Germany: Results from the in-depth study “GROSOL”

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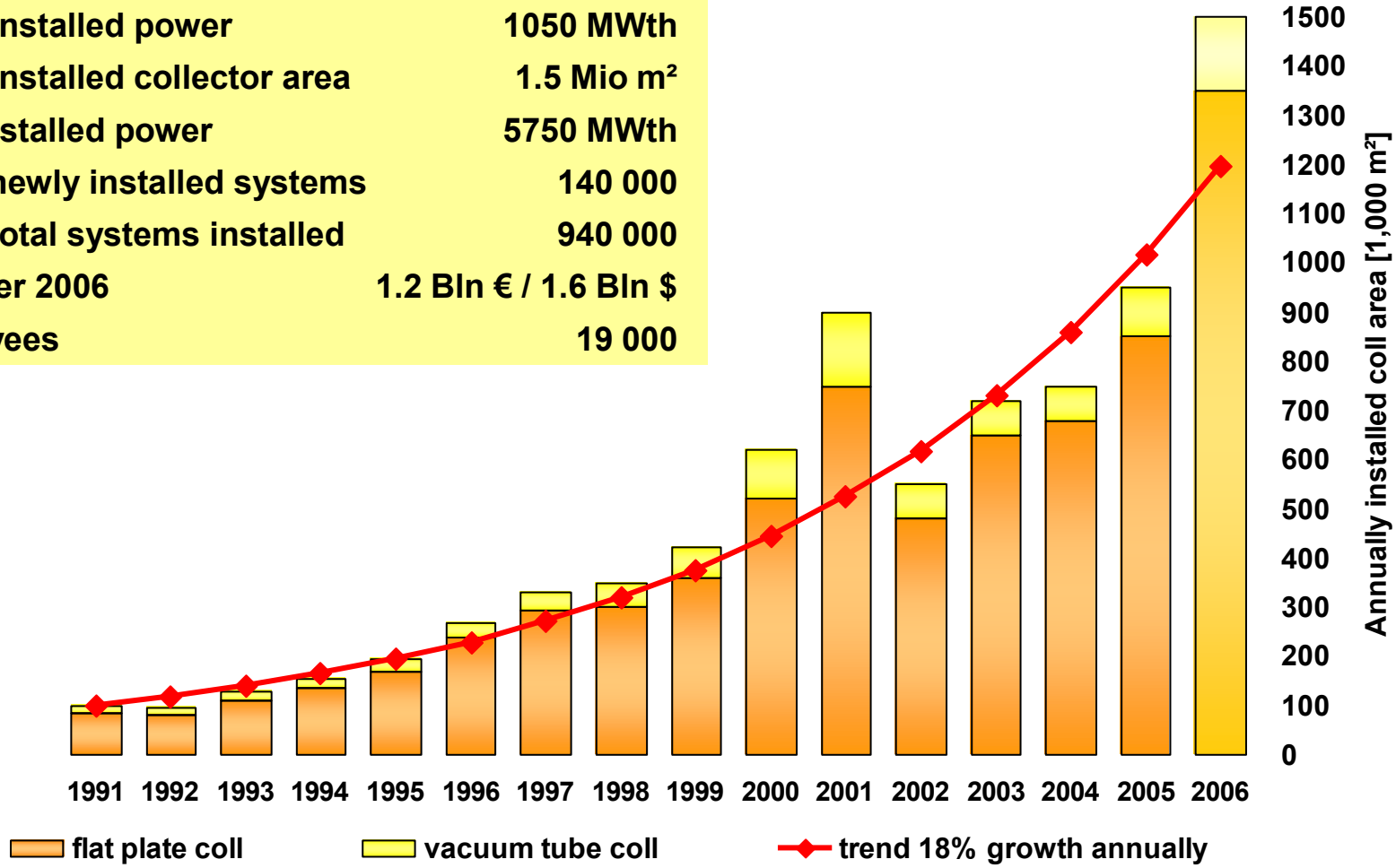
Solar Thermal Market Development in Germany

Solar Thermal Market Data 2006	
Newly installed power	1050 MWth
Newly installed collector area	1.5 Mio m²
Total installed power	5750 MWth
No. of newly installed systems	140 000
No. of total systems installed	940 000
Turnover 2006	1.2 Bln € / 1.6 Bln $
Employees	19 000



