



Towards the Integration of Large SHC Systems into
DHC Networks

IEA SHC TASK 55

COPENHAGEN, 12–13 SEPTEMBER 2017
Patrick Reiter, Sabine Putz



AALBORG UNIVERSITY
DENMARK



IEA Energy Technology Network



(1) Cross-Cutting Activities

(2) Energy End-use Technologies

- Buildings
- Electricity
- Industry
- Transport

(3) Fossil Fuels

(4) Fusion Power

(5) Renewable Energy Technology

IEA Energy Technology Network

Technology Collaborations Programmes (TCPs)



Cross-Cutting Activities		
1	Clean Energy Education and Empowerment	C3E -
2	Energy Technology Systems Analysis	ETSAP http://www.iea-etsap.org/
Energy End-Use Technologies		
Buildings		
3	Buildings and Communities	EBC http://www.iea-ebc.org/
4	District Heating and Cooling	DHC http://www.iea-dhc.org
5	Energy Efficient End-use Equipment	4E https://www.iea-4e.org/
6	Energy Storage	ECES https://iea-eces.org/
7	Heat Pump Technologies	HPT http://heatpumpingtechnologies.org/
Electricity		
8	Demand-Side Management	DSM http://www.ieadsm.org/
9	High-Temperature Superconductivity	HTS -
10	Smart Grids	ISGAN http://www.iea-isgan.org/
Industry		
11	Industrial Technologies and Systems	IETS -
Transport		
12	Advanced Fuel Cells	AFC http://www.ieafuelcell.com/
13	Advanced Motor Fuels	AMF http://www.iea-amf.org/
14	Advanced Materials for Transportation	AMT http://tcp-ia-amt.org/
15	Combustion	Combustion https://www.ieacombustion.com/
16	Hybrid and Electric Vehicles	HEV http://www.ieahev.org/
Fossil Fuels		
17	Clean Coal Centre	CCC http://www.iea-coal.org/
18	Enhanced Oil Recovery	EOR http://iea-eor.ptrc.ca/
19	Fluidized Bed Conversion	FBC http://www.processeng.biz/iea-fbc.org/
20	Gas and Oil Technologies	GOT http://www.gotcp.net/
21	Greenhouse Gas	GHG http://www.ieaghg.org/

Fusion Power		
22	Co-operation on Tokamak Programmes	CTP -
23	Fusion Environment, Safety, Economy	ESE FP
24	Fusion Materials	FM http://www.frascati.enea.it/ifmif/
25	Nuclear Technology of Fusion Reactors	NTFR -
26	Plasma Wall Interaction	PWI http://www.pwi-tcp.org/
27	Reversed Field Pinches	RFP -
28	Spherical Tori	ST http://iea-st.pppl.gov/
29	Stellarator-Heliotron Concept	SH http://www.ipp.mpg.de/sh-tcp
Renewable Energy Technologies		
30	Bioenergy	Bioenergy http://www.ieabioenergy.com/
31	Geothermal	Geothermal http://iea-gia.org/
32	Hydrogen	Hydrogen http://ieahydrogen.org/
33	Hydropower	Hydro http://www.ieahydro.org/
34	Ocean Energy Systems	OES https://www.ocean-energy-systems.org/
35	Photovoltaic Power Systems	PVPS http://www.iea-pvps.org/
36	Solar Paces	SolarPACES http://www.solarpaces.org/
37	Solar Heating and Cooling	SHC http://www.iea-shc.org/
38	Wind	Wind https://www.ieawind.org/



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 Copenhagen, 12-13 September 2017

