M/s. KALEESUWARI REFINERY PRIVATE LIMITED

P.RAMACHANDRAN – GM OPERATIONS
J.BALAJI – AGM ENGINEERING
V.MAGESH – ENERGY MANAGER

M/s. Kaleesuwari Refinery Private Limited

- Kaleesuwari Group started in 1973 and from then it established itself well in edible oil market and industry.

- It produces Refined oils, Blended oils, Vanaspati, Bakery shortenings, Margarine and Dhal variants.

- Gold winner is it's flagship brand. Orysa, Eldia, Fedora, Cardia life and Dheepam are other known brands.

- Headquartered out of Chennai (Tamil Nadu), Kaleesuwari Refinery Private Limited has four modernized manufacturing units in India – Chennai, Palani, Kakinada & Tumkur.

M/s. Kaleesuwari Refinery Private Limited

- ISO 9001:2015, HACCP, ISO 22000:2005, BRC, Halal and Kosher certified company.
- Kaleesuwari Chennai unit was the First edible oil refinery in India which received BRC certification for maintaining Food safety standards.
- Production of Bio Diesel.
- Harnessing and utilizing renewable wind energy from our privately operated windmills
- As a high-profile edible oil company, we will strive to lead by example to meet the highest energy management standards and be at the forefront of sustainable development as a standard bearer for good environmental and resource management.

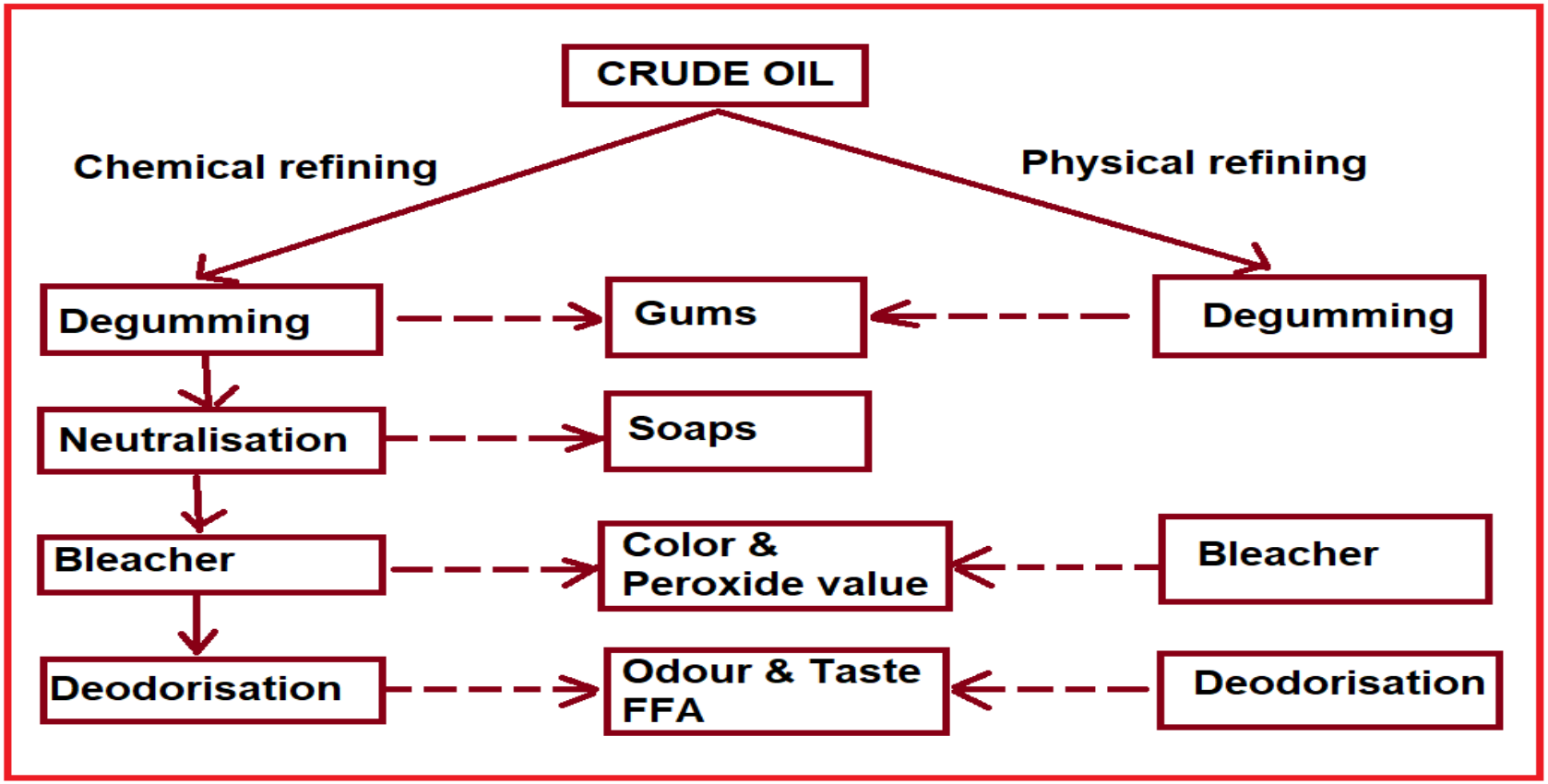
Manufacturing Process

- Edible oils are mostly refined before their consumption so that the resulting taste is sensorially neutral. Even very small traces of volatile products are easily perceived by the consumer.

