Identifying the Market Barriers and Drivers to Accelerating the Deployment of Solar Thermal Systems in Southern and Eastern Africa

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Global Capacity in Operation 2014

Total capacity in operation $[GW_{th}]$, $[GW_{el}]$ and energy supplied $[TWh_{th}]$, $[TWh_{el}]$, 2014

- Solar Thermal Heat: $406$ $[GW_{th}]$, $341$ $[GW_{el}]$
- Wind Power: $370$ $[GW_{th}]$, $735$ $[GW_{el}]$
- Photovoltaic: $177$ $[GW_{th}]$, $200$ $[GW_{el}]$
- Geothermal Power: $13$ $[GW_{th}]$, $74$ $[GW_{el}]$
- Solar Thermal Power: $4$ $[GW_{th}]$, $10.9$ $[GW_{el}]$
- Ocean Tidal Power: $1$ $[GW_{th}]$, $1.1$ $[GW_{el}]$

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Heat accounts for more than half of world’s total final energy consumption today.

World total final energy consumption, 2011 (322 EJ)

- Buildings: 25.9%
- Industry: 24.4%
- Other sectors: 2.8%

Source: Paolo Frankl, IEA, Paris
Heat plays important role worldwide

Note: Figure based on 2009 data
Source: Energy Technology Perspectives 2012

Source: IEA Technology Roadmap – Solar Heating & Cooling
South Africa’s Electricity Production
Reserve Margin – Electricity Production

Source: ISGAN Case Book

South Africa reserve margins

- Margin range (100% - 70% available capacity)
- Margin with Eskom target availability (80%)
- Realised margin*

Source: Wood Mackenzie (installed capacity), NERSA (peak demand), Eskom
*including data for 2015 year-to-date
Reserve Margin – Electricity Production

Source: ISGAN Case Book
The anticipated contribution from IDM interventions to the national electricity plan

IDM = Integrated Demand Management Programme launched by ESCOM 2004

Source: ISGAN Case Book
Solar Resource in Southern and Eastern Africa
Global Solar Thermal Capacity in Operation 2013

- China: 70.0%
- Europe: 11.8%
- USA / Canada: 4.7%
- Asia excl. China: 2.7%
- Latin America: 2.3%
- MENA Region: 1.6%
- Australia / NZ: 1.6%
- Sub-Saharan Africa: 0.3%
- Other countries: 5.0%
Market Growth

Market growth 2012 / 2013

- Sub-Saharan Africa: 19%
- Asia excl. China: -20%
- Australia: -9%
- Latin America: 16%
- China: -3%
- Europe: -3%
- MENA Region: 27%
- USA / Canada: -5%
- World: 2%

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Measures for a successful deployment

Coherent strategy to promote solar thermal

- Training
- R & D
- Demonstration projects
- Ambitious targets
- Awareness raising
- Financial incentives
- Regulations

Source: ESTIF
South African
1 Million Solar Water Heater Program

Up to now: Installation of 350,000 – 400,000 systems

Possible Improvements:
• Monitoring of the success (nb. of installations)
• Quality control
• Training of installers
Barriers to Implementation

Smart implementation of Solar Thermal Programs can play an important role in providing the energy needs of a country and can do so at a comparatively low cost. It furthermore presents an opportunity to create and protect employment and contribute to the environmental aspirations of the country.

Barriers to implementation

- required upfront capital investment
- long payback periods
- low levels of awareness and
- low confidence in projected energy and cost savings that will be achieved

The most critical mitigation of barriers is a policy, regulatory and funding framework that promotes and supports solar thermal implementation and creates an appropriate and stable enabling environment.

A range of funding models, effective pricing structures and levels, channels to market and technology options assist to make incentives accessible to more consumers.

Effective communication is another critical aspect of successful implementation.
Solar Thermal Technology Roadmaps
Roadmap - Strategy for growth

Today:

Vision for 2030:
0.5 m² collector area per inhabitant
Solar Thermal Technology Roadmaps

Annual Installations

- Industry
- Health
- Accommodation
- Small SWH / Residential

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SAIREC Side Event

SOLTRAIN
Results of the Southern African Solar Thermal Training and Demonstration Initiative
Awareness Campaigns

Organized 22 stakeholder meetings with 680 participants
Participation at 21 trade fairs and exhibitions
Training Systems for Universities and VTCs
Test Centre at Stellenbosch University
Training Rig on Trailers
Demonstration Projects
Demonstration Projects
Company Support for Local Production