www.4dh.eu

www.reinvestproject.eu

www.heatroadmap.eu

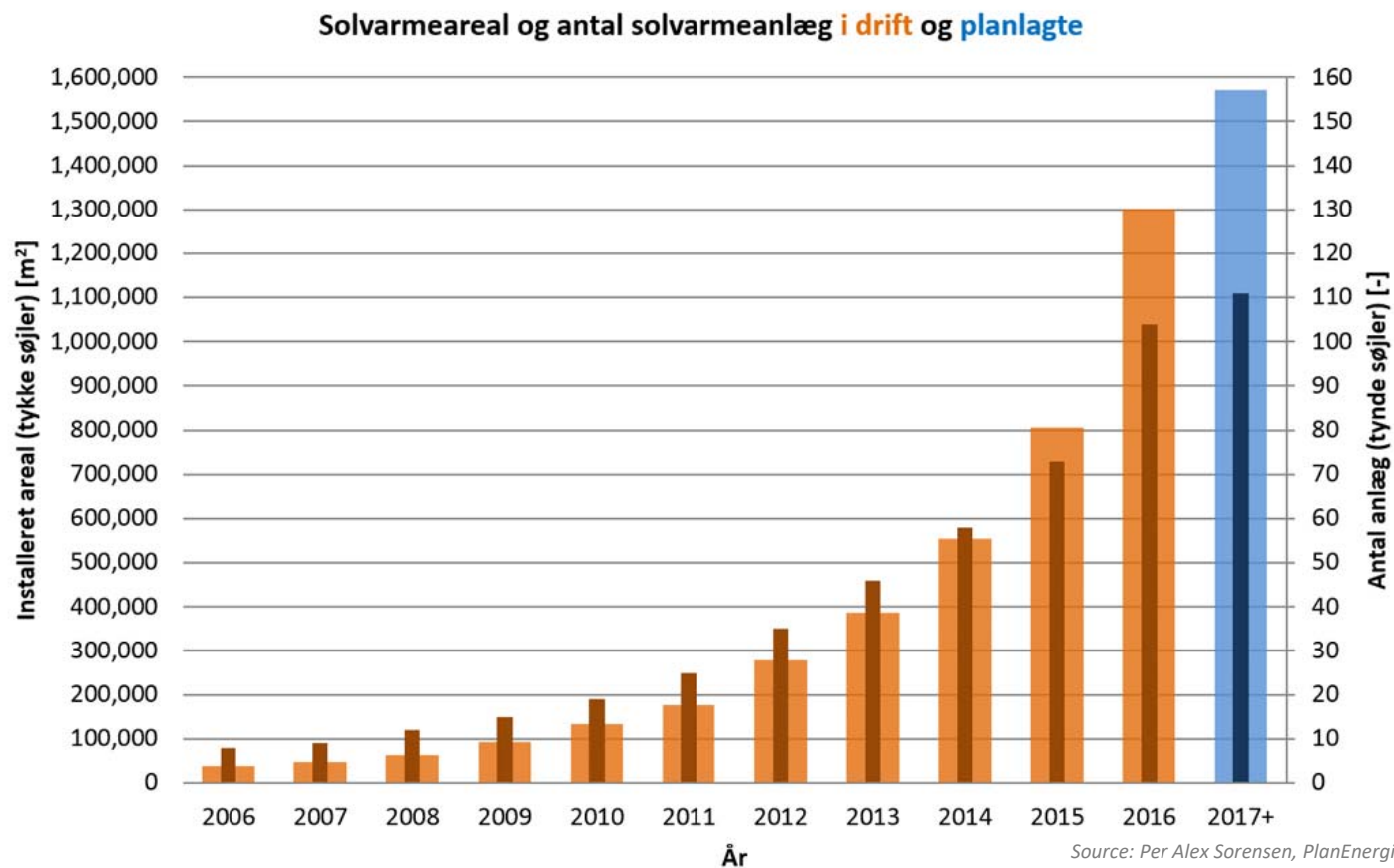


SHC TASK 55



- Focuses on the integration of large SHC systems into DHC networks
- Aims to promote Solar District Heating & Cooling across countries and energy policy frameworks
- Acts as an exchange platform between
 - Heat suppliers & Utilities
 - Local communities
 - Housing enterprises
 - Industry
 - Policy makers
 - Researcher & Experts

