



South Asia

## Baseline Audit Report

### Premier Exports International

Chandiroor-688547, Alppuzha, Kerala, India



BEE's National Program on Energy Efficiency in  
SMEs Kochi (Sea Food) cluster in XII plan

TÜV SÜD South Asia Pvt. Ltd.

May, 2016



## Acknowledgement

**TUV SUD South Asia Pvt. Ltd.** is thankful to **Bureau of Energy Efficiency (BEE), Ministry Of Power** for providing us an opportunity to conduct Baseline audit in five units of Kochi Seafood Processing Cluster under the BEE SME Programme. We express our sincere Gratitude to the following officials of BEE

**Shri Dr. Ajay Mathur** –Director General

**Shri Sanjay Seth**– Secretary

**Shri Milind Deore** – Energy Economist

**Shri Tarun Dixit** – Project Engineer

We are extremely grateful to the officials of the **Seafood Exporters Association of India (SEAI)** for their support and cooperation. We extend

Our special thanks to **Mr. S. Ramakrishnan, Secretary of the SEAI** and **Mr. Alex Ninan, Vice President of the SEAI.**

We thank the **The Premier Export International owner** and their staffs for their support and cooperation during the baseline audit study.



South Asia

<b>Contents</b>	
Executive Summary	4
Objectives	6
Brief about Units	7
Technology overview of typical sea food processing unit	8
Energy & Production Situation in the Unit	10
Process flow diagram	14
Condenser analysis	15
Identified technology up gradation proposals	17
Replacement of reciprocating compressor with screw compressor with VFD	17
Replacement of existing V-Belt drive with synthetic Energy Efficient S.P.C saver belt/Flat belt in the compressor motor	19
Installation of THERMOSHIPON SYSTEM (GAS COOLING) for Compressor.	20
Automation of refrigeration plant by using PLC controller	21
Identified Energy Saving Proposals:	
Proper insulation of identified insulation damaged areas.	22
Conclusion	23
Equipments Suppliers Contact Details	24



## EXECUTIVE SUMMARY

### 1. Unit Details

Unit Name	Premier Exports International
Address	Chandiroor-688547, Alppuzha, Kerala, India
Contact Person	Mr.David Phone:9847095621
Products	Sea Food processing
Production	MARINE PRODUCTS EXPORTING ( SHRIMPS, SQUID, CUTTLEFISH, OCTOPUS, RIBBONFISH, MACKERAL, ETC )
DIC Number	320111202224
Bank Details	UCO Bank, Mattancherry Cochin -2 A/C No.01090200001060 IFSC: UCBA0000109
TIN / PAN No.	TIN: 32150636065
	PAN:AADFP3158P
Contract demand	350 KVA

### 2. Existing Major Energy Consuming Technology

The major equipments in a typical seafood processing unit are compressors, condensers, cooling towers, freezers, ice making units, and the motors connected to these equipment. Compressors are the major energy consuming equipment in these seafood processing units.

#### Cold Storage:

After packing frozen material product will keep in cold storages at -18deg C temperature. Premier Foods is having cold storage to keep products in required temperatures they installed and R22 which is the commonly used as coolant in the FCU's .



### 3. Proposed Energy Saving Technologies with Cost Economics

#### Identified technology up gradation proposals

- Replacement of reciprocating compressor with Screw compressor with VFD
- Replacement of existing V-Belt drive with synthetic Energy Efficient flat belt/SPC saver belt drive in the compressor motor
- Installation of THERMOSHIPON SYSTEM (GAS COOLING) for Compressor.
- Automation of refrigeration plant by using PLC controller

Cost Economic Analysis:

S No	Recommendation	Annual Savings in kWh	Savings in INR	Investment in INR	Payback in Years
1	Replacement of reciprocating compressor with Screw compressor with VFD	305505	1967452	3100000	1.58
2	Replacement of existing V-Belt drive with synthetic Energy Efficient flat belt/SPC saver belt drive in the compressor motor	101835	641561	180000	0.28
3	Installation of THERMOSHIPON SYSTEM (GAS COOLING) for Compressor.	45990	305374	600000	0.19
4	Automation of refrigeration plant by using PLC controller	114975	763434	1200000	1.57
	Total	407340	2609013	3280000	1.26

#### Identified Energy Saving Proposals:

- Proper insulation of identified insulation damaged areas.

