# Solar heating & cooling in Europe

Meeting with Eurocities, Joint WG GAB, WG CCEE and WG Water

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Managing Director
26 April 2023

# Solar heat is happening **HERE IN GHENT !…**


**“Rabottorens”**

Social housing project from ‘’Woning Gent’’ .
Solar heat = primary heating source of a locally installed buffertank that is connected to a district heating circuit.

Phase 1: 300m² (cf pic.)
Phase 2: 180m²

More info

# Setting the scene…

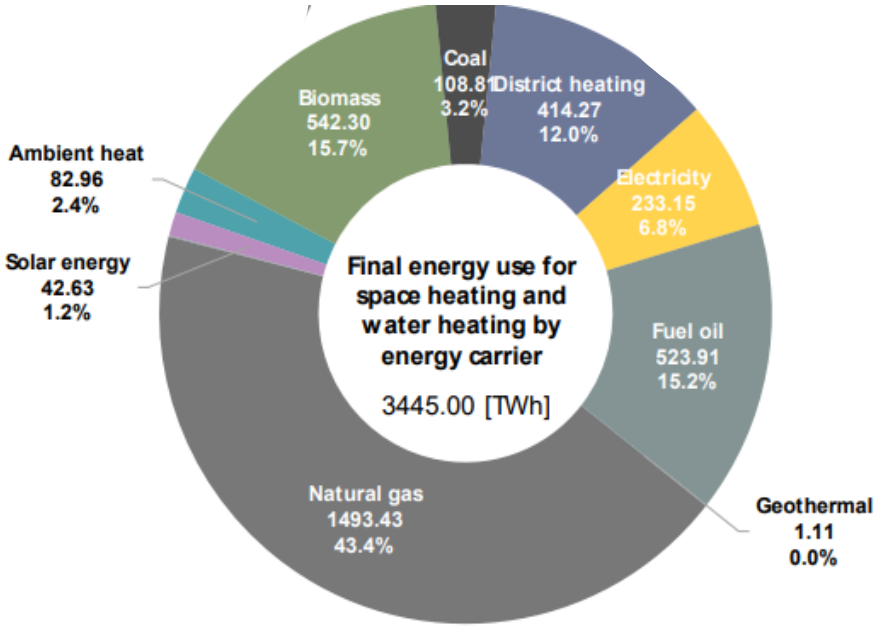
**Heating share of global final energy consumption, 2021**

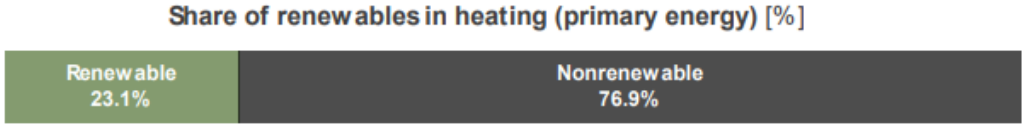
**50** %

Source

Heat = **80**% of the energy consumption in households

Energy demand for space and water heating in the EU-27 in 2017 (source EU COM ENER/C1/2018-494):




***"Despite the technologies needed for heating decarbonisation being readily available and mature, significantly faster rates of deployment are needed to get on track with the Net Zero Emissions by 2050 Scenario."***

*Source, IEA*

Heating – Analysis - IEA

Solar Heat Europe
ESTIF

# What is solar heat?

# Market segments

# The key role of cities

# RENEWABLE ENERGIES
delivered thanks to solar technologies

Solar Heat Europe

CONCENTRATED SOLAR THERMAL

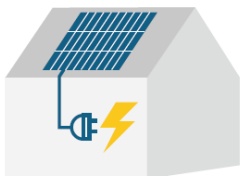
NON-CONCENTRATED SOLAR THERMAL

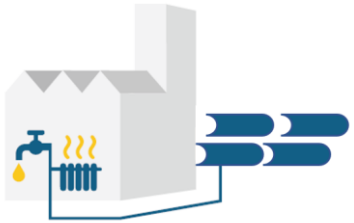
SOLAR PHOTOVOLTAICS

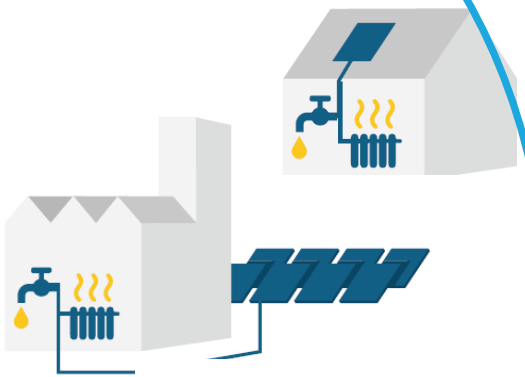
CONCENTRATED SOLAR POWER

CONCENTRATED SOLAR FUELS

CONCENTRATED SOLAR HEAT







1) SOLAR POWER

2) FUELS

3) SOLAR HEAT

# About SOLAR HEAT EUROPE

UPSTREAM SUPPLIERS OF RAW MATERIALS FOR ST

SUPPLIERS OF COMPONENTS OF ST

MANUFACTURERS OF COMPLETE ST EQUIPMENTS

ST DEVELOPPERS (business/financial model)

ST ENGINEERING CIES

OPERATORS

ST RESEARCHERS (private or public) and UNIVERSITIES

ST CONSULTANTS

ST TEST LABS/CERTIFICATION (SKN)

SOLAR THERMAL NATIONAL ASSOCIATIONS

USERS OF HEAT (private/professional)

## Representing the full value chain of the Solar Thermal (ST) sector since 30 years…

## Promoting the benefits of solar heating and cooling solutions and engaging with EU policy makers for the successful implementation of these technologies in Europe and beyond.