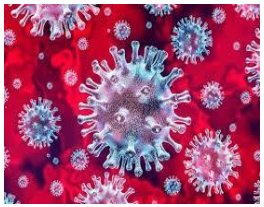
Why do we Refine Oils ?

- To remove impurities / unwanted natural products that may interfere in further process steps
- To improve organoleptic properties
  - Taste
  - Odour
  - Colour
- To improve shelf life of oils
- To use in different versatile food applications.
- To adhere Statutory standards set by legal authorities (FSSAI)

Manufacturing Process



IMPACT OF COVID 19



- Crude edible oil (Raw material) price got increased.
- Potential improvement projects got delayed.
- Supply chain got affected due to non availability of Manpower/Tins /Chemicals
- Daily packing production got affected by maintaining social distance.

However we overcome these difficulties by following actions

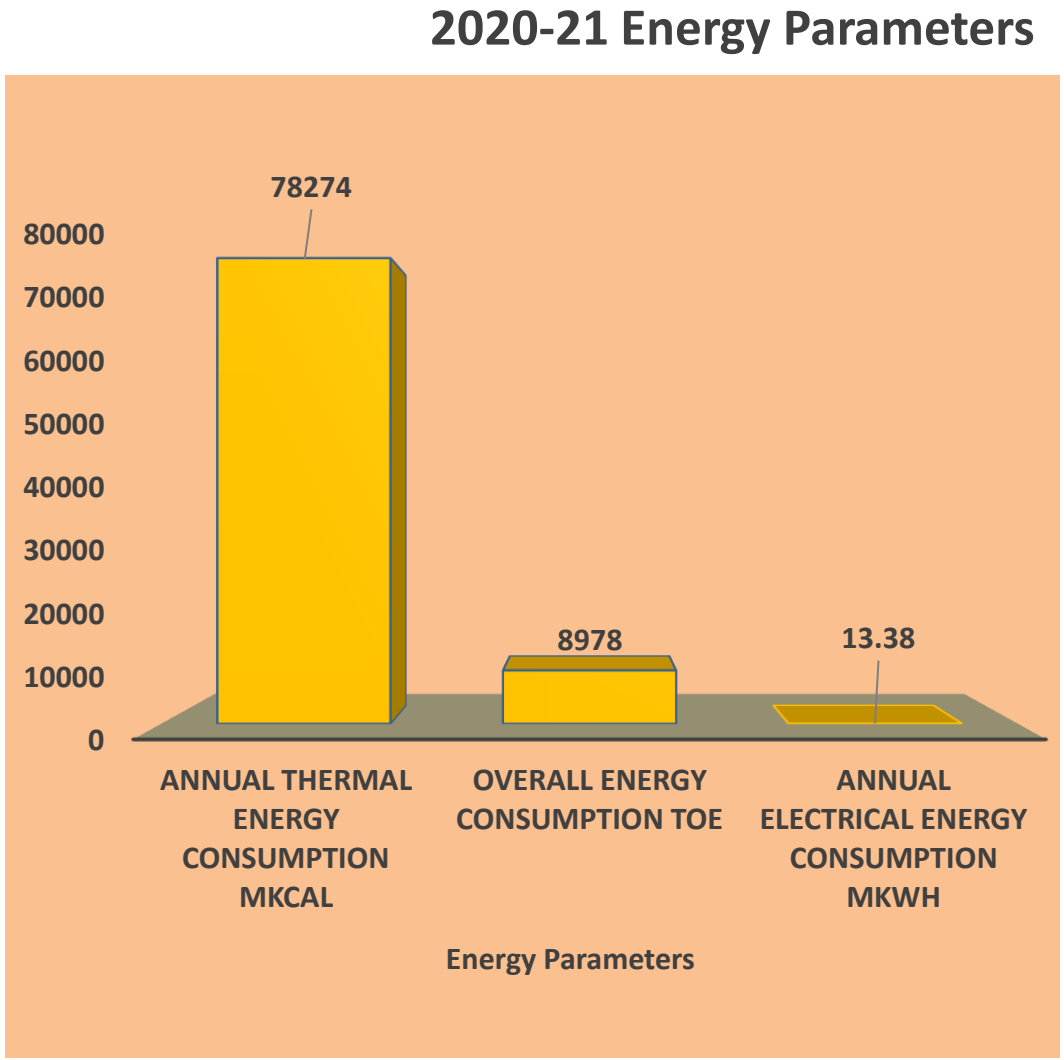
- Being a FMCG, we utmost take care of the employees for providing transportation, food, social distance and safe operating practices.
- We have distributed basic needs like rice, pulses, vegetables & oils to all our employee families and surrounding areas spend around 4.2 crores.
- Covid relief fund provided to all our employees.

