



06.12.2016

Distributed solar district heating: Built examples in Austria



- Introduction SOLID
- First SDH plants in Austria
- Large scale distributed SDH plants in Graz
- Outlook SDH – „BIG SOLAR“

SOLID - more than just warm water

Headquarters in Graz since 1992

Offices in D, USA & Singapore

Partners in many countries

Reference projects worldwide



District heating feed-in and
biomass heating grids



Industrial process heat



Solar heating and cooling

Scope of services of SOLID

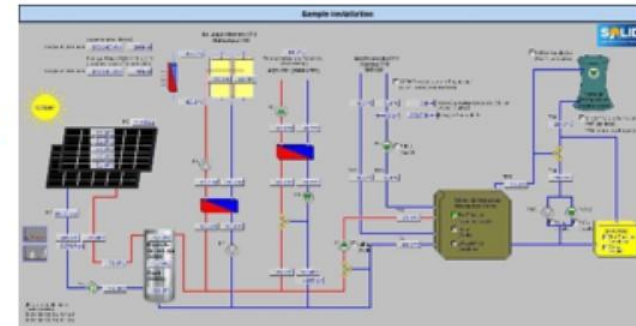
Large scale solar thermal plants (> 1000m²)

- Planning
- Plant installation
- Solar thermal collectors (manufacturer independent!)



.... And services!!

- Operations (remote monitoring, maintenance)
- Finance (national & international)
- Research & development
- Consulting



➡ SOLID is the only full service provider for solar heat and cold



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First SDH plants in Austria

- 1994 Deutsch Tschantschendorf, Austria
- 325 m² solar collectors
- 350 kW biomass boiler
- 40 m³ hot water tank
- Target: Shut down of biomass boiler during summer



First SDH plants in Austria

1995 Bildein, Südburgenland, 450 m²



First SDH plants in Austria

1995 Bildein, Südburgenland, 450 m²

1996 Urbersdorf, 360 m²



First SDH plants in Austria

1995 Bildein, Südburgenland, 450 m²

1996 Urbersdorf, 360 m²

1997 Eibiswald, 1.246 m²





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UPC Arena, Graz

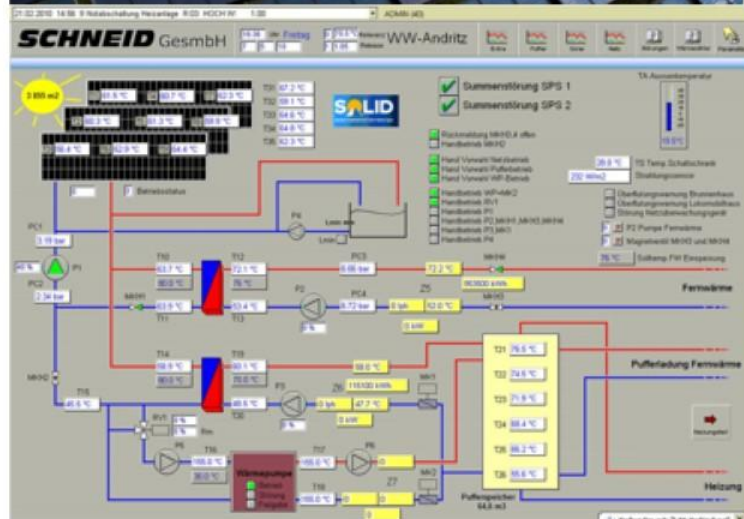
1st solar feed-in plant in Graz



- Collector array: 1.407 m²
- Commissioning: 2002
- Energy service contract
- Solar yield: ~ 500 MWh/ year

