



Solarthermie-2000 - R&D sugli impianti solari termici di grandi dimensioni in Germania

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Programma R&D nazionale Solarthermie-2000

Solarthermie-2000 (1993 – 2003)

- parte 1: valutazione di impianti esistenti
- parte 2: impianti per la produzione di acqua calda sanitaria con una superficie oltre 100 m²
- parte 3: teleriscaldamento solare con accumuli stagionali

Solarthermie2000plus (2004 – 2010)

Estensione a

- Impianti combinati di grandi dimensioni
- Condizionamento solare di edifici
- Impianti solari per processi industriali
- Reti di teleriscaldamento solari 100 % rinnovabili



Struttura del Programma

Realizzazione di impianti dimostrativi (contributi elevati)

Ricerca e accompagnamento tecnico-scientifico

Procedure estese di sostegno agli investitori

Risultati:

- Concetti ottimizzati
- Tecnologia
- Infrastruttura
- Mercato
- Management Skills

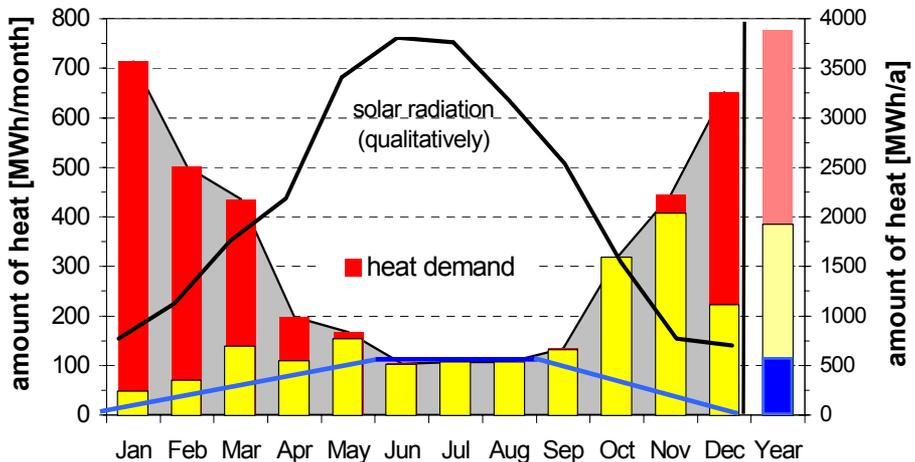
Budget: ca. 5 Mio €/a

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Heat demand and solar thermal energy usage

(system in Friedrichshafen)

Central Solar Heating Plant with Diurnal heat Storage (CSHPDS)



Central Solar Heating Plant with Seasonal Storage (CSHPSS)

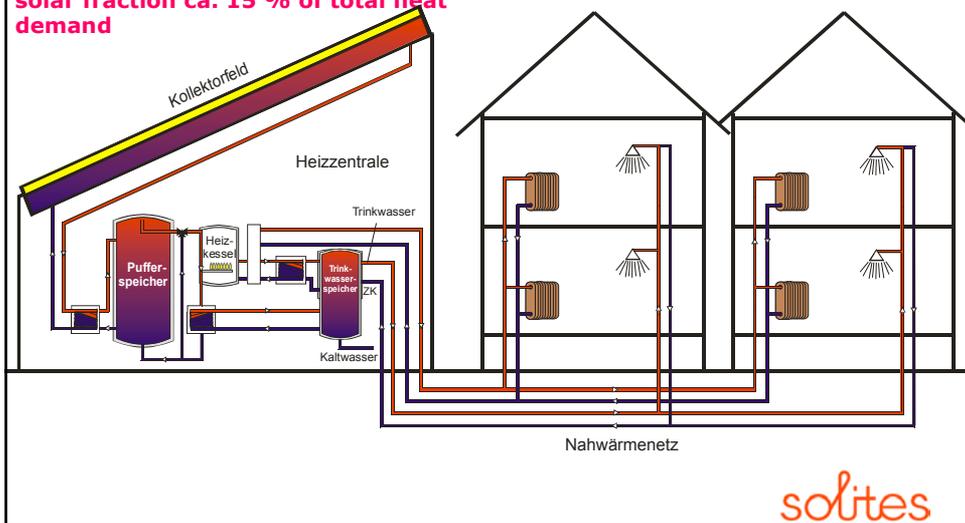
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Solar assisted block heating for domestic hot water - 1993