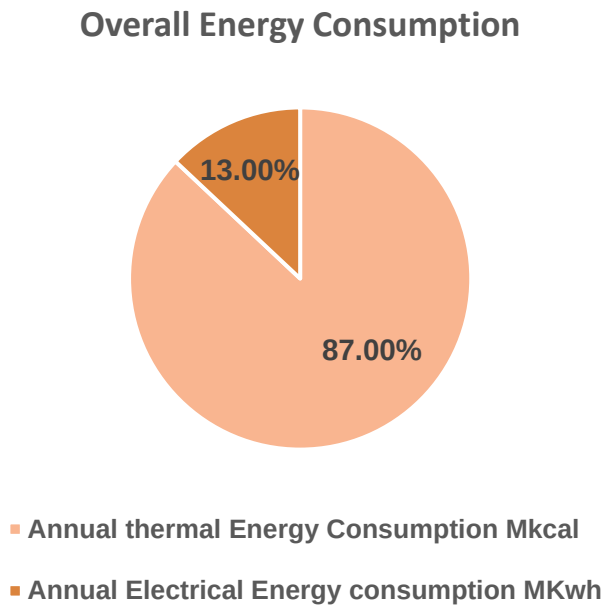
- Provided 24*7 nurse, on call doctor, covid helpline numbers, emergency oxygen and up with nearby hospitals.
- Vaccination camps provided inside the campus and now our employees are 96% vaccinated

Energy Consumption Overview

Parameters	Unit of Measurements	2017-18	2018-19	2019-20	2020-21
Production Data	MT	2,13,025	2,42,624	2,66,571	3,94,221
Annual Electrical Energy consumption	million kwh	9.81	10.45	11.28	13.38
Annual thermal Energy Consumption	million kcal	52,988	59,867	63,870	78,274
Overall energy consumption	TOE	6143	6886	7357	8978

Energy Consumption Overview



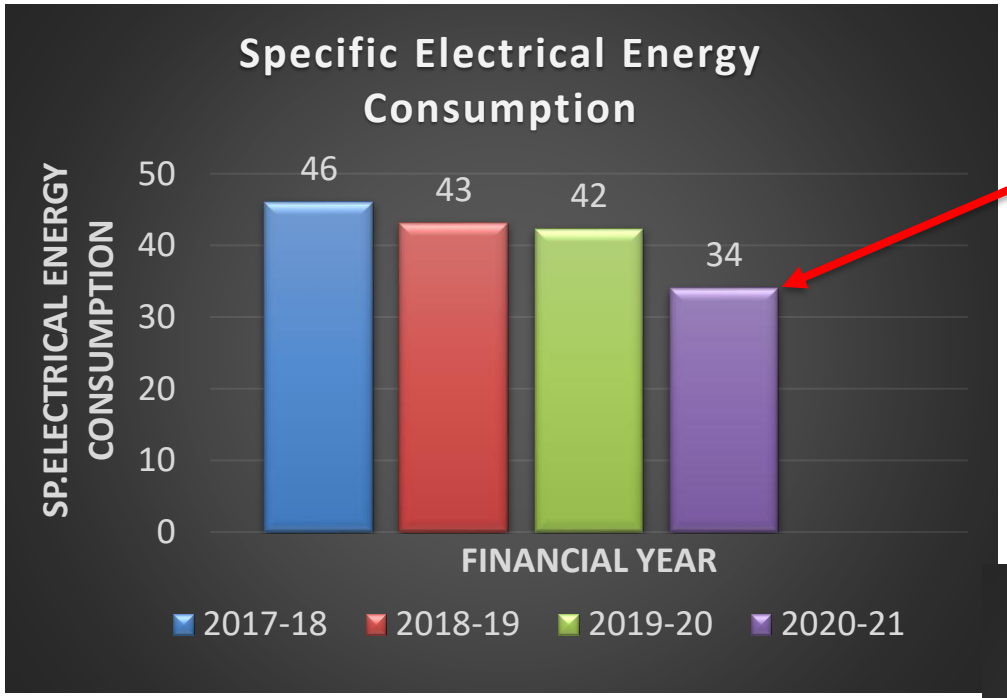


Annual thermal Energy Consumption MKcal	87.0%
Annual Electrical Energy Consumption MKwh	13.0%
Overall Energy Consumption TOE	100%

