



DIESEL LOCO MODERNISATION WORKS PATIALA

Sh. Bipan Kumar Sharma (WEE)

1. Brief introduction on Company/Unit

- ❖ **Diesel Loco Modernization Works (DMW) Patiala a premier production unit of Indian Railways was set up in 1981 as DCW to manufacture critical engine components of Diesel Locomotives.**
- ❖ **Production started in the year 1989.**
- ❖ **In 2010 It also started manufacturing new Diesel Locomotives with 120 locomotives per year.**
- ❖ **It produced its first 3-Phase, WAP7 New Electric Locomotive in Feb. 2018.**
- ❖ **It also manufactures New Diesel Electric Tower Car (DETC), WAG-9HC Rewinding of Traction Motors and Manufacture of Coils**
- ❖ **Total WAP-7 -194 Nos., DETC - 127Nos., WAG-9HC – 3 Nos. rolled out from this unit till March-2021**

1. Brief introduction on Company/Unit

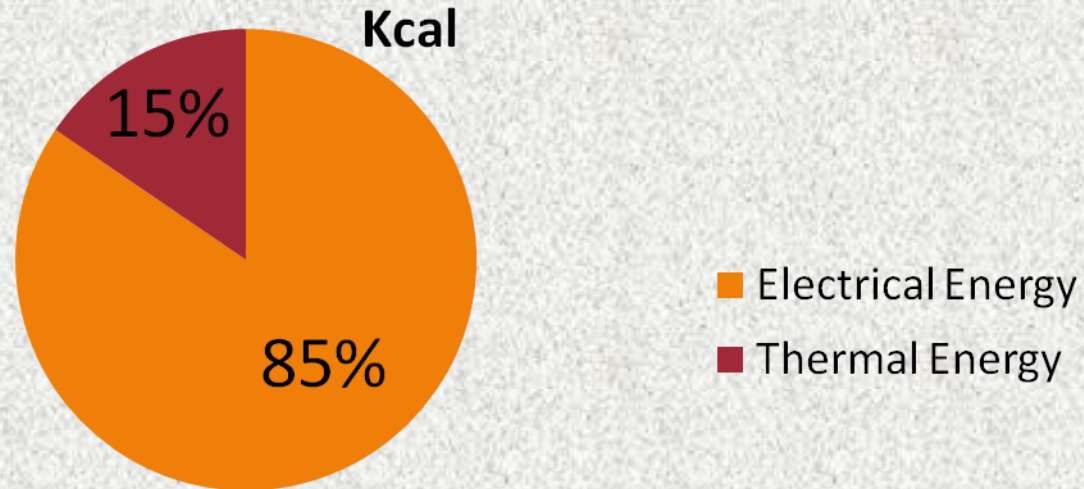
- ❖ It will also permit use of energy produced through Renewable sources by Installing *2.15 MWp roof top SPP*.
- ❖ DMW is equipped with following standards
- ❖ ISO 50001:2018, ISO 9001:2015, ISO 14001:2015, IS 18001:2007 & ISO 3834-2:2005 & 5 S certifications.

2. Energy Consumption Overview

❖ Overall energy consumption and Production Data.

#	FY	Overall Energy Consumption (KgOE)	No. of Unit Produced (SU)	SEC (KgOE/SU)	% Impr. w/r/t. prev. Yr
1	2018-19	1020649.18	458.76	2224.76
2	2019-20	888537.48	446.91	1988.15	10.63
3	2020-21	542592.08	371.31	1462.70	26.42