Solar District Heating Denmark



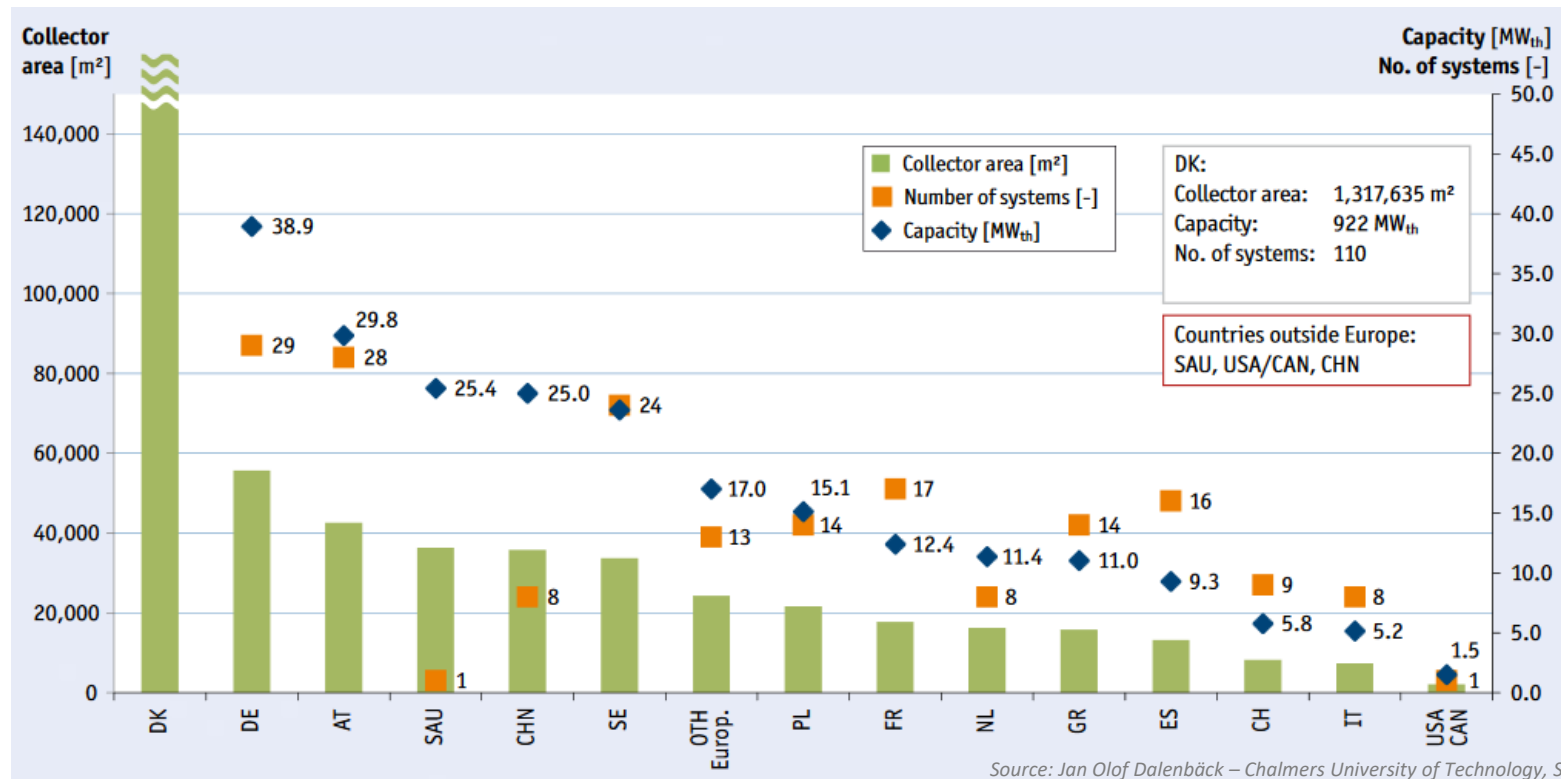
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Solar District Heating and Cooling

Capacities and total collectors installed - 2016



SHC TASK 55 Subtasks



SUBTASK A – Network Analysis and Integration

Lead: AUSTRIA: AIT – Austrian Institute of Technologies (Ralf-Roman Schmidt)
→ Collaboration with IEA DHC

SUBTASK B - Components Testing, System Monitoring and Quality Assurance

Lead : CHINA: SUNRAIN (Jiao Qingtai)

