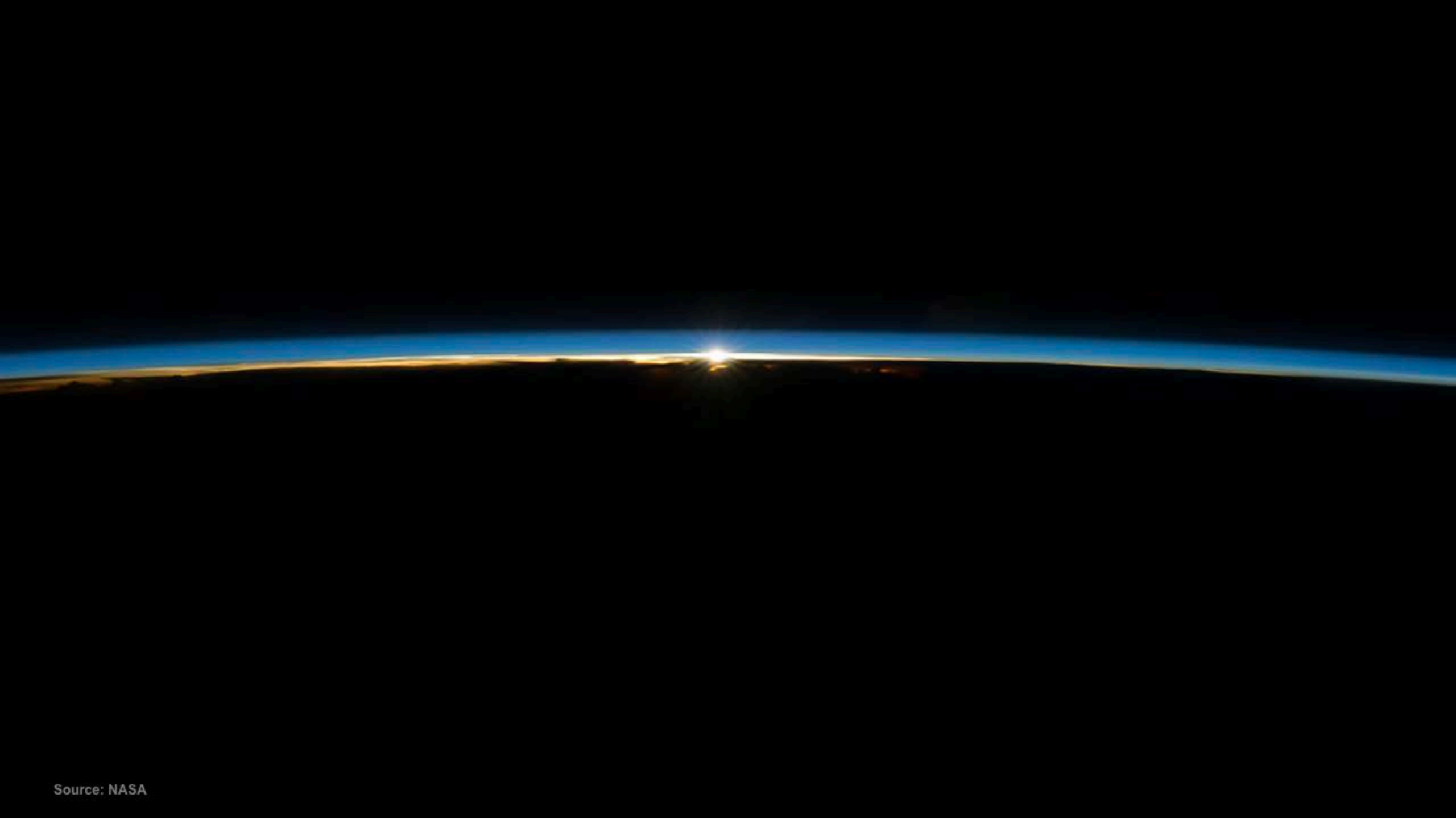


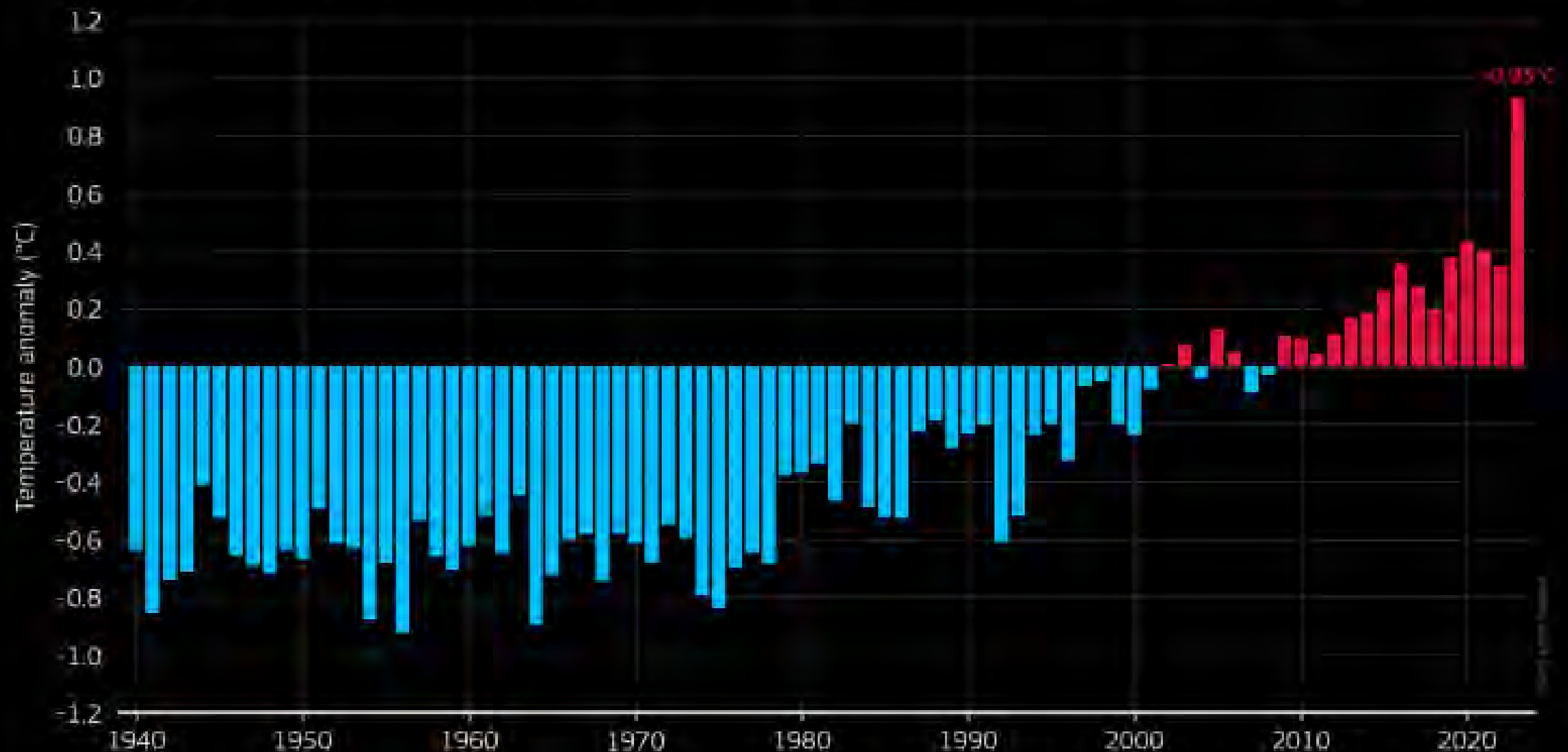


Source: NASA



GLOBAL SURFACE AIR TEMPERATURE ANOMALIES • SEPTEMBER

Data: ERA5 • Reference period: 1991-2020 • Credit: C3S/ECMWF



PROGRAMME OF
THE EUROPEAN UNION



IMPLEMENTED BY





Heavy rain caused over 200 deaths in 2021



Wildfires in US and Australia

COP21 Paris 2015

net-zero emissions
of greenhouse gases
“in the second
half of this
century”

“limiting global temperature
increase well below
2 degrees Celsius, while
urging efforts to limit the
increase to **1.5 degrees**”

Nationally Determined
Contribution, NDC

WORLD NEWS

Digging our own grave, time to say enough: UN secy gen António Guterres at COP26

Guterres said our addiction to fossil fuels was pushing humanity to the brink. "We face a stark choice - either we stop it or it stops us. It's time to say 'enough'," the UN chief said.



"Enough of brutalising biodiversity, enough of killing ourselves with Carbon, enough of treating nature like a toilet, enough of burning, drilling and mining our way deeper. **We're digging our own graves.** Our planet is changing before our eyes," Guterres said, adding the six years since the Paris Climate Agreement have been the six hottest years on record.

Addressing the gathering, Prime Minister of United Kingdom Boris Johnson said the world was **strapped to a "doomsday device"** and likened an ever-warming Earth's position to that of fictional secret agent James Bond — **strapped to a bomb that will destroy the planet** and trying to work out how to defuse it.

IEA says ending new oil and gas exploration today is the only viable climate path

Grant Smith 5/18/2021



LONDON (Bloomberg) --The world has a choice -- **stop developing new oil, gas and coal fields today** or face a dangerous rise in global temperatures.

That's the bold assessment from the International Energy Agency, the organization that has spent four decades working to secure oil supplies for industrialized nations. In its new road map for achieving net-zero global carbon emissions by 2050, the IEA laid out in stark terms what the planet must do to avoid harmful the climate change -- and just how far that is from our current reality.

Annual gains in energy efficiency must be three times faster over the next decade. Installations of photovoltaic panels would have to rival the size of the world's biggest solar park -- every single day until 2030. Within three decades, the role of fossil fuels should reverse entirely -- from 80% of global energy needs today to barely a fifth by mid-century.

"Our road map shows the priority actions that are needed today to ensure the opportunity of net-zero emissions by 2050 -- narrow but still achievable -- is not lost," IEA Executive Director Fatih Birol said on Tuesday. It is "perhaps the greatest challenge humankind has ever faced."

To achieve this objective, spending on new oil and gas projects needs to end immediately, although investment in existing reservoirs could continue, the IEA said in the report, which was prepared for the COP26 climate talks scheduled for November. No new coal-fired power stations should be built unless they include technology to capture their emissions, it said.



IEA director Fatih Birol



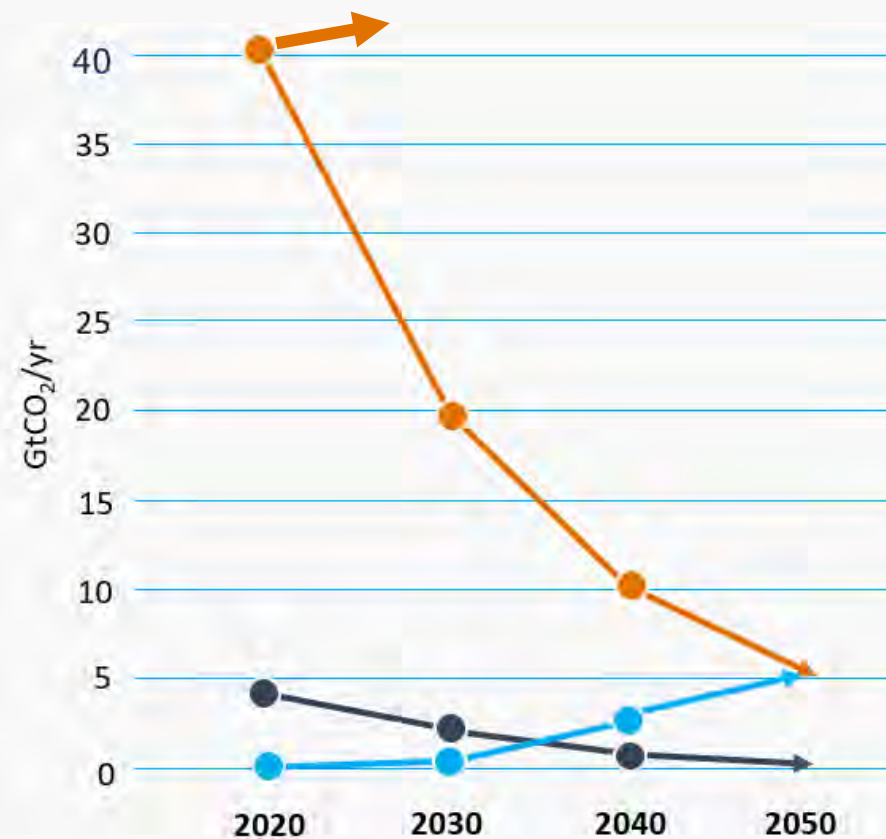
United Nations Climate Change

"We are on a highway to climate hell with our foot still on the accelerator. It is either a Climate Solidarity Pact — or a Collective Suicide Pact. Humanity has a choice: cooperate or perish."

**António Guterres, High-Level session
of COP27, Sharm el-Sheikh**



IPCC ROADMAP FOR 1,5°C "CARBON LAW"



Global CO2 emissions



CO2 removal (GtCO₂/yr)



CO2 emissions from land use (GtCO₂/yr)

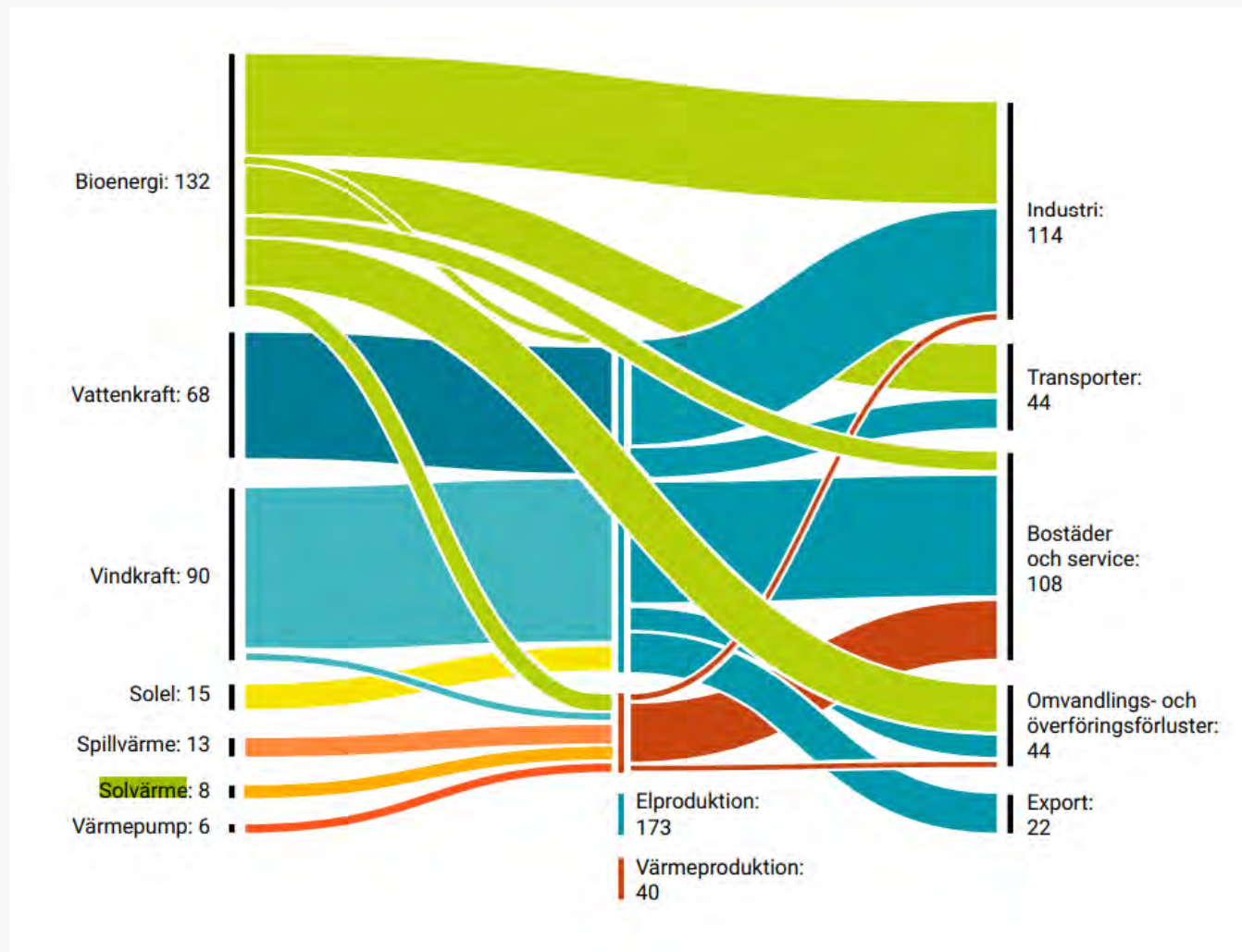
COP 28 in Dubai
"transition away
from fossil fuels"

