

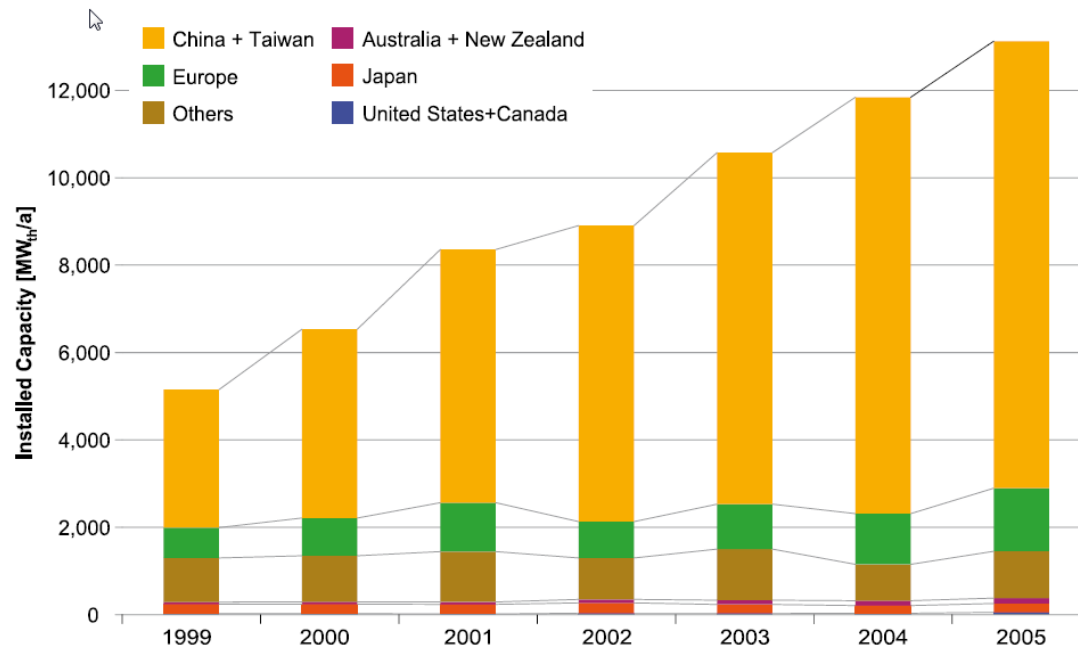
SOLAR THERMAL TECHNOLOGY market & trends

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Prepared by Marketing & Market Development DPT
Centre for Renewable Energy Sources and Saving

The Solar Thermal Market Worldwide

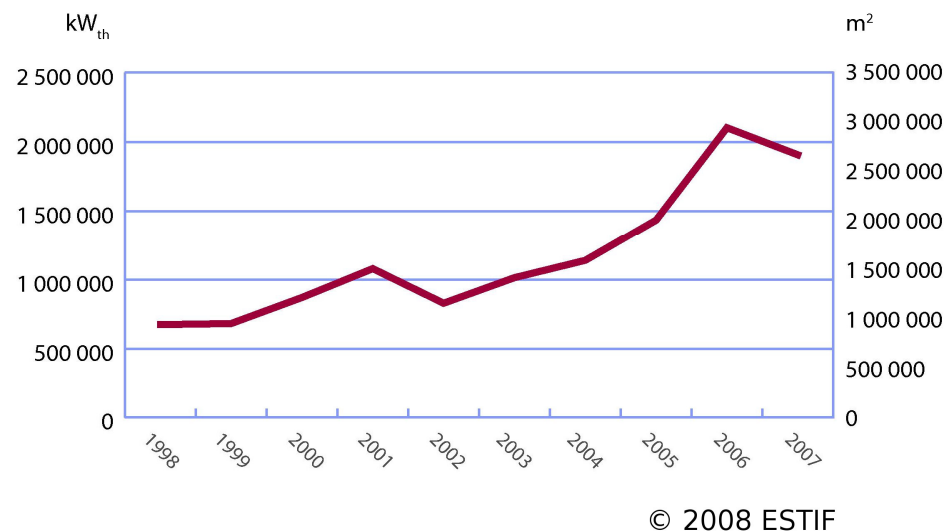
current status



Annual newly installed capacity of flat-plate and evacuated tube collectors in kWth per region (source: IEA 2007)

