CII Energy Excellence Awards

Rane NSK Chennai Heartly Welcome CII Team

Date : 24th August, 2021

Presented by : RNSS - CHENNAI

Team Members

B Muralikrishnan
(Manager – PLE)

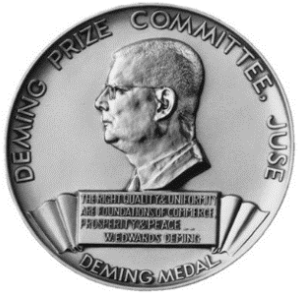
A Mohamed Sameer
(Sr. Executive – PLE)

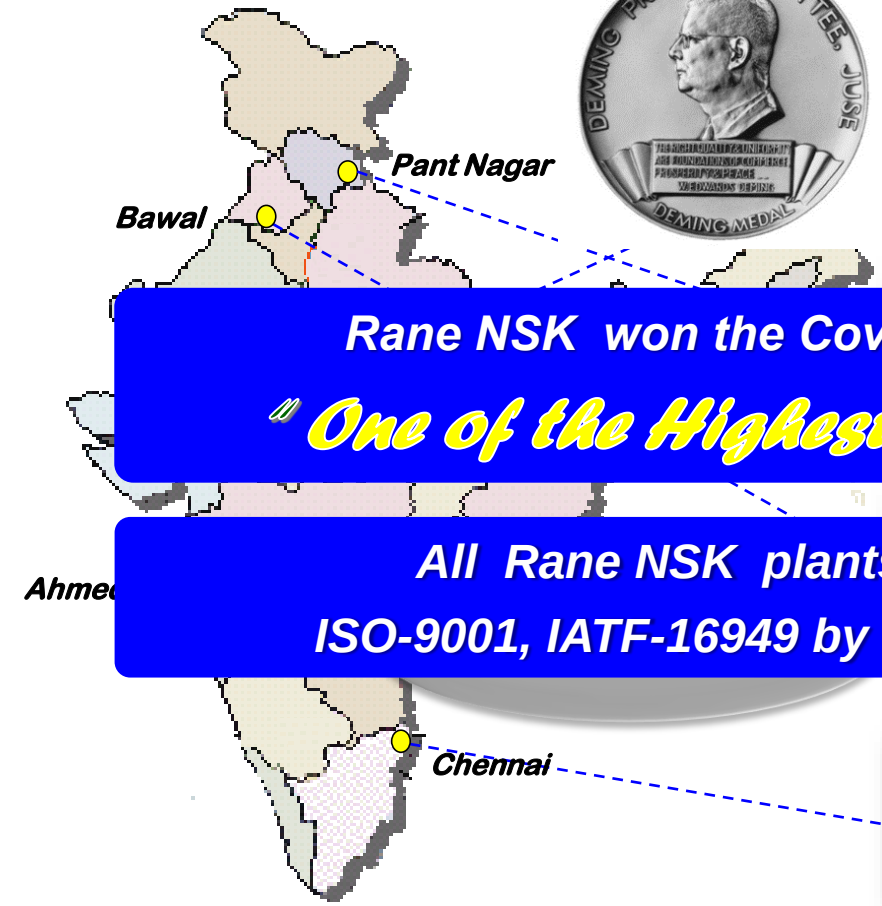
M Vijayan
(Sr. Executive – PLE)

2021

Contents

1. Company Profile & Product Details





Rane NSK Plant Locations

- Gujarat plant (Plant-4)
- Established : 2018
- Employees : 235 (51+184)
- Capacity per Month – 62,000 Column EPS

- Pant Nagar plant (Plant-3)

Rane NSK won the Coveted 'DEMING' Prize from JUSE in 2018

" One of the Highest Awards on TQM in the World "

- Bawal plant (Plant-2)

All Rane NSK plants Certified for ISO-45001, ISO-14001, ISO-9001, IATF-16949 by TUV-Nord and ISO/IEC-27001 by TUV-SUD

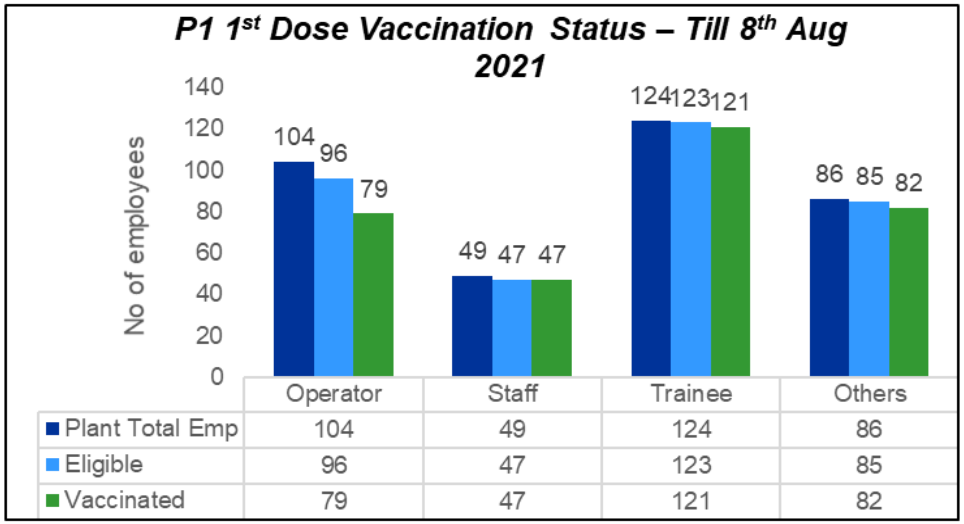
- **Chennai plant (Plant-1), Corp.Office & R&D**
- **Established : 1997**
- **Employees : 210 (60+150), (83)**
- **Capacity per Month – 75,000 Columns**

Plant	Products / Variants			Application	Major Customers
Plant-1 (Chennai)	Column-MSC	Manual Steering		• Passenger Cars • Utility Vehicles, LCV, MCV & HCV	❖ MSIL, TML, VE, Toyota, Honda ❖ ISUZU (Thaiand)

- MSC – Manual Steering Column

(XX+XX) – Indicates No.of. Employees (Management Staff + Operators & Trainees)

2. Impact of COVID-19

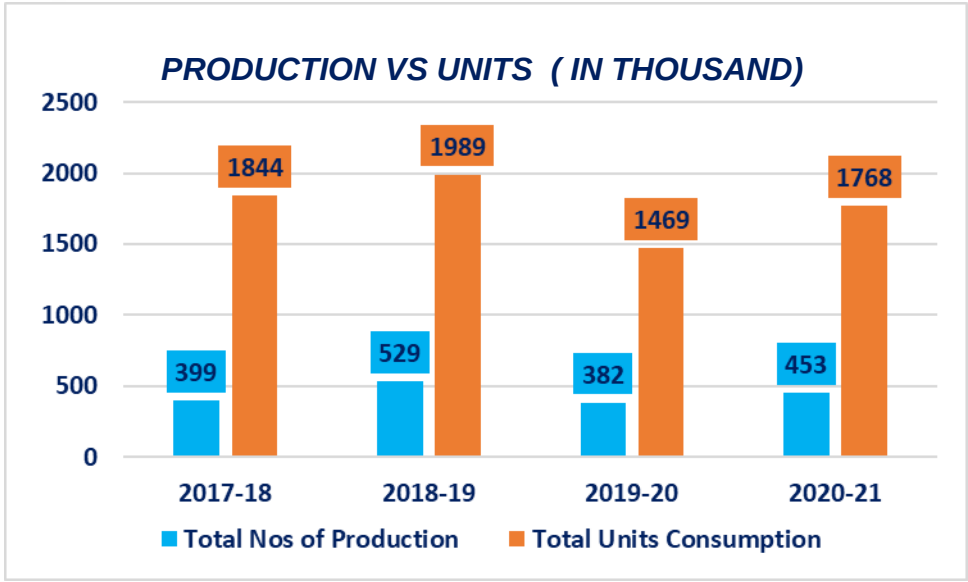


Impact on SEC (5% Increased)

