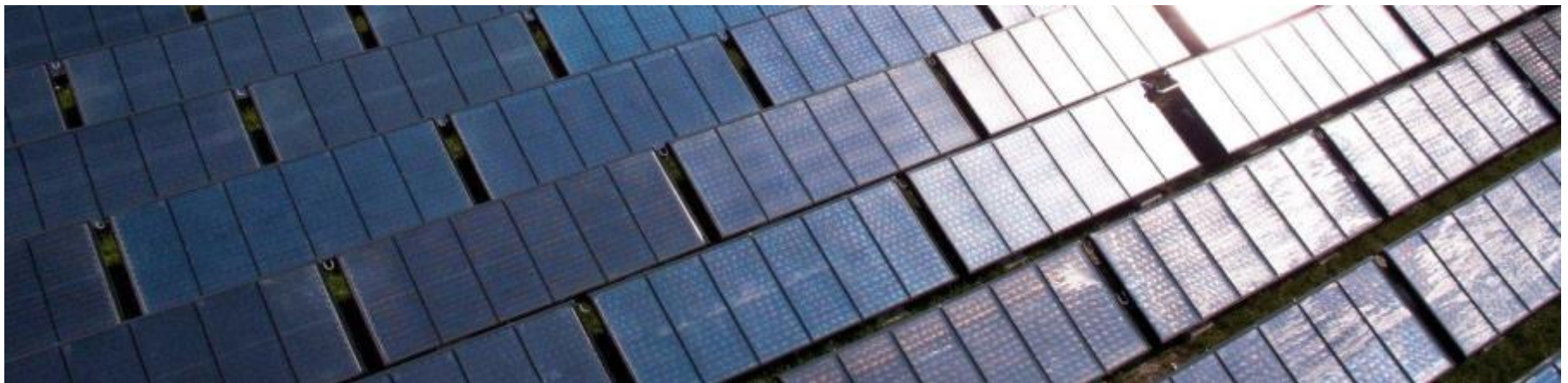


Solar Process Heat & Finance Mechanisms

Challenges & Experiences



Dr. Christian Holter
S.O.L.I.D. GmbH
16.11.2017

SOLID - more than hot water

Headquarter in Graz, Austria

Subsidiaries in Germany, USA &
Singapore

Partners in many other countries

Around 300 reference plants
around the world



Solar district heating



Solar heat for industrial processes



Solar cooling and domestic hot water

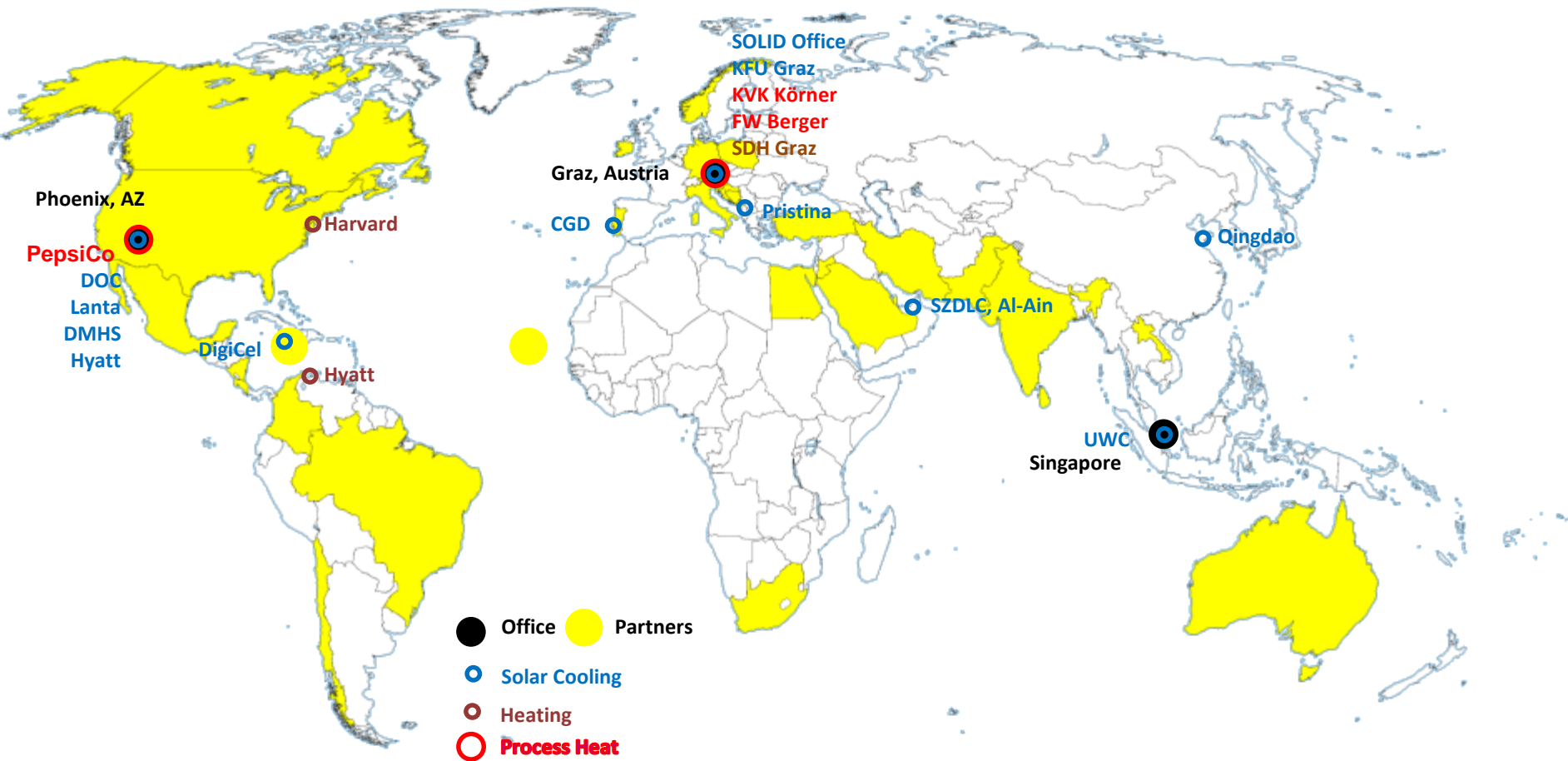
Large solar thermal systems (>500m²)

