SOLTRAIN
SOLAR THERMAL DEMONSTRATION SYSTEMS in Southern Africa

APPLICATIONS, FACTS,
COST, SOLAR YIELDS,
ENVIRONMENTAL EFFECTS

Uniting against Poverty

WITH FUNDING FROM
AUSTRIAN DEVELOPMENT COOPERATION

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South Africa, 2015

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http://www.blackdotenergy.co.za

Background:

The background to SOLTRAIN is the Memorandum of Understanding of the Government of the Republic of Austria and the Southern African Development Community, SADC, signed in October 2008. The general objective of the cooperation between Austria and SADC under this MoU is to steer and enhance good governance for sustainable economic and social growth thus contributing to poverty reduction among the SADC Member States. Cooperation under this MoU will be centred in the areas of good governance and infrastructure with thematic focus in renewable energy. With the main focus on solar thermal systems the project SOLTRAIN contributes significantly to fulfil the commitments incurred by ADC in this MoU.

The SOLTRAIN partner organizations

AEE – Institute for Sustainable Technologies

Gleisdorf, Austria

Sustainable Energy Society of Southern Africa (SESSA)

Pretoria, South Africa

Centre for Renewable and
Sustainable Energy Studies (CRSES)

Stellenbosch University

Stellenbosch, South Africa

Namibia Energy Institute (NEI)

Polytechnic of Namibia

Windhoek, Namibia

University Eduardo Mondlane

Maputo, Mozambique

Domestic Solar Heating Pvt. Ltd, (DSH)

Harare, Zimbabwe

Bethel Business and Community Development Centre (BBCDC)

Mt. Moorosi, Lesotho

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Foreword

SOLTRAIN - Southern African Solar Thermal Training and Demonstration Initiative is a regional initiative on capacity building and demonstration of solar thermal systems in the SADC region. It is funded by the Austrian Development Agency and co-funded by the Opec Fund for International Development.

SOLTRAIN started in 2009, and is now in its second phase of cooperation with Lesotho, Mozambique, Namibia, South Africa and Zimbabwe.

The aim of SOLTRAIN is to support the target countries in changing from a largely fossil energy supply system to a sustainable supply structure based on renewable energy in general, and on solar thermal in particular.

The implementing agency of SOLTRAIN is AEE INTEC, an Austrian institute active in solar thermal energy research, training and demonstration.

The local partners are the Sustainable Energy Society of Southern Africa and the Centre for Renewable and Sustainable Energy Studies from Stellenbosch University in South Africa, the Namibian Energy Institute from Namibia, the Bethel Business and Community Development Centre from Lesotho, the Eduardo Mondlane University in Mozambique and the company Domestic Solar Heating in Zimbabwe.

SOLTRAIN focuses on the four crucial areas:

Raising awareness of the potentials in solar thermal technology: By using targeted campaigns, relevant stakeholders and the public are made aware of the wide range of application areas for solar thermal systems. Awareness raising also includes showing the benefits of solar thermal systems concerning energy supply, poverty alleviation, job creation and the protection of the natural environment.

Building of competence in solar thermal technology: Currently there are no centres of competence for solar thermal in the partner countries. SOLTRAIN will help to establish institutional structures which can offer expert advice, training and technical support to the local industry and politicians. Research and development capacities will also be part of these centres, which will be set up in South Africa at Stellenbosch University.

Creating solar thermal technology platforms: Similar to the European technology platforms, these platforms will include all key stakeholders and sectors that influence the general conditions of how to accelerate the dissemination and use of solar thermal systems.

Demonstrating that solar thermal technology works: SOLTRAIN set up solar thermal demonstration plants in order to apply the knowledge taught in the training programmes to installers, students and politicians. Both smaller and bigger plants were set up in social institutions and small and medium enterprises, where they contribute to water heating, cooling and the generation of process heat.

In this booklet different examples of solar thermal demonstration systems, which were installed as part of the practical training within SOLTRAIN, are documented. The demonstration systems shall provide an overview of different applications, system types and sizes but also shall produce information on their energy savings and the avoided CO_2 emissions.

More than 2100 people trained and nearly 200 solar thermal systems installed

Between 2009 and 2015 about 2150 people were trained in 80 training courses, and 187 solar thermal systems ranging from 2 to 125 m² collector area per system have been installed during the first and second phase of SOLTRAIN.

The applications of these systems range from small-scale thermosyphon systems for single family houses to medium sized systems with forced circulation for industrial and commercial applications. Some good demonstration systems were installed for the food and beverage industry. Most of the beneficiaries are social institutions like orphanages, hospitals or boarding schools.

Impact on energy savings and CO_2 emissions

The annual solar yield of all solar thermal demonstration systems installed in phase I and II of the SOLTRAIN project is 1.47 million kWh; this corresponds to electricity savings of 1.62 million kWh/a and 513 tons of avoided CO_2.

The figures for the different countries can be seen in the table below.

Table 1: Calculated annual solar yield and corresponding electricity savings as well as avoided CO_2 emissions of all solar thermal demonstration systems.

Country	Total collector area [m²]	Total capacity [kW_{th}]	Number of systems [---]	Solar yield [kWh/a]	Electricity savings [kWh/a]	CO_2 reduction*) [t_{CO_2}/a]
Mozambique	41.4	29	2	30,330	33,363	12
Namibia	228	160	71	207,398	228,138	72
South Africa	1,326	928	85	929,688	1,022,657	323
Zimbabwe	332	232	19	274,441	301,885	95
Lesotho	34.5	24	10	28,527	31,380	10
TOTAL	**1,962**	**1,374**	**187**	**1,470,384**	1,617,422	**513**

*) Based on oil equivalent

ZAR 346,000 avoided annual electricity cost

If taking the 2015 electricity tariff (213.90 c/kWh including VAT) for households of the city of Cape Town as a cost basis, a total of ZAR 346,000 of electricity cost are saved every year with the installed systems.

System cost

The following table shows the specific system cost of all installed demonstration systems. The specific system cost range is from ZAR 4200.00 to ZAR 24100.00.

These broad variations show that southern Africa has not yet a mature market. A clear price reduction based on economy of scale cannot be seen. The price level also reflects the fact that most of the major components for solar water heating systems are imported and therefore also the end consumer price is on international level. Labour cost has an insignificant influence on final system prices.

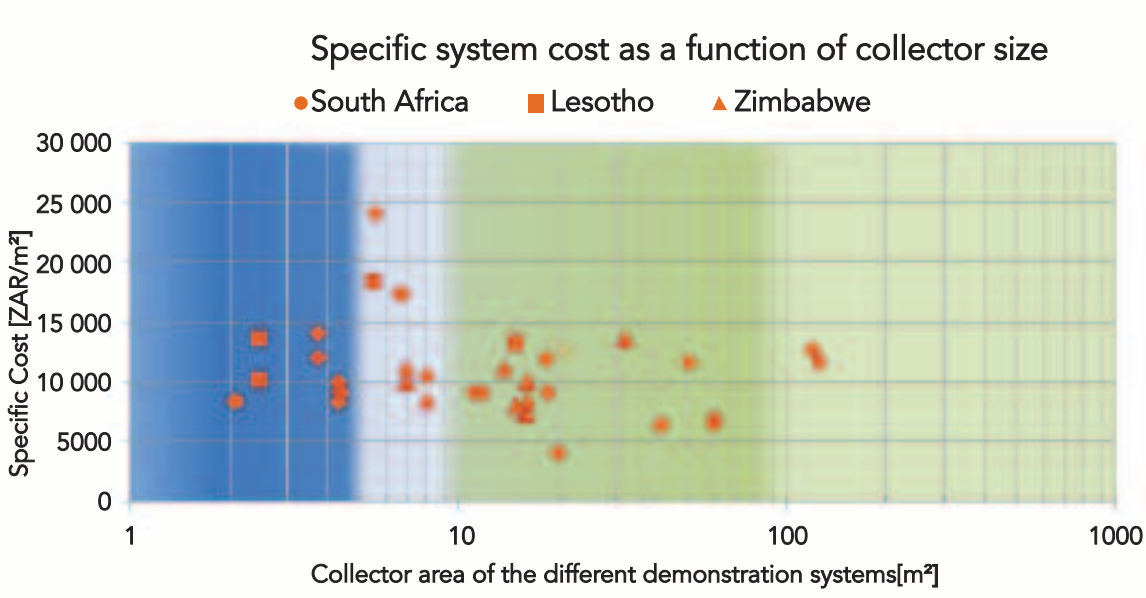


Figure 1: Specific system prices of solar thermal systems in Southern Africa as a function of the size of the system. The prices shown include installation and VAT.

It has to be mentioned here that SOLTRAIN is not intended to be a roll-out programme. The aim of the demonstration systems is to support the installation of new solar thermal applications, provide awareness, and also to give feedback to installers on the quality and performance of these systems.

The project team is confident that this booklet is demonstrating the performance of solar thermal systems and will contribute to raise the awareness of solar energy utilization in Southern Africa.

With sunny regards

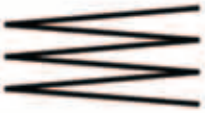
Werner Weiss

(Project co-ordinator, AEE INTEC)

Diagram Key


pump


membrane expansion vessel


internal heat exchanger


external heat exchanger


electrical element


temperature mixing valve


pressure relief valve


float valve

temperature and pressure safety valve


mixing valve with motor


thermal collector direct pumped system


thermal collector direct thermosyphon system


thermal collector indirect pumped system


thermal collector indirect thermosyphon system


non-pressurised hot water storage tank


pressurised hot water storage tank


pressurised jacket hot water storage tank


pressurised buffer storage tank


space heating

Solar Thermal Training Systems

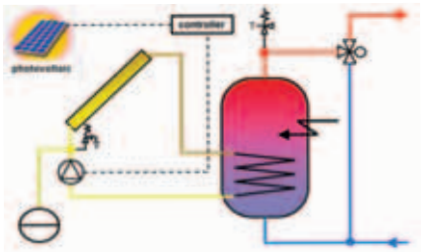
In order to perform technical training courses for different target groups (University staff and students, staff and instructors of vocational schools and installers) solar thermal training systems have been provided for each of the project partners in Lesotho, Mozambique, Namibia, South Africa and Zimbabwe. Each of these training units consists of one pumped solar thermal system and one thermosyphon system.

The training units are installed either on buildings of the involved educational institutions or on trailers. The systems mounted on trailers can be used for education and training purposes as well as for awareness raising activities. In order to be independent from an electrical grid, the pumped system can be powered by a PV module, which is also mounted on each of the trailers.

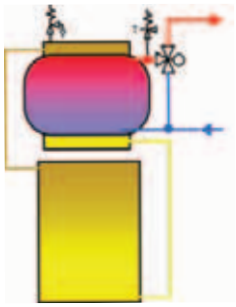
All systems are equipped with monitoring devices, so that students are able to carry out measurements.

All relevant temperatures, solar radiation, mass flow in the collector loop and hot water consumption, as well as solar power and the energy yield can be monitored and the data can be stored in a data logger. The stored data can be downloaded and processed using a software programme, which was provided by AEE INTEC. By using this software the operation mode of the systems can be analyzed and evaluated.

