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Support Measures in Green Sectors:
Economic and Environmental Effectiveness and Implications for Trade

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Solar technologies in North Africa: Potentials and targets of local manufacturing

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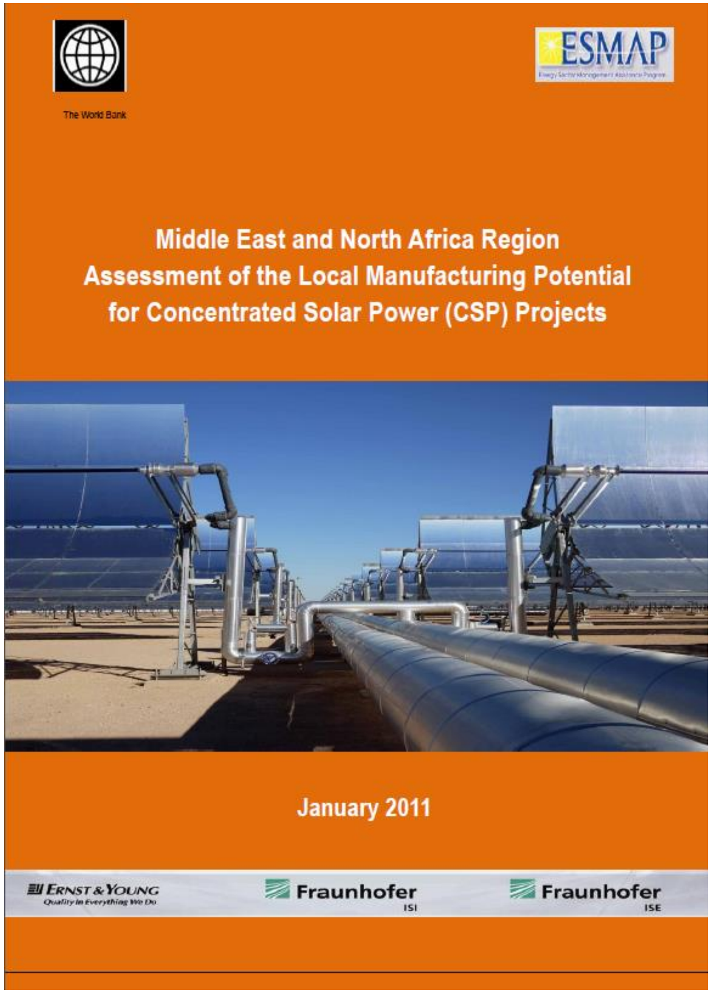
Local Manufacturing Potential of CSP projects in MENA Analysis for World Bank 2010