Sp. Energy Consumption for FY 2017-21

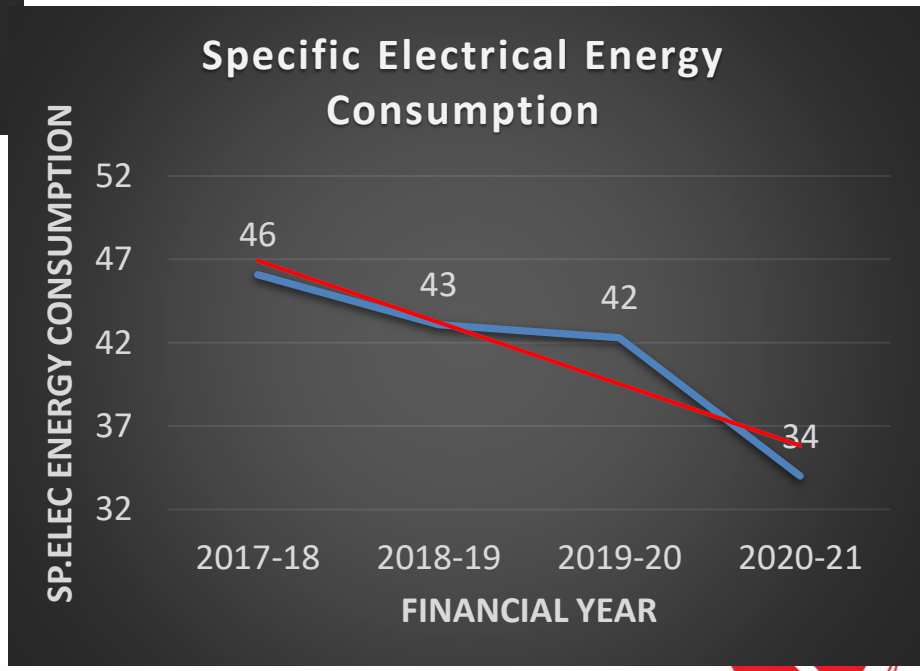
Parameters	Unit of Measurements	2017-18	2018-19	2019-20	2020-21
Production Data	MT	2,13,025	2,42,624	2,66,571	3,94,221
Specific electrical energy consumption	kwh/ton of Prod	46.07	43.09	42.30	33.93
Specific thermal energy consumption	kcal/ton of Prod	2,48,739	2,46,749	2,39,600	1,98,554
Specific Overall energy consumption	TOE / ton of Prod	0.0288	0.0284	0.0276	0.0228

