

# Open District Heating

[WWW.oppenfjarrvarme.se](http://WWW.oppenfjarrvarme.se)

## Executive summary

- Open District Heating gives data centers an opportunity to turn costs into revenue
- Fortum's vast district heating system in Stockholm makes the city an unique heat sink and localization for data centers
- Don't waste your energy – sell it to Fortum Värme



## Open District Heating a novel market for recovered energy

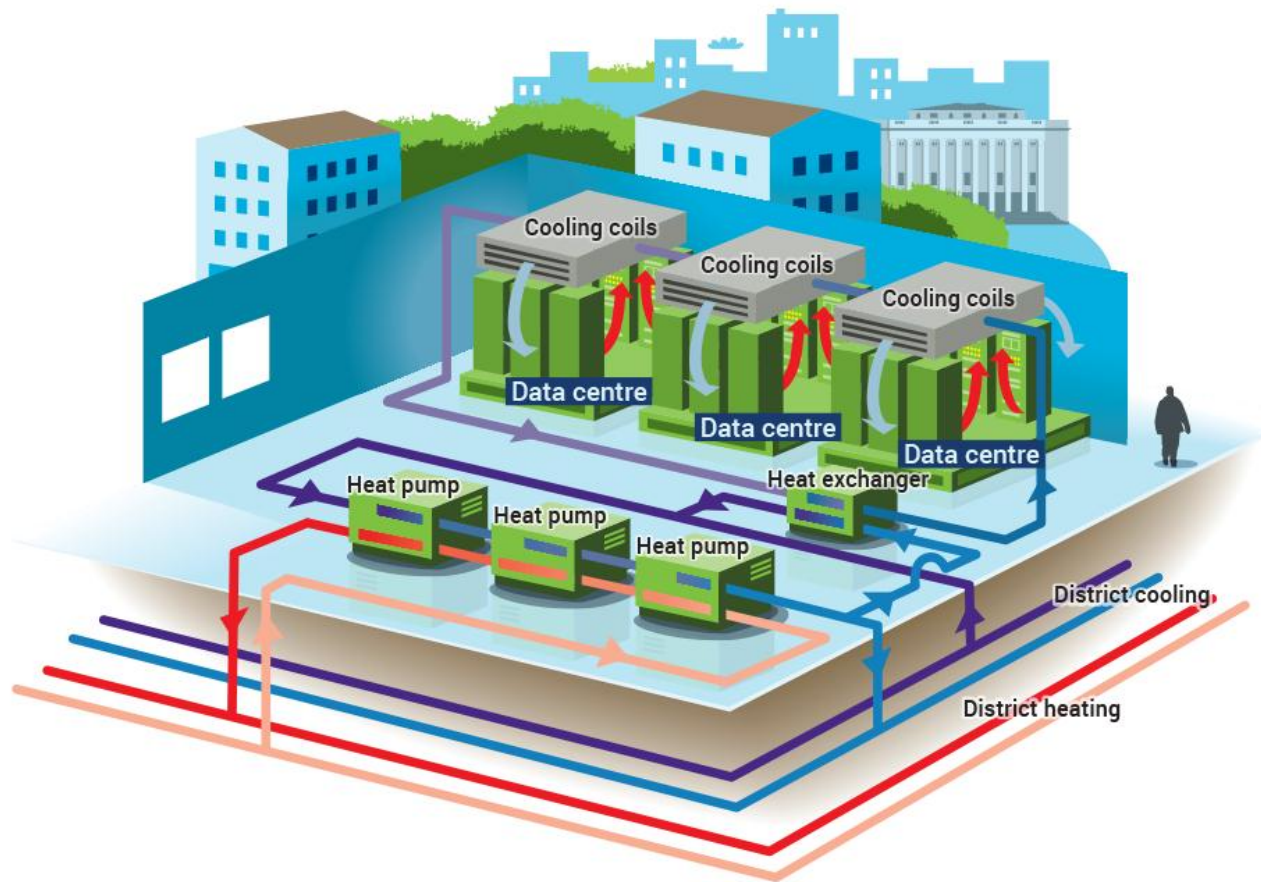
- Fortum Värme has created a market place for recovered heat and production capacity
- We offer long-term transparent contracts and open prices for trade in excess heat and cooling
- Large as well as small companies and businesses can join the scheme