Cost Economic Analysis:

S No	Recommendation	Annual Savings in kWh	Savings in Rs
1	Proper insulation of identified insulation damaged areas.		1-2 % savings



## OBJECTIVE OF BEE SME PROGRAM

The BEE SME Program aims to improve Energy Efficiency (EE) in SME sector by technological interventions in the various industrial clusters in India. The EE in SMEs is intended to be enhanced by helping the industries in the 25 energy intensive SME clusters by:

- Technology interventions
- Implementation of EE measures and projects in clusters, and
- Capacity building for improved financial planning for SME entrepreneurs

The program also aims at creating a platform for dissemination of the appropriate practices and the appropriate technologies available in the market for energy efficiency and conservation, to create awareness in the clusters, and to demonstrate the new technology interventions/ projects to stimulate adoption of similar technology/projects in the clusters. The BEE SME program has been designed in such a way that it addresses the specific needs of the industries in the SME sector for EE improvement and to overcome the common barriers in the implementation of EE technologies in cluster through knowledge sharing, capacity building, and development of innovative financing mechanisms.

The major activities for which we need to give support to BEE's National Program on Energy Efficiency in SMEs Kochi (Sea Food) cluster in XII plan are:

- Conducting pre-activity cluster workshop.
- Conducting initial Baseline audits to get an overview of the technology presently existing in the Seafood processing units in Kochi.
- Identify areas of energy saving, both without & with investment and propose to BEE two energy efficient process technologies.
- Identify at least 5 Local technology/ service providers for the above technologies in the cluster
- Identify 20 SME units willing to implement and demonstrate the above two technologies
- Assist BEE to enter into a contract with each of the 20 shortlisted SME units
- Conduct comprehensive Baseline Energy Audits in 20 SME units
- Development of technology specific case studies for each technology
- Preparing Best Operating Practices(BOP) document for the top 5 energy using equipment/ process
- Carry out post implementation energy audit in each of the above 20 units
- Verify and submit to BEE all the relevant documents of each participating unit
- Assist BEE in conducting five post energy audit training workshops



## BRIEF ABOUT UNIT

**The Premier Export International** A company with international reputation who export frozen sea foods Located at the major fishing port in Cochin, the production facilities are centrally placed in relation to the fishing fleet and fishing grounds. For fast and secure procurement of raw materials and quick and easy shipment of finished products.

Being highly perishable food material, Seafood calls for extreme care in its handling and preservation for international markets. Our processing time is always under stringent mechanism, which makes it mandatory that all our products are processed according to HACCP guidelines. Size grading and packing are done as required by the customers. Products are exported in fresh and frozen conditions.

“Seafood Delight” proudly claims.... If it’s in sea, it’s on our list. For consistent supply of an array of specialty fish, we have an integrated cold storage facility.

## Technology overview of typical sea food processing unit

### 1. Compressors :

It is noticed that reciprocating compressors are being used in the chilling unit. Reciprocating compressors consists of a piston moving back and forth in cylinder, with suction and discharge valves to achieve suction and compression of the refrigerant vapor. The suction side of the compressor is connected to the exit of the evaporator, while discharge side of the compressor is connected to condenser inlet. The performance evaluation of the compressors (KW/TR) should be done regularly in order to monitor the performance of the same.

### 2. Condenser :

It is observed at the time of audit, evaporative types of condenser are being used in the plant:

The above mentioned condenser is being used in the HVAC system to the cool ammonia which is the commonly used coolant in the plant for freezers. The detailed analysis and performance evaluation of condenser will be discussed in refrigeration system chapter.

#### Evaporative condenser:

The evaporative condenser is one of the energy efficient models compared to other type of condenser used in the processing unit. The vapor to be condensed is circulated through the condensing coil, which is continually wetted on the outside by a recirculating water system. Air is pulled over the coil, causing a small portion of the recirculating water to evaporate. The evaporation removes the heat from the vapor in the coil, causing it to condense.







### 3. Freezers

It is noticed at the time Baseline audit that the following type of freezers are being used in the Premier Foods food processing unit

- i) Plate freezer
- ii) Blast freezer

#### **Plate freezer:**

Plate freezer are commonly used for freezing brick shaped packaged products. In plate freezers, the refrigerant is allowed to circulate inside the thin channels within the plates. The packaged products are firmly pressed between the plates. High rates of heat transfer can be obtained between the packed product and the refrigerant plates

#### **Blast Freezer:**

Blast freezer is commonly used freezer in sea food processing unit in which blower is being used to supply the cold air over the product in order freeze the product. The temperature range will be in the range of -40 deg C and the air speed over the product will be high, to get good heat transfer.

### 4. Other equipments:

In addition to the above processing equipment, ice making unit and chilled water base cooling systems are also being used in the plant for processing area cooling purpose.