- Europe is one of the most dynamic markets for solar-thermal systems in the world, together with China and Oceania.
- The world installed capacity in 2006 was 118 GWth, with the largest markets being China and Taiwan.
- The global growth rate during the period 2004 – 2005 was 11 % and the global average annual growth rate for the period 2000-2005 was 15%.
- In the EU, three countries hold 72% of the market, a consequence of long-term financial incentive schemes for the development and deployment of solar-thermal technology (Germany, Austria, Greece)
- Assuming an average annual growth rate of 20%, a global market size in the range of 150 GWth (250 million m²) per year can be projected for 2020.

Solar Thermal Market in EU27+ CH

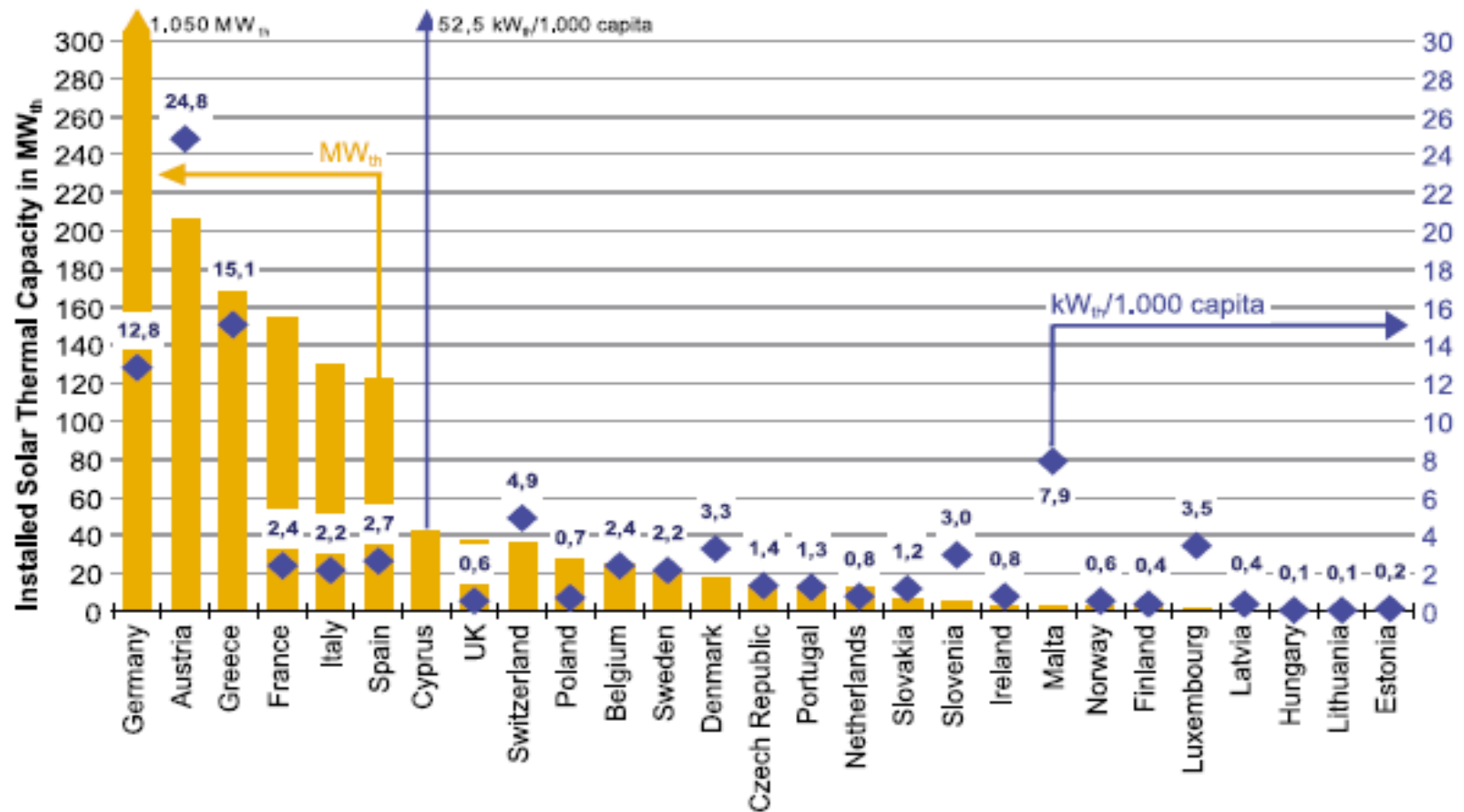


- semi-steady annual growth rate the last years, numbering up to 3.5 million m² area of yearly installed collectors in EU
- the cumulative installed capacity of solar-thermal systems in Europe in 2006 was 13 GWth
- approximately to 0.7 Mtoe of useful heat.
- the annual installations in the EU reached a maximum of 2.1 GWth in 2006,
- the average growth rate in terms of installed capacity during the period 2000-2005 was 13%, while the corresponding one for 2004 and 2005 was almost 25%.

GROWTH RATES OF SOLAR THERMAL SYSTEMS IN EU

	EU27+CH	DE	TOP6-DE	REST
2005	26%	27%	27%	24%
2006	46%	58%	38%	28%
2007	-10%	-33%	13%	14%

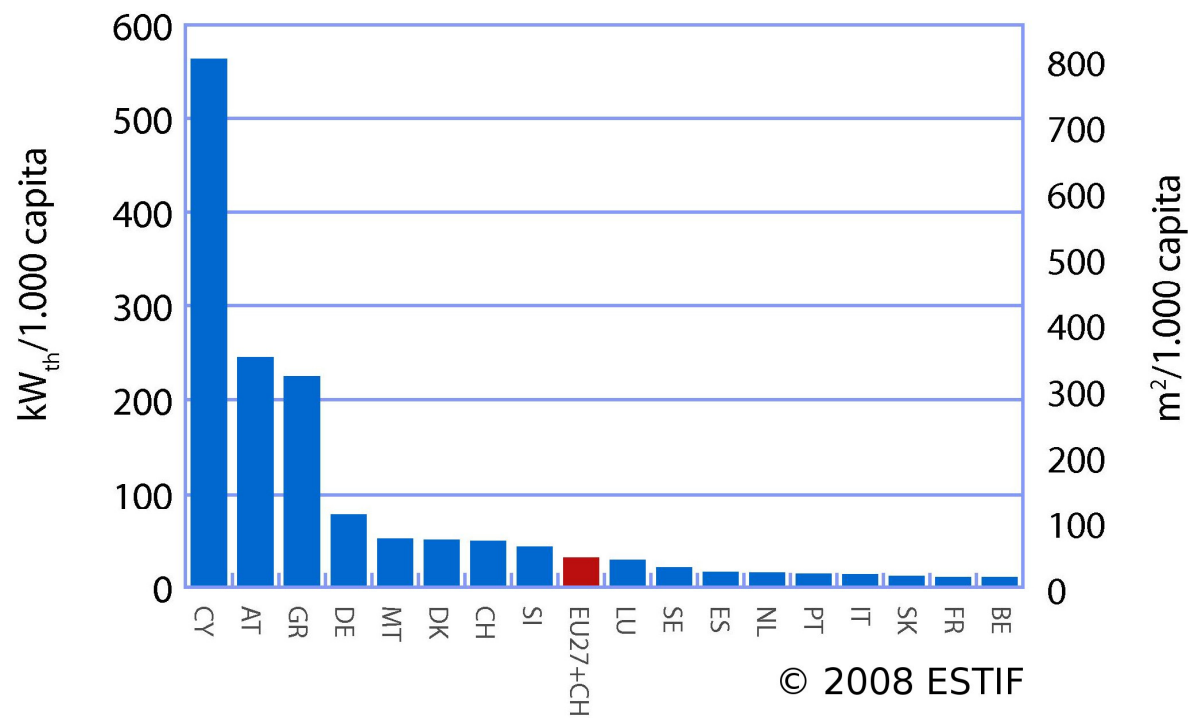
The European Solar Thermal current status



