S.O.L.I.D. Portfolio

Large Scale Solar Thermal Plants:

• Project Development
• Engineering
• Turnkey Solutions for several 1000m²
  
  Solar Cooling, Solar Process Heat and Cold, SDH, DHW
• Operation & Maintenance
• Finance (ESCo)
• Research & Development
- Exchange and extend know-how in cooperation with universities (theory) and business (practice)
- Improvements to existing products and steady development of new products
- Partner and co-ordinator in national and international funded R&D projects

Current R&D Project Topics:
- Automated solar system control
- Solar cooling applications
- SC & SH for industrial processes
- Solar District Heating
- Solar thermal in tropical climates
- Solar Energy Contracting
Flat Plate Collectors

- ökoTech
  - Manufacturing Department of S.O.L.I.D.
  - Collectors are built to order
  - Specializes in large scale thermal collectors manufacturing – up to 18m²

- Advantages
  - Higher energy output
  - Easier and faster installation
  - Less connections and pipings
SMALL Collectors vs. Large Collectors

<table>
<thead>
<tr>
<th>Type</th>
<th>2 m² - 3 m²</th>
<th>14 m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Absorber Area</td>
<td>80%</td>
<td>92% ≈ 10% more Energy Output</td>
</tr>
<tr>
<td>k-Value</td>
<td>5-8 W/m²K</td>
<td>3 W/m²K = high T = less heat losses</td>
</tr>
<tr>
<td>Media Flow</td>
<td>discontinuous Flow Rate</td>
<td>constant Flow Rate</td>
</tr>
</tbody>
</table>

⇒ up to 50% less Efficiency
• Sheik Zayed Desert Learning Center (UAE/Al Ain)

• Solar Cooling

• Commissioning 2011

• Cooling power 350 kW

• Collector area 1100 m²

• Expected Solar yield: 825 kWh/m²/year
References 2011

- UWCSEA (Singapore)
- Solar Cooling and DHW
- Operating August 2011
- Cooling power 1.5 MW
- Collector area 4000 m²
- Expected Solar yield: 580 kWh/m²/year
Main Interests Task 38 FU

- Exchange of experience with other SC constructors
- Quality and performance improvement of own installations (especially regarding climates with damp heat)
- Certification, labelling SC
- Finance (ESCo) for SC
- District Cooling – feed in tariffs
- Solutions for building integration of large collectors
- Active stakeholder training & dissemination (authorities, financiers, political agencies, funding agencies etc.)
Relevant R&D Projects

- Subtask Leader **IEA Task 45, Subtask C “Systems”**
- **SC Monitor and SolarCoolingOpt**
- **IP-Solar** [www.ip-solar.com](http://www.ip-solar.com)
  Automated failure detection and monitoring
- **High Combi** – Optimization efficiency SC; DEMO
- **BioSolEsco**
- **SDH-TakeOff**
Work Plan Inputs

• Large scale solar cooling turnkey solutions experience – best practise and system design
• ESCo – contracting experience
• Market experience especially in Asia, USA, Middle East
• Monitoring of SC, automated failure detection
• Possibility to monitor a plant for TASK 38 FU at TASK 38 monitoring specifications (level a, b, c)
• Active work in all tasks, but essentially in subtask b and c
Thank you!
IEA TASK 45
Large solar heating/cooling systems, seasonal storages, heat pumps

• **SUBTASK A**  “Solar collectors for large systems:”
  - Improve cost / performance ratio
  - Secure long life time

• **SUBTASK B**  “Seasonal storages”
  - Reduce cost of the “expensive concepts
  - Increase durability / maintenance cost / performance of the “cheap concepts”

• **SUBTASK C**  “Systems” (> 0.5MW; > 700m² collector)
  - Optimize performance of systems → analysing control strategies and the right combination of solar thermal, heat pump, seasonal storage for SDH and SDC
  - Operation strategies, minimize maintenance and operation cost
  - Financing issues and contracting
Overlapping TASK 38 FU & TASK 45

**TASK 38 Affected Objectives / Deliverables of TASK 45:**

- Provide a good basis for decision makers to decide on investment in large solar systems
- Provide state of the art of simulation tools
- Give models for ESCo services (contracting)
- Give procedures for performance guarantee - and check
- Give recommendations for monitoring and checking system output
- Give recommendations for operating strategies