Pumped solar thermal system with hot water storage tank. Pumps, controller and the monitoring devices are powered by a small photovoltaic system.



Indirect solar thermosyphon system with hot water storage tank



Trailers

Description of trailers

One pumped and one thermosyphon system respectively is mounted on a trailer. The trailers were assembled by the South African company SEG SOLAR ENERGY (Pty) Ltd South Africa, 168 Bram Fischer Drive Randburg , Johannesburg 2194 (http://www.solarenergy.at/en/

System description

System:	Pumped system

Collector

Type:	Flat plate collector
Installed collector area:	4.7 m² (3.3 kWth)
Tilt angle:	25° on the roof of the trailer
Collector manufacturer:	GREENoneTEC

Hot water storage

Volume:	300 litres
Storage manufacturer:	Austria Email
Electricity supply system:	120 Watt PV-panel

Pumped solar thermal system with hot water storage tank. Pumps, controller and the monitoring devices are powered by a small photovoltaic system.

System description

System:	Thermosyphon System

Collector

Type:	Flat plate collector
Installed collector area:	2.34 m² (1.6 kWth)
Tilt angle:	45°

Hot water storage

Volume:	120 litres

Indirect solar thermosyphon system with hot water storage tank

Solar Test Facility Stellenbosch University

Knowledge Centre, Corner of Banghoek and Joubert Street, Stellenbosch 7600, South Africa

Solar Thermal Research	
Total roof area size:	860 m²
Area division:	1) Concentrated (high temperature) solar thermal research area (560 m²) 2) Non concentrating (low-temperature) solar thermal research area (300 m²)

SWH Collector testing rig	
Application:	Collector Efficiency Measurement
System type:	Pumped system
Operation description:	Measure absorbed energy vs solar irradiance for various temperature set points

SWH Demonstration System	
Application:	Domestic hot water, demonstration and research
System type:	Pumped system
Collector type:	Flat plate collector
Installed collector area:	6 m² (4.2 kW_{th})
Orientation of collector area:	North
Tilt angle:	30°
Collector Manufacturer:	Solsquare
For more information on collector type and manufacturer: http://www.solsquare.com/	
Storage volume:	471 liters
Storage manufacturer:	SEG (Austria Email)
For more information on storage tank and manufacturer: http://www.austria-email.com/	
Installation:	April 2013

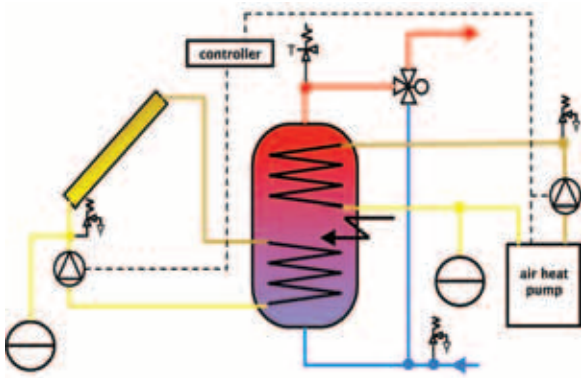
Solar Company – Installer
The system was installed as part of a training course.

CENTRE FOR RENEWABLE & SUSTAINABLE ENERGY STUDIES

Tel: 021-808 4069
Email: crses@sun.ac.za
Website: www.crses.sun.ac.za

UNIVERSITEIT STELLENBOSCH UNIVERSITY

Pumped solar thermal system with hot water storage tank and heat pump



Training System
University of Pretoria

University Road, Hatfield, Pretoria, South Africa

Description of the beneficiary

Owner of the building is the University of Pretoria. The University of Pretoria celebrated its centenary in 2008 and is a leading tertiary education institution in Africa. Detailed information is available under http://web.up.ac.za

The University of Pretoria is also leading in terms of solar water heating installations and has a total of more than 4700 m² solar collector area in planning, construction or working. The National Hub for Energy Efficiency and Demand Side Management Centre of New Energy Systems (based at the University of Pretoria, Engineering Department) is responsible for the training of students in the field of energy efficiency and renewable energies.

System description

Application:	Training system
System:	Pumped system

Collector

Type:	Flat plate collector
Installed collector area:	3 x 2.8 m² (5.88 kW_{th})
Orientation of the collector area:	North
Tilt angle:	35°
Collector manufacturer:	Solarfocus

For more information on collector type and manufacturer: http://www.solarfocus.at/

Hot water storage

Volume:	500 litres
Storage manufacturer:	Solarfocus
Back-up system:	Heat Pump
Installation:	November 2014

Solar Company – Installer

Holms and Friends

R511 ext, 26 Welgegund, 491 JQ, Hartbeespoort, 0216, South Africa

Training System Polytechnic Hotel School

Beethoven Street, Windhoek West, Namibia

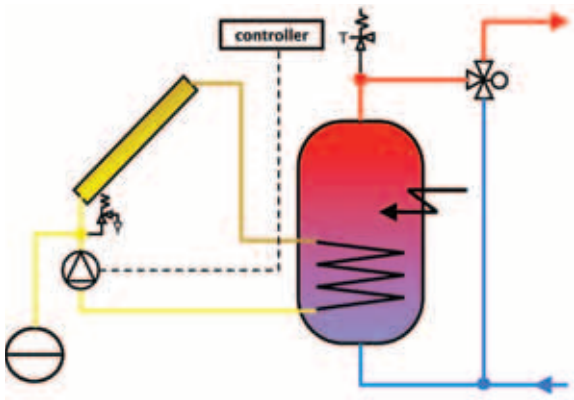
System description	
Application:	Training System
System:	Pumped system

Collector	
Type:	Flat plate collector
Installed collector area:	8 m² (5.6 kWth)
Orientation of the collector area:	North
Tilt angle:	35°
Collector manufacturer:	Solsquare Energy
For more information on collector type and manufacturer: http://www.solsquare.com/	

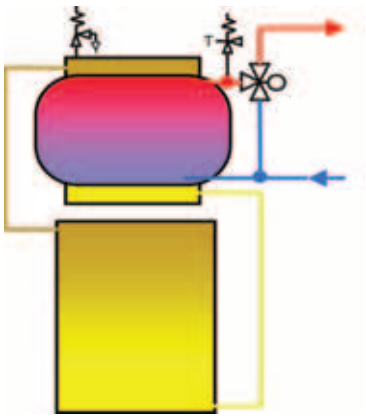
Hot water storage	
Volume:	500 litres
Storage manufacturer:	SEG (Austria Email)
For more information on storage tank and manufacturer: http://www.austria-email.com/	
Installation:	May 2013

Solar Company – Installer
The system was installed as part of a training course.

Pumped solar thermal system with hot water storage tank



Indirect solar thermosyphon system with hot water storage tank



Training System
National Youth Service

Rietfontein, Namibia

System description	
Application:	Training system
System:	Indirect Thermosyphon system

Collector	
Type:	Flat plate collector
Installed collector area:	4 m² (2.8 kWth)
Orientation of the collector area:	North
Tilt angle:	30°
Collector manufacturer:	Solsquare Energy

For more information on collector type and manufacturer:

http://www.solsquare.com/

Hot water storage	
Volume:	300 litres
Storage manufacturer:	Solsquare
Back-up system:	-
Installation:	May 2014

Solar Company – Installer

The system was installed as part of a training course.

Training System BBCDC

Mt. Moorosi 750, Lesotho

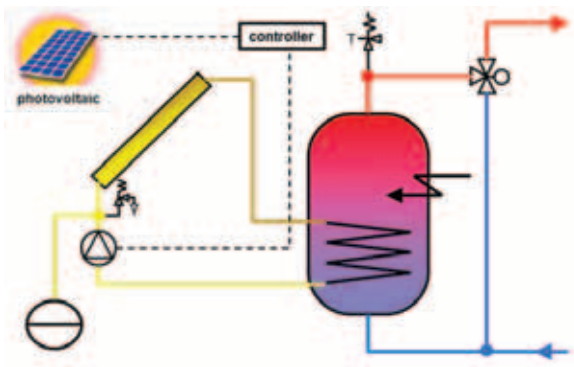
System description	
Application:	Training System
System:	Pumped System

Collector	
Type:	Flat plate collector
Installed collector area:	7.05 m² (4.9 kWth)
Orientation of the collector area:	North
Tilt angle:	35°
Collector manufacturer:	SEG (GREENoneTEC)
For more information on collector type and manufacturer: http://www.greenontechcom/	

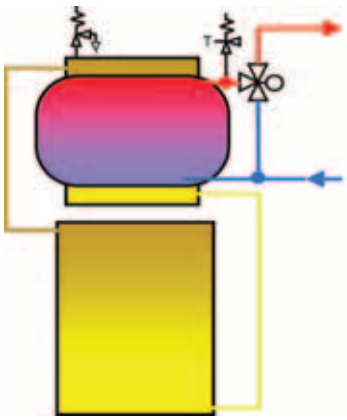
Hot water storage	
Volume:	500 litres
Storage manufacturer:	SEG (Austria Email)
For more information on storage tank and manufacturer: http://www.austria-email.com/	
Electricity supply system:	120 W PV-panel
Installation:	January 2014

Solar Company – Installer
The system was installed as part of a training course.

Pumped solar thermal system with hot water storage tank. Pumps, controller and the monitoring devices are powered by a small photovoltaic system.



Indirect solar thermosyphon system with hot water storage tank



Training System BBCDC

Mt. Moorosi 750, Lesotho

System description	
Application:	Training system
System:	Indirect thermosyphon system

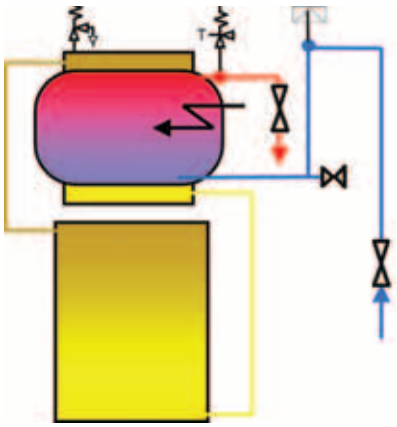
Collector	
Type:	Evacuated tube collector
Installed collector area:	3.7 m² (2.5 kWth)
Orientation of the collector area:	North
Tilt angle:	35°
Collector manufacturer:	HPC Telecom Techniques (South Africa)
For more information on collector type and supplier: http://www.teltec.co.za/	

Hot water storage	
Volume:	200 litres
Storage manufacturer:	X-Stream
For more information on storage tank and manufacturer: http://www.xstream.co.za/	
Installation:	January 2014

Solar Company – Installer
The system was installed as part of a training course.

