Potential of local manufacturing for wind and CSP components in Egypt
OBJECTIVE OF THE THESIS

To assess the local manufacturing capabilities in Egypt for wind and CSP components

In coordination with

Fraunhofer ISE

ENERGY RESEARCH CENTER CAIRO UNIVERSITY
METHODOLOGY OF THE THESIS

Literature Review
- Country profile
- RET Development

Required knowledge for the assessment

Evaluation of interviews
- Qualitative and Quantitative
  - Local manuf. Analysis
- Normative scenarios
  - Scenarios

Conclusion
CONTENT

- Country Profile
- Local Manufacturing Analysis
- RE Scenarios for Egypt
- Results and Findings
COUNTRY PROFILE

Status quo
- Total 24,726 MW

Projection for 2020
- Total 46,000 MW

Installed capacities by type (EEHC):
- Thermal: 79%
- Hydro: 11%
- Wind: 8%
- Private Sector BOOT (Thermal): 2%

Projected total capacities for 2020 (EEHC, NREA):
- Thermal: 74%
- Hydro: 16%
- Wind: 1%
- Solar: 4%
- Private Sector BOOT (Thermal): 1%
Based on interviews conducted
- 12 companies and one workshop

Identify
- Technical potential
- Main barriers
- Develop recommendations
LOCAL MANUFACTURING ANALYSIS

Wind Energy Technology breakdown

Wind farm breakdown in percentages vs local share

Wind farm breakdown in percentages vs potential local share

Interview outcomes
CSP Technology breakdown

CSP breakdown in percentages vs local share

- Grid connection
- Tracker, Controls, Electrical and solar equipment
- HTF System
- Pylons and foundations
- Steel construction
- Receivers
- Mirrors

CSP breakdown in percentages vs potential local share

- Grid connection
- Tracker, Controls, Electrical and solar equipment
- HTF System
- Pylons and foundations
- Steel construction
- Receivers
- Mirrors

Interview outcomes

LOCAL MANUFACTURING ANALYSIS
3 Scenarios

Boundary conditions

- Total electricity generated by RE: 180.4 TWh by 2020
- Local share in manufacturing:
  - Only additional capacities are calculated
NREA scenario

- NREA scenario

![Graph showing renewable energy scenarios from 2008 to 2020. The x-axis represents years (2008 to 2020), and the y-axis represents MW. The graph shows the growth of different energy sources over the years. The sources include Hydro, Thermal, Wind, and Solar.](image-url)
CSP scenario

- CSP scenario
RE SCENARIOS

- Hybrid scenario

[Image of a chart showing energy production scenarios for different years, with categories for Hydro, Thermal, Wind, and Solar energy.]
<table>
<thead>
<tr>
<th>Scenario</th>
<th>Wind (installed capacity MW)</th>
<th>CSP (installed capacity MW)</th>
<th>Initial investment required (bn $)</th>
<th>one-year-Jobs created</th>
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</thead>
<tbody>
<tr>
<td>NREA Scenario</td>
<td>7200</td>
<td>500</td>
<td>9.078</td>
<td>19,980</td>
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<tr>
<td>CSP Scenario</td>
<td>1000</td>
<td>3600</td>
<td>28.64</td>
<td>68,020</td>
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<tr>
<td>Hybrid Scenario</td>
<td>4100</td>
<td>2050</td>
<td>20.106</td>
<td>45,470</td>
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</table>

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Steel facilities</th>
<th>Cement facilities</th>
<th>Glass facilities</th>
<th>Fiberglass facilities</th>
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<tbody>
<tr>
<td>NREA Scenario</td>
<td></td>
<td>7</td>
<td>0.2</td>
<td></td>
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<tr>
<td>CSP Scenario</td>
<td>11.25</td>
<td>0.01</td>
<td>0.4</td>
<td></td>
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<tr>
<td>Hybrid Scenario</td>
<td>9.1</td>
<td>0.1</td>
<td>0.2</td>
<td>1.1</td>
</tr>
</tbody>
</table>

