

SOLTRAIN

SOUTHERN AFRICAN SOLAR THERMAL TRAINING AND DEMONSTRATION INITIATIVE



Project Structure

Contracting Authority:

Austrian Development Agency (ADA)

Austrian

Development Cooperation

Co-financed by:



Uniting against Poverty



Project implementation:



Austrian
Development Cooperation

Sustainable Energy Society of Southern Africa (SESSA)

P.O.Box 58 Hartbeespoort 0216

South Africa



Centre for Renewable and Sustainable Energy Studies (CRSES)

Stellenbosch University

South Africa



Renewable Energy & Energy Efficiency (REEE)

Polytechnic of Namibia

Windhoek



SOLTRAIN I and SOLTRAIN II

Eduardo Mondlane University (UEM)

Faculty of Engineering

Av. Mozambique, Km 1.5

Maputo

Mozambique



Domestic Solar Heating Pvt. Ltd, (DSH)

11 Kingsbridge Avenue, Northwood

Mt. Pleasant, Harare

Zimbabwe



Bethel Business and Community Development Centre (BBCDC)

PO Box 53, Mt. Moorosi 750





SOLTRAIN I

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**The duration of the project was 36 months
May 2009 - April 2012**

SOLTRAIN I - Scope and Goals (1)

The overall goal of this southern African regional project is to contribute to the switch from a fossil fuel based energy supply to a sustainable energy supply system based on renewable energies.

This should be achieved by **building up training capacities** in the participating countries in the field of solar thermal technology and the **improvement of the quality, performance and lifetime** of solar thermal systems.

Furthermore it is the aim of the project to create **new jobs** at small and medium enterprises and to initiate and/or to strengthen **political support mechanisms** for solar thermal systems.

Scope and Goals (2)

50 demonstration systems for social institutions (hospitals, orphanages, homes for elderly people, HIV/AIDS institutions etc.) will be installed in order to increase the hygienic standard of the social institutions and to reduce significantly the energy cost for water heating.

The project was carried out in Mozambique, Namibia, South Africa and Zimbabwe in cooperation with educational institutions as well as institutions and companies working in the field of renewable energies.

Target Groups

Training institutions like universities and other training centres

Small and medium enterprises

Social institutions

Policy and administration

SOLTRAIN I

Monitoring of 7 existing systems

Seven already existing systems were selected and equipped with monitoring devices.

To have a good distribution of different system concepts and designs 4 South African systems, 2 Namibian systems and one Mozambican system were chosen for monitoring.