Background: The GroSol study for CSTS systems

The situation of CSTS-systems in Germany

- The **market share** of CSTS-systems is very small: **< 3%**
- Due to the research program SOLARTHERMIE 2000 and 2000 plus, there is good know-how regarding **CSTS-systems larger than 100 m²** collector area and **solar district heating with seasonal storage**
- SOLARGE and other projects improved the knowledge and the awareness about CSTS-systems but in addition they showed clearly, that **market deployment of CSTS systems is more complex as it was assumed before**

⇒ **We have to increase efforts to stimulate the CSTS market**

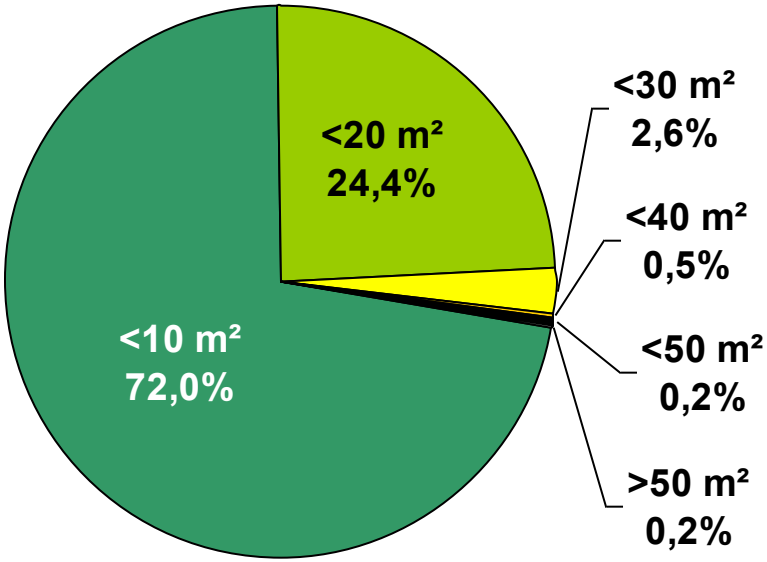
⇒ Due to the complex issue, **we have to analyze the situation in detail and then start concerted actions**

⇒ BSW-Solar with other partners developed the **GroSol study for large solar thermal systems**, which was cofinanced by the ministry for environment

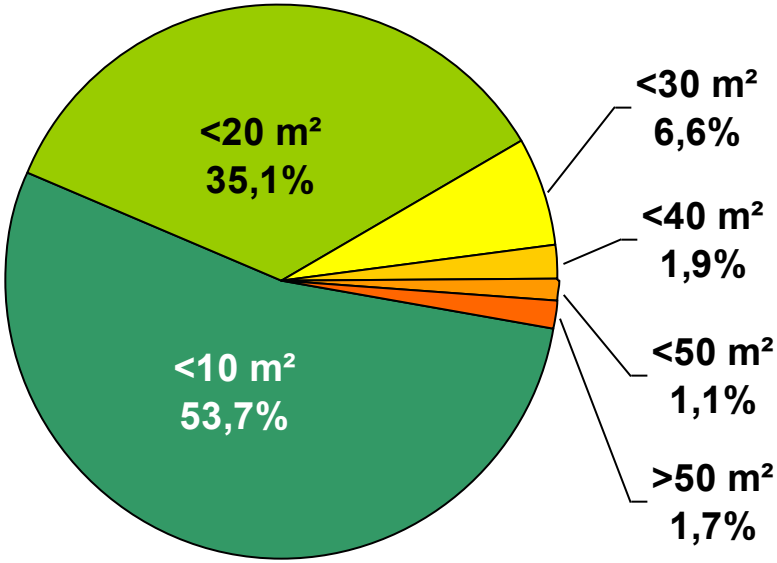
Market segments of the German Solar Thermal market?

- 96,4% of the systems and 88,8% of the collector area are systems < 20m²
- 98,4% of the systems are investments of private investors