115 m² collector area
5 m³ buffer store +
1 m³ in domestic hot water store

solar fraction ca. 15 % of total heat
demand

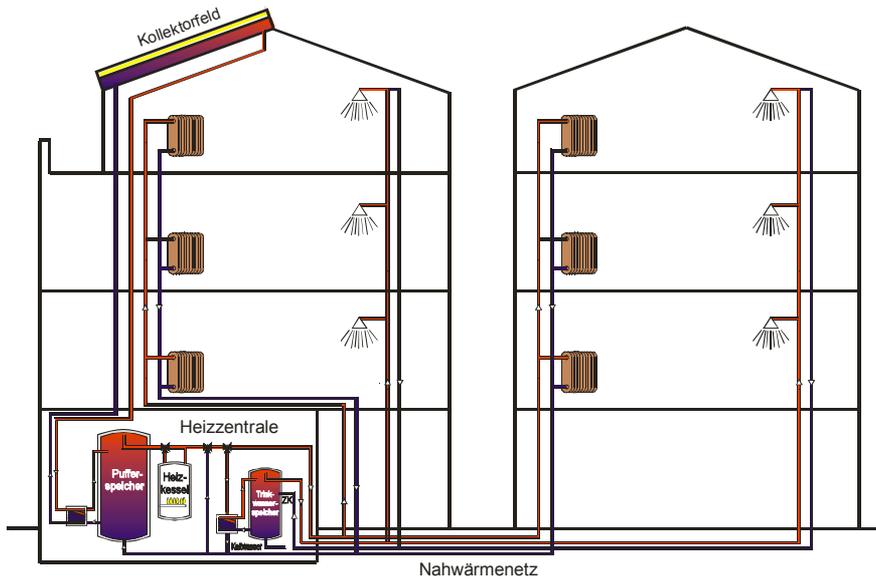
29 detached houses in
Ravensburg



Solar assisted block heating in Ravensburg



Large scale solar plant as a „Combisystem“ - 1997



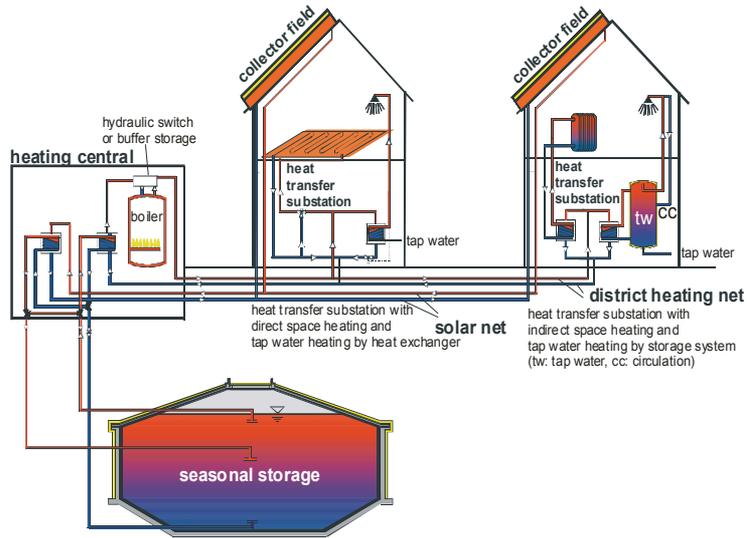
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Large scale solar plant as a „Combisystem“ in Holzgerlingen



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Central solar heating plant with seasonal storage (CSHPSS)



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R&D-projects (CSPHSS) within Solarthermie-2000

Hamburg (1996)



Friedrichshafen (1996)



Neckarsulm (1998)



Steinfurt (1999)



Rostock (1999)



Hannover (2000)



Chemnitz, 1. stage (2000) Attenkirchen (2001)



In construction

München
Crailsheim

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SNAB: Integration der Kollektorflächen