## Harnessing the energy of the sun to generate renewable thermal energy for heating or cooling


- Clean & direct renewable heat generation
- Reduces carbon emissions
- Increases energy security and independence, locally based
- Thermal storage included
- Can be combined with any other technology
- European-based industry, net exporter

# Clean heat from different solar collectors

## Solar Thermal

**Non concentrated technologies**
(T°C < 120-180°C)


Flat Plate (with single-axis tracker)


High-Vacuum Flat Plate

The Solar Keymark
CEN Keymark Scheme

- Certification standards in place since 20 years
- > 1150 certificates
- CEN scheme
- Transparent and open
- +300 stakeholders


Evacuated Tube


Hybrid / PVT (Photovoltaic-Thermal)

# Clean heat from different solar collectors

## Concentrated Solar Thermal

**CST**

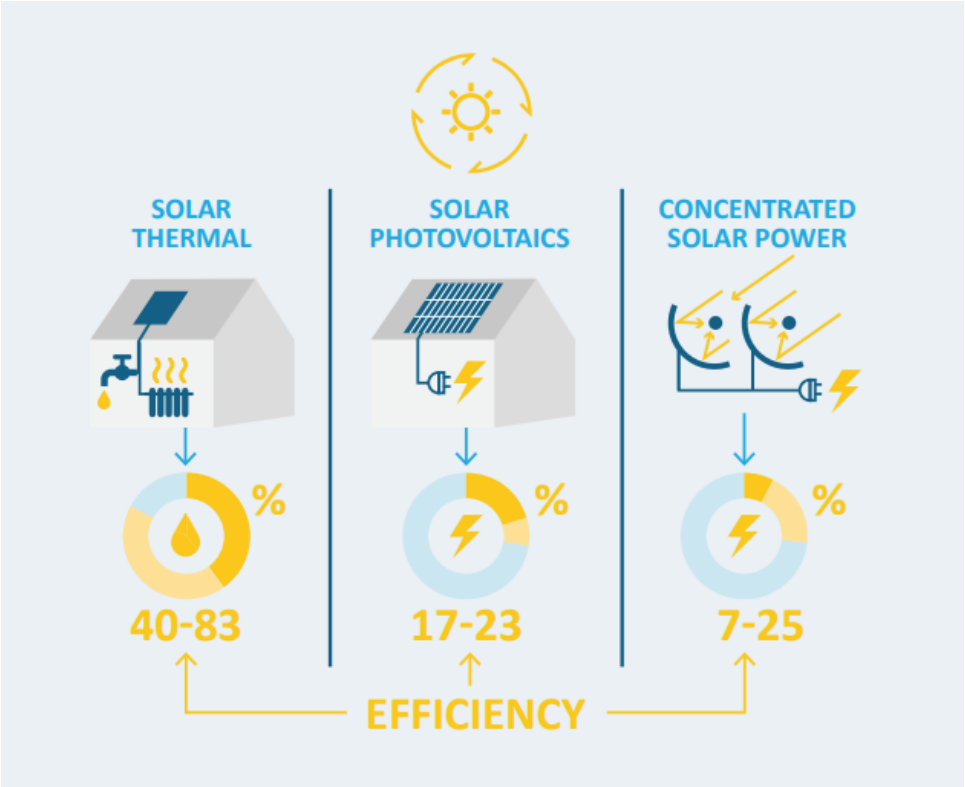
**Concentrated technologies**
(T°C < 400°C)


Parabolic (concentrated solar heat)


Linear fresnel (concentrated solar heat)


Fresnel lenses (concentrated solar heat)

# Solar themal collectors: a very **HIGH YIELD/m²**




SOLAR ENERGY PRODUCED | 1 YEAR

(Rooftop) Area needed:

SOLAR THERMAL: 6,4m² = 3 MWh/a

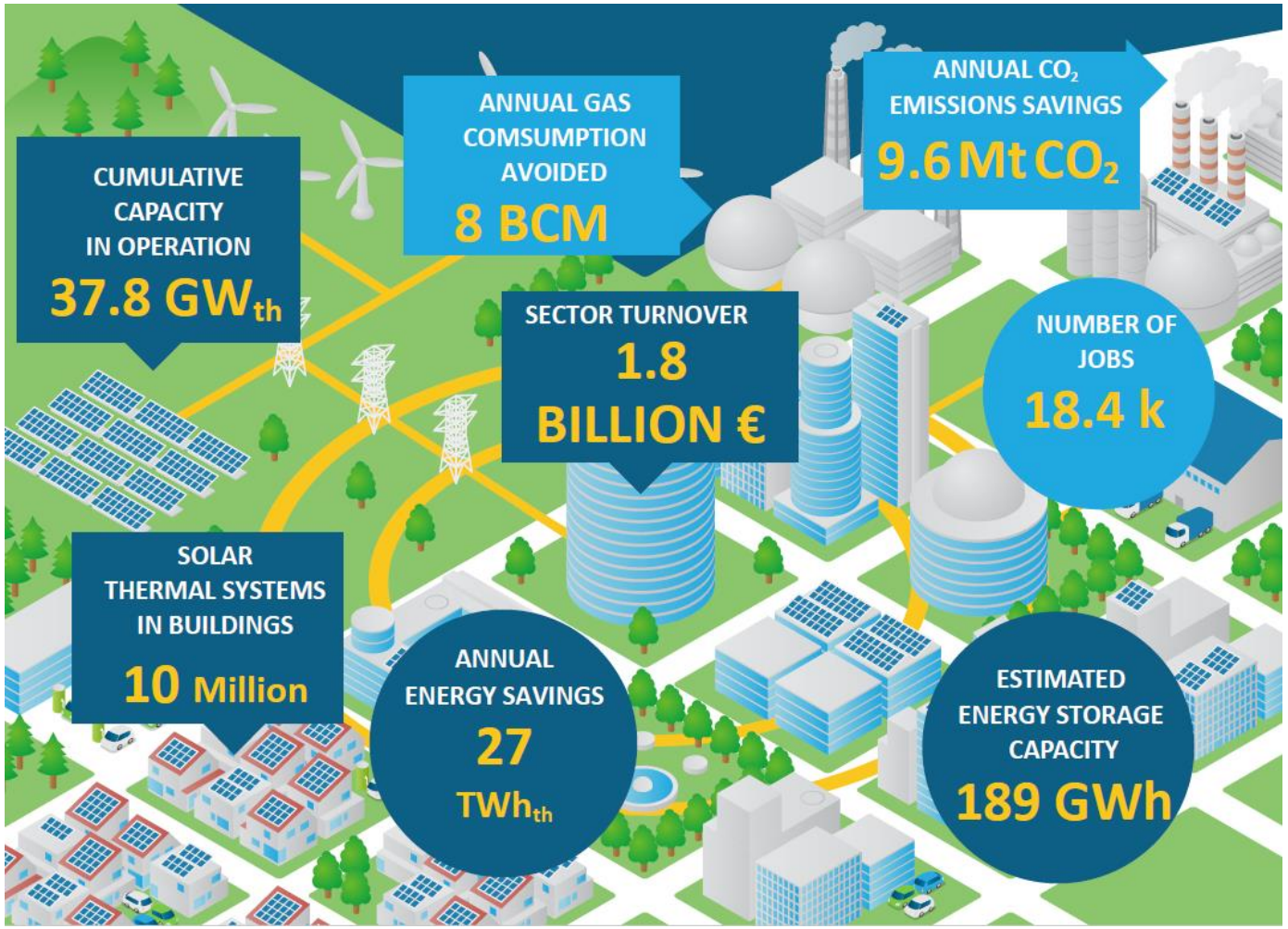
SOLAR PV: 15,4m² = 3 MWh/a

⇒ Even level playing field among the different solar technologies

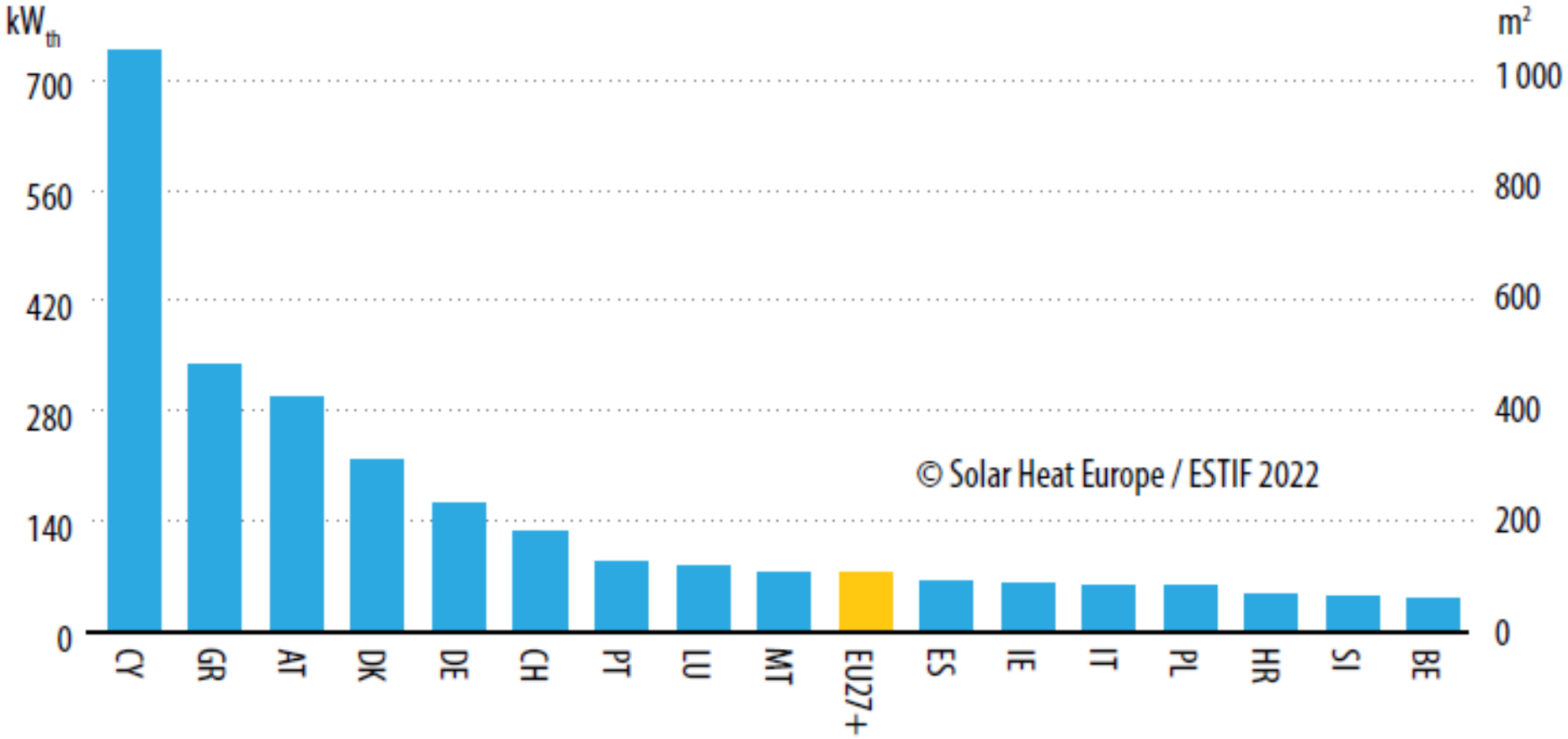
⇒ Both technologies (PV/ST) can co-exist on the same roof