As foreseen **all seven systems have been monitored for a period of 12 months.**

Monitoring of 7 existing systems



System 1 at a commercial laundry,
Cape Town



System 2 at a residential house,
Stellenbosch



System 3 at the Liliam Student Residence,
University of Pretoria



System 4 at ABI Miller, North Riding

Monitoring of 7 existing systems



System 5 at the Polytechnic student hostels, Windhoek, Namibia



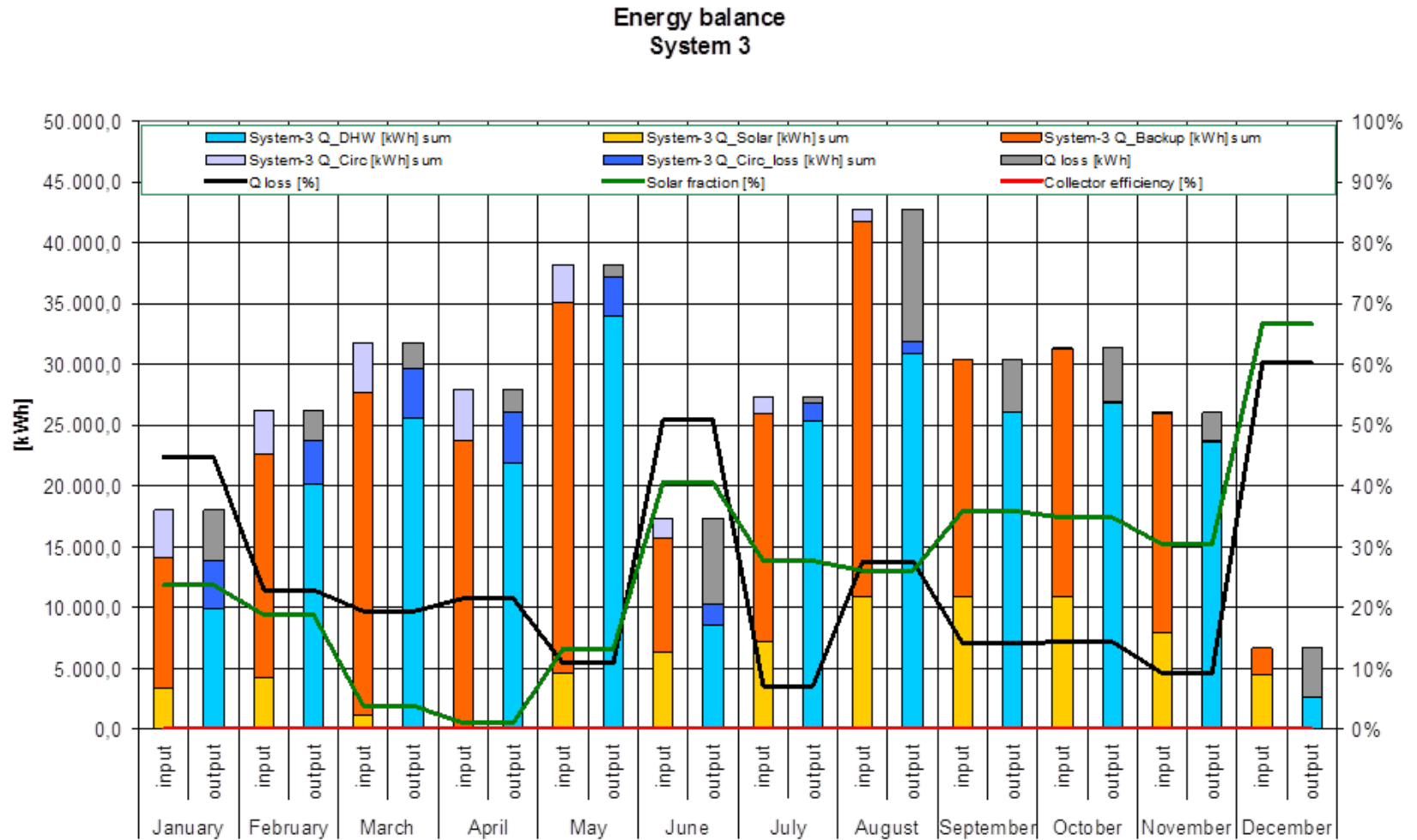
System 6 Katutura State Hospital, Windhoek



System 7 at the Lousada Family Home in Maputo, Mozambique

Monitoring of 7 existing systems

■ Austrian
■ Development Cooperation



Key figures of monitored systems

System	System design	collector area [m ²]	storage volume [liter]	storage volume/m ² collector area [liter]	average mass flow in collector circle [liter/hour system]	specific average mass flow in collector circle [liter/hour m ²]	maximum mass flow in collector circle [liter/hour system]	maximum specific mass flow in collector circle [liter/hour m ²]	average temperature difference = t solar flow - t solar return flow [°K]	maximum temperature difference = t solar flow - t solar return flow [°K]	average daily hot water consumption [liter/day]	average daily hot water consumption/ installed m collector area [liter/m ² day]	yearly collector yield [kWh/a]	specific yearly collector yield [kWh/m ² a]
System 1	indirect thermosyphon system	4	300	75	27	6,8	57	14,3	21,3	47,3	513	128	3.198	800
System 2	direct thermosyphon system	3	200	67	32	10,7	64	21,2	14,0	30,6	140	47	2.169	723
System 3	pumped system (energy meter is installed in secondary circle)	160	30.000	188	1.246	7,8	1.916	12,0	22,4	43,1	15.748	98	72.133	451
System 4	pumped system (energy meter is installed in secondary circle)	72	6.400	89	1.426	19,8	2.309	32,1	9,9	36,8	7.648	106	55.363	769
System 5	indirect thermosyphon system	4	300	75	31	7,9	59	14,8	16,3	40,5	523	131	3.050	763
System 6	pumped system (energy meter is installed in secondary circle)	99	8.000	81	695	7,0	1.125	11,4	18,2	34,8	6.191	63	29.868	302
System 7	direct thermosyphon system with evacuated tubes	8	400	50	*	*	*	*	*	*	110	14	2.901	363
* this values can't be monitored because of the special design of a direct thermosyphon system with evacuated tubes														

48 Training Courses – 1317 Participants

Nine “train the trainer courses” for professionals were carried out in the partner countries. A total of **400 persons participated** the nine courses.

30 dissemination courses with a total of **701 participants** were organized by the project partners. 17 of these courses took place in South Africa, three in Windhoek (Namibia), three in Maputo (Mozambique) and 7 courses took place in Harare (Zimbabwe).

Nine workshops for political decision makers and administration with a total of **216 participants** were carried out.

Training Courses

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Test Facility at Stellenbosch University

at Cooperation



Training Trailer for REEEI in Namibia

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Installation of Demonstration Systems at Social Institutions

A total of 60 solar thermal systems with a total collector area of 668 m² were installed and handed over to the social institutions.

