



Brief of Secunderbad division

- Formed on 2nd october,1966
- 5th Highest loading division of Indian Railways
- 8th Biggest division in terms of originating passengers

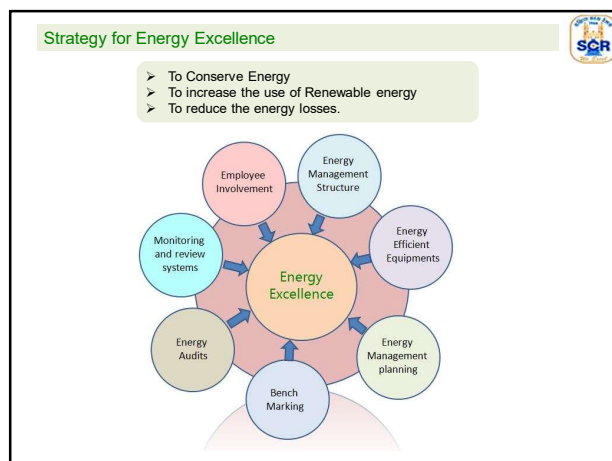
States covered:
Telangana, Maharashtra, Karnataka & Andhrapradesh

Run daily –

- ❖ 157 Mail/Express Trains
- ❖ 95 Passenger Trains
- ❖ 121 MMTS services.

Salient Features of Electrical Maintenance Wing

No of Railway stations • 162	No of PRS locations • 229
No of Electrical Sub stations • 44	No of Electrical Pumps • 425
Capacity of transformers installed • 31,000 KVA	No of Lifts • 17
No of Level crossing Gates • 290	No of Escalators • 12
No of staff quarters • 6300	No of DG sets • 99
No of service buildings • 317	Total connected load • 39 MW



Energy Policy & Salient features



Promoting

- Promoting and increasing use of Renewable energy

Conducting

- Conducting energy audits and implementing all improvement measures

Monitoring

- Monitoring and review of energy performances

Sharing

- Sharing our experiences on energy conservation with other Divisions & Zones over Indian Railways

Awareness

- Creating awareness on energy conservation amongst all employees

IT'S GOING TO
BE HARD, BUT
HARD DOES NOT
MEAN IMPOSSIBLE.



Green Energy Initiatives



On Grid solar plants:

- We installed 1.67 MW solar power plant (RCC rooftop /Galvalume).
- Energy savings of 27.56 Lakh units per annum.
- Monetary saving of Rs. 2.28 Cr per annum.
- Reduction of carbon emissions of 2480 Tons per annum.



500 kWp On Grid plant on RCC rooftop of PFs at SC stn.



227.5 kWp On Grid plant on Galvalume sheets of PFs at HYB stn.

Green Energy Initiatives



Renewable energy Resources

- Installed 64 kWp OFF Grid solar power plant
- 55 Pumps are augmented with solar supply
- 37,800 LPD solar hot waters using over the Division.
- Natural Sun light pipes installed at stations, institutions, office buildings.



Off grid solar plant at LC gates



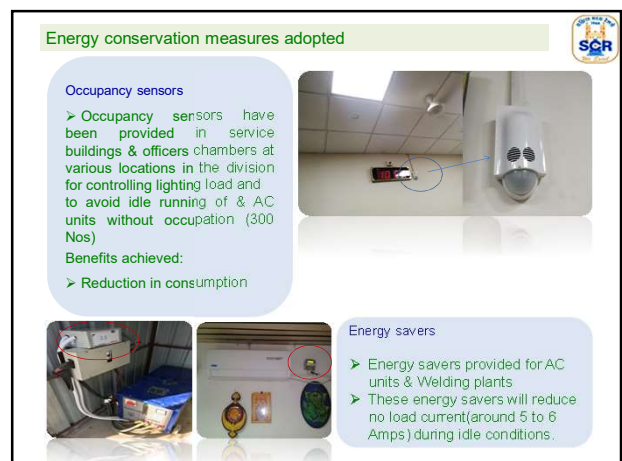
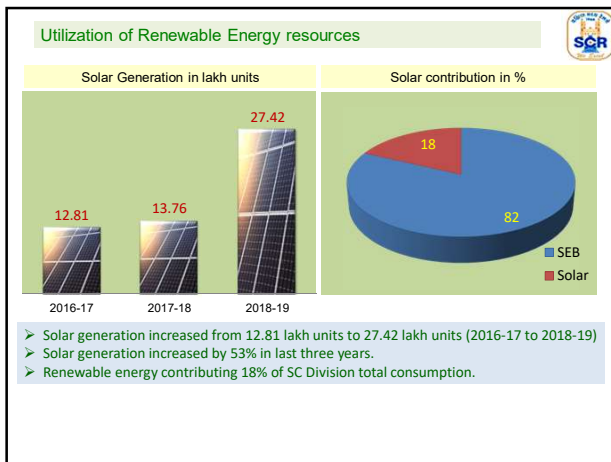
Solar panels fed to pumps