Which share of No of ST systems is installed in which class of system size



Which share of collector area is installed in which class of system size



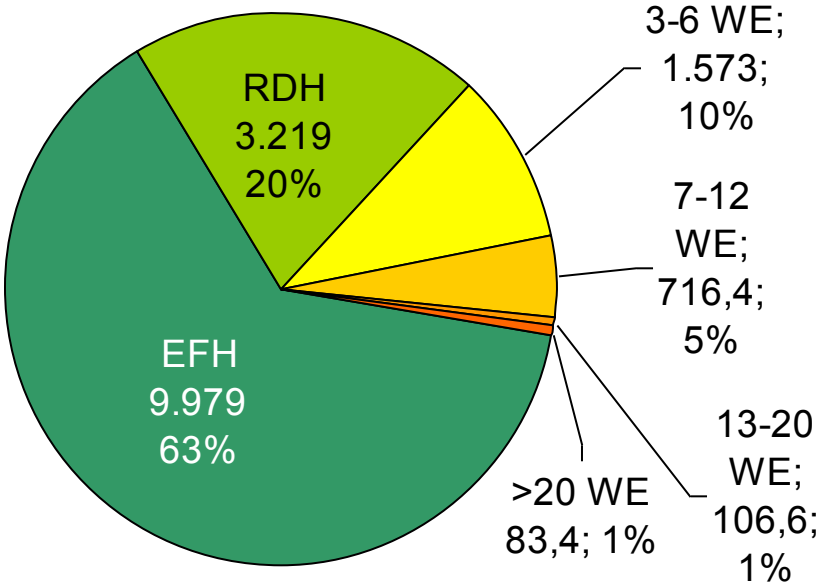
Daten: MAP-Anträge 2001-2006, Gesamtzahl: 492.446 Anlagen

Heat consumption: distribution of buildings and apartments

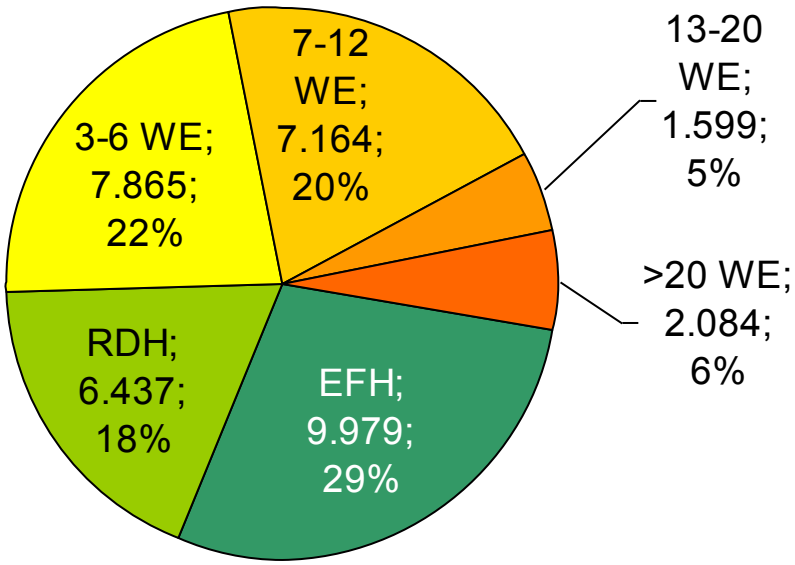
- 83% of the dwellings are for one/two-families, 17% multi family dwellings
- 47% of the apartments are in OFD/TFD, 53% in MFD

⇒ **Ca. 50% of the heat is used in multi family dwellings**

No of dwellings according class of dwelling size in 1.000



No of apartments according class of dwelling size in 1.000



Gesamt: 35,1 Mio WE in 15,7 Mio Wohngebäuden

Daten: DESTATIS

Applications for CSTS systems

- **Dwellings: Multi family dwellings**
  - **Installed (estimation): 2.500 systems with 100.000 m² collector area**
- **Hotel and restaurant industry**
- **Public buildings, hospitals, social buildings, public baths**
- **Recreation and sports buildings**
- **Agriculture**
- **Production and storerooms**
- **Laundries, car-washs**
- **Food industry**
- **Factory canteens and washrooms**
- **Production processes**

1.255 CSTS systems
with 39.484 m² collector area in place

Example electroplanting in Menden
100 m² vacuum tubes with
2x750 Liter storage

CSTS in MFD

Focus up to now: systems >100m² coll area within R&D-program Solarthermie 2000 (+)

Cohnsches Wohnviertel Hennigsdorf

Built: 1940 bis 1960

Size: MFD with 1.300 apartments

Renovation since 2000

460 apartments: connected to district heating system plus CSTS system

Investor: Hennigsdorfer Wohnungsbauges. mbH (HWB)

856 m² collector area

Programm: Solarthermie2000

Programm: Solarthermie2000

Wohngebäude Eiselstraße Gera

Renovation 02/03: Reduction of the No of floors, general renovation

Investor: Geraer Wohnungsbaugenossenschaft 'Aufbau,

Two collector areas:

73,2 m² pitched roof of penthouse and
25,3 m² within the facade

Where is the high potential for CSTS-systems

	3-6 WE	7-12 WE	13-20 WE	>20 WE
No of apartments in 1000	**7.865**	**7.164**	1.599	2.084
No of apartment buildings in 1000	1.573	716	107	83
Possible coll area*	23,6 Mio m²	21,5 Mio m²	4,8 Mio m²	6,2 Mio m²
Share of apartments	**42%**	**38%**	9%	11%

* 3m² pro WE

- 80% of the MFD-apartments are in MFD with 3-12 apartments

Highest potential for CSTS-systems:

⇒ **MFD with 3-12 WE for CSTS-systems with 15-50 m² collector area (3-8 m²/apartment)**

⇒ **Commercial systems: Hotels and restaurant industry**

High economic requirements but:

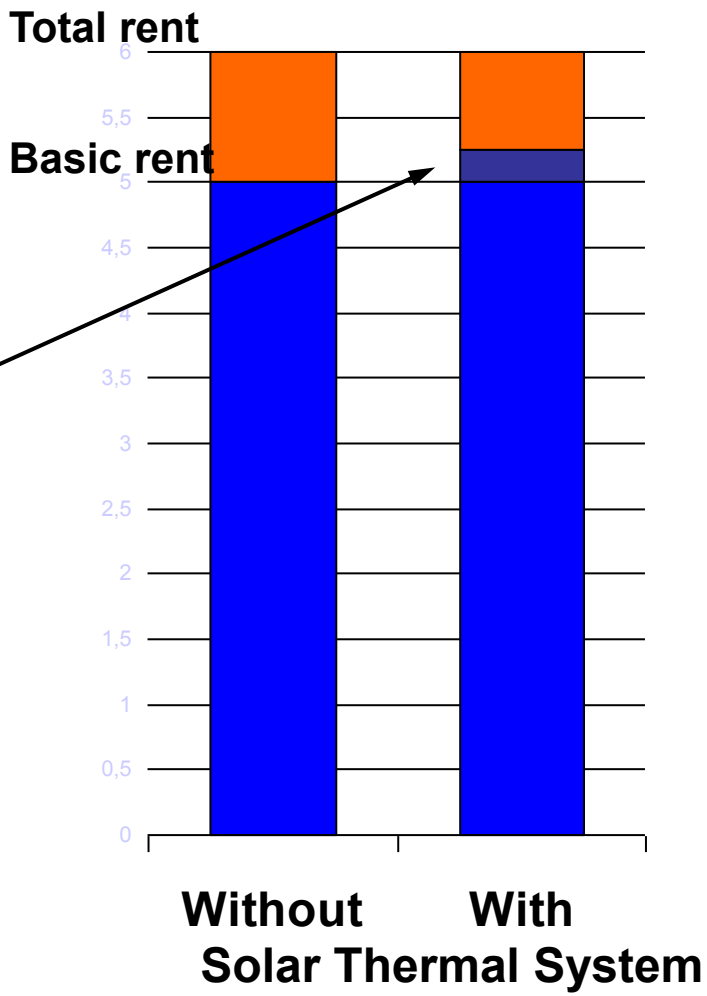
⇒ Constantly high hot water consumption in summer