Sp. Electrical Energy Consumption / ton of Prod

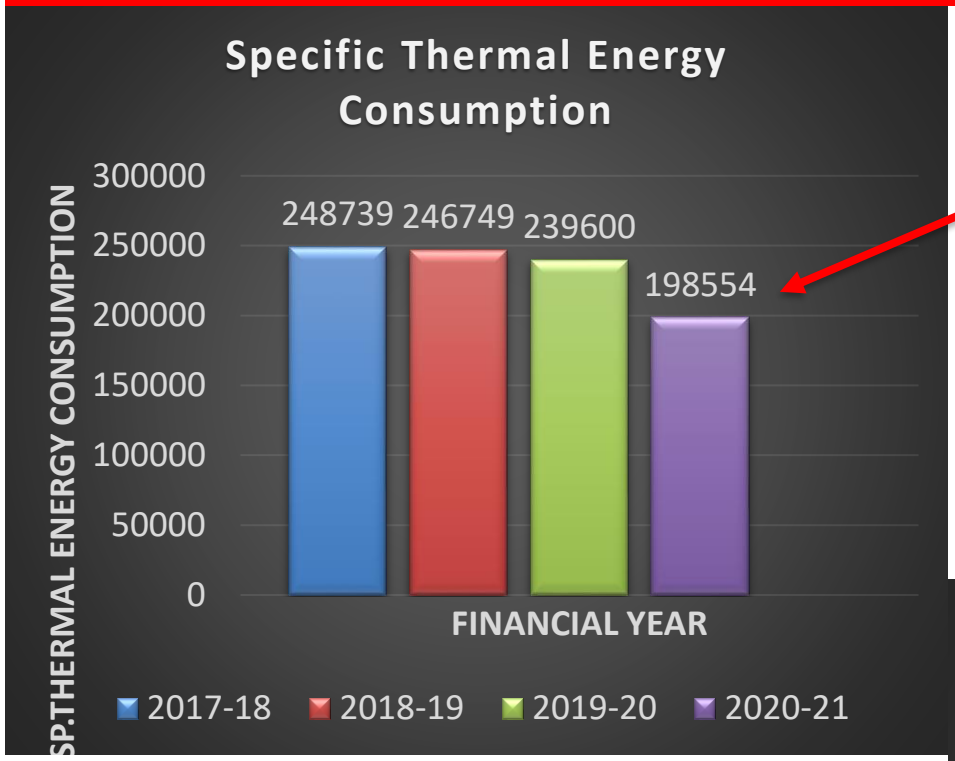


Percentage of drop 26% from 2017 to 2020 by our energy management measures

Percentage of drop
2016-2020 year – 17.65%
2017-2021 year – 26%

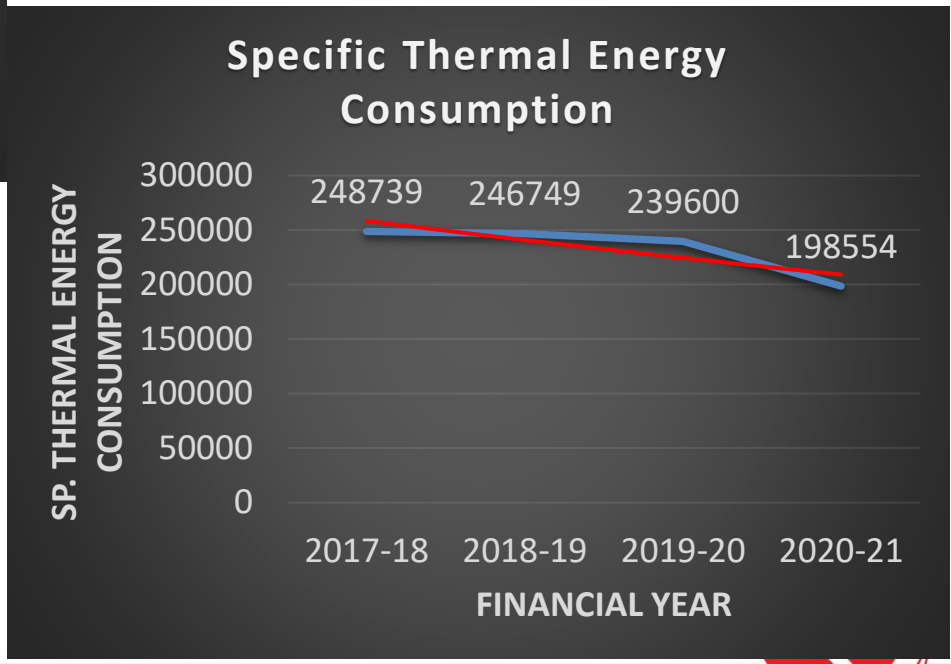


Sp. Thermal Energy Consumption / ton of Prod



Percentage of drop 20% from 2017 to 2020 by our energy management measures

Percentage of drop
2016-2020 year – 7%
2017-2021 year – 20%



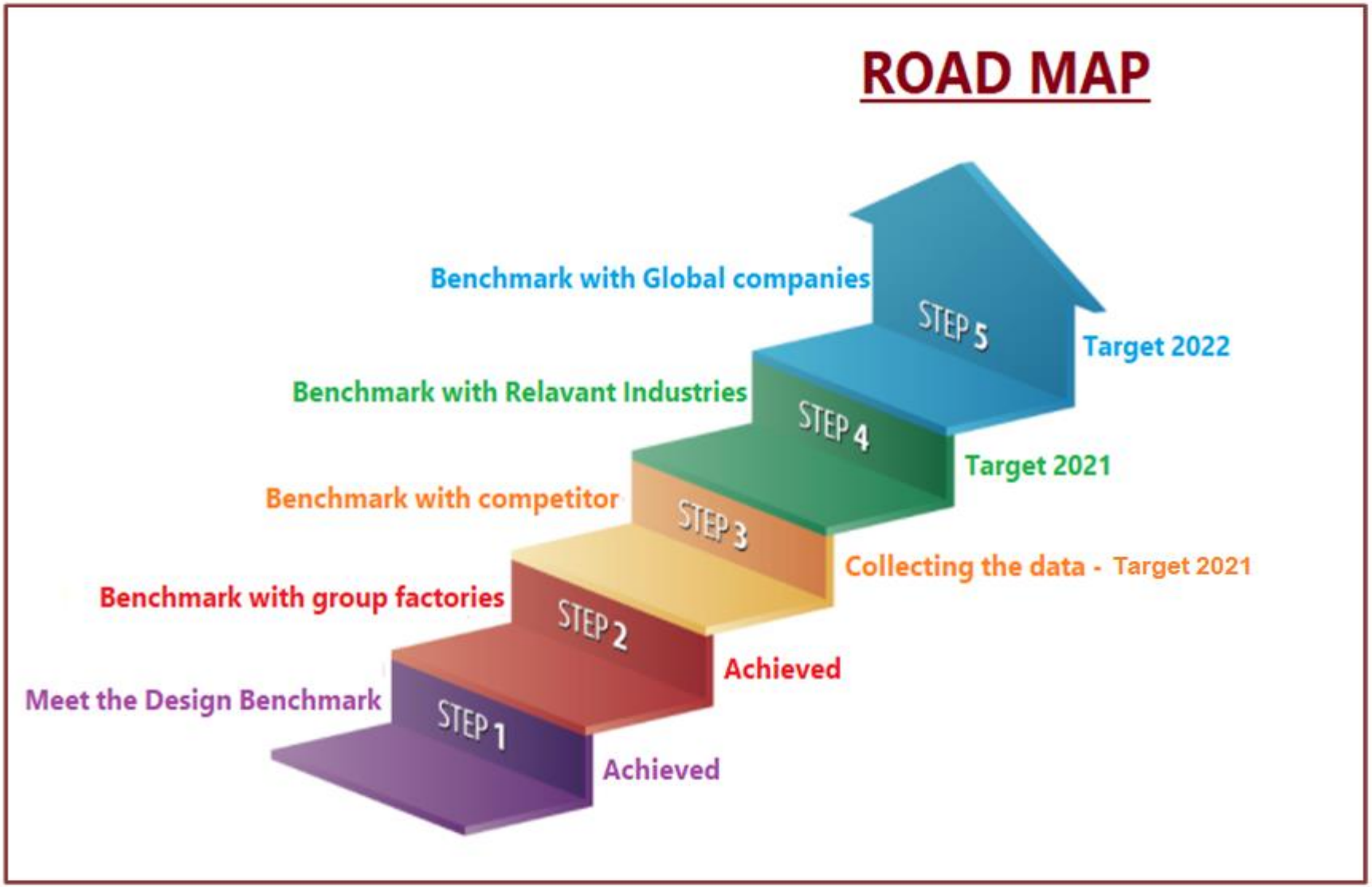
Information on Competitors, National & Global benchmark