60 Demonstration Systems

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Pumped system at Meerhof School, South Africa



Baphumelele Childrens Home, South Africa

60 Demonstration Systems

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Kestell Orphanage, South Africa



Nuwerus Home for the aged – Worcester,
South Africa

60 Demonstration Systems

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Pumped system - home of retired sisters,
Zimbabwe



Direct thermosyphon system at Makumbi
visitation high school
Zimbabwe

60 Demonstration Systems

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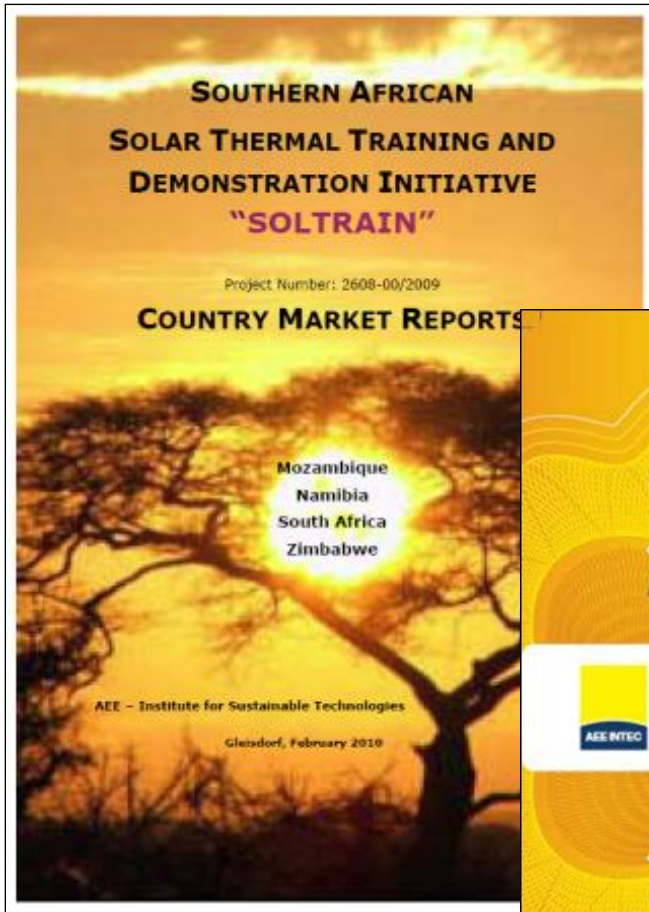
Anglican Medical Services, St Mary's Health Centre, Namibia



Ndlavela Hospital, Maputo, Mozambique

Awareness Activities

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Awareness Activities

Austrian Development Cooperation

About SOLTRAIN
 KNOW ABOUT SOLTRAIN - THE SOUTHERN AFRICAN SOLAR THERMAL TRAINING AND DEMONSTRATION INITIATIVE.
Southern African Solar Thermal Training and Demonstration Initiative (SOLTRAIN) (National Hub for Postgraduate Programme in Energy Efficiency and Demand Side Management) - Mozilla Firefox

National Hub for Postgraduate Programme in Energy Efficiency and Demand Side Management

SOLTRAIN NEWS

SOLTRAIN WORKSHOP ENDS ON HIGH NOTE

'SHOT IN THE ARM' FOR SOLAR THERMAL KNOWLEDGE IN SOUTHERN AFRICA

PARTICIPANTS RATE THE COURSE HIGHLY

Solar project contributes to skills development

Solar project contributes to skills development - Mozilla Firefox

SESSA MEMBER ASSISTS SOCIAL INSTITUTIONS WITH FREE SOLAR HEATING SYSTEMS

ON THURSDAY, 03 MAY 2012, POSTED IN MEMBERS PRESS OFFICE, SESSA NEWS, SOLAR WATER HEATING NEWS

Solar water heating systems - one at an old age home and the other at an orphanage - went live in March this year thanks to the initiative of SESSA member Holms and Friends and the Austrian Development Agency (ADA).

At the Villiersia Old Age Home in Pretoria, Holms and Friends installed 18 collectors with a total area of 33.12 m² linked to a pumped system with an external heat exchanger, a pressurised tank, a membrane expansion vessel and an electric-pump loop system.

The Kestell Children's Home in the Northern Cape was fitted with 15 collectors with a surface area of 27.47 m². These were linked to a system similar to that at Villiersia Old Age Home, and provide hot water for the 40 occupants of the home.

The two installations, plus another completed last year, form part of a 50 solar water heating systems pledge made by the ADA in support of the SOLTRAIN project, which is coordinated by Professor Dieter Holms and Henning Holms of Holms and Friends (formerly Omnibus Engineering).