Naturskyddsföreningen förnyelsebart 2040

SNF föreslår 8 TWh
storskalig solvärme

Stockholm har i jämförelse
1,2 TWh fjärrvärme

Greenpeace, Miljöpartiet,
IVA Vägval för klimatet



El från solceller

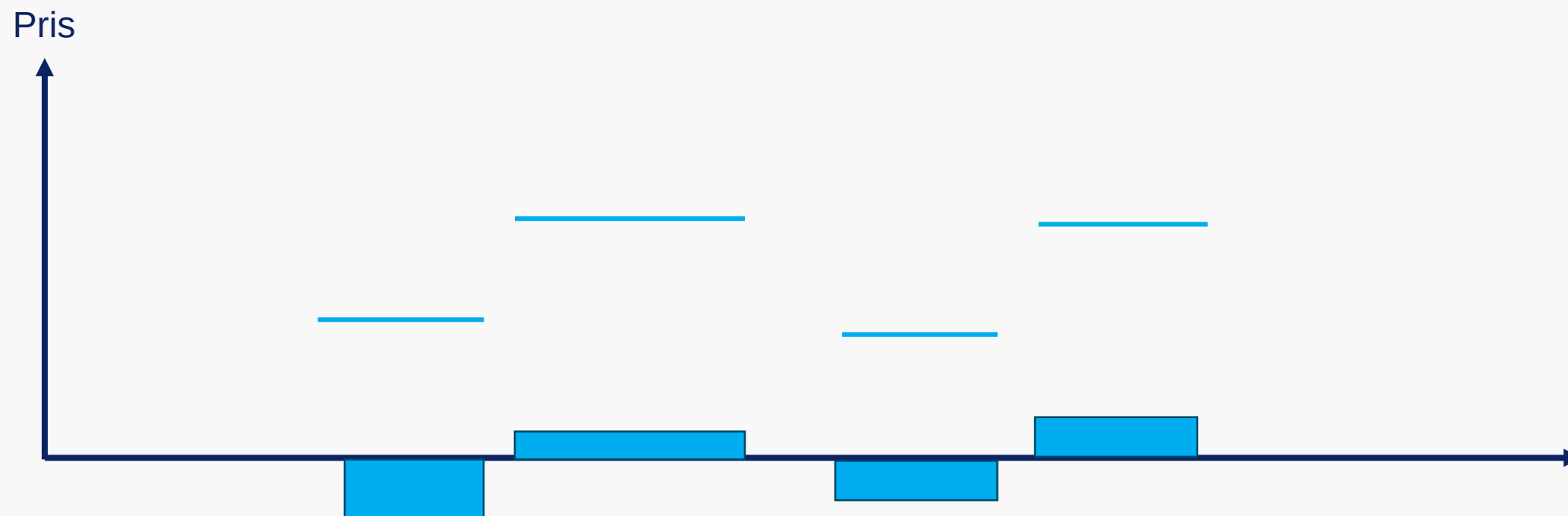
2024-06-06

- SNF föreslår 15 TWh el från solceller, idag ca 3 TWh
- Kinesiska staten investerade 300 miljarder kronor för att bli världsledande på solceller
- 97% av allt råmaterial produceras nu i Kina
- Automatiserade fabriker och fallande kostnader – billigaste elen på många platser



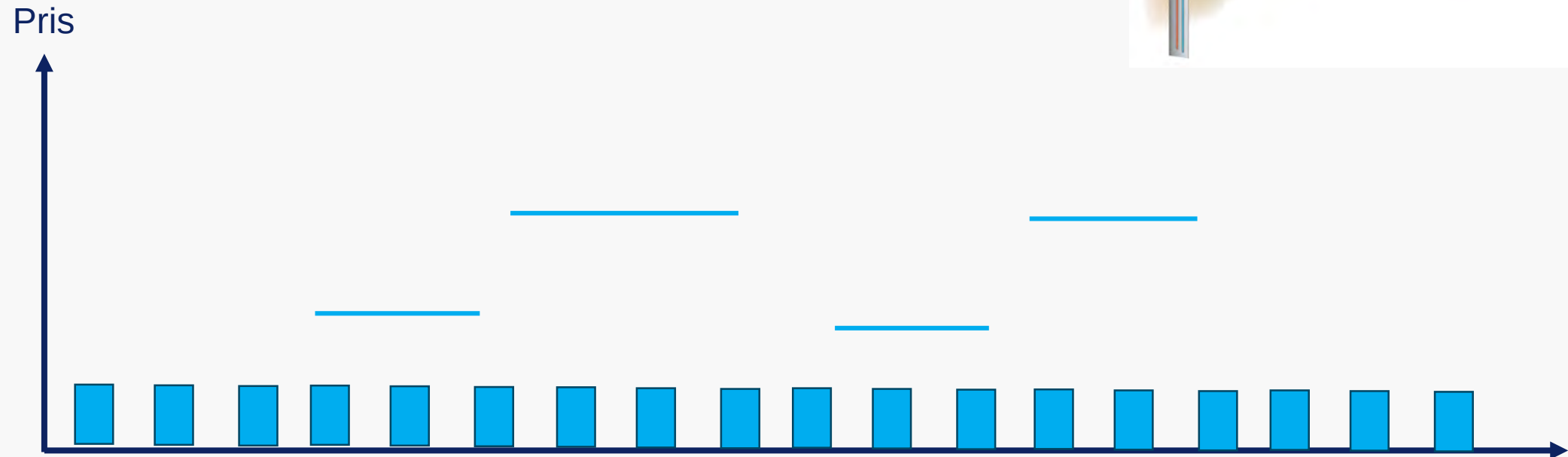
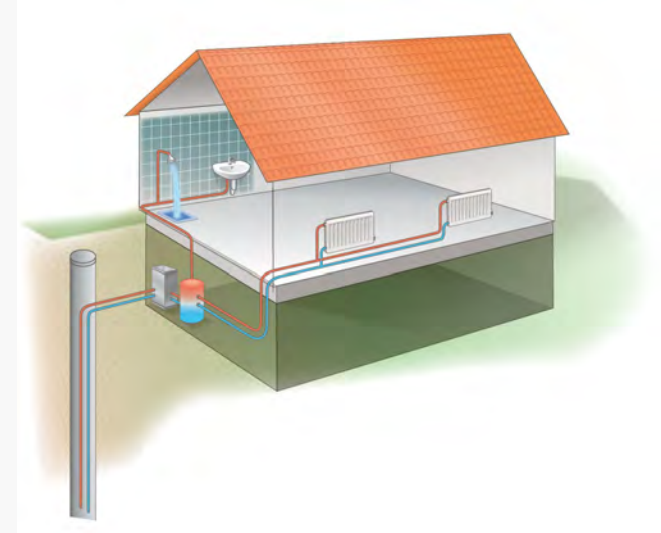
Förskjuten kWh för att passa med produktionen

- Ladda batteri och leverera el när det är brist



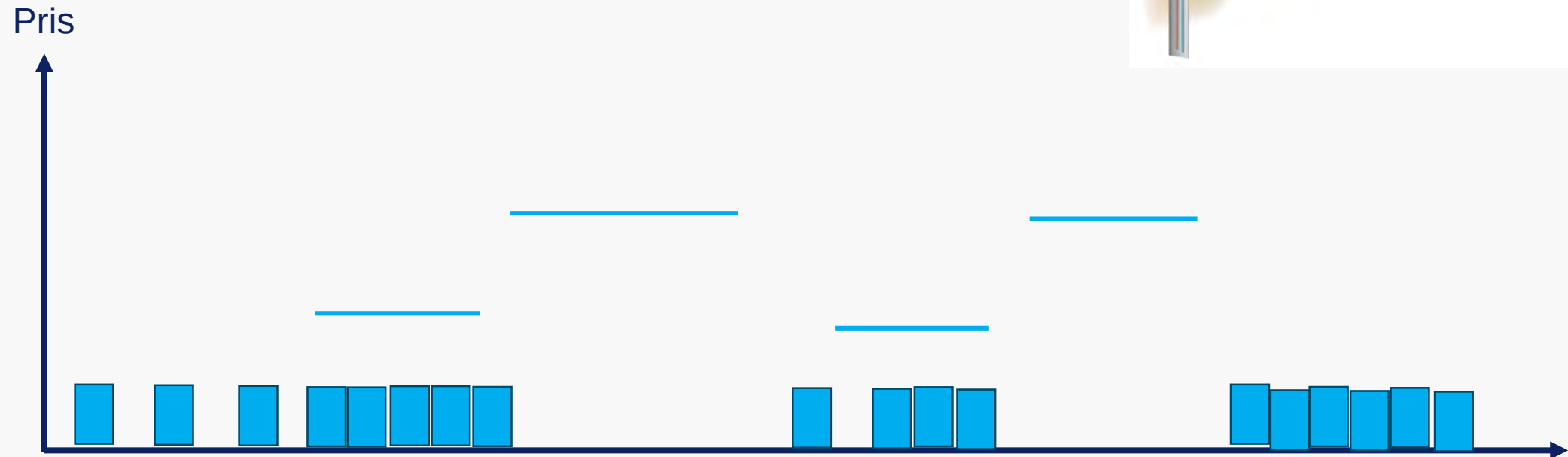
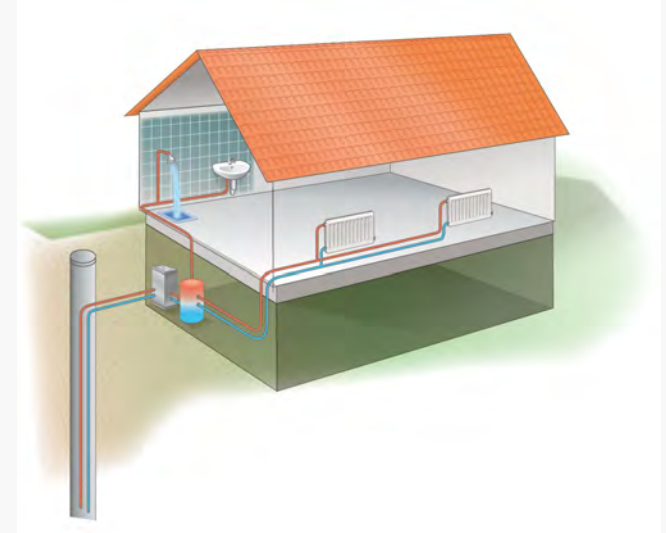
Förskjuten kWh för att passa med produktionen

- Kör värmepumpen när elen är billig, vänta lite när elen är dyr



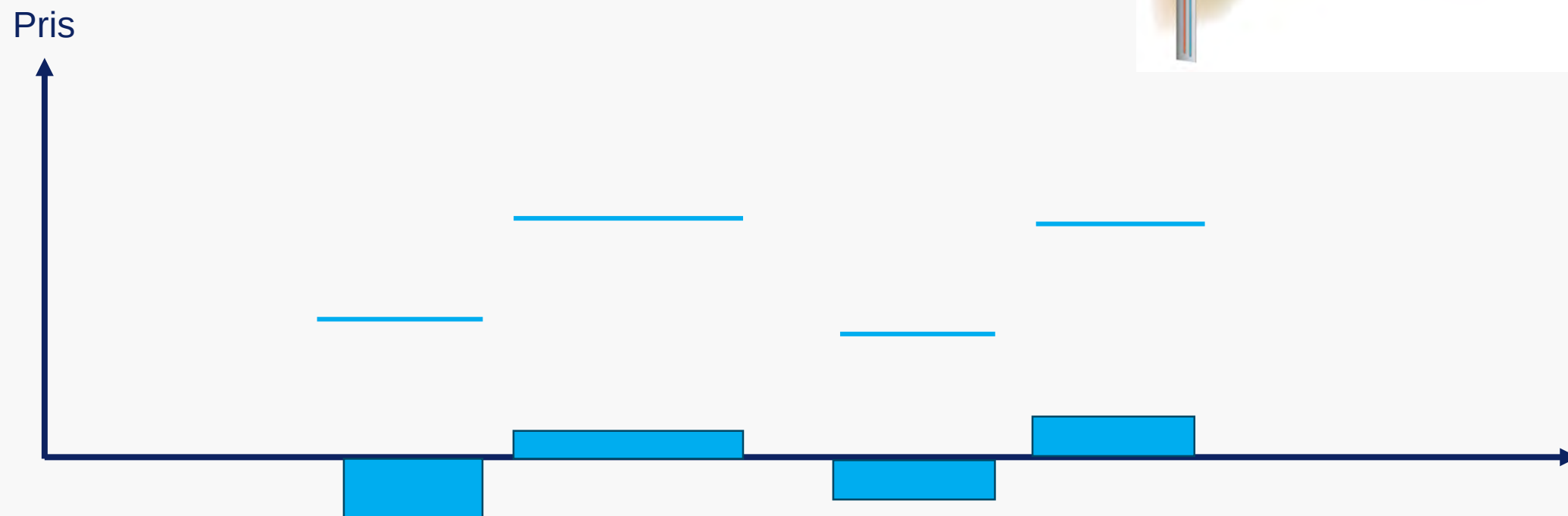
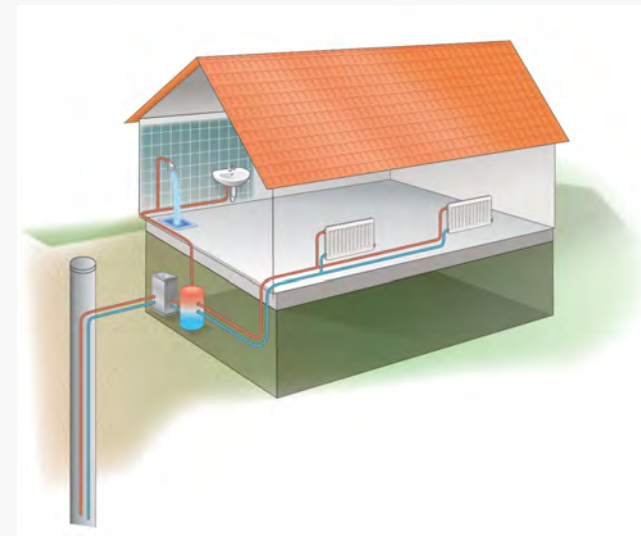
Förskjuten kWh för att passa med produktionen

- Kör värmepumpen när elen är billig, vänta lite när elen är dyr



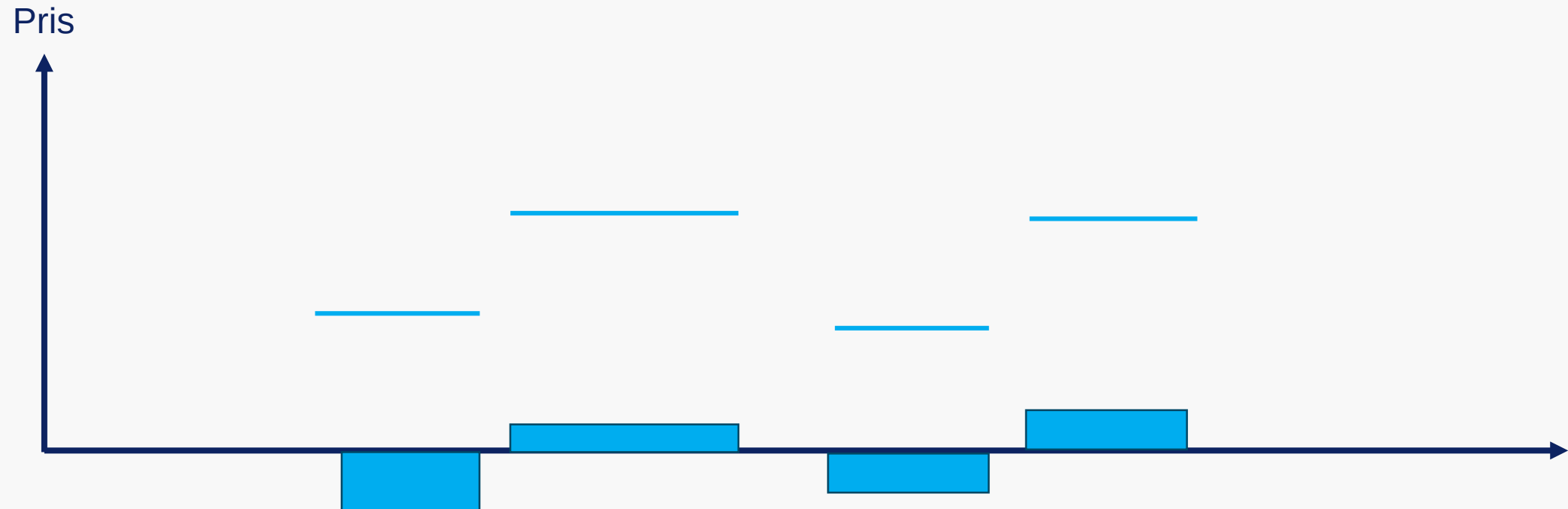
Förskjuten kWh för att passa med produktionen

- Kör värmepumpen när elen är billig, vänta lite när elen är dyr



Förskjuten kWh för att passa med produktionen

- Laststyrning har samma effekt på elnäten som energilagring





**Solar Heat
Europe**
ESTIF

70% efficient solar heat today
provides heat and steam for 266
district heating networks and 10
million homes in Europe

