Localization of CSP

Joint Saudi-German CSP Workshop
Selection of most suitable CSP technology for a given site using Techno-Economic Optimization

Structural and mechanical design
geometry, profiles, material, drives…

Structural Analysis (FEA)

Optical Analysis (Ray Tracing)

Thermo-dynamic Model
Selection of most suitable CSP technology for a given site using Techno-Economic Optimization

- **Cost Model** must be included
Selection of most suitable CSP technology for a given site using Techno-Economic Optimization

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- Figure of Merit: Electricity Cost / Internal Rate of Return

Techno-Economic analysis and optimization
Example 1/2: Parabolic trough collector: Tube or Torque box (material or labour)?

More steel, less labour

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😊 Identical copy of existing solution (originally found for different site and conditions)

😊 Site specific technology choice and adaption depending on local labour and material cost

Localization of CSP  Dr. Gerhard Weinrebe  20.11.2013
Example 1/2: Selection of optimum Absorber Tube (HCE) diameter

A. Clear Sky
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B. Hazy Sky
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- Optimum absorber tube diameter is a function of sunshape and therefore site specific

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![A. Clear Sky](image1)

![B. Hazy Sky](image2)

⇒ Suitable absorber tube diameter for site A ≠ suitable diameter site B!
Localization of CSP – A joint effort to identify and ensure best practice

- High local content is required in the Kingdom (and also elsewhere)
- In a **joint localization study** it shall be evaluated, which services and (solar field) components can be best manufactured and sourced locally today and in the future.
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- In addition, a strategy to increase local capabilities is developed on **company** and **country** level: ‘capacity building’
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- In a joint localization study it shall be evaluated, which services and (solar field) components can be best manufactured and sourced locally today and in the future, and how they have to be adapted

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- Identifying & following an adequate Localization strategy is necessary to meet the targets set in the KA CARE white paper, and to grow a sustainable CSP industry and market in the Kingdom.

- Localization has two main aspects:
  - Adaption of CSP to local conditions (adaption engineering)
  - Localization of fabrication, construction, engineering... (know-how transfer and capacity building)
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- German Companies developed the technology that has been used in the first CSP plants in Spain, Egypt, India etc.
- In the past years, the technology has been transferred to Spain:

<table>
<thead>
<tr>
<th>From the first plants in 2008 to the most recent ones</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Past situation</strong></td>
</tr>
<tr>
<td>Technology Development</td>
</tr>
<tr>
<td>Component manufacturing</td>
</tr>
<tr>
<td>Basic Engineering</td>
</tr>
<tr>
<td>Site Development</td>
</tr>
<tr>
<td>Project development</td>
</tr>
<tr>
<td>EPC</td>
</tr>
<tr>
<td>Detailed engineering</td>
</tr>
<tr>
<td>Construction</td>
</tr>
<tr>
<td>Operation and Maintenance</td>
</tr>
<tr>
<td><strong>TOTAL LOCAL CONTENT</strong></td>
</tr>
</tbody>
</table>

Source: www.protermosolar.com
Proposal: Joint Localization Study

- Contribution of Deutsche CSP
- Contribution of Saudi Team
Proposal: Joint Localization Study

- Contribution of Deutsche CSP
  - Tools & Methods such as techno-economic optimization

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  - Drawings & Specifications of typical solar field components

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  - Training in CSP specific manufacturing and services

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  - Input data for techno-economic optimization
  - Costing of typical solar field components & services
What are the expected results (1/2)?

- **Companies from the Kingdom will be** trained in costing and offering CSP components and solar fields, and therefore they will be
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**Deutsche CSP**

Deutsches Industrienetzwerk
Concentrated Solar Power

**Localization of CSP**

Dr. Gerhard Weinrebe
20.11.2013
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\[
\text{Make Saudi Companies and Institutes „Ready for CSP“: Capacity Building}
\]

\[
\text{Information on local capabilities and special requirements}
\]
Saudi (Steel) Companies - Examples
What are the expected results (2/2)?

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  - general path for the Kingdom (KA CARE)

to maximize local content
Localization of CSP
Summary and take-aways

Key Statements
- Adaption to local conditions is key to success
- Tools and know-how readily available
- Successfully been realized before (Spain, Egypt, India, …)

Our Proposal
- Joint Localization Effort

Opportunities and benefits for Saudi partners
- Ready for CSP projects in the Kingdom and elsewhere
- Competitive advantage

Why choosing German partners
- Interested in long-term partnership
- Experienced, high-quality partner