# PV and ST sharing the space


# The solar heat market today

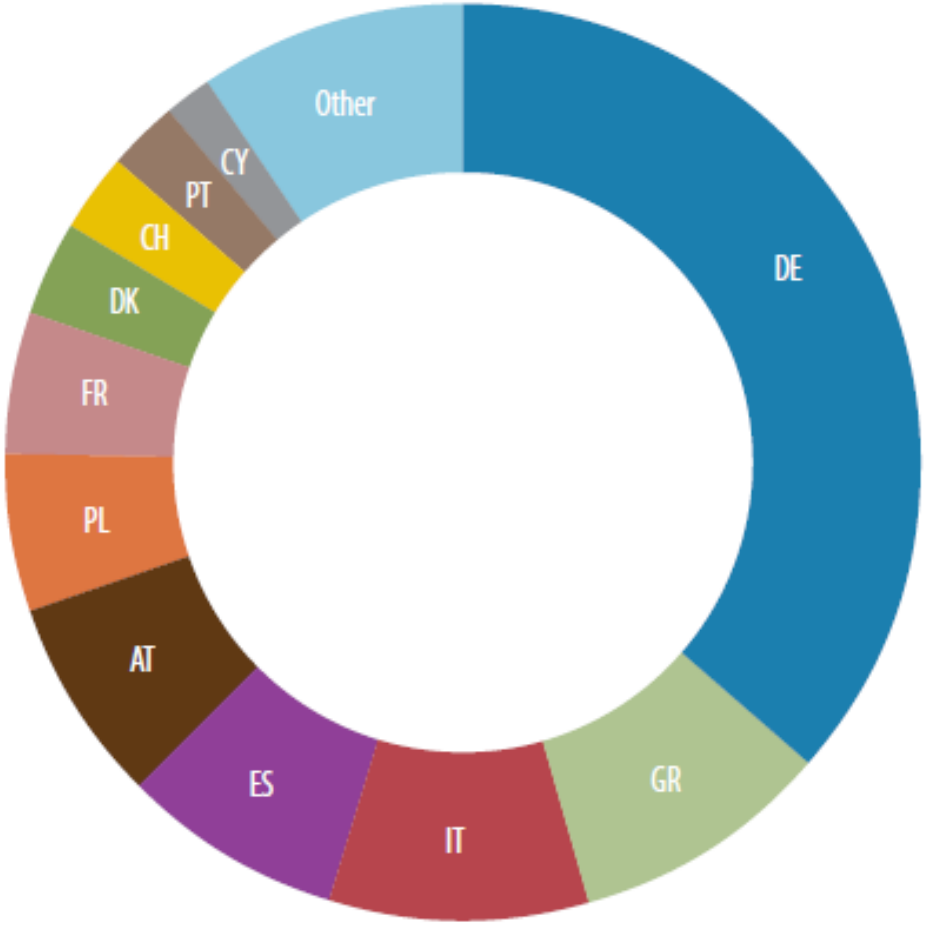


# Total installed capacity per 1000 capita
(aggregated volume 2021)



# Share of EU Solar Thermal Markets

(Total installed capacity, aggregated volume 2021)

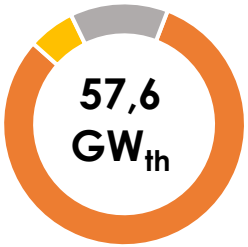



| | |
|---|---|
| DE | 36.0% |
| GR | 9.2% |
| IT | 9.0% |
| ES | 7.7% |
| AT | 7.1% |
| PL | 5.5% |
| FR | 4.9% |
| DK | 3.4% |
| CH | 2.8% |
| PT | 2.3% |
| CY | 1.6% |
| Other | 9.3% |