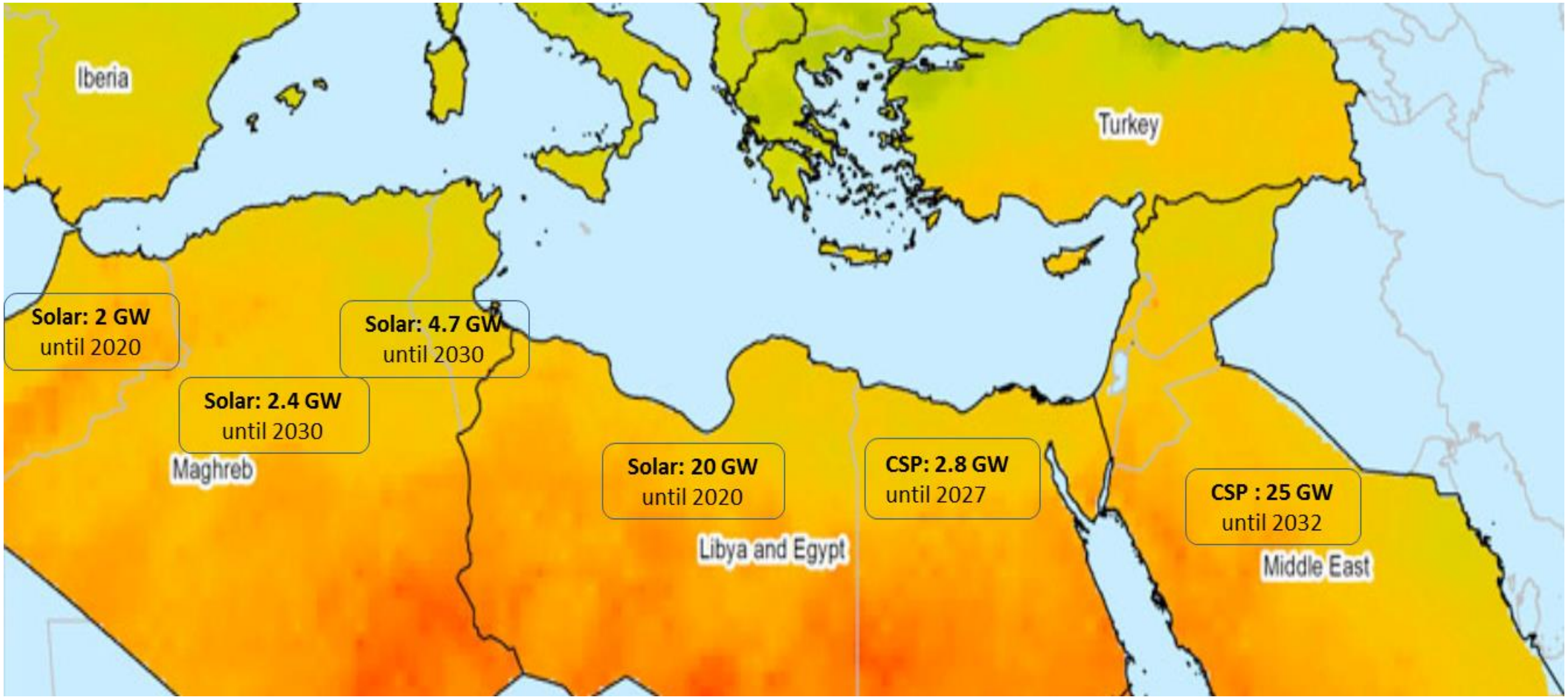
1. Results of the study

2. General findings: Local manucaturing of solar technologies in MENA



(available for download)

Solar technology targets in North Africa

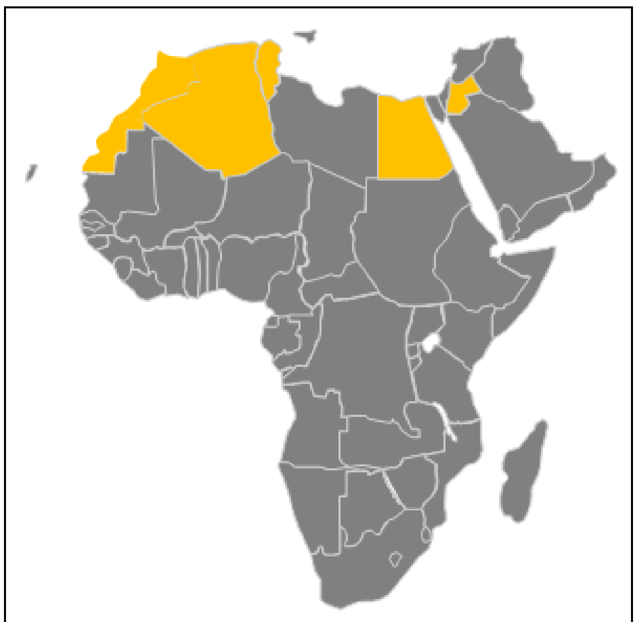


Source data: own research; underlying radiation map: (Dii and Fraunhofer ISI, 2012)

Assessment of local manufacturing of CSP in North Africa

Countries in focus of the study for the World Bank in 2010:

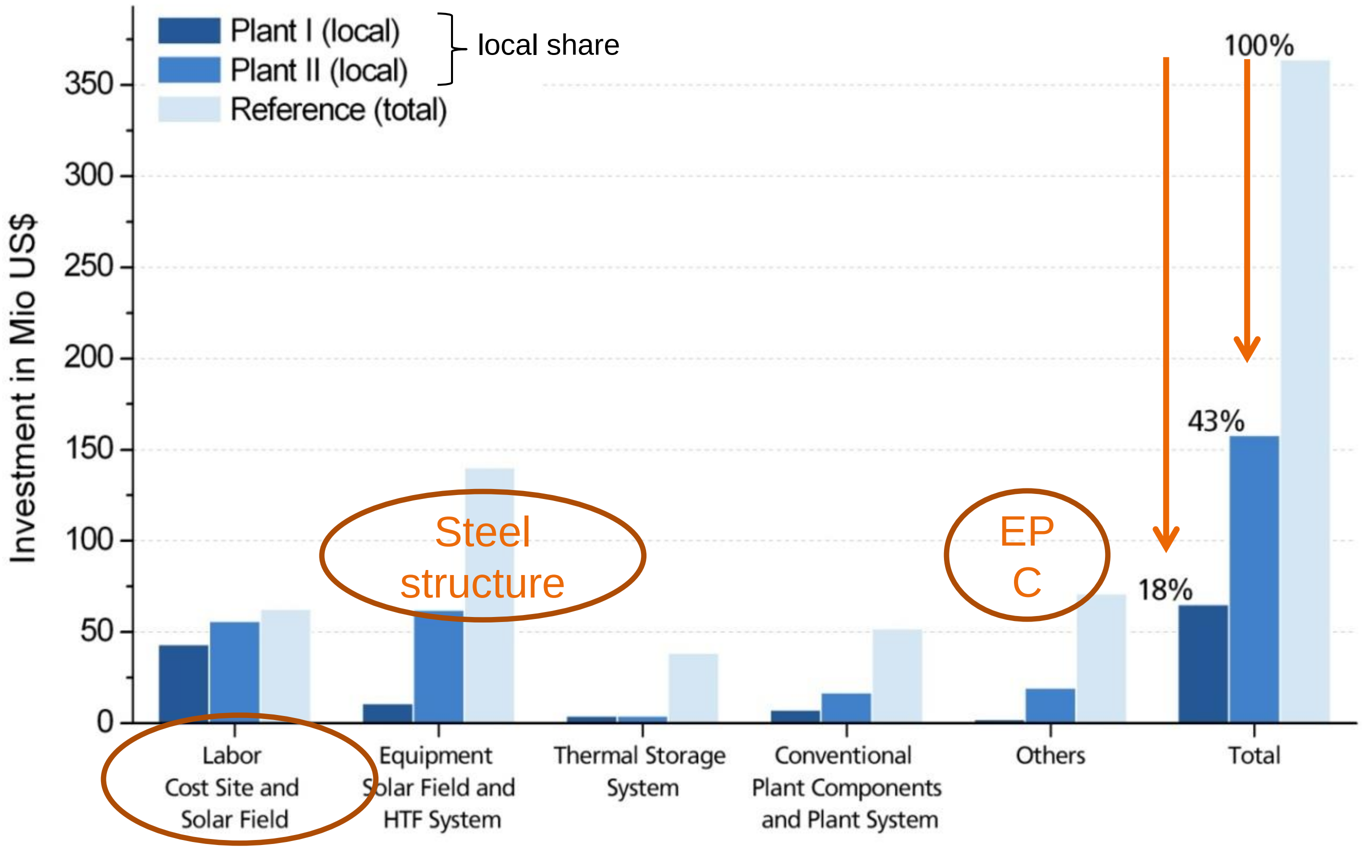
Algeria, Egypt, Jordan, Morocco, Tunisia



Main objectives of the study:

1. Provide an overview of manufacturing processes, costs and cost reduction potential for key CSP components
2. Assess the potential for a CSP manufacturing industry in the MENA region
3. Establish roadmaps and an action plan for the development of local CSP manufacturing in MENA
4. Analyze potential economic benefits of a CSP component manufacturing industry in MENA

1. Step:
Local and international participation in completed CSP projects



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2. Step:
Global CSP value chain: What are the opportunities for local companies?

