Slik fikk svenskene danskebåten på fjernvarme

– A new, innovative use of district energy for the future.

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This project has received funding from the European Union's Seventh Framework Programme for research, technological development and demonstration under grant agreement no 314441.

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Agenda

- The Celsius Project (to set the scope)
- Demonstrators.
- Distric Heat to Ship (STENA Danica)
- Questions

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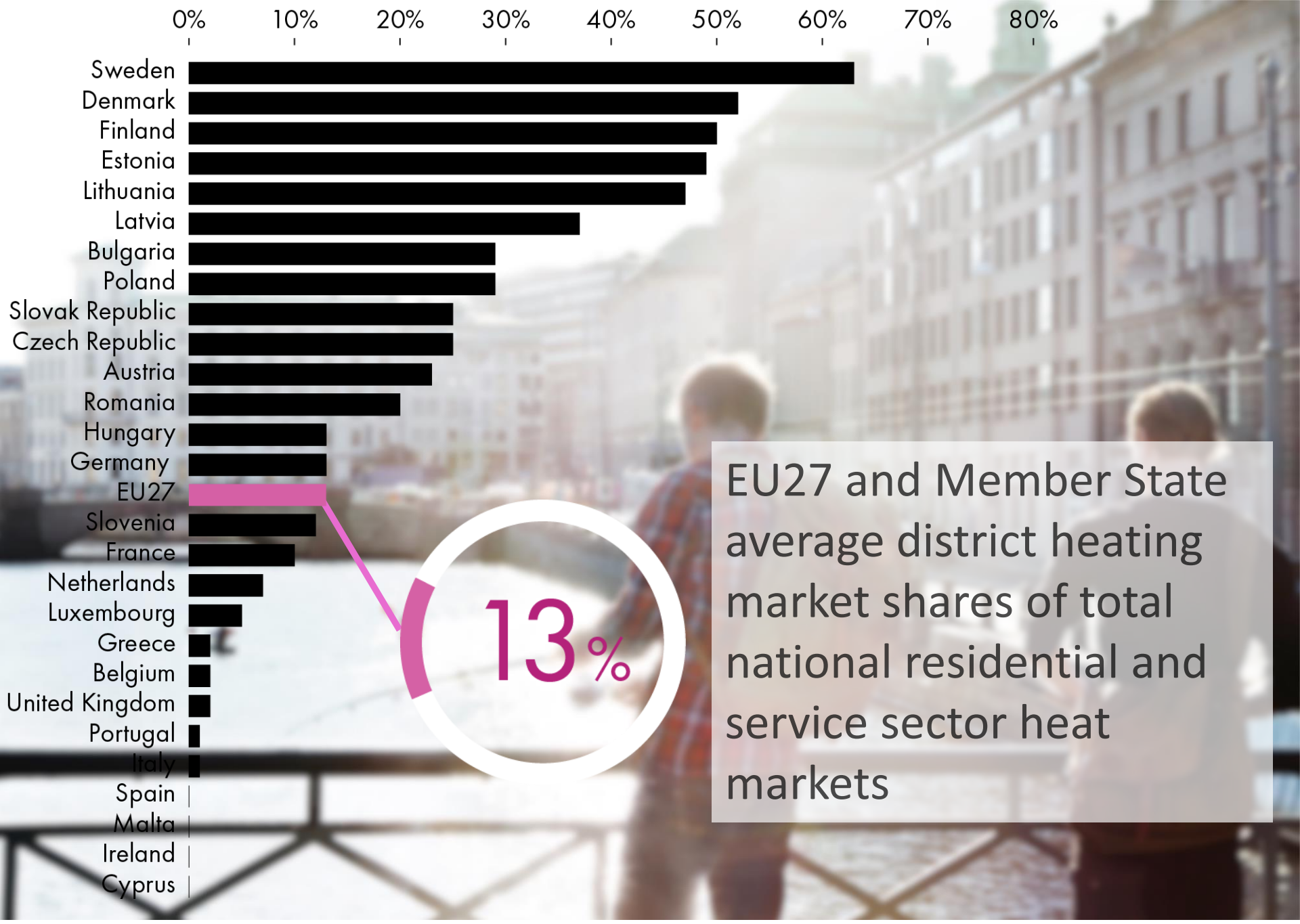
About the CELSIUS Project

- Gothenburg, London, Genoa, Cologne, Rotterdam
- 20 partner organizations
- April 2013 – December 2017
- 11 new demonstrators + 20 existing demonstrators
- 50 new Celsius-cities
- Total budget 26 MEUR (EU contribution 14 MEUR)

13%

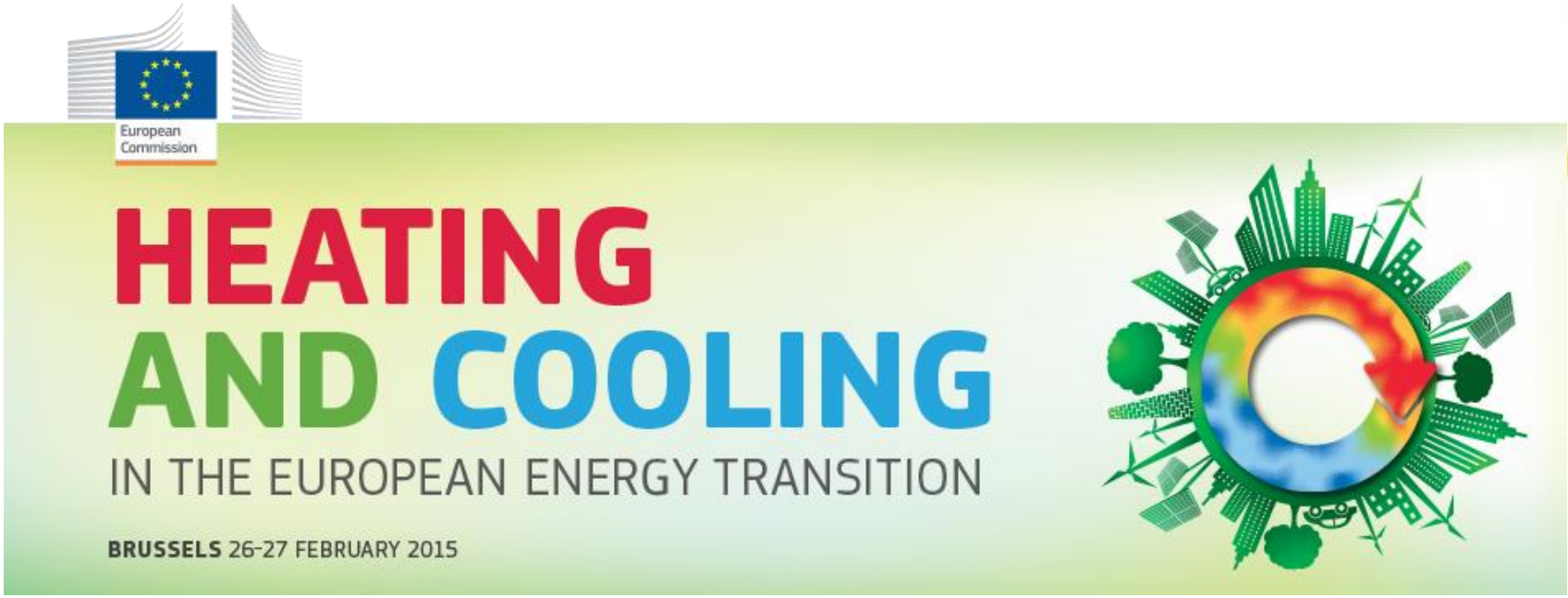
EU27 and Member State average district heating market shares of total national residential and service sector heat markets