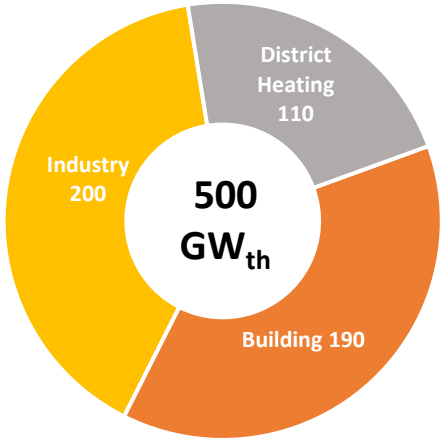
# Solar heating & cooling - Perspectives

## Globally:

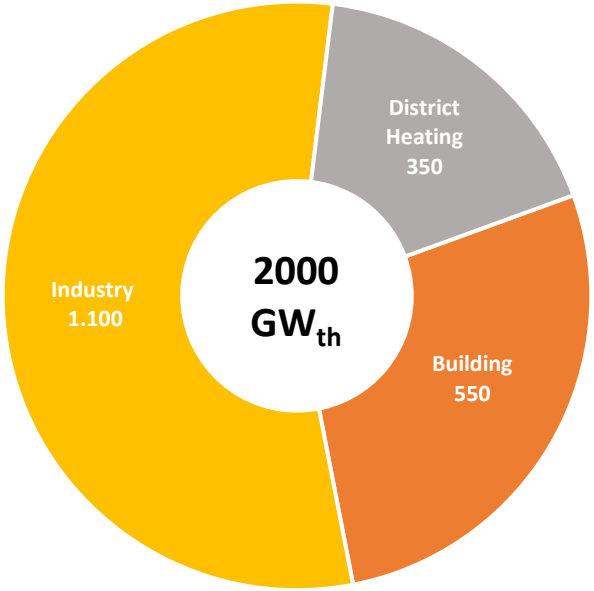
Source: IEA




2025




2035




2050

## Europe:

EU Solar Strategy, Solar Thermal/Solar Heat Europe:

x 3

**40 GWth** → **140 GWth**

< 2030

# Market segments

# Solar thermal market segments

**« Small scale »**

**Residential**
(individual houses)

**Commercial**
(e.g. hotels, hospitals, leisure centers, shopping centers)

**« Large scale »**

**District heating**
(for cities, villages)

**Industrial**
(eg. paper, food & drinks, textile, chemicals)

# Concrete examples in operation now

**Single family house:**
Vienna

16kW (24m²) collector area
2,000 liters of storage
hot water and heating
support post-heating gas

# Concrete examples in operation now

**Multi family houses:**
Vienna

Flat collectors
Post-heating district heating

# Concrete examples in operation now

**Hotel Stadthalle**
1150 Vienna

91 kW (130 m²) collector area
4,000 liters of storage hot water
Post-heating district heating

**City Hotel Wilhelmshof**
1020 Vienna

110kW (156m²) collector area
6,000 liters of storage
Hot water for guests, kitchen, washing machines
Post-heating heat pump

# Concrete examples in operation now

**Solar Heat for Industrial Processes** (SHIP) plant in France

Clean heat for **malt production** factory, Boortmalt

Area collectors: **14 252 m²**

Capacity: **10 MW**

Thermal storage: **3k m³**

Photo NewHeat

**Commissioning: April 2021**

**Largest solar thermal plant for industrial process in Europe**

# Concrete examples in operation now

**Solar District Heating** plant in Silkeborg, Denmark

Area collectors: 156 694 m²

Capacity: **110 MW**

Covering **20% of heat demand and complete summer load** for 21000 connected households (44000 inhabitants)