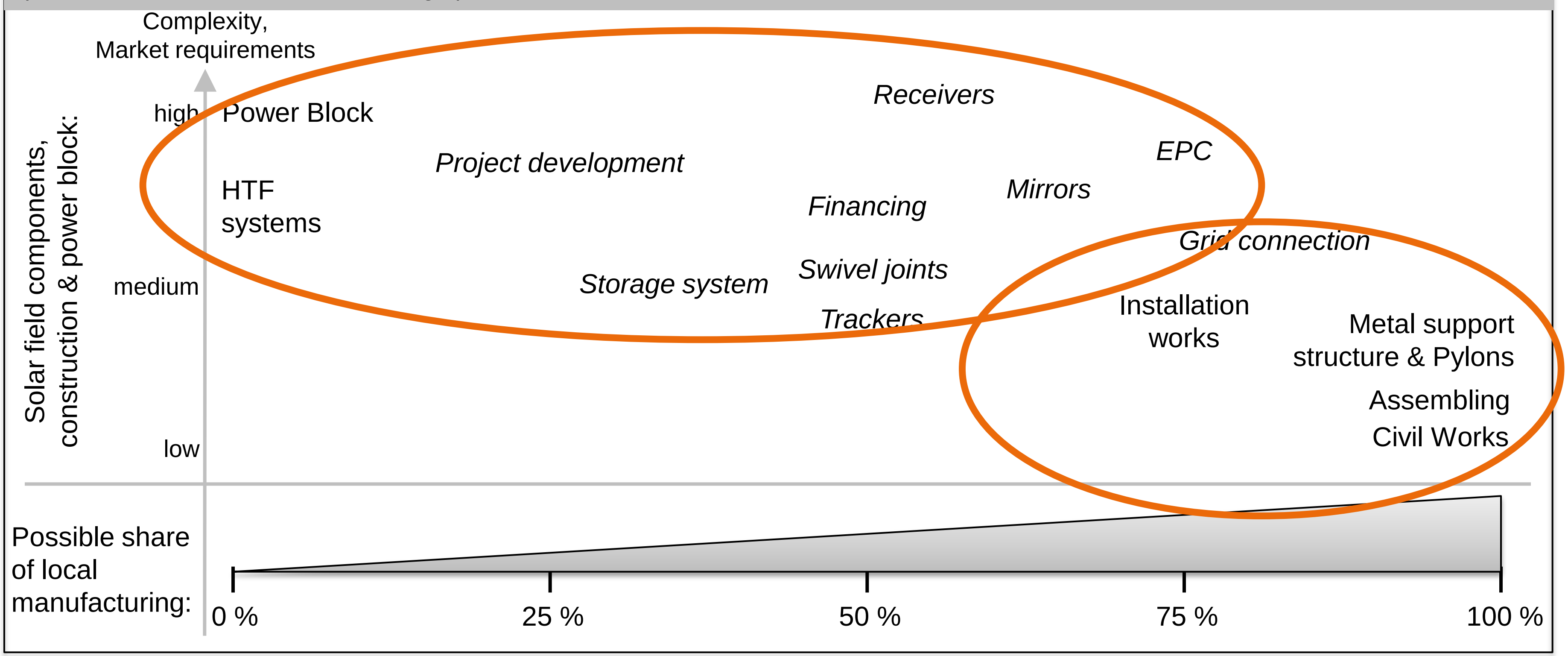
Core value chain	Project Development	Materials	Components	Plant Engineering & Construction	Operation	Distribution
Elements of the core value chain	▪ Concept Engineering ▪ Geographical Determination ▪ Determination of general requirements	▪ Concrete ▪ Steel ▪ Sand ▪ Glass ▪ Silver ▪ Copper ▪ Salt ▪ Other chemicals	▪ Mirrors ▪ Mounting Structure ▪ Receiver ▪ HTF ▪ Connection piping ▪ Steam generator / heat exchanger ▪ Pumps ▪ Storage System ▪ Power Block ▪ Grid connect.	EPC-Contractor: ▪ Detailed Engineering ▪ Procurement ▪ Construction	▪ Operation & maintenance of the plant	▪ Utility ▪ Transport & distribution of electricity
Essential partners	Finance & Ownership					
	Research & Development					
	Political Institutions					

Analysis of the CSP value-chain:

- Identification of current market players
- Review of production processes
- Cost analysis / cost reduction potential
- Complexity assessment for components

Evaluation of component manufacturing

Figure: Results of the industry survey on potential of local manufacturing
(Normal = status, italic = medium target)