There is enough waste heat produced in the EU to heat EU's entire building stock



EU27 and Member State average district heating market shares of total national residential and service sector heat markets

Det handlar om kommunikation och politik



Energieffektivisering är en viktig pusselbit. Men nu, för första gången, lyfts fjärrvärme fram som en del av lösningen på Europas framtida energiförsörjning. Arbetet med att ta fram en värme och kylstrategi börjar ge resultat.

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CELSIUS-städerna

Idag 64 st !

Ca 40 miljoner invånare

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Create value for member cities

Knowledge transfer

CELSIUS toolbox

Specialist workshops

CELSIUS expert group

Demonstrators

Webinars

Networking platform

Policy recommendations

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CELSIUS Toolbox – an online wiki

Launch done 22 mars 2016

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Welcome to the CELSIUS Toolbox! - A district heating and cooling resource

The CELSIUS Toolbox strives to be a source of knowledge and inspiration for cities interested in developing district heating and cooling solutions. It addresses cities which are just beginning to implement small-scale district heating and cooling networks as well as cities with large established systems endeavoring for even smarter and more efficient solutions.

The CELSIUS Toolbox consists of five elements. To navigate the CELSIUS Toolbox, choose one of four options:

1. Go directly to the element of your interest

CELSIUS Roadmap	Technical Toolbox	Social Toolbox	Demonstrators	CELSIUS Cities
- a holistic perspective when developing DHC systems	- technical information on developing DHC systems	- social and economic aspects of DHC development	- new and existing CELSIUS demonstration projects	- CELSIUS Cities and CELSIUS member Cities

2. Use the CELSIUS Roadmap that connects the information from the other four elements through three themes

Market theme
Production theme
Optimisation theme

CELSIUS Roadmap
Guide to Roadmap Content for Cities

3. Go to Categories to which all articles are linked

4. Watch a CELSIUS webinar, workshop or other video recording

Imagine an intelligent, competitive and liveable city. Imagine a resource-efficient city with smart heating and cooling. This is your city – a CELSIUS city! More about the CELSIUS vision.

As one of the possibilities to work toward the EU energy efficiency goals, CELSIUS is a demonstration and information transfer project with focus on smart heating and cooling solutions. More about CELSIUS.

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Webinar ca 1 gång per månad

CELSIUS Talk: Optimising DH Systems at Building Level

Wednesday October 19 at 10:30 CET

During this online meeting we will explore different possibilities of optimising district heating systems at building levels. Starting with innovative solutions for the building as a whole, Dr. Romanas Savickas, Head of Engineers Analysis Group at Veolia Energy will explain the technology that they have developed in Vilnius, Lithuania, to monitor actual energy consumption and improve energy efficiency in buildings.
Patrik Arvsell, from Göteborg Energi will then talk about different ways to optimise the substations so they provide the best temperature into the building to maximise cost savings and energy efficiency.
To conclude, Maria Jangsten from Chalmers Teknologkonsulter AB will present on how to optimise radiator temperature in multi-family homes.

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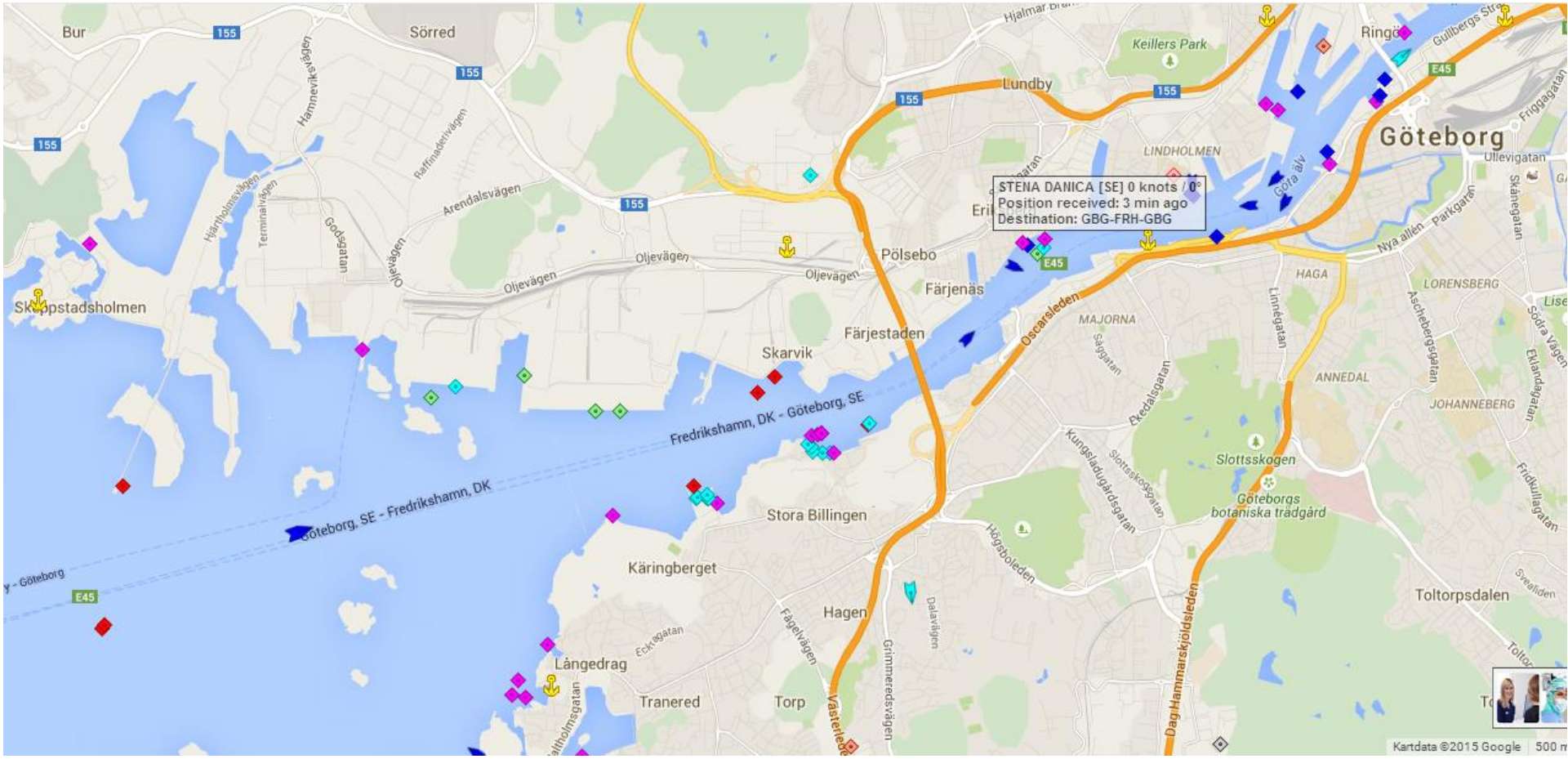
Demonstrator inaugurations