## Energy & Production Situation in the Unit

### Energy scenario:

The electricity is drawn from the Kerala state electricity board (KSEB) and Diesel generators are being used in the plant as a back system to meet the demand in case of grid supply failure or scheduled power cut from the grid

### Energy consumption of the plant

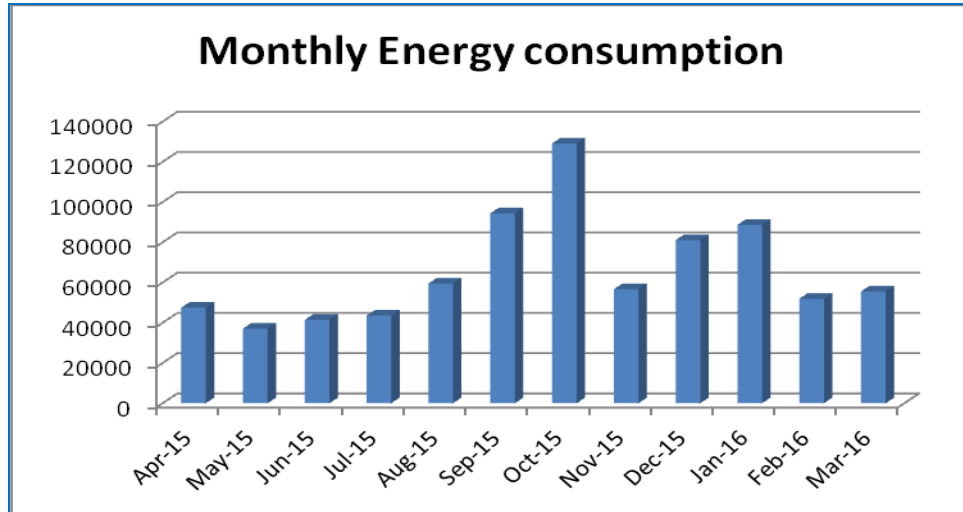
The primary source of energy is electricity and that is imported from the KSEB and diesel generators are being used as an back system during power failure. Month wise electricity consumption of the total plant details are as follows:

S. No	Month & Year	CMD (KVA)	RMD (KVA)	KWh	KVAh	P.F	Total Bill(Rs)	P.F incentives/ penalty	Unit cost (Rs/KWh)
1	Apr-15	350	263	47504	47684	1.00	332969	-6362	7.01
2	May-15	350	263	37096	37232	1.00	274714	-4927	7.41
3	Jun-15	350	263	41452	41688	0.99	301634	-5007	7.28
4	Jul-15	350	263	43548	43992	0.99	251192	-5261	5.77
5	Aug-15	350	263	59492	60372	0.99	399958	-7235	6.72
6	Sep-15	350	342	94392	96400	0.98	598499	-9903	6.34
7	Oct-15	350	318	129080	132796	0.97	781044	-11925	6.05
8	Nov-15	350	272	56656	57728	0.98	386502	-6124	6.82
9	Dec-15	350	270	81092	82924	0.98	511215	-8573	6.30
10	Jan-16	350	269	88688	90732	0.98	552918	-1993	6.23
11	Feb-16	350	263	51936	52808	0.98	360872	-5622	6.95
12	Mar-16	350	263	55564	56796	0.98	378188	-5966	6.81
	Total			<b>786500</b>	<b>801152</b>		<b>5129705</b>	-78898	
	Avg		276	<b>65541</b>	<b>66762</b>	<b>0.98</b>	<b>427475</b>		<b>6.64</b>

The electricity consumption of the plant is varying from 0.37 lakh kWh/month to 1.29 Lakh kWh/month and average electrical energy cost for the plant is 6.64 Rs/KWh



## Monthly Variation of Electricity Consumption during the year 2015-16



### Diesel Generators:

Diesel generators are being used in the plant as a back system to meet the demand in case of grid supply failure or scheduled power cut from the grid. Month wise consumption and generation details of the plant are as follows:

S. No	Month & Year	Diesel(Ltrs)	KWh	cost(Rs)
1	Apr-15	395	1185	22997
2	May-15	256	768	14904
3	Jun-15	359	1077	20901
4	Jul-15	610	1830	34093
5	Aug-15	805	2415	44991
6	Sep-15	1885	5655	89952
7	Oct-15	750	2250	36953
8	Nov-15	1740	5220	87400
9	Dec-15	585	1755	29232
10	Jan-16	540	1620	26104
11	Feb-16	105	315	5007
12	Mar-16	50	150	2385
		<b>8080</b>	<b>24240</b>	<b>414919</b>

It is seems to be diesel consumption of plant is nominal only



### Production scenario:

The following table shows the monthly wise production details of the Premier Export International for FY-2015-16.