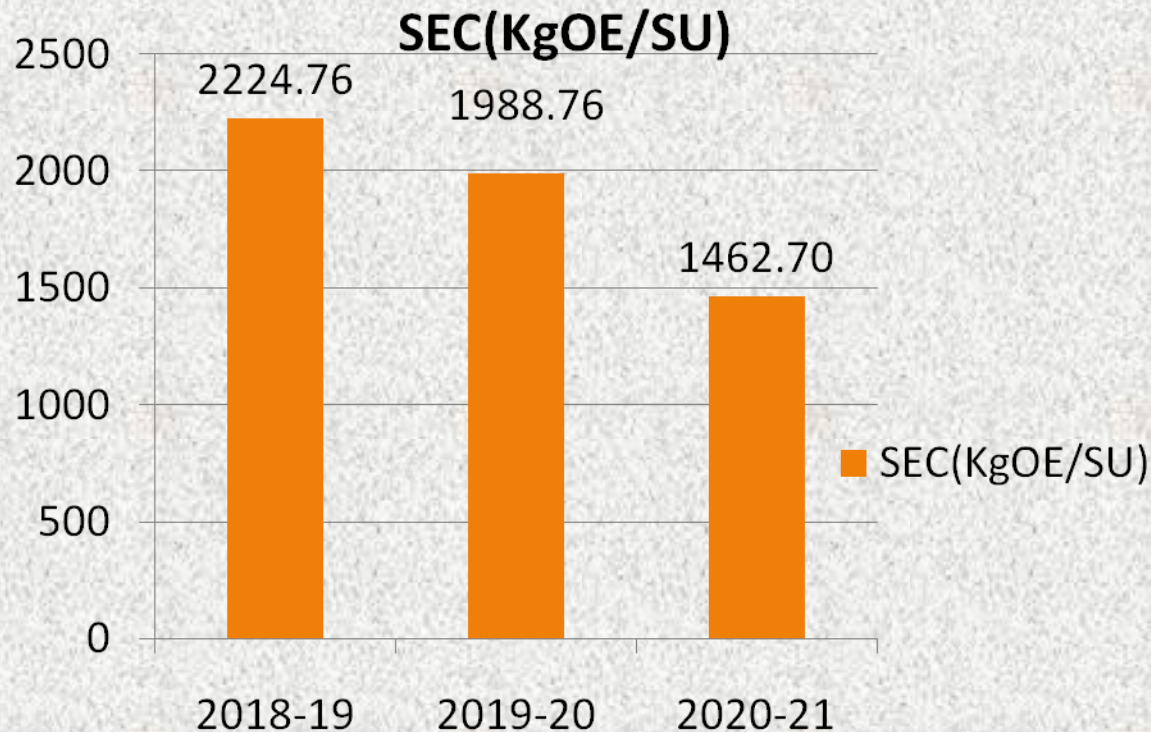
2. Energy Consumption Overview



- ❖ **Thermal and Electrical Energy Consumption Pie Chart-2020-21**
 - **Thermal energy consumption – 839.54 Million KCal**
 - **Electrical Energy consumption – 5.05 Million kWh**
 - **Overall energy consumption – 5425.92 Million KCal**

3. Sp. Energy Consumption in last 3 years (FY 2018-19 to FY 2020-21)

❖ Specific Energy Consumption (Thermal & Electrical) Trend



4. Information on Competitors, National & Global benchmark

- ❖ Benchmark fixed by BEE for reduction in SEC 3399.80 as per Gazette of India Regd. No. D.L.-33004/99 Published on March 31, 2016
- ❖ Keeping in view, SEC of 2014-15 as Base Line Revised target fixed 3500.5656 KgOE/Unit produced
- ❖ Target SEC for DMW for the FY 2018-19 was 3196.84
- ❖ Achieved SEC by DMW for the FY 2018-19 was **2224.76**
- ❖ ***Participation in State and National level events for evaluation***

4. EnCon project planned for FY 2021-22

#	Energy Conservation Projects	Annual Elect. Saving (In Lakh KWH)	Annual Thermal Saving (In Million KWH)	Investment (Rs. Lakhs)& pay back (In Yr) (Appx)	Comment
1	Awareness Program toward Energy Conservation and close monitoring of energy consumption.	0.50		0 Immediate	
2	Replacement of Old Overaged 90 W Ceiling fans by 50 W Energy Efficient Super Fans- 2000 Nos.	1.44		43.70 3.5 Yr	
3	Procurement of 2 Tonne/3 Tonne battery operated Fork Lifter in place of Old condemned Diesel operated Fork lifter - 8 Nos.	1.54		101.00 8 Yr	