NAMIBIAN SYSTEMS

Indirect solar thermosyphon system with hot water storage tank



National Housing Enterprise

62 Systems

Gen. Murtala Muhammed Ave. Eros, Otjomuise Area, Windhoek, Namibia

Description of the beneficiary

The National Housing Enterprise (NHE) is a state-owned company of the Government of the Republic of Namibia under the Ministry of Regional and Local Government, Housing and Rural Development. The NHE provides housing solutions for low and middle income inhabitants in order to alleviate the national housing need of the Namibian population. As a long-term vision there is the aim of providing affordable housing for every Namibian by 2030. NHE implemented a special Mass Housing Project in 2014 with over 185000 housing units for the next 10 years. The first phase is planned for the next two years with 9000 housing units across the country.

System description

Application:	Hot water preparation for domestic purposes
System:	Indirect thermosyphon system

Collector

Type:	Flat plate collector
Installed collector area:	2.1 m² (1.47 kWth)
Orientation of the collector area:	North
Tilt angle:	30°
Collector manufacturer:	ASSOS

For more information on collector type and manufacturer: http://www.assosboilers.com/

Hot water storage

Volume:	160 litres
Storage manufacturer:	ASSOS
Back-up system:	Electricity
Annual solar yield:	134 366 kWh
Avoided CO_2:	46.5 tons per year
Installation :	December 2015

Solar Company – Installer

Trinity Business Solutions

Unit C1, SME Incubation Centre, Katutura, Namibia

Joe's Beerhouse Kitchen

Nelson Mandela Ave, Klein Windhoek, Windhoek, Namibia

Description of the beneficiary

Joe´s Beerhouse is a restaurant that was established 21 years ago in a small side street of Windhoek. It now serves up to 550 people a night of which up to 60 % are tourists. Joe´s Beerhouse has 110 local employees.

System description

Application:	Restaurant (tourism targeted)
System:	Pumped system with internal heat exchanger

Collector

Type:	Flat plate collector
Installed collector area:	60 m² (42 kW_{th})
Orientation of the collector area:	North
Tilt angle:	35°
Collector manufacturer:	Solsquare Energy

For more information on collector type and manufacturer: http://www.solsquare.com/

Hot water storage

Volume:	2538 litres
Storage manufacturer:	Austria Email

For more information on storage tank and manufacturer: http://www.austria-email.com/

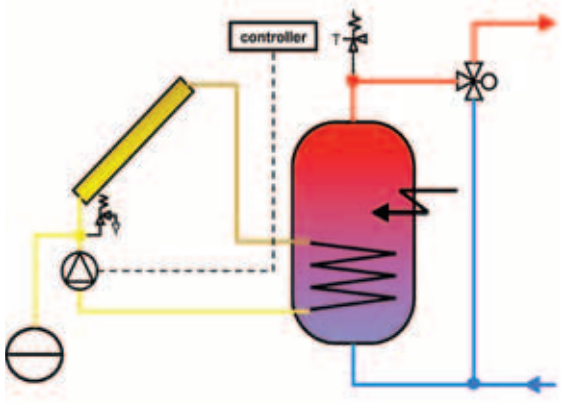
Back-up system:	Electricity
Annual solar yield:	48 840 kWh
Avoided CO_2:	16.89 tons per year

Solar Company – Installer

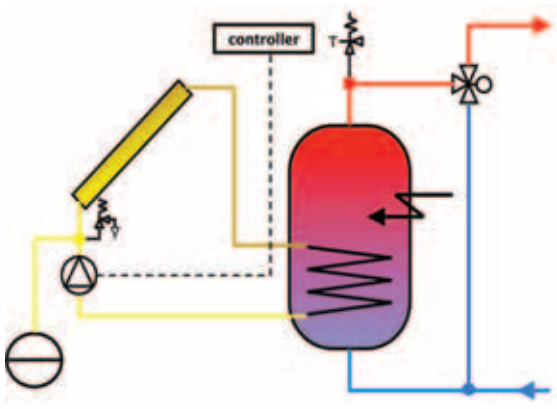
Solsquare Energy

38 Newcastle Street, Unit 5, Rosch Park, Northern Industria, Windhoek, Namibia

Pumped solar thermal system with hot water storage tank



Pumped solar thermal system with hot water storage tank



Okakarara Vocational Training Centre

Description of the beneficiary

The Okakarara Vocational Training Centre is situated 351 km north- east of Windhoek in the small town of Okakarara in the Otjozondjupa region. It is about 93 km from Otjiwarongo the nearest town. The institution offers certificate courses in hospitality, hairdressing, carpentry as well as courses in the electrical and mechanical fields and has more than 600 trainees of which 150 trainees stay in the hostel.

System description

Application:	Domestic hot water
System:	Pumped system

Collector

Type:	Flat plate collector
Installed collector area:	6.69 m² (4.6 kWth)
Orientation of the collector area:	North
Tilt angle:	16°
Collector manufacturer:	GREENoneTEC

For more information on collector type and manufacturer: http://www.greenonetec.com/

Hot water storage

Volume:	500 litres
Storage manufacturer:	Austria Email

For more information on storage tank and manufacturer: http://www.austria-email.com/

Back-up system:	Electricity
Annual solar yield:	5 446 kWh
Avoided CO_2:	1.88 tons per year

Solar Company – Installer

Solsquare Energy (Pty) Ltd

38 Newcastle Street, Unit 5, Rosch Park, Northern Industria, Windhoek.

Valombola Vocational Training Centre

Mandume Ndemufayo Street, Private Bag 5516, Oshakati, Namibia

Description of the beneficiary

The Valombola Vocational Training Centre is situated 730 km north of Windhoek in the town of Ongwediva, in the Oshana region. The Valombola vocational training centre academy facility is a house providing accommodation to special trainees who are attending short courses called "skills upgrading courses". The facility is a hostel used by 24 vocational trainees.

System description

Application:	Domestic hot water
System:	Pumped system

Collector

Type:	Flat plate collector
Installed collector area:	6.69 m² (4.6 kWth)
Orientation of the collector area:	North
Tilt angle:	35°
Collector manufacturer:	GREENoneTEC

For more information on collector type and manufacturer: http://www.greenonetec.com/

Hot water storage

Volume:	500 litres
Storage manufacturer:	Austria Email

For more information on storage tank and manufacturer: http://www.austria-email.com/

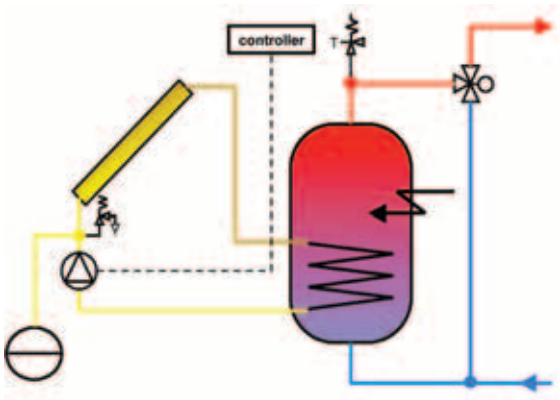
Back-up system:	–
Annual solar yield:	5 446 kWh
Avoided CO_2:	1.88 tons per year

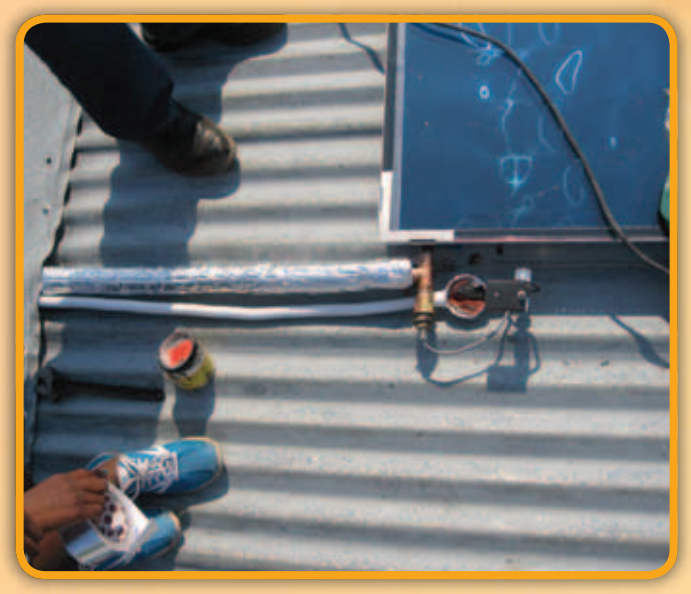
Solar Company – Installer

Solsquare Energy (Pty) Ltd

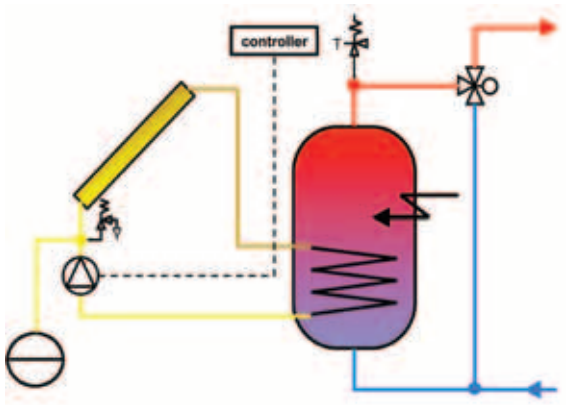
38 Newcastle Street, Unit 5,
Rosch Park,
Northern Industria,
Windhoek, Namibia

Pumped solar thermal system with hot water storage tank





Pumped solar thermal system with hot water storage tank



Rundu Vocational Training Centre

Rundu, Namibia

Description of the beneficiary

The Rundu Vocational Training Centre is situated 700 km north-east of Windhoek in the town of Rundu in the Kavango region. It is formally known as Rundu technical institute, started in 1987 at Rundu Secondary School premises. It moved to the current premise in March 1990. The mission of the institute is to provide training opportunities for young Namibians to become skilled workers through vocational training. Trades offered are: Auto mechanic, auto electric, electrical general, bricklaying, cabinet making, plumbing and commercial.

System description

Application:	Domestic hot water
System:	Pumped system

Collector

Type:	Flat plate collector
Installed collector area:	6.69 m² (4.6 kWth)
Orientation of the collector area:	North
Tilt angle:	16°
Collector manufacturer:	GREENoneTEC

For more information on collector type and manufacturer: http://www.greenonetec.com/

Hot water storage

Volume:	500 litres
Storage manufacturer:	Austria Email

For more information on storage tank and manufacturer: http://www.austria-email.com/

Back-up system:	–
Annual solar yield:	5 446 kWh
Avoided CO_2:	1.88 tons per year

Solar Company – Installer

Solsquare Energy (Pty) Ltd

38 Newcastle Street, Unit 5,
Rosch Park,
Northern Industria,
Windhoek, Namibia

Eenhana Vocational Training Centre

Eenhana, Namibia

Description of the beneficiary

The Eenhana Vocational Training Centre is situated 741 km north of Windhoek in the small town of Eenhana in the Ohangwena region. The institution offers certificate courses in bricklaying and plastering, office administration & information and communication technology, joinery & cabinetmaking, plumbing & pipefitting and welding & fabrication.