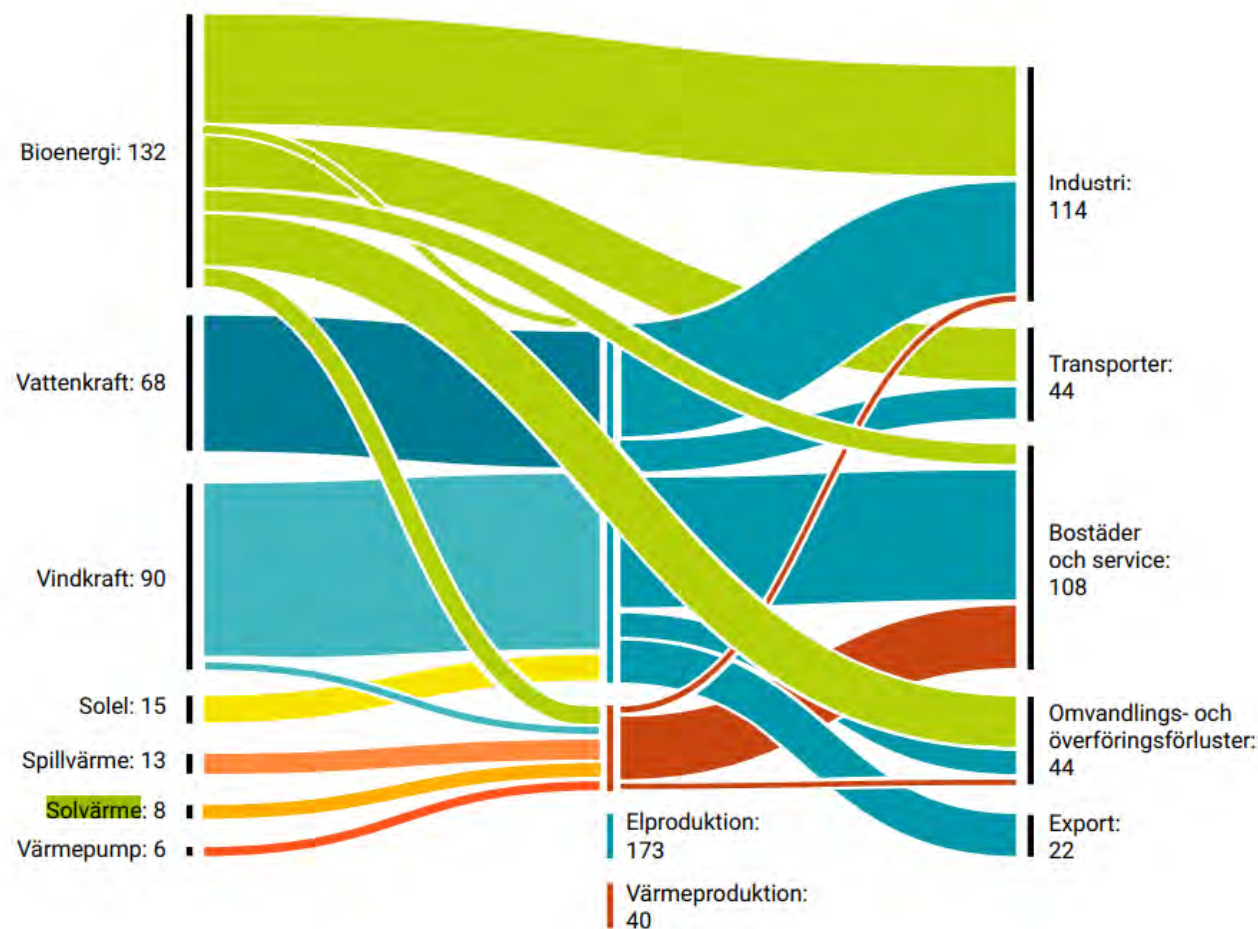
Joakim Byström, CEO Absolicon
Former board member of SHE

Naturskyddsföreningen förnyelsebart 2040

SNF föreslår 8 TWh storskalig solvärme

Stockholm har i jämförelse 1,2 TWh fjärrvärme

Greenpeace, Miljöpartiet, IVA Vägval för klimatet



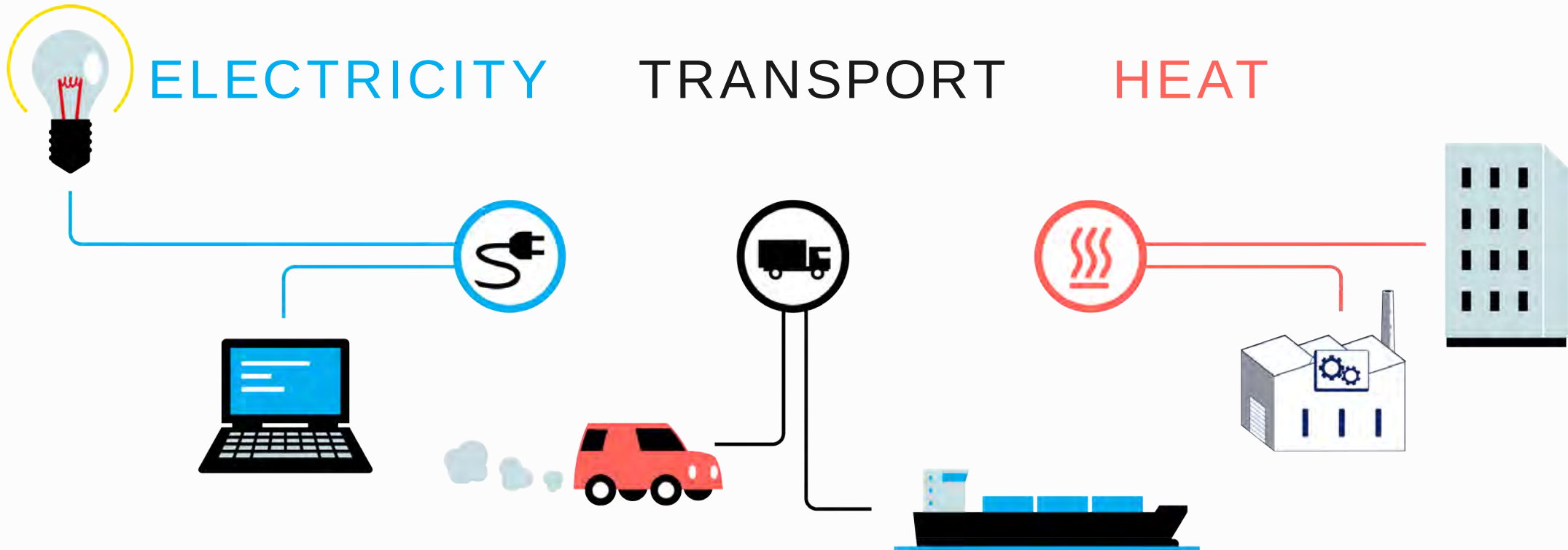
Two solar technologies - two organisations



“Solar

- Solar collectors has **70%** efficiency producing heat
- Heat stored in **hot water tanks**
- Solar thermal is a **European export** market

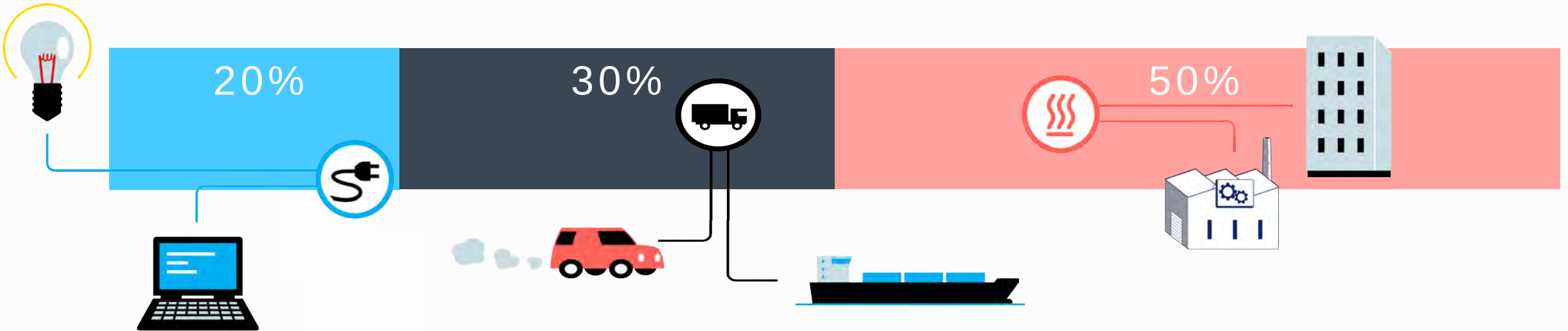
END USE OF ENERGY IN SOCIETY



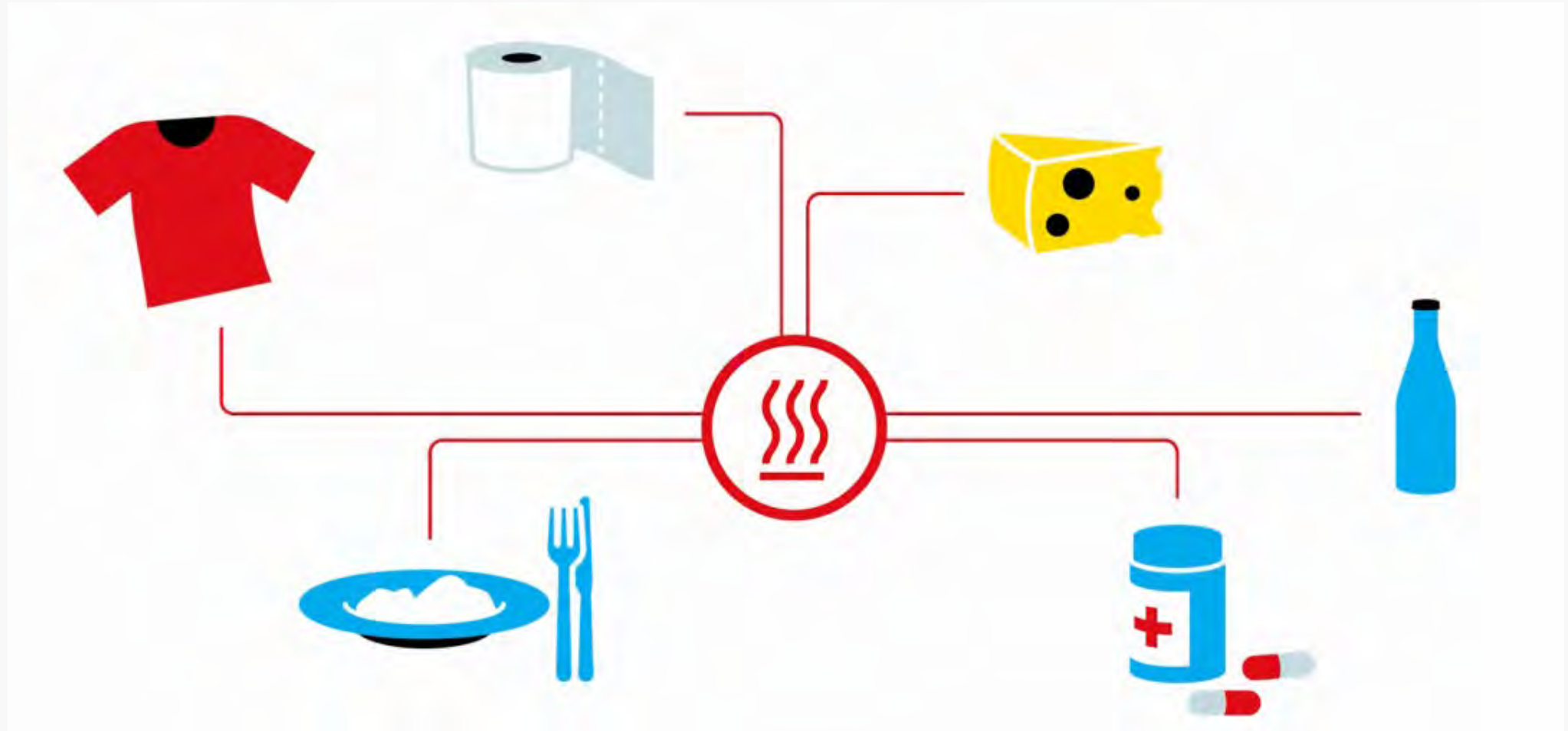
HEAT IS HALF

50 percent of the world's energy demand comes from heat

40 percent of CO2 emissions comes from heat

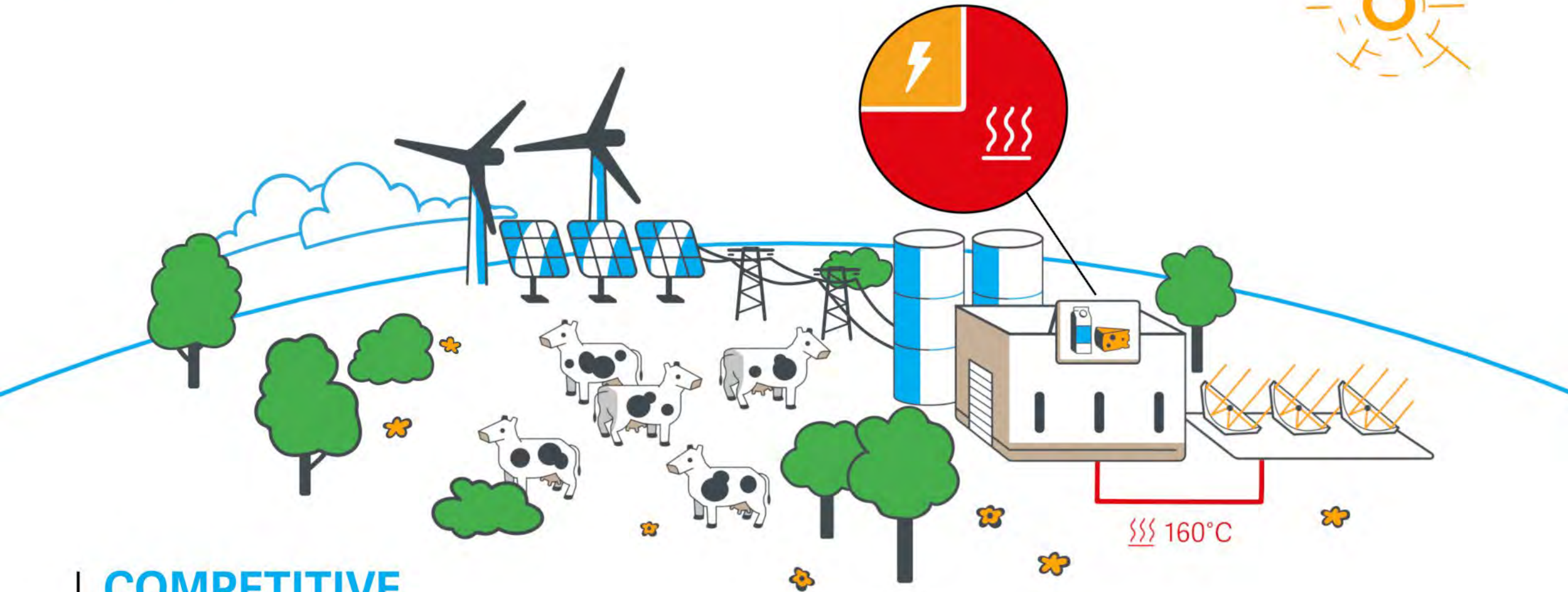


EVERYTHING WE CONSUME IS MADE WITH HEAT





ZERO CO₂ DAIRY



COMPETITIVE

with climate awareness



In general, an industry consume
 $\frac{1}{4}$ electricity och $\frac{3}{4}$ heat