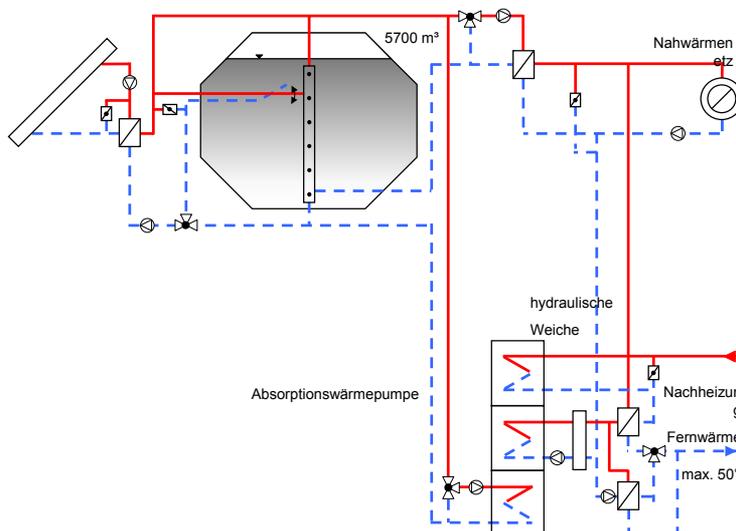


- 17.9.2004:
- 1. Preis des architektonischen Realisierungswettbewerbes:
- Götze + Hadlich, München



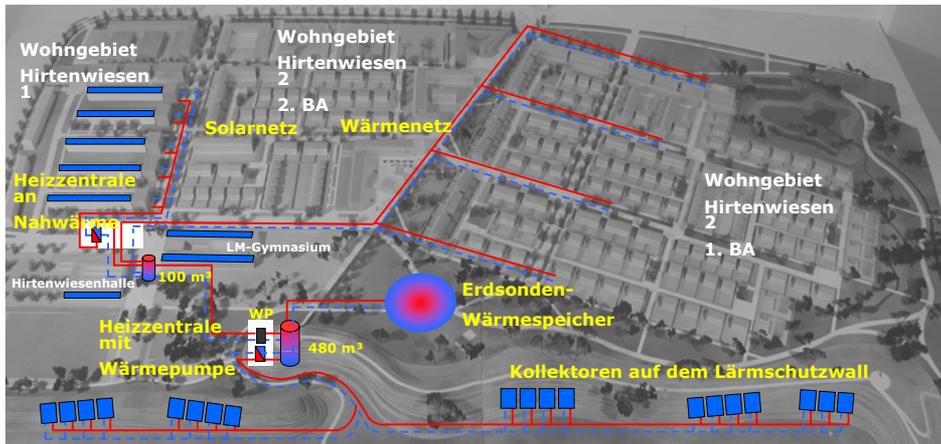
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Systemkonzept München Ackermannbogen



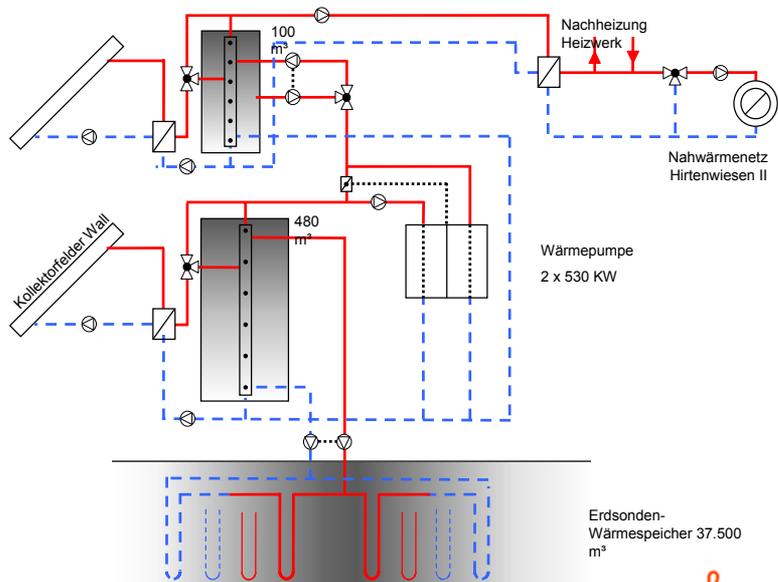
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Crailsheim: Baugebiet Hirtenwiesen 2