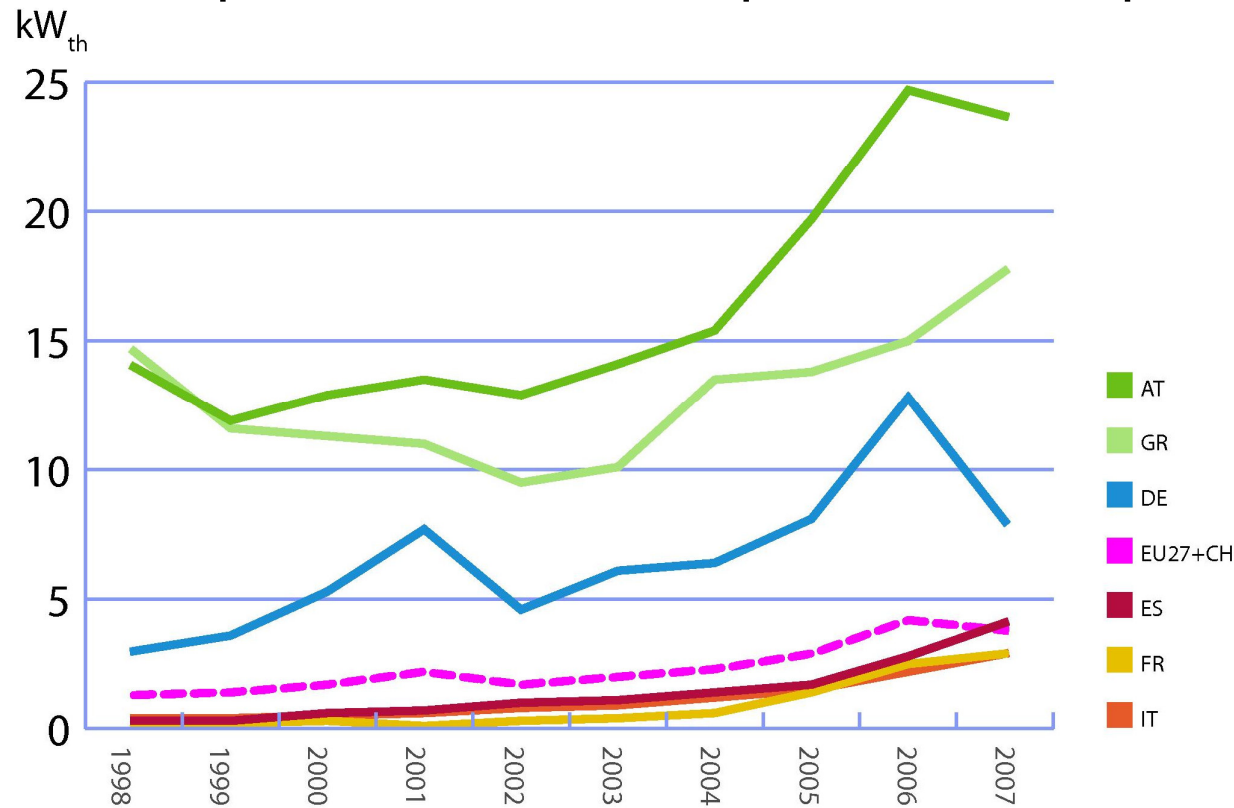
Solar Thermal capacity installed in the various European countries