Sol cells for electricity

18% efficiency

Storage in batteries



Solar collectors for heat

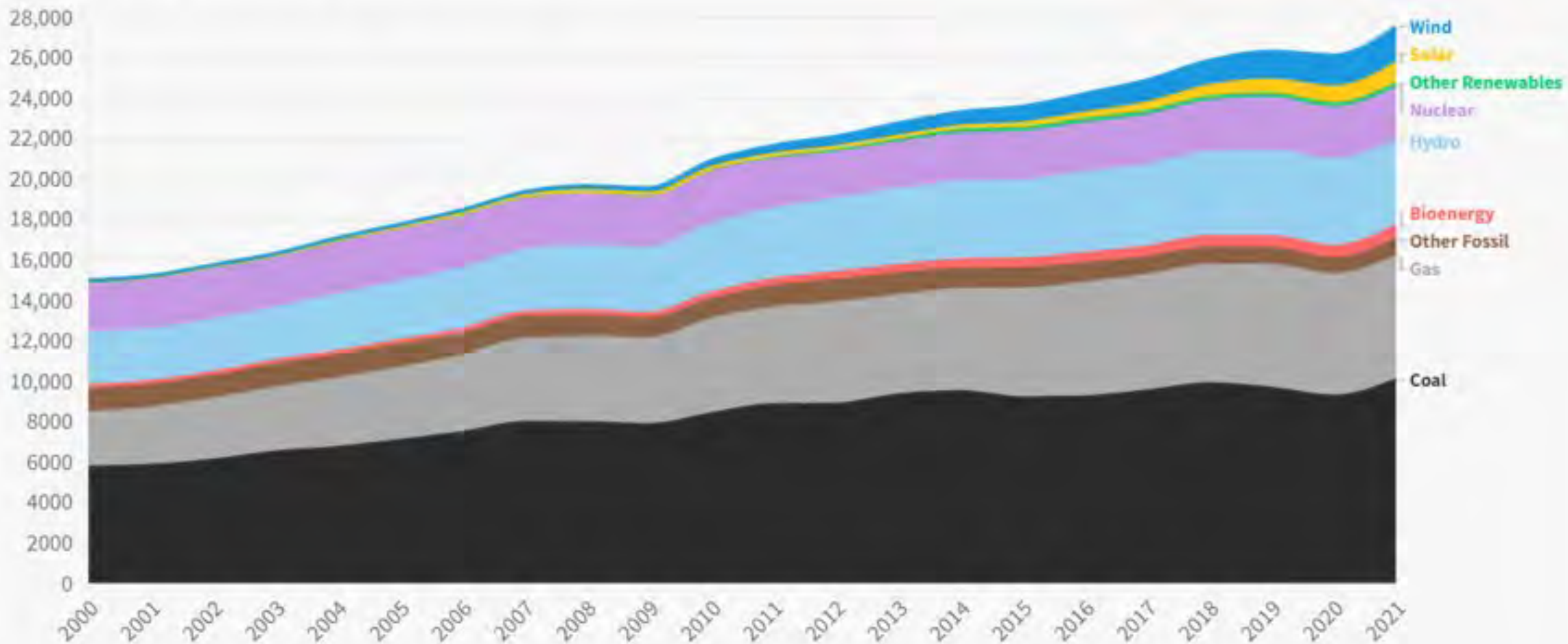
76% efficiency

storage in pressurized tanks

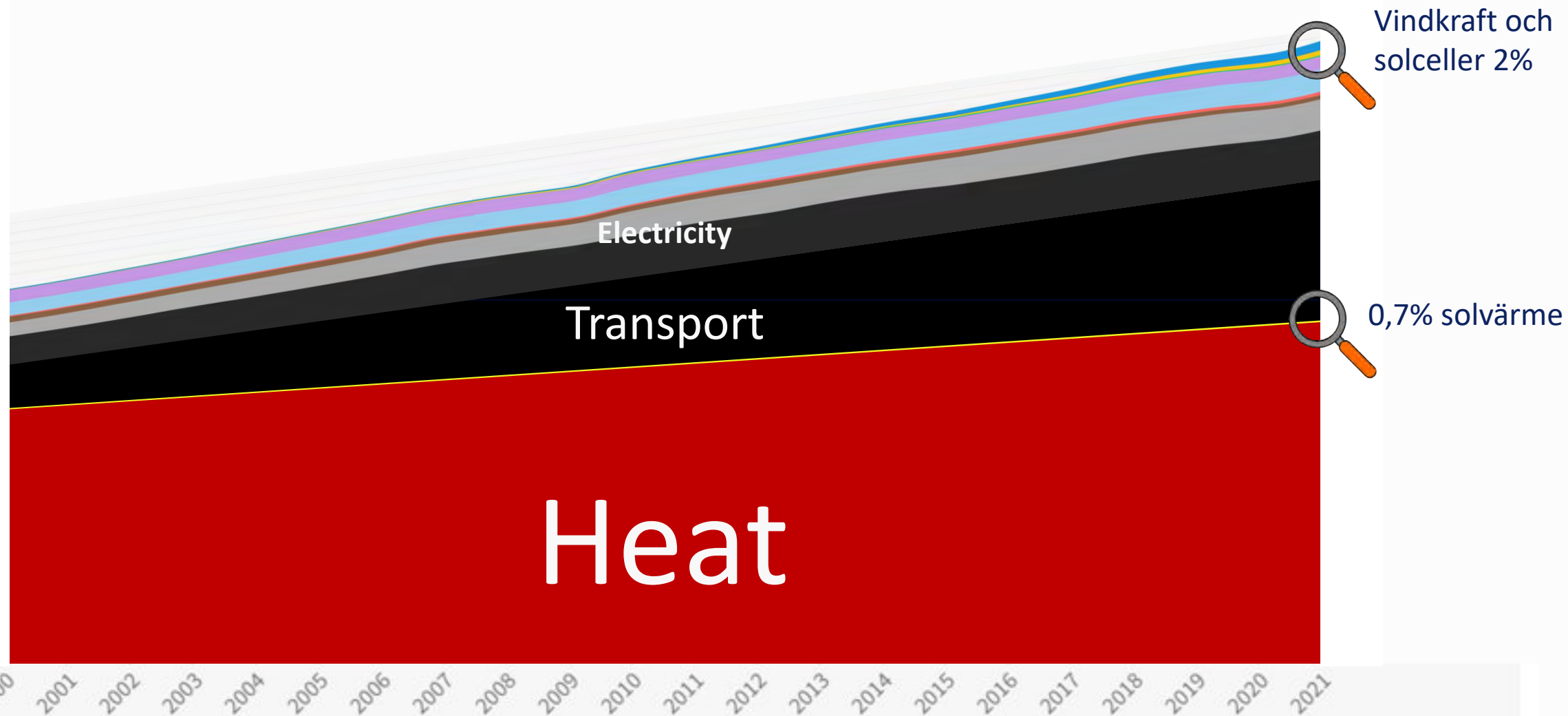
Global electricity generation

Terawatt hours

EMBER

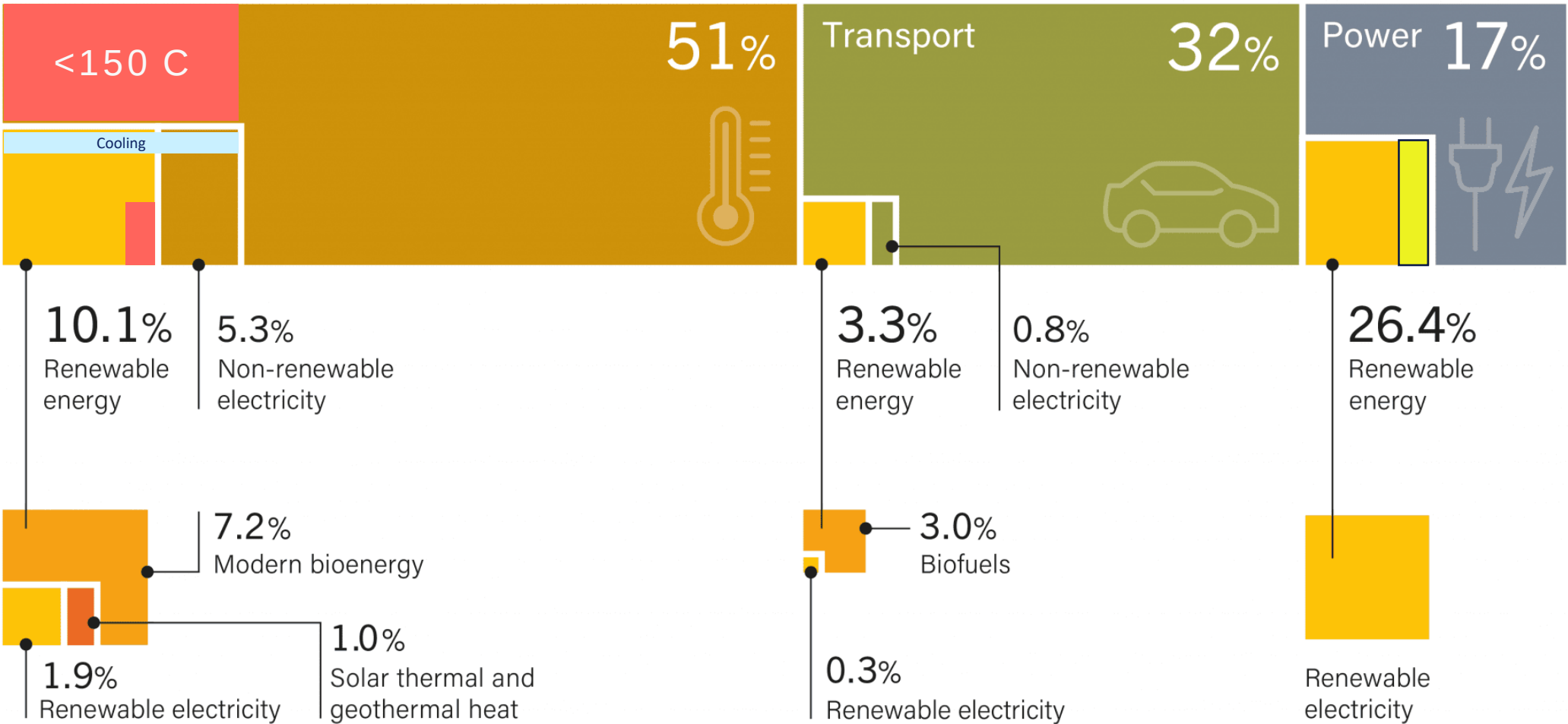


Source: Ember's Global Electricity Review 2022



Source: Ember's Global Electricity Review 2022

Renewable Share of Total Final Energy Consumption, by Final Energy Use, 2017



Note: Data should not be compared with previous years because of revisions due to improved or adjusted methodology.

Source: Based on IEA data.

Solvärme för småhus

SOLAR THERMAL: Solar Heat for homes and buildings

- In Europe 130 million buildings – **10 millions** of them are using Solar Thermal for domestic hot water
- Solar thermal market has **2 billion Euro** turn over and **20 000 employees**
- Solar thermal has **200 GWh** thermal storage compared to 9 GWh of battery storage
- Solar thermal is a **big export market** – photovoltaic is an import market



Solvärme för industrier

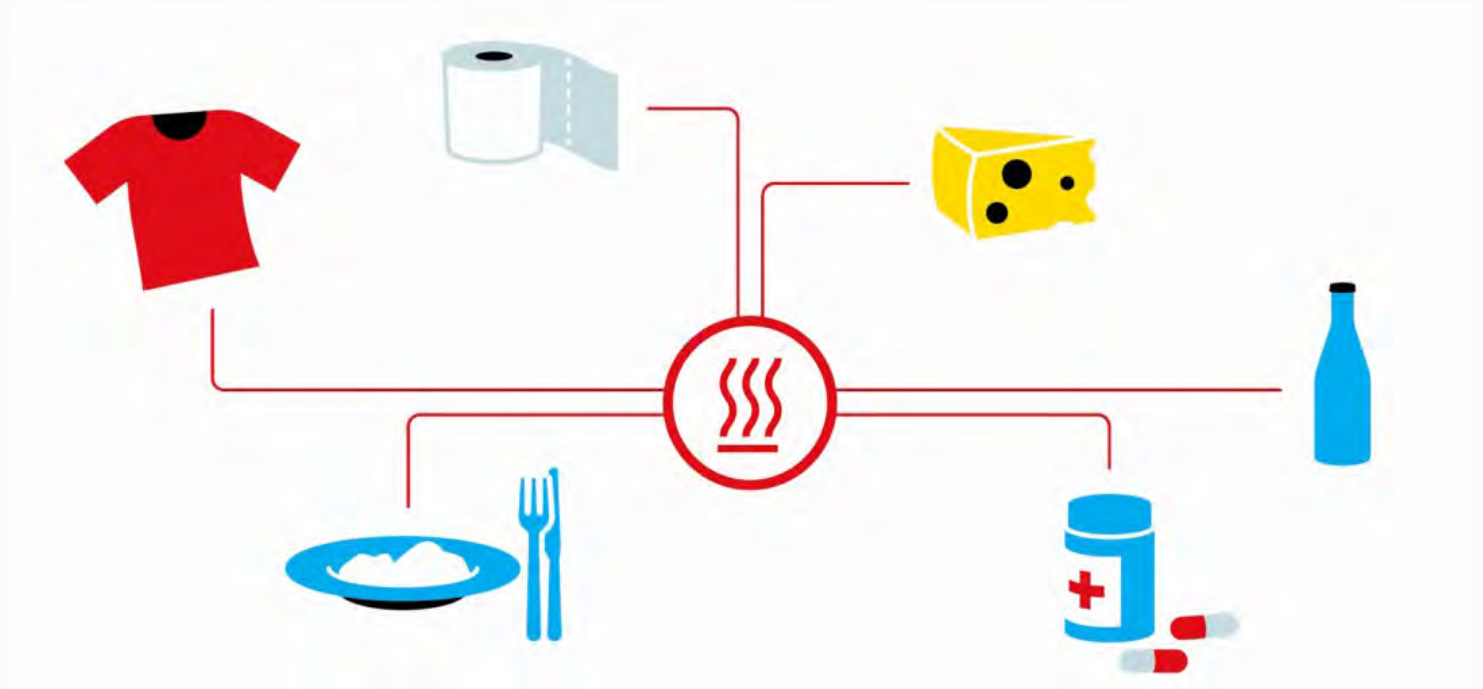
EVERYTHING WE CONSUME IS PRODUCED WITH HEAT

Generation of heat represent 40% of the CO2 emissions from energy

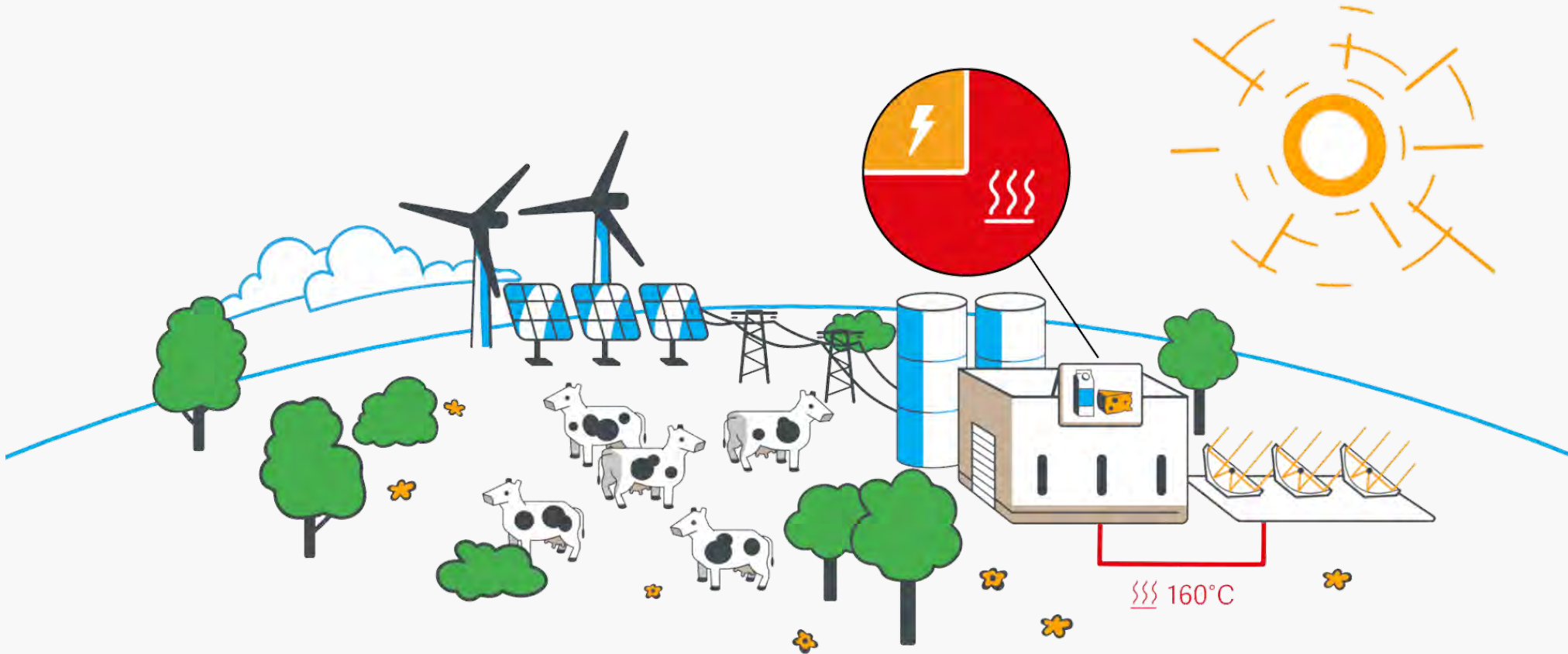
Heat often accounts for up to 70 percent of the total energy used in industrial production