The project's objectives include accelerating the transition to clean energies by creating awareness amongst policy decision makers and raising the standard of service in the supply and installation of solar water heating systems.

With support from the ADA and Austrian company, AEE Intec, SOLTRAIN has trained employees of small and medium enterprises, students, and policy makers and administrators to install solar water heaters.

After completion of the SOLTRAIN course, graduates are expected to share their acquired knowledge in dissemination courses. Further expanding the knowledge and raising the standard of the solar water heating industry.

SOLTRAIN II - Duration

November 2012 - February 2016



SOLTRAIN II – Lessons learnt

Framework conditions are very different in each county

- Knowledge at institutions of higher education
- Knowledge of installers (basic to excellent)
- Political support (Namibia, South Africa versus Mozambique)
- Quality control (SABS in SA, none in other counties)
- Possibilities of local production
- Awareness of the population

SOLTRAIN II (diversification - but joint goals)

- Adjusted work program for each country
- SA: Advanced training on solar air conditioning and industrial applications
- NAM, ZIM and Mozambique: Combination of practical and theoretical training
- Different focus on demonstration systems

SOLTRAIN II includes four major activities

- 1. Focused awareness campaigns**
- 2. Centres of Competence**
- 3. Solar Thermal Technology Platforms**
- 4. Solar thermal Demonstration Systems**

Awareness Campaigns

1. Focused **awareness campaigns** on solar thermal systems to inform all relevant stakeholders and the interested population about the different applications of solar thermal energy and the related impact on security of energy supply, poverty, employment and on the environment.



Awareness Campaign - Trade Fairs

Up to now: Participation at 10 trade fairs

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TV and radio and other PR

Work Package 2 - Awareness Campaign

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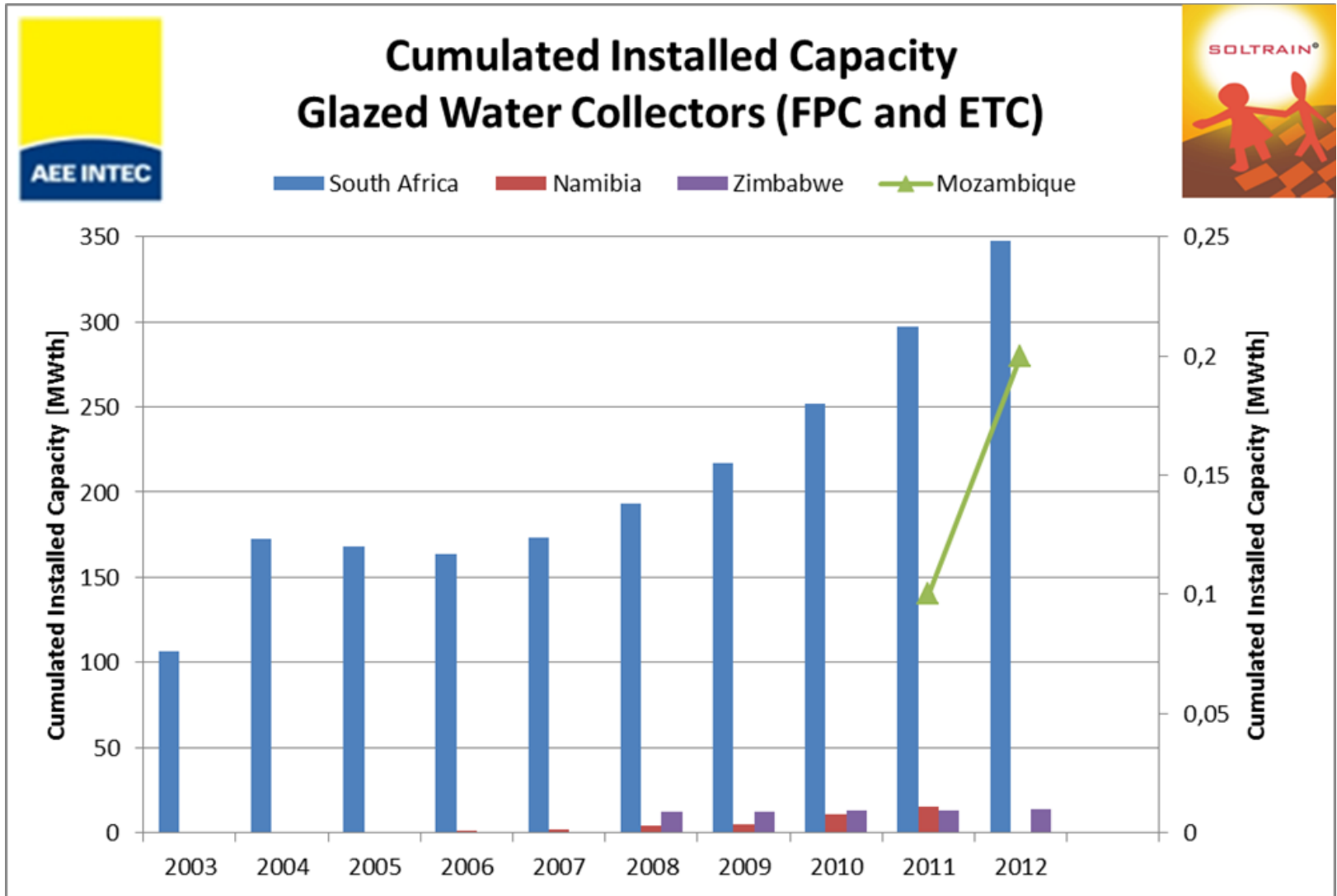
Annual Market Survey - Solar Statistics