ESTIF, 2007

Solar thermal capacity in operation per 1.000 capita in 2007



Development of market per 1.000 capita



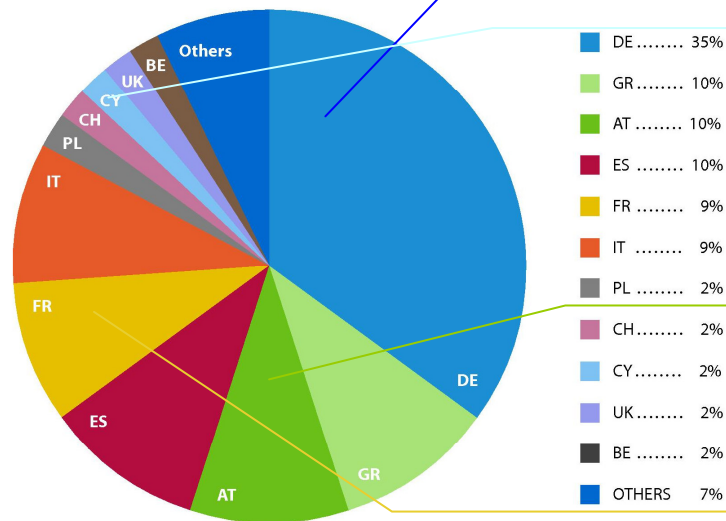
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The market growth of ST systems at the various countries strongly relates with the existence or not of:

- fiscal incentives (i.e. Germany, before 2006 and after) and
- regulatory measures (i.e. building code in Spain after 2005)

The European Solar Thermal current status

Shares of the European Solar Thermal Market



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Germany: The biggest ST market in Europe

Cyprus: European leader in installed capacity per capita

Austria: More than six times head of the EU average (per capita)

France: 2005/2006, the highest rate of growth 81%

Current situation of the installed ST systems in Europe

- 90% of the installed capacity in Europe, is designated for the supply of domestic hot water at single family house units
- 5%, systems of domestic hot water at multi-family house units,
- 5% combi systems for single family houses that provide both hot water and space heating.

Denmark, Sweden, Germany and Austria: A number of large scale solar thermal installations based for supplying heat to district heating networks. Some of them are also coupled with seasonal heat storage

various solar cooling installations, tailor-made, for industrial purposes & demonstration projects (more than 250 all over Europe, around 100 small scale)

The European Solar Thermal current status

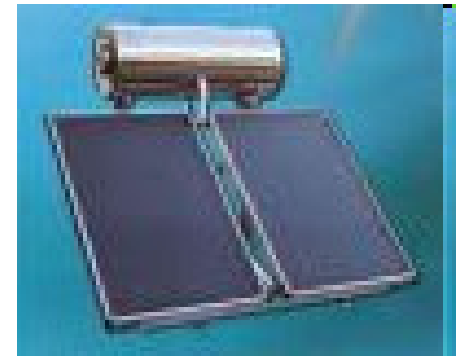
Country	Typical collector area in m ²	System price in € (incl. installation & VAT)	Comments
Italy	3,0	1500	<i>thermosiphonic system</i>
Greece	2,4	1500	<i>thermosiphonic system</i>
Spain ¹⁷	4,0	2.200	<i>thermosiphonic system</i>
Germany	6,0	5.000-6.000	4 person household, pumped system
Austria	6,0	4.200	pumped system
France	3,0-5,0	3.800-5.000	200-300lt storage tank
Sweden	5,0	3000	DHW tank with electric back-up heater

Average cost of ST for DHW production. (Source IEE SolarCombi+ project)

At least 80% of the ST value chain for the European market is placed in the EU.

- Over 90% of manufacturing
- Almost 100% of sales and marketing and
- 100% of installation and maintenance

Only raw materials for ST are imported at high shares.