Cologne, October, 2013
District heating from sewage water

Rotterdam, April, 2014
Heat hub, 300 MWh/50 MW

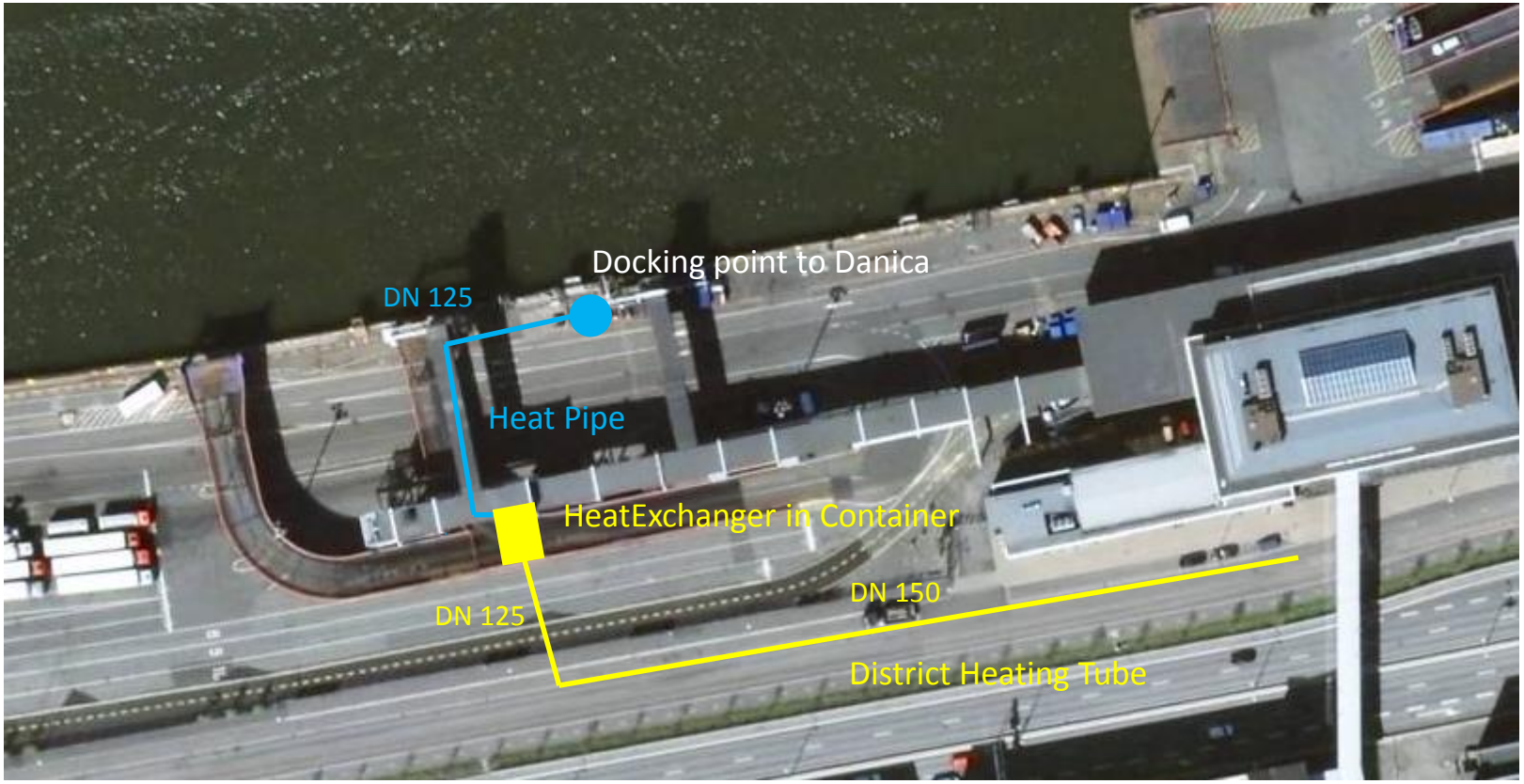
Gothenburg, December, 2014
District heating to ships

Ariel view of the docking point to the ship



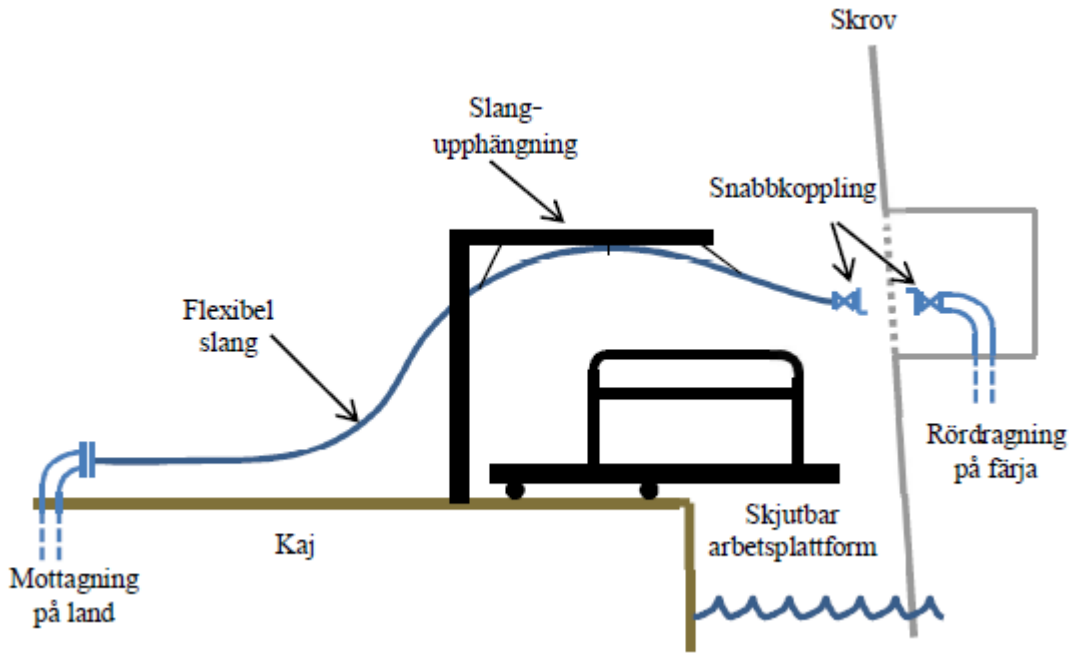
Source: www.marinetraffic.com

Ariel view of the docking point to the ship



The Gothenburg District Heating

The principle for the connection of District Heating



Principle for connection to the ship with hoses in a flexible suspension and a new ramp. (in conjunction with wastewater)