System description

Application:	Domestic hot water
System:	Pumped system

Collector

Type:	Flat plate collector
Installed collector area:	6.69 m² (4.6 kWth)
Orientation of the collector area:	North
Tilt angle:	15°
Collector manufacturer:	GREENoneTEC

For more information on collector type and manufacturer: http://www.greenonetec.com/

Hot water storage

Volume:	500 litres
Storage manufacturer:	Austria Email

For more information on storage tank and manufacturer: http://www.austria-email.com/

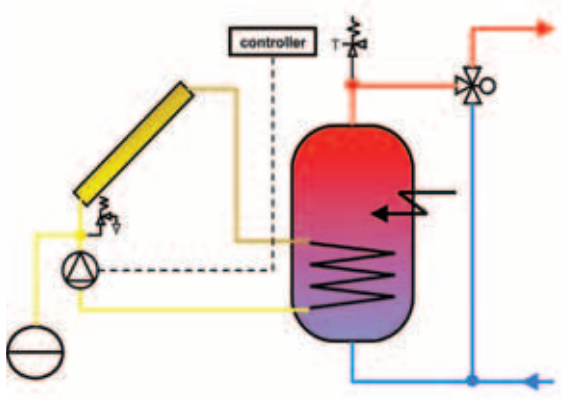
Back-up system:	Electricity
Annual solar yield:	5 446 kWh
Avoided CO_2:	1.88 tons per year

Solar Company – Installer

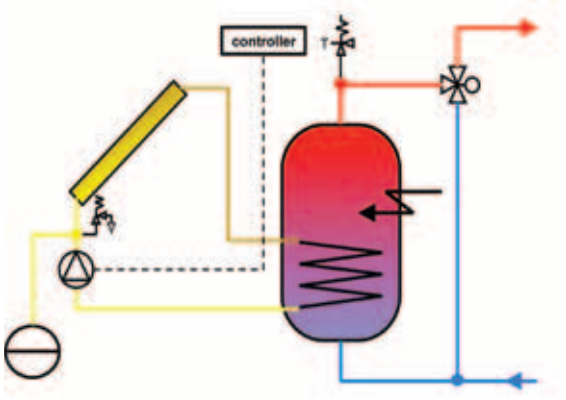
Solsquare Energy (Pty) Ltd

38 Newcastle Street, Unit 5,
Rosch Park,
Northern Industria,
Windhoek, Namibia

Pumped solar thermal system with hot water storage tank



Pumped solar thermal system with hot water storage tank



Zambesi Vocational Training Center

Private Bag 1064 Ngweze, KamaMulilo, Zambezi Region, Namibia

Description of the beneficiary

The Zambezi Vocational Training Centre (ZVTC) located at Katima Mulilo in the Caprivi Region, is a favourite choice of educational facility for its inhabitants who enroll to receive practical trade skills and training to advance in life.

The centre offers training in brick-laying and plastering, clothing and production, joinery and cabinetmaking, hospitality and tourism, plumbing and pipe-fitting, office administration and wielding and metal fabrication.

ZVTC also accommodates trainees sent from the National Youth Services, an organisation that provides disadvantaged youth with opportunities for further studies and training so as to enhance their opportunities for employment.

System description

Application:	Domestic hot water
System:	Pumped system

Collector

Type:	Flat plate collector
Installed collector area:	6.69 m² (4.6 kWth)
Orientation of the collector area:	North
Tilt angle:	15°
Collector manufacturer:	GREENoneTEC

For more information on collector type and manufacturer: http://www.greenonetec.com/

Hot water storage

Volume:	500 litres
Storage manufacturer:	Austria Email

For more information on storage tank and manufacturer: http://www.austria-email.com/

Back-up system:	Electricity
Annual solar yield:	5 446 kWh
Avoided CO_2:	1.88 tons per year

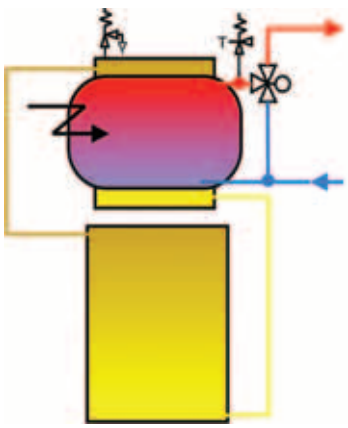
Solar Company – Installer

Solsquare Energy (Pty) Ltd

38 Newcastle Street, Unit 5, Rosch Park, Northern Industria, Windhoek, Namibia

SOUTH AFRICAN SYSTEMS

Indirect solar thermosyphon system with hot water storage tank



Bergridge Park

9 Systems

Edison Drive and Firgrove Way, Meadowridge Cape Town, South Africa

Description of the beneficiary

Bergridge Park Retirement Village consists of single and double occupancy flats. The hot water preparation was first done with conventional electrical geysers and upgraded to solar thermal systems. At Bergridge Park nine systems are installed.

System description

Application:	Domestic hot water
System:	Indirect thermosyphon system

Collector

Type:	Flat plate collector
Installed collector area:	9 x 3.74 m^2 (23.67 kW_{th})
Orientation of the collector area:	North
Tilt angle:	30°
Collector manufacturer:	Solahart, Australia

For more information on collector type and manufacturer: http://www.solahart.com/

Hot water storage

Volume:	9 x 300 litres
Storage manufacturer:	Solahart, Australia

For more information on storage tank and manufacturer: http://www.solahart.com/

Installation:	Bergridge Park 1**:** August 2013 Bergridge Park 2: May 2014
Back-up system:	Electricity
Annual solar yield:	28 485 kWh
Avoided CO_2:	9.89 tons per year

Solar Company – Installer

Solaheat - Div. of Solaheat Services CC

72 Zwaanswyk Road, Tokai, 7945, Cape Town, South Africa

Midrand Graduate Institute

2 Systems

Alsatian Road Glen Austin, Midrand, South Africa

Description of the beneficiary

RAB DEVCO is a property development company who has various long term contracts with universities. They provide housing for students who attend the various learning institutions.

System description

Application:	Sanitary hot water
System:	Pumped system with external plate heat exchanger, low-flow with a flow rate of 10 kg/m²*h

Collector

Type:	Flat plate collector
Installed collector area:	2 x 125 m² (175 kWth)
Orientation of the collector area:	North
Tilt angle:	40°/35°
Collector manufacturer:	GREENoneTEC

For more information on collector type and manufacturer: http://www.greenonetec.com/

Hot water storage

Volume:	12 x 1500 litres
Storage manufacturer:	Austria Email

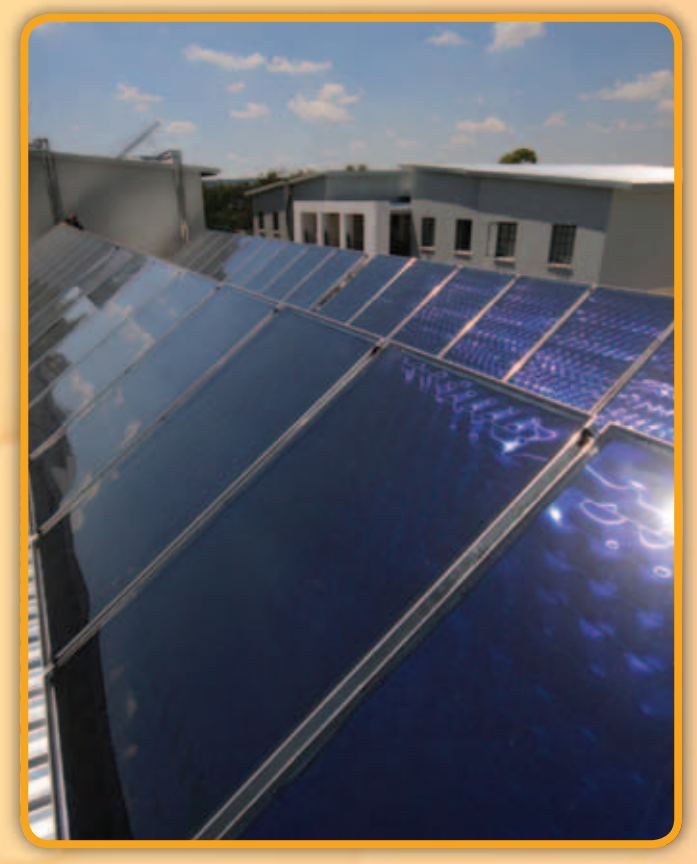
For more information on storage tank and manufacturer: http://www.austria-email.com/

Back-up system:	Heat pump
Installation:	January 2015
Annual solar yield:	216 750 kWh
Avoided CO_2:	74.95 tons per year

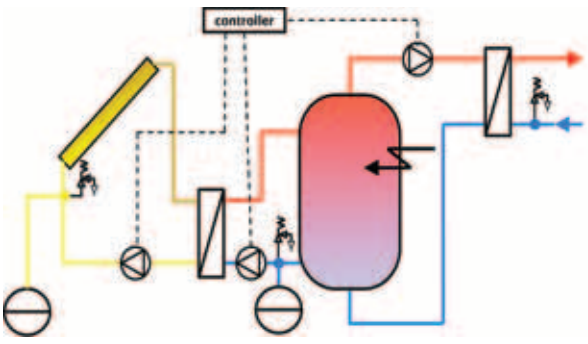
Solar Company – Installer

Sonnenkraft SA Pty (Ltd)

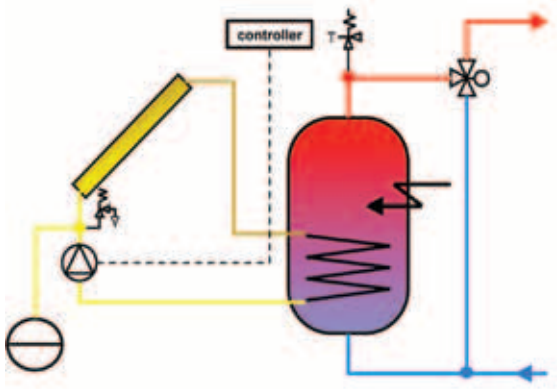
168 Bram Fischer Drive,
Randburg,
South Africa



Pumped solar thermal system with buffer storage tank, external heat exchanger and fresh water unit



Pumped solar thermal system with hot water storage tank



Foghound Interactive Coffee Company

24 Richards Drive, Halfway House, Midrand, 1685, South Africa

Description of the beneficiary

Foghound Interactive Coffee Company is a coffee company in South Africa that supplies a complete range of coffee solutions from traditional, super-automatic, fully-automatic and capsule machines to a wide range of coffee, both 100% Arabica coffee beans and capsule flavours, cleaning products and accessories.