- Cost competitiveness still an issue for some ST applications/systems
- Cost competitiveness of ST systems is also strongly dependant on non-technological factors (solar radiation, ambient temperature, load profile of use)

During the last decade, a 50% increase in the total installed capacity of DHW systems resulted to a cost reduction of about 20%

Experts from the European Solar Thermal Technology Platform (ESTTP) claim that if the installed solar-thermal capacity reaches 70 GW in 2010 and 200 GW in 2030, system costs for small scale forced circulation units installed in central Europe will reach €400/KWth in 2030

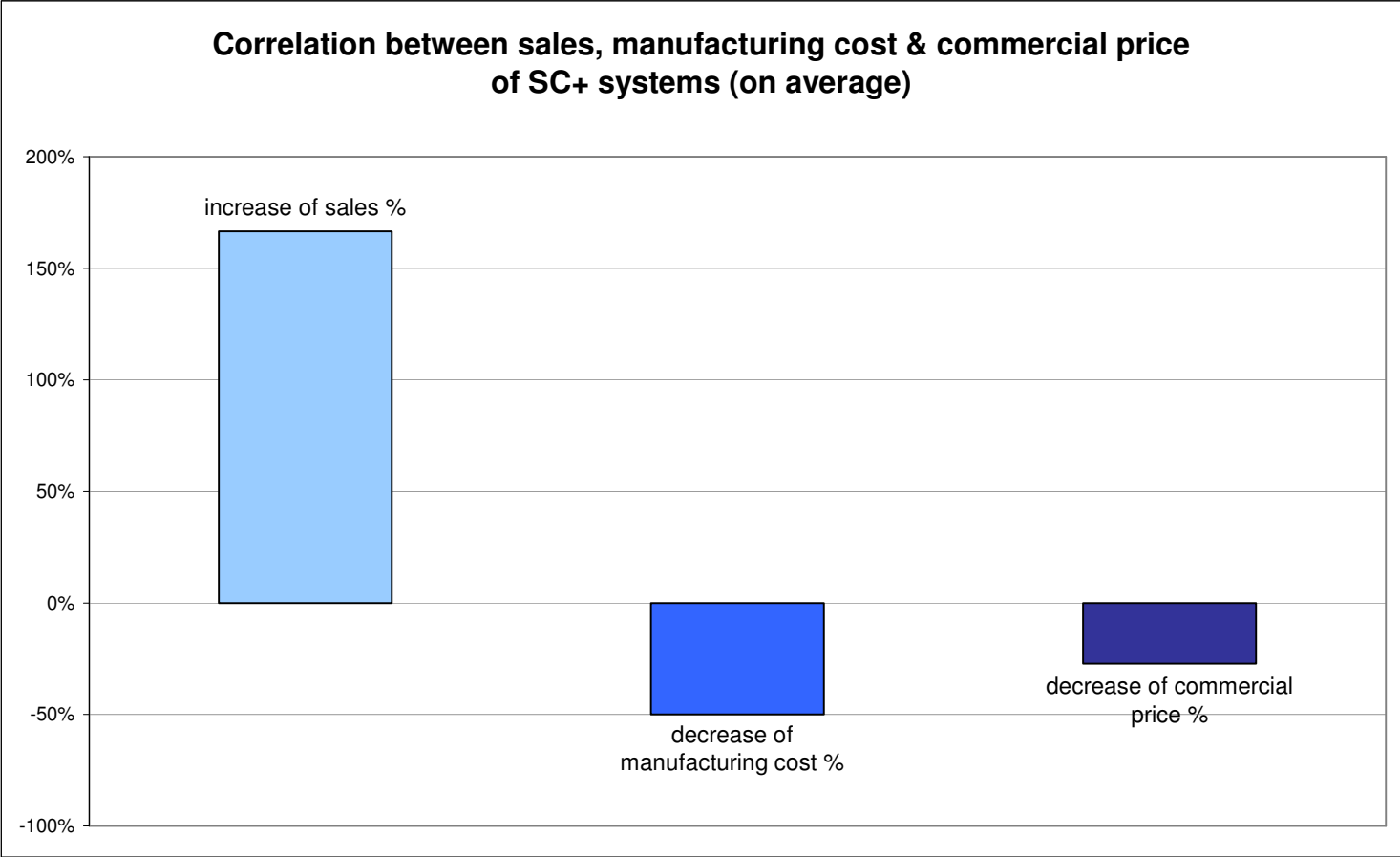
It is foreseen that by 2030, due to economies of scale and technological progress a 60% reduction of cost can be succeeded (source ESTTP)

