Industrial Energy Efficiency Project in South Africa

Case Study – ESO Interventions

Company name	At Source Foods
Sector	Agro-processing Sector
Year joined IEE Project	2012
Year of interventions	2013
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Systems of intervention	Energy Systems Optimisation

1. BACKGROUND

1.1 Company profile

At Source Foods is a choice grade dried fruit packing and distribution company based in Ceres, Western Cape. The company sources dried fruits from Koelfontein Farm and from other local farms. The area is known for its citrus fruit farming making it a suitable location for this dried fruit manufacturing company. Some of the fruits are also exported such as prunes, nuts and apricots etc. The company consists of 250 employees and have a fairly constant packing production throughout the year.

At Source Foods packs and processes dried fruits for the biggest retailers in South Africa such as Woolworths and Pick & Pay. "Cecilia's World" is an in-house brand that was recently launched and dried fruits manufactured under this label are sold in local shops. Production has increased year on year resulting in expansion of the manufacturing plant. The company exports about 50% of its products to the international market.

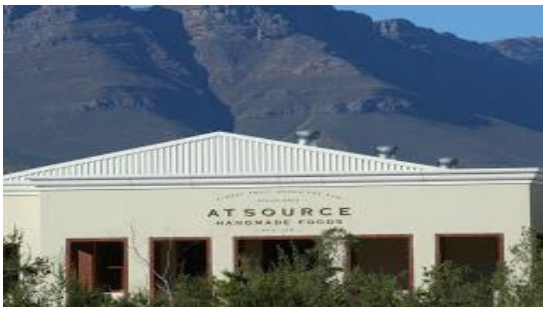


Figure 1: At Source Foods located in Ceres

Figure 2: Aerial View: At Source Foods (see red balloon)

1.2 Nature of challenges

The company has ambitions towards sustainability and have managed to implement a culture of continuous improvement. At Source Foods has started analysing its electrical and energy consumption due to the escalating costs specifically in the peak periods. The company shows a keen interest in identifying opportunities to save energy and money. Energy management awareness in the company is limited to management and factory workers are not necessarily aware of their impact on energy consumption.

2. OVERVIEW OF IMPLEMENTATION

2.1 Steps taken and Interventions

The IEE assessment highlighted the drying ovens as one of the major significant energy users in the company. It is estimated that around 60% of the electrical energy consumption is due to this operation which operates over a 24 hour period. Therefore most of the initial interventions focused on improving the drying tunnel operation. The company investigated the process of drying by looking at the air flow within the tunnel and ways of improving the efficiency of drying.

2.2 IEE capacity building programme

Some of the company's management team attended the Energy Management Systems course offered by the IEE Project. This was very insightful and enabled the company to structure energy in a more integrated manner by increasing awareness. An example of this is notices were displayed so that staff is aware of how much the drying tunnel consumes and over the different periods (peak, off-peak and standard).

3. KEY ACHIEVEMENTS

Key findings table -

Implementation Period (yyyy-yyyy)	**2013 – 2013**
Total Number of project	**2**
Monetary savings in ZAR	**R 113 000**
Energy savings in KWh	**137 663 kWh**
Total investment made ZAR	**R100 000**
Payback time period in years	**1 year**
GHG Emission Reduction (ton CO2)[1]	**132**

The company implemented 2 main interventions for the drying tunnels. This includes fitting tracks and flaps to trolleys carrying the pans of fruit rolls. This focusses forced air through the pans, so that less energy is used to heat unutilised spaces within the ovens. They also tried to increase the amount of pans per drying session. This has led to a decrease in kWh consumption per pan.

[1] SA Grid kWh to CO2 Conversion Factor set at 0.957 as per the 'Journal of Energy in South Africa' – Vol 22 No 4; November 2011.