System description

Application:	Hot water for kitchen
System:	Pumped system with internal heat exchanger, high-flow with a flow rate of 45 kg/m²*h

Collector

Type:	Evacuated tube collector
Installed collector area:	4.34 m² (3.04 kWth)
Orientation of the collector area:	North
Tilt angle:	26°
Collector manufacturer:	SUNDA Solar

For more information on collector type and manufacturer: http://www.sundasolar.com/, http://www.sunda.de/

Hot water storage

Volume:	2 x 200 litres
Storage manufacturer:	Eskol Solar
Back-up system:	Electricity
Installation:	July 2014
Annual solar yield:	3 763 kWh
Avoided CO_2:	1.3 tons per year

Solar Company – Installer

Holms and Friends cc

R511 ext, 26 Welgegund,
491 JQ, Hartbeespoort,
South Africa

Rosedon House

9 Systems

11 Rosedon Road, Rondebosch East, Cape Town, 7780, South Africa

Description of the beneficiary

Rosedon House is a residential facility for adults with cerebral palsy (CP) who are no longer able to live independently or with their families. Adults at Rosedon House come from communities across the Western Cape and have varying degrees of CP. Rosedon House offers independent supervised living, with each resident having their own room. Transport is provided to hospital and doctor appointments, sport association and social functions.

System description

Application:	Hot water preparation for domestic purposes
System:	Indirect thermosyphon system

Collector

Type:	Flat plate collector
Installed collector area:	9 x 4.28 m² (27 kWth)
Orientation of the collector area:	North
Tilt angle:	30°
Collector manufacturer:	Chromagen, Israel

For more information on collector type and manufacturer: http://chromagen.com/

Hot water storage

Volume:	9 x 300 litres
Storage manufacturer:	Chromagen, Israel

For more information on storage tank and manufacturer: http://chromagen.com/

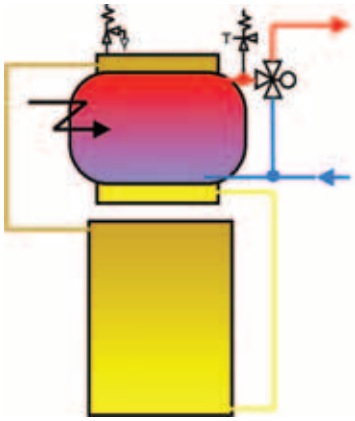
Back-up system:	Electricity
Installation:	September 2013 June 2014
Annual solar yield:	32 750 kWh
Avoided CO_2:	11.38 tons per year

Solar Company – Installer

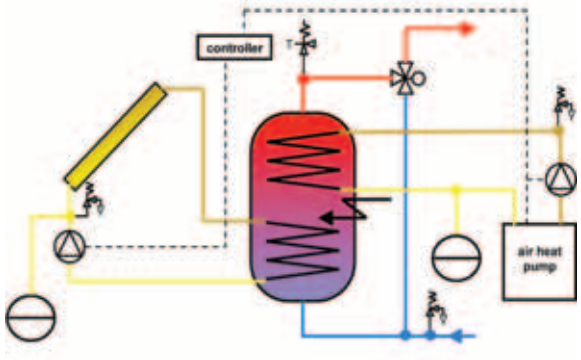
Solaheat – Div of Solaheat Services CC

72 Zwaanswyk Road, Tokai 7945, South Africa

Indirect solar thermosyphon system with hot water storage tank



Pumped solar thermal system with hot water storage tank and heat pump



Welverdiend Retirement Village

Corner of De Oewer Stellenberg Rd, Bellair, Cape Town

Description of the beneficiary

Welverdiend Retirement Resort is located in Bellair, Cape Town. The building is a home for the aged with 91 self-contained units providing accommodation for up to 130 people as well as a frail care unit for up to 25 people. Living units comprise a mix of studio, one and two bedroom apartments.

System description

Application:	Domestic hot water
System:	Pumped system with internal heat exchanger

Collector

Type:	Flat plate collector
Installed collector area:	50 m² (36 kWth)
Orientation of the collector area:	North-east
Tilt angle:	18°
Collector manufacturer:	Atlantic Solar, South Africa

For more information on collector type and manufacturer: http://www.greenonetec.com

Hot water storage

Volume:	3 x 2000 litres
Storage manufacturer:	Xstream Geysers, South Africa

For more information on storage tank and manufacturer: http://www.xstream.co.za/

Back-up system:	Heat pump
Installation:	November 2013
Annual solar yield:	36 358 kWh
Avoided CO_2:	12.6 tons per year

Solar Company – Installer

Deacon´s Solar, 12 Enslin Street, Paarl
Western Cape

Huis Horison

1 Patrys Street, Stellenbosch, South Africa

Description of the beneficiary

Huis Horison is a residential and sheltered-employment centre in Stellenbosch specialising in the holistic care of people with a primary intellectual disability.
Established in 1974, the centre is located on a smallholding on the slopes of Papegaaiberg Mountain.
The centre can house and care for 102 people and provide employment to all the residents as well as 30 day-workers.
More information of the care facility can be found via:
www.huishorison.org.za

System description

Application:	Hot water preparation for domestic purposes
System:	Pumped system

Collector

Type:	Flat plate collector
Installed collector area:	18.4 m² (12.88 kWth)
Orientation of the collector area:	North
Tilt angle:	30°
Collector manufacturer:	GREENoneTEC

For more information on collector type and manufacturer:
http://www.greenonetec.com

Hot water storage

Volume:	1 000 litres
Storage manufacturer:	Austria Email

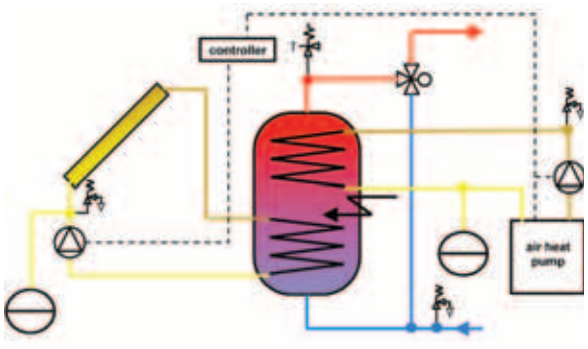
For more information on manufacturer of storage tank:
www.austria-email.at/

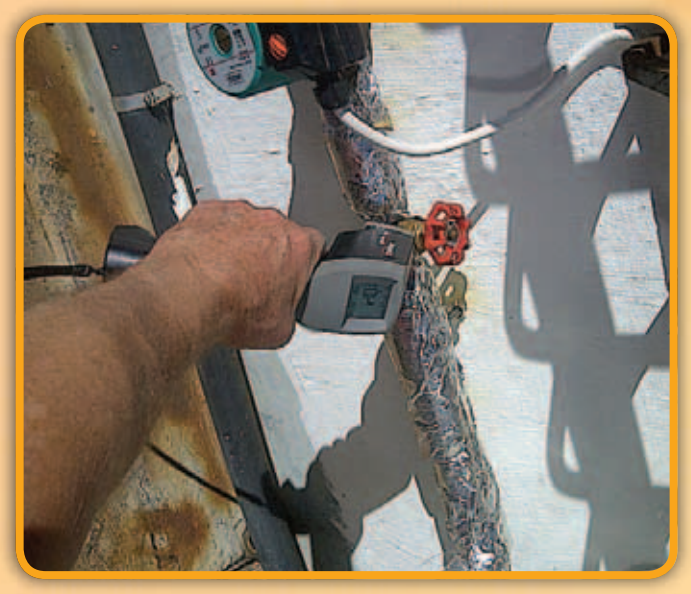
Back-up system:	11.8 kW heat pump
Installation:	July 2013
Annual solar yield:	13 380 kWh
Avoided CO_2:	4.628 tons per year

Solar Company – Installer

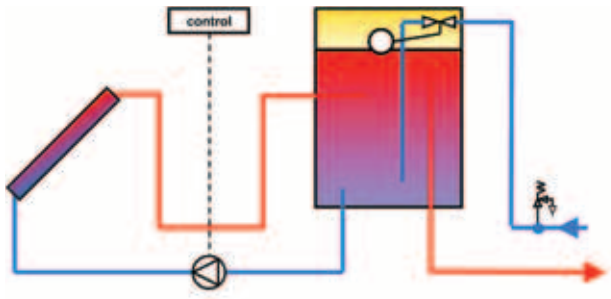
Natural Dynamics / E3 Engineered Energy Efficiency Pty Ltd
Unit 1, V Park, Buketraube Road,
Saxenburg Business Park 2
Cape Town
South Africa

Pumped solar thermal system with hot water storage tank and heat pump





Direct pumped solar thermal system with hot water storage tank (non-pressurised)



Zuid Afrikaans Hospital

4 Systems

255 Bourke Street, Muckleneuck, Pretoria, South Africa

Description of the beneficiary

Zuid Afrikaans Hospital is owned by a not for profit organization. It was founded more than 100 years ago to treat patients from the concentration camps after the Anglo-Boer war. The hospital has 134 beds. Zuid Afrikaans Hospital is a large scale demonstration site with sufficient roof space for solar collectors and hot water storage tanks. The reduction in electricity cost will improve the running cost of the only non-profit hospital in South Africa. More information on the hospital can be found via: http://www.zah.co.za/about_us/

System description

Application:	Hospital hot water for bath and kitchen
System:	Pumped high-flow system, flow rate 35 kg/m²*h

Collector

Type:	Flat plate collector
Installed collector area:	System 1: 11.2 m² (7.8 kWth) System 2: 4.4 m² (3 kWth) System 3: 18.6 m² (13 kWth) System 4: 11.8 m² (8.2 kWth)
Orientation of the collector area:	North
Tilt angle:	30°
Collector manufacturer:	Powerz-on

For more information on collector type and manufacturer: http://www.powerz-on.co.za/

Hot water storage

Volume:	3 630 litres
Storage manufacturer:	Pioneer Plastics Energy (Pty) Ltd with Michelangelo Technology
Installation:	December 2013
Annual solar yield:	39 882 kWh
Avoided CO_2:	13.794 tons per year

Solar Company – Installer

Pioneer Plastics Energy (Pty) Ltd with Michelangelo Technology

5 Potgieter Street, Rosslyn, Pretoria, South Africa

Grün: Bed & Breakfast, Training Centre & Office

R511 ext, 26 Welgegund, 491 JQ, Hartbeespoort, South Africa

Description of the beneficiary

Grün is a Bed & Breakfast which will eventually have nine bedrooms for business people and weekend holiday travellers. In addition, the building houses a multi-purpose event hall intended for training of professionals and end-users in the build- and energy industry. It also houses the offices of Holms and Friends, a local energy consultancy.