Energy usage by sector

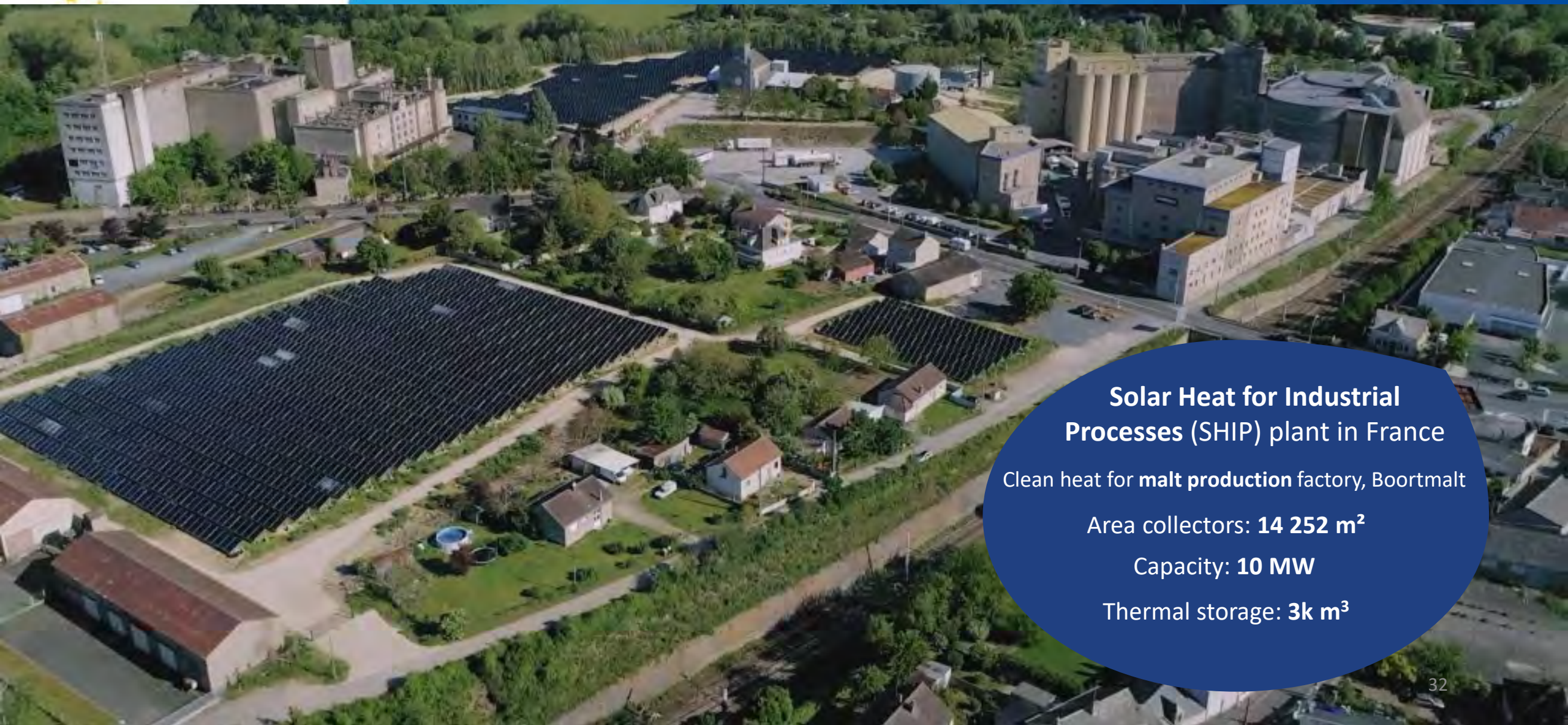
Sector	Electricity	Heat
Textile	15%	85%
Dairy	30%	70%
F&B	25%	75%



FACTORY WITH ZERO CO₂ EMISSIONS



SOLAR THERMAL: Solar Heat for Industrial Processes



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**

COLGATE-PALMOLIVE, GREECE

HOUSEHOLD CHEMICALS INDUSTRIAL CASE

LOCATION

Athens, Greece

PROCESS

Fabric softener
reactor

CAPACITY

158 kW

FOOTPRINT

550 m²

COLLECTORS

48

APERTURE

264 m²

CARLSBERG GROUP, GREECE

Ground solar installation



Solar heat
up to **160 °C**

Absolicon Solar Collector AB

Location	Thessaloniki, Greece
Industry	Brewery
Footprint	1600 m ²
Solar Field	660 m ²
Production	354 MWh/year
Heat	Steam 150 °C

ASAHI GROUP, ITALY

Ground solar installation

Location	Bari, Italy
Industry	Brewery
Footprint	1600 m ²
Solar Field	660 m ²
Production	354 MWh/year
Heat	Steam 150 °C Hot Water 85 °C



460 kW Absolicon T160 Solar Collector field

2024-06-06



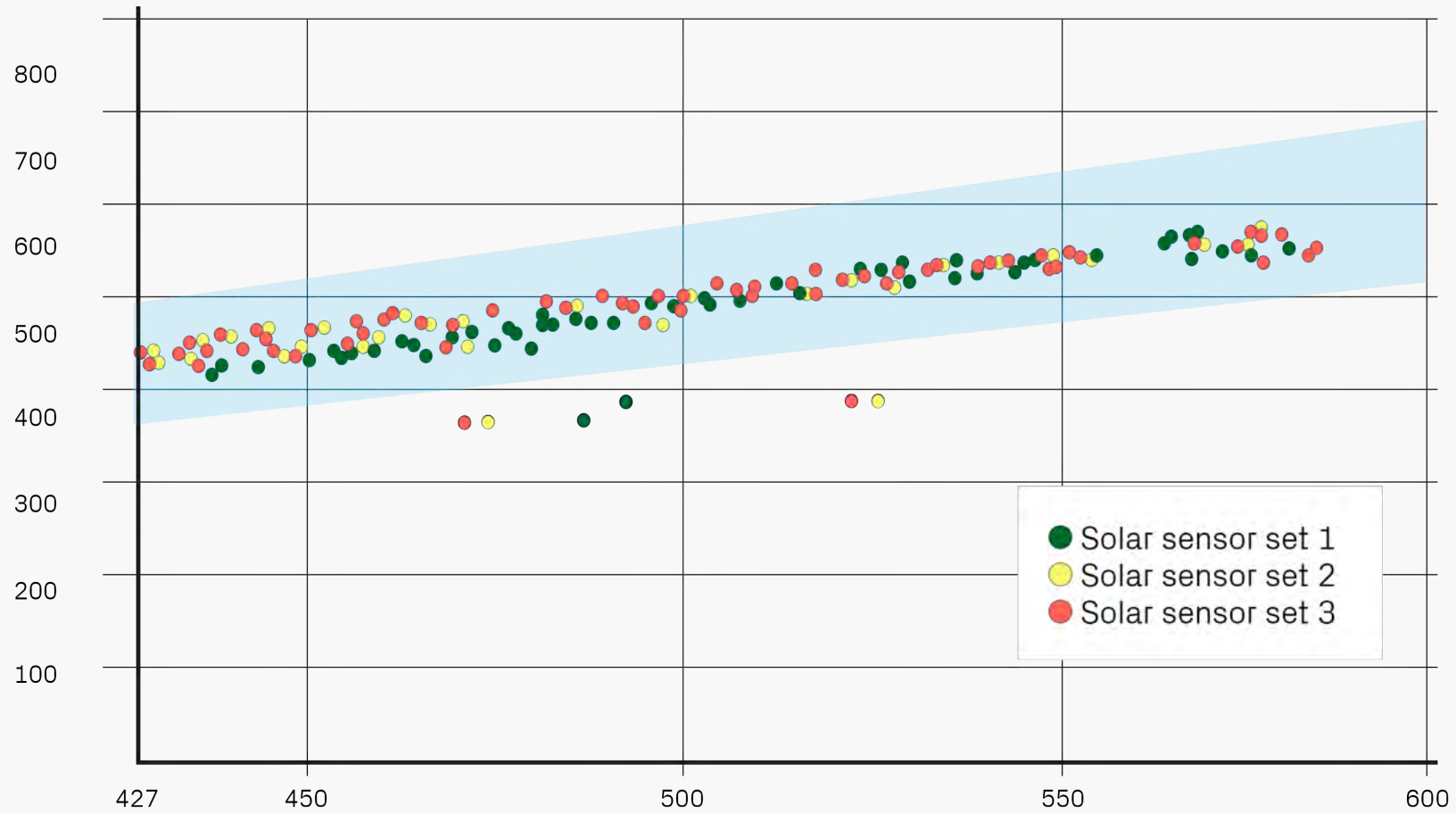
Solar Central



2 MWh energy storage



MEASURED PEAK POWER



FOCUS ON THE WORLD'S LARGEST FOOD AND BEVERAGE COMPANIES



Example: Pepsico

- CO₂ Reduction target **75 percent by 2030.**
- **260 production plants** around the world

ABSOLICON PHILOSOPHY FOR ZERO CO₂

– CHOOSE AT EACH TIME THE CHEAPEST ENERGY SOURCE

Adaptation of processes

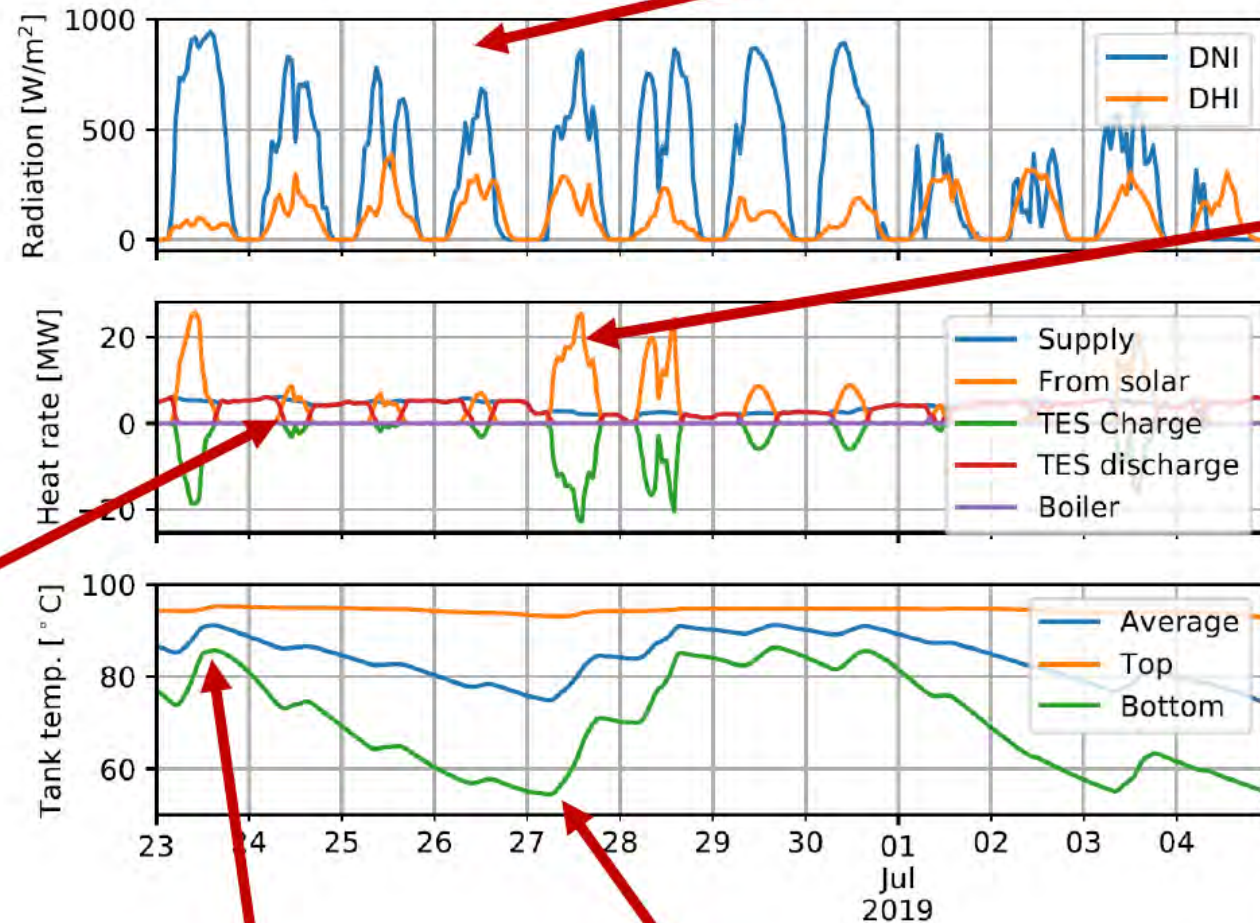
1. Energy efficiency
2. Use steam only when needed, replace with pressurised hot water
3. Work with a large energy storage

Three energy sources

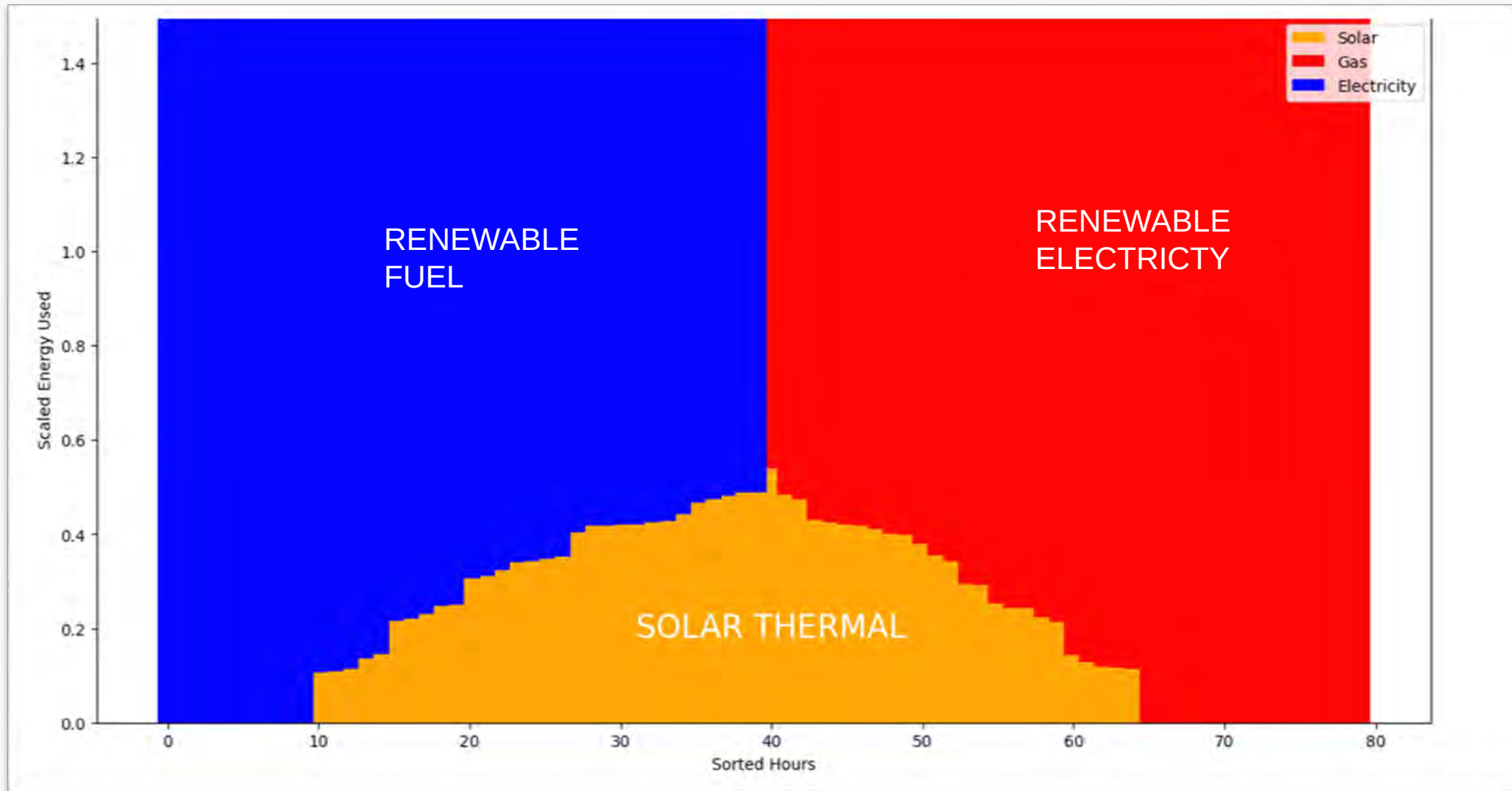
1. Solar thermal on available surface
2. Electricity for heat pumps and (when electricity is cheap) for e-boiler
3. Burning renewable fuel - biogas, biofuel or H₂