Local market demand is often below typical production sizes of components

- Examples of market thresholds for investments in manufacturing facilities

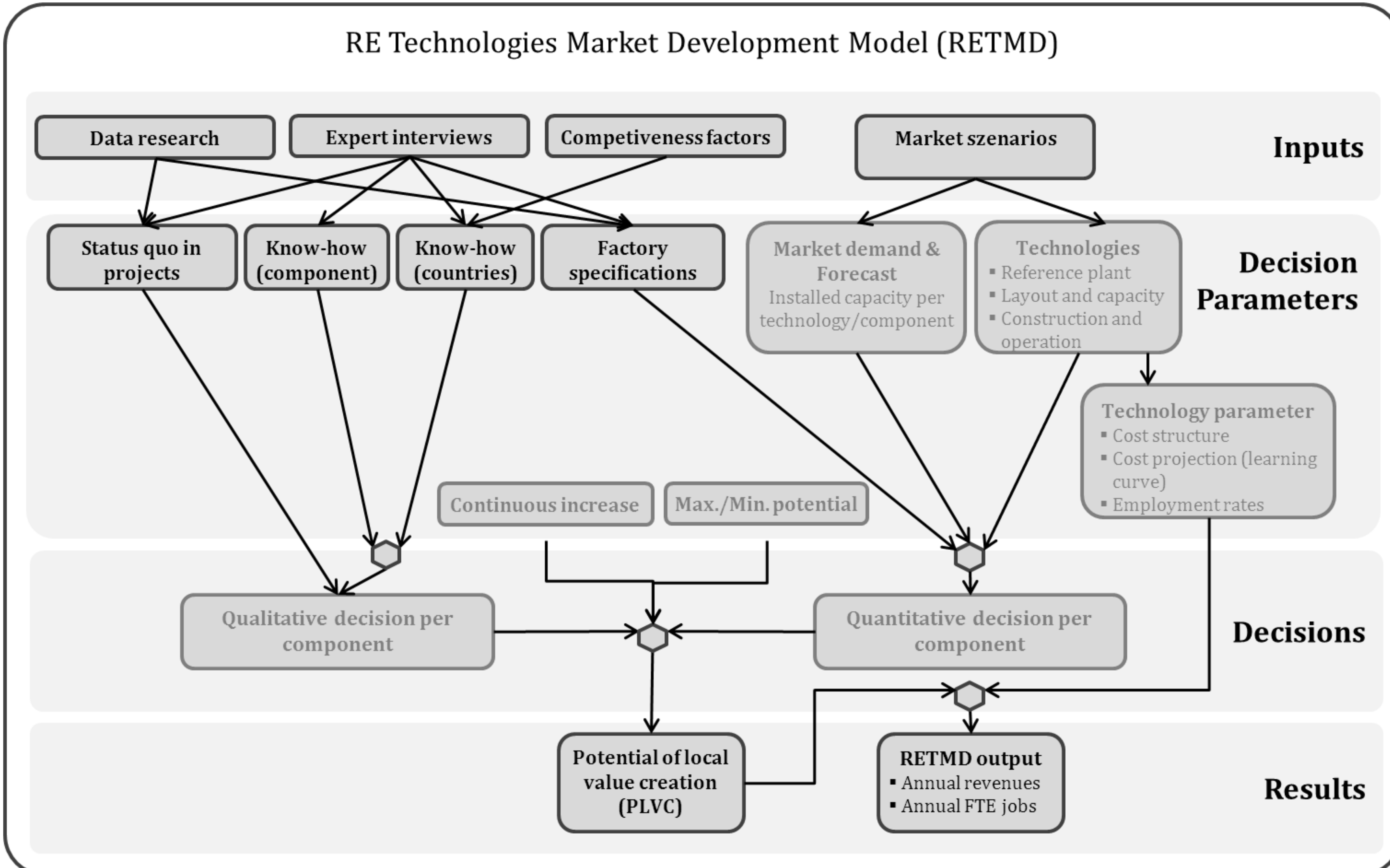
	Components of the value chain	Annual output of a typical factory (MW/year)	Investment per factory (in Mio €)	Jobs per factory (Jobs p.a.)	Specific Jobs (Jobs/MW)
Com pon ents	Receiver	200 – 400 MW p.a.	40 Mio €	140 Jobs	0.3 – 0.7