System description

Application:	Domestic hot water and underfloor heating for 500 m² floor area
System:	Pumped system with external plate heat exchanger, high-flow with a flow rate of 45 kg/m²*h

Collector

Type:	Evacuated tube collector
Installed collector area:	41 m² (28.76 kWth)
Orientation of the collector area:	North
Tilt angle:	75°
Collector manufacturer:	SUNDA Solar

For more information on collector type and manufacturer: http://www.sundasolar.com/, http://www.sunda.de/

Hot water storage

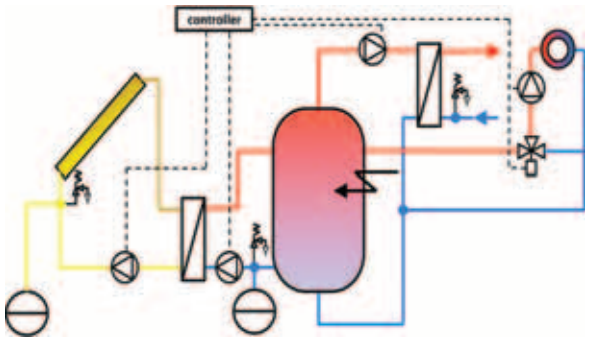
Volume:	3500 litres
Storage manufacturer:	Eskol Solar
Back-up system:	Heat pump driven by a photovoltaic array
Installation:	June 2014
Annual solar yield:	35 547 kWh
Avoided CO_2:	12.294 tons per year

Solar Company – Installer

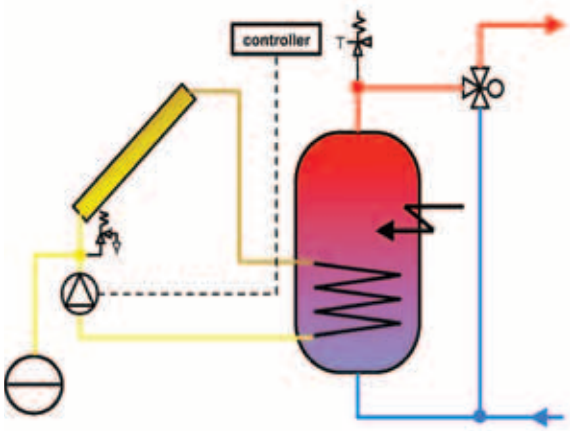
Holms and Friends cc

R511 ext, 26 Welgegund, 491 JQ, Hartbeespoort, South Africa

Pumped solar thermal combi system with buffer storage tank, external heat exchanger, fresh water unit and space heating



Pumped solar thermal system with hot water storage tank



Monte Vista Housing Units

3 Systems

R511 ext, Monte Vista Development, Hartbeespoort, South Africa

Description of the beneficiary

Smart Energy is an ESCo service provider who is installing energy efficiency and renewable energy systems on the buildings which the company Econocom is constructing. Initial systems have been implemented to verify the calculated energy savings

System description

Application:	Domestic hot water and underfloor heating for 500 m² floor area
System:	Pumped system with internal heat exchanger, high-flow 45 kg/m²*h

Collector

Type:	Flat plate collector
Installed collector area:	3 x 8 m² (16.8 kWth)
Orientation of the collector area:	North
Tilt angle:	12°
Collector manufacturer:	SUNDA Solar

For more information on collector type and manufacturer:

http://www.sundasolar.com/

Hot water storage

Volume:	3 x 800 litres
Storage manufacturer:	Elbi, Italy

For more information on storage tank and manufacturer: http://termoidraulica.elbi.it/

Back-up system:	Electricity
Installation:	November 2014
Annual solar yield:	20 808 kWh
Avoided CO_2:	7.2 tons per year

Solar Company – Installer

Holms and Friends

R511 ext, 26 Welgegund, 491 JQ, Hartbeespoort, 0216, South Africa

Louis Jackman Guesthouse

R511 ext, Portion 134, Farm Rietfontein, 485 JQ, Hartbeespoort, South Africa

Description of the beneficiary

Louis Jackman Guest House has six double bed bedrooms and three private bedrooms. In total the guest house can accommodate seventeen people. Each bedroom has shower and hand wash basin. Some are equipped with a bath. In addition there is a central kitchen

System description

Application:	Domestic hot water
System:	Pumped system with internal heat exchanger, high-flow 45Kg/m²*h

Collector

Type:	Flat plate collector
Installed collector area:	20 m² (14 kW_{th})
Orientation of the collector area:	North-west
Tilt angle:	35°
Collector manufacturer:	SUNDA Solar

For more information on collector type and manufacturer: http://www.sundasolar.com/, http://www.sunda.de/

Hot water storage

Volume:	1500 litres
Storage manufacturer:	Elbi, Italy

For more information on storage tank and manufacturer: http://termoidraulica.elbi.it/

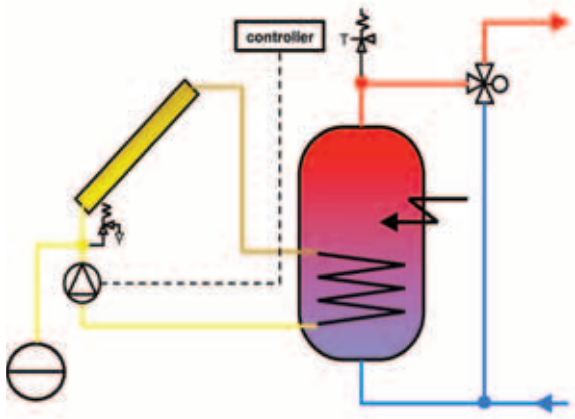
Back-up system:	Heat pump
Installation:	November 2014
Annual solar yield:	17 340 kWh
Avoided CO_2:	6 tons per year

Solar Company – Installer

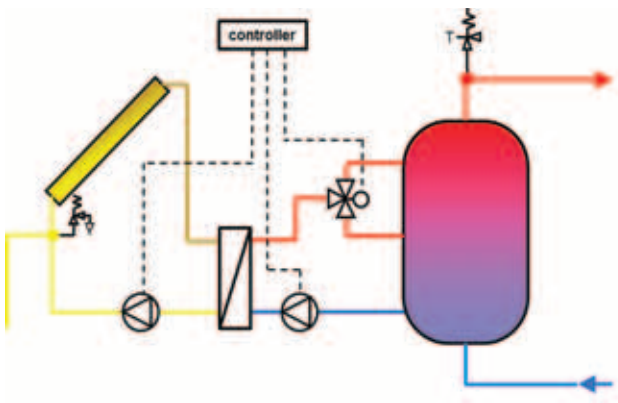
Holms and Friends

R511 ext, 26 Welgegund, 491 JQ, Hartbeespoort, 0216, South Africa

Pumped solar thermal system with hot water storage tank



Pumped solar thermal system with hot water storage tank, external heat exchanger and stratification



Cape Brewing Company

Spice Route Farm, Suid-Agter Paarl Road, Suider-Paarl, Western Cape, South Africa

Description of the beneficiary

Cape Brewing Company is a state-of-the-art craft brewery which opened in 2012. It produces 30 000 hl of beer annually but is continually growing to meet the rising demand. Since 2013 more than 30 permanent positions have been created. The brewery received more than 45 000 visitors in 2014.

System description

Application:	Process heat (Brew water and cleaning processes)
System:	Pumped system

Collector

Type:	Flat plate collector
Installed collector area:	120 m² (84 kWth)
Orientation of the collector area:	North
Tilt angle:	15°
Collector manufacturer:	GREENoneTEC

For more information on collector type and manufacturer: http://www.greenonetec.com/

Hot water storage

Volume:	10 000 litres
Storage manufacturer:	Saturn Stainless Industries

For more information on storage tank and manufacturer: http://www.saturnstainless.co.za/

Back-up system:	Existing paraffin boiler
Installation:	November 2015
Annual solar yield:	105 600 kWh
Avoided CO_2:	32.3 tons per year

Solar Company – Installer

E3 Engineered Energy Efficiency (www.e3energy.co.za)

Unit 1, V-Park, Buketraube Road, Saxenburg Business Park 2, Blackheath, 7580, South Africa

Chalmar Beef

2 Systems

Section 10, Tweefontein 19IR
Bapsfontein, South Africa

Description of the beneficiary

Chalmar Beef Pty (Ltd) is a family owned business and was established in 1969. Chalmar Beef Pty (Ltd) grows and produces their own feedstock, they also own their own livestock and have a fully operational abattoir facility in place with a capacity to slaughter and process up to 400 cattle per day.

System description

Application:	Ablution Staff hot water
System:	Drain back system

Collector

Type:	Flat plate collector
Installed collector area:	2 x 55.8 m² (2x39 kWth)
Orientation of the collector area:	North
Tilt angle:	22°
Collector manufacturer:	Genergy

For more information on collector type and manufacturer: http://www.genergy.co.za/

Hot water storage

Volume:	2x5000 litres
Storage manufacturer:	Energyweb

For more information on storage tank and manufacturer: http://www.energyweb.co.za/

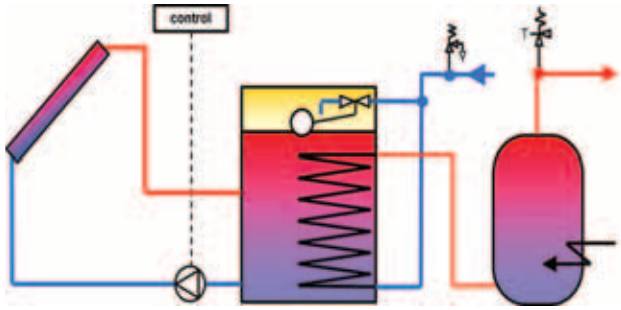
Back-up system:	Electricity
Installation:	December 2015
Annual solar yield:	104 040 kWh
Avoided CO_2:	35.9 tons per year

Solar Company – Installer

ENERGYWEB

673, Berg Ave, Florauna, Pretoria, South Africa

Direct pumped solar system with non-pressurised buffer storage tank (drain back)



LESOTHO SYSTEMS

St. Camillus Orphanage

4 Systems

Mohlakeng, Mohales Hoek, Lesotho

Description of the beneficiary

The beneficiary is the orphanage that will accommodate 32 children; it is called St. Camillus and is based in Mohale's hoek, Lesotho. The place takes care of orphans and they need hot water for domestic use.

System description

Application:	Domestic hot water for showers and kitchen
System:	Indirect thermosyphon system

Collector

Type:	Flat plate collector
Installed collector area:	4 x 2.48 m² (4 x 1.725 kWth)
Orientation of the collector area:	North
Tilt angle:	40°
Collector manufacturer:	Solimpeks

For more information on collector type and manufacturer: http://www.solimpeks.de/

Hot water storage

Volume:	800 litres (4 x 200 litres)
Storage manufacturer:	Xstream

For more information on storage tank and manufacturer: http://www.xstream.co.za/

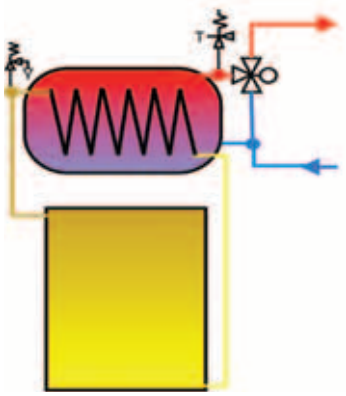
Back-up system:	-
Installation:	August 2014
Annual solar yield:	10 000 kWh
Avoided CO_2:	3 462 tons per year

Solar Company – Installer

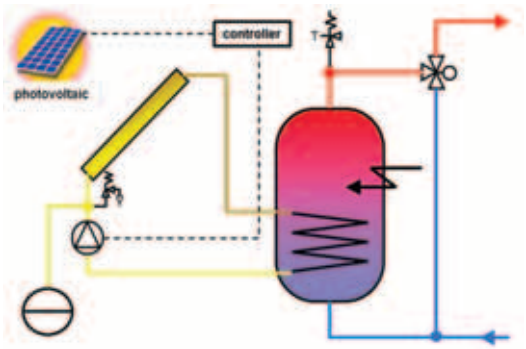
Solar Soft

Mohales Hoek, Lesotho

Indirect solar thermosyphon system with hot water storage tank medium pressure (fibre glass)



Pumped solar thermal system with hot water storage tank. Pumps, controller and the monitoring devices are powered by a small photovoltaic system.