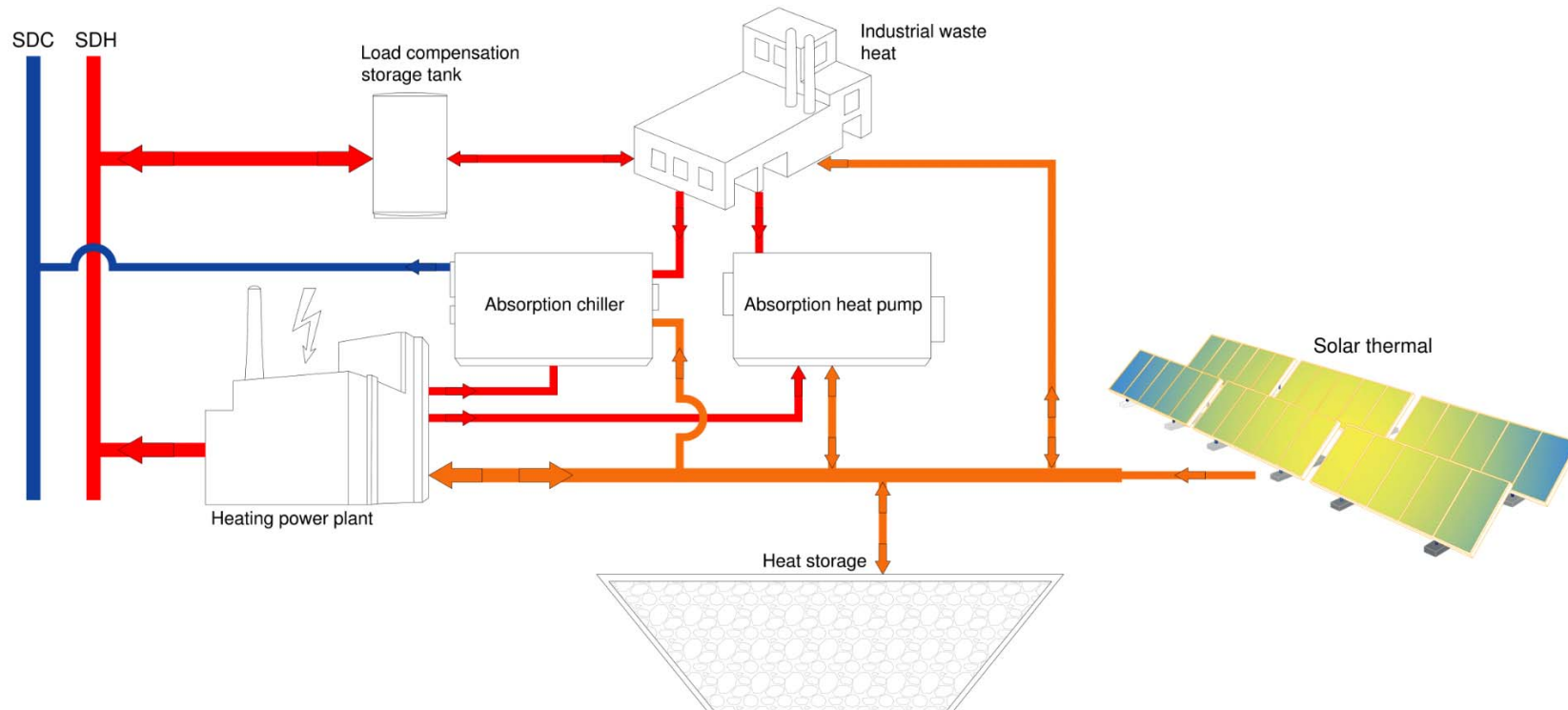
SUBTASK C - System design of ST & Hybrid Systems

Lead : DENMARK: PlanEnergi (Jan-Erik Nielsen)

SUBTASK D – Economic Aspects and Promotion

Lead : SPAIN: TECNALIA (Patricio Aguirre Múgica)

SHC TASK 55 System Example



Research project: MeQuSo

World wide first in-situ performance tests for SDH: 6 different collector types – installed in Graz/Austria