## Open District Heating a novel market for recovered energy

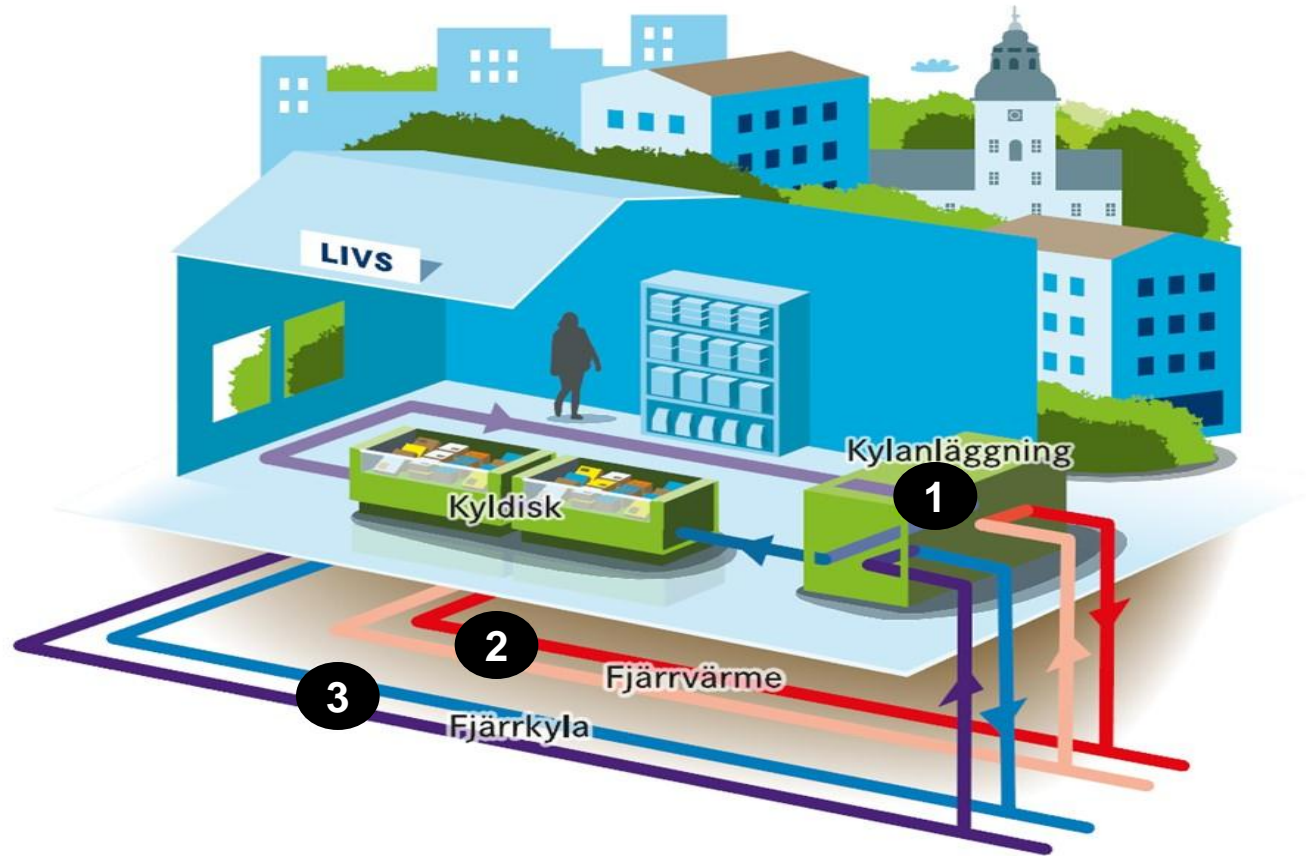
- Trade based on mutual gain
- Watchwords: Business, Scalability, Competition, Openness
- Together we build the next generation's urban energy system

# Open District Heating for data centers in short



- Cool the data center with a heat pump
- Supply excess heat to the district heating network
- Supply surplus cooling capacity to the district cooling network
- Long term and transparent contracts, 10 + 5 years
- The data center invests in the heat pump
- Fortum Värme invests in the connection to the distribution system

# Open District Heating for supermarkets in short



- 1 Refrigerated counters with CO<sub>2</sub> (R744) as refrigerant
- 2 Excess heat to the district heating system
- 3 District cooling system

# Opportunities for data centres with Open District Heating

**Cost efficient**  
solution for process  
cooling

**Improved utilization**  
of the data center's  
cooling system

**Create redundancy**  
in the cooling system for  
increased reliability

**Finance investment**  
in new energy efficient  
technology

**Heat recovery**  
forms part of sustain-  
ability efforts

# Fortum Värme's district heating and cooling systems in Stockholm



- » The city of Stockholm has a population of 900.000 and the greater metropolitan area a population of 2.2 million
- » Fortum has an annual district heating supply of 8.2 TWh (2013) and a peak load of 3.7 GW
- » Supply of district heating in the greater metropolitan area is 12 TWh p.a. corresponding to 70% of total demand
- » Fortum's district heating network comprises 2800 km of piping
- » Fortum's district cooling network comprises 250 km of piping
- » The business logic of locating a large data center is similar to the location of combined heat and power plants in urban areas

# The four price models of Open District Heating 2015

## ODH Spot and ODH Return

- Hourly price and temperature requirement for the next day published online at 4 PM.
- Option for supplier to deliver
- Compensation based on delivered energy
- Suitable for businesses with varying amount of excess heat

## ODH Call and ODC Call

- Hourly call for production incl. price and temperature requirement for the next day published online at 4 PM
- Supplier obliged to deliver contracted output load upon call from Fortum
- Fixed annual compensation based on contracted output load, plus variable compensation for delivered energy.
- Suitable for businesses with constant surpluses of heat or cooling



# Open District Heating Prices 2015: Expected Revenue (2020)

Price Model 1 MW Heating	South SEK	South Hours	North SEK	North Hours
ODH Call A	1 374 712	4 172	1 489 560	4 793
ODH Call B	1 433 822	4 492	1 738 996	7 386
ODH Call C	1 433 822	8 760	1 433 822	8 760
ODH Spot	1 553 004	8 760	1 922 381	8 760
ODH Return	629 972	8 760	826 743	8 760

# Conclusions

- Open District Heating gives heat from data centers a significant value
- Open District Heating makes Stockholm a prime location for data centers
- Recovering heat from the cooling process with Open District Heating is profitable, sustainable and reliable.