Nazareth Health Centre

Ha Ramabanta, Maseru

Description of the beneficiary

Nazareth Health Centre is located at the outskirts of Maseru and accommodates a maternity clinic for women from the surrounding rural areas. The solar thermal system supplies the showers of the bedrooms of pregnant women.

System description

Application:	Domestic hot water for showers
System:	Pumped system

Collector

Type:	Flat plate collector
Installed collector area:	5.55 m² (3.9 kW_{th})
Orientation of the collector area:	North
Tilt angle:	35°
Collector manufacturer:	GREENoneTEC

For more information on collector type and manufacturer: http://www.greenonetec.com/

Hot water storage

Volume:	300 litres
Storage manufacturer:	Austria Email

For more information on storage tank and manufacturer: www.austria-email.at/

Back-up system:	-
Installation:	August 2015
Annual solar yield:	4 770 kWh
Avoided CO_2:	1.6 tons per year

Solar Company – Installer

Kaybon

Moshoeshoe Road, Maseru, Lesotho

St. Joseph Hospital

Roma 180, Lesotho

Description of the beneficiary

The beneficiary is a hospital that accommodates 30 beds. It is called St Joseph Hospital and based in Roma, Lesotho. The place takes care of patients and they need hot water for domestic use.

System description

Application:	Domestic hot water for showers and kitchen
System:	Pumped system with internal heat exchanger

Collector

Type:	Flat plate collector
Installed collector area:	14.1 m² (9.8 kWth)
Orientation of the collector area:	North
Tilt angle:	20°
Collector manufacturer:	GREENoneTEC

For more information on collector type and manufacturer: http://www.greenonetech.com/

Hot water storage

Volume:	1000 litres
Storage manufacturer:	Austria Email

For more information on storage tank and manufacturer: http://www.austria-email.com/

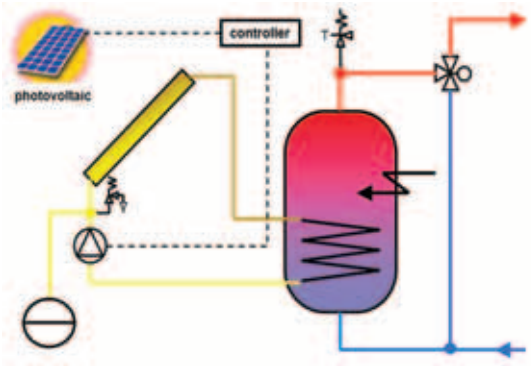
Back-up system:	-
Installation:	January 2015
Annual solar yield:	15 135 kWh
Avoided CO_2:	5.2 tons per year

Solar Company – Installer

Solar Soft

Mohales Hoek, Lesotho

Pumped solar thermal system with hot water storage tank and photovoltaics



ZIMBABWEAN SYSTEMS

Fambidzanai Permaculture Centre

4 Dovedale Road, Mount Hampden, Harare, Zimbabwe

Description of the beneficiary

Fambidzanai Permaculture Centre (FPC) is a non-governmental organisation, registered as a trust in Zimbabwe that was established in 1988. FPC promotes permaculture and provides courses with specific objectives on use of natural resources, health and food security. FPC is located in a 42 hectare plot and can accommodate up to 40 guests but on average they have 30 beds occupied on three days per week. Catering and conference facilities are available to individuals, training participants and tourists.

System description

Application:	Hot water preparation for showers and kitchen
System:	Direct thermosyphon system

Collector

Type:	Flat plate collector
Installed collector area:	8 m² (5.6 kWth)
Orientation of the collector area:	North
Tilt angle:	15°
Collector manufacturer:	Sunrain

For more information on collector type and manufacturer:

http://en.sunrain.com/

Hot water storage

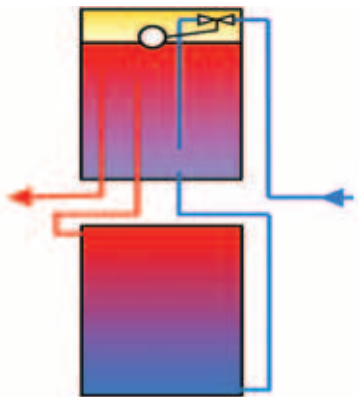
Volume:	500 litres
Storage manufacturer:	SuneX Solar Systems P/L
Installation:	November 2013
Annual solar yield:	6 832 kWh
Avoided CO_2:	2.36 tons per year

Solar Company – Installer

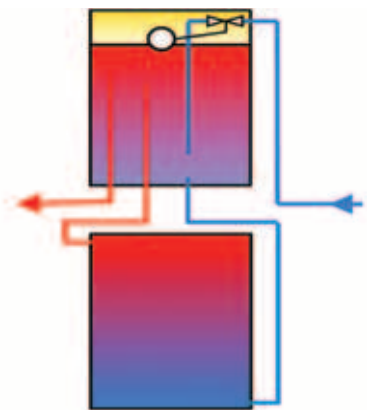
SuneX Solar Systems P/L

28 Seke Road, Hatfield, Harare, Zimbabwe

Direct solar thermosyphon system with hot water storage tank (non-pressurised)



Direct solar thermosyphon system with hot water storage tank (non-pressurised)



Mary Ward House Girls' Hostel

3 Systems

Chishawasha, Harare Zimbabwe

Description of the beneficiary

The hostels are part of the St. Ignatius College in Chishawasha which is a full-time boarding school. Mary Ward Sisters run the hostel for 54 A-Level girls who attend school at nearby St. Ignatius College.

System description

Application:	Hot water preparation for showers and kitchen
System:	Direct thermosyphon system

Collector

Type:	Flat plate collector
Installed collector area:	System1 : 13.8 m^2 (9.65 kW_{th}) System 2: 13.8 m^2 (9.65 kW_{th}) System 3: 6.9 m^2 (4.8 kW_{th})
Orientation of the collector area:	West-northwest
Tilt angle:	35˚/15˚
Collector manufacturer:	SolarMAX, South Africa

For more information on collector type and manufacturer: http://www.solarmax.co.za/

Hot water storage

Volume:	System 1: 1000 litres System 2: 1000 litres System 3: 500 litres
Storage manufacturer:	SuneX Solar Systems P/L
Back-up system:	-
Installation:	January 2014
Annual solar yield:	23 570 kWh
Avoided CO_2:	8.15 tons per year

Solar Company – Installer

SuneX Solar Systems P/L

28 Seke Road, Hatfield, Harare, Zimbabwe

Mzuri Sana Farm

2 Systems

Tarisa Road, Ruwa, Zimbabwe

Description of the beneficiary

The Mzuri Sana Farm is a chicken farm located in Ruwa, Zimbabwe. Staff have to shower when entering and leaving the poultry hatchery area. The 200 litre pressure geyser cannot cope with the demand for 30 to 40 showers per day. In order to relieve the electricity supply situation, two solar thermal systems were installed.

System description

Application:	Staff showers on a chicken farm
System:	Direct thermosyphon system

Collector

Type:	Flat plate collector
Installed collector area:	2 x 16.1 m² (2 x 11.3 kWth)
Orientation of the collector area:	West-northwest
Tilt angle:	15°
Collector manufacturer:	SolarMax, South Africa

For more information on collector type and manufacturer: http://www.solarmax.co.za/

Hot water storage

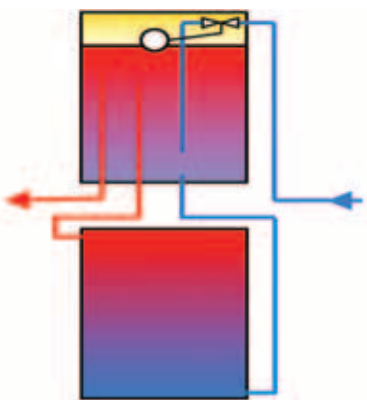
Volume:	2 x 1000 litres
Storage manufacturer:	SuneX Solar Systems P/L
Installation:	January 2014
Back-up system:	Electric geysers
Annual solar yield:	27 498 kWh
Avoided CO_2:	9.52 tons per year

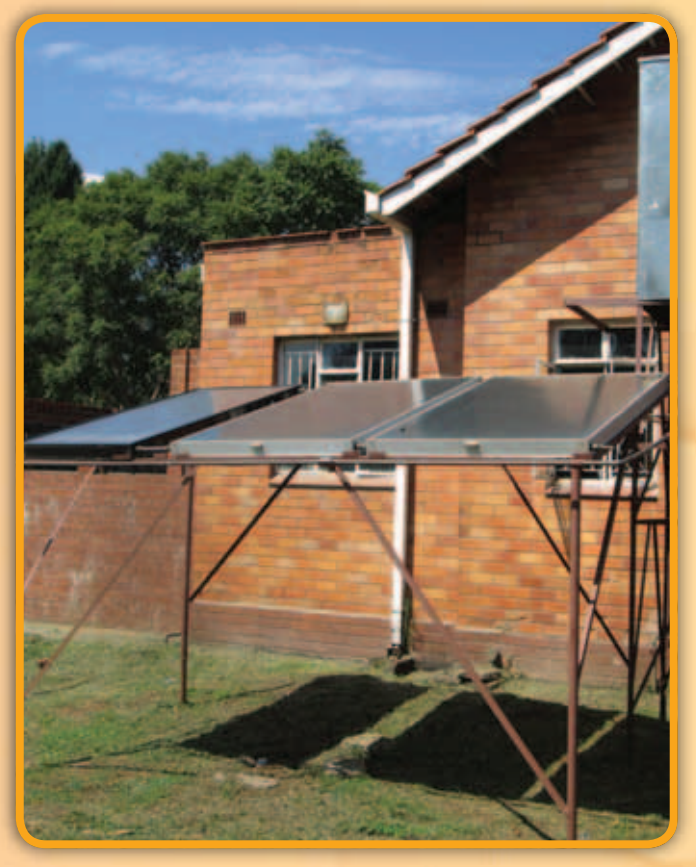
Solar Company – Installer

SuneX Solar Systems P/L

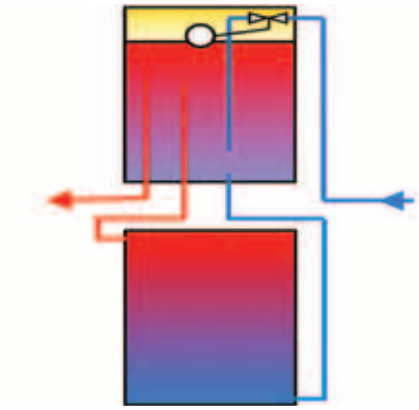
28 Seke Road, Hatfield, Harare, Zimbabwe

Direct solar thermosyphon system with hot water storage tank (non-pressurised)





Direct solar thermosyphon system with hot water storage tank (non-pressurised)



St. Ignatius College

2 Systems

Chishawasha, Harare, Zimbabwe

Description of the beneficiary

St. Ignatius College is a high school near Harare, Zimbabwe. It is a full time boarding school and was founded in 1962 by the Jesuits. The school is male for forms one to four and coeducational for A-level students. The hostels accommodate 400 boys.

