



South Asia

Baseline Audit Report

Choice Canning Company

Choice house, P.V. Sreedharan road,
Near Aroor toll bridge, kumbalam, Cochin-682506



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 **Choice Canning Company** owner and their staffs for their support and cooperation during the baseline audit study.

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Executive Summary

1. Unit Details

Unit Name	Choice Canning Company
Address	Choice house, P.V. Sreedharan road, Near Aroor toll bridge, kumbalam, Cochin-682506
Contact Person	Mrs. Narayanadas & Mrs. Dipti Phone:8086881519 & 8086881597
Products	Sea Food processing
Production	
IEM Number	507/SIA/IMO/2005 dated 07.02.2005
Bank Details	STATE BANK OF INDIA OVERSEAS BRANCH Account Name : Choice Trading Corporation Pvt. Ltd. Current Account No. : 10471432032 State Bank of India – Commercial Branch Ernakulam 4062 Vankarath Towers, NH By – Pass Junction, Pativattom, Cochin 682 024 IFSC Code : SBIN0004062 Swift Code : SBININBB245
TIN / PAN No.	TIN: 32150609572 PAN: AABCC3150B
Contract demand	800 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 . Choice Foods is having total 4 cold storages to keep products in required temperatures they installed and 404 A which is the commonly used as coolant in the FCU's

3. Proposed Energy Saving Technologies with Cost Economics

a) 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 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	400770	2496797	7600125	3.04
2	Replacement of existing V-Belt drive with synthetic Energy Efficient flat belt drive in the compressor motor	95265	600170	180000	0.30
3	Installation of THERMOSHIPON SYSTEM (GAS COOLING) for Compressor.	101616	614776	800000	1.30
4	Automation of refrigeration plant by using PLC controller	254040	1536942	1600000	1.04
	Total	851691	5248685	10180125	1.94

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 Choice Group is one of the largest and highly diversified business conglomerates headquartered in Cochin with branches in all the major trading centers in South India, besides USA , Canada and Singapore. The history of Choice Group spans half a century of entrepreneurial excellence dating back from modest beginnings in the early fifties to its present day stature as a highly reputed business house in the South Indian state of Kerala. The multi-activity profile of the Group is serviced by over thousand employees deriving their strength from the vision and dynamic leadership of Mr. Jose Thomas under whom the corporate has recorded impressive growth in its flagship operations in Marine products Exports and Shipping and also registered expansion in areas as diverse as Real Estate, Property Development and Education. Our various divisions in operation are Choice Canning Co. Inc , New Jersey, USA Choice Canning Co. Cochin Choice Trading Corporation Pvt.Ltd, Cochin, India Choice Canning Co., Ontario, Canada Choice Group Holdings Pte Ltd, Singapore Choice Intermodal Services, Cochin (with branches in Chennai, Tuticorin, Vizag, Goa, Bangalore, Hyderabad, Coimbatore and Krishnapatnam) Choice Shipping Lines, Cochin (with branches in Tuticorin, Vizag, Goa, Hyderabad, Bangalore, Chennai, Coimbatore,Mumbai) Choice Constructions, Cochin Choice School ,Cochin JTPAC, Cochin Choice Infoway Each business is managed independently by a young and dedicated team of professionals and the continuing success of the Group is attributable to its spirit of innovation and commitment to excellence. In each of its chosen fields of activity, the Group enjoys an enviable position. In many of them, it is the leader and innovator. In all of them, the same standards of professionalism and excellence prevail. The courage to dream has always been the mark of a leader but this coupled with inexhaustible energy, perseverance, daring and an ambitious vision has rendered Mr. Jose Thomas, the M.D of Choice Group truly outstanding - young in age, rich in experience and bursting with the desire to place the Choice Group on the global business map. Starting at the very young age of 17, this gutsy entrepreneur has engineered a remarkable growth graph starting with his small seafood company and subsequently expanding into diverse activities while consistently ensuring that each division left its mark of excellence in all its operations. Today, the group registers a turnover close to 600 crore with seafood exports as the flagship business of the Group.

