FALKONAIR

SOLAR THERMAL CASE STUDY
SUPERSPAR, East London

Solar Thermal Refrigeration Air Conditioning

Solar thermal assisted compression technologies providing effective and efficient process cooling

Solar Thermal 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 Solar Thermal 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.

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 Solar Cool 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:

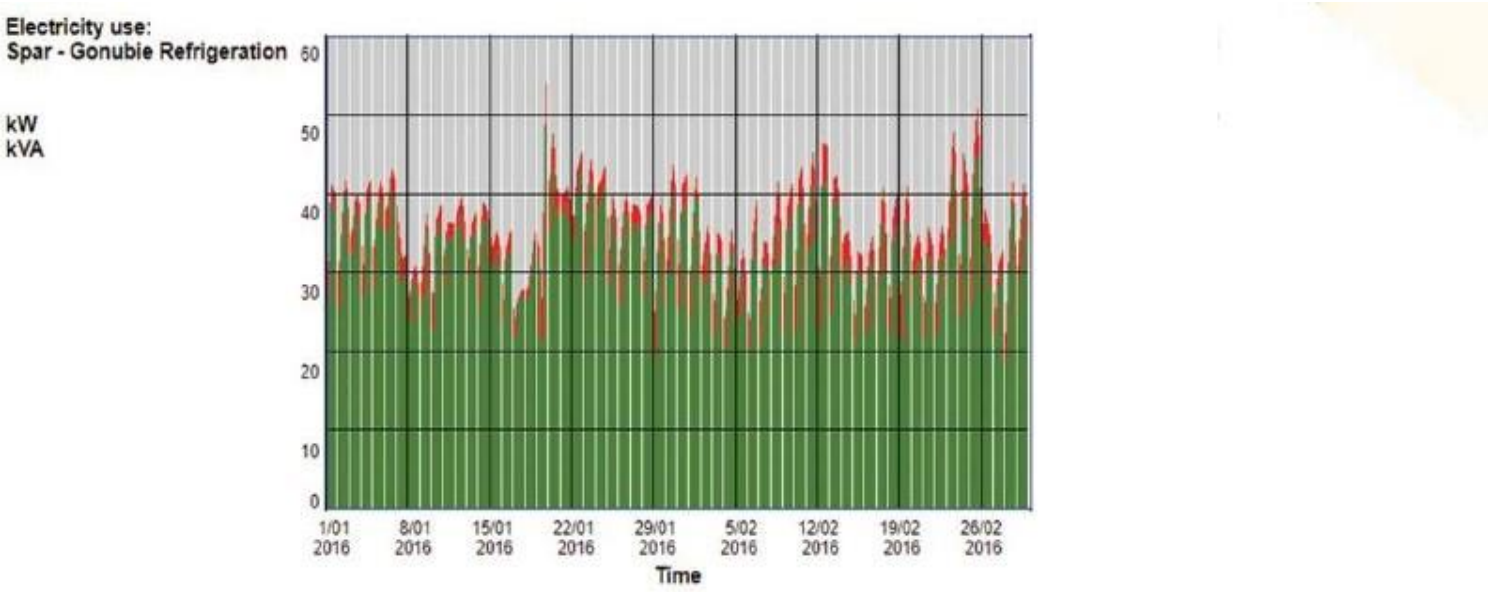
- Reduced electricity overhead
- Reduced ongoing equipment maintenance costs
- Extended lifespan of equipment
- Reduced CO2 production

THE RESULTS

Below are the results for the first multiplex system which was fitted with Solar Thermal – metering direct power drawn from that multiplex only

Consumption Figures before Solar Period: 01 Jan 2016 – 01 Mar 2016

kWh: 35993,768 Kva: 53,731



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

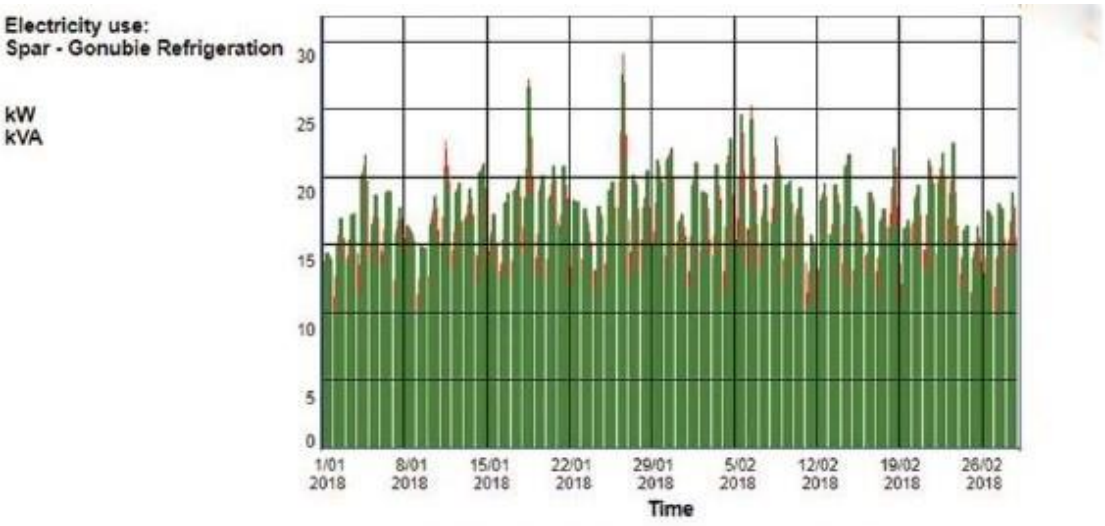
17493 Electricity: Energy consumption total - 35994kWh

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 Solar installed

kWh: 18654,523 Kva: 29,011 Period: 01 Jan 2018 – 01 Mar 2018



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	824.1004	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
			Sub Total:	R21,075.29

Total before VAT: R21,075.29
VAT(15.0%): R3,161.29
Total: R24,236.58

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

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.

FALKONAIR

USA: Wellington Florida
UK: Stafford Staffordshire
info@falkonair.com

Toll Free USA: (888) 857-0004
Toll Free For UK: 0-800-824-7804