- Develop two industries
  - Increase export potential
  - Increase job market potential

Main Barriers and Obstacles for the local manufacturers

- No clear future plans for RE
- No market
- Fossil fuel subsidies
- Political instability
- Bureaucracy
- No feed in tariff
- Lack of skilled workforce
- Lack of financial support for RET
- Missing know how
- Financial problems
- No captive usage mechanism
- Lack of statistics
- Bad management of industrial areas
- No guarantees
- Customer mentality
The Egyptian Energy sector

RESULTS AND FINDINGS

Economic Environment
Political Environment
Regulatory
Financial
Technical
Government
NREA
Banks
Companies

Findings
RESULTS AND FINDINGS

Companies
NREA
Government
Regulatory
NREA
Technical
Companies

Results
RESULTS AND FINDINGS

Recommendations for regulatory side

Objective
- Define long term objective in the RE sector
- Define national industrial strategy

Laws & regulations
- Local content requirements
- Quota or Feed-in Tariff implementation
- Tax incentives

Incentives
- Continuous R&D competence
- Funds for industrial development
- Direct subsidies for RE sector
- Interaction between R&D and industry

Motivation
- Awareness raising
- Encourage JV’s
- Workers training
- Growing number of RE projects
- Promotion of RE technologies

Benefit
- Encourage export

Phasing out of fossil fuel subsidies
RESULTS AND FINDINGS

Recommendations for manufacturing side

### Objective
- Define long term objective in the RE sector
- Take initiative to enter the RE market

### Preliminary steps
- Acquire technical know how
- Foundation of JVs
- Acquisition of licenses

### Development
- Continuous focus on R&D competence
- Training of employees
- Integrate applied research
- Communicate with research institutes

### Motivation
- Invest in upgrading production lines
- Rent governmental production lines
- Improve quality standards
- Promotion of RE technologies

### Benefit
- Export
- Local market and income possibility

Phasing out of fossil fuel subsidies
SUMMARY

- Technical potential is there
- With the right set of incentives and motivation local manufacturing can be established successfully
- Requires taking initiative from both sides
- A lot of awareness raising
Will there be a step towards phasing out fossil fuel subsidies? How will this affect the RE market?

How will the political situation develop in the upcoming years? And where will RET stand?

Will there be a FiT or quota implemented in Egypt within the next years?

Will there be a local content requirement for the new RE projects?

Will Egypt be a part of the DESERTEC project? How will this change the course of development of the RE sector?
References

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- (New and Renewable Energy Authority, NREA, 2010)
- (George Sterzinger, Wind Turbine Development: Location of Manufacturing activity, 2004)
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- (Dr. A. Khalil, Dr. A.Mobarak, IMC Report, 2006)
References – Previous Studies

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  - Prof. Amin Mubarak (Professor at the Mechanical Power Engineering Department - Cairo University, Renewable Energy expert and former head of Energy and Industry Committee at the Egyptian Parliament)
  - Mr. Wolfgang Mostert (Economist and International Renewable Energy Consultant)
  - Dr. Sayed Kaseb (Associate Professor at the Mechanical Power Engineering Department - Cairo University, and Industrial expert)
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MENA Assessment of the Local Manufacturing Potential for Concentrated Solar Power (CSP) Projects, Final Report - October 2010

- Ernst & Young et al.: Alexis Gazzo, Pierre Gousseland, me Verdier
- Fraunhofer Institute for Solar Energy Systems ISE: Christoph Kost, Gabriel Morin, Maximilian Engelken, Julian Schrof, Peter Nitz, Jens Selt, Werner Platzer
- Fraunhofer Institute for Systems and Innovation Research ISI: Mario Ragwitz, Inga Boie, Dorothea Hauptstock, Wolfgang Eichhammer
THANK YOU

Questions
Load curve

Average yearly Load in 2010

Wind power

Solar power

from Storage

MW

0 5000 10000 15000 20000 25000

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24

Hours