Photo: Arcon Sunmark

# Concrete examples in operation now

**Solar District Heating**
plant in Salaspils, Latvia

Area collectors: **21 672 m²**

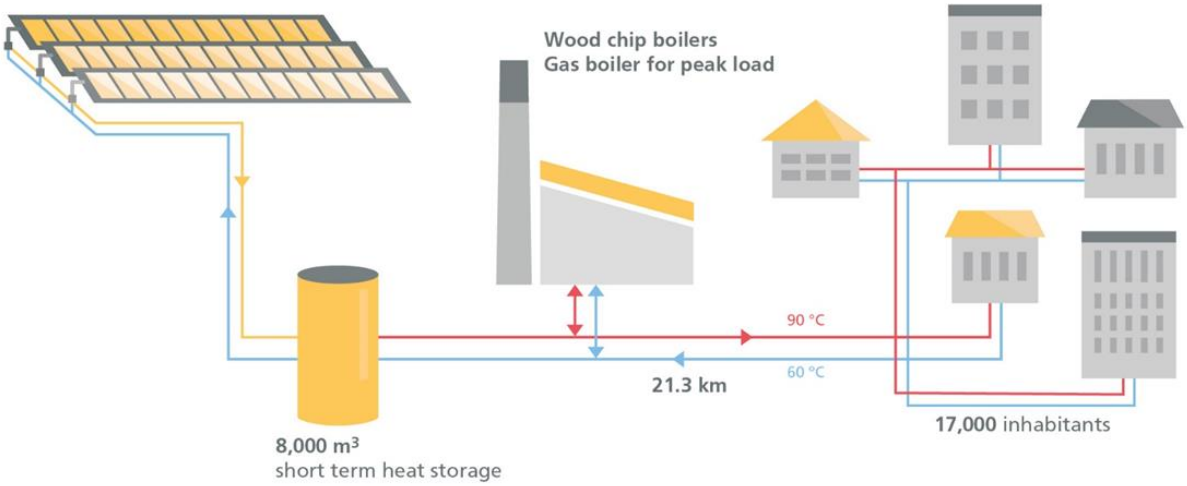
Capacity: **15 MW**

90 % renewable district heat since 2019

FLAT PLATE
21,672 m², 15 MW
MANUFACTURER: Arcon-Sunmark, Denmark
SUPPLIER: Filter, Latvia

Photo: Salaspils Saltums

| | |
|---|---|
| Contribution to total heat demand | 65 GWh / year |
| Solar thermal | 16 % |
| Biomass boilers + flue gas condenser | 72 % |
| Gas boilers | 12 % |
| Ø solar yield 2020/2021 | 486 kWh/m²a |



# There is space for solar heat even in larger cities


Source: https://www.absolicon.com/fs/

Source: IEA SHC Task 68 - Efficient Solar District Heating Systems

| Site | Saragossa/ Zaragoza, Spain |
|---|---|
| Inhabitants | 736,000 |
| Heat demand in heating grid | 1,412 GWh |
| Solar irradiation | 1,877 kWh/m2a |
| Land size of solar field | 75.5 hectares |
| Capacity of solar field | 233.5 MW |
| Solar share | 20 % |

(A golf course has between 60 and 90 hectares)

# Compatible with biodiversity and greening of roofs

Photo: SOLID Solar Energy Systems

Collector fields (eg for DH) or SHIP do not seal the ground and give plants and animals a good chance of continuing to use the area.


Created by GRÜNSTATTGRAU, Austria Solar and Photovoltaic Austria and the City of Vienna Energy Planning
Released 2021

Development of **joint guidelines** between eg local industry association (ST/PV) and authorities :

Detailed description of each technology
Possible combinations and synergy effects
Numerous reference examples
Planning guidelines
Funding info
Free download at:
https://www.wien.gv.at/stadtentwicklung/energie/solar-leitfaden.html

# The key role of cities

# Energy transtion: From EU to local

EU

National

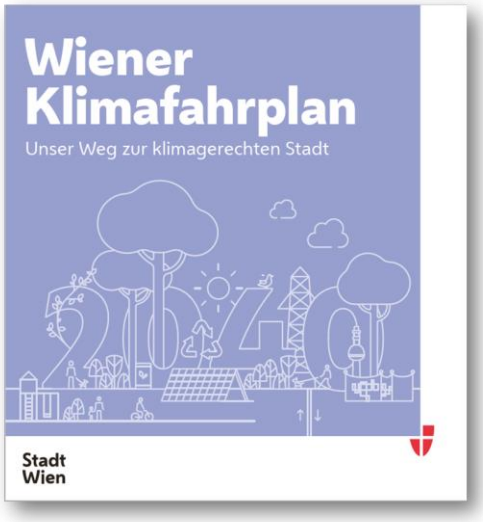
Regional

Local

Cities

**Fit for 55/ RepowerEU**

Renewable Energy Directive, Energy Performance of Buildings Directive, Energy Efficiency Directive Solar Energy Strategy...