The drip-free quick couplers..
(aviation style)

The Stena Danica Ferry

In regular service between Gothenburg and Fredrikshamn (Denmark)
Built 1983
Approx. 2300 passengers
Approx. 500 Cars

At quay ~ 6 hours/night (Gothenburg)

The Gothenburg District Heating

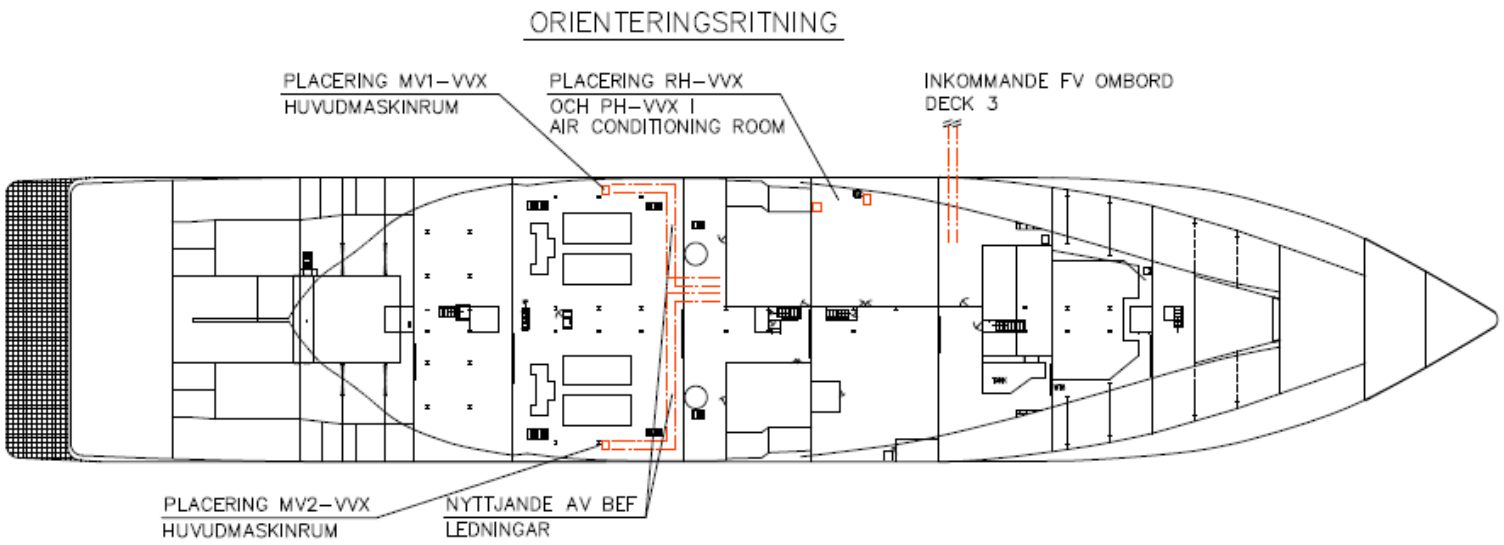
The Gothenburg District Heating

Installed Capacity

Three different operating modes:

1. Heating ship.
2. Prevention of freezing (hoses)
3. Stand by

- Pretreatment:…….420 kW
- Reheating……320 kW
- Engine heating…….2 x 220 kW



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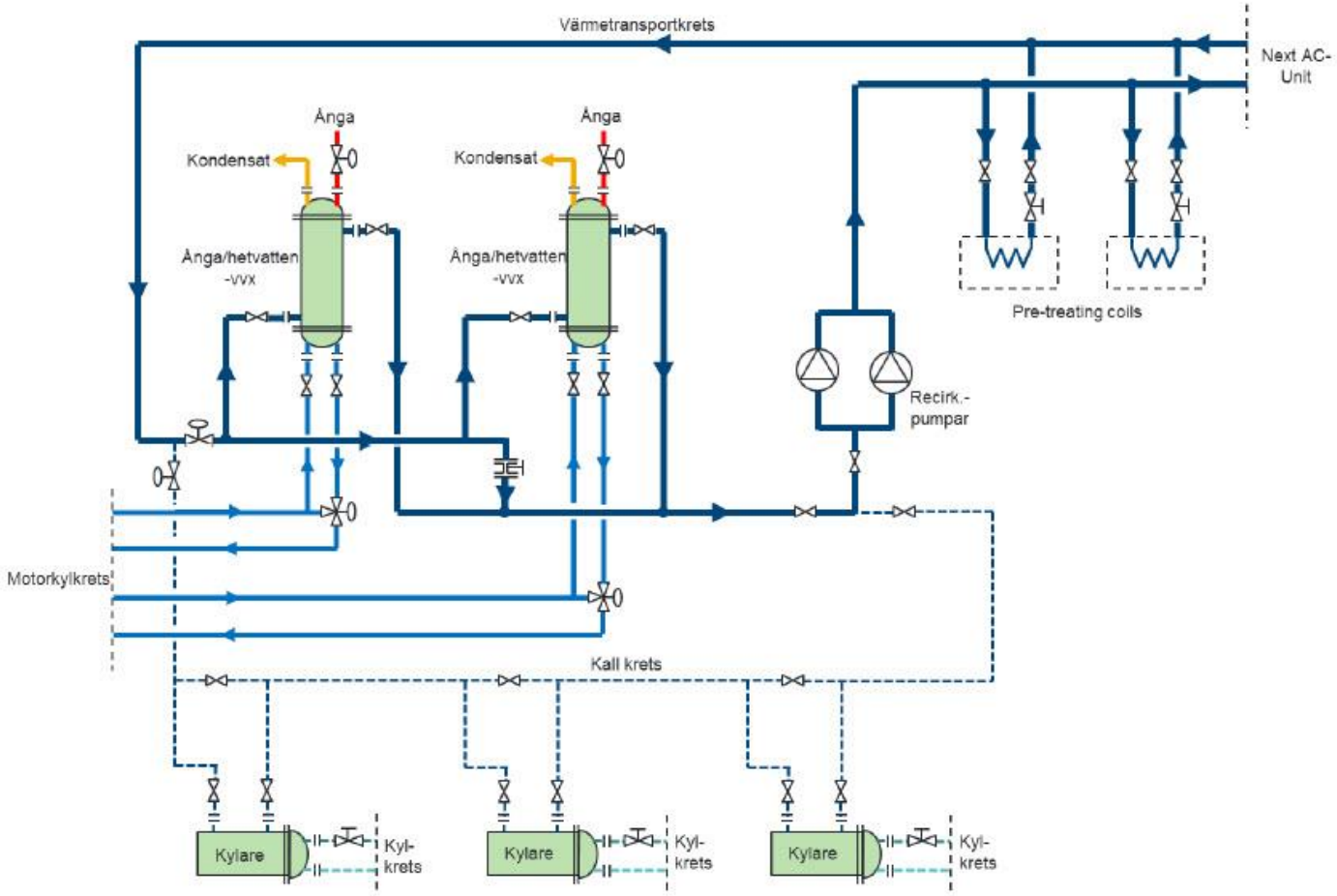
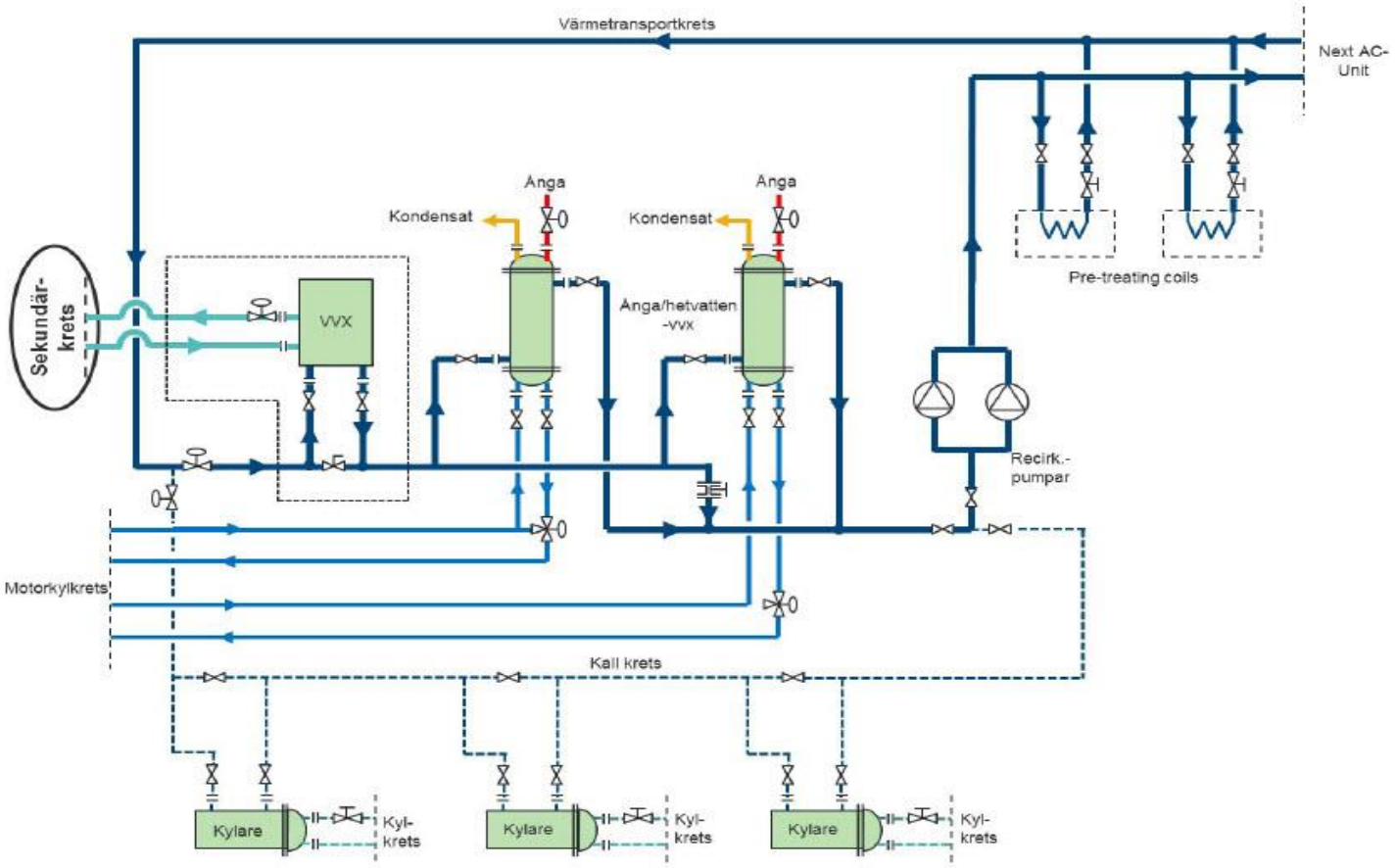
Energy Usage



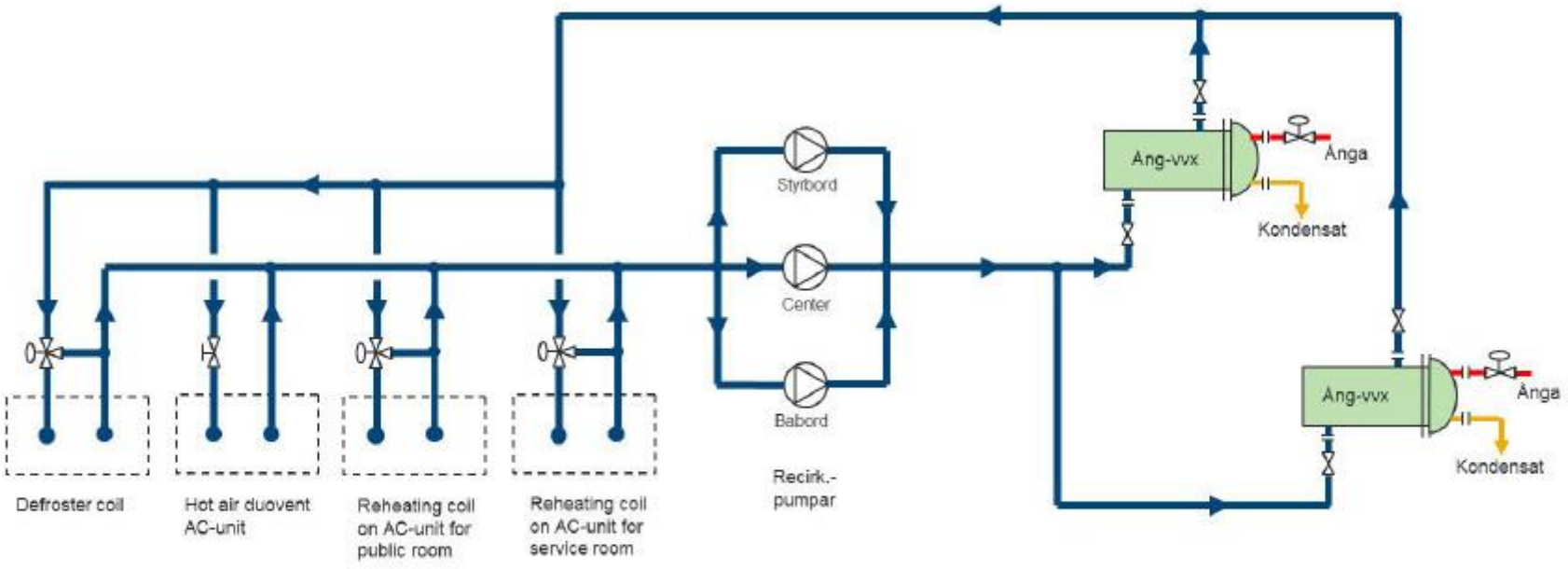
Figur 1. Processchema över "Pre-treatment"-systemet.