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 the following type of condenser are being used in the plant:

1. Evaporative Condensers

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 Choice Foods food processing unit

- i) **Spiral Freezer**
- ii) **FLUIDIZED TUNNEL FREEZER**

Spiral Freezer:

Spiral freezers operate using a mechanical conveyor system to pass food through a continuous freezing process. Spiral freezers will allow food producers to;

- Freeze food products individually, or in set batches
- Adjust airflow and belt / conveyor speeds to allow increased freezing speeds depending on the production/cost requirements.
- Ensure the product is frozen quickly
- Ensure the product is frozen consistently
- Ensure the quality of the product is not impaired during the freezing process.

FLUIDIZED TUNNEL FREEZER:

The Perforated Tray Tunnel System utilizes a combination of horizontal and vertical pulsating air, continuously turning the product in the fluidization form. The Tray tunnel are sectioned with different air flow to allow more air in the precool section for fast crust freezing, then it flows towards freeze section for more gentle and less air buoyant action to remove product latent heat. The products are then fed onto the tray by shaker or infeed

conveyor, and then poured onto the built up fluidized product about two to six inches deep depending on the product size. The product line continuously meets an upward high velocity air stream, where the product is levitated in the mid air stream until it is crust frozen. Then it flows and settles down the tunnel in fluidized state. As the product is continuously fed into the tunnel tray, the product travels on air in fluidization form (like water) down the tunnel until it stops at the adjustable discharge gate. As the product is backed up to adjusted depth it overflows the discharge gate. The gate height is adjusted according to the various product sizes and shape. Usually higher depth for a larger sized product and a lower depth for smaller sized product.

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:

It is noticed during the course of audit that two type of energy is being used in the plant, which are electrical energy and thermal energy. 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