- Plant operated with less manpower and increased shift pattern as per COVID -19 Protocol
- Fixed load even low production

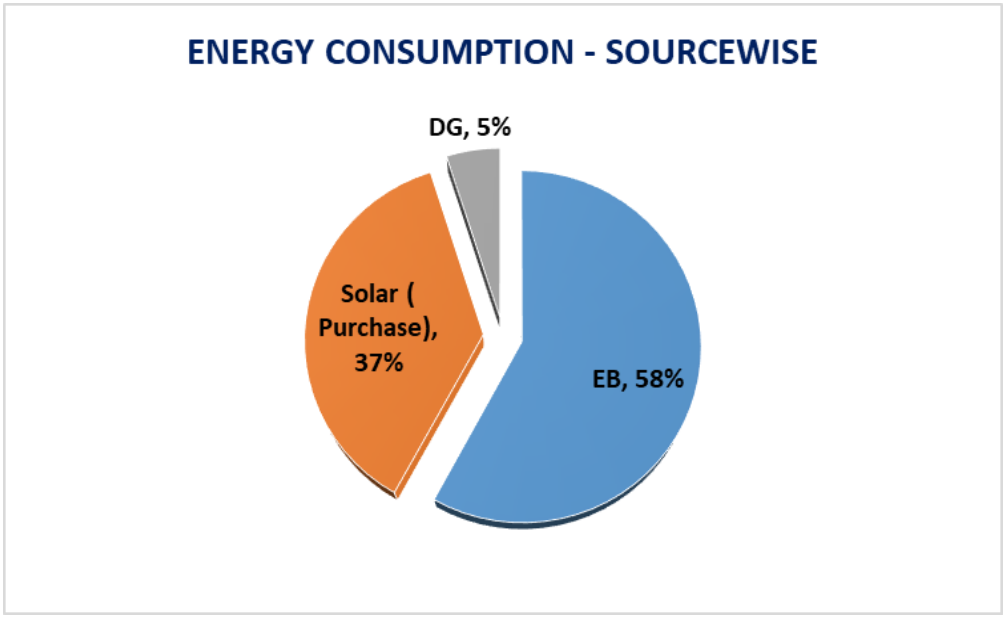
S. No	Major Action Details
1	Reusable mask has been replaced by one time usage surgical mask.
2	Three time body temp checking and Random Oximeter checking for all employees .Smell and taste test implemented.
3	Plant premises sanitation, Hand sanitizer and hand wash arrangement.
4	Social distancing marking in bus, shop floor,officer,canteen and others.
5	Hand wash Area - Mechanical foot operating lever installed.
6	COVID - 19 Precautionary Measure - Issuing Supplementary Tablets.
7	X-Ray and CRP test for all employees .
8	COVID 19 Awareness through PA System, SOP & DOJO training.
9	COVID Mapping and Aarogya sethu app high risk – Rapid test taken
10	Water bottle distribution to all employees to avoid frequent touching of drinking water tap .
11	Shop floor, canteen social distancing – Employees separation sheet provided.
12	Shift reduction, Work from home, Holliday and vehicle arrangement.
13	Factory medical officer support vaccination awareness conducted
14	2 No's COVID 19 Vaccination camp conducted.

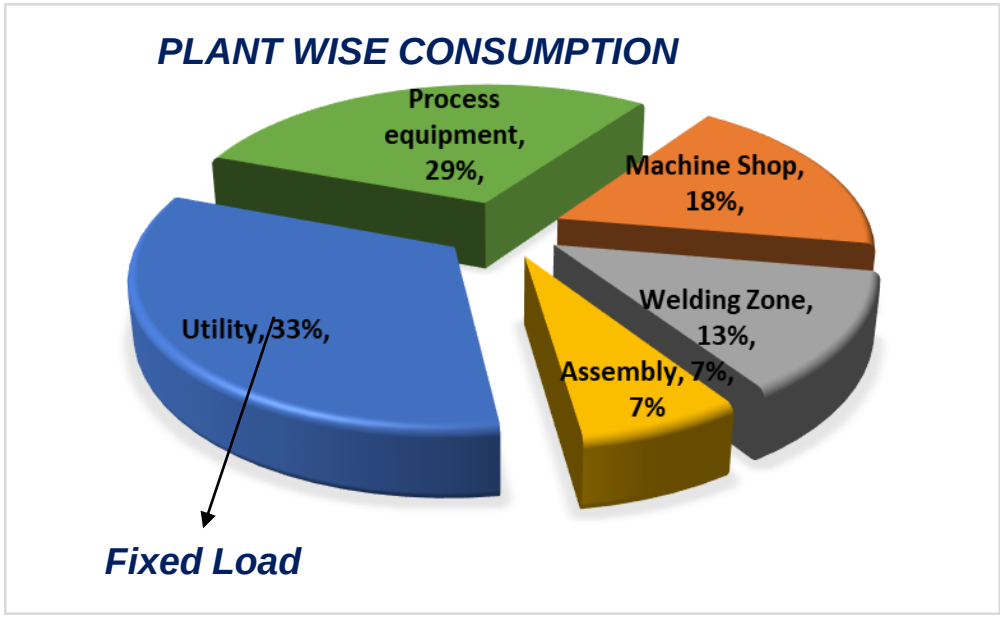
3. Sp. Energy Consumption in last 3 Year (FY 2018-21)



Variations

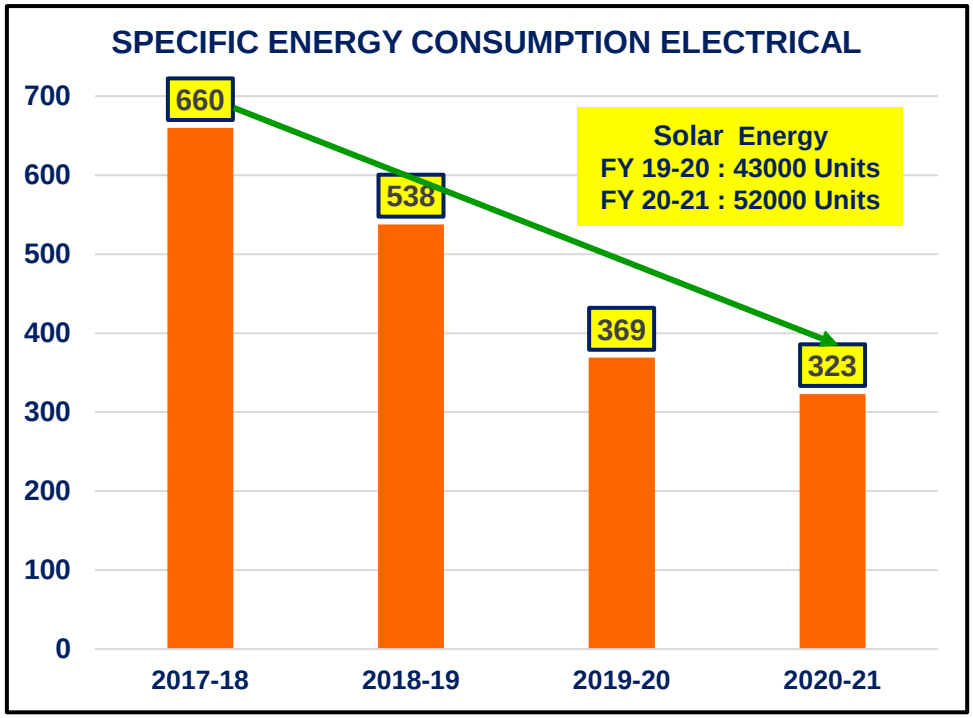
- Common utilities are working even production load is low
- Variation in product size and quantity as per market scenario