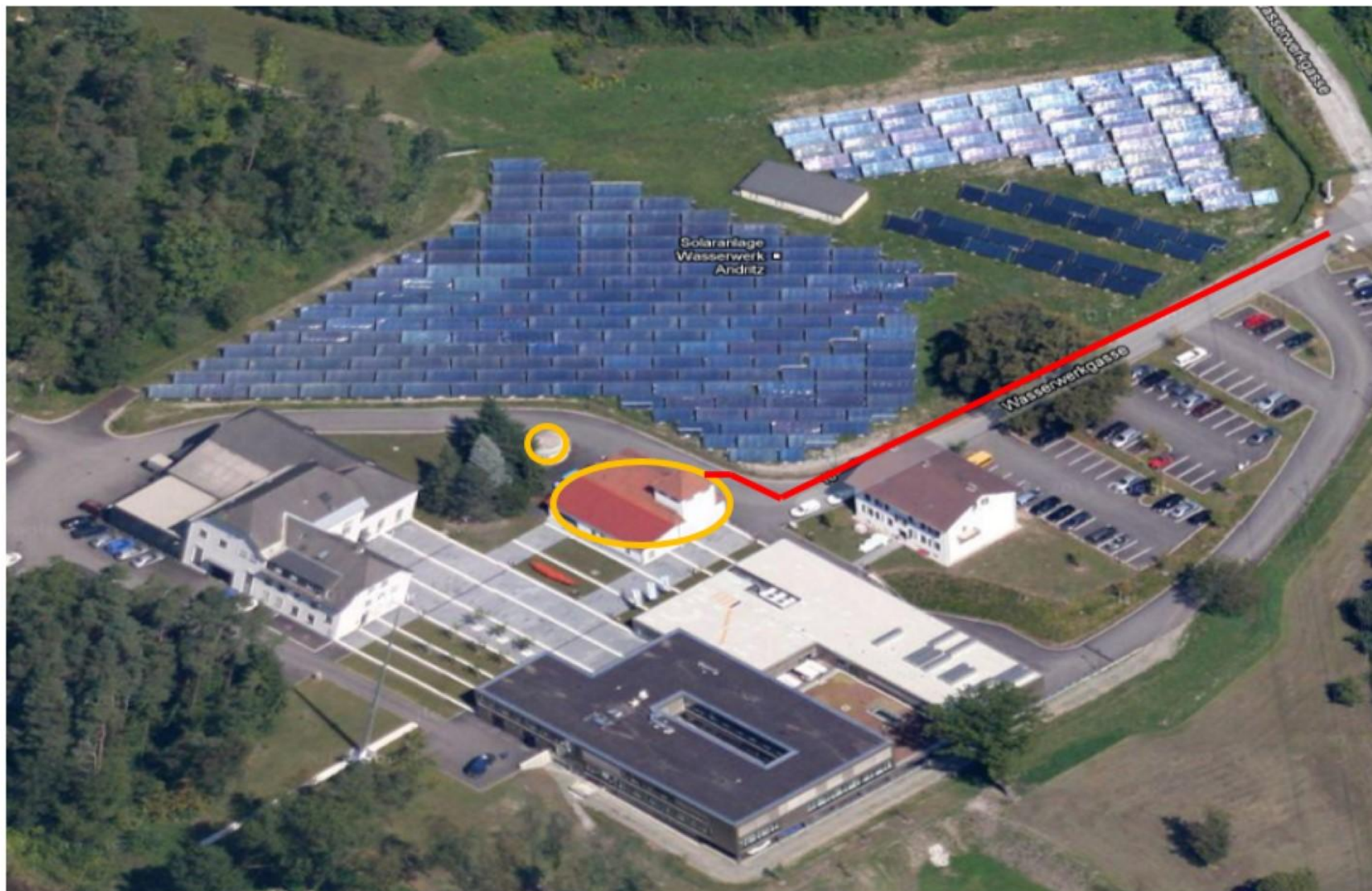
Solar energy is directly used in the grid, peak solar generation is significantly below lowest heat load in grid in summer

