

# Solar Thermal Refrigeration & Air Conditioning

Solar thermal assisted compression technologies providing effective and efficient process cooling

ThermX technology substantially increased the efficiency of the refrigeration within this SuperSpar Store located in East London, South Africa. Our system is an innovative, combined technology designed to harvest the free energy from the sun, thus creating thermal energy to better assist the refrigerant compression process.



The Gonubie SuperSpar, equipped with 2 Multiplex Refrigeration Racks was the first client for Solar Cool South Africa's ThermX refrigeration solution – defeating the ever increasing electrical consumption and costs, while harnessing the energy of a cooling system's "enemy" to do so i.e. the Sun.





## CUSTOMER SITUATION:

Over recent years, energy prices have continued to rise exponentially in South Africa, putting financial pressure on their consumers as well as themselves.

This can have a severe impact on overall site/group profitability, with electricity now being one of the largest overheads (expenses) in this Spar group, as they own multiple stores.

We needed to provide a solution which could provide this store/group with a competitive edge against the ever increasing electricity tariffs.

## CHALLENGE:

Any additional capital expenditure involved in the whole installation must have a Return on Investment for the Group of no more than 5-years.



IMPORTED BY	: PHOENIX RACKS (PYT) LTD CAPE TOWN / SOUTH AFRICA +27 21 712 2288
TYPE	: PXR 05
CODE	: M06 07 15 00
VOLUME	: 160 LT
WORKING PRESSURE	: 33 BAR
WORKING TEMPERATURE	: -10 C° / +120 C°
TEST PRESSURE	: 37 BAR
COUNTRY OF ORIGIN	: TURKEY
PRODUCTION DATE	: 26.05.2013
PRODUCT STANDART	: EN 14276 - EN 13445
PRODUCT CATHEGORY	: CAT IV
CERTIFICATION BODY	: TUV SUD TURKEY

## SOLUTION:

To provide the group with the most cost effective Solar Thermal Refrigeration Solution in the world – no mechanical parts; no maintenance; life expectancy 20+ years; hotter it gets, the more efficient the provided solution.

With this decrease in overhead costs, the store sets themselves at a great competitive advantage in the market increasing their profitability.

For every other refrigeration system on the planet, the sun is effectively the enemy...with SolarCool however, the hotter it gets, the more efficient it becomes; reducing overall energy consumption by up to 60% when the sun is in the sky.

“South Africa benefits from between 2500hrs and 2600hrs unbroken sunshine every year, at such a small comparative additional cost there are no reasons why any business would not take advantage of this free energy on their cooling and heating systems”

## BENEFITS:

- Reduced electricity overhead
- Reduced ongoing equipment maintenance costs
- Extended lifespan of equipment
- Reduced CO2 production

## THE RESULTS:

Below are the figures for the first multiplex system which was fitted with ThermX – metering direct power drawn from that multiplex only.

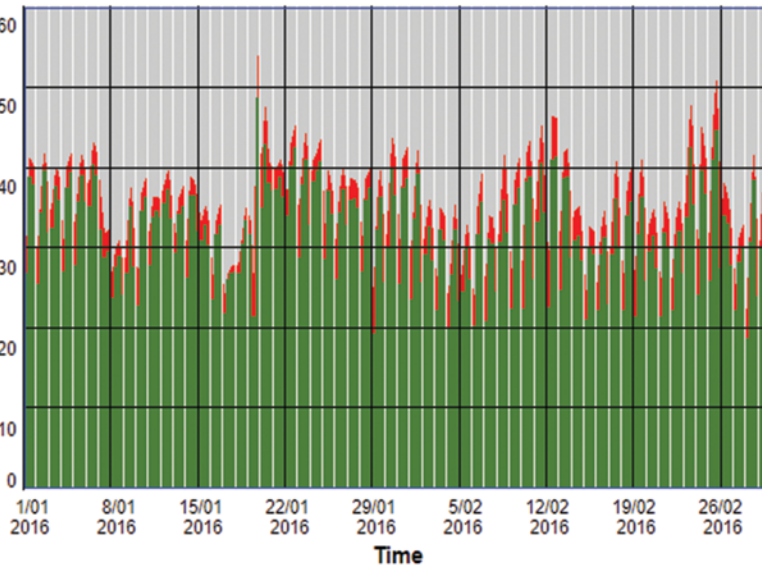
Consumption Figures before ThermX  
 kWh: 35993,768 kVA: 53,731

Period: 01 Jan 2016 – 01 Mar 2016

**Electricity use:**

**Spar - Gonubie Refrigeration**

kW  
 kVA



Fri Jan 01 2016 00:00 to Tue Mar 01 2016 00:00

35993.768 kWh. 53.731 kVA. pf=0.90 @ 2016-01-19 17:30. LoadFactor(kVA)=49%. LoadFactor(kWh)=5

Loss due to Power Factor <1=R1182.