S. No	Month & Year	Production(KG)
1	Apr-15	37094
2	May-15	45648
3	Jun-15	23218
4	Jul-15	145197
5	Aug-15	326142
6	Sep-15	455036
7	Oct-15	64046
8	Nov-15	140248
9	Dec-15	119453
10	Jan-16	37788
11	Feb-16	55254
12	Mar-16	24565
		<b>1473689</b>

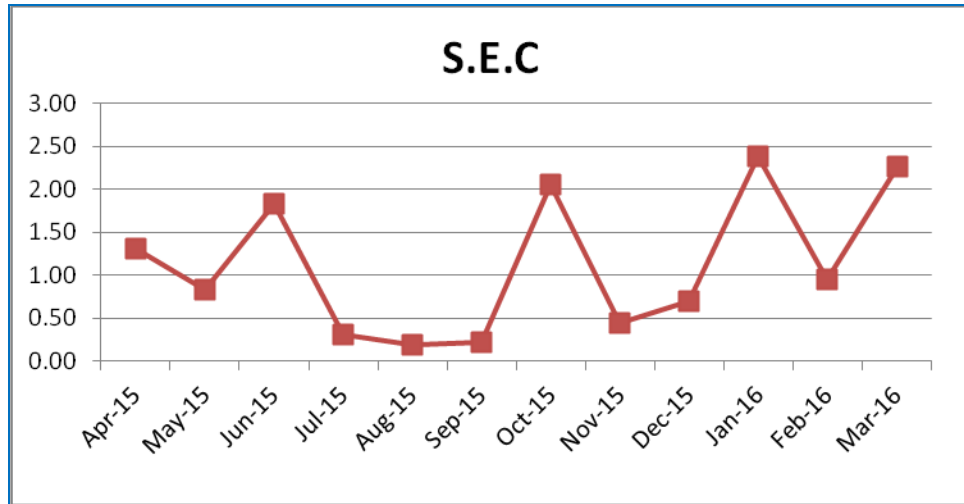
### Specific Energy Consumption:

The specific energy consumption unit range from 0.19 kWh/kg of the product to 2.3 kWh/kg of the product.

S. No	Month & Year	Production ( Kg)	Total (EB+DG)(KWh)	S.E.C(KWh/Kg)
1	Apr-15	37094	48689	1.31
2	May-15	45648	37864	0.83
3	Jun-15	23218	42529	1.83
4	Jul-15	145197	45378	0.31
5	Aug-15	326142	61907	0.19
6	Sep-15	455036	100047	0.22
7	Oct-15	64046	131330	2.05
8	Nov-15	140248	61876	0.44
9	Dec-15	119453	82847	0.69
10	Jan-16	37788	90308	2.39
11	Feb-16	55254	52251	0.95
12	Mar-16	24565	55714	2.27
		<b>1473689</b>	<b>810740</b>	<b>1.12</b>