4. HIGHLIGHTS OF ESO INTERVENTIONS

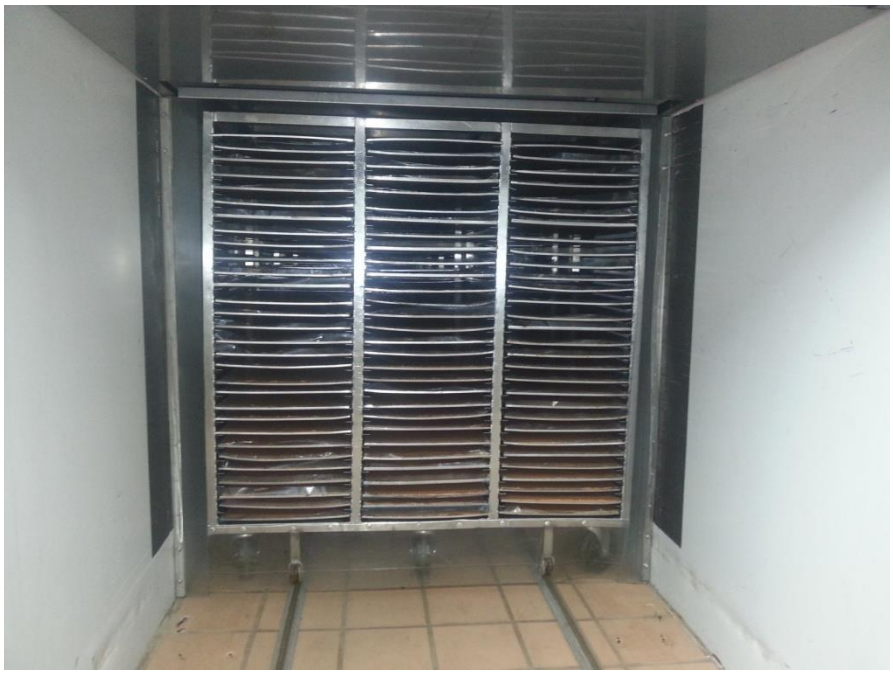
4.1 Summary of Energy Savings Opportunities Implemented

System	Energy Carrier	Intervention	Period of Implementation	Investment ZAR	Savings ZAR	Payback Yrs	Energy saving (kWh)	GHG Emission Reduction (Kg CO2/year)
Drying tunnel operation- improve air flow	Electricity	Improved air flow	2013 –2013	100 000	83 000 (based on 2012/2013 calendar year)	0.75	112 480	107 643
Optimise no of pans per drying session	Electricity	Increase the number of pans being dried per session	2013- continuous	none	R 30 583	0	25 183	24100

4.2 Details of interventions

Improve air flow of the drying ovens:

The company installed permanent tracks in the drying ovens to ensure there is no movement of the trolleys allowing hot air to escape. They also installed flaps to restrict air flow through the pans of fruit being dried avoiding the loss of hot air in unutilised areas. The installation of the tracks resulted in a reduction of drying time as well. The drying time prior to installation was reduced from 24 hours to around 19 hours. The total amount of energy consumed by the ovens was reduced by about 20%.



Increase pans per session through staff behavioural changes

The company considered improving behavioural changes to ensure that the drying tunnels were being optimised. This was implemented by ensuring that the maximum amounts of pans are added to the tunnels. This ensures that production is optimised as well as reducing the amount of kWh used per pan. A challenge in this area is that the

amount of pans is still dependant on planning and it is not always possible to have the maximum number of pans per drying session.

5. PROCESS CHALLENGES

Assessing the baseline data for the improvements in the drying tunnels was a challenge. Sub-metering for the drying ovens did not exist at the time of conducting the assessment and the total amount of energy consumed was estimated. At the time of conducting the case study, a week's monitoring was done to establish the baseline for both drying tunnels.

Permanent sub-metering of the tunnels has only been installed recently (August 2013). The company has not fully been able to analyse the data yet due to software challenges. Once this has been worked out a monthly update can be given on the exact amount of electricity being consumed by the drying tunnels.

6. FUTURE PLANS

The company has identified several opportunities which they have already started investigating.

As the drying ovens are still the single biggest consumer of electricity the company has looked into setting up a hybrid drying system. This process will use 2 types of energy LPG as well as electricity. As the company is on a rura-flex tariff the use of LPG will be energy saving during the winter months peak periods. The company has estimated a saving of around R 200 000 by utilising the hybrid system.

The cold stores doors are left open most of the day when there is transport of product taking place. There are four cold stores of which the doors will be retrofitted with automated motors. The company is currently sourcing weighing scales to measure the weight of these doors so that appropriately sized motors can be fitted by the suppliers. These motors will be fitted during last quarter of 2013 and each forklift will be fitted with a remote control device to open and close the cold store doors.

7. BENEFITS & LESSONS LEARNED

- The process of implementation is lengthy from the point of investigation up until execution. Unexpected delays in a project could delay the implementation and possibly slow down the impetus of the project.
- The baseline data needs to be well ascertained before implementing a project of high capital investment. Baseline data affects the actual savings achieved.
- Behavioural changes require continuous effort by top management as one need to ensure that constant motivation is provided to staff working with.
- The company embraced other funding possibilities such as MCEP and will be commissioning a wastewater treatment facility in the future.