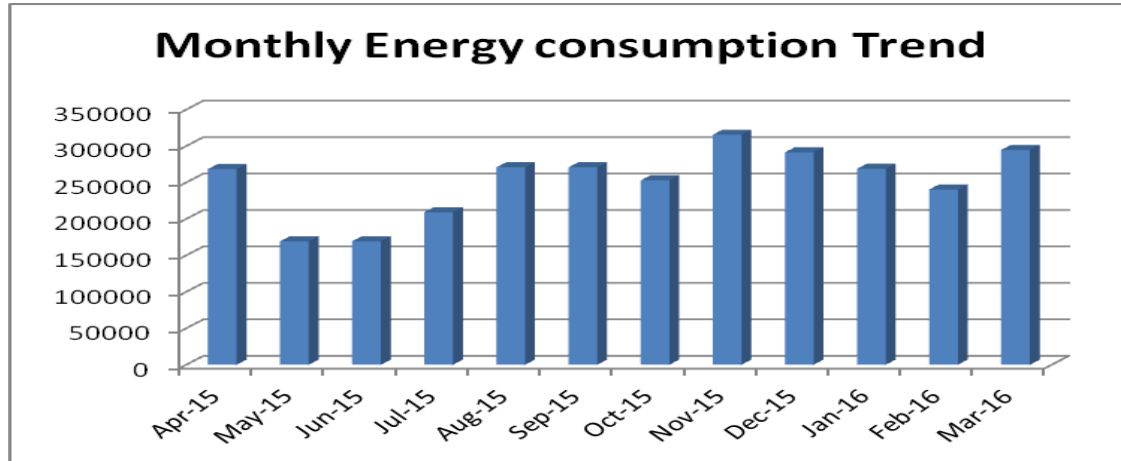
Energy consumption of the plant

The primary source of energy is electricity and that is imported from the KSEB and diesel generators are being used as and 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	800	762	268330	279800	0.96	1642509	-20892	6.12
2	May-15	800	600	169300	175870	0.96	1071240	-13149	6.33
3	Jun-15	800	600	169300	175870	0.96	1071240	-13149	6.33
4	Jul-15	800	773	209080	221980	0.94	1123887	-10879	5.38
5	Aug-15	800	741	270770	282050	0.96	1635142	-20999	6.04
6	Sep-15	800	741	270770	282050	0.96	1635142	-20999	6.04
7	Oct-15	800	756	252800	264720	0.95	1558364	-16270	6.16
8	Nov-15	800	786	315440	333460	0.95	1880518	-20229	5.96
9	Dec-15	800	746	291230	307210	0.95	1755332	-18824	6.03
10	Jan-16	800	759	268730	283150	0.95	1647694	-17469	6.13
11	Feb-16	800	709	240320	255030	0.94	1455931	-12254	6.06
12	Mar-16	800	808	294600	313980	0.94	1782999	-15195	6.05
	Total			3020670	3175170		18259998	-200308	
	Avg			251722	264597	0.95	1521667		6.05

The electricity consumption of the plant is varying from 1.69 lakh kWh/month to 3.15 Lakh kWh/month and average electrical energy cost for the plant is 6.05 Per Unit (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	1395	4185	83700
2	May-15	1005	3015	60300
3	Jun-15	1955	5865	117300
4	Jul-15	2245	6735	134700
5	Aug-15	1370	4110	82200
6	Sep-15	4525	13575	271500
7	Oct-15	1040	3120	62400
8	Nov-15	2285	6855	137100
9	Dec-15	1705	5115	102300
10	Jan-16	1000	3000	60000
11	Feb-16	545	1635	32700
12	Mar-16	3060	9180	183600
		22130	66390	1327800

It seems to be diesel consumption of plant is nominal only

Production scenario :

The following table shows the monthly wise production details of **Choice Canning Company** for FY-2015-16.

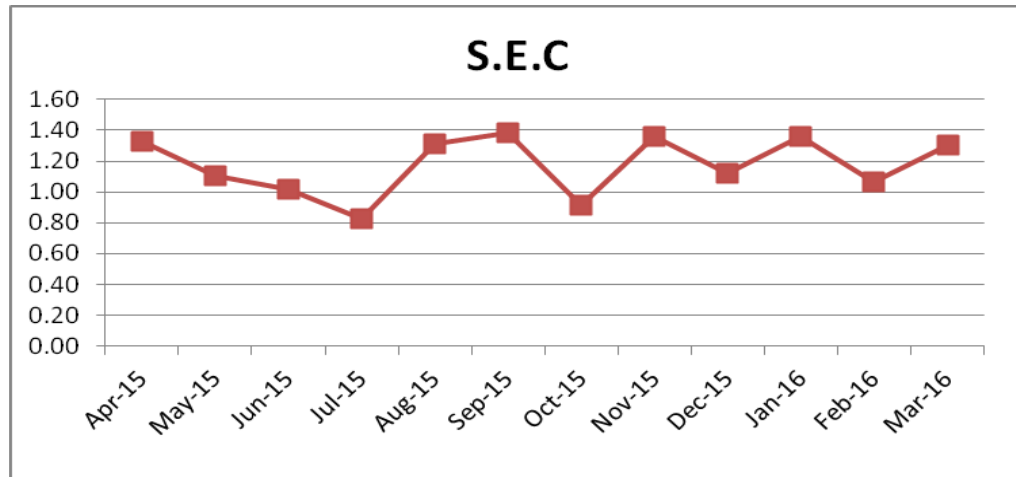
S.No	Month & Year	Production(LBS)	Production(KG)
1	Apr-15	452360	205145
2	May-15	342806	155463
3	Jun-15	378658	171721
4	Jul-15	575540	261007
5	Aug-15	463372	210139
6	Sep-15	453620	205717
7	Oct-15	617285	279939
8	Nov-15	523240	237289
9	Dec-15	583202	264482
10	Jan-16	441025	200005
11	Feb-16	501999	227657
12	Mar-16	513858	233035
		5846965	2651599

Specific Energy Consumption:

The specific energy consumption unit range from 0.83 kWh/kg of the product to 1.38 kWh/kg of the product.