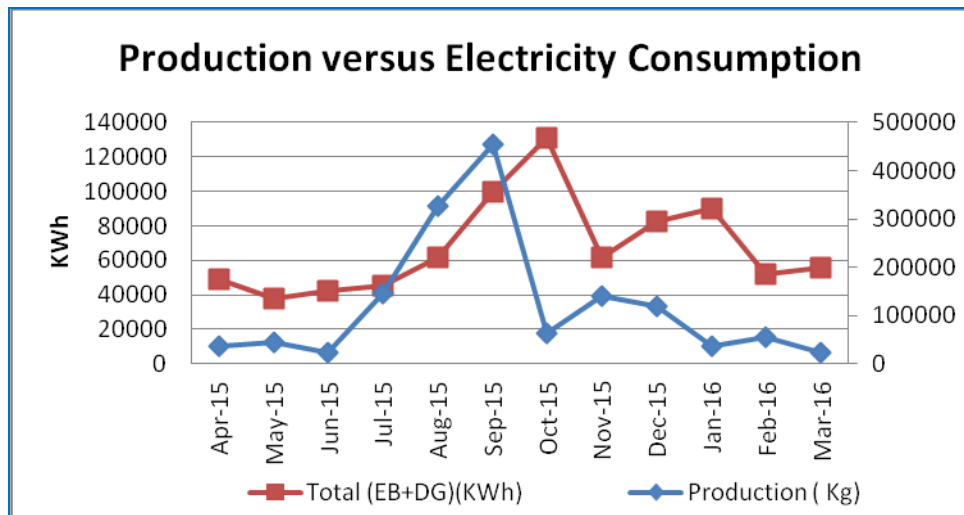


**Monthly Specific Energy consumption Variation for the year 2015-16**



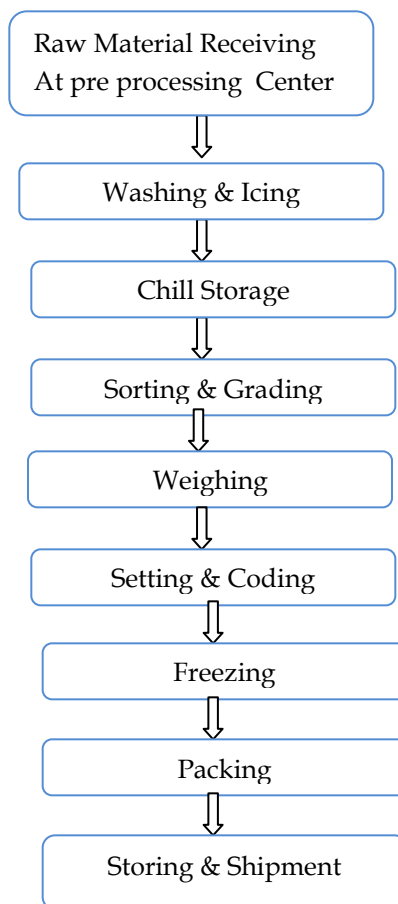
It seems to be January-16 month accounts for highest Specific energy consumption 2.5 KWh/Kg followed by March-16 and October-15 months.

**Monthly Variation in Production versus Electricity Consumption for the year 2015-16**



## Process flow diagram

The typical process followed in the seafood processing industry is shown in the flowchart below. For all of the units surveyed, the preprocessing of fish was done outside the units and the operations in the units started with the cleaning of preprocessed/ cleaned fish. While most of the units follow the general process of cutting, cleaning, grading, weighing, freezing, packing, and storing; the difference arise in the way fish is frozen and the freezers used for the purpose.



From the flowchart, it can be inferred that the energy intensive steps in the process are the freezing and the storage. Freezing alone accounts for nearly 75% of all the electricity consumed in the unit.



## Condenser Analysis

The major equipments in a typical seafood processing unit are compressors, condensers, cooling towers, freezers, ice making units, and the motors connected to these equipment. Compressors are the major energy consuming equipment in these seafood processing units.

Premier Foods have installed Evapco condenser in their HVAC system to cool the ammonia which is the commonly used coolant in the unit.

As a part of audit we conducted performance evolution of refrigeration system, there are 4 compressors installed in Premier Foods to meet the cooling load requirements.

S. No	Description	Design	Measured			
		Rating(KW)	V	A	KW	P.F
1	Compressor-1	110	Not working			
2	Compressor-2	90	Not working			
3	Compressor-3	55	Not working			
4	Compressor-4	55	Not working			

By the time of audit, there is no production in the plant we are unable to measure the performance of refrigeration system, to estimate cooling load of freezer can be calculated using the formula given below:

**Heat rejected at condenser = Cooling load + Work done by compressor**

$$\text{Heat Rejected (TR)} = (\text{Evaporator TR}) + \frac{\text{kW}}{3.516}$$

$$\text{Heat rejected (TR)} = \frac{Mc \times C_p \times (t_{wo} - t_{wi})}{3024}$$

There are 2 Evapco condenser units installed for total 4 compressors. Based on heat load units will come in to active mode automatically.



## Cold Storage:

After packing frozen material product will keep in cold storages at -18deg C temperature. Premier Foods is having cold storage to keep products in required temperatures they installed and R22 which is the commonly used as coolant in the FCU's. Details of units are given below:

Power Measurement details of cold storage and ante rooms are given below:

S. No	Cold store	Unit no's	Power Measurement details				
			V	A	KW	P.F	KVA
1	Cold store	unit-1	407	23.6	13.1	0.71	18.5
2	Cold store	unit-2	404	21.3	11.4	0.75	15.2
3	Cold store	unit-3	406	23	11.9	0.76	15.7
4	Ante room	unit-1	416	8.45	5.6	0.88	6.3
5	Ante room	unit-2	415	9	6.5	0.88	7.3

Performance evolution of Sea food cold storage FCU's are given below:

DESCRIPTION	Cold Storage			Ante room	
	Unit-1	Unit-2	Unit-3	Unit-1	Unit-2
Air density(Kg/m3)	1.29	1.29	1.29	1.29	1.29
Air flow(m3/h)	3211	3171	3572	1605	1906
Supply air temp deg C	-15	-14	-14	14	13
Return air temp deg C	-9	-10	-9	18	17
TR	8.22	6.09	7.62	3.08	3.66
KW	13.1	11.4	11.9	5.6	6.5
KW/TR	1.59	1.87	1.56	1.80	1.77
COP	2.20	1.87	2.25	1.95	1.99

From the above table we can observe that Net refrigeration capacity of the cold storage AC system varies from 6 to 8 TR. Also the range in kW/ TR is observed to be little bit high.