3. SPECIFIC ENERGY CONSUMPTION ELECTRICAL (FY 2018-21)

Specific Energy Consumption – Last 3 Years…



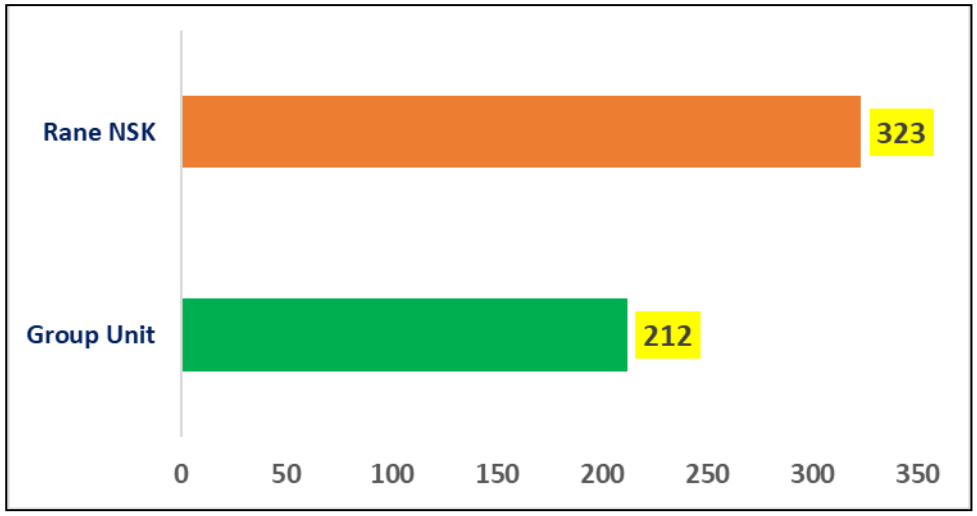
Energy Projects implementation – Last 5 Years…

S.No	Technique	Completed Task
1	Idle Time Trip	67
2	Delta to Star Convertion	14
3	VFD	24
4	Process based On/Off (Interlocks)	7
5	Motor Class Conversion IE3 / IE4	15
6	Thyristor to invertor Control for welding power source	17
7	AC Controller	65
8	Lighting (Timed on / off & Dawn to dusk	225
9	LED Lighting	225
10	Drier to Compressor Interlock	2
11	Efficiency Improvement (Magnetron) for DG	5

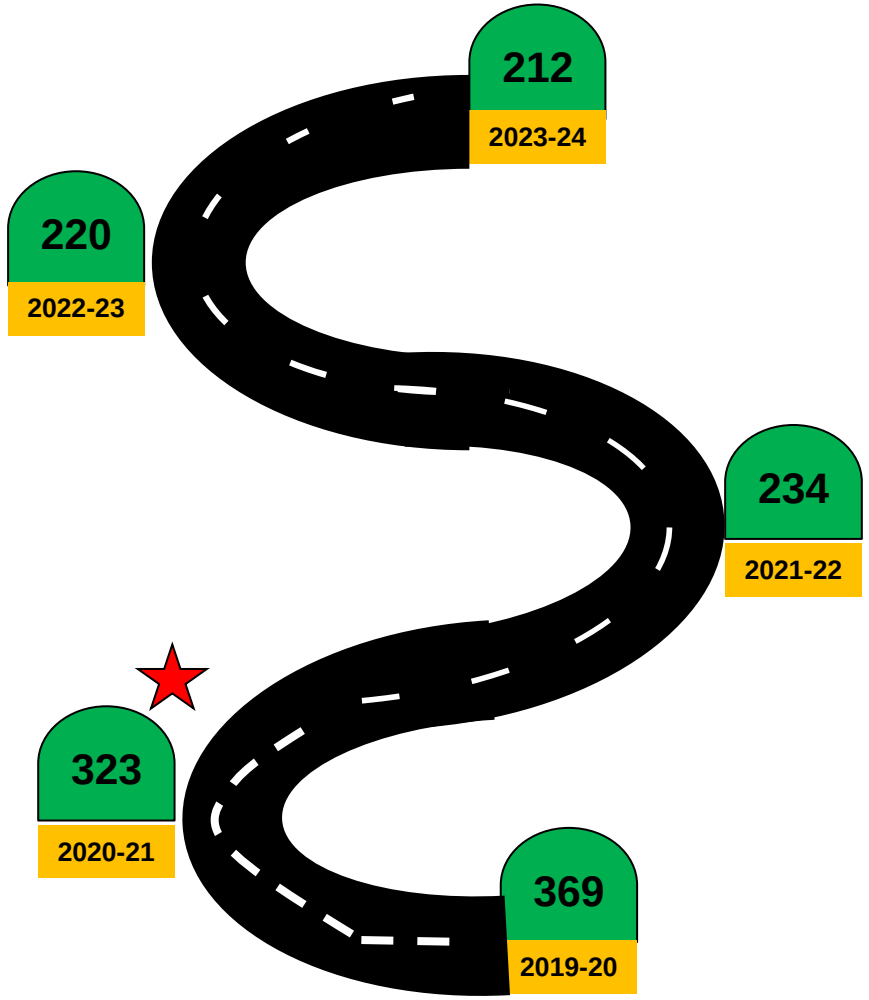
% 48 of Improvement of SEC FY 2017 - 21

4. Information on Competitors , National & Global benchmark

SEC BENCHMARK



ROAD MAP TO ACHIEVE SEC



Long Term Plan to achieve Target SEC

- *All Motors in IE3 Class*
- *Energy Purchase Vs Renewable - 35% : 65%*
- *Compressed Air Usage reduction by 14%*

4.1 ENCON PROJECTS FY 2021-2022

SL. NO	PROJECT TILTLE	ANNUAL SAVING (KWH)	ANNUAL SAVING (INR MN)	INVESTMENT (INR MN)
1	Air conditioner external temperature controller -64 Nos	40354	0.33	0.52
2	Heat pump system in phosphating plant	69000	0.57	0.8
3	Air line Ring type System.	16524	0.13	0.35
4	Servo stabilizer in main Lightning distribution board	31800	0.26	0.11
5	Motor class conversion IE3-18 nos	33150	0.27	0.38
6	VFD For Hydraulic & Blower motor -17 nos	60732	0.5	0.56
7	IGBT Controlled air heater	540	0.004	0.12
	Total	252100	2.064	0.28