Combined room heating and district heating

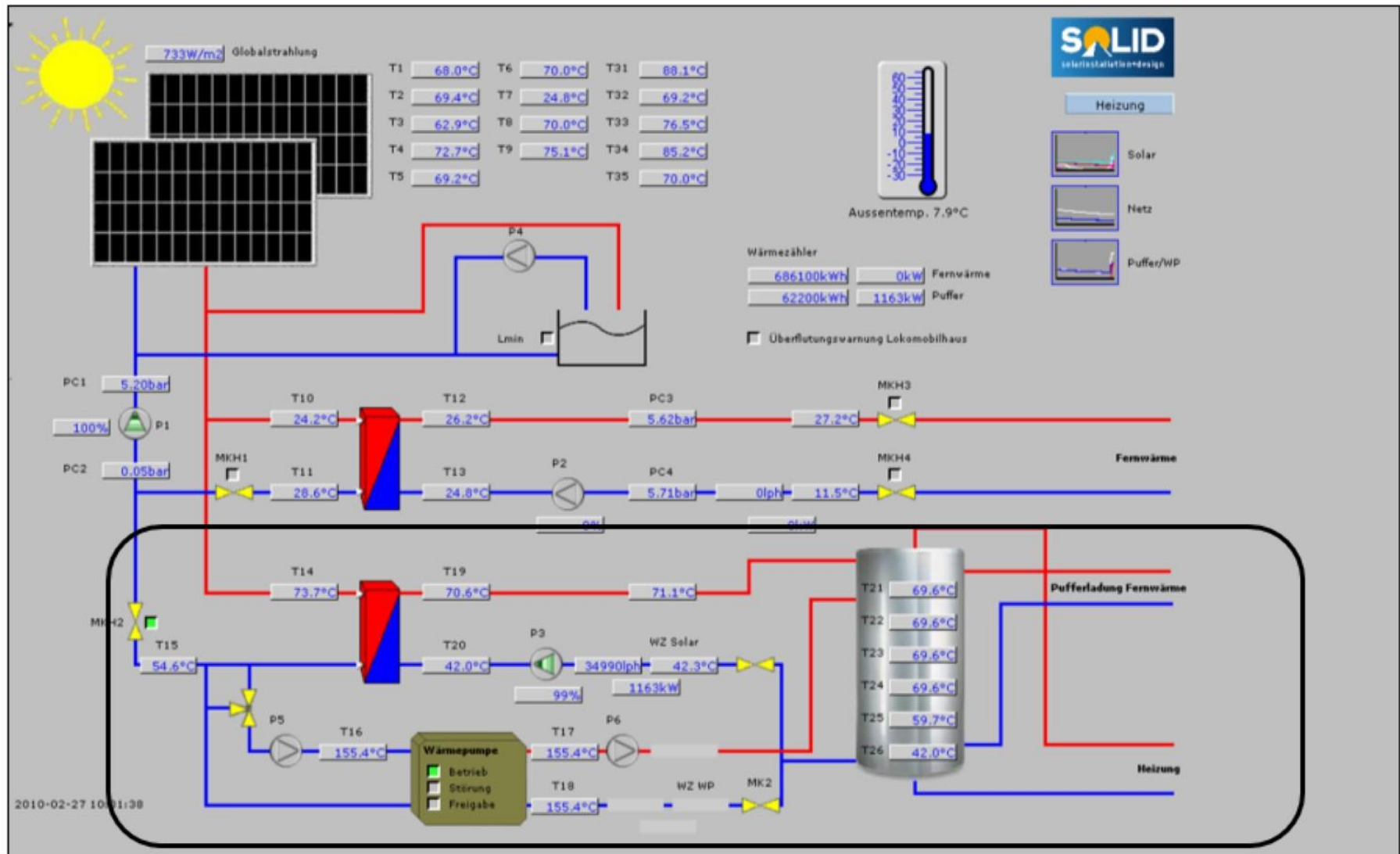


- Collector array: 3.855 m²
- Solar yield: ~ 1.660 MWh/ year
- Thermal load: approx. 2.000 kW
- Commissioning: 2010
- Energy service contract

Waterworks Andritz, Graz



Waterworks Andritz, Graz



Collector fields at Fernheizwerk Graz



Collector area:

2007: 5.000 m²

2014: 7.000 m²

2015: 7.500 m²

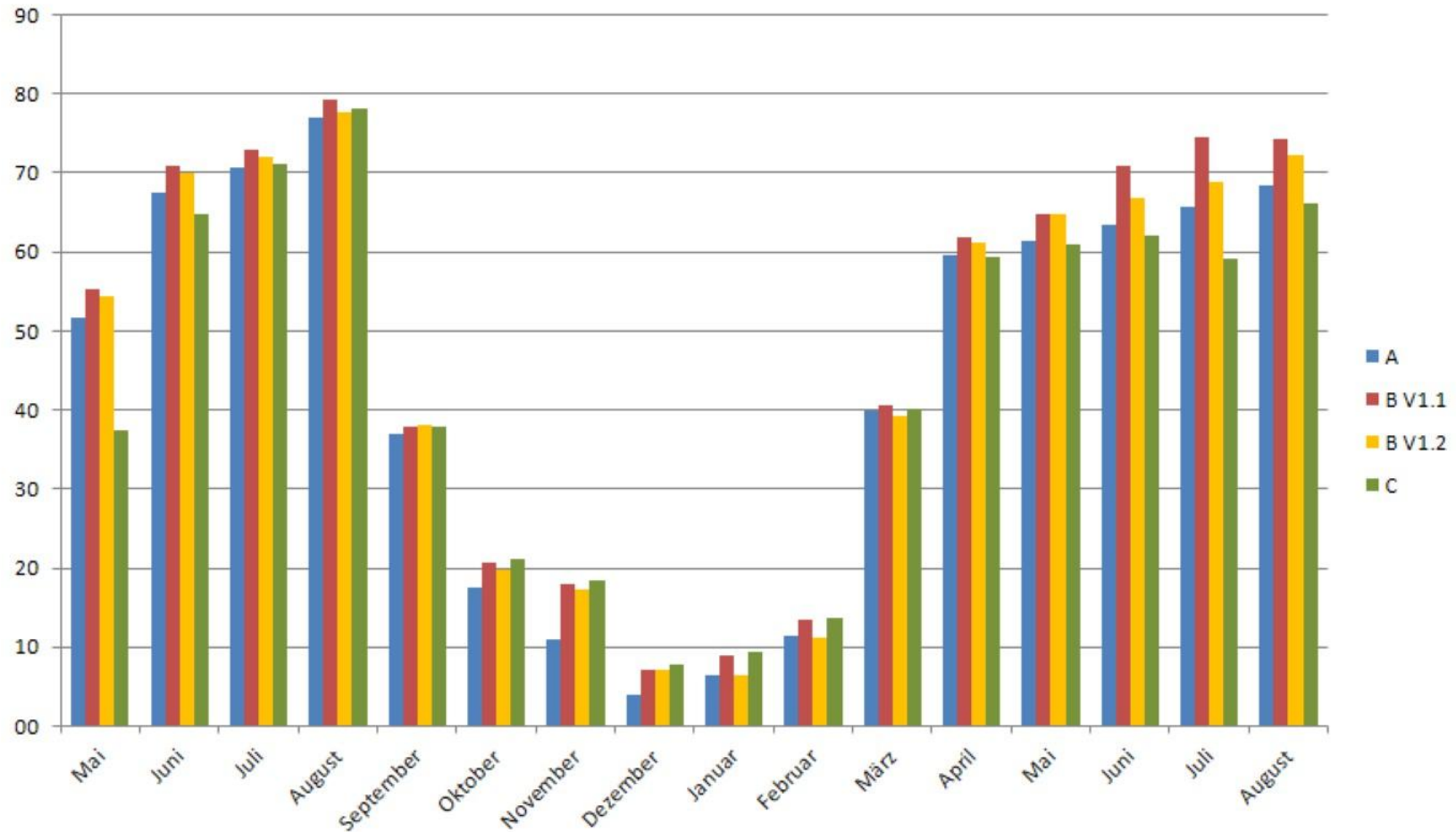
2016: 7.750 m²

Special feature:

Field test for collectors

Biggest solar thermal plant in Austria

Solar yields 2015/16



→ 470 - 500 kWh/m²a

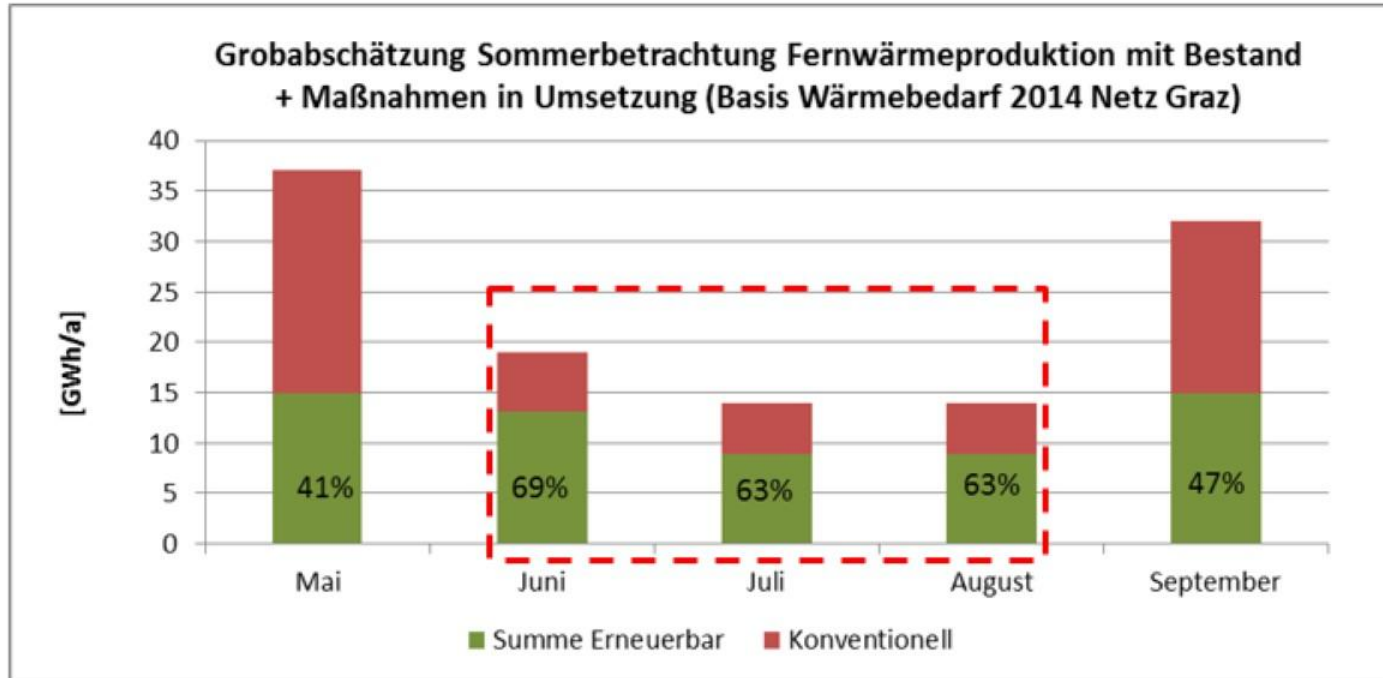
Development of flat plate collectors

Year	Project	Collector Type	Solar Yield
2002	UPC Arena	Standard flat plate	320-350 kWh/m ² a
2008	Waterworks Andritz	Advanced flat plate	400-450 kWh/m ² a
2015	Fernheizwerk/AEVG	Advanced flat plate	470-500 kWh/m ² a



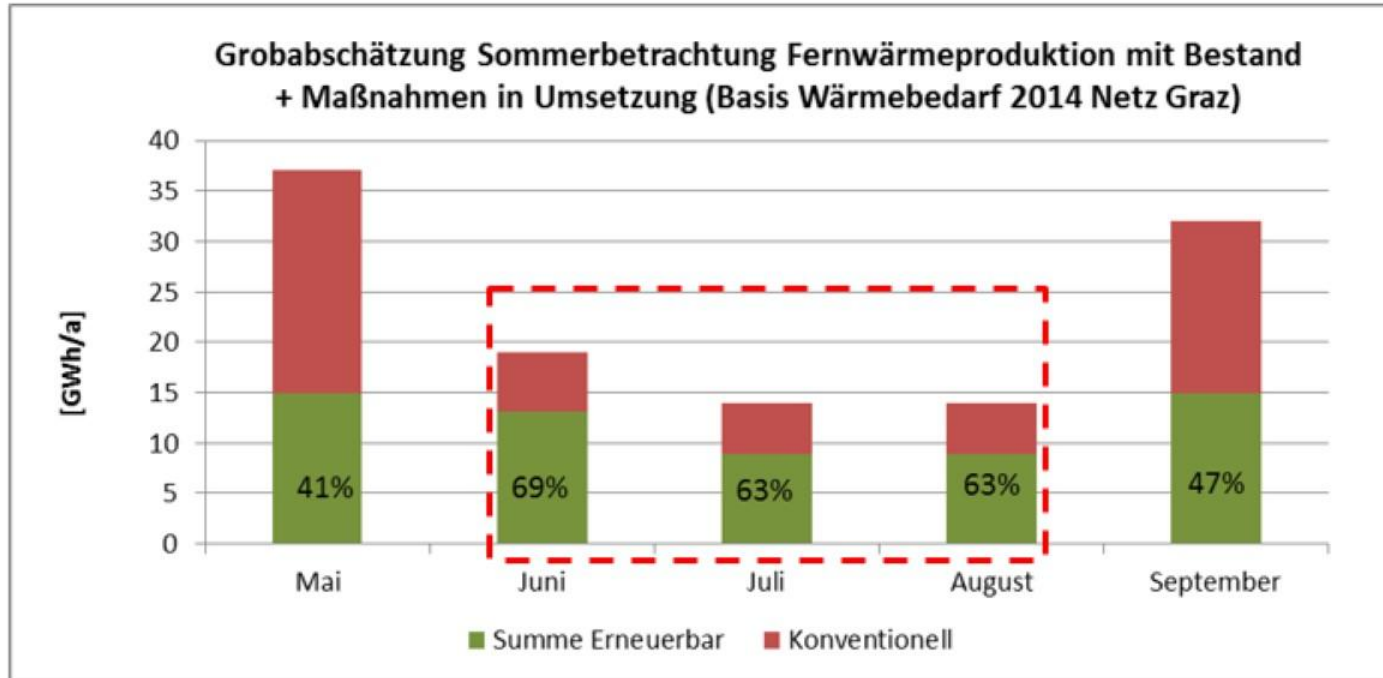
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Summer heat almost covered by RES



The summer heat is almost covered by waste heat, renewable projects & existing solar plants

Summer heat almost covered by RES



The summer heat is almost covered by waste heat, renewable projects & existing solar plants



For increasing the solar fraction, we need to use long time storage!