Energy Usage



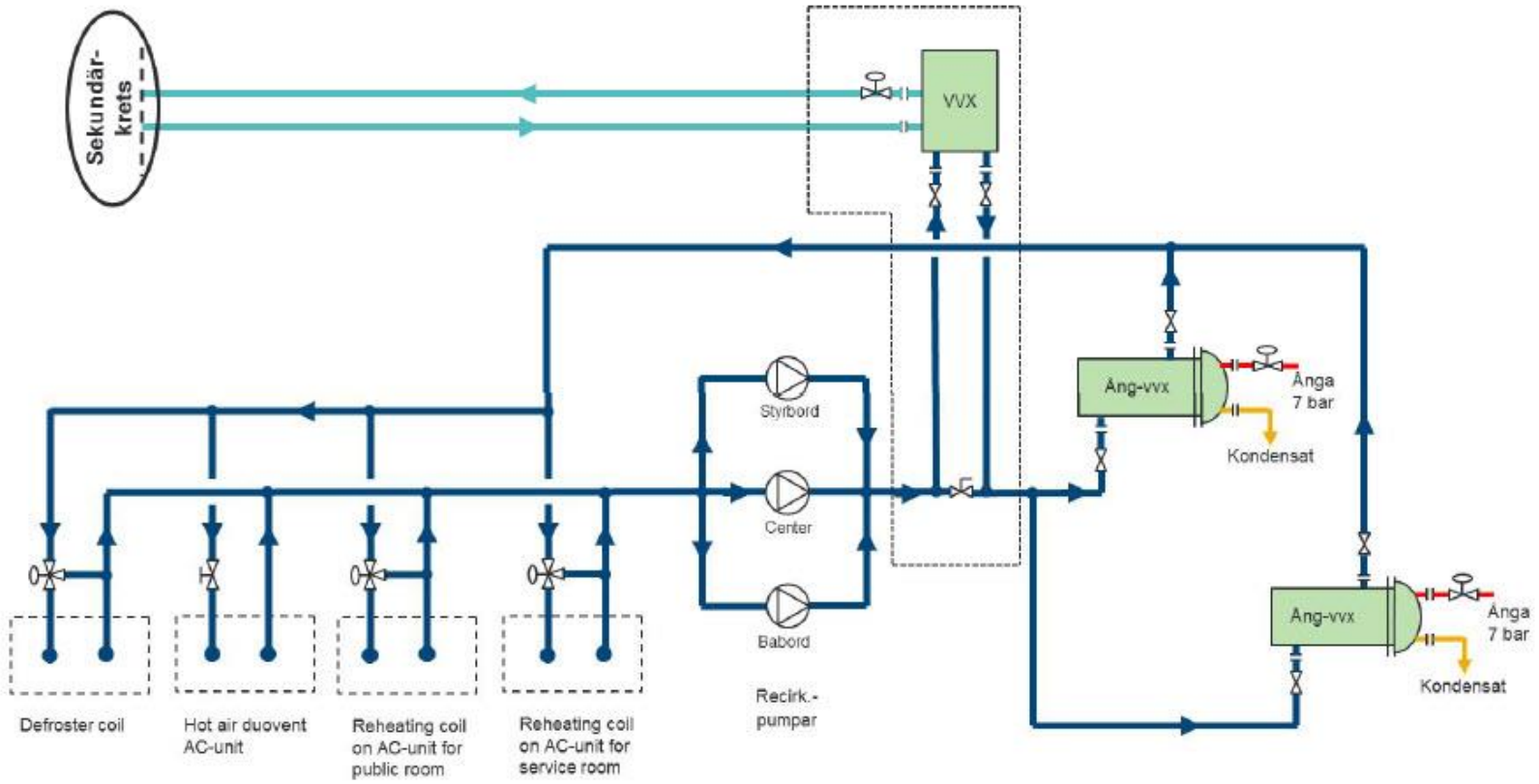
Figur 12. Förslag på hur ombyggnad av "Pre-treatment"-systemet kan utföras.

Energy Usage



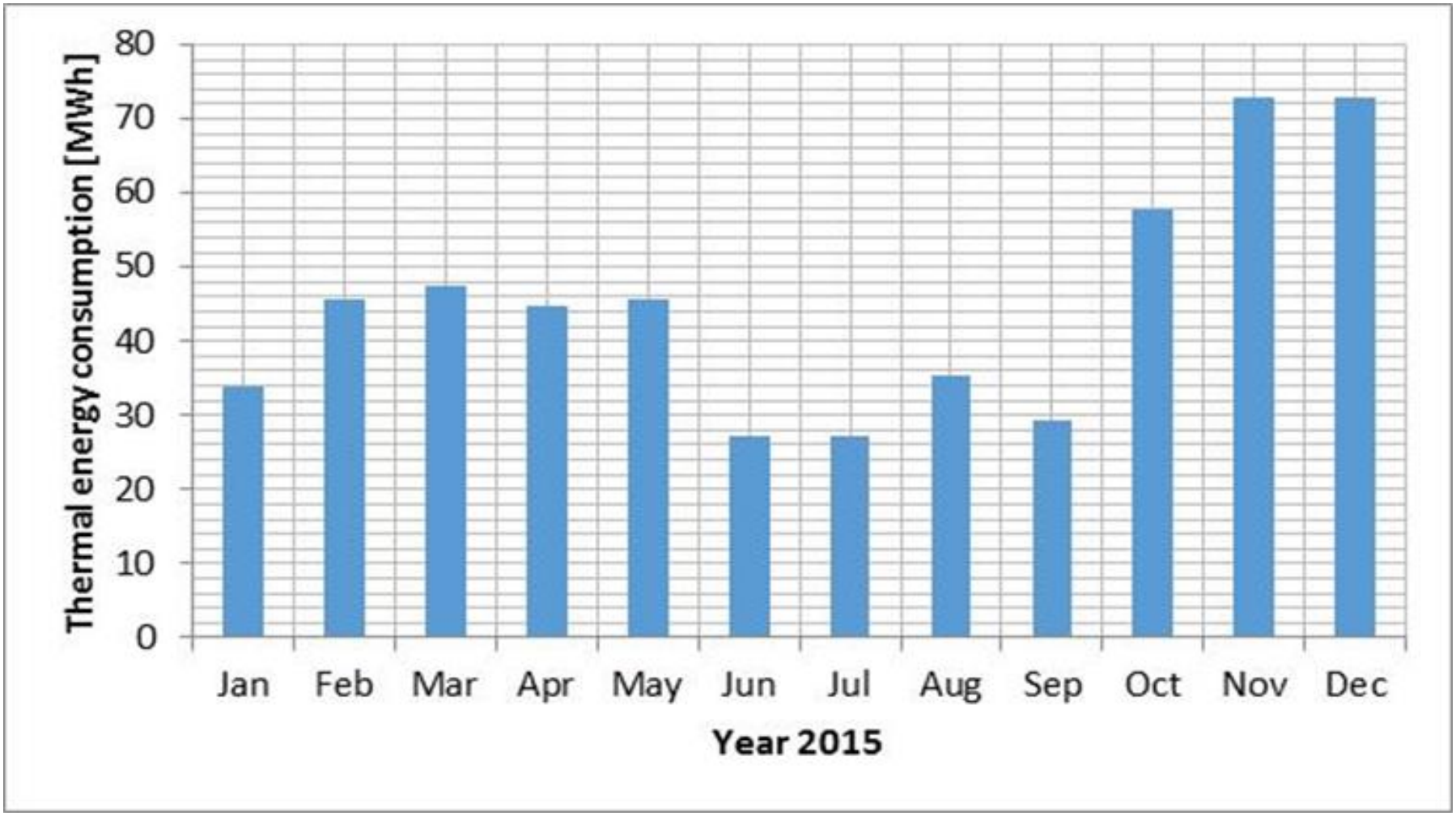
Figur 2. Processchema över "Reheating"-systemet.