reINVEST



SOLID
solarinstallation+design



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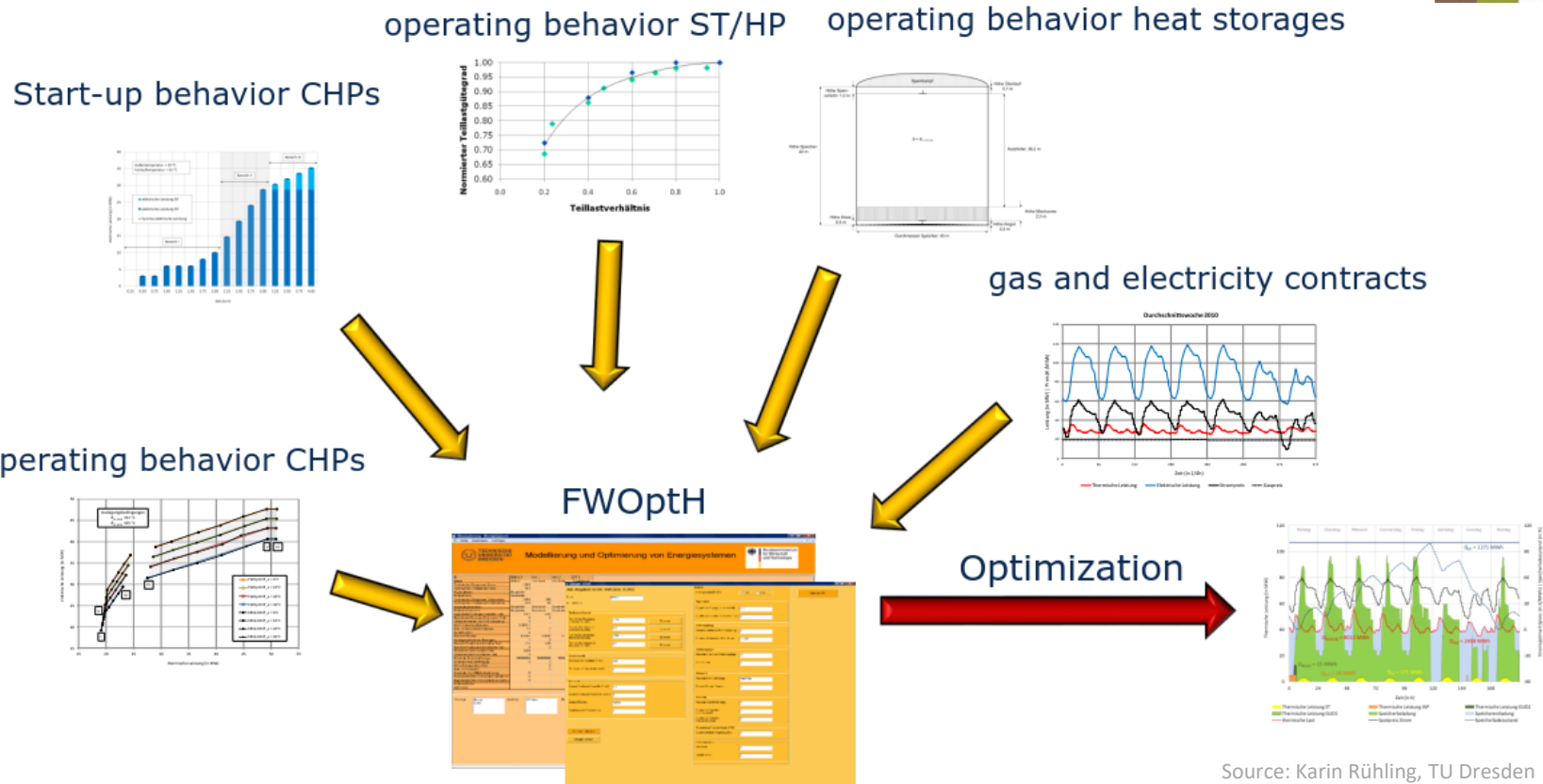
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