- We have **4** factories. We used to benchmark Common products in terms of Unit per Tons, Steam Kcal /Tons, Water KL/Tons and Manpower per Tons.

Description	Our Factory	Group factory	Competitor
Steam & Coal (Rs per ton)	502	712	905
Power (Rs per ton)	144	222	400

By doing re-engineering, capacity increasing, Energy saving activities we are reducing the utility cost and same will be implemented in our group companies

Road map to achieve the target



Major Encon Project Planned in FY 2021-22

- Replacement of Existing Pumps to Energy Efficient Pumps.
- Bio fuel for Boiler to reduce coal consumption.
- Chilled water Vacuum system to reduce 75KLD water and one ton of steam per Hr.
- Replacement of Vacuum Pump & Ammonia compressor
- 750Kw Roof Top Solar system.
- Steam Ejector Nozzle alteration.
- Screw filter press for ETP
- Waste cartons as fuel for Hot water generator.
- Upgradation of windmills.
- New Modernized WTP & ETP (Existing one 15 years Old).
- Fully Automatic Packing automation.(Spanish Technology to reduce 40 manpower per day)
- Utilization of Rainwater harvesting

Energy Saving projects implemented

Year	No of Proposals	Investments	Savings per annum
2018-2019	5	Rs.28.25 lakhs	Rs.498 lakhs
2019-2020	8	Rs.78.3 lakhs	Rs.143 lakhs
2020-2021	7	Rs.304.3 lakhs	Rs.233 lakhs

Energy Saving projects implemented

Sl. No	List of projects implemented in 2020-21	Annual Electrical Savings (kWh)	Annual Fuel Savings (MT)	Investments (in Lakhs)	Annual Monetary Savings (in lakhs)	Payback (in months)
1	Energy Efficient Chiller	0	288	42	14.5	36
2	Continuous sludge removal by screw filter	12780	0	12	1	12
3	Cooling tower Optimization	34085	0	2	2.75	11
4	Flash steam recovery with Condensate unit	21305	150	5.4	7	10
5	Kaizen in cooling tower	34087	0	0.4	2.7	2
6	Optimization of non-value added pumps	243856	0	2.5	19.5	2
7	Energy Efficient Palm Plant	1123200	1872	240	186	16
	Total	1469313	2310	304.3	233.45	**24**

We have saved around 10% of our overall energy cost by implementing energy saving projects

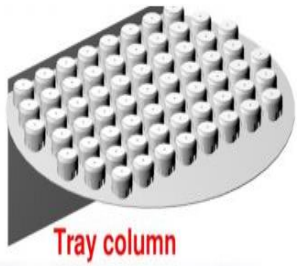
Energy Saving projects implemented

Sl No	List of projects implemented in 2019-20	Annual Electrical Savings (kWh)	Annual Fuel Savings (MT)	Investments (in Lakhs)	Annual Monetary Savings (in lakhs)	Payback (in months)
1	Dal Pouch dust collector	1250	0	0	0.1	0
2	Ref-2 steam line alteration work	0	170	1	7.5	2
3	Ref-4 cooling tower motor IE3 changeover	67200	0	1.7	5.4	4
4	Ref-4 Slurry mixer gearbox	33600	0	0.25	2.7	1
5	Ref-1 cooling tower pump	67200	0	0.35	5.4	1
6	Ref-4 682B Pumpset	30240	0	0	2.4	0
7	Re-engineering of Palm oil plant	63520	478.4	75	720	1.5
	Total	**263010**	**648.4**	**78.3**	**743.5**	**9.5**