## IDENTIFIED TECHNOLOGY UP GRADATION PROPOSALS:

### 1) Replacement of reciprocating compressor with screw compressor with VFD

#### Present status:

Ammonia based reciprocating compressor is being used in plant for cooling purpose. Compressors are coupled with motor through V belt drive. There are total 4 compressors with different ratings details are given below:

S. No	Description	Rating(KW)
1	Compressor-1	110
2	Compressor-2	90
3	Compressor-3	55
4	Compressor-4	55

#### Observation

- The specific energy consumption of reciprocating compressor is varying from 1.5 kW/TR to 2 kW/TR
- The specific energy consumption of screw compressor will vary from 0.85 kW/TR to 1 kW/TR
- Compressors are not operated to their full capacity due to less capacity utilization of the plant.

#### Recommendation:

It is recommended to replace the reciprocating compressor with screw compressor in order to reduce the specific energy consumption to certain level and that will result in considerable amount of energy savings.





**Saving percentage:**

Saving percentage will be 10-20%

**Investment:**

Investment amount will be in the range of 20 to 30 Lakhs.

**Payback:**

Payback period will be in between 1.5 to 2 years.

In general 4 compressors are running to meet cooling requirement, it is suggested to replace 2\*55 KW, 1\*110KW and 1\*90 KW reciprocating compressor with screw compressors, calculation has been mentioned below:

S. No.	Particulars	Units	Value	Value	Value
1	Capacity of the reciprocating compressor	kW	90	55	110
2	Number of compressors	no's	1	2	1
3	Actual power consumption of 4 compressors	kW	310		
4	Expected power consumption by screw compressor with VFD(@15% saving)	KW	264		
5	Savings in kW	kW	47		
6	Operating hours	hours	18		
7	Savings in kWh per annum	kWh/Annum	305505		
8	Savings in Rs	Rs	1967452		
9	Investment	Rs	3100000		
10	Payback	Years	1.58		



## 2) Replacement of existing V-Belt drive with synthetic Energy Efficient S.P.C saver belt /flat belt in the compressor motor

### Present status:

Compressor motors are connected with compressor through V Belt drive. Compressors are most energy consumer of sea food processing unit and the operating time of the compressors are varying from 15 to 18 hours per day.

### Observation:

- Use of V belt causes some energy losses. There are power transmission losses of about 5-7%.
- The latest trend in the industry is to replace the V Belt drive with S.P.C saver belt and these belts have the following advantages:
  - i. Non-hygroscopic - prevents elongation due to moisture absorption
  - ii. Ensures better grip on the pulley

### Recommendation:

- It is recommended to replace the V belts with flat belt /SPC saver belt in order to reduce power transmission losses and this will result in considerable amount of energy savings.
- The energy saving calculation for 4 number of compressors which is operating with V belt drive has been mentioned below as a sample calculation:

S. No.	Particulars	Units	Value
1	Total Capacity of the motors	kW	310
2	Actual power consumption with V belt	kW	233
3	Projected consumption with flat belt	kWh	209
4	Savings in kWh	kWh	23
5	Total No. of compressors	Nos	4
6	Operating hours	hours	12
7	Savings in kWh per annum	kWh/Annum	101835
8	Savings in Rs	Rs	641561
9	Investment	Rs	180000
10	Payback	Years	0.28



### 3) Installation of THERMOSHIPON SYSTEM (GAS COOLING) for Compressor.

#### **Present status:**

At the time of audit, it is observed that unit is using water cooled Cooling system for compressor. Cooling water is circulating on compressor head to cool down compressor temperature . Separate Pump installed and running continuously for circulating cooling water for compressor cooling.

#### **Observation:**

- Cooling towers are filled with algae formation and that will affect the effectiveness of the cooling towers.
- Thermoshipon system is a new technology developed for compressor cooling. It will improve the work done compressor and efficiency .

#### **Recommendation:**

It is recommended to install Thermoshipon system for compressor cooling in order to save substantial amount of energy savings.

#### **Percentage Saving :**

Saving percentage will be at least 1-2 %.

#### **Investment:**

Investment amount will be in the range of 6 Lakhs.

#### **Payback:**

Payback period will be in around 2 year.