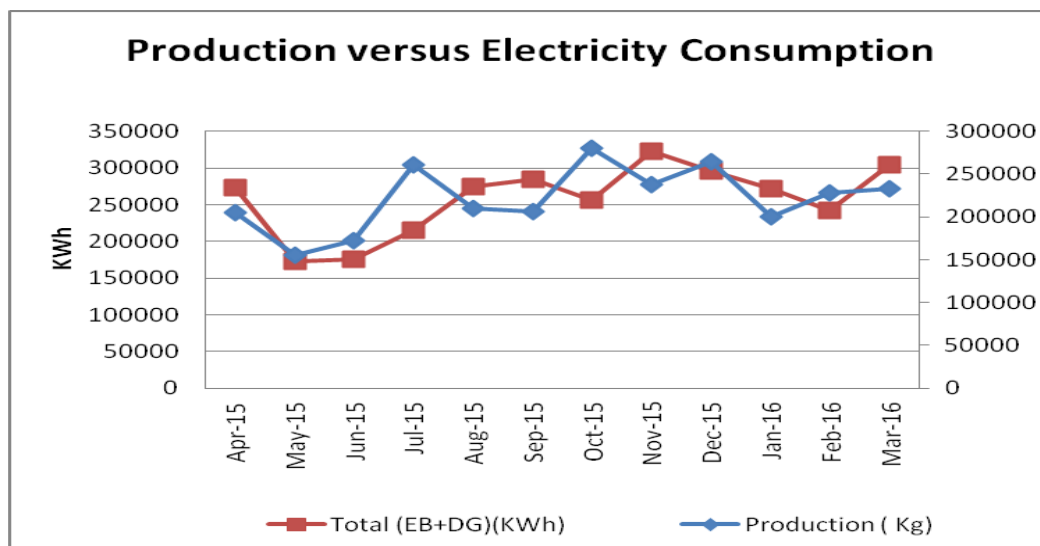
S.No	Month & Year	Production (Kg)	Total (EB+DG)(KWh)	S.E.C(KWh/Kg)
1	Apr-15	205145	272515	1.33
2	May-15	155463	172315	1.11
3	Jun-15	171721	175165	1.02
4	Jul-15	261007	215815	0.83
5	Aug-15	210139	274880	1.31
6	Sep-15	205717	284345	1.38
7	Oct-15	279939	255920	0.91
8	Nov-15	237289	322295	1.36
9	Dec-15	264482	296345	1.12
10	Jan-16	200005	271730	1.36
11	Feb-16	227657	241955	1.06
12	Mar-16	233035	303780	1.30
		2651599	3087060	1.17

Monthly Specific Energy consumption Variation for the year 2015-16



It seems to September month accounts for largest Specific energy consumption 1.38 KWh/Kg followed by ,November and January months 1.33 & 1.30 KWh/kg