Innovation Project

Introduction of Packed Column Scrubber for Deodoriser :-

Packed distillation scrubber are “filled with structure packing material” which increase the contact time of rising vapours and liquid. The more vapor liquid contact the better the separation.
Packed column scrubbers are designed for chemical scrubbing of contaminants from gas streams. Internal packing in the scrubber housing provides a large wetted surface area to induce intimate contact between the contaminated gas and the scrubbing liquid.
It will avoid Cooling tower contamination, high By-product recovery and low power and steam consumption



Innovation Project

Introduction of Packed Column Scrubber & Preheater for Deodoriser :- (Investment 2.4 Crores)

The following changes we noticed after addition of Packed column scrubber in Deodoriser unit

Description	Before	After
Production	500MT/day	600MT/day
Steam	210 kg/Ton of Prod	160 kg/Ton of Prod
Power	21 units/Ton of Prod	15 units/Ton of Prod
Heat	4200 Kcal/Ton	3600 Kcal/Ton

Annual Saving of this project is Rs.186 Lakhs

Utilisation of Renewable Energy sources

Technology (electrical)	Year	Type of Energy	Onsite / Offsite	Installed Capacity (MW)	Generation (million kWh)	% of overall electrical energy
Windmill	2018/19	Electrical	Offsite	2.7	4.77754	45.7%
Windmill	2019/20	Electrical	Offsite	2.7	5.08711	45.11%
Windmill	2020/21	Electrical	Offsite	2.7	4.47121	33.42%

Since our factory capacity keep on increasing, windmill % dropping

Technology (thermal)	Year	Type of Energy	Installed Capacity of Boiler	Heat Produced (million KCal)	% of overall thermal energy
Boiler	2018/19	Thermal	4 Ton	511	1.02%
Boiler	2019/20	Thermal	4 Ton	471	0.88%
Boiler	2020/21	Thermal	4 Ton	543	1.28%

Utilisation of Renewable Energy

- Planning to invest 20 crores in solar which will take care of non-conventional energy thereby increasing 33% to 60%
- Use of Bio fuel for Boiler to reduce coal consumption
- Hot water generation using Waste oil strained carton boxes and garden waste.
- Our Own Vegetable oil base Biodiesel as fuel for our Vehicles
- Solar Sludge drying bed.
- Fixed Polycarbonate sheets for Roof area for natural ventilation.
- Fixed Roof top Air turbo ventilators for natural air movement
- Utilized the existing resources to produce 600 tons per day

Waste utilization and management

Sl. No	Year	Waste Details	Qty (MT)	GCV	Heat value (Mkcal)	Waste as % of total fuel
1	2018-19	Carton box, wood & waste oil	340	2500	511	2.03%
2	2019-20	Carton box, wood & waste oil	314	2500	471	1.87%
3	2020-21	Carton box, wood & waste oil	362	2500	543	2.15%

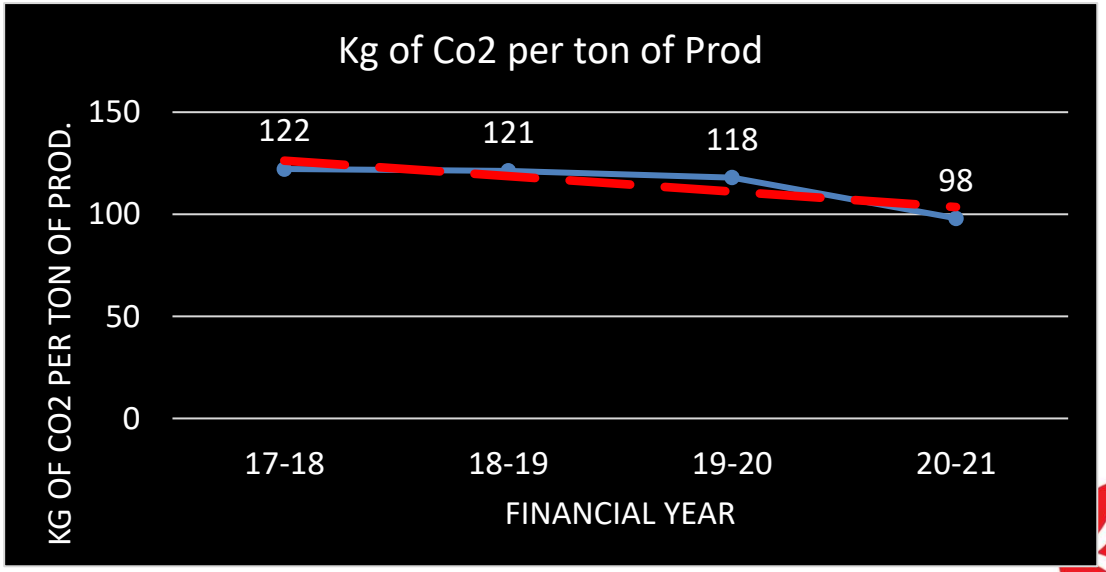
Sl. No	Type of waste generated	Quantity of waste generated (MT/year)			Disposal method
		2018-19	2019-20	2020-21	
1	Paper	72.5	59.63	58.21	Recycle
2	Plastic	95.4	50.73	54.82	Recycle
3	Metal	210.898	92.614	78.54	Recycle