Total Saving 252100 Units/ Year

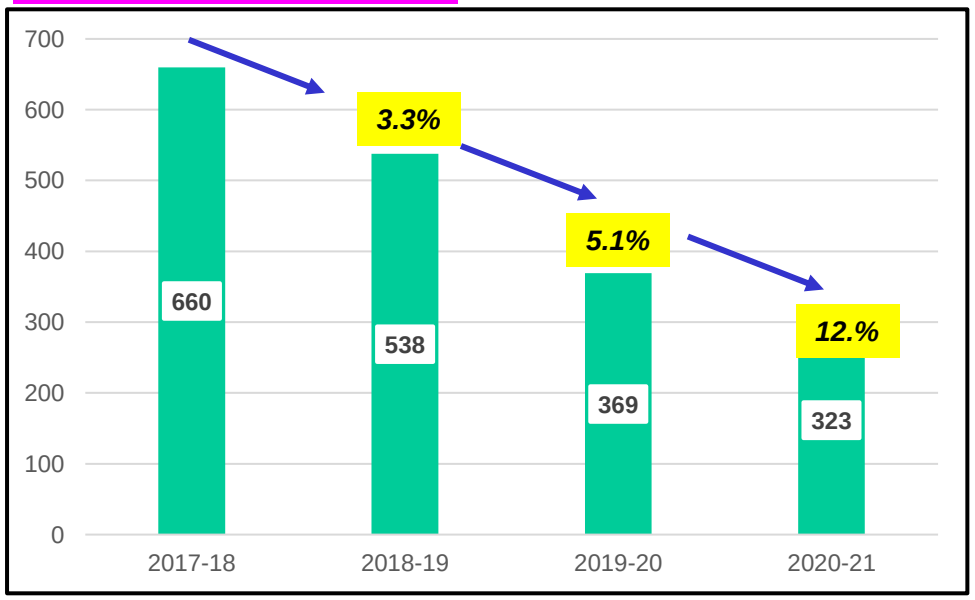
Total Investment 28Lakhs

Co2 Reduction 179MT

5. Energy Saving projects Summary (FY 2018-21)

YEAR	NO OF ENERGY SAVING PROJECTS	INVESTMENS (INR MILLION)	ELECTRICAL SAVINGS (MILLION KWH)	SAVINGS (INR MILLION)	IMPACT ON SEC
2018-2019	7	0.55	0.068	0.6	3.3%
2019-2020	5	0.5	0.053	0.44	5.09%
2020-2021	7	1.2	0.14	1.14	12.03%

SEC IMPACT TREND



5.1 ENCON PROJECTS FY 2018-19

SL. NO	PROJECT TILTLE	ANNUAL SAVING (KWH)	ANNUAL SAVING (INR MN)	INVESTMENT	ROI IN YEARS
1	Paint shop Exhaust and Air circulation Motor Interlock	864	0.0073	0.012	1.65
2	Tube light 40W(Including choke 55W) to led 18W replacement	11774	0.099	0.026	0.26
3	Thyristor(22KW) to Inverter Type welding power source (14KW)	18720	0.16	0.162	1.01
4	Exhaust fan interlock with welding machines	1440	0.013	0.019	1.46
5	Amano fume collector interlock with welding machine	2201	0.019	0.003	0.15
6	Idle Off for press and hydraulic machines	8928	0.075	0	0
7	VFD for Hydraulic machines machine	23136	0.194	0.325	1.68
	Total	67063	0.56	0.54	0.96

5.2 ENCON PROJECTS FY 2019 - 20

SL. NO	PROJECT TILTLE	ANNUAL SAVING (KWH)	ANNUAL SAVING (INR MN)	INVESTMENT (INR MN)	ROI IN YEARS
1	Compressor and Drier Interlock	540	0.005	0.003	0.60
2	VFD for Broaching machine	7212	0.06	0.045	0.75
3	Idle Off for press and hydraulic machines	16524	0.138	0	0
4	Thyristor(22KW) to Inverter Type welding power source (14KW)	20208	0.168	0.312	1.86
5	VFD drive for phosphating Scrubber for 45KW motor	8280	0.07	0.135	1.93
	Total	52764	0.44	0.495	1.13

5.3 ENCON PROJECTS FY 2020-21

SL. NO	PROJECT TILTLE	ANNUAL SAVING (KWH)	ANNUAL SAVING (INR MN)	INVESTMENT (INR MN)	ROI IN YEARS
1	Thyristor (22KW) to Inverter Type welding power source (14KW)	18720	0.16	0.15	0.94
2	Hi- Bay light 250W CFL lamp to 150W LED light	10920	0.09	0.17	1.9
3	Air conditioner Temperature external controller	4236	0.036	0.007	0.19
4	Magnetic Resonator for Diesel generator	2630	0.022	0.026	1.18
5	133 CFM Compressor pressure Optimisation	84864	0.71	0.78	1.09
6	CFL 55W to LED base light 25W	6739	0.057	0.06	1.05
7	Tube light 40W(Including choke 55W) to led 18W replacement	8311	0.07	0.012	0.17
	Total	136421	1.14	1.204	1.05

Project #1 – A/C External Temperature Controller using Programmable logic devices

Challenges

- Compressor not switching off, when set temperature attainted because of temperature sensor placed inside the ac
- High Power consumption nearly 20.7 % of Eb bill.
- Set Temperature not attainted due to low set value (< 24 ˚ C) & Surrounding temp.

Concept

To Control Switching On/ Off AC Compressor by installing two temp sensor with programmable logic device

Room Temperature RT

Indicates Compressor status

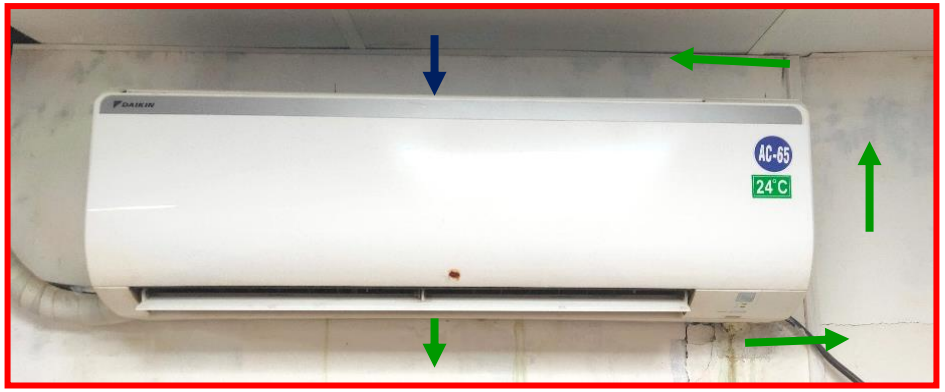
Set Temperature Locking with password protection