Energy Usage

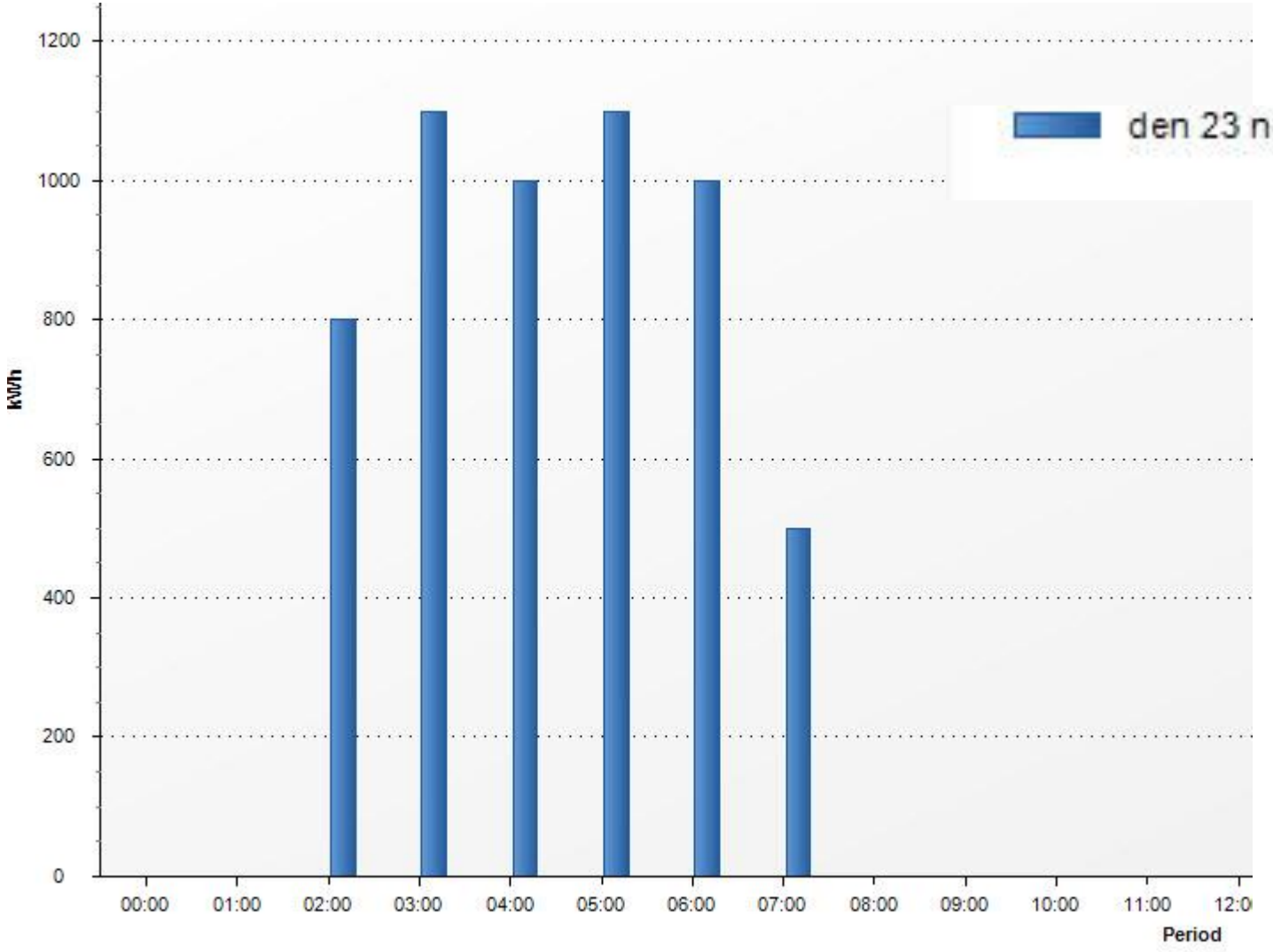


Figur 13. Förslag på hur ombyggnad av "Reheating"-systemet kan utföras.