- Project Development
 - Reasonable approved concepts
 - Master engineering- system KH
 - Construction supervision
 - Operation and Maintenance
 - Project Financing (ESCo)
-
- Research & development
 - Consulting, Training



Headquarter in Graz, Austria
Subsidiaries in USA & Singapore

Partners in many other countries
Recent reference plants around the world



Overview – Selected References of SOLID

Name	Collector array, m ²	Status
Körner KVK Wies	86	In operation since 2007
Wine producer Peitler	100	In operation since 2003
Gatorade, Phase 1	893	In operation since 2008
Gatorade, Phase 2	2600	In operation since 2010
Gatorade, Phase 3	3770	In operation since 2013
Stonyfield dairy	3118	Engineering study
CB Chicken Slaughterery	1050	Engineering study
Meat factory Berger	1068	In operation since 2013
AVL List GmbH	1500	In operation since 2017

Gatorade (Pepsi Cola) Phoenix , AZ



Preheating production water for the soft drinks before the reverse osmosis plant.

Storage: 38 m³

2008: 893 m²

2010: upgrade to 2600 m²

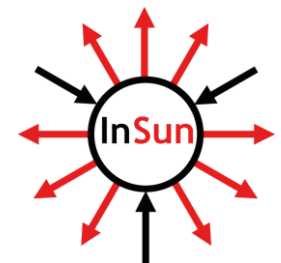
2012: upgrade to 3700 m²

Next step to integrate Solar Heat in the pasteurization in planning phase today



Meat factory Berger, Austria/Sieghartsk.

- 1067 m² HT flat-plate collectors
- Guaranteed solar yield: 400 kWh/(m²*year)
- European funded – Research and best practice demo project
- Commissioned in June 2013



- Multiple feasibilities show that ROI of 3-7 years are achievable in southern countries and 7-12 years in countries with moderate climates
- Life Cycle analyses shows great returns

Examples:

- Food & Beverage Industry
- Mining
- Hotel & Leisure Sector

BUT

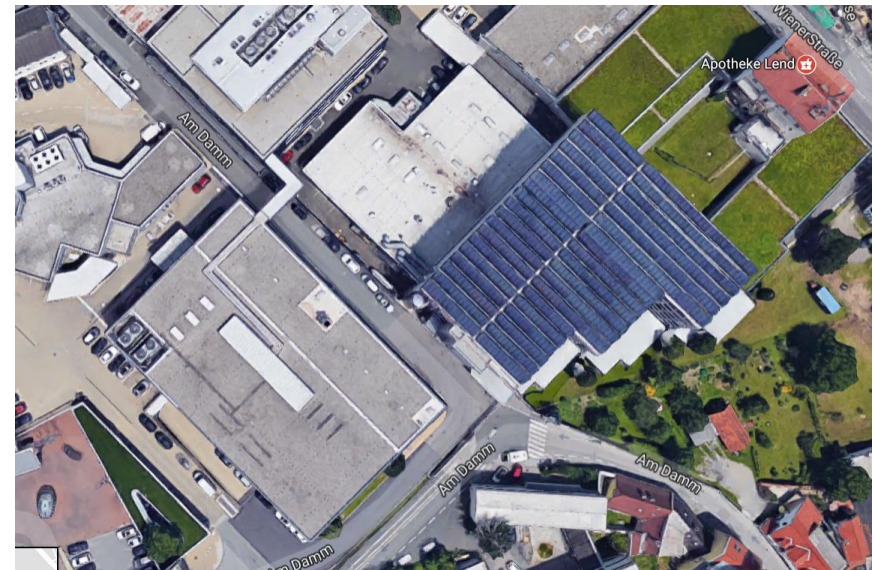
- Energy is- still- mostly a minor cost factor
- 3 years ROI is really long to competitive investments in industry
- Competition to investments in core business
 - Better buy a machine for improving commercial output than saving energy costs

ESCO

- External Financing
- Lacking trust of third parties into stability and reliability industry
 - Risk of changes in processing
 - Risk of closing facilities
- But it works under certain circumstances 😊
 - Good standing & Reliable customer
 - Specific contract set up
 - Good ROI
 -

AVL List GmbH, Austria

- Client: AVL List LLC., an Austrian company international known for development of powertrain systems.
- The 1500 m² solar thermal plant provides heat for conditioning regulators and building's heating systems
- ESCO
- Installed capacity: ~750 kW
- Expected solar yield: ~615 MWh/year
- Ca. 240t of CO₂ savings per year.
- Commissioning: 2017



Thank you for your attention!



S.O.L.I.D. Gesellschaft für Solarinstallation und Design mbH

Puchstrasse 85, 8020 Graz, Austria

CEO: Christian Holter & Franz Radovic

Tel: +43 316 292840-0

Fax: +43 316 292840-28

Email: office@solid.at

<http://www.solid.at>



<https://www.youtube.com/watch?v=QI70CRYsuY0>

Desert Mountain High School, USA