Coil Vent Temperature CT

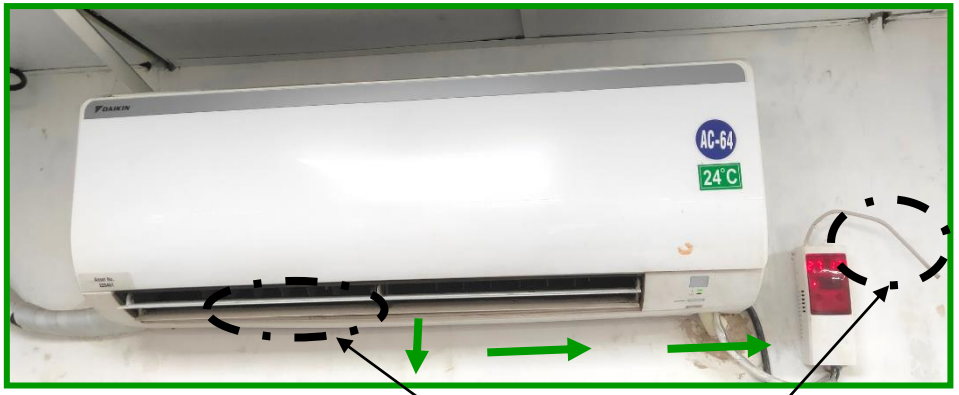
Indicates Temperature status

Compressor	Run time
I Run time	15-50 min
II Run time	15-44 min
III Run time	15-38 min
IV Run time	00-15 min
Over Cooling	00-15 min
Ideal time	00-12 min

BEFORE



AFTER



Impact

Energy saving Units/ Year : 630.4 Units
Cost saving / year : Rs 5264
Co2 foot print reduction : 0.45 MT
Investment : Rs 7000 per unit

ROI 1.3Years

Replication Potential (2021-2022)

Total Number of Devices to be installed : 64
Total Investment : 5.2 Lakhs
Expected Units of Saving / Year : 40354 Units
Cost saving / year : Rs 336955
SEC Improvement : 2%

Team Contribution

- **Project Study**
- **Installation & Performance Monitoring**

Set Temp	Units Savings Per day (10 hours)
26	2.20
24	2.02
22	1.85

7. Utilization of Renewable Energy Sources

YEAR	Technology (Electrical)	Type of Energy	Onsite / Offsite	Installed Capacity (MW)	Generation (million kWh)	% of overall electrical Energy
2018-2019						
2019-2020	PV Module Ground mounted	Solar	Offsite	10.5	0.56	38%
2020-2021					0.723	40%

Renewable Energy (Solar) Details

Source	Radial Renewables, Mumbai
Type	Group Captive @ 30% Equity Share
Capacity	10.5MW for Group / 0.5 MW RNSS -Chennai
Rate per Units	INR 4.35 @ Generating Point
Net Rate	INR 5.20 to 5.25

7.1 Utilization of Renewable Energy Sources

Roof Mounted Ventilators installed Shop floor – 58 Nos
Annual Savings 13282 Kwh
Investment : 2.8 Lakhs

Translucent roofing sheets (25%) provided in sheds to use natural light.
Annual Equivalent Savings: 21060 KWh
Investment : 1.25 Lakhs

Solar water heater for Dish washing
Annual Savings 3744 Kwh
Investment : 1.0 Lakhs

8. Waste Utilization and Management

Sl.no	YEAR	Type of Waste Generated	Quantity of Waste generated (MT/Year)	Disposal Method
1	2018-19	Hazardous Waste	9934	➢ Hazardous Waste Sent to TNPCB authorized Vendor ➢ Solid Waste sent to Scrap Dealer through Auction
		Solid Waste	140472	
2	2019-20	Hazardous Waste	5504	
		Solid Waste	98719	
3	2020-21	Hazardous Waste	10960	
		Solid Waste	96101	

Hazardous waste

- *Paint Sludge*
- *Phosphating Sludge*
- *ETP Waste*
- *Oil Soaked Cotton waste*

Solid waste

- *Metal Scrap from process*
- *Aluminum Oxide*

Complete Waste Management carried out through Eco Track System, NSK Portal

8.1 WASTE UTILISATION

1

Moisture, dirt contained Hydraulic Oil Quantity - 2400 Litres / Year

↓

Sent to refineries for filtration

↓

(Avg 1600Litres / Year) Filtered oil from refineries used in process with combination of 3:1

2

Aluminum Oxide wastages from Shot blasting 5 T / Year

↓

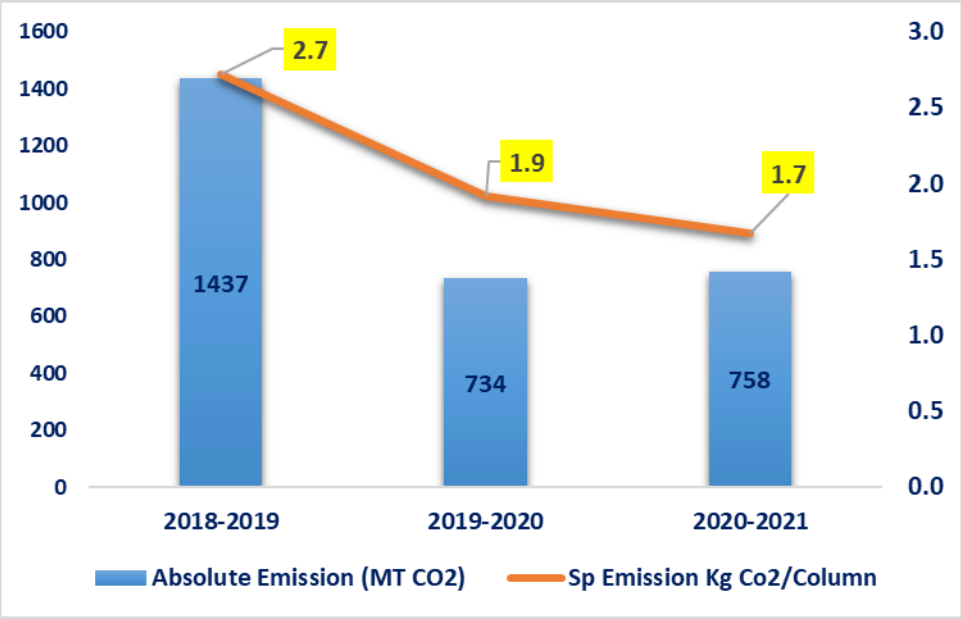
Filtered from other foreign particles

↓

Used for Flooring material in building construction

9. GREEN HOUSE GAS INVENTORISATION

ABSOLUTE EMISSION & EMISSION INTENSITY



% of Reduction of GHG emission 48.1%

SHORT TERMS GOAL

- Paper Usage reduction through E - Procurement
- Solar street light implementation
- Phosphating plant technology advancement for elimination of heater load
- Diesel generator Efficiency improvement for increase of combustion fuel.