4. Encon project planned in FY 2021-22

#	Energy Conservation Projects	Annual Elect. Saving (In Lakh KWH)	Annual Thermal Saving (In Million KWH)	Investment (Rs. Lakhs)& pay back (In Yr) (Appx)	Comment
5	System improvements in Compressed Air System (A) Barest minimum number of compressors operated in staggered mode as per actual requirement of air in various shops. (B) Regular monthly joint survey conducted in all shops and air leakage has been arrested on top priority.	1.00		0 Immediate	
6	Optimisation use and Close monitoring of Oven/Furnaces Insulation and Temperature	0.30		0 Immediate	
7	Reduction of Contract Demand From 5000 KVA to 4000 KVA	0		0.03 Immediate	Rs. 25 Lakhs / Year
8	Improvement in environment in AC areas for	4.2		4.05	

5. Energy Saving projects implemented in last three years

Year	No of Proposals	Investments (In Rs. Million)	Savings (In Lakh KWh)
2018-2019	5	13.1	20.37
2019-2020	8	4.1	6.84
2020-2021	6	3.03	7.27

5. EnCon projects detail for FY 2018-19

#	Project Details	Investment (Rs. Lakhs)	Annual Saving (In Rs. Lakh)	Pay back (Yr)
1	Replacement of 4674 Nos. LED based luminaries under ESCO model through EESL	90.5	72	1.5
2	Replacement of 198 Nos. 90 W A.C .ceiling fans by 50 W energy efficient super fans under ESCO model through EESL	4.3	2.4	2
3	Replacement of 10767Nos. Tube lights/Lamp with LED in Staff Quarters.	5.2	13	0.5
4	Energy saver for Air Conditioner.	3.5	1.4	2.5
5	Mass awareness campaign, Vigorous counseling and Sensitization of staff towards Energy Conservation.	0	4.1	Immediate

5. EnCon projects detail for FY 2019-20

#	Project Details	Investment (Rs. Lakhs	Annual Saving (In Rs. Lakh)	Pay back (Yr)
1	Vigorous counseling and sensitization of staff about Energy Conservation.	0	5.91	Imme diate
2	Provision of LED based lights(200W & 120W) in lieu of conventional light (400W & 250W)--20+40= 60 Nos	5	2.95	2
3	Improvement in compressed air system (a) Commissioning of 2 Nos. Digital microprocessor based controller. (b)Replacement of Under ground Over aged compressed air pipe line with new over head- 80 Meters. (c) Procurement of 3 No. baby compressors for individual shop use	29.40	21.76	1.5
4	Close Monitoring and Reduction in working hours of Water Pumping Installations	0	6.92	Imme diate
5	Replacement of Conventional light of different wattage with suitable wattage LED. (60W,30W,72W,36WLED)- 240 Nos.	3.7	4	1

5. EnCon projects detail for FY 2019-20

#	Project Details	Investment (Rs. Lakhs)	Annual Saving (In Rs. Lakh)	Pay back (Yr)
7	Replacement of 40/36 W T12/T8 Florescent tube rods with Energy Efficient 20 W LED.- 400Nos.	0.98	1.86	0.5
8	Operation of AC compressors from 15th May to 30 th Sept., Sealing of AC areas leakages., No operation of AC plants after 8 PM. Only AHU,s are to be switched ON.	0	8.99	Immediate

5. EnCon projects detail for FY 2020-21

#	Project Details	Investment (Rs. Lakhs)	Annual Saving (In Rs. Lakh)	Pay back (Yr)
1	Awareness Program toward Energy Conservation and close monitoring of energy consumption.	0	4.16	Immediate
2	Reduction in Contract demand from 7000 KVA to 5000 KVA and its monitoring	0	51.12	Immediate
3	Procurement of Metal ARC welding machine with DC ARC welding rectifier - 2 Nos.	8.40	1.66	5
4	Procurement of Compressed air blower gun with silent nozzle.- 98 Nos.	3.76	2.41	1.5
5	Procurement of Battery Operated Platform Truck - 4 Nos.	18.19	2.79	6.5

5. EnCon projects detail for FY 2020-21

#	Project Details	Investment (Rs. Lakhs)	Annual Saving (In Rs. Lakh)	Pay back (Yr)
6	<p>System improvements in Compressed Air System</p> <p>(A) Barest minimum number of compressors operated in staggered mode as per actual requirement of air in various shops.</p> <p>(B) Regular monthly joint survey conducted in all shops and air leakage has been arrested on top priority.</p> <p>(C) 30 new compressed air pipe line at 2 feet height from ground level has been commissioned between PMS and HMS in place of old underground and over aged compressed air pipeline. It eliminated accumulation of moisture in underground pipe lines</p>	0	49.47	Immediate