After starting implementation of 5S, waste generation reduced from 2019-2020

GHG Inventorisation

- We have our own State-art Biodiesel Plant. Biodiesel is generating from Vegetable oil and are supplying to various industries to reduce diesel consumption and improve unconventional energy.
- 40 no's of our own Vehicles are using 50% of Biodiesel mixed with Diesel. We are planned to increase 50% to 80% of usage.
- Year on year 10% increase in Renewable energy implementation and Planning to use Bio fuel for Boiler.
- Emission Details: (19.5% drop from 2017 to 2021)

Year	Kg of Co2 per ton of Prod
17-18	122
18-19	121
19-20	118
20-21	98



Green Supply chain Management

- Usage of Bio-diesel – to reduce the fossil fuel.
- Producing Bio-diesel from our own by product(Fatty acid)
- Recyclable carton box and plastic used in pouch packing.
- Successful Implementation of SAP S4 HANA Server to get quick data.
- Truck utilization increased from 96% to 98% by rearrangement, thereby reducing transportation and fuel cost.

Energy Management Team

GM - Factory

Mr.RAMACHANDRAN - BEE Certified

HEAD - ENERGY MANAGEMENT

Mr.V.Magesh - BOE Certified &
Mr.J.Balaji

Energy Demand Reduction Team

Energy Alternative supply Team

TEAM Mechanical	TEAM Electrical	TEAM Utility	TEAM Production
Elumalai	Kanagaraj	Kumaraswamy	Sureshbabu
Rajaseker	Dillibabu	Ganesh	Babu
Senthil	Saravanan	Prakash	Ramesh
Ravi	Gopu	Prabhu	Kumar
Srinivasan	Kaniyappan	Dhanesh	Chandran
Gopal	Premkumar	Saravanan	Ashok

Managers
Subramaniam
Sureshbabu
Saravanan

Employee Involvement & Monitoring

M/s. Kaleesuwari Refinery Private Limited is committed to minimizing our impact on the environment as far as possible, in order to preserve our environment for the benefit of present and future generations. We aim to deliver on this commitment by: -

- Promoting the concept of energy efficiency at all levels in the organization among the workforce and top management.
- Identifying and implementing energy efficient technologies.
- Developing energy conservation maps and setting energy conservation Key result areas to the team.
- Continuous training on energy conservation and new technologies.

Employee Involvement & Monitoring

- Ensuring that adequate resources to enable the energy policy to be implemented.
- Benchmarking energy usage with international / national industry.
- Ensure continual improvement, Kaizen in energy performance on electricity, steam, water and waste reduction.
- Minimize the environmental effects as a part of social responsibilities.

"We are committed to reduce the specific energy consumption per ton of production in our organisation and conserve the precious energy"

Quality circle and 5s implementation done, we are in 3s now

SYSTEM CERTIFICATION

- ISO 9001:2015 (Quality Management systems)
- ISO 22000:2005 (Food safety Management)
- HACCP (Food safety Management)
- BRC (Food safety Management)
- HALAL (Export –Islamic regulation)
- KOSHER (Export – Jewish regulation)

CERTIFICATION PLANNED

- ISO 45001:2018 (OHSAS, Target: 2021-22)
- ISO 14001:2015 (Environmental Management, Target: 2021-22)
- ISO 50001 (Energy Management system, Target: 2022-23

Investment of Energy saving Projects

- 1.5% investment of energy saving projects on total turnover of the company.

LEARNING FROM CII ENERGY AWARD

- Great learning:- **Learning translates to saving**. Great learning Opportunity for us. These awards raise global awareness on benefits of energy management.
- Benchmarking importance
- Understanding best practices
- To explore possible opportunities and challenges in Energy saving activities.
- Updating on New technologies & Technology sharing.
- Industrial best practices
- Horizontal deployment of Energy saving for all other our units

Major Achievements

- Successful Completion of Energy Efficient 500TPD Palm oil Plant with automation for Energy saving
- Flow meter automation in loading area for Quantity Accuracy
- Robo palletization for 5 litre jar Packing to reduce Manpower
- Screw filter press for Dewatering in ETP for energy saving and manpower reduction
- Loading conveyor automation in warehouse for easy way of loading and manpower reduction
- Power Purchase from IEX to reduce energy cost

THANK YOU

magesh.v@kaleesuwari.com
Phone: 9282327512

KALEESUWARI
REFINERY PRIVATE LIMITED

CII

Corporate Office : No.53, Rajasekaran Street,
Mylapore, Chennai - 600 004. India
Tel: + 91 44 3999 3999 Fax: +91 44 3999 3900