⇒ Image of the project is important

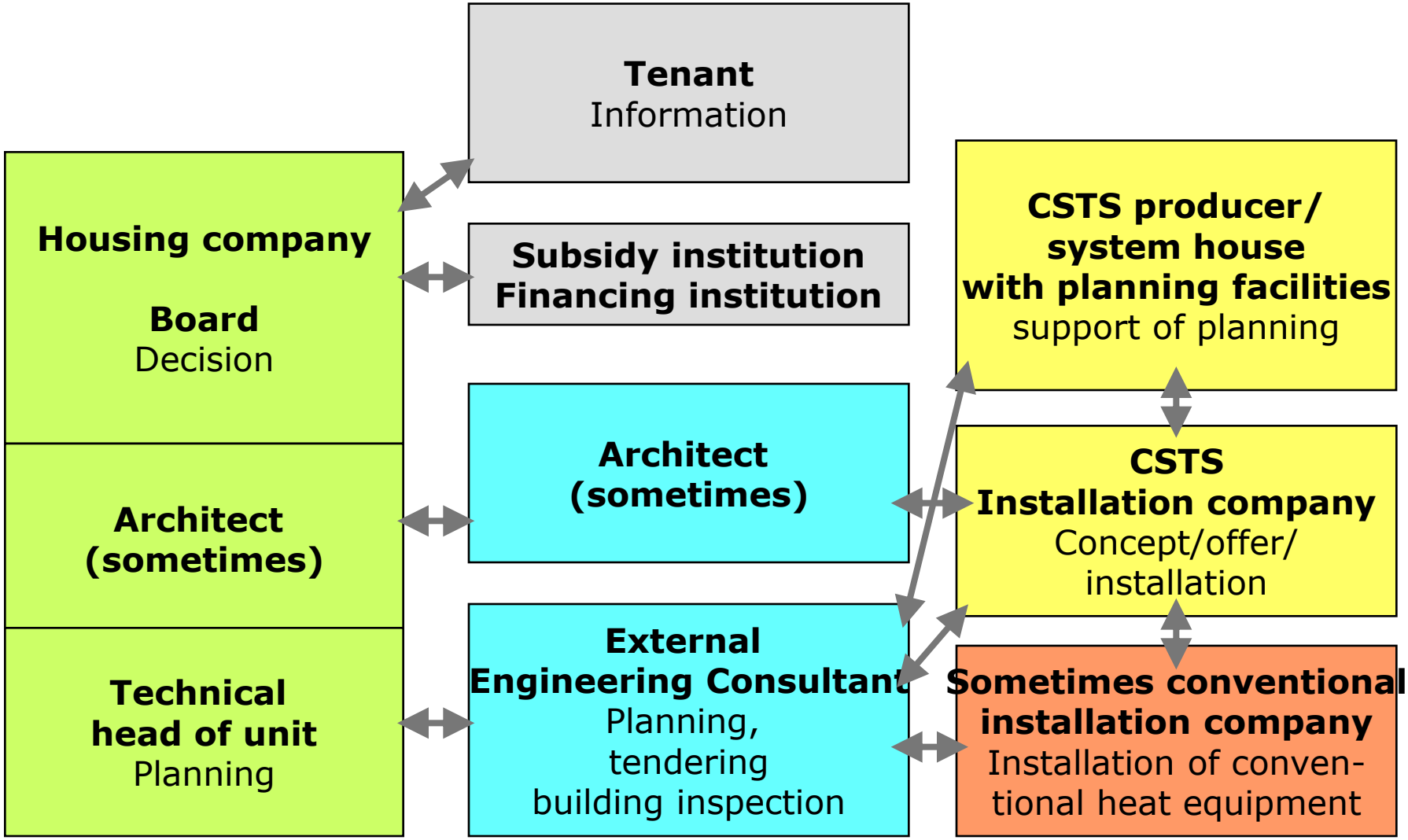
⇒ Usually easy integration of CSTS-systems in the hot water system

Main barriers with regard to rented flats in MFD

- **Investor-User-Dilemma**
  - Apartment owner invests in CSTS-systems, but the tenant benefits from the investment
    - Due to the German law, the owner can charge only true costs for the production of the heat, not the investments
  - ⇒ **Possible Solution: „Modernisierungsumlage“ (refurbishment allocation)**
    - ⇒ Idea: Higher basic rent (without heating costs) plus lower heating costs
- **Acceptance necessary**
- High **operational reliability** necessary
- **Solar yield has to fulfil expectations**
- **Absence of experience** unsettles investors, planners and installers
- **Lack of standardization** increases the risk of failures in planning and installation



Main barriers: A lot of actors are involved



Owners of residential buildings

No of apartments in Germany: 38.7 Mio (WE)		
Professional-commercial housing companies (HC) 9,8 Mio WE	Private, small renter/ amateur renter 13,8 Mio WE	Used by owners 15,1 Mio WE
Cooperative society: 2,3 Mio WE	Additional apartments in residential homes occupied by owners: 3,4 Mio WE	OFD/TFD: 12,2 Mio WE
Municipal owned HC: 2,7 Mio WE	Amateur renter: 10,4 Mio WE	Condominium in MFD: 2,9 Mio WE
Public owned HC: 2,4 Mio WE		
Private owned HC: 2,6 Mio WE		
HC owned by churches: 0,2 Mio WE		
Others: 1,6 Mio WE		Yellow: WE within MFD

Concerted actions are needed to develop CSTS-markets

Successful market CSTS deployment needs **concerted actions in parallel:**

1. **Improved framework conditions: Higher subsidies/solar obligation**
2. **CSTS awareness campaign**
   - Target oriented approach for investors, planners, professionals and privat actors
3. **Training for planners and installers**
4. **Building up networks of competence**
   - Make know-how available, improve exchange of experience
5. **Further development of the technology (standardization)**
   - Reduction of technical solutions
   - Improved monitoring
   - Quality assurance measures