Widen the Solar Thermal Systems applications

More R&D Needed ↓

Buildings	Industrial Process Heat	District Heating & Cooling	Desalination
Solar Water Heating	Low-Temp. heating	Demo networks heating	Demonstration small scale
Space Heating	Heat + Cold (Water/Air)	Combi's with Storage	Up-scaling small
Space Heating and Cooling	Mid-temp. heat / cold	Combi's storage Heat/cold	Demo-large scale
Total concept H&C+DHW+ Seasonal storage	High-temp. heat/cold	Large deployment	Up-scaling large systems

Solar Thermal Applications in correlation with the needed level of R&D. (source ESTTP)



Correlation between sales, manufacturing cost & commercial price for small solar cooling systems (<20kW)
Source: IEE solarcombi+ project)

Type of ST applications:

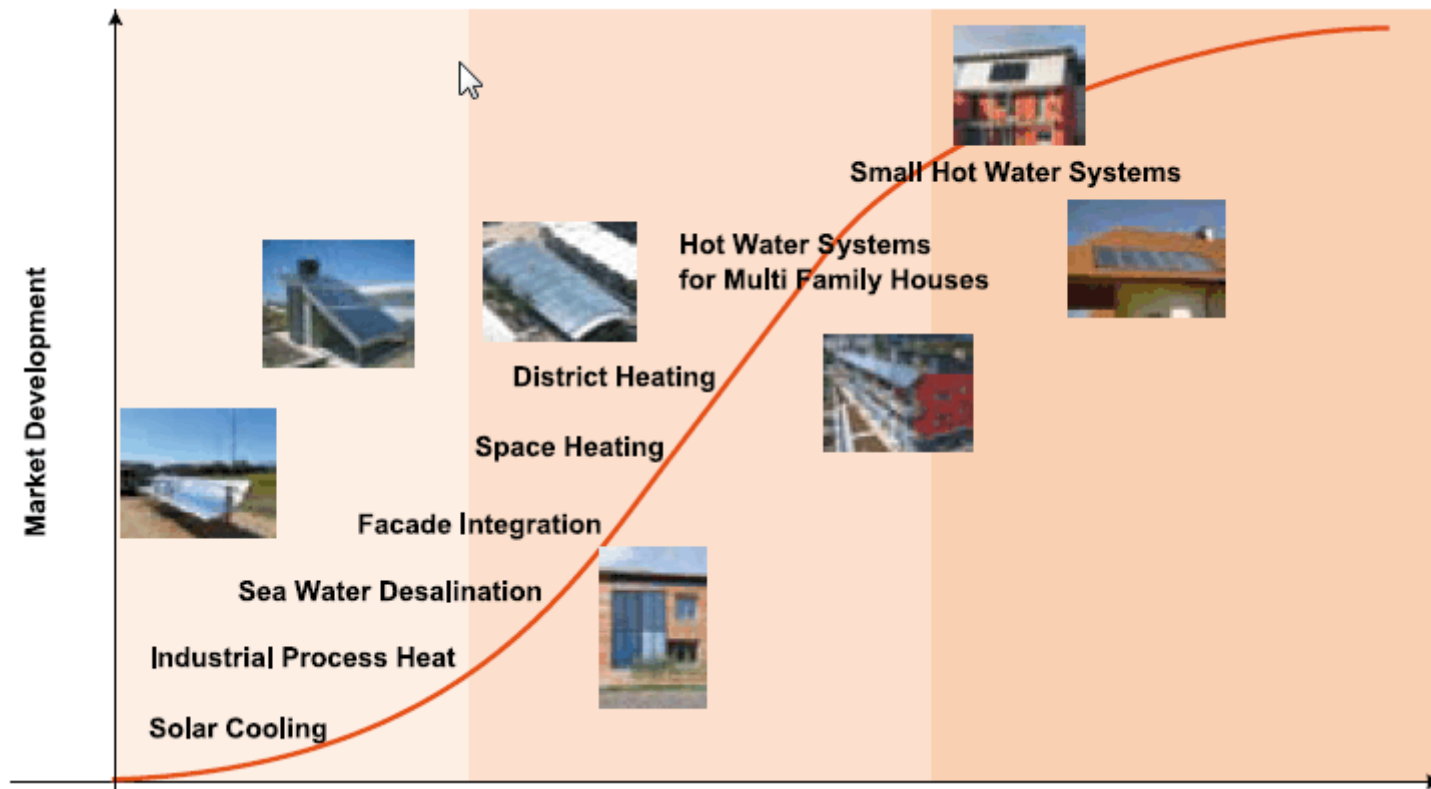
- Solar water heaters (DHW)
- Solar space heating (solarcombi systems)
- Solar district heating
- Building façade integration systems
- Sea water desalination
- Industrial process heat
- Solar cooling (solarcombi+ systems)

market deployment



The Solar Thermal Market

STATUS & TRENDS



Indication of the current state of deployment of solar thermal applications from development to application in the mass market. (Source: AEE INTEC, 2008)

Cost reductions are expected mainly to be driven by the following:

- Direct building integration of collectors
- Improved manufacturing processes
- New advanced materials for collectors
- Mass production of standardized systems (turnkey), which will influence-lower the installation and maintenance cost

The growth and development of new ST applications (i.e. solar buildings, solar cooling, desalination) from the entry phase to mass production will highly affect and cut down the investment cost for ST installations.

Key factors to achieve further market growth through targeted **technological deployment** is laid at the areas of:

- High efficiency solar collectors
- New thermal storage technologies
- Improved solar cooling systems
- Optimisation of solar energy usage by intelligent building control systems

Regulation

- Standards
- Legislation, directives
- CE mark (conformity)
- Certification

CEN



The **non-technological factors** to be considered in order to achieve further market growth of ST are mainly the following:

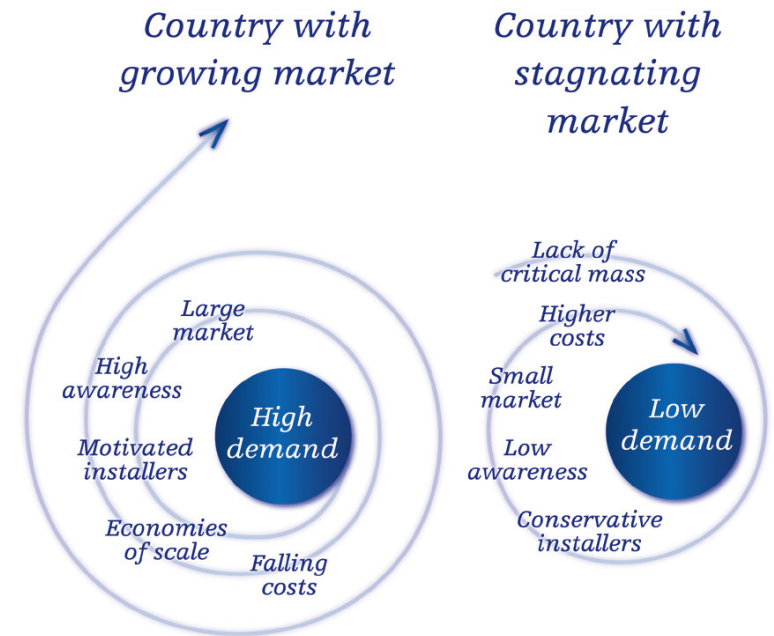
- Establish market mechanisms and fiscal incentives both for pilot projects but also for targeted end-users
- Training of installers for new type ST systems
- ST companies to act also as ESCO in order to accelerate the use of such systems, especially in the industrial sector

The knowledge transfer from the stakeholders

Coherent strategy to promote solar thermal



Self-perpetuating cycle of imbalance



Source ESTIF

The Solar Thermal Market

VISION FOR TOMORROW



For the compilation of this presentation, material was used from the referenced sources, along with reports from the CRES market development dept & solar thermal dept respectively