6. Innovative Projects implemented last 3 FY.

- ❖ Reduction in Contract demand from 7000 KVA to 5000KVA.
- ❖ Commissioning of 2 Nos. Smart Microprocessor Based Flow Controller in Compressed Air System
- ❖ procurement of 4 Nos. baby compressors for individual shop in place of centralized compressed air piping system
- ❖ Introduction of Robotic welding Machine.
- ❖ Improvement in environment in AC areas for CNC Machine.
- ❖ Mass Awareness campaign to conserve energy against man made wastages
- ❖ Close Monitoring of Power Factor.
- ❖ Close watch on AC set temperature between 26 °C to 28 °C
- ❖ Close monitoring of Energy and Water consumption on daily, monthly and yearly basis

Adopting all above have resulted appx. saving of 35.64 Lakh kwh towards electricity bills in workshop area. Costing Appx. Rs 2.2 Crore during the FY 2020-21 w.r.t. 2019-20

7. Utilisation of Renewable Energy sources

□ Onsite Renewable Energy Generation details.

#	Year	Capacity Installed (In KWp)	Annual Solar Generation (In KWh)	Cost Gain (In Rs. Lakh)	Investment (In Rs. Lakh)	% Contribution in overall Elec. Consumption
1	2017-18	2150	6,68,268	46.84	788.22	3.88
2	2018-18	2150	26,49,308	220.68	0	17.19
3	2019-20	2150	27,03,073	210.02	0	18.35
4	2020-21	2150	2622320	217.65	0	23.44

8. Waste utilization and management

❖ 1. Waste Recycling

S. No	Year	Type of waste generated (MT/year)		Quantity of waste generated (MT/year)	Compost Manufacture (MT/year)	Disposal method
		Wet Waste	Dry Waste			
1	2018-19	134	30.76	164.76	13.4	Recycling. i.e. Segregation and finally Organic compost
2	2019-20	131.76	28.16	159.92	13.7	
3	2020-21	185.58	28.80	214.38	18.55	

8. Waste utilization and management

❖ 2. Disposal of Scrap Material

S.No	Year	Type of waste generated	Quantity of waste generated (MT/year)	Amount of Scarp Material (In Crore)	Disposal method
1	2018-19	Miscellaneous ferrous/Non ferrous material	6787	34.27	E-Auction
2	2019-20		8366	33.57	
3	2020-21		4549	32.14	

❖ 3. Utilization of Waste Water.

- ❑ Provision of 21 Nos. **Rain Water Harvesting System** in **DMW complex**.
- ❑ **Utilization of treated water of STP for irrigation purpose in DMW Stadium, parks and inside workshop for plantation areas**

9. GHG Inventorisation

S.No.	Year	Total Kg Co2/Ton of Final Product
1	2018-19	5037.92
2	2019-20	5279.99
3	2020-21	6186.62



Gains

₹57361925.6



CO₂ reduced

8321.0t



Coal saved

3540.9t



SO₂ reduced

265.6t

10. Green Supply Chain Management

- ❑ **Green Purchase Policy.**
- ❖ **E- Tendering**
- ❖ **E-Pass/PTO to staff/employees**
- ❖ **E-Procurement**
- ❖ **E- office 100%**
- ❖ **E- Payment to firms/contractors**
- ❖ **E- Auction of scrap**
- ❖ **E- Awareness towards energy conservation through electronic media**
- ❖ **Digitalization of DMW Hospital activities.**

10. Green Supply Chain Management

Action Plan to expanding the "Green Supply Chain" activities.