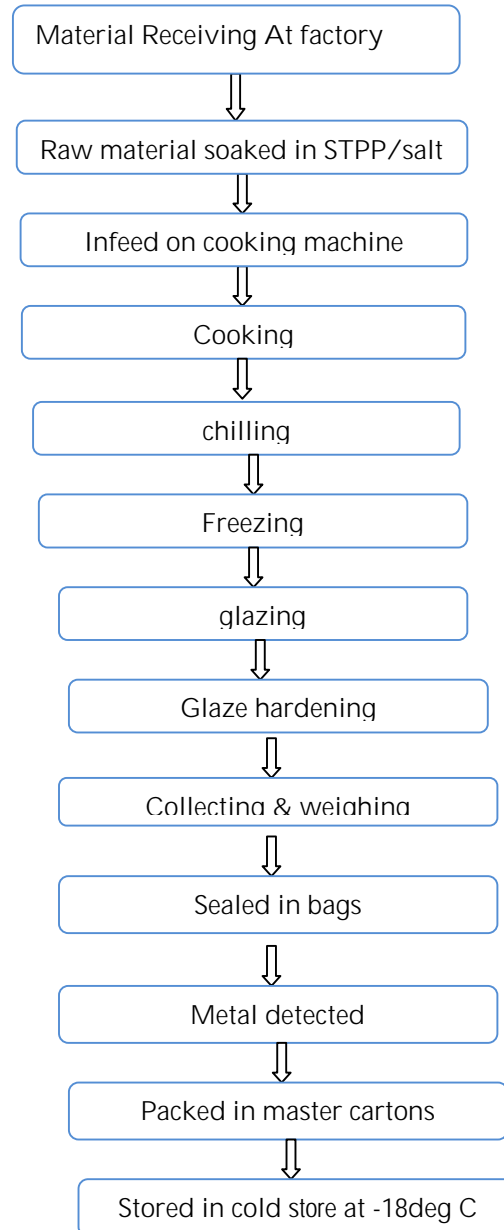
Monthly Variation in Production versus Electricity Consumption for the year 2015-16



It seems to October month is having large variation between Production and Energy .

Process flow diagram

The typical process followed in the seafood processing industry is shown in the flowchart below.



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 is 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.

Choice Foods have installed Evapco cooled 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 8 compressors installed in Choice Foods to meet the cooling load requirements.

S.No	Description	Design	Measured				
		Rating(KW)	V	A	KW	P.F	KVA
1	Compressor-1	90	428	120	74.1	0.83	89.27
2	Compressor-2	90	Not working				
3	Compressor-3	55	Not working				
4	Compressor-4	55	Not working				
5	Compressor-5	55	Not working				
6	Compressor-6	55	437	66.7	49.2	0.95	51.78
7	Compressor-7	125	Not working				
8	Compressor-8	55	Not working				

By the time of audit only one blast freezer is working, 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 8 compressor. based on heat load units will come in to active mode automatically.

Performance evaluation of refrigeration System

	Unit-1	Unit-2
Mass flow Rate of cooling water M3/h	17885	15103
inlet air temp deg C	31.5	32
Outlet air temp deg C	34.8	35
Inlet air Humidity %	61	57
Out let air Humidity %	83	79
Inlet air enthalpy KJ/KG	78	74
Outlet air temp KJ/KG	112	106
Specific heat of air kg/m3 deg C	1.23	1.23
Condenser-Heat Rejected (TR)-Measured	59.17	47.03
Compressor (KW)-measured	74.1	49.2
Evaporator (TR)-Measured	38	33

Cooling Tower analysis:

Cooling tower is using to cool the compressor head , there is a common cooling tower for all compressors ,



detailed analysis is given below:

Parameter	Unit	CT
CW top temp	°C	35
CW basin Temp	°C	32
wet Bulb Temp	°C	24
Effectiveness	%	27.3

It seems to be cooling tower heat transfer area (fills) are found inefficient. During the rainy season and winter there is not much of a problem. Where as in summer, they needs to be cleaned periodically to improve their performance

Cold storage :

After packing frozen material product will keep in cold storages at -18deg C temperature . Choice Foods is having total 4 cold storages to keep products in required temperatures they installed and 404 A 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-1 &2	unit-1	422	19.1	13	0.93	14.0
2	Cold store-1 &2	unit-2	420	18.3	12.5	0.94	13.3
3	Cold store-3 &4	unit-3	422	23.7	16	0.93	17.2
4	Cold store-3 &4	Unit-1	421	19.6	13.2	0.93	14.2