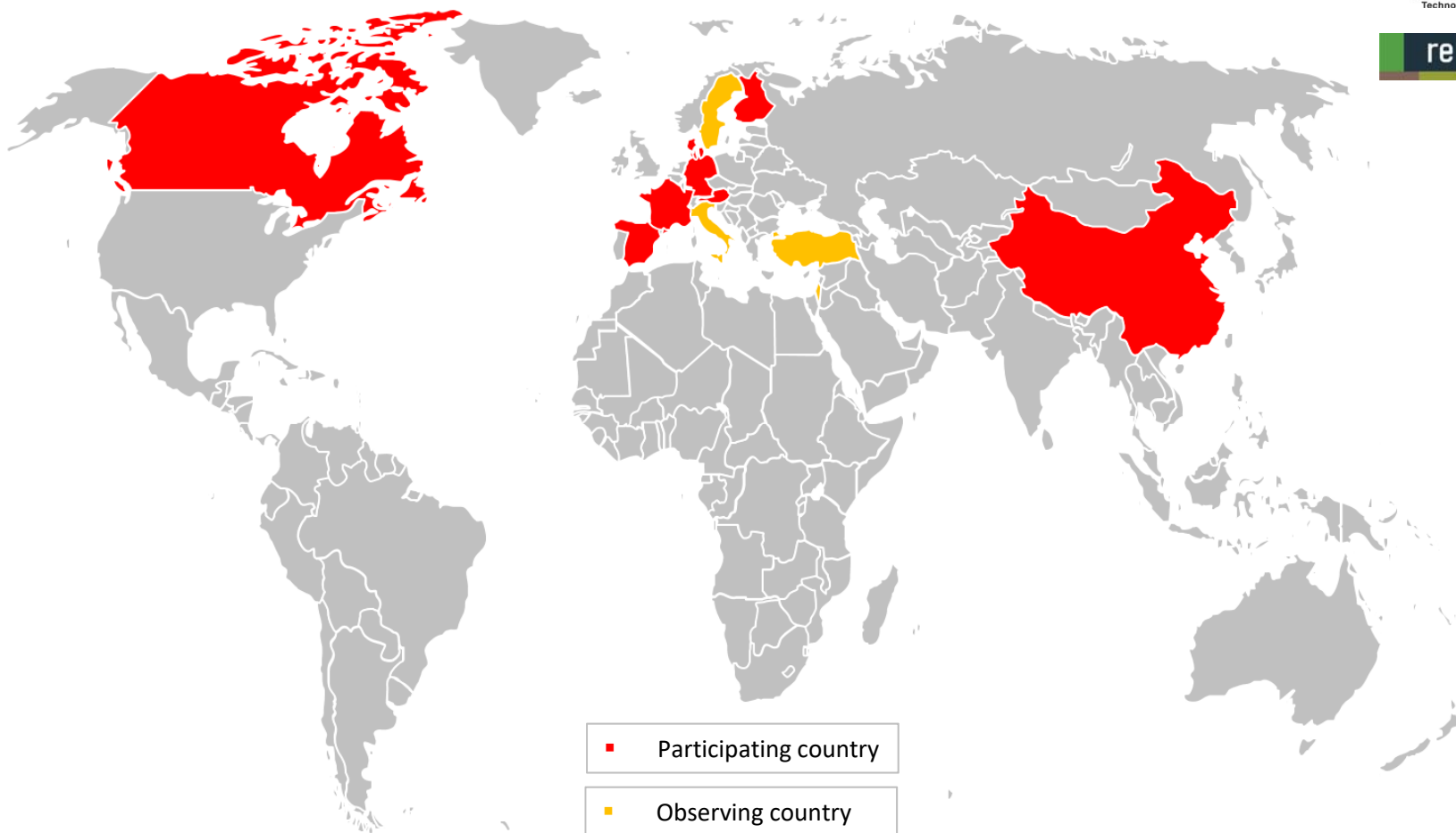
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Research projects: GREEN HEAT³, SOLSTAND & MULTI-LEVEL DISTRICT HEATING