- ❖ *Utilization of abandoned roof top since last 30 years.*
- ❖ *Decrease in inside temperature i.e. 2 °C to 4 °C in each location where Rooftop Solar Power Panels have been installed.*
- ❖ *Limitations are already there with SDA not to go for more than **1MW with single power supply connection**. Petition was filed with State Electricity Regulatory Commission Chandigarh to enhance the limit as Plant is already functioning. Request was turned down and advised to go in CPP mode. Case is under process for approval with DISCOM Officials i.e. PSPCL . We may go for installation of more Capacity Solar Power Plant if limit by SDA enhanced to up to 5 MW, as plenty of space on roof tops of different another shops and service buildings is available. Our humble submission to Ministry of Power, CII and MNRE to enhance limit of 1 MW to 5 MW through net metering. With this DMW/PATIALA production unit of INDIAN Railways will be 100 % on Green Energy.*

11. Teamwork, Employee Involvement & Monitoring

- ❖ ***“Jago Yatra”*** in residential area of DMW Complex involving Primary School Children.
- ❖ **Organised Seminars in Technical Training Centre Seminar hall**
- ❖ **Group discussion at various level to adopt Energy Conservation Measures.**
- ❖ **Supervisors and Staff trained towards Energy Conservation through Electronic media i.e. text & Whatsapp messages etc.**
- ❖ **Nomination of 2 supervisors for each shop of workshop areas to spread awareness towards Energy Conservation and Adoption of various Energy Conservation Measures.**
- ❖ **Poster & Slogan Competition regarding Energy Conservation organised during Energy Conservation Week-2020.**

11. Teamwork, Employee Involvement & Monitoring

Review meeting chaired by Head of the Department

Separate budget for Energy Conservation- No

Energy Efficiency / Awareness training program

- ❖ **Formation of Energy Cell**
- ❖ **Awareness campaign against Man-Made Wastages**
- ❖ **Counseling at shop floor levels by Energy Cell Team.**
- ❖ **Individual Staff / Officer awareness in Offices /Halls and Workshop area**

11. Teamwork, Employee Involvement & Monitoring

Counseling of Staffs towards Energy Conservation.



2020/10/8 15:33

11. Teamwork, Employee Involvement & Monitoring

Counseling of Staffs towards Energy Conservation.



11. Teamwork, Employee Involvement & Monitoring

Training of Staff towards Energy conservation.

- ❖ Total 90 Supervisors and 465 Employees have been trained for Energy Conservation Awareness during FY 2020-21 in TTC (Technical Training Centre)

Monitoring system

- ❖ ***Energy consumption is being monitored on hourly basis at MAIN RECEIVING STATION of 66 KV grid round the clock.***
- ❖ ***Daily monitoring at Deputy HOD level of Electrical Department.***
- ❖ ***Monthly consumption report of each shop /service buildings for comparison with last month and last year same period consumption in Energy Cell***
- ❖ ***Monthly PCDO to Railway Board through HOD .***
- ❖ ***Monitoring at Railway Board level.***
- ❖ ***Submission of Form -1 of each FY before 30th June to BEE, PEDDA (SDA) & Railway Board under PAT CYCLE Scheme.***

11. Implementation of ISO 50001/Green Co/IGBC rating

❖ DMW Certified with ISO 50001:2018

INTERCERT®

CERTIFICATE OF REGISTRATION

INTERCERT hereby certifies that the Energy Management System of

Diesel Loco Modernisation Works

Diesel Loco Modernisation Works, Patiala-147003, India

Has been successfully assessed as per the requirements of

ISO 50001:2018

For the scope of

All Activities of Diesel Loco Modernisation Works Carried out for Manufacture/ Re-Manufacture and Up-gradation of Motive Power Rolling Stock Sub-assemblies including Spares. Besides that it includes Administrative Building, Hospital and Water Installation Located in Colony and Workshop.

Initial Certification Date : 22-06-2020
 Certificate Issue Date : 22-06-2020
 Surveillance Validity Date : 21-06-2021
 Recertification Date : 21-06-2023

Registration Number: IC-En-2006057

Issued on behalf of InterCert Head - Certifications

IAF
 ISO 50001
 INTERCERT ACCREDITED
 Management Systems
 Certification Body
 MSCB-121

The validity of this certificate can be verified at www.intercert.com or through email at info@intercert.com. This certificate is the property of INTERCERT and must be returned on request. Accreditation details are available with IAS, (International Accreditation Services) Inc. USA at www.iasonline.org