SIMULATION OF SOLAR FIELD, HEAT PUMP AND STORAGE TANK

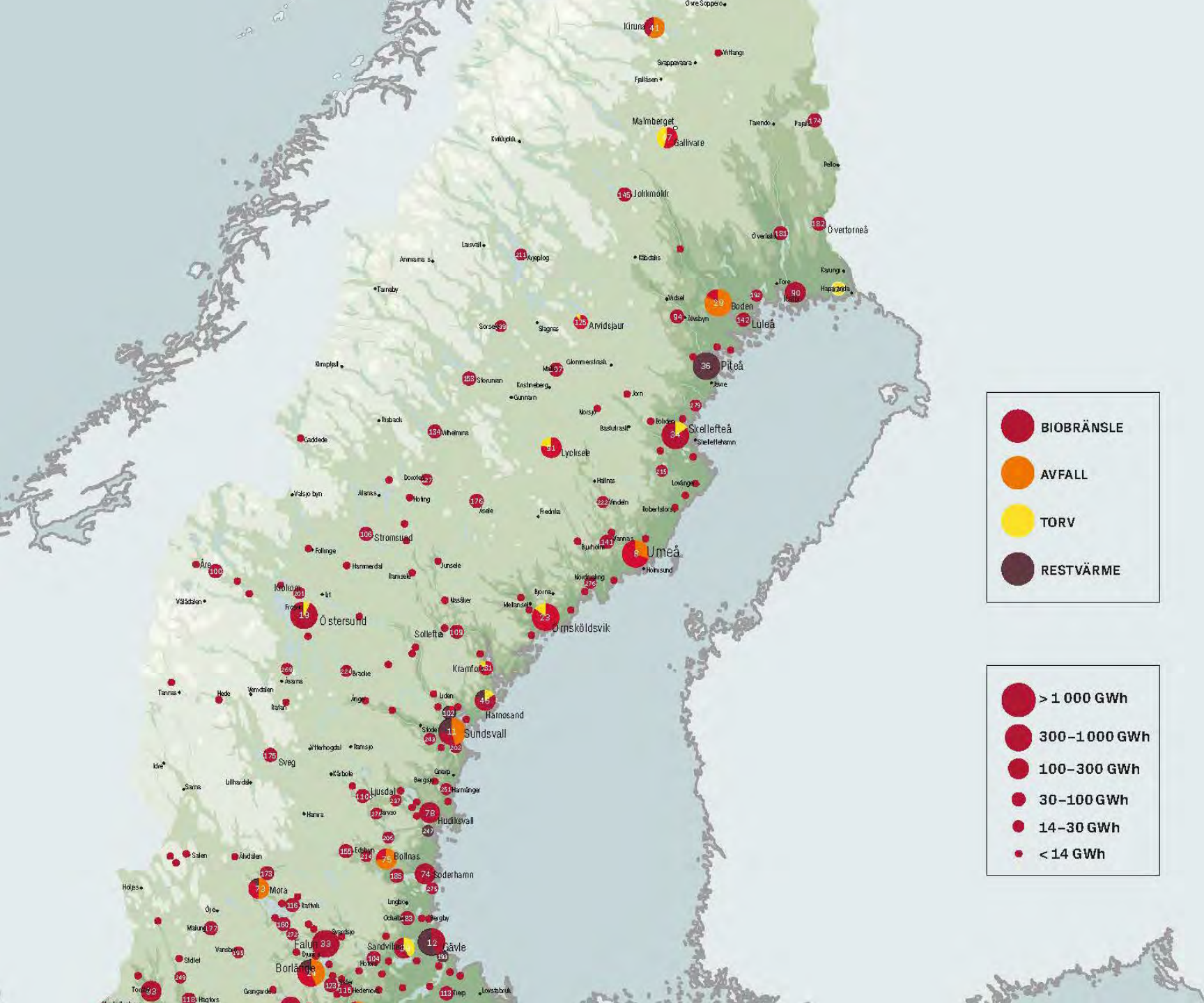
Many sunny summer days in a row



HEART DIAGRAM FOR LOWEST RENEWABLE ENERGY COST



Solvärme för fjärrvärmenät



Hälften av Sveriges bostäder värme idag med fjärrvärme – men hela systemet är hotat av minskande värmebehov och låga elpriser

SNF: 8 TWh solvärme år 2040

BIOENERGI SVEBIO

bioenergitidningen.se / svebio.se © Bioenergi

SOLAR THERMAL: Solar District Heating



156 000 m², 44 000

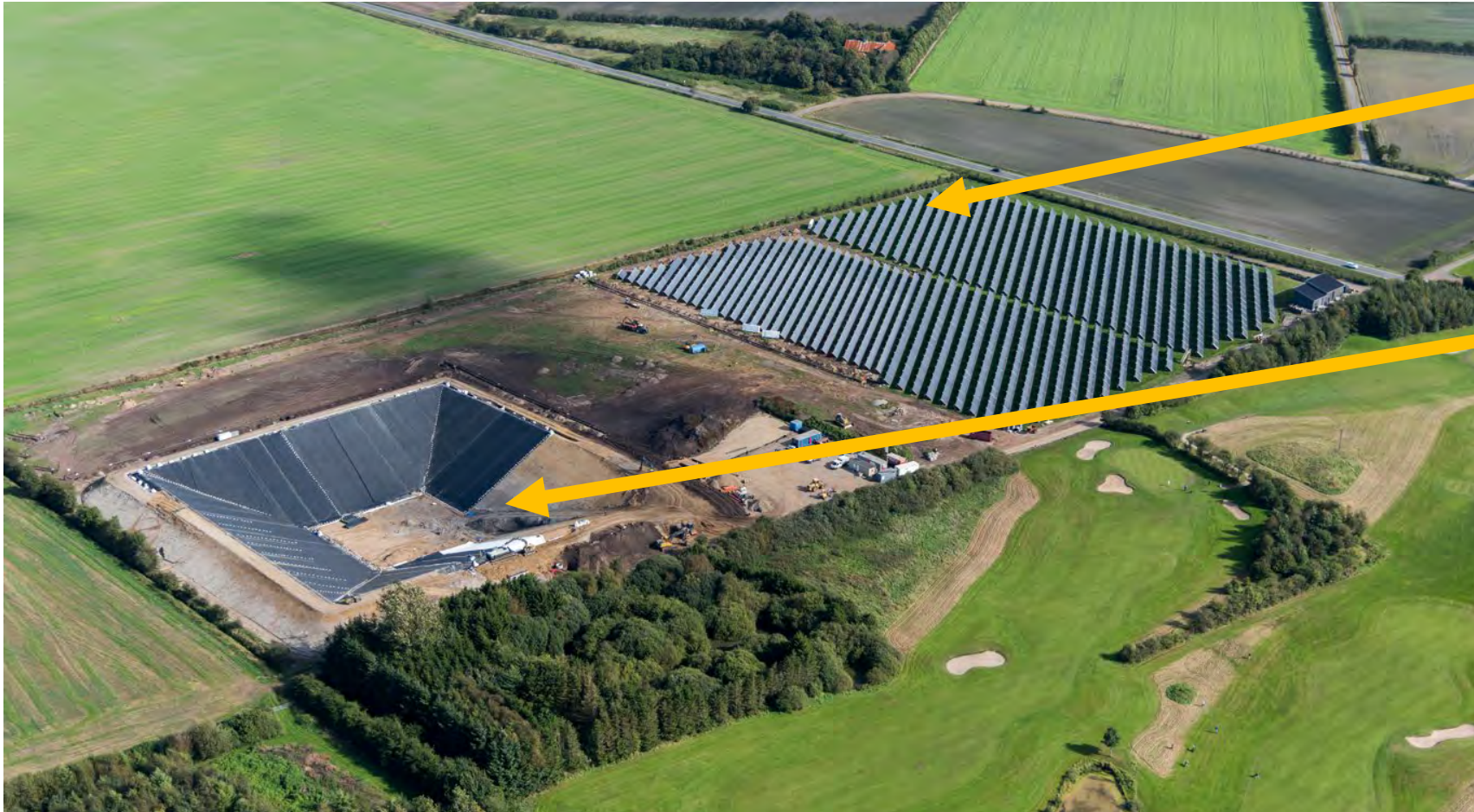
SOLAR THERMAL



**26 MW
(37 500 m²) solar
collectors**

**Heat storage
60 000 m³**

**Since 2012, solar
thermal provide 50
% of the heat for
the 3500 people in
Dronninglund**

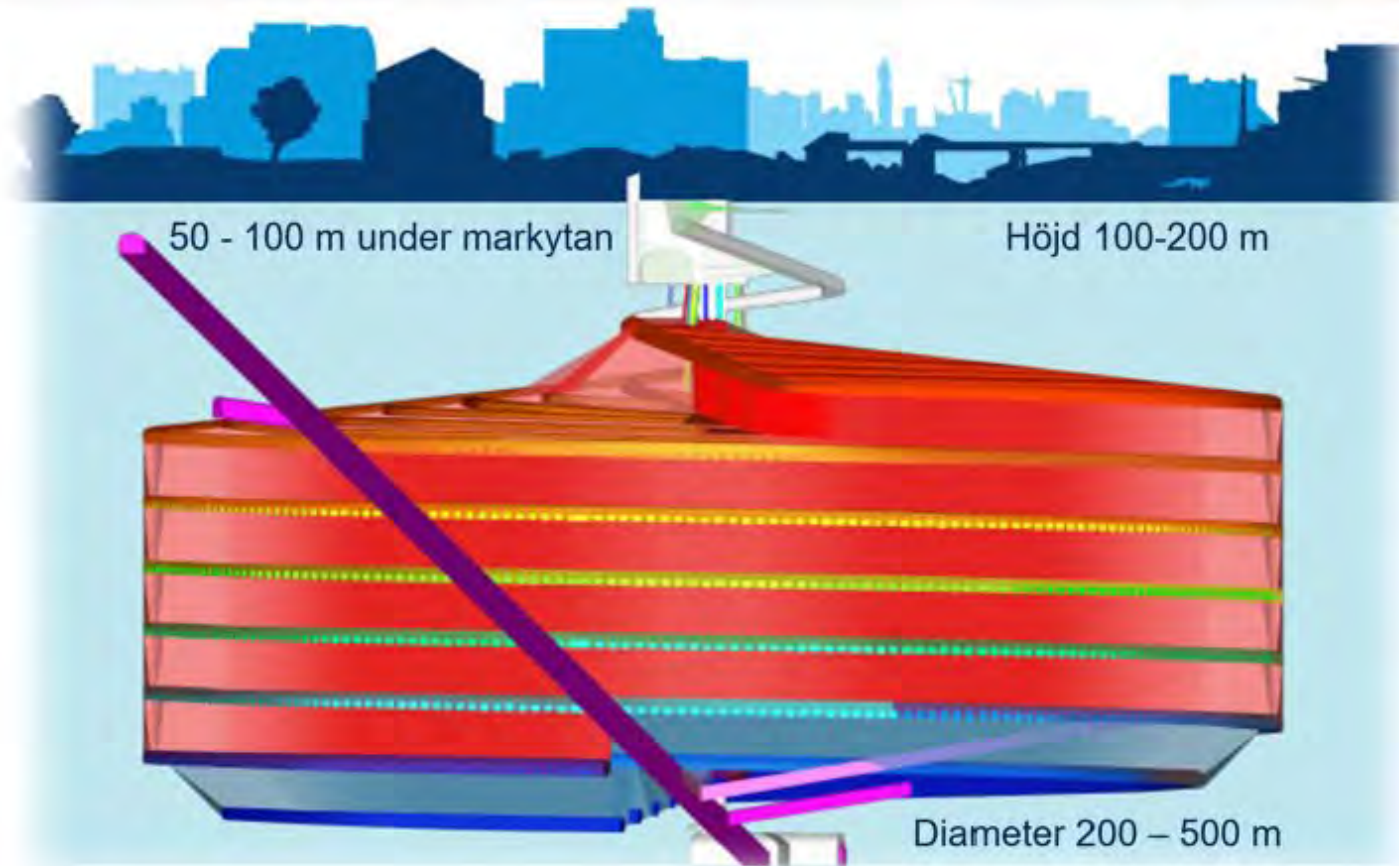


**27 000 m²
solar collectors**

**Heat storage
12 500 m³**

**Since 2017,
Toftlund has
received 50 percent
of its heat from
solar heat**

EnergyStorage med vanligt vatten i tunnlar och borrhål under en stad



- EnergyStorage temperatur är + 95 grad i sin övre del ned till + 4 grad C i bottenkiktet
- Värmepumpar förädlar och skiftar överskottsenergi till högvärdig värme och kyla



EnergyStorage tunnlar och långa borrhål produceras med fjärrstyrd gruvutrustning från svenska leverantörer





Solar heat
up to **110 °C**

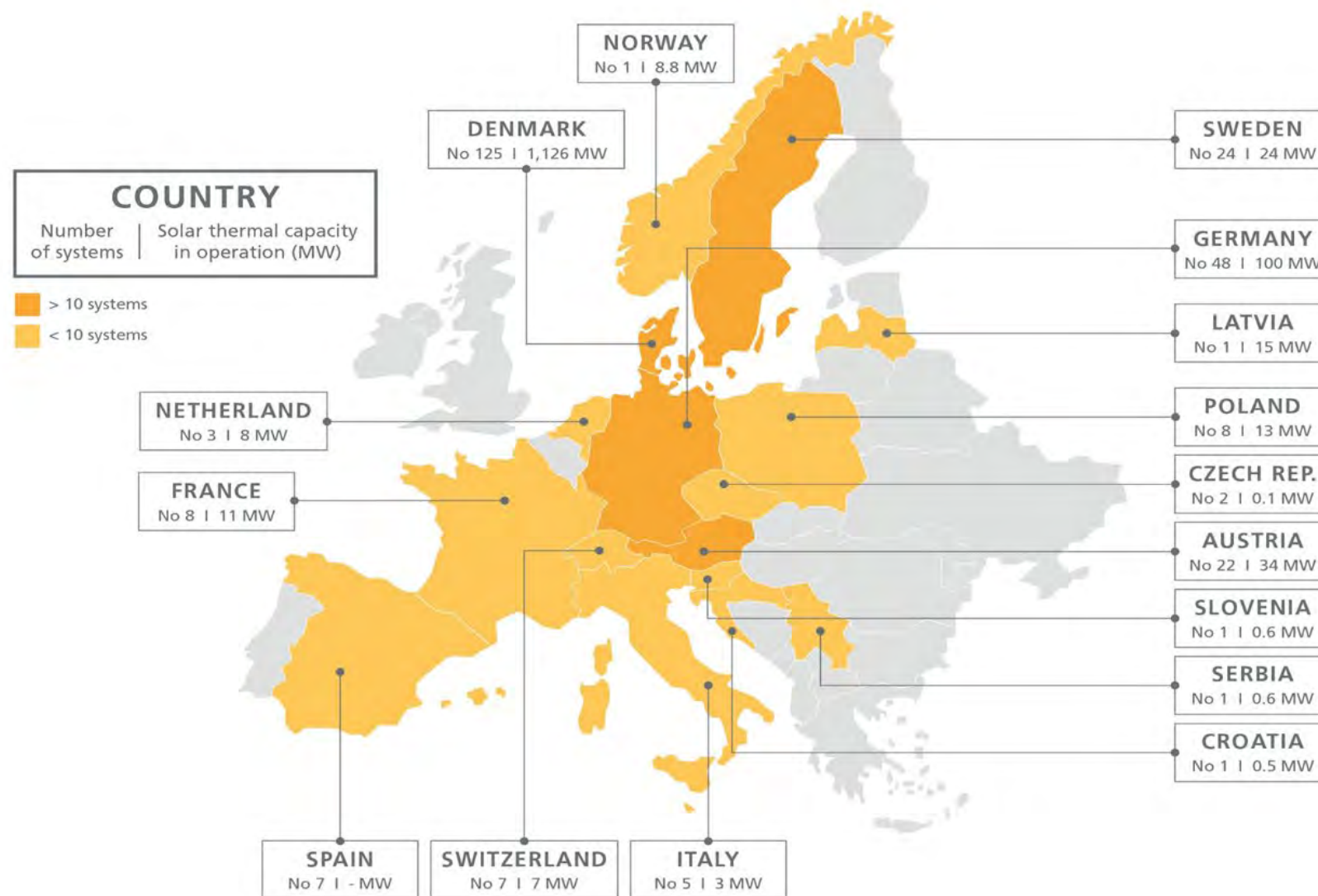
266 towns in Europe use solar district heating

