainable electricity for the sector
  • Industry contributes to energy savings by running IT in extremely resource efficient facilities

• Build district heating systems suitable for use of sustainable residual data center heat
  • Data centers in the Netherlands could potential heat up to 1M new energy efficient households or 375K existing households

• Adapt legislation to enable the use of low temperature residual heat
  • Rules and regulations have to be adapted to the unique features of low grade temperature district heating systems
Thank you for your attention!

State of the Dutch Data Centers

2020

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