LONG TERM GOALS

- Addition 42K Units/Month from Renewable
- Class IE3 Motor Implementation
- Centralized Air Conditioner Implementation
- Compressor Efficiency Improvement
- Exhaust Duct Design change for Paint Shop

DAILY EMISSION DATA UPDATE TO PUBLIC VIEW IN FRONT OF THE FACTORY GATE

9.1 GREEN HOUSE GAS EMISSION REDUCTION

Magnetic Resonator for DG

Annual Diesel Power Consumption : 19200 Litre
Annual Diesel Savings : 960 Litre
Annual Cost Savings : Rs 84480
Investment : Rs 7800
Return on Investment : 4 Months

Co2 Emision Reduction : 2.3 MT

Kilometers driven by a passenger car : 9094 Km

Battery Operated Forklift

Annual Diesel Power Consumption: 1440 Litre
For diesel forklift
Annual Diesel Savings : 1440 Litre
Annual Cost Savings : Rs 136800
Investment : Rs 6 Lahks
Return on Investment : 4.5 Months

Co2 Emission Reduction : 3.4 MT

Kilometers driven by a passenger car : 13695 Km

Green Procurement Policy

Rane NSK – Rane NSK Steering Systems	STANDARD OPERATING PROCEDURE	Doc No.: CPUR SOP-S2
		Rev No.: 0
	Green Procurement	Date: 10 Apr 2017
		Page No.: 1/1

PURPOSE: To check supplier's Environmental Safety Status

SCOPE: To control Harmful Substances Waste in environment

RESP: Role holder for the position

PROCEDURE:

1. Use the template "NSK Environmentally harmful Substance Management System Ver.1.2(Apr.2014)" for referance.
2. Send NSK Environmentally harmful Substance Management System Ver.1.2(Apr.2014) check sheet to all supplier for self evaluation.
3. Get the check sheet filled from suppliers.
4. Plan Audit accordingly with suppliers.
5. Visit the supplier with self evaluation sheet and verify the same with all other required documents (Refer GP FORMS & FORMATS CHECK SHEET (Ver. 01))
6. Get the NSK Form 1, Form 2 and Form 3 filled from the supplier (Refer NSK Group Green Procurement Standard Edition E001)
7. Compile the report and share it with the department heads.

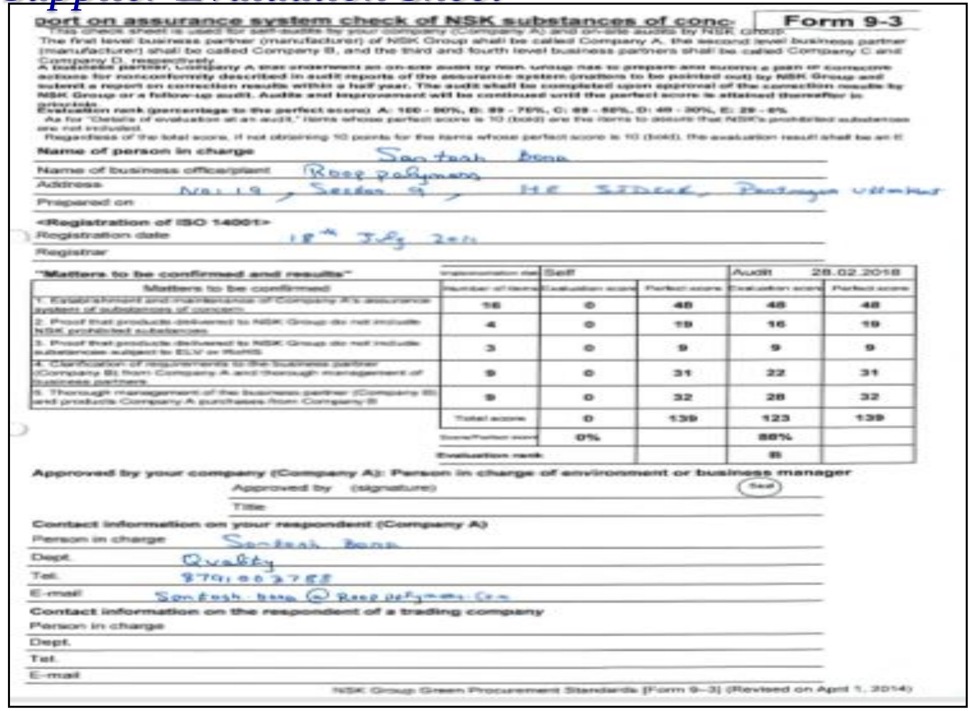
Reviews and approvals:

1. Reviewer to review the report.

Sl.No	Rev.level	Rev.Date	Rev.Details	Updated By

Prepared By	Approved By
Kanwaljeet Singh	ManojMalkothra

Supplier Evaluation Sheet


Form 9-3

Supplier Audit Plan Vs Actual (FY 2018-19)

Ref No : 4.1.2	Green Procurement Audit Plan P1 (Prioritized Suppliers)			YEAR : FY 18 -19 / Rev. : 00							
S. NO.	SUPPLIER NAME	LOCATION		Oct'18		Nov'18		Dec'18		Jan'19	
				1 - 15	16 - 31	1 - 15	16 - 30	1 - 15	16 - 31	1 - 15	16 - 31
1	HITECH ARAI LTD	Tamil Nadu	PLAN								
		Madhurai	ACTUAL								
2	INNOVA RUBBERS PVT LTD	Maharashtra	PLAN								
		Nasik	ACTUAL								
3	PAVITRA TOOLINGS	Karnatka	PLAN								
		Banglore	ACTUAL								
4	ROOP POLYMER LTD	Haryana	PLAN								
		Gurugram	ACTUAL								
5	SHAKTI PLASTIC	Tamil Nadu	PLAN								
		Chennai	ACTUAL								

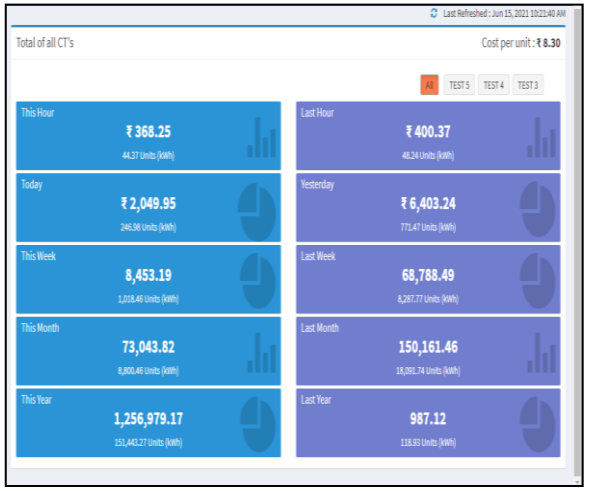
Legend: Deneid | PLAN | ACTUAL | Delay

Supplier Audit Plan (FY 2021-22)

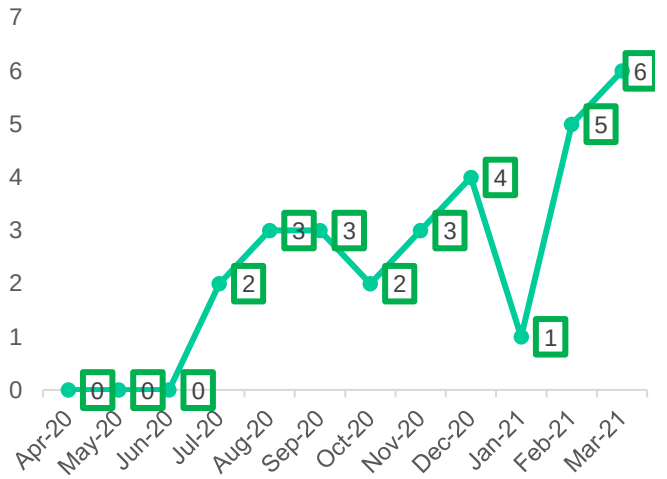
Ref No : 4.1.2	Green Procurement Audit Plan P1 (Prioritized Suppliers)			YEAR : FY 21- 22 / Rev. : 00							
S. NO.	SUPPLIER NAME	LOCATION		Aug'21		Sep'21		Oct'21		Nov'21	
				1 - 15	16 - 31	1 - 15	16 - 30	1 - 15	16 - 31	1 - 15	16 - 31
1	ASHWIN COLD FORGE	Tamil Nadu	PLAN								
		Chennai	ACTUAL								
2	LAKSHMI LIFE SCIENCE LTD	Tamil Nadu	PLAN								
		Coimbatore	ACTUAL								
3	MANGAL PRECISION	Andhra Pradesh	PLAN								
		Chittoor	ACTUAL								
4	NUTECH CNC PVT LTD	Tamil Nadu	PLAN								
		Chennai	ACTUAL								
5	PRECITEK COMPONENTS PVT LTD	Tamil Nadu	PLAN								
		Chennai	ACTUAL								
6	PREMIER SEALS	Maharashtra	PLAN								
		Pune	ACTUAL								
7	SIMMONDS MARSHALL	Maharashtra	PLAN								
		Pune	ACTUAL								