# 264 towns and cities in Europe use solar heat

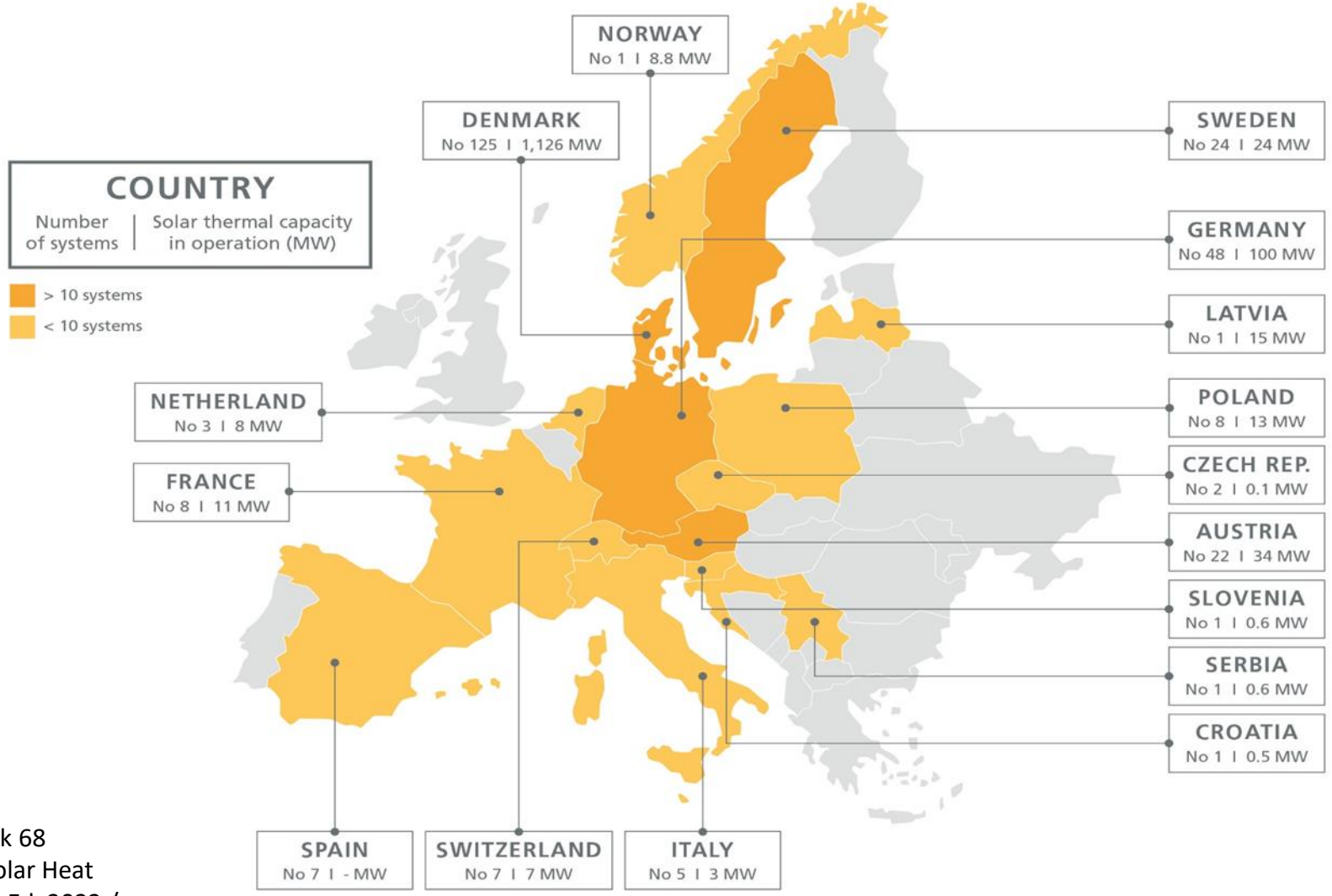


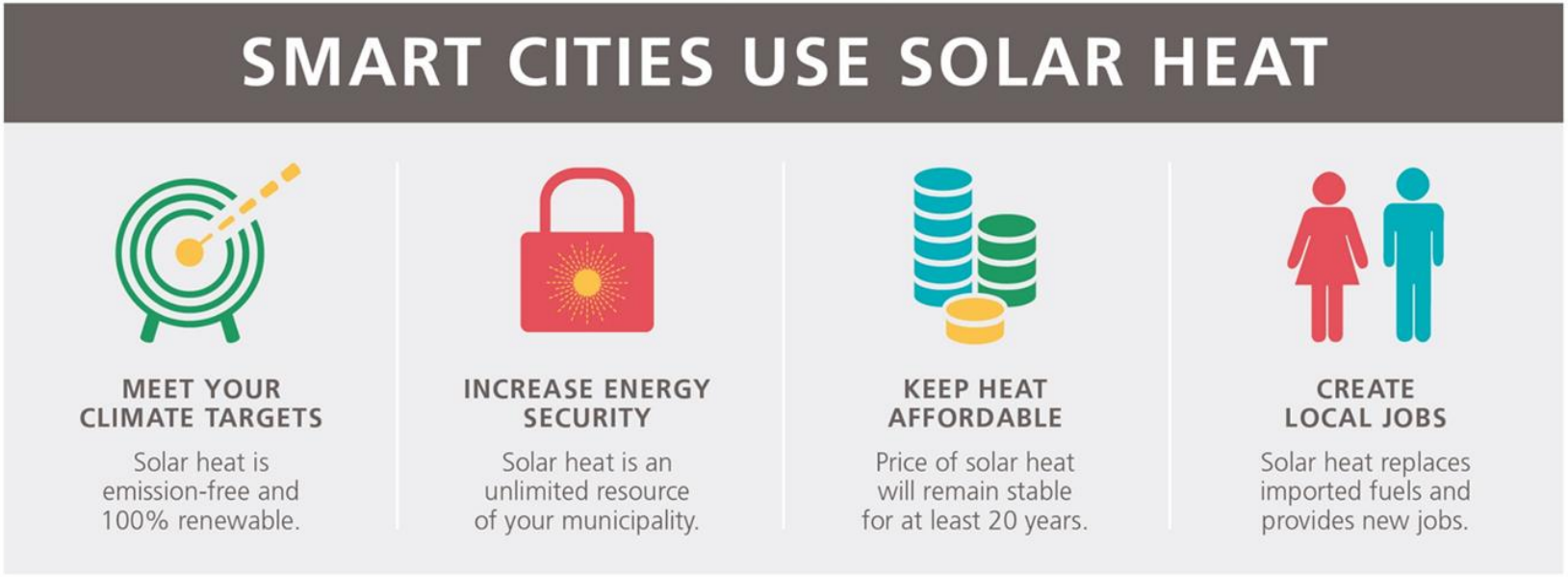

Chart: IEA SHC Task 68
Source: IEA SHC Solar Heat Worldwide Report Ed. 2022 / own research