Solar hot water plants

Savings:

- 13.32 Lakh units per annum
- 1.10 Cr per annum
- Reduction of 1198 tons of carbon emissions per annum



Energy conservation measures adopted

Timers for Water coolers

- Timers provided for water coolers to maintain for pre set timings

Nature timers for High mast lights

- Timers provided for all highmast lights at stations, loading points

ON delay timers for Rolling in examination lights

- ON delay timer provided for Rolling in examination lights

Benefits achieved:

- Reduction in consumption
- Reduced maintenance cost
- Reliable system



Encon Innovation project



Energy savings: 31555 KWH per annum

Monetary savings: Rs.2.61 Lakhs per annum

Investment: Rs.6.22 Lakhs

ROI: 2.4 Years

Duplex Solar Power Plant (5kW On-Grid + 1000 LPD Hot Water):

•5kW On-Grid & 1000 LPD Hot water Duplex Solar Power Plant was commissioned at Running Room/HYB.

•This is the first of its kind over the South Central Railway.

• Apart from converting the solar incident radiation into electricity, These Duplex Panels absorb the heat and use the heat energy to increase the water temperature through Heat Exchanger.

•This Plant can simultaneously generate 22.5 units of electrical energy and 1000 ltrs of hot water per day.

Major Energy efficiency Measures adopted in past 3 Years

	Energy saving measures	Savings in Lakh units	Savings in Rs. Lakhs
1	LED conversion of all conventional lighting	36.69	304.52
2	BLDC fans	2.80	23.26
3	Replacement of old split ACs with Inverter AC units	0.79	6.54
4	Energy Efficient pumps in place of non star rated pumps	0.33	2.71
5	Timers for water coolers	3.61	29.99
6	Bifurcation of 30% & 70% lighting	3.67	30.53
7	Temperature settings of Water coolers	1.73	14.39
8	Energy savers for AC units & Welding plants	1.05	8.75
9	Occupancy sensors in officers chambers	1.82	15.14

FY	Savings in Lakh units	Savings in Rs. Lakhs	Reduction of carbon emissions in Tons
2016-17	9.01	74.91	811
2017-18	39.59	328.41	3563
2018-19	3.92	32.51	352

Team Work & Employee Involvement

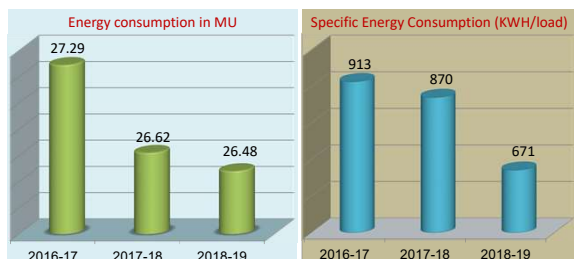


Performance Review Meeting regarding Energy Conservation, Exhibition on Latest technology appliances on energy conservation



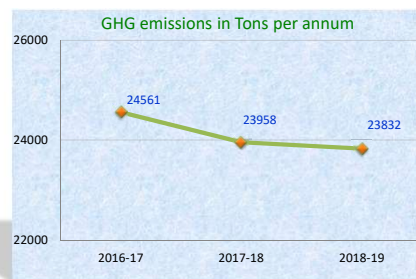
Drawing competition & Seminar on Energy conservation amongst staff

Energy scenario in last 3 years



Consumption Reduced from 27.29 MU to 26.48 MU	SEC Reduced from 913 to 671
Consumption reduced by 3% in last 3 years	SEC reduced by 36% in last 3 years
Even though connected load increased by 24%	Connected load increased by 9553 KW

GHG Mitigation of Secunderabad division



➤ GHG emissions reduced by 3% over a period of 3 years.