System description

Application:	Hot water preparation for showers and kitchen
System:	Direct thermosyphon system

Collector

Type:	Flat plate collector
Installed collector area:	System 1: 16.1 m² (11.3 kWth) System 2: 6.9 m² (4.8 kWth)
Orientation of the collector area:	System 1: North-west System 2: North
Tilt angle:	System 1: 35° System 2: 20°
Collector manufacturer:	SolarMAX, South Africa

For more information on collector type and manufacturer: http://www.solarmax.co.za/

Hot water storage

Volume:	System 1: 1000 litres System 2: 500 litres
Storage manufacturer:	SuneX Solar Systems P/L
Back-up system:	System 1: No-backup system System 2: Electricity\
Installation:	May 2014
Annual solar yield:	19 641 kWh
Avoided CO_2:	6.79 tons per year

Solar Company – Installer

SuneX Solar Systems P/L

28 Seke Road, Hatfield, Harare, Zimbabwe

Wadzanai Training Centre

90 Ridgeway North, Borrowdale, Harare, Zimbabwe

Description of the beneficiary

The primary mission of Wadzanai Training Centre is the academic and pastoral formation of students preparing for church leadership, advanced theological studies and a variety of ministries in Zimbabwe and around the world. The process takes place within a community of faith in interaction with a living Catholic tradition and ecumenical perspectives.

System description

Application:	Hot water preparation for laundry and staff shower
System:	Direct thermosyphon system

Collector

Type:	Flat plate collector
Installed collector area:	15 m² (10.5 kWth)
Orientation of the collector area:	North
Tilt angle:	10°/30°
Collector manufacturer:	EDS, South Africa

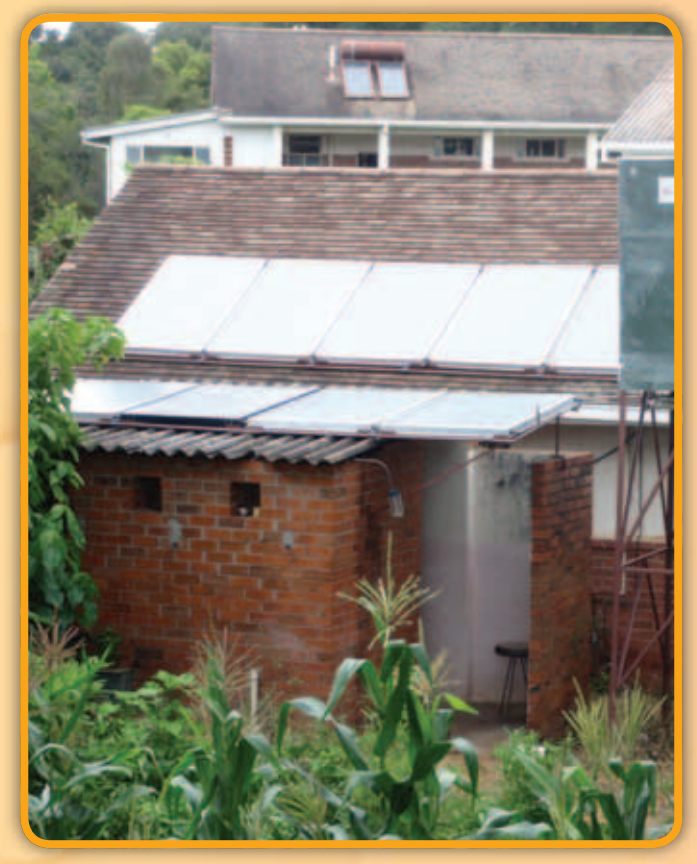
Hot water storage

Volume:	1000 litres
Storage manufacturer:	SuneX Solar Systems P/L
Installation:	October 2013
Back-up system:	-
Annual solar yield:	12 810 kWh
Avoided CO_2:	4.43 tons per year

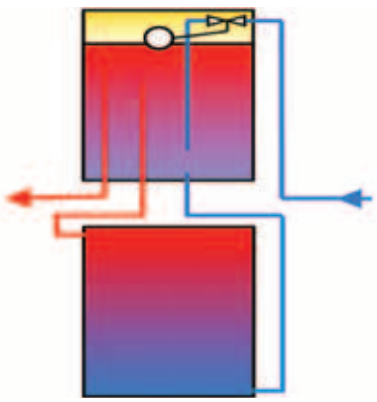
Solar Company – Installer

SuneX Solar Systems P/L

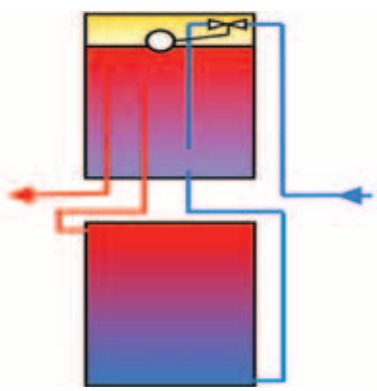
28 Seke Road, Hatfield, Harare, Zimbabwe



Direct solar thermosyphon system with hot water storage tank (non-pressurised)



Direct solar thermosyphon system with hot water storage tank (non-pressurised)



Churchill Boys High School

3 Systems

1 Worcester Road, Eastlea, Harare, Zimbabwe

Description of the beneficiary

Churchill Boys High School is a boarding school with an enrolment of 350 boys. It opened the doors to its first students in 1959. It also has 1000 day-scholars spanning from form 1 to form 6. Churchill Boys High School is a school which has a wide curriculum covering both the academic and sports side of the young boys. Over the years the school has contributed a lot towards the nation's manpower needs. At Churchill Boys High School three systems are installed that are financed by the Austrian Development Agency and OFID respectively.

System description

Application:	Hot water preparation for external taps
System:	Direct thermosyphon system

Collector

Type:	Flat plate collector
Installed collector area:	2 x 16 m² (2x11.2 kW_{th}), 1 x 32 m² (22.4 kW_{th})
Orientation of the collector area:	North
Tilt angle:	18°
Collector manufacturer:	Sunrain

For more information on collector type and manufacturer: http://en.sunrain.com/

Hot water storage

Volume:	2 x 1000 litres, 1 x 2500 litres
Storage manufacturer:	SuneX Solar Systems P/L
Back-up system:	--
Installation:	May 2015, October 2015
Annual solar yield:	54 676 kWh
Avoided CO_2:	18.9 tons per year

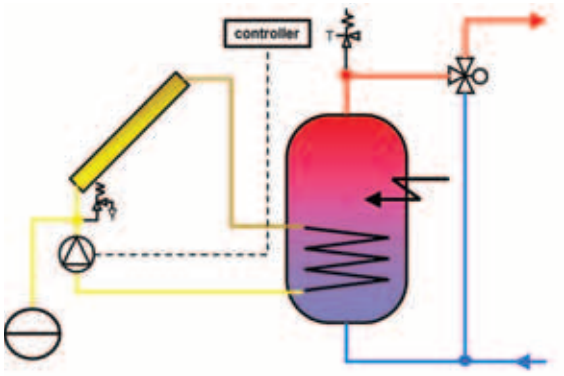
Solar Company – Installer

SuneX Solar Systems P/L

28 Seke Road, Hatfield, Harare, Zimbabwe

MOZAMBICAN SYSTEMS

Pumped solar thermal system with hot water storage tank



Ndlavela Hospital

Rua da Saude 141, Bairro de Ndlavela-Machava, Municipio da Matola, Mozambique

Description of the beneficiary

Located 15 km away from the capital Maputo, in the "Ndlavela Urban District", this is a peri-urban Health Center initially designed to assist 25 in-patients in the maternity and infirmary wards. There are very limited maintenance staff (not more than 2) with few plumbing skills.

System description

Application:	Domestic hot water for showers and kitchen
System:	Pumped system

Collector

Type:	Flat plate collector
Installed collector area:	20.7 m² (14.5 kW_{th})
Orientation of the collector area:	North
Tilt angle:	40°
Collector manufacturer:	GREENoneTEC

For more information on collector type and manufacturer: http://www.greenonetech.com/

Hot water storage

Volume:	1000 litres
Storage manufacturer:	Austria Email

For more information on storage tank and manufacturer: http://www.austria-email.com/

Back-up system:	-
Installation:	December 2011
Annual solar yield:	16 498 kWh
Avoided CO_2:	5.7 tons per year

Solar Company – Installer

SEG Solar Energy (Pty) Ltd

168 Bram Fischer Drive, Randburg, South Africa

Psychiatric Hospital Centro de Rehabilitacao

Av. Sebastiao Mabote 2176, Mahotas, Maputo, Mozambique

Description of the beneficiary

Located 8 km away from the capital Maputo, in the "Mahotas Urban District", this is a peri-urban Health Center initially designed to assist around 70 full and part time adults and children with mental health impairment. It is run by Christian Sisters, with limited number of them exposed, in the past, to Solar Hot Water Systems (in Europe). There is one full-time maintenance engineer with universal vocation (i.e., electricity, plumbing, some in-house machinery, etc.).

System description

Application:	Domestic hot water for showers and kitchen
System:	Pumped system

Collector

Type:	Flat plate collector
Installed collector area:	20.7 m² (14.5 kWth)
Orientation of the collector area:	Northeast
Tilt angle:	40°
Collector manufacturer:	GREENoneTEC

For more information on collector type and manufacturer: http://www.greenonetech.com/

Hot water storage

Volume:	1000 litres
Storage manufacturer:	Austria Email

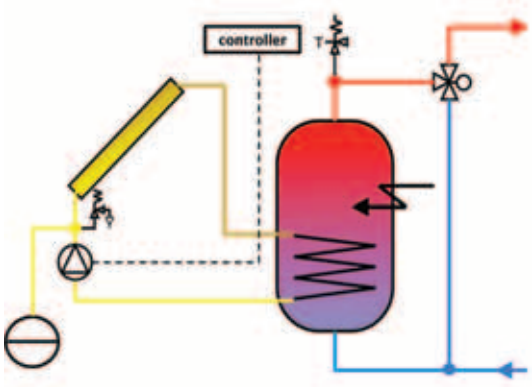
For more information on storage tank and manufacturer: http://www.austria-email.com

Installation:	December 2011
Annual solar yield:	16 498 kWh
Avoided CO_2:	5.7 tons per year

Solar Company – Installer

SEG Solar Energy (Pty) Ltd

168 Bram Fischer Drive, Randburg, South Africa



Pumped solar thermal system with hot water storage tank

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