SHC TASK 55 Short Facts



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Why IEA SHC TASK 55



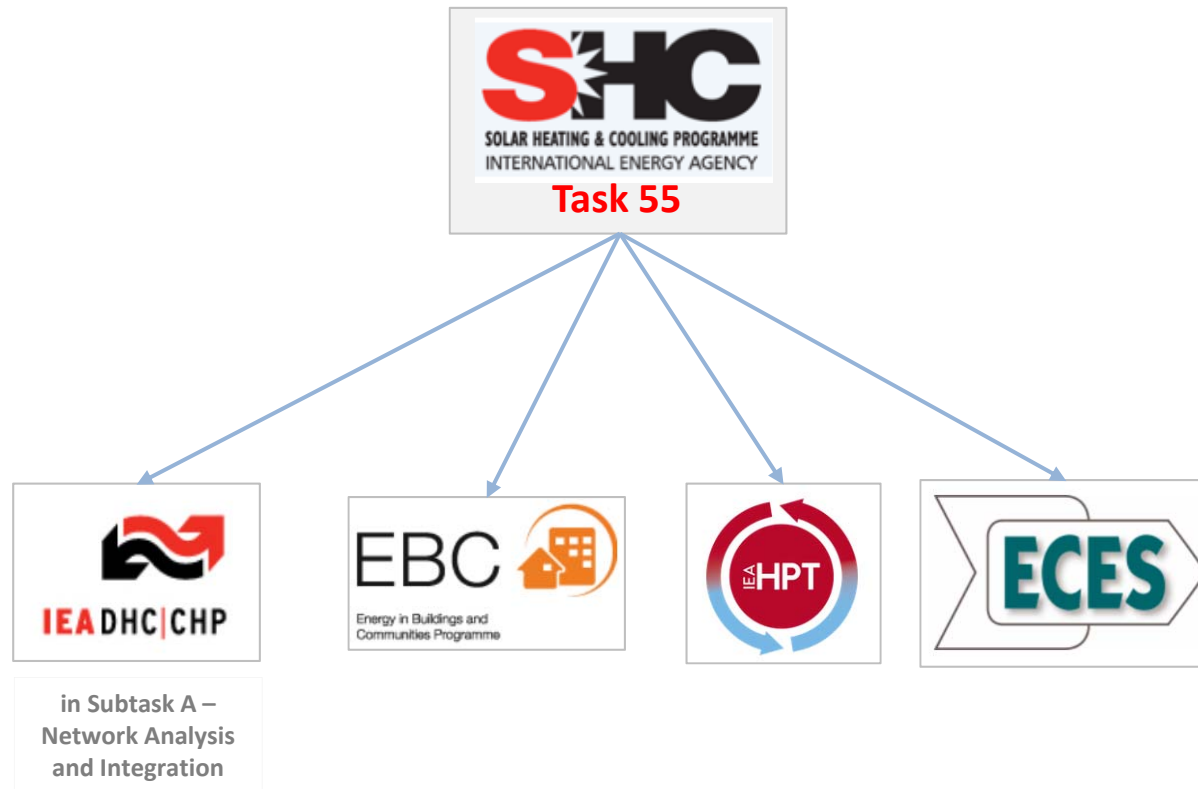
- Substituting fossils and pushing the overall energy efficiency in urban areas for solar district heating and cooling
- Successor of TASK 45
- Step from MEGAWATT to GIGAWATT systems
- Need for low system cost – need for reduced heat price – need for validated increased collector field efficiency and output
- Task 55 acts as exchange platform for interested:
 - Heat suppliers
 - Local communities
 - Housing enterprises
 - Industry
 - Policy makers
 - Researcher & Experts

IEA SHC Programme



- Facilitation of the energy transition to reduce emissions and primary energy demand
- Accelerates the pace of solar thermal technology development
- Promotes standardization of solar thermal
- Enhances national R&D programmes
- Permits national specialization
- Saves time and money through establishment of SHC Tasks

Collaborations with other TCPs



Solar District Heating Worldwide



- Very successful development in Denmark
 - Primary energy consumption decreased significantly
 - First carbon free bigger city (Copenhagen) planned for 2030 - whole Denmark carbon free latest until 2050 (alternative energy mix)
- Austria has also long tradition in SDH and a plenty of other countries (China, Germany, Sweden, Canada, Norway, Sweden, Poland, Netherlands, Spain, Portugal, Greece and Turkey) have already installed larger SDH
- Governments priorities towards ambitious environmental and energy policy are changing slowly, but a trend toward SDH can be observed

Solar District Heating Denmark



Vojens, DK, 70,000 m² (49 MW), 200,000 m³



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Solar District Heating Denmark



The solar heating plant in Silkeborg is 156,694 m² - the world's largest in 2017. It covers 20% of the annual heat demand in Silkeborg.

[\[http://www.silkeborgforsyning.dk/\]](http://www.silkeborgforsyning.dk/)