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Systemkonzept Crailsheim



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Crailsheim: Hirtenwiesenhalle und Gymnasium



- Sporthalle mit 200 m² Kollektoren
- Gymnasium mit 500 m² Kollektoren

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Crailsheim: Sanierung von Kasernengebäuden



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Crailsheim: Neue Bauweise für Heißwasser-Pufferspeicher aus Betonfertigteilen



- Betrieb auf 3 bar Druck und
- 108 °C Maximaltemperatur
- Innere Edelstahlauskleidung und Ratiotherm-Schicht-beladeeinrichtung

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Collectors: large, prefabricated moduls or solar-roof



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**Collector area on the noise protection wall
in Neckarsulm**



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1995: Collector installation on roof in new buildings



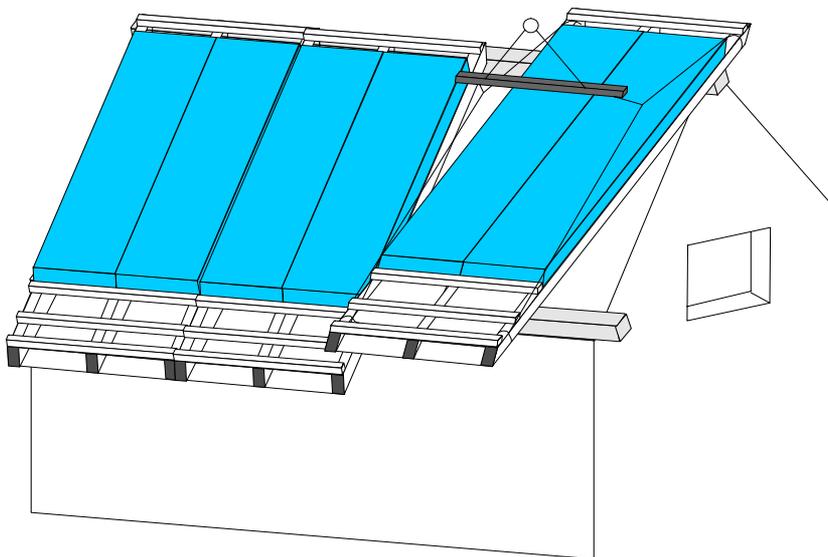
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Collectors on the sports hall in Neckarsulm



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Solar roof as turn-key installation



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Solar roof on the primary school in Neckarsulm



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Solar City in Hannover-Kronsberg



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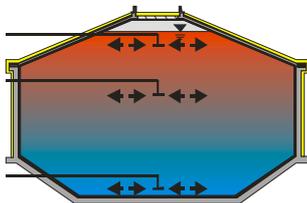
Solar roof on the building „HELIOS“ in Rostock



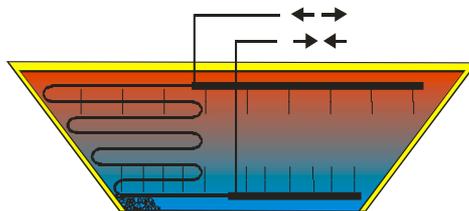
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Different seasonal heat storage technologies

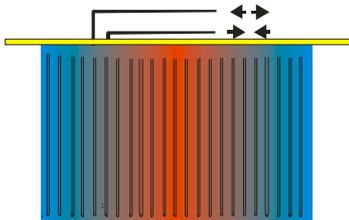
hot-water heat storage



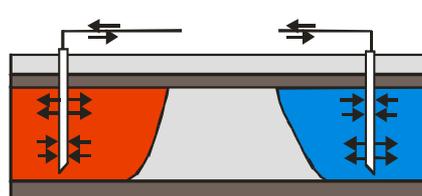
gravel-water heat storage



duct heat storage



aquifer heat storage



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Different seasonal heat storage technologies

hot-water heat storage



heat storage
in tanks

gravel-water heat storage



duct heat storage



ground
heat storage

aquifer heat storage



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Future of large scale solar heating systems - 1

To develop profitable systems

higher efficiency of the whole heating system,

cost reduction of the solar thermal system and

comprehensive project development and management are necessary.