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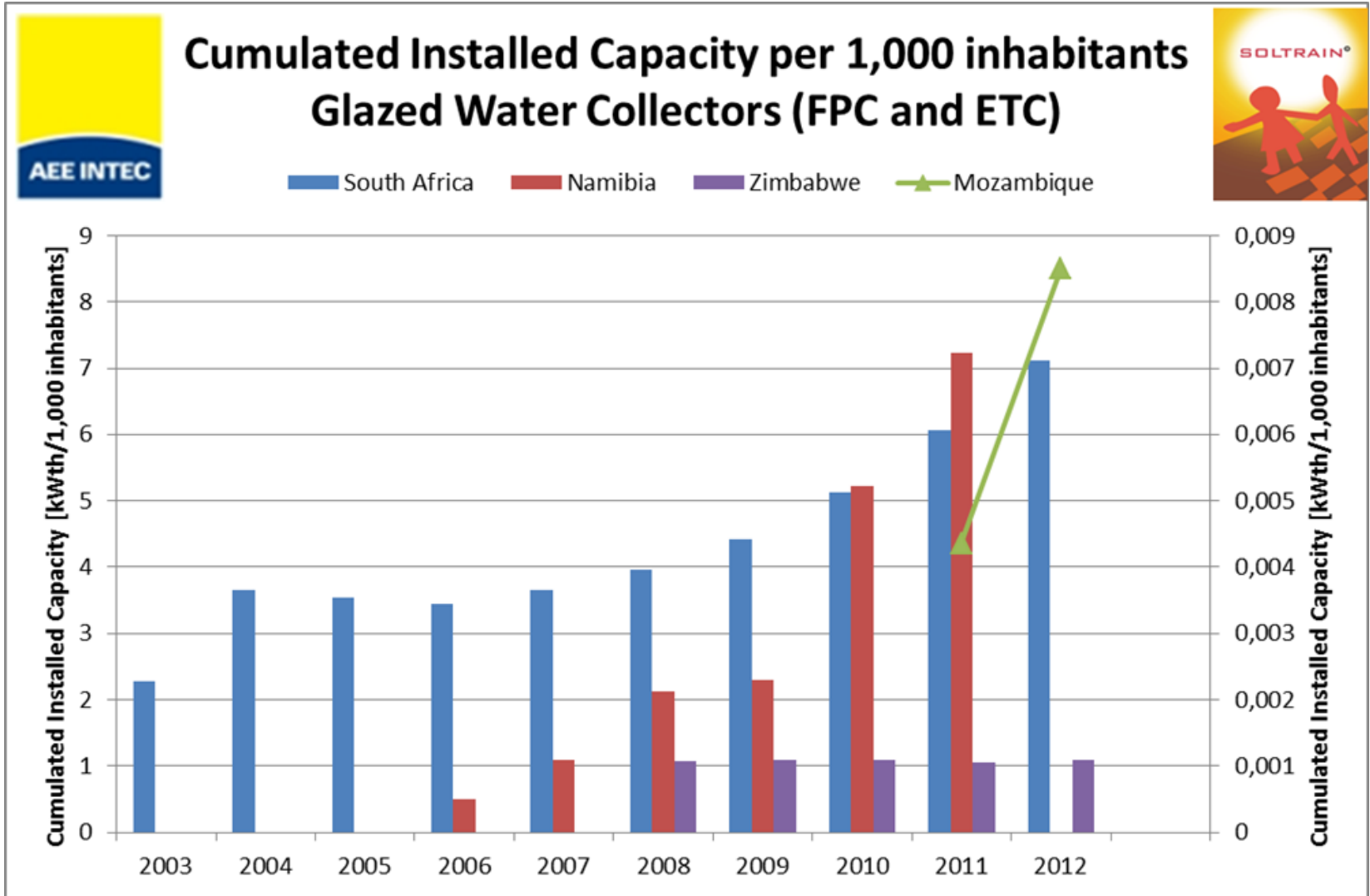
Annual Market Survey - Solar Statistics

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Annual Market Survey - Solar Statistics

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Centres of Competence

The 2nd activity is to implement a sustainable institutional structure and focal points for solar thermal information, training, support for industry and policy as well as for applied research.