	Mirrors	200 – 600 MW p.a.	30 Mio €	300 Jobs	0.7 – 1.5
	Steel structure	50 – 200 MW p.a.	10 Mio €	70 Jobs	0.3 – 0.5
	HTF	Very high	-	-	-

3. Step: Competitive advantages and weaknesses of CSP value chain in MENA

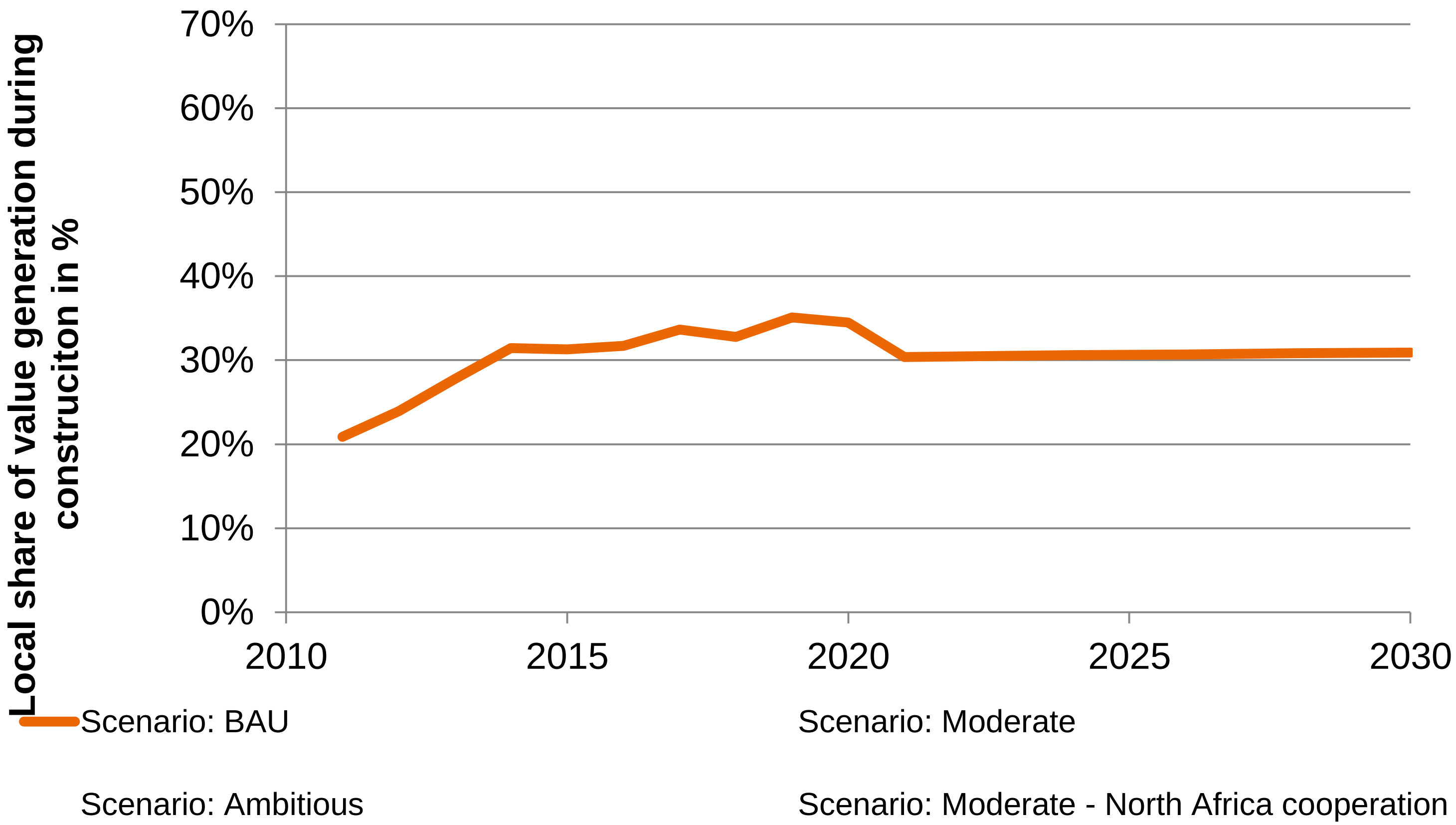
- Small market size
- Fiscal, institutional and legislative framework
- Insufficient training of workforce and availability of skilled workers
- Lack of awareness
- Market competition