S. No.	Particulars	Units	Value
1	Capacity of the Present reciprocating compressors	kW	350
2	Number of compressors	no's	6
3	Expected power consumption by installation of Thermoshipon system (@2% saving)	KW	7
4	Operating hours	hours	18
5	Savings in kWh per annum	kWh/Annum	45990
6	Savings in Rs	Rs	305374
7	Investment	Rs	600000
8	Payback	Years	1.96



#### 4) AUTOMATION of refrigeration plant by using PLC controller:

##### Present status:

At Present Refrigeration system is controlling in manual mode only. Based on temperature requirements refrigerate flow controlling with the help of opening and closing valves manually by operators.

##### Observation:

- while operating manually error may occur, it will cause power loss.
- We can program When to start and when to stop in Automatic system .
- PLC will control Loading and unloading of compressors automatically.

##### Recommendation:

It is recommended to install PLC based automatic system to save substantial amount of energy .

##### Percentage Saving :

Saving percentage will be at least 5 %.

##### Investment:

Investment amount will be in the range of 12 Lakhs.

##### Payback:

Payback period will be in around 1.5 year.

S. No.	Particulars	Units	Value
1	Capacity of the Present reciprocating compressors	kW	350
2	Number of compressors	no's	6
3	Expected power consumption by installation of PLC controlled Automation system (@5% saving)	KW	17.5
4	Operating hours	hours	18
5	Savings in kWh per annum	kWh/Annum	114975
6	Savings in Rs	Rs	763434
7	Investment	Rs	1200000
8	Payback	Years	1.57



## IDENTIFIED ENERGY SAVING PROPOSALS:

### 1) Proper insulation of identified insulation damaged areas.

#### **Present status:**

- Most of the units have poor insulation for the ammonia lines leading to large exposed areas and ice accumulation.
- Exposed ammonia lines absorb significant amount of thermal energy thereby reducing the evaporative capacity within the freezer.

#### **Observation:**

- The average surface temperature were 4-5 °C higher than the insulated area of the ammonia lines

#### **Recommendation:**

- By providing complete and proper insulation, thermal energy transgression across exposed surface can be cut off.
- Need to Survey entire refrigeration line frequently for identification of any exposed areas or Insulation damage areas

#### **Savings percentage:**

Approximately 1-2% of energy can be achieved.

#### **Investment:**

Nominal amount



## Conclusion

Based on our audit in the Premier Foods processing unit and above given energy saving opportunities in detail we are recommending the below given energy efficient technology up gradation in the Premier Foods International

1. Replacement of reciprocating compressor with screw compressor with VFD
2. Replacement of existing V-Belt drive with synthetic Energy Efficient S.P.C saver belt in the compressor motor
3. Installation of THERMOSHIPON SYSTEM (GAS COOLING) for Compressor.
4. Automation of refrigeration plant by using PLC controller

The total investment cost is 20 Lacs, after successful implementation of any project; the plant will get the subsidiary amount of Rs. 10 Lac from BEE

The summary of the savings plans are given below:

S. No	Recommendation	Investment in INR	Eligible Subsidiary amount in INR
1	Replacement of reciprocating compressor with Screw compressor with VFD	3100000	1000000
2	Replacement of existing V-Belt drive with synthetic Energy Efficient flat belt drive in the compressor motor	180000	
3	Installation of THERMOSHIPON SYSTEM (GAS COOLING) for Compressor.	600000	
4	Automation of refrigeration plant by using PLC controller	1200000	

The BEE will provide subsidiary amount of Rs.10 Lacs per plant and will not provide more than ceiling amount of Rs.10 Lac



## Equipments Suppliers Contact Details

### Compressors & Condensers

**Kirloskar Pneumatic Co Ltd.**

1st Floor, Elcanso Building, 10, Casa Major Road,  
Egmore, Chennai-600 008  
Phone: 044-28193066, 2890436, 2892092 Fax: 044-  
28194397  
E-mail: [kpclchnacd@kpcl.net](mailto:kpclchnacd@kpcl.net)

**Elgi Equipment Limited**

#39/3973, Pallimukku, M.G.Road, Kochi –  
682016. Tel (0484) 2360155  
Fax (0484) 2351904 E-mail :  
[enquiry@elgi.com](mailto:enquiry@elgi.com)

**Frick India Limited**

41/3273-D, Golden Castle Bldg. Old Railway Rd., Cochin  
- 682018. Phone: 0484-2394173  
E-mail: [cochin@frick.co.in](mailto:cochin@frick.co.in)

**Johnson Controls (India) Pvt. Ltd.**

C/ o. York India Limited, Delphina Building 2nd  
floor CMH Road, Indiranagar Stage 1  
Bangalore, Karnataka 560 038 India Ph: +91 (80)  
3057 5730  
Fax: +91 (80) 3057 5729