Future plans to achieve Global Bench Marking



- Augmentation of Renewable energy sources.
- Development of Zero Energy (ZE) Railway stations and buildings.
- Adoption of smart energy monitoring & control.
- Maximum use of Natural sun light pipe system.
- Periodical Energy auditing and Management.
- Certification of building by prominent institutions Like Bureau of Energy Efficiency.

Energy Conservation measures implemented at Secunderabad Station



Salient features of Secunderabad Railway station



Connected
load
3600 KW

Annual Energy
consumption
16.77 Lakh
units per
annum

Major Loads

- Escalators
- Lifts
- Lighting
- Pumps
- HVAC plants
- Pre cooling points

Energy Objectives achieved by



- Use of latest technology High efficacy 100% LED luminaries.
- Use of BEE 5star rated Inverter type, eco-friendly refrigerant Air-conditioners



LED Lighting on Platforms



Inverter type AC units in Waiting halls

Energy Objectives achieved by



- Use of Super energy efficient BLDC fans.
- Use of Natural sun light pipes.



Super energy efficient BLDC fans on all Platforms



Natural day lights in waiting halls

Energy Objectives achieved by



- Use of BEE 5 star rated energy efficient pumps.
- Employee involvement through training, seminars, group discussions.
- Monitoring of load centre /feeder wise consumption and corrections.



Star rated pump

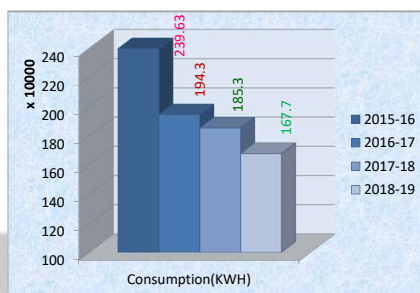


Employee training



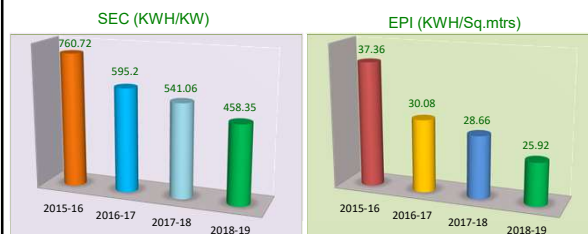
Monitoring feeder wise consumption

Energy Scenario of Secunderabad station



- Consumption has reduced by 30% from 2015-16 to 2018-19
- Connected load increased by 500 kW during same period.

Energy Parameters of Secunderabad Station



- SEC (KWH/KW) has reduced by 40% from 2015-16 to 2018-19.
- EPI (KWH/Sq. Mtrs) has reduced by 31% during the same period.

Energy Saving Projects implemented in last 3 years at SC station



- Reducing the Energy consumption by Focussing on installation of renewable sources, Energy efficient alternatives, latest advance technology for energy monitoring & optimization of consumption.

Following are some of the major energy saving projects

Encon projects implemented in 2016-17

Sl No	Project Description	Savings in kWh/Annum	Investment in Rs.	Payback period in years
1	500 kWp On Grid solar plant	8,21,250	3.30 Cr	4.84
2	Solar hot water plants	1,40,083	0.16 Cr	1.38

- 500 kWp On Grid solar plant contributes 36% of total energy consumption of Secunderabad station.
- 100% of hot water requirement is met by solar hot water plants.

Energy Saving Projects implemented in last 3 years at SC station



Encon projects implemented in 2017-18

Sl No	Project Description	Savings in kWh/Annum	Investment in Rs.	Payback period in yrs
1	High Efficacy LED lighting	1,15,150	50.00 Lakhs	5.23
2	Optimization of HVAC loads	15,9,000	Zero	Zero

Encon projects implemented in 2018-19

Sl No	Project Description	Savings in kWh/Annum	