- Low labor cost
- Short distance to Europe
- First experience
- Political will to develop a local RE technologies industries
- High growth in the electricity demand => new capacity required

4. Step: Calculation of local potentials and job creation



Potential local participation during construction of CSP plants



Source: C. Kost et al. (2012), Value generation of future CSP projects in North Africa

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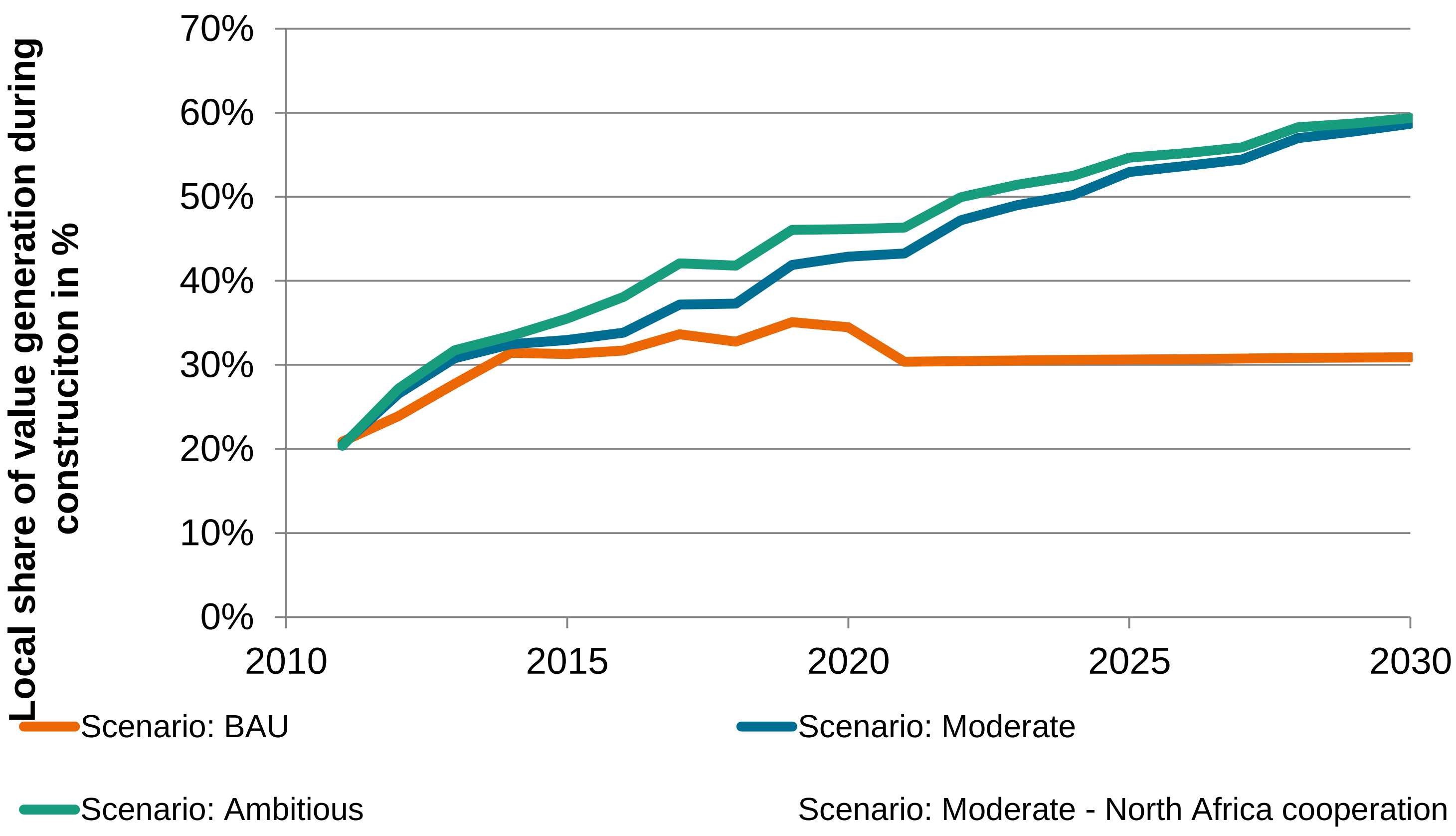
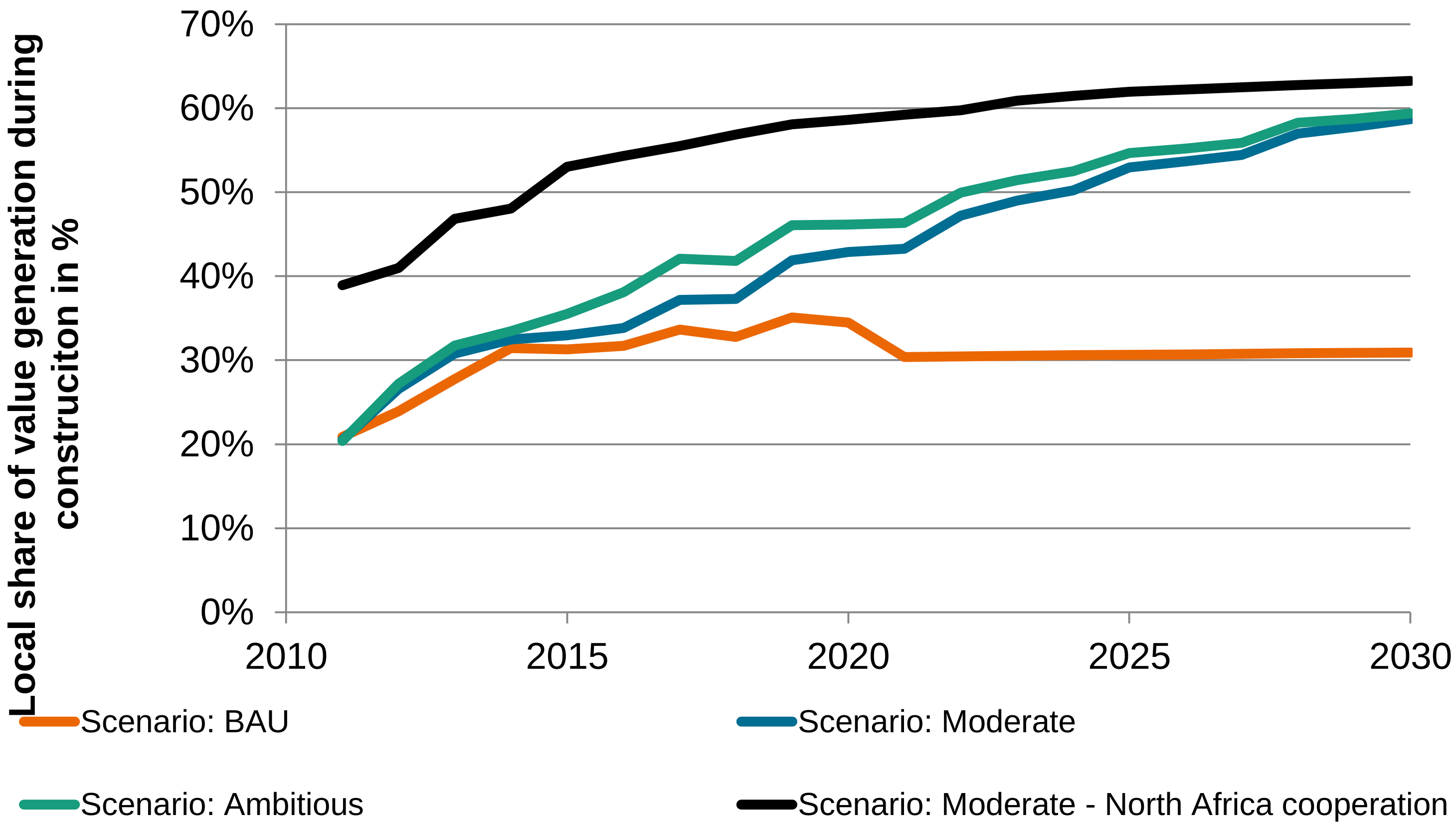
Potential local participation during construction of CSP plants