### Provisional Bill

**Customer:** Spar - Gonubie Refrigeration **Document date:** 2018-10-29 08:29  
**Meter Account:** 17493  
**Period:** From 2016-01-01 00:00:00.000 to 2016-03-01 00:00:00.000  
**Tariff:** Buffalo City - 3A - Large Power Users 400V  
**Meter Totals:** **51502776** Start reading: 00273134kWh 00048526kvarh  
 (Elster A1700) End reading: 00309128kWh 00061203kvarh

17493 Electricity: Energy consumption total - 35994kWh

Tariff	Description	Units	Rate[R]	Amount
Monthly Basic Charge		1month	751.5156	R751.51
Consumption	Spar - Gonubie Refrigeration , 51502776	35993.768kWh	0.6297	R22,664.19
Demand Charge	0.905pf 2016-01-19 17:30	53.73kVA	231.6593	R12,447.05
Sub Total:				R35,862.75

**Total before VAT:** R35,862.75  
**VAT(15.0%):** R5,379.41  
**Total:** R41,242.16

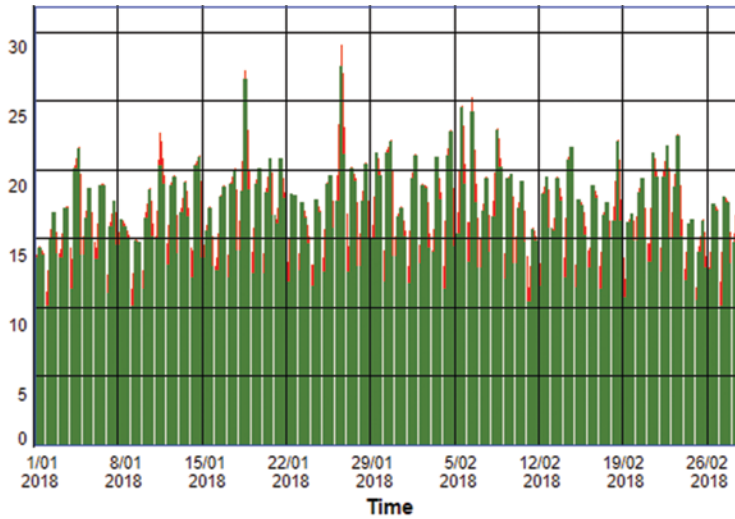


Consumption Figures with ThermX installed

kWh: 18654,523 kVA: 29.011 Period: 01 Jan 2018 – 01 Mar 2018

Electricity use:  
Spar - Gonubie Refrigeration

kW  
kVA



Mon Jan 01 2018 00:00 to Thu Mar 01 2018 00:00

18654.523 kWh. 29.011 kVA. pf=0.94 @ 2018-01-26 14:30. LoadFactor(kVA)=45%. LoadFactor(kWh)=47%.

Loss due to Power Factor <1=R390.

Provisional Bill

**Customer:** Spar - Gonubie Refrigeration **Document date:** 2018-10-29 08:27  
**Meter Account:** 17493  
**Period:** From 2018-01-01 00:00:00.000 to 2018-03-01 00:00:00.000  
**Tariff:** Buffalo City - 3A - Large Power Users 400V  
**Meter Totals:** **51502776** Start reading: 00577742kWh 00128329kvarh  
 (Elster A1700) End reading: 00596397kWh 00130069kvarh

17493 Electricity: Energy consumption total - 18655kWh

Tariff	Description	Units	Rate[R]	Amount
Monthly Basic Charge		1month	824.1064	R824.10
Consumption	Spar - Gonubie Refrigeration - 51502776	18654.523kWh	0.6905	R12,881.32
Demand Charge	0.947pf 2018-01-26 14:30	029.01kVA	254.0461	R7,369.87
<b>Sub Total:</b>				<b>R21,075.29</b>
<b>Total before VAT:</b>				<b>R21,075.29</b>
<b>VAT(15.0%):</b>				<b>R3,161.29</b>
<b>Total:</b>				<b>R24,236.58</b>

Above is a comparison between 2 direct periods in time of 2 months each. The first without ThermX installed and the other with ThermX fully commissioned, installed and calibrated correctly.

PROJECT PARTNERS

- ✓ United Refrigeration
- ✓ AVAR Refrigeration
- ✓ IDM Solutions
- ✓ Solar Cool SA
- ✓ WG Spar Group

A simple calculation from the above Data shows that the consumption was reduced by a substantial 24.72kVA (46%) & 17 339.245kWh (48.17%). With increased tariff rates between the 2 periods, the estimated Rand saving is R17 005.58 (41.23%).

Total cost was R375 979.98 Inc. VAT. This puts an estimated ROI of the total project @ 3.68years – this excludes the projection of future price increases or the reduction in O&M costs on the refrigeration system itself.



To find out more...

If you'd like to know more about this project, please

Email: [Info@solxenergy.com](mailto:Info@solxenergy.com)  
 or call: 888-764-7659