Germany has 25 new large-scale SDH projects in pipeline

Spain planning 25+ new SDH installations

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

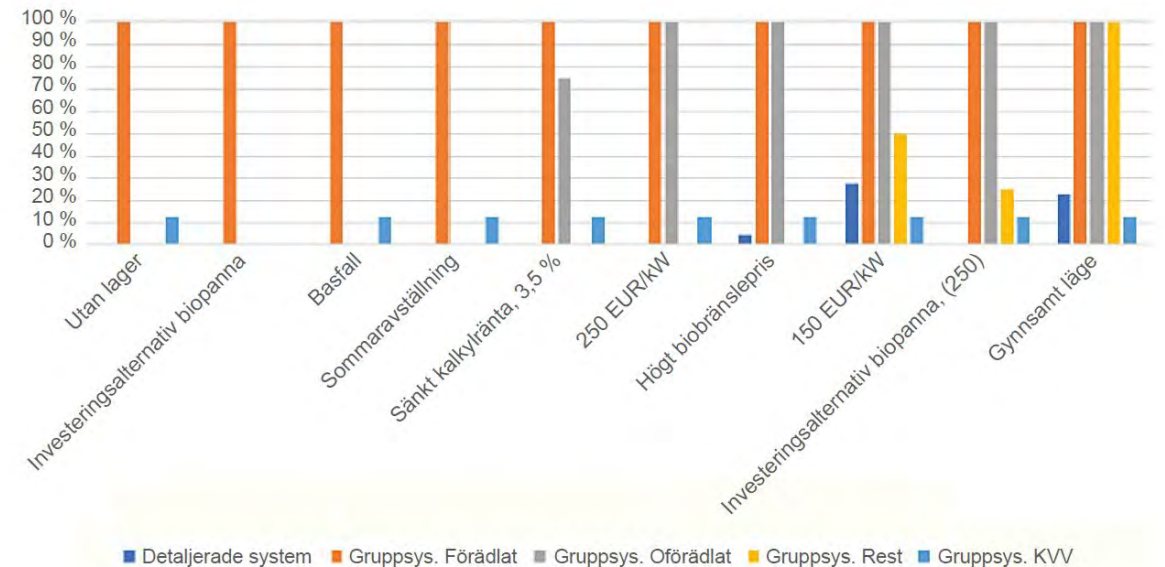
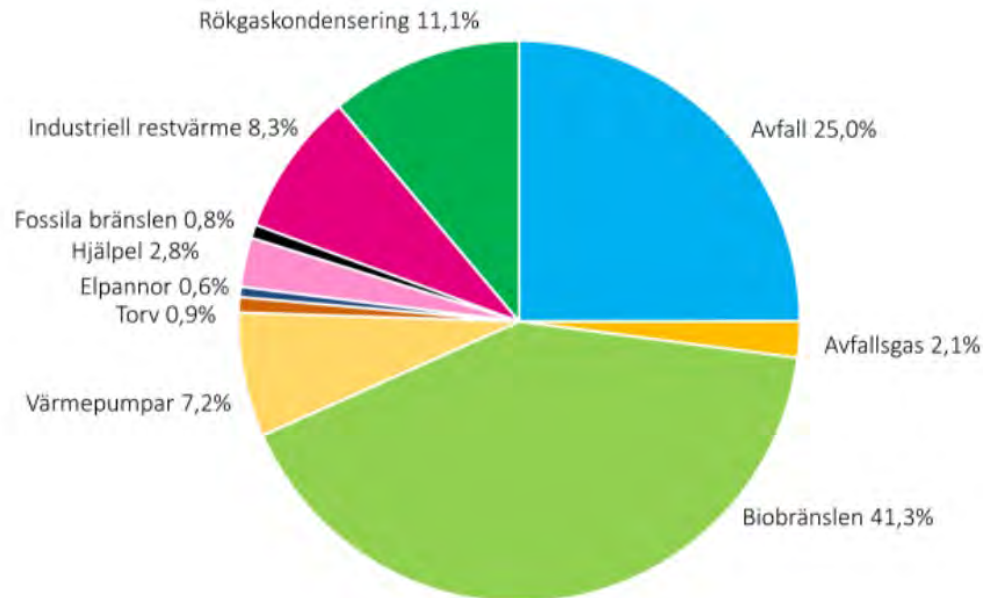
SOLAR THERMAL



ENERGIMYNDIGHETEN SOLVÄRME I SVERIGE

Med säsongslager: 6 TWh solvärme + 5 TWh effektivisering = 11 TWh

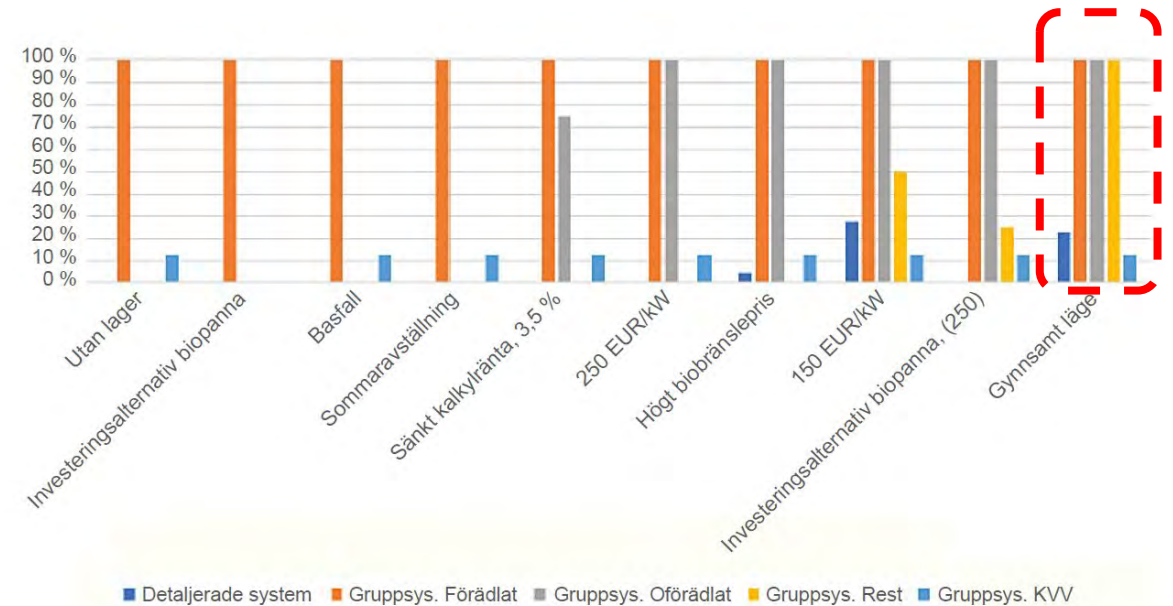
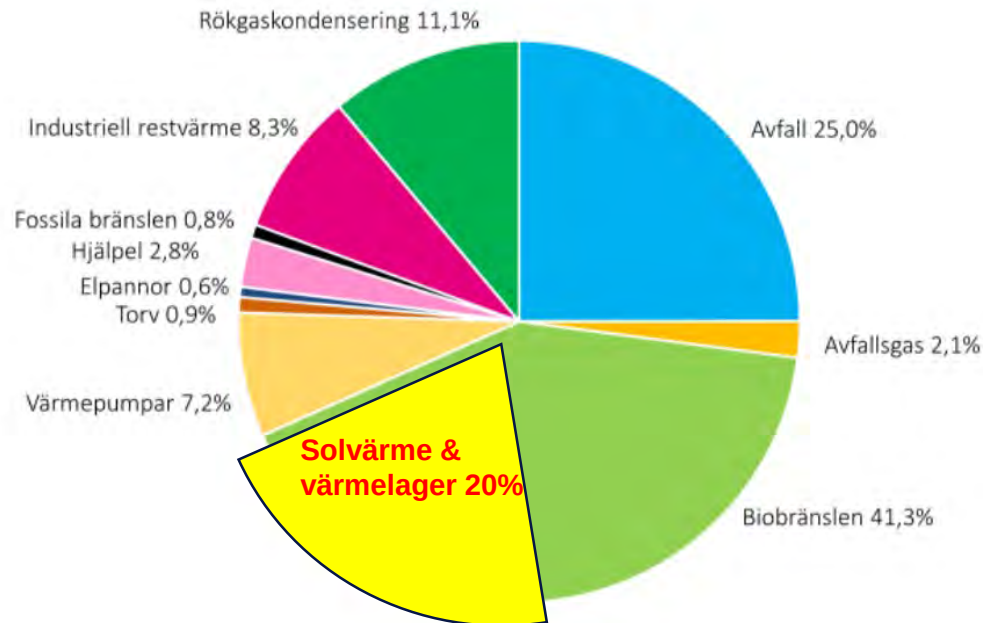
Fjärrvärmens bränslemix 2020

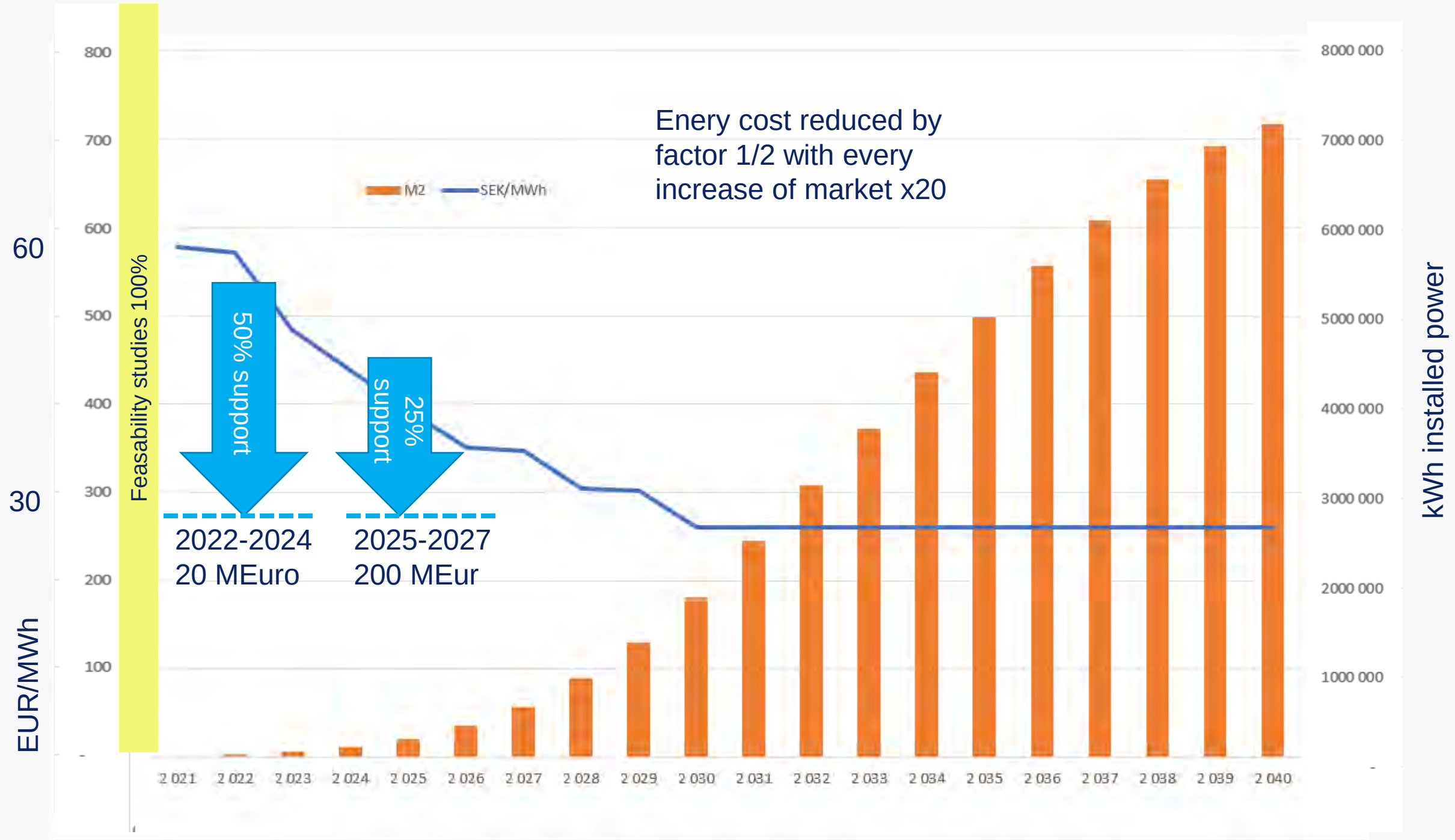


ENERGIMYNDIGHETEN SOLVÄRME I SVERIGE

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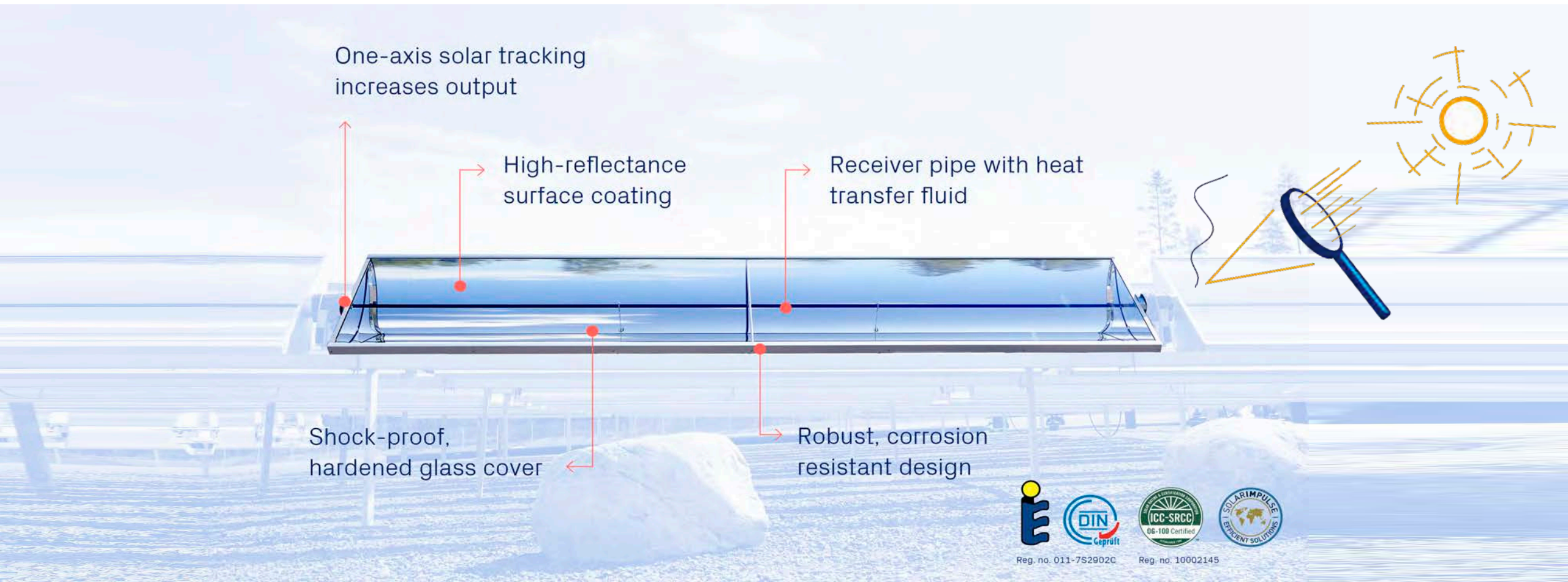




Absolicon i Härnösand

ABSOLICON T160 SOLAR COLLECTOR

- 5.5 m long, 1 meter wide
- 160 C heat and steam
- Over 76% optical efficiency
- Follows the sun during the day
- Service life at least 25 years
- 80+ patents applied for or granted