Legend: PLAN | ACTUAL | DELAY

IOT BASED ENERGY MONITORING



OPERATOR SUGGESTIONS



ENERGY COMMITEE REVIEW CHAIRED BY PLANT HEAD

PROJECTS IMPLEMENTED BY OPERATOR

- Idle off Hydraulic machines
- Fume Collector interlock with welding machine
- Welding machine and Job Cooler interlock
- Timer based Switching On/Off of HI bay lights.
- Motion sensor based switching on/ off Restroom
- Alternative switching of Air conditioner

BUDGET FOR ENERGY SAVING PROJECTS FY 2021-2022 : 75 lakhs

CASE STUDY – ENERGY INITITATIVES

TITLE :Reduce Energy consumption in Vailing Machine

1. Problem :

1.1 Problem definition :

High Energy consumption in Vailing

1.2 Importance of the Problem :

Energy cost is 14% of the total variable cost in plant

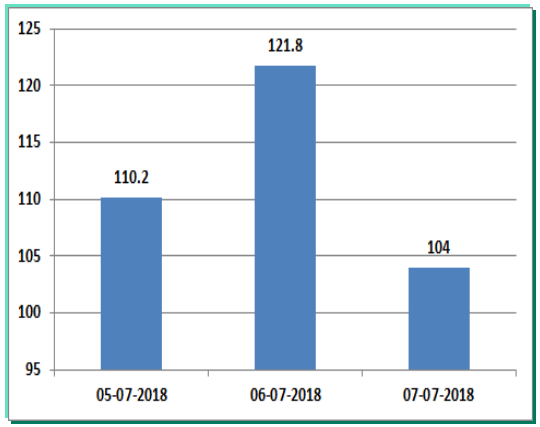
Energy is one of the critical resource getting waster

1.3 Theme & Target :

To reduce energy consumption in Vailing Machine

2. Observation :

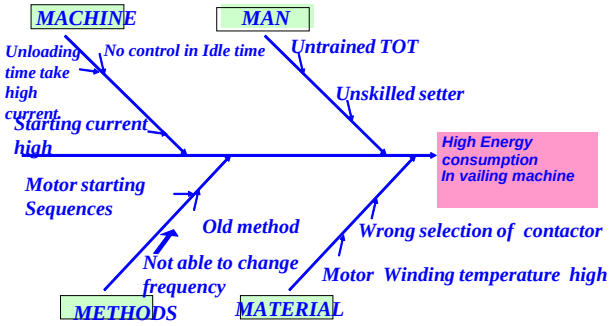
2.1 Major contributor for Energy consumption in press shop because of higher KW



- Vailing Machine high contribution
- Average Consumption Per day - 112 Kwhr

3. Analysis :

3.1 Cause and effect Diagram:



3.2 Validation of Probable Causes

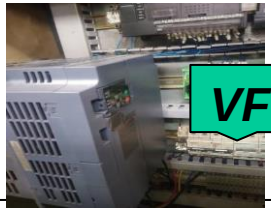
Sl.No	Probable cause	Validation	Result
1	No control in Idle time	control available found ok	Insignificant
2	Un loading time take high current	unloading time take 50% of full load current	Significant
3	starting current is high	Verified starting current is 200% higher than rated current	Significant
4	Unskilled setter	Trained person and OJT followed	Insignificant
5	Untrained TOT	Trained person and OJT followed	Insignificant
6	Motor starting sequence	Verified the motor starting sequence, found ok	Insignificant
7	Old Model	Verified DOL starter is old model	Significant
8	Motor winding temperature	Verified the temperature using IR gun	Insignificant
9	Not able to change Frequency	Verified the design is old so that not able change the frequency	Significant
10	Wrong selection contactor	verified as per current rating found ok	Insignificant

4. Action

S.No	What (Root cause)	How	Who	When
1	Old method And Not able to change Frequency	DOL starter is replacing by new VFD , now frequency also changeable	PLE	Aug-18
2	Starting current is 200% higher than the rated current	To Providing the VFD control to reduce the starting current below the rated current	PLE	Aug-18
3	There is no provision to reduce the energy consumption in unloading time	To Providing the VFD control to reduce the power in unloading time	PLE	Aug-18

Before

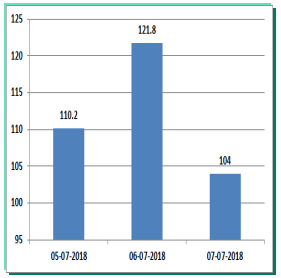
After



5. Check & Benefits:

Before

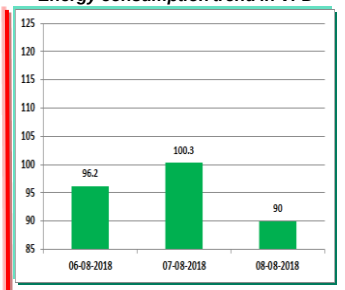
Energy consumption trends in star delta



Average Consumption Per day - 112 Kwhr

After

Energy consumption trend in VFD



Average Consumption Per day - 95.5 Kwhr

6. Standardization :

Sl.No	What	Why	When	where	Who	How
1	Installation of VFD for higher KW motors	For Energy Saving	01.09.2018	New Machine Procument check list	PLE	By ensuring the Checklist

Tools used :

Cause and effect diagram

Bar graph

CASE STUDY – ENERGY INITITATIVES

TITLE :Reduce Energy consumption in welding Shop

1. Problem :

1.1 Problem definition :

To eliminate the idle running of welding scrubber

1.2 Importance of the Problem :

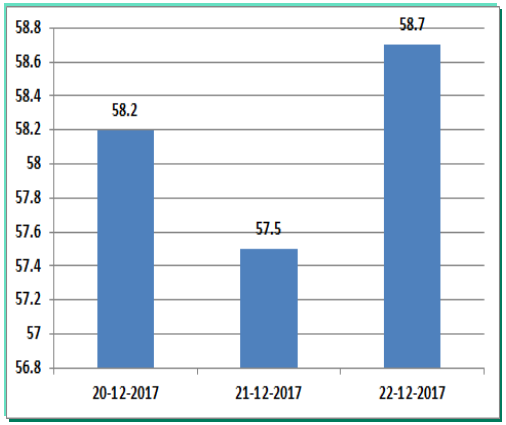
Energy is one of the critical resource getting waster