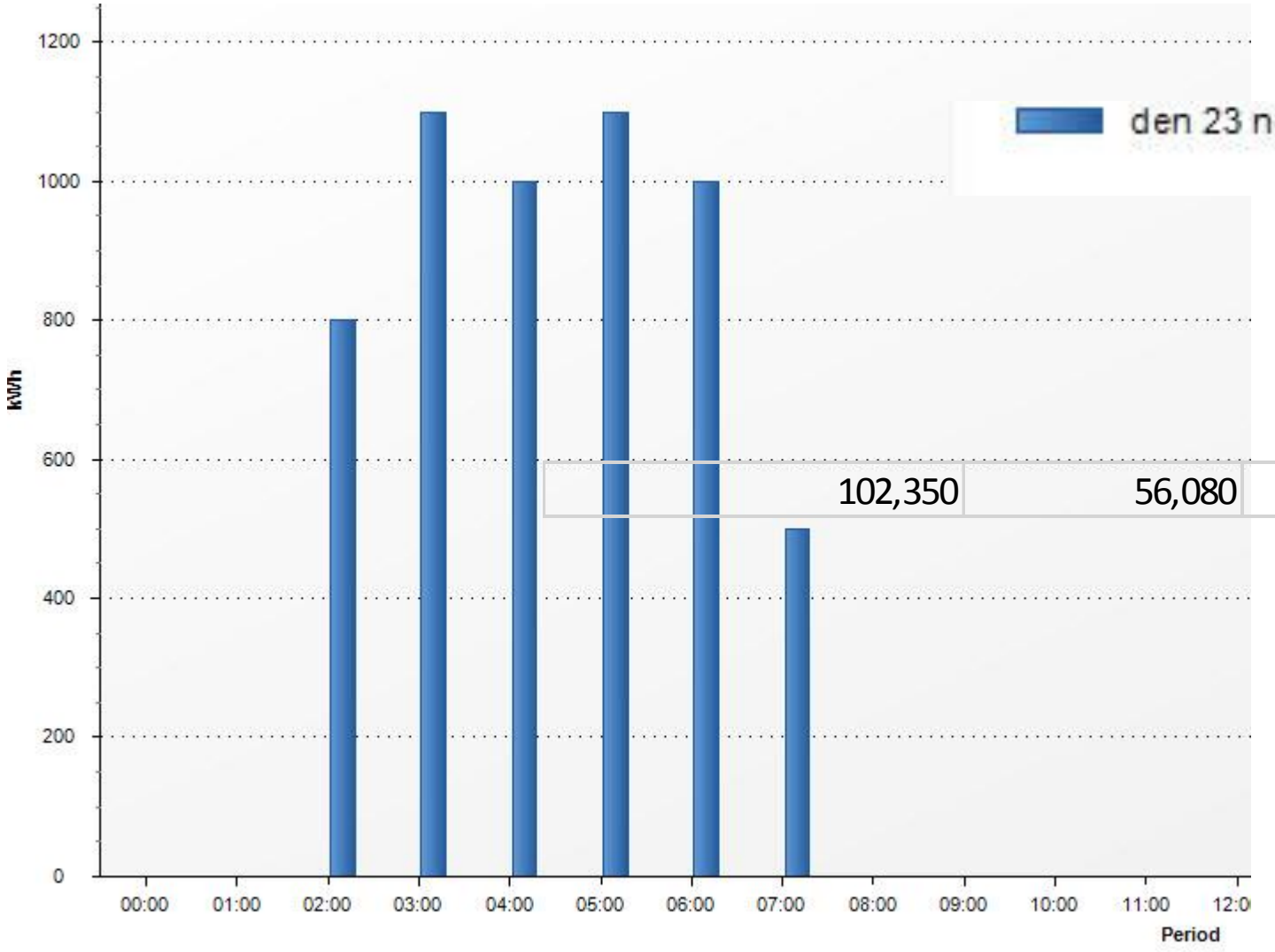
Energy Usage ~ 450 MWh/year



Energy Usage – peak load 1.6 MW (calculated)



Energy Usage – peak load 1.6 MW (calculated)



102,350	56,080		46,27

The Gothenburg District Heating

The business case (2014):

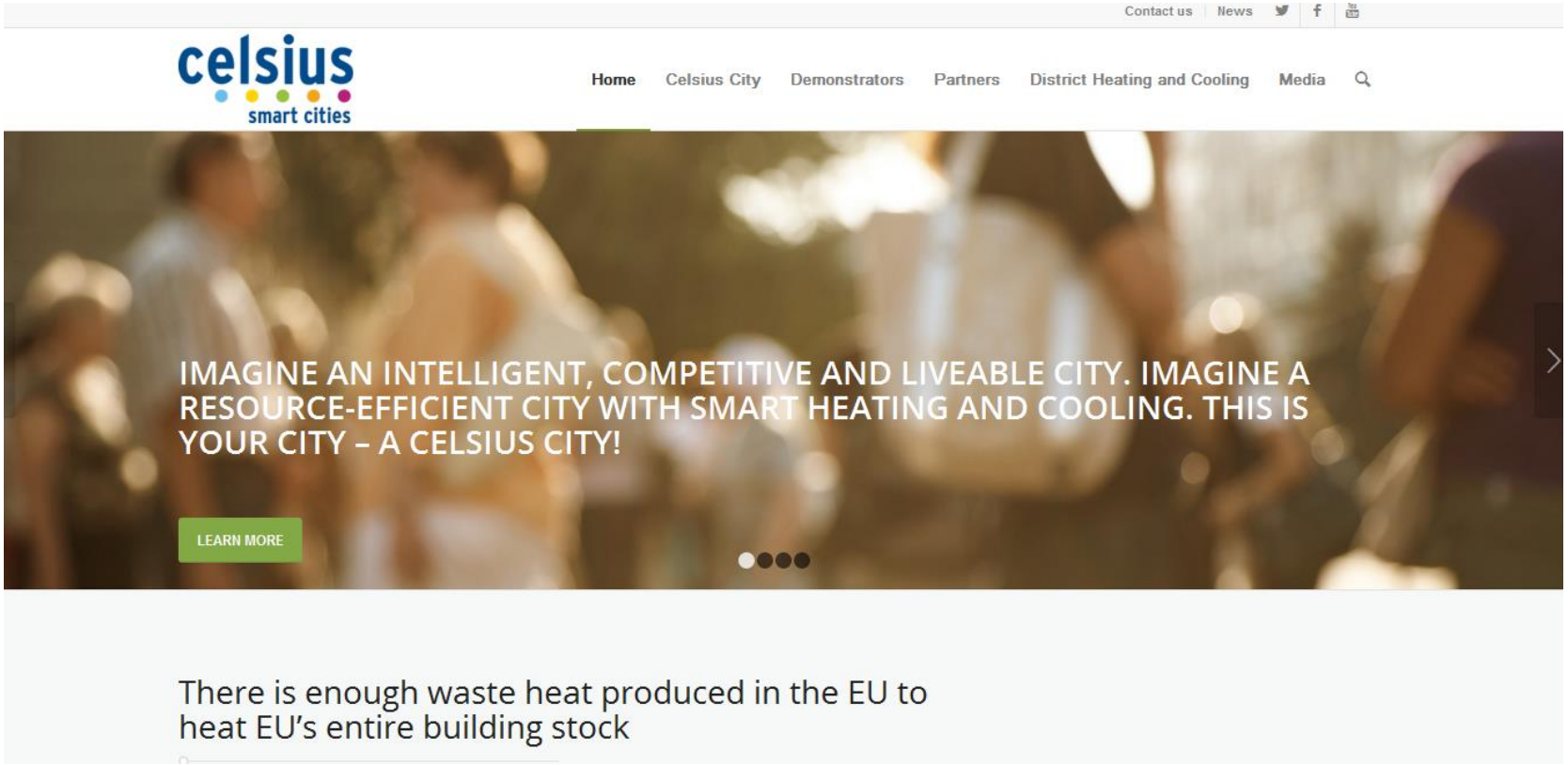
3 Dimensions:

- Environmental
  - Reduced CO2 emission ~ 500 ton /yearly
  - No NOx. (isch < 100 kg/year)
  - No SOx. (isch < 10 kg/year)

- Social
  - Less noise (nearby neighbors ☺)

- Economical
  - District Heating less expensive then oil…
  - Pay back ~ 2 years.
  - [Oil burner $\xrightarrow{\text{yields}}$ 85% heat], 1 ton Oil= 11 MWh, EO1 XX Euro/MWh.

Takk for oppmerksomheten!!



Besøk oss www.celsiuscity.eu!

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