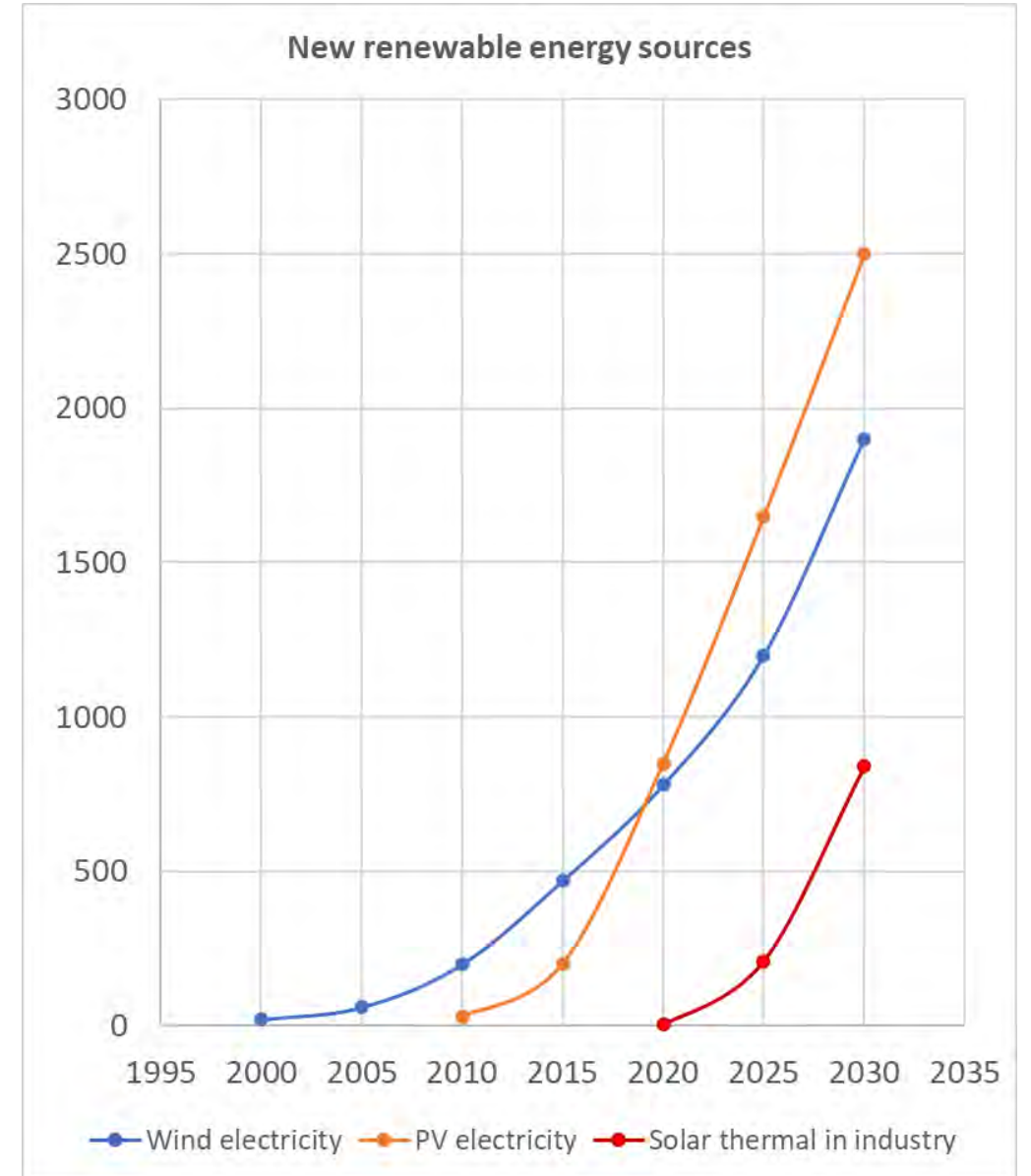


SOLAR THERMAL - THE THIRD WAVE OF RE

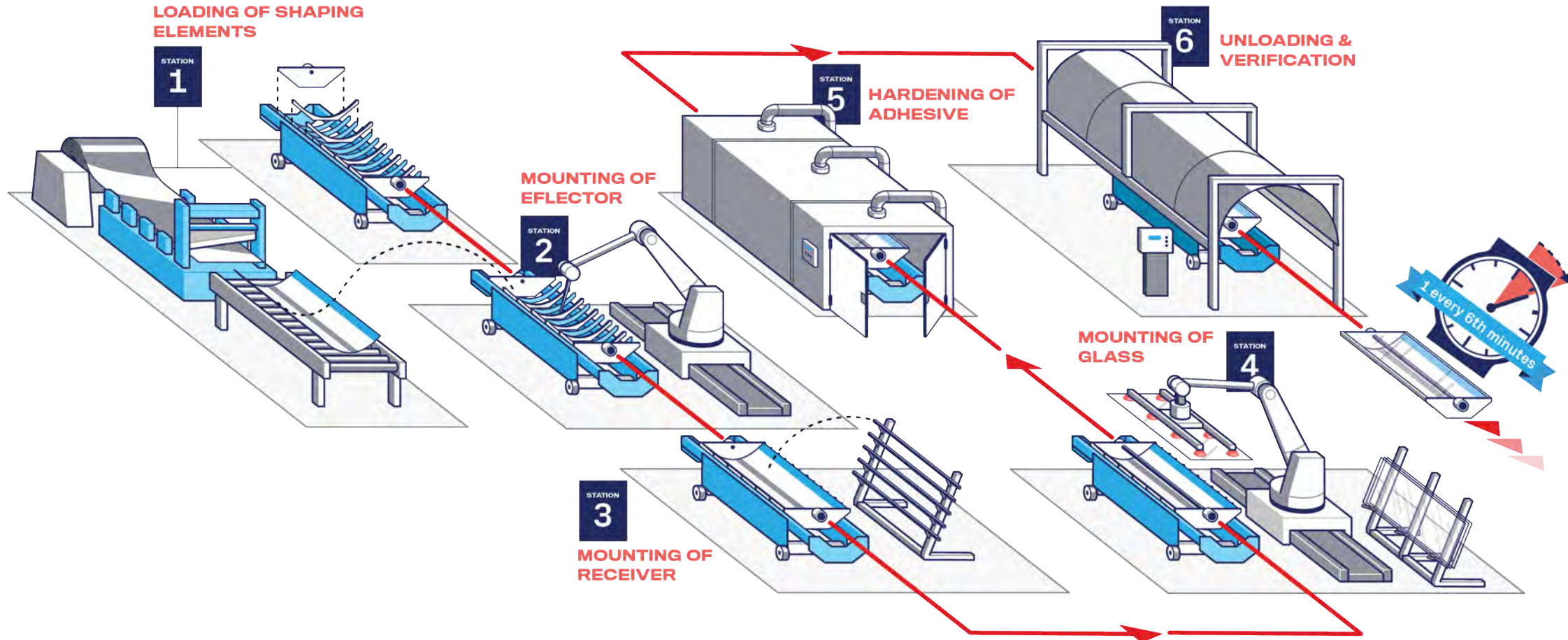
Renewable electricity production started with **wind power** in Denmark (Vestas) and **solar cells** in Germany (SunPower)

Now it is a mature **\$800 billion market**, expected to grow to \$2 trillion in 2030 at a CAGR of 8.5%

- **Renewable heat production** with **solar thermal** is the "third wave" of renewable energy
- According to IRENA roadmap, installations grow from 5 million m² of solar collectors today to 1 200 million m² (850 GW) (CAGR of 70%) and a **\$50 billion market** in 2030



THE PRODUCTION LINE IS DESIGNED FOR COST-EFFECTIVE HIGH-VOLUME INDUSTRIAL PRODUCTION



Absolicon sells the robotized production line

- The only company in the world with a solution for rapid roll-out of industrial solar heating
- Partnership with ABB for marketing, sales and delivery
- Annual recurring revenue from materials and licenses
- Also sells material and takes a license fee
- Price: €4 million



TWO PRODUCTION LINES SOLD - ORDER VALUE 8 MILLION USD

Canada



Egypt

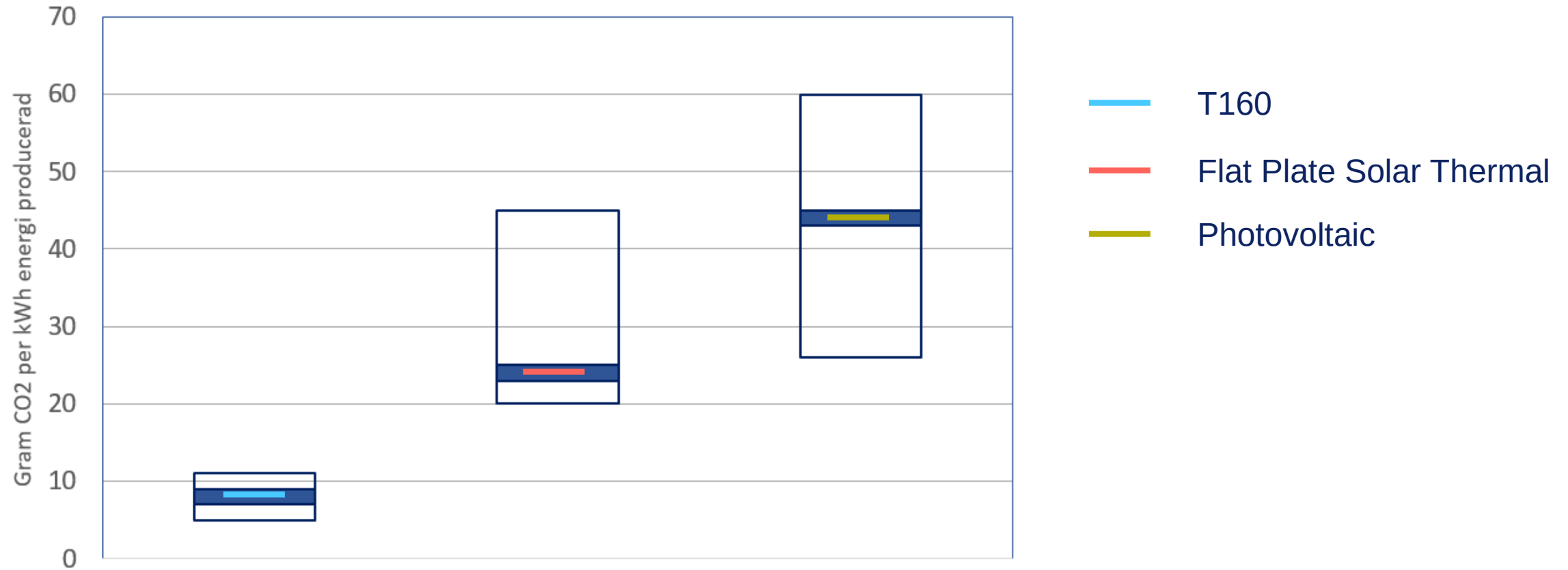


Creative Power Solutions



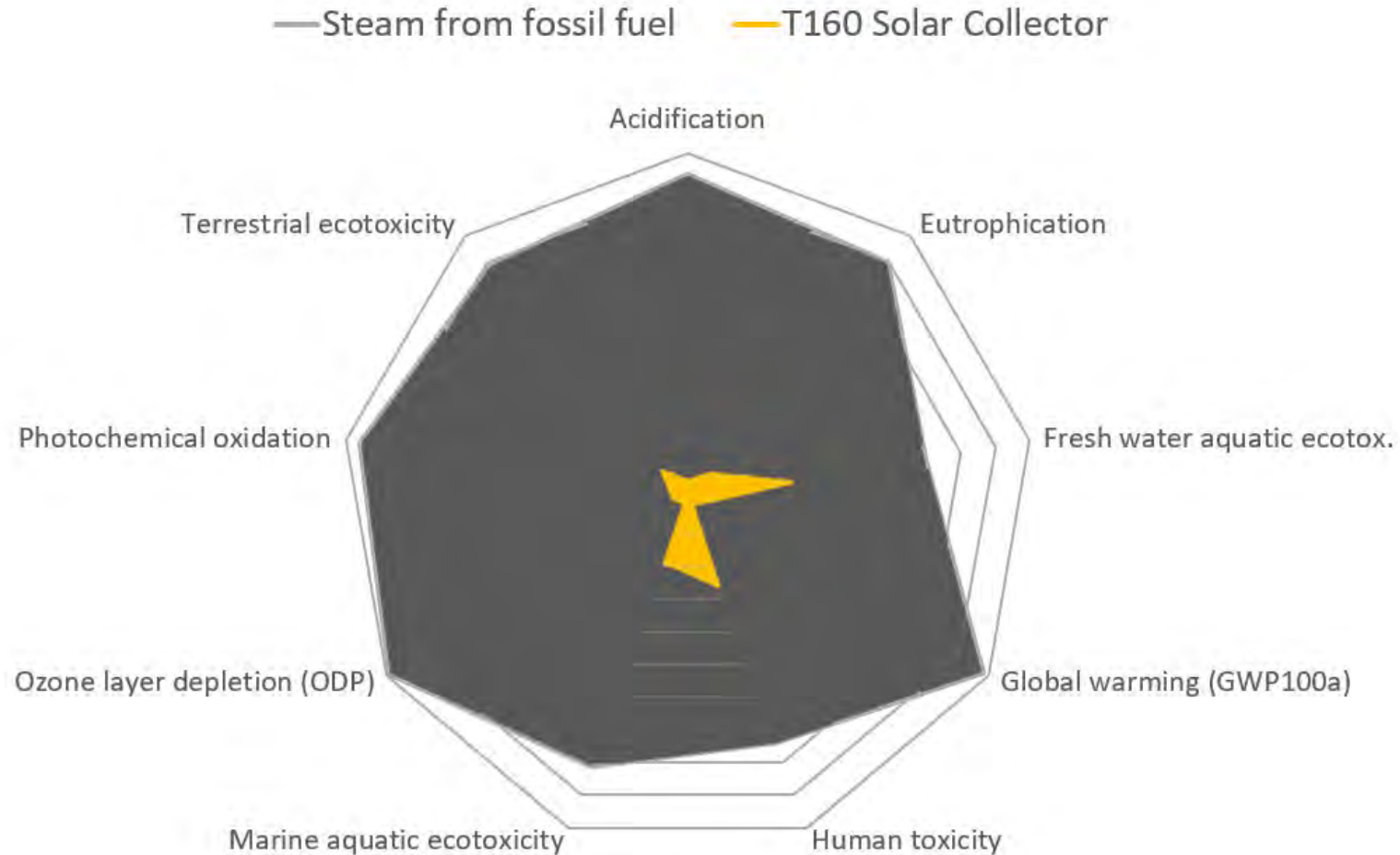
ABSOLICONS T160 HAS A LOW CARBON FOOTPRINT

CO2 emissions from different renewable energy sources with LCA



CLIMATE IMPACT COMPARED TO STEAM FROM FOSSIL FUEL

Low climate impact

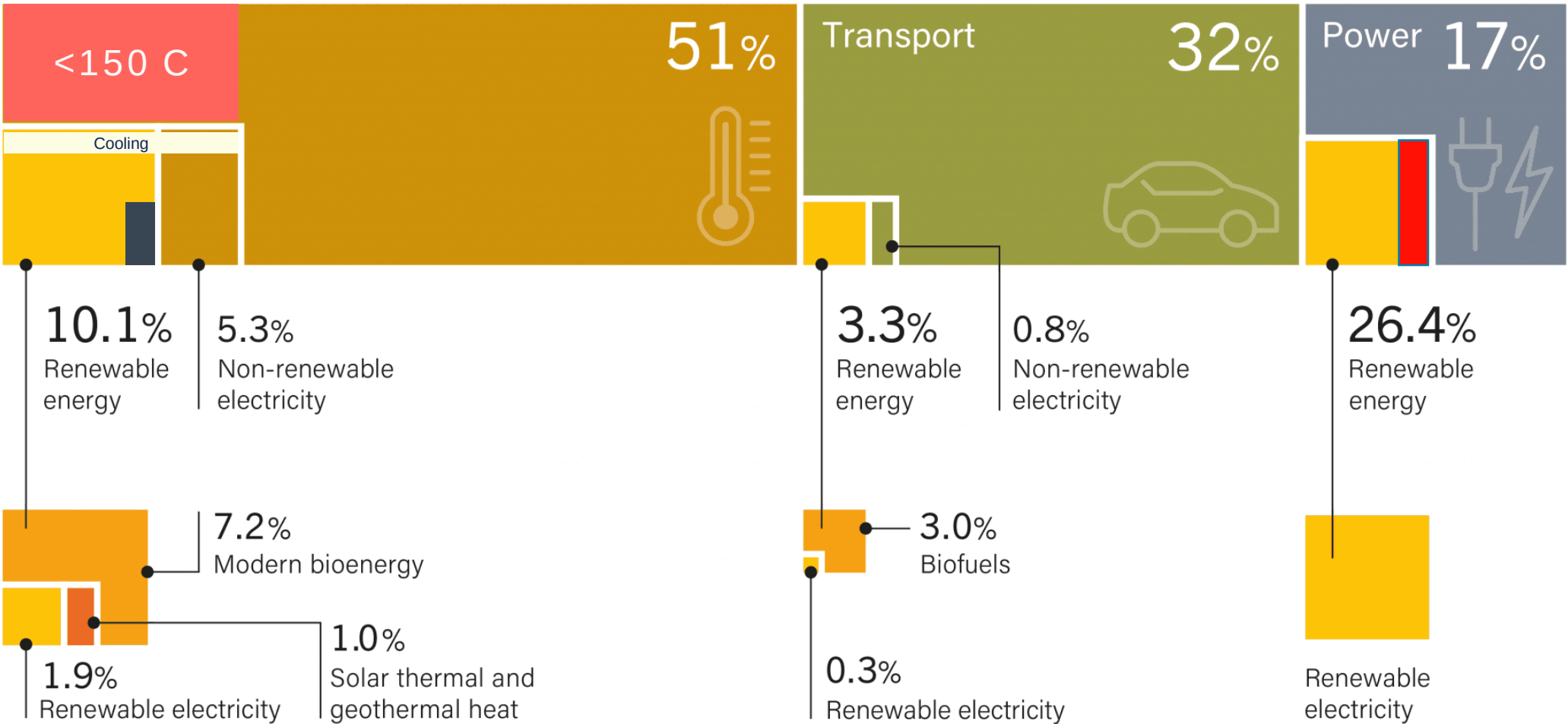


EXAMPLE IN 2033 – 100 PRODUCTION LINES SOLD

This global network of production lines builds 20 million m² of solar collector fields per year – IRENA says 1200 million m² are needed by 2030

Revenue (assuming production of 200 000 m ² / year / plant)	Gross profit margin	Gross profit
€ 400 million in sales from 100 production lines at €4M each sold from 2023 to 2033	50%	€200 million
€ 1 billion in material sales in 2033 (50% share of total material need, € 20 million x 100)	8%	€80 million annually
€ 50 – 100 million in license revenue per year (5€/m ²)	100%	€50 million annually

Renewable Share of Total Final Energy Consumption, by Final Energy Use, 2017



Note: Data should not be compared with previous years because of revisions due to improved or adjusted methodology.

Source: Based on IEA data.



Solar heat
up to **110 °C**