**Evapco Condensor**

ACS Consultancy Pvt . Ltd 276/ 5, Sangam  
Apartments Belly Area, Anna Nagar West  
Chennai-40, India  
Ph: (91) 9840818637 / 9444048480 Fax: (91) 44-  
42026477  
Email: [evapco-india@airtelmail.in](mailto:evapco-india@airtelmail.in)

**Lloyd Insulations (India) Limited,**

38/ 449, Panampilly Nagar  
Manorama Junction,  
Ernakulam, Kerala 680036  
Ph: +91 (484) 2324472

**Bombay Ammonia Sales  
Corporation**

B-17, Rishabh Shri House, Ranjeet  
Nagar Commercial Complex,  
New Delhi – 110 008

**Vision Engineering Madras Pvt. Ltd.**

No 6/1, Shanthi Nagar Main Road, Ramapuram, Chennai  
- 600089, Opposite Dlf & Moonlight  
Phone: +(91)-44-22492800, 22490801,  
Mobile: +(91)-9444040948, 9444040946,  
9444040950

**Baltimore Aircoil Condensor**

Densol Engineering Pvt . Ltd. #43/ C, 9th Main,  
R P C Layout Vijayanagar 2nd Stage  
Bangalore 560040

**Belts****Beblec (India) Private Limited**

Plot No. 126, Sipcot Industrial Complex  
Hosur - 635 126  
Tamil Nadu, India

**Belts****Anjanaa Belting**

3857, TNHB, Ayapakkam,  
Chennai – 600077  
Ph: +91-44 – 64991300/ 9840186799





South Asia

<b>Sagar Electric Power Services</b> #70, K. Kamaraj Road, Bangalore, India—560042 Ph: +91 9060133874; 9448073258	<b>Vijay Energy Products Pvt.Ltd.</b> SP – 75, Ambattur Indl. Estate Chennai – 600 058 044 – 625 4326
<b><u>Pumps</u></b>  <b>BI Marketing &amp; Services Pvt Ltd</b> Dealer: Grundfos Pumps No.50, 3 <sup>rd</sup> street, East Abhiramapuram, Chennai – 60004 Ph: +91-44-24671267	<b><u>VFD's</u></b>  <b>Enpro Industrial Automation Pvt Ltd.</b> Dealer: Danfoss VFD F18 Ambattur Industrial estate, Ambattur Chennai – 600058 Ph: +91-44-26244583; 26244865;26359850 email: <a href="mailto:projects@enproautomation.com">projects@enproautomation.com</a>
<b><u>Motors</u></b>  <b>Project &amp; Supply</b> A – 605, Sunswept Lokhandawala Complex Swami Samarth Nagar,4, Bungalow, Andheri (West) Mumbai 400 050,Ph: 022 – 626 6584	<b><u>Motors</u></b>  <b>Kirloskar Electric Co. Ltd</b> 294 – 295, Lloyd's Road, Royapettah. Chennai –14. Ph: 044 – 28133176
<b><u>Motors</u></b>  <b>Siemens Ltd</b> 3rd Floor, Jyoti Mahal, No. 49, St . Marks Road, Bangalore 560 001 +91 80 5119 1500 Ph: +91-4344-276358 / 278658 / 400688 /400687	<b><u>Capacitors</u></b>  <b>Momaya Capacitors</b> 401, Madhav Apartments Jawahar Road, Opp.Rly.Stn. Ghatkopar (East) Mumbai – 400 077,Ph: 022 – 516 2899 / 1005 / 0745
<b><u>Insulation</u></b>	
<b>India Insulations</b> NH Bypass, Vytilla, Kochi – 682 019, Kerala Ph: +91 (484) 2304465	<b>Thermax Limited,</b> RNG Pallazzo, No. 1, 1st Floor South End Street Kumarapark East Bangalore 560 001 Ph: +91 (80) 22371721,Fax: +91 (80) 22371726
<b>For Ice Storage System:</b>	
<b>Balamurugan Refrigeration Engineers,</b> Liveiro building, Thoppumpady Kochi 5	<b>GEA Refrigeration India Pvt. Ltd.</b> Branch Office- 5th Floor, Lohia Jain Business Centre, Friends' Park Society, Senapati Bapat Road ,Pune –



South Asia

Ph: +91 (484) 2231844	411016 India
<b>ACS Refrigeration</b> 272/5, Sangam Apartments, Belly Area, Anna Nagar west., Chennai – 600040. Tamil Nadu, India. Mob No:- 09840818637, Tele Fax:: 044-42026477 Email : <a href="mailto:sales@acsref.com">sales@acsref.com</a>	

The service providers were selected considering the technology recommended and their ability to service the sea food processing units located in Kochi. Since not all service providers have dealership network in Kochi, hence dealers have been selected from Chennai & Bangalore.