1.3 Theme & Target :

To reduce energy consumption in Welding Scrubber by 10%

2. Observation :

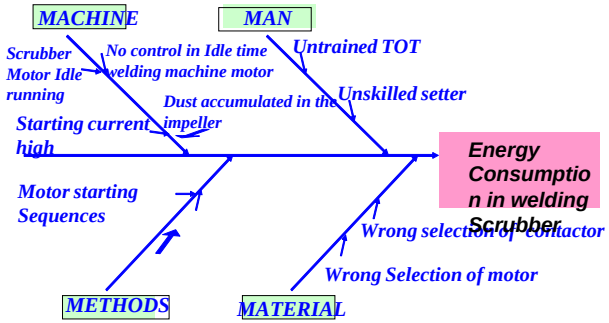
2.1 Major contributor for Energy consumption is running of amino continuously



❖ **Average Consumption Per Day- 58.133 KWhr**

3. Analysis :

3.1 Cause and effect Diagram:



3.2 Validation of Probable Causes

Sl.No	Probable cause	Validation	Result
1	No control in Idle time in welding machine motor's	control available found ok	Insignificant
2	Scrubber motor Idle running	No control for Idle running	Significant
3	Starting current is high	Verified starting current is 200% higher than rated current	Insignificant
4	Unskilled setter	Trained person and OJT followed	Insignificant
5	Untrained TOT	Trained person and OJT followed	Insignificant
6	Motor starting sequence	Verified the motor starting sequence, found ok	Insignificant
7	Wrong selection Motor	Proper rating of motor is verified to be Ok	Insignificant
8	Dust Accumulated in the impeller	Verified the cleanliness of impeller and found to be ok	Insignificant

4. Action

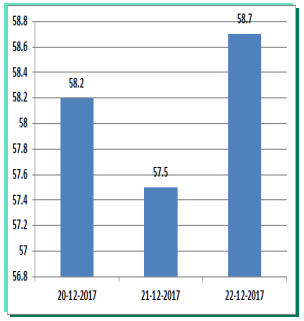
S.No	What (Root cause)	How	Who	When
1	Motor Idle Running	Interlocked with connected welding machines to eliminate the idle running	PLE	Jan -18

Before

After

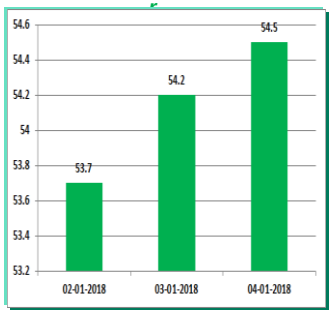
5. Check & Benefits:

Before



❖ **Average Consumption Per Day- 58.133 KWhr**

After



❖ **Average Consumption Per Day- 54.133 KWhr**

6. Standardization :

Sl.No	What	Why	When	where	Who	How
1	Monitoring the working of idle off	For Energy Saving	08.01.2018	PM check Sheet	PLE	By ensuring the CheckSheet

Tools used :

Cause and effect diagram

Bar graph

12. Implementation of ISO 50001 / IGBC rating

Approach

- Developing an Energy Management System.
- Continual Improvement Energy Management System.
- Facilitate a holistic approach to create environment friendly buildings.
- Improve indoor Environmental quantity enhancement.
- Calculate life cycle.
- Optimize water Usage.

Target for Implementation

IGBC Rating : 2022-23
ISO 50001 Certification : 2023-24

ACTIVITY CHART IMPLEMENTATION OF IGBC RATING

Sl.no	Activity	Plan/ Actual	2021-22				2022-23				Remarks
			Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	
1	IGBC Guideline Study	P									
		A									
2	Audit Check Sheet Preparation	P									
		A									
3	Audit 1 : Self Audit internal CFT	P									
		A									
4	Score evaluation	P									
		A									
5	Improvement Actions for observations	P									
		A									
6	Audit 2 : Group Company audit	P									
		A									
7	Improvement Actions for observations	P									
		A									
8	Audit 3 - IGBC Team	P									
		A									

Our Self Evaluation Score 60%

Legend Plan Actual Delay

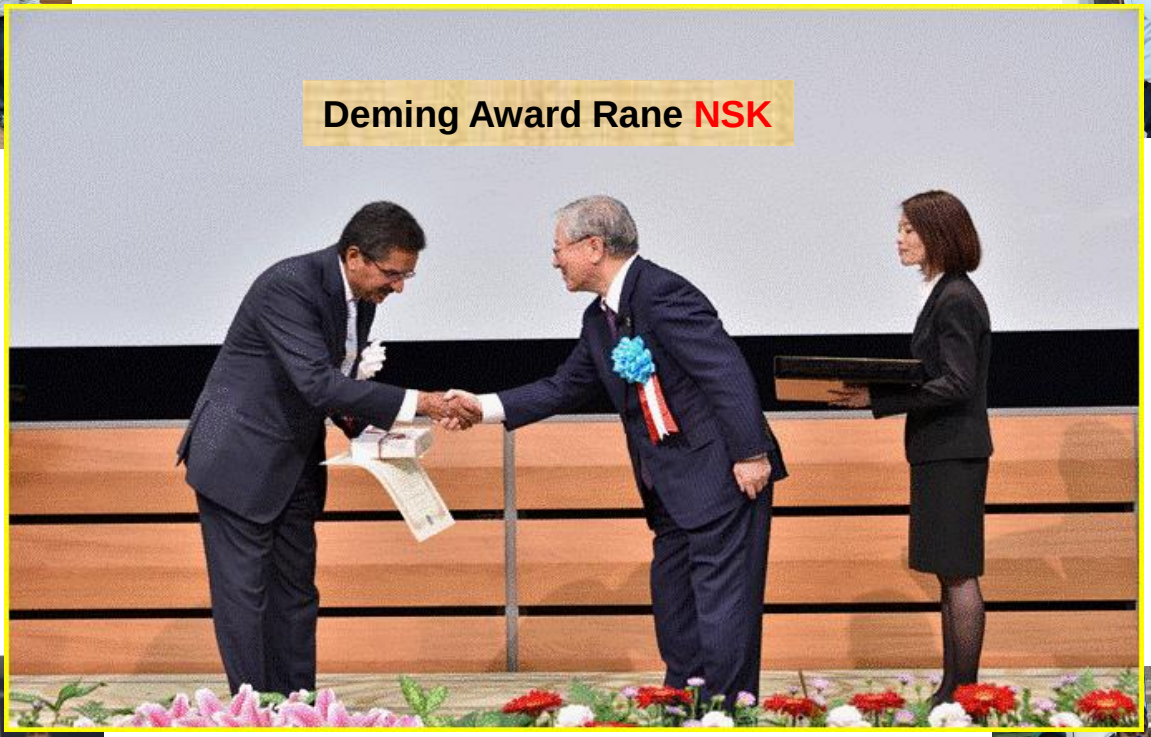
QCFI

LEARNING FROM CII

- Cross Company Learning
- Easy to implement Proven projects

Suggestion

Deming Award Rane NSK



QCC

KAIZEN

One Time Use & throwaway Plastics – Awareness Campaign to Local Community






Factory – Green Environment

Tree Sampling & Distribution to all Employees




Thank You

Rane NSK Steering Systems Private Limited
Contact Details

B Muralikrishnan
Manager
Kb.muralikrishnan@ranegroup.com
9941650131

A.Mohamed Sameer
Sr Engineer
a.mohamedsameer@ranegroup.com
9944191668

Ls.Sridhar
Sr Engineer
Ls.sridhar@ranegroup.com
9500020624