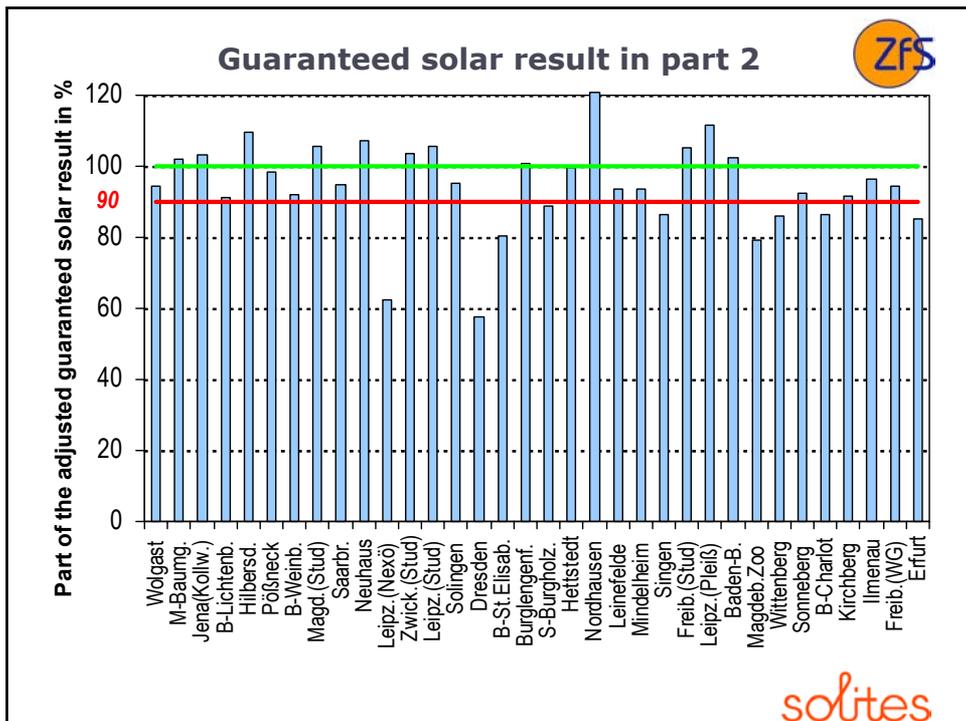
system type	solar fraction	heat cost
A. CSPHDS	15 %	0.08 - 0.15 €/kWh
New national building code includes solar thermal energy and can lead to profitability for large solar thermal systems (>100 m ²) in new buildings		
B. CSHPS	> 50 %	0.17 - 0.40 €/kWh
Aim for this decade:		0.10 - 0.15 €/kWh
(heat cost in conventional district heating systems: 0.045 - 0.06 €/kWh)		

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Future of large scale solar heating systems - 2

1. Governmental subsidies are essential.
(especially for solar retrofit)
2. As higher the solar fraction, as higher the necessary subsidies.
(European limit: 50 % of „the costs“)
3. Quality ensurance and technology transfer by
comprehensive scientific accompaniment
4. Long-term and continuous work
(start of Solarthermie-2000 in 1993,
knowledge begins to arrive in target groups after ca. 8 years)

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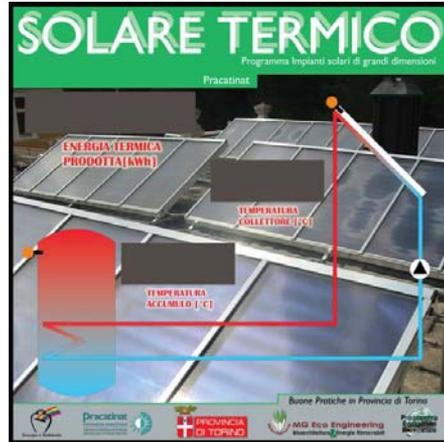
QUANDO PROGETTARE IMPIANTI SOLARI TERMICI DI GRANDE DIMENSIONE



Il programma della Provincia di Torino

AMBIENTEITALIA
Istituto di Ricerca

L'impianto solare di Pracatinat



Milano, Giovedì 9 giugno 2005



Conoscere le nuove OPPORTUNITA' delle FONTI di ENERGIA RINNOVABILI



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Campagna triennale per promuovere impianti solari termici di grandi dimensioni per edifici residenziali e alberghi

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