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

S.No.	DESCRIPTION	Cold storage-1&2		Cold storage-3&4	
		Unit-1	Unit-2	Unit-1	Unit-2
1	Air density(Kg/m3)	1.29	1.29	1.29	1.29
2	Air flow(m3/h)	3846	3345	4515	4515
3	Supply air temp deg C	-21.5	-16.0	-15.0	-15.0
4	Return air temp deg C	-17.0	-11.0	-11.8	-11.3
5	TR	7.38	7.13	6.16	7.13
6	KW	13.00	12.50	16.00	13.20
7	KW/TR	1.76	1.75	2.60	1.85
8	COP	1.99	2.00	1.35	1.89

From the above table we can observe that Net refrigeration capacity of the AC system varies around 7 TR. Also the range in kW/ TR is observed to be little bit high in unit -1 in cold storage-3 and the COP varies from 1.9 to 2 .

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 8 compressors with different ratings details are given below:

S.No	Description	Rating(KW)
1	Compressor-1	90
2	Compressor-2	90
3	Compressor-3	55
4	Compressor-4	55
5	Compressor-5	55
6	Compressor-6	55
7	Compressor-7	125
8	Compressor-8	55

580

Observation

- The specific energy consumption of reciprocating compressor is varying from 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 76 Lakhs.

Payback:

Payback period will be in 3 years.

In general 3 compressors are running to meet cooling requirement , it is suggested to replace 2*90 KW and 1*125 KW reciprocating compressor with screw compressors, calculation has been mentioned below:

S. No.	Particulars	Units	Value	Value
1	Capacity of the reciprocating compressor	kW	90	125
2	Number of compressors	no's	2	1
3	Actual power consumption of 6 compressors	kW	305	
4	Expected power consumption by screw compressor with VFD(@15% saving)	KW	259.25	
5	Savings in kW	kW	45.75	
6	Operating hours	hours	24	
7	Savings in kWh per annum	kWh/Annum	400770	
8	Savings in Rs	Rs	2496797	
9	Investment	Rs	7600125	
10	Payback	Years	3.04	

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 in order to reduce power transmission losses and this will result in considerable amount of energy savings.
- The energy saving calculation for 8 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	580
	Actual power consumption with V belt	kW	435
3	Projected consumption with flat belt	kWh	413
	Savings in kWh	kWh	22
5	Total No. of compressors	Nos	8
	Operating hours	hours	12
7	Savings in kWh per annum	kWh/Annum	95265
	Savings in Rs	Rs	600170
9	Investment	Rs	180000
	Payback	Years	0.30

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 8 Lakhs.

Payback:

Payback period will be in around 1.5 year.

S. No.	Particulars	Units	Value
1	Capacity of the Present reciprocating compressors	kW	580
2	Number of compressors	no's	8
3	Expected power consumption by installation of Thermoshipon system (@2% saving)	KW	11.6
4	Operating hours	hours	24
5	Savings in kWh per annum	kWh/Annum	101616
6	Savings in Rs	Rs	614777
7	Investment	Rs	800000
8	Payback	Years	1.30

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 16 Lakhs.

Payback:

Payback period will be in around 1 year.

S. No.	Particulars	Units	Value
1	Capacity of the Present reciprocating compressors	kW	580
2	Number of compressors	no's	8
3	Expected power consumption by installation of PLC controlled Automation system (@5% saving)	KW	29
4	Operating hours	hours	24
5	Savings in kWh per annum	kWh/Annum	254040
6	Savings in Rs	Rs	1536942
7	Investment	Rs	1600000
8	Payback	Years	1.04

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

S.No	Recommendation	Investment in INR	Eligible Subsidiary amount in INR
1	Replacement of reciprocating compressor with Screw compressor with VFD	7600125	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.	800000	
4	Automation of refrigeration plant by using PLC controller	1600000	