Key facts - BIG Solar Graz

The economically most feasible concept has shown following figures:

- Collector array: 450.000 m²
- Seasonal storage: 1.800.000 m³
- Absorption heat pump: 100 MW

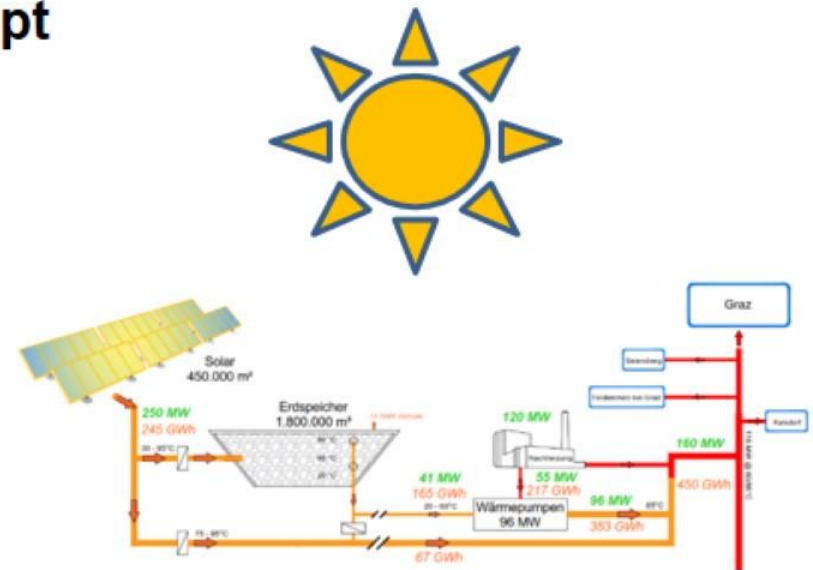
→ **Solar yield: 244 GWh/year**

→ **Solar thermal power: max. 320 MW**

Solar fraction: > 20 %

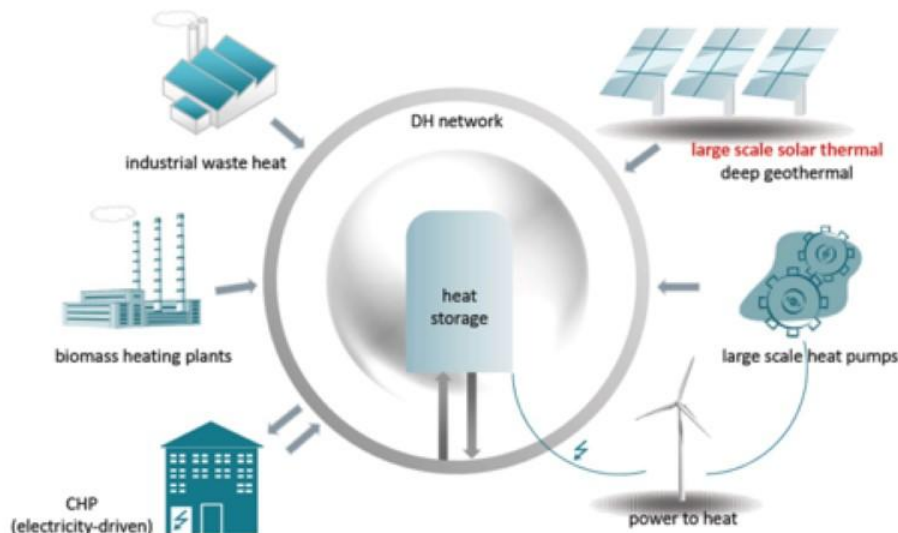
Invest: nearly 200 Mio. EUR

Heat generation cost around 35 €/MWh



Summary

- Solar district heating is already a proven technology
- In recent years collector efficiency and quality has increased
- High potential of BIG solar district heating plants in combination with seasonal storages NOW!!
- For the “Wärmewende” SDH is one crucial part of the future energy mix of renewables



Summary





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THANK YOU FOR YOUR ATTENTION