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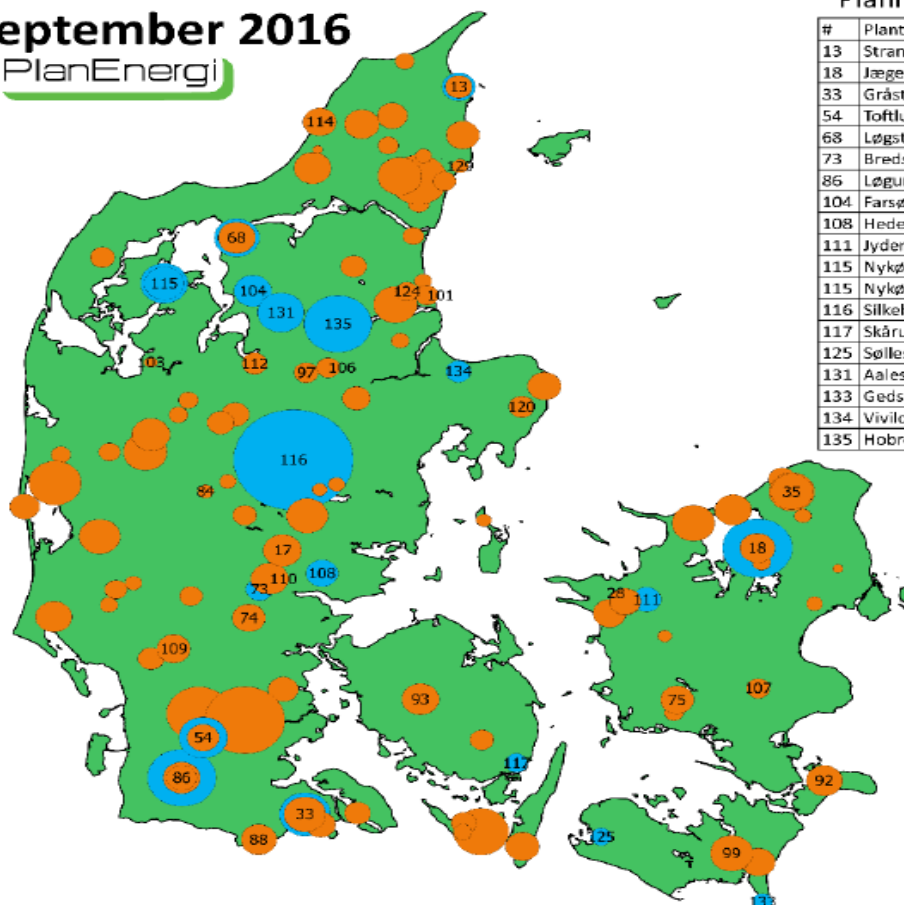
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VEST

September 2016

PlanEnergi

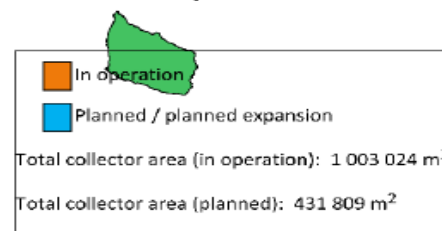


Planned new & expansions

#	Plant	Collector area (m ²)
13	Strandby	{8019}+4000
18	Jægerspris	{10000+3405}+40000
33	Gråsten	{19024}+10000
54	Toftlund	{11000}+15000
68	Løgstør	{15208}+7000
73	Bredsten - Balle	7800
86	Løgumkloster	{9699+5576}+36000
104	Farsø	15120
108	Hedensted	11000
111	Jyderup	9239
115	Nykøbing Mors	16708
115	Nykøbing Mors	{16708}+8000
116	Silkeborg	156694
117	Skårup (Sydfyn)	5418
125	Søllested	4701
131	Aalestrup	24129
133	Gedser	4000
134	Vivild	7000
135	Hobro	50000

New plants & expansions in operation

#	Plant	Collector area (m ²)
17	Tørring	{7284}+8467
28	Svebølle-Visking.	{7035+3000}+1000
35	Helsingø	{4733+14855}+3276
74	Egtved	12000
75	Fuglebjerg	12000
84	Køllecær	2873
86	Løgumkloster	{9699}+5576
88	Padborg	13961
92	Stege	14515
93	Tommerup	15000
97	Ørum	6375
99	Øster Tørebj.	20000
101	Als (Marlagerfj.)	5947
103	Ejsing	1800
106	Hammershøj	6000
107	Haslev	6010
109	Holsted	12500
110	Jelling	15290
112	Løgstrup	7031
114	Løkken	12096
120	Trustrup-Lyngby	7245
124	Veddum (VSV)	5500
129	Voerså	2873



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Upcoming TASK 55 Meetings



3rd TASK 55 Meeting

Location: Masdar Institute of Technologies Abu Dhabi, UAE

Date: **27./28. October 2017** - before SWC/SHC conference

<http://swc2017.org/home.html>

4th TASK 55 Meeting

Location: Spain, tba

Date: probably 8./9. March 2018

5th TASK 55 Meeting and Industry Workshop

Location: China, tba (Beijing is an option)

Date: October 2018



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Contact for joining IEA SHC TASK 55:



Operating Agent

Sabine Putz

s.putz@solid.at

More information

<http://task55.iea-shc.org/>



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