Source: C. Kost et al. (2012), Value generation of future CSP projects in North Africa

Potential local participation during construction of CSP plants



Larger market and regional integration facilitate local manufacturing

Source: C. Kost et al. (2012), Value generation of future CSP projects in North Africa

Part 2:

General discussion

Why are renewable energy technologies specific?

- Energy investments represent a high share of national infrastructure investments (limited budgets)
- Monopolistic market structure in energy markets
- Subsidies still required
- Market still in early market stage: Market depends on projects, no stable market demand
- Large power plants instead of dezentralized, small projects

Problems:

- Job creation during construction/manufacturing, not during operation
- Local demand of jobs vs limited industry capabilities/know-how
- But: Prices for high-tech goods or skilled worker relatively high
- Small R&D spendings

International influence on local markets and local industries

- Increasing competition in global RE market
- Some market distortions (over-supply, limited projects)
- Tender system supported by international donors (specific requirements)
- High technical requirements in tender systems
- Need of reference projects
- High technology standards

How to create local markets and industries in smaller countries?

- Stable markets (high important)
- Avoid stop-and-go in local markets
- Define clear project roadmaps
- Define regulatory framework
- Reduce RE project sizes
- Find niche markets, focus on certain technologies
- Regional integration: Specialization and synergies
- Avoid high requirements of local content, better: continuous industry development

Thank you very much for your attention!

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Fraunhofer-Institute for Solar Energy Systems ISE

Largest European solar energy research institute

>1200 members of staff (incl. students)

10% basic financing

90% contract research

45% industry, 45% public

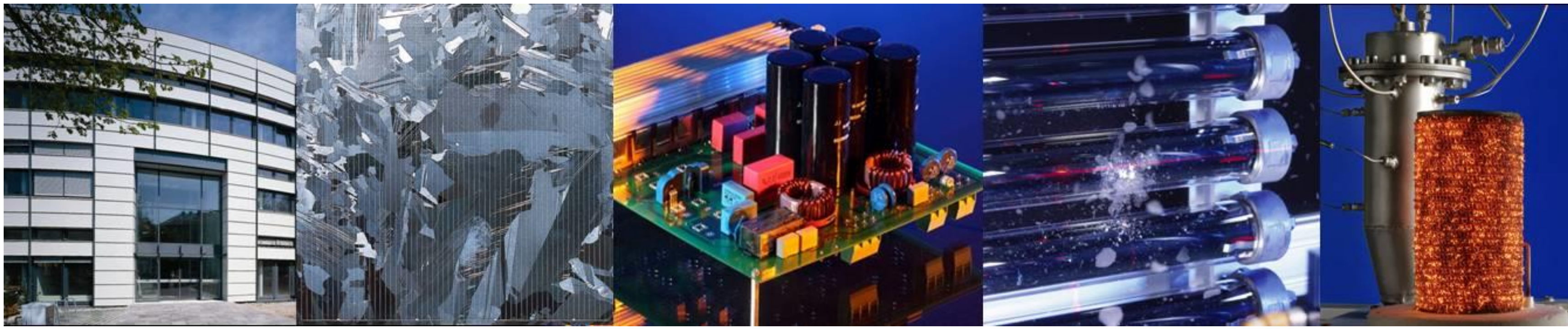
€ 73 M total budget (2011)

> 10% p.a. growth rate

Areas of business:

- Silicon Photovoltaics
- Photovoltaic Modules and Systems
- Alternative Photovoltaic Technologies Photovoltaics
- Solar Thermal Technologies
- Renewable Power Generation
- Energy-Efficient Buildings and Technical Building Components
- Applied Optics and Functional Surfaces
- Hydrogen Technology

Thank You Very Much for Your Attention!



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Download of study under press releases of ise.fraunhofer.de

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High amount of jobs during construction and installation