# Solar heat and cities: opportunities

- **Heating & Cooling is a local matter : Cities have a leading role to play**
  - Implementation of EU legislation must tackle the local level
  - Local Climate plans
- **You can help to inform**
  - Raise awareness among citizens and professional end-users on the benefits of Solar Heat
  - Ensure availability of correct information (one-stop shops)
- **You can help identify land available**
  - Cost and availability of land in urban centres (go-to areas/permitting)
  - Promote good practice for biodiversity
- **You can help to train & develop a skilled workforce**
  - Local civil servants
  - Technical offices
  - Other roles (e.g. installers)
- **You can facilitate access to funding**
  - Feasibility studies
  - Easy access to funding available at EU, national level

LAND:
e.g. artificial and built surfaces (rooftops, transport infrastructure areas, parking areas, waste sites, industrial sites, mines, artificial inland water bodies, lakes or reservoirs),
and, where appropriate, urban waste water treatment sites, as well as degraded land not usable for agriculture

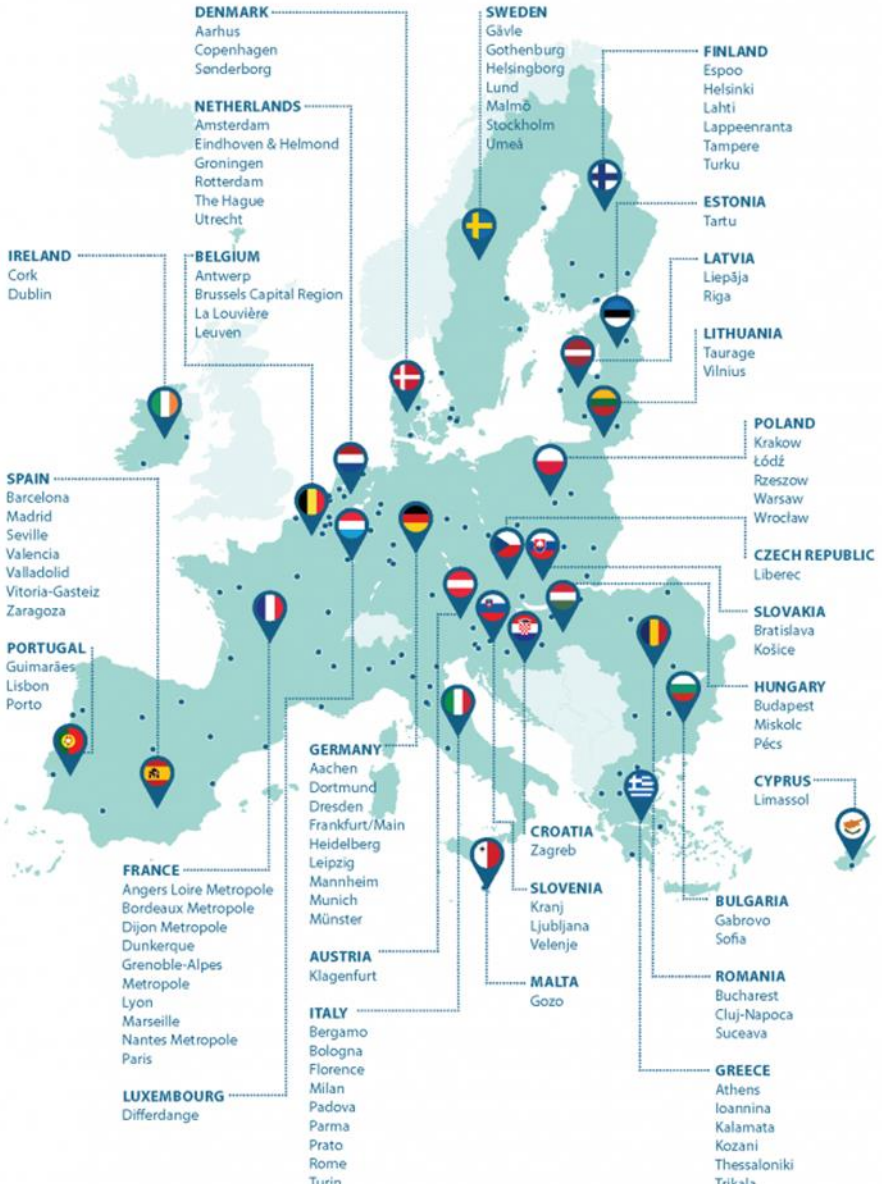
# Solar heat and cities: opportunities



# Helping your city becoming climate neutral

- EU Commission's target: 112 selected mission cities should be climate-neutral by 2030.
- The solar field simulator of IEC Task 68 “Efficient Solar District Heating Systems” identifies the area that is necessary to cover 20 % of the total district heat demand in 12 of these cities using the sun.
- Field simulator https://www.absolicon.com/fs/

**The Solar Heat Europe network is ready to accompany you!**




## THANK YOU !

***MORE INFO:***

***Webinars:***

*- District Heating 28 March 23 recording*

*- Upcoming, with Convenant of Mayors and Energycities: 17 May & 5 June*

***Facts sheets/Energycities:***

*- Obligation for heating and cooling planning with appropriate support for municipalities*

*- Technical and financial support scheme - LINKS*

Solar Heat Europe ESTIF

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