❖ DMW received a certificate Green Co Gold in the month of October 2017

CII - Sohrabji Godrej Green Business Centre

hereby certifies that

Diesel Loco Modernisation Works Patiala

has successfully achieved the standards as required for the following level of certification under the GreenCo - Green Company Rating System which is valid for a period of 3 years

GreenCo Gold
 October 2017

Jamshyd N Godrej
 Chairman
 CII-Godrej GBC

Pradeep Bhargava
 Chairman
 GreenCo Rating System

L.S Ganapati
 Chairman
 GreenCo Assessor Panel

K S Venkatagiri
 Executive Director
 CII-Godrej GBC

❖ DMW achieved “Platinum Rating” for its Administrative Building in March 2019 from Confederation of Indian Industry (CII)

Indian Green Building Council (IGBC)

hereby certifies that

DMW Administrative Building
 Patiala, Punjab
 (IGBC Registration No. GEB 18 0276)

has successfully achieved the Green Building Standards required for the following level of certification under the IGBC Green Existing Buildings Rating System

Platinum
 March 2019
 (This certification is valid for 3 years)

Gurmit Singh Arora
 Chair, IGBC Green EB O&M

V Suresh
 Chairman, IGBC

S. Raghunath
 Deputy Director General, CII

K S Venkatagiri
 Executive Director, CII-Godrej GBC

14. Long Term Vision on EE

- ❖ Provision of 2 MWp Solar Power Plant if amendment in Policy by CERC and concerned DISCOM for enhancement of limit from 1MW to 5 MW.
- ❖ Case study of Over aged Overhead Crane- 8 nos.
- ❖ Case study of water distribution system.
- ❖ Implementation of SMART Energy Monitoring System.
- Support required to achieve these targets
 - ❖ Technical support
 - ❖ Supplier engagement, etc.

Awards and Achievements

- ❖ DMW received a certificate of Green Co Gold in the month of October 2017.
- ❖ ***Punjab Energy Development Agency (2018) ---- 2nd Position at State Level Energy Conservation Award.***
- ❖ ***Smart City India Award 2019, -----1st Position for Green Energy***
- ❖ ***Punjab Energy Development Agency (2019)---- 2nd Position at State Level Energy Conservation Award.***
- ❖ **Participated in 20th National Award for Excellence in Energy Management 2019 organized by CII HYDERABAD**
DMW/PATIALA declared an” *Energy Efficient Unit* “ in the event.
- ❖ ***National Energy Conservation Award 2019 -----1st position among PUs of INDIAN RAILWAYS.***

Awards and Achievements

- ❖ Participated in 21st National Award for Excellence in Energy Management 2019 organized by CII HYDERABAD
DMW/PATIALA declared an” *Energy Efficient Unit* “ in the event.
- ❖ *1st Rank from Municipal Corporation Patiala in the field of cleanliness for DMW colony for the year 2020.*
- ❖ Golden Peacock Energy Efficiency Award ---- Winner among Government (Railway) sector *for the year 2020.*
- ❖ *Punjab Energy Development Agency (2020) ---- 2nd Position at State Level Energy Conservation Award for the year 2020.*

Any other relevant information

Major Achievements.

- ❖ It is worth mentioning here that 568 ESCerts have been finalized and accepted by BEE to DMW during M&V Audit of PAT Cycle-II and 2nd highest among Railway production Unit***

Thank You

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13. Other Innovative technologies implemented

❖ Intelligent Flow Controller for Compressed Air System



13. Other Innovative technologies implemented

- ❖ Use of Baby Compressors for individual shop in place of centralized compressed air pipng system



Use of Baby Compressor instead of Central Compressed System

13. Other Innovative technologies implemented

❖ Robotic Welding Machine for Engine Block



13. Other Innovative technologies implemented

❖ Power Factor Detail of DMW from 2018-19 to 202-21

Year	2018-19	2019-20	2020-21
April	1	1	1
May	0.99	1	1
june	0.99	1	0.99
July	1	1	0.99
August	1	1	1
September	1	0.99	1
October	1	0.99	0.99
November	1	0.99	0.99
December	0.99	1	1
January	1	1	1
February	1	0.99	1
March	0.99	0.99	0.99
Avg.	0.99	0.99	0.99

13. Other Innovative technologies implemented

- ❖ Close watch on AC set temperature between 26 °C to 28 °C