These **Centres of Competence** will be implemented in institutions of higher education in each country.



CRSES, UEM, REEEI and SESSA

Training courses - Centres of Competence

In total: 13 “train the trainer courses” for professionals with a total of **624 participants** were carried out in the partner countries. **41 dissemination courses with a total of 925 participants** were organized by the project partners. Also **11 workshops for political decision makers** and administration with a total of **292 participants** were carried out.



Training systems at the educational institutions

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Demonstration systems at the educational institutions

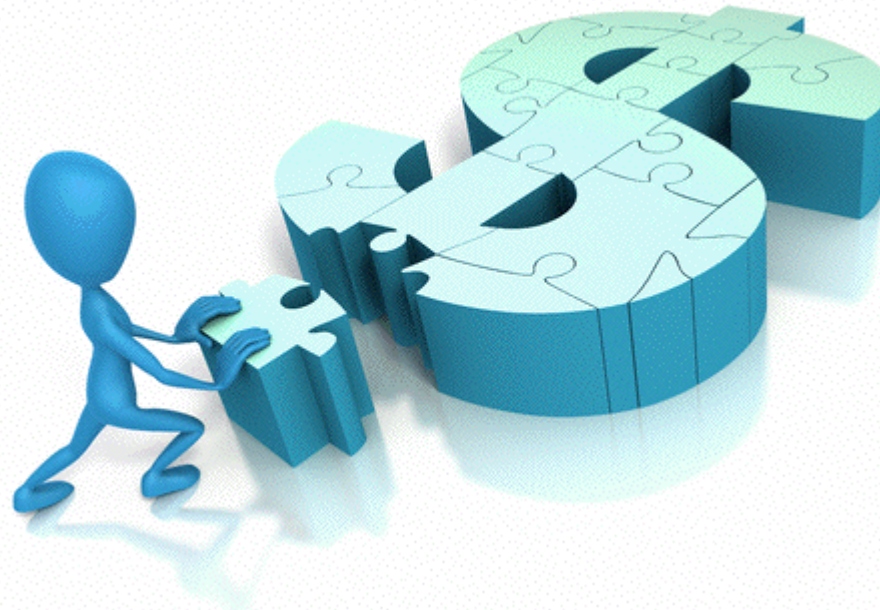
Training system at BBCDC in Lesotho

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Centres of Competence (2)

The CoC's in South Africa (CRSES) and Namibia (REEEI) are also going to carry out **workshops with banks/finance institutions** in order to find out the interest and possibilities to finance solar thermal systems (e.g. micro financing schemes and revolving funds).



Solar Thermal Technology Platforms

The 3rd major activity is the establishment and implementation of **“Solar Thermal Technology Platforms”** (STTP) into all **Centres of Competence** in Namibia, Mozambique.

These platforms will be cross linked to a **Southern African Solar Thermal Technology Platform** in order to enhance the information exchange and the cooperation between the platforms.



Solar Thermal Technology Platforms

The **national STTP's include all stakeholders** (**companies**, higher education as well as administration and policy) who make a positive input in improving growth of solar thermal applications in all relevant sectors. The STTPs are going to prepare **a national Solar Thermal Roadmap** and implementation plan for each participating country and should act as the relevant entity for decision makers when it comes to support measures in terms of technical solutions, subsidy schemes or research and dissemination activities for solar thermal systems.



Assistance to local producers

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Locally manufactured tanks and locally assembled collectors in Zimbabwe

Support to local companies

Zimbabwe

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Demonstration systems

To show and demonstrate the different solar thermal applications “**flag ship sites or districts**” will be established after consultation with policy, local authorities or NGO’s.

The idea of “flag ship sites or districts” is to have several systems for different applications at different eligible institutions installed relatively close together (**one village, town or small region**).

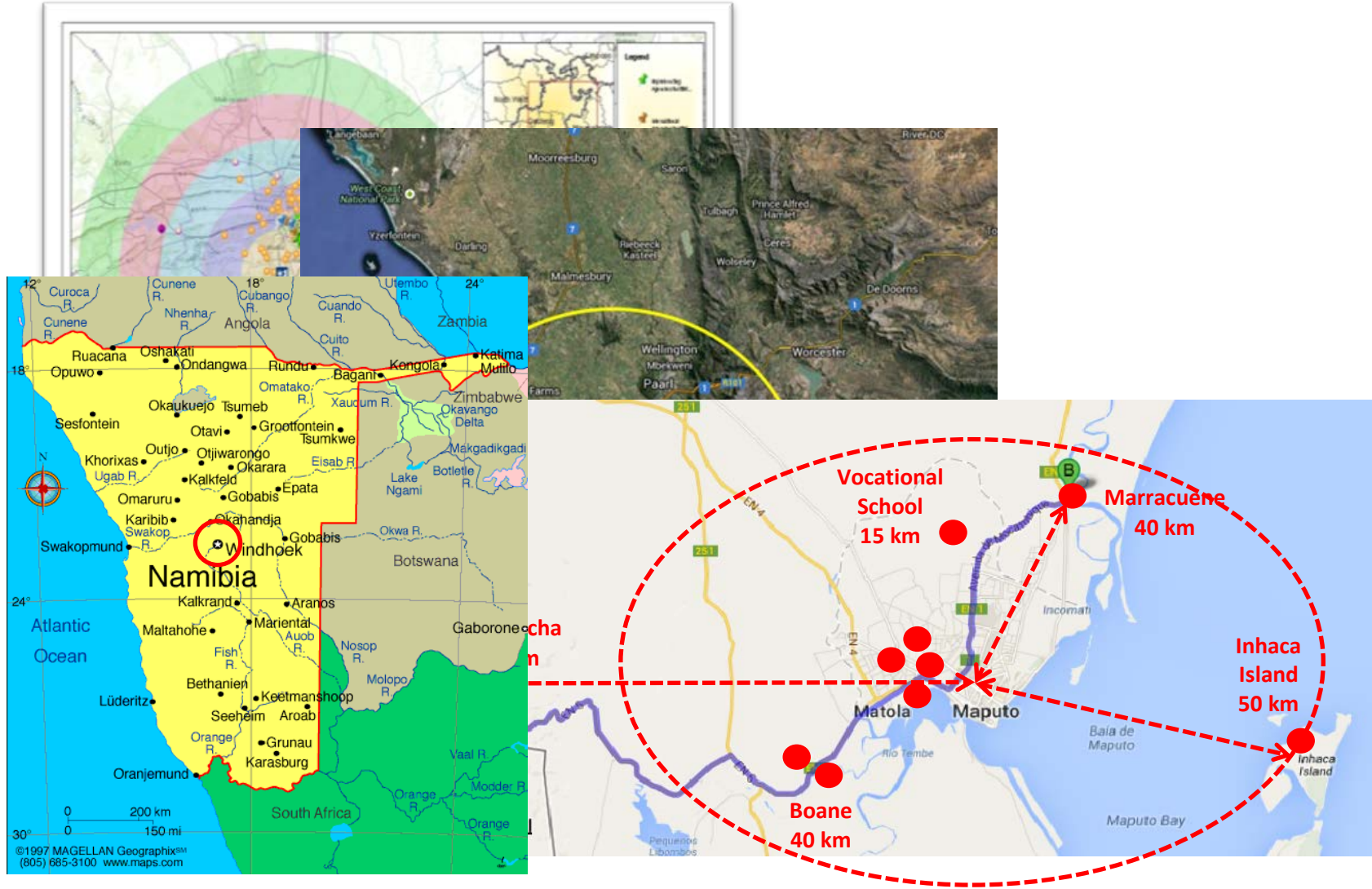
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Flag-ship Demonstration Districts

Work Package 5 – Demonstration Systems

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Demonstration systems

In order to apply the knowledge gained at the training courses solar demonstration systems

A total of 100 solar thermal systems were installed and handed over to social institutions and small enterprises



Beneficiary: Huis Horison , Employment Centre for Disabled

Address: 1 Patrys Street, Stellenbosch

Installer: Natural Dynamics

Solar Thermal System
1 system
Installed Collector area: 18.4 m²
Hot water storage volume: 1,000 l
Application: Domestic hot water
System type: Pumped

Date of installation: 8-12 July 2013

Date of commissioning: 12 July 2013

Date of quality check: 2 August 2013

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Beneficiary: Welverdiend Retirement Village

Address: Corner of De Oewer & Stellenberg Rd
Bellair, Cape Town

Installer: Deacons Solar

Solar Thermal System 1 system
Installed Collector area: 50 m²
Hot water storage volume: 3x2,000 l
Application: Domestic hot water
System type: Pumped

Date of installation: November 2013
Date of commissioning: 29 November 2013
Date of quality check: 22 November 2013

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Beneficiary: Bergridge Park Retirement Village

Address: c/o Edison Drive and Firgrove Way, Meadowridge
Cape Town

Installer: Solaheat – Div of Solaheat Services CC

Solar Thermal System

3 systems
Installed Collector area: 11.22 m²
Hot water storage volume: 900 l
Application: Domestic hot water
System type: Indirect thermosyphon system

Date of installation: 31 August 2013
Date of commissioning: 31 August 2013
Date of quality check: 16/10/2013

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Beneficiary: Mzuri Sana Farm (Plant 2)
Address: Tarisa Road, Ruwa, Zimbabwe
Installer: Sunex Solar Systems/Moderate Air
Solar Thermal System 1 system
 Installed Collector area: 16 m²
 Hot water storage volume: 1,000 l
 Application: Staff showers on a chicken farm
 System type: Direct thermosyphon system

 Date of installation: 13-17/01/14
 Date of commissioning: 27/01/14
 Date of quality check: 27/01/14

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Beneficiary: Fambidzanai Permaculture Centre

Address: 4 Dovedale Road, Mount Hampden, Harare

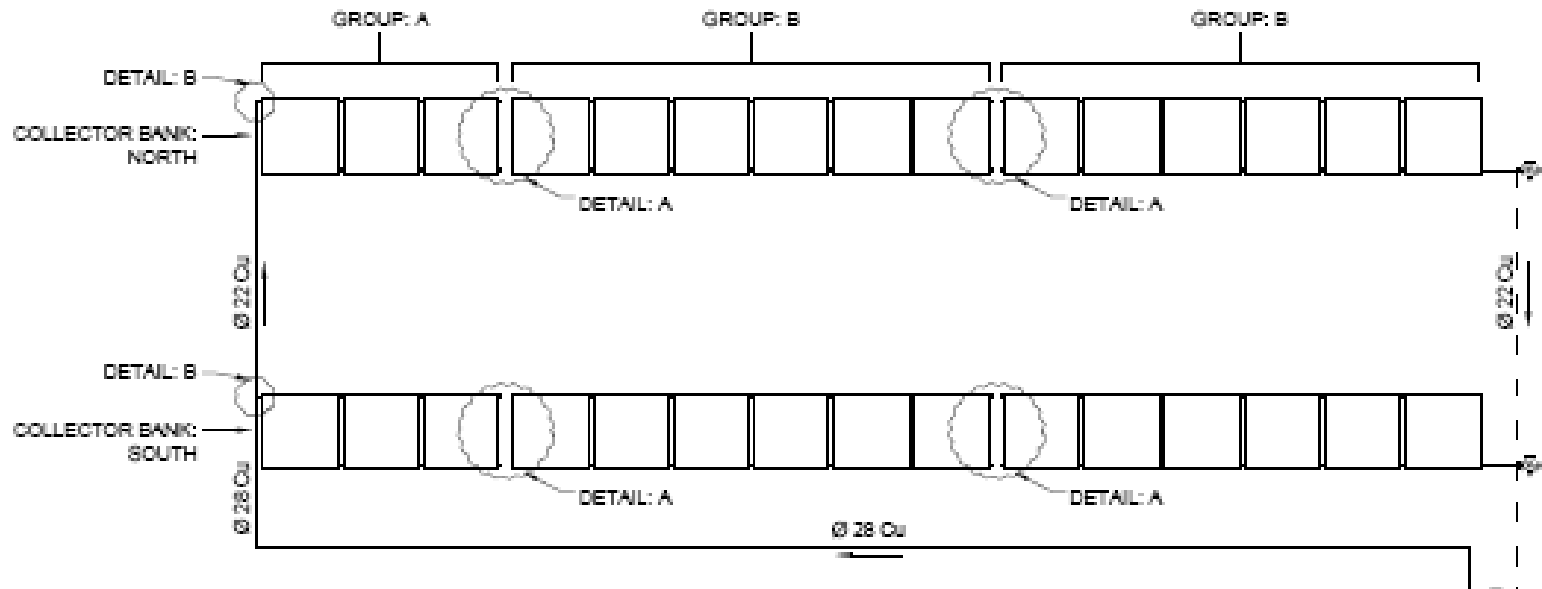
Installer: SUNEX SOLAR SYSTEMS P/L

Solar Thermal System
1 system
Installed collector area: 8 m²
Hot water storage volume: 500 l
Application: Shower block and kitchen
System type: Direct thermosyphon system

Date of installation: 5/11/2013
Date of commissioning: 11/12/2013
Date of quality check: 11/12/2013

Financed by:





Flanking measures for a successful deployment

Coherent strategy to promote solar thermal