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

<p>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</p>	<p>Elgi Equipment Limited #39/3973, Pallimukku, M.G.Road, Kochi – 682016. Tel (0484) 2360155 Fax (0484) 2351904 E-mail : enquiry@elgi.com</p>
<p>Frick India Limited 41/3273-D, Golden Castle Bldg. Old Railway Rd., Cochin - 682018. Phone: 0484-2394173 E-mail: cochin@frick.co.in</p>	<p>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</p>
<p>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</p>	<p>Lloyd Insulations (India) Limited, 38/ 449, Panampilly Nagar Manorama Junction, Ernakulam, Kerala 680036 Ph: +91 (484) 2324472</p>
<p>Bombay Ammonia Sales Corporation B-17, Rishabh Shri House, Ranjeet Nagar Commercial Complex, New Delhi – 110 008</p>	<p>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</p>
<p>Baltimore Aircoil Condensor Densol Engineering Pvt . Ltd. #43/ C, 9th Main, R P C Layout Vijayanagar 2nd Stage Bangalore 560040</p>	
<p>Belts</p> <p>Beblec (India) Private Limited Plot No. 126, Sipcot Industrial Complex Hosur - 635 126 Tamil Nadu, India</p>	<p>Belts</p> <p>Anjanaa Belting 3857, TNHB, Ayapakkam, Chennai – 600077 Ph: +91-44 – 64991300/ 9840186799</p>

Sagar Electric Power Services #70, K. Kamaraj Road, Bangalore, India—560042 Ph: +91 9060133874; 9448073258	Vijay Energy Products Pvt.Ltd. SP – 75, Ambattur Indl. Estate Chennai – 600 058 044 – 625 4326
<u>Pumps</u> BI Marketing & Services Pvt Ltd Dealer: Grundfos Pumps No.50, 3 rd street, East Abhiramapuram, Chennai – 60004 Ph: +91-44-24671267	<u>VFD's</u> Enpro Industrial Automation Pvt Ltd. Dealer: Danfoss VFD F18 Ambattur Industrial estate, Ambattur Chennai – 600058 Ph: +91-44-26244583; 26244865; 26359850 email: projects@enproautomation.com
<u>Motors</u> Project & Supply A – 605, Sunswept Lokhandawala Complex Swami Samarth Nagar,4, Bungalow, Andheri (West) Mumbai 400 050,Ph: 022 – 626 6584	<u>Motors</u> Kirloskar Electric Co. Ltd 294 – 295, Lloyd's Road, Royapettah. Chennai –14. Ph: 044 – 28133176
<u>Motors</u> Siemens Ltd 3rd Floor, Jyoti Mahal, No. 49, St . Marks Road, Bangalore 560 001 +91 80 5119 1500 Ph: +91-4344-276358 / 278658 / 400688 /400687	<u>Capacitors</u> Momaya Capacitors 401, Madhav Apartments Jawahar Road, Opp.Rly.Stn. Ghatkopar (East) Mumbai – 400 077,Ph: 022 – 516 2899 / 1005 / 0745
<u>Insulation</u>	
India Insulations NH Bypass, Vytilla, Kochi – 682 019, Kerala Ph: +91 (484) 2304465	Thermax Limited, RNG Pallazzo, No. 1, 1st Floor South End Street Kumarapark East Bangalore 560 001 Ph: +91 (80) 22371721,Fax: +91 (80) 22371726
<u>For Ice Storage System:</u>	
Balamurugan Refrigeration Engineers, Liveiro building, Thoppumpady Kochi 5 Ph: +91 (484) 2231844	GEA Refrigeration India Pvt. Ltd. Branch Office- 5th Floor, Lohia Jain Business Centre, Friends' Park Society, Senapati Bapat Road ,Pune – 411016 India



ACS Refrigeration

272/5, Sangam Apartments, Belly Area, Anna Nagar west., Chennai – 600040. Tamil Nadu, India.

Mob No:- 09840818637, Tele Fax:: 044-42026477

Email : sales@acsref.com

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.