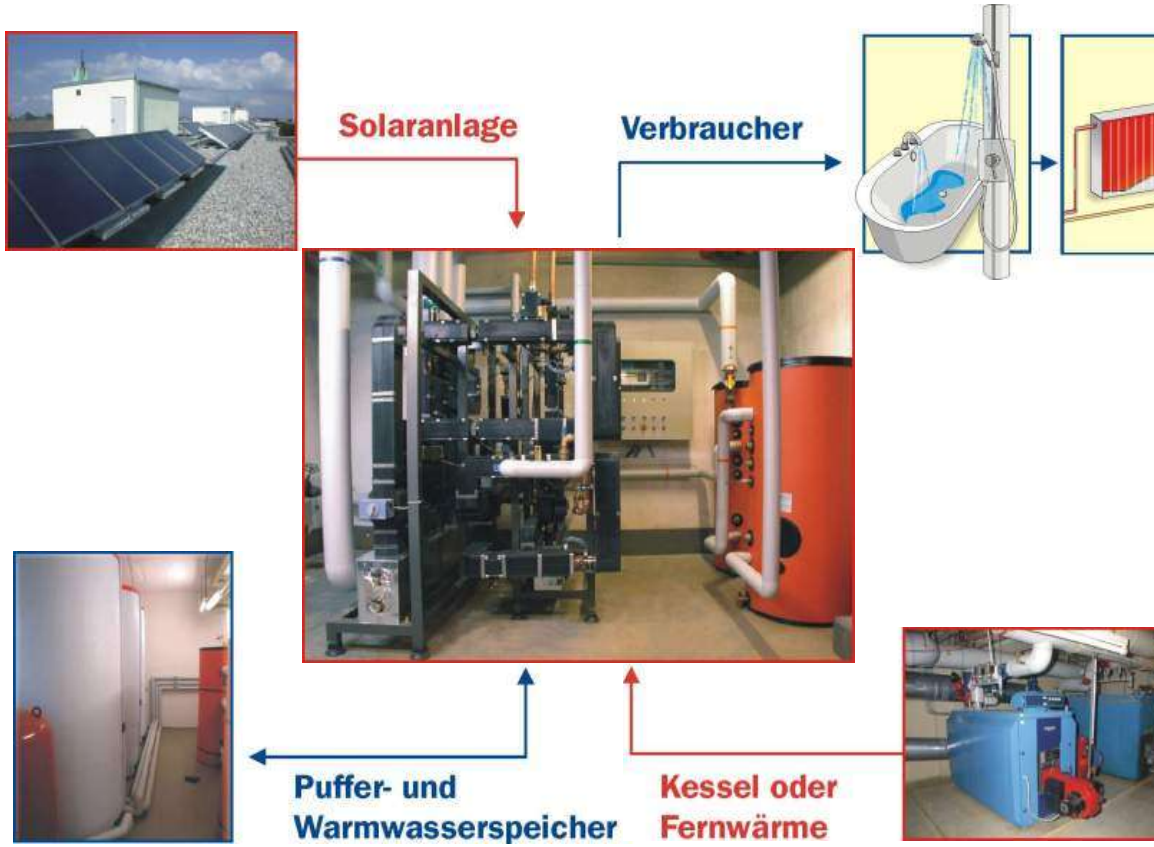
Image: Wagner & Co

Further development of the technology

- **Monitoring**
- **Standardization of concepts**
- **Use of pre-fabricated units**
- **Improved interaction of the solar with the conventional heating system**

Example solar heating centre: high efficient management of all heating flows

- High savings
- Reduction of failures in planning and installation



Conclusions

- Appr. 50% of the heat is used in MFD => RES-targets can only be reached, if the CSTS-market is developed
- In Germany less than 1% of the systems and less than 3% of the collector area is installed in CSTS-systems
- 80% of the MFB incorporate 3-12 apartments

=> Highest potential: CSTS-systems with 15-50 m^2 coll area

- The CSTS-market is very complex with a lot of barriers => concerted actions in parallel are necessary:
  1. Improved framework conditions: subsidies/obligations
  2. Awareness campaigns
  3. Training of planners and installers
  4. Building up of competence centres
  5. Further technological development

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- Sowie Olivier Drücke, Marc-O. Thiem und andere

Co-financing:

German Ministry for Environment

Bundesministerium
für Umwelt, Naturschutz
und Reaktorsicherheit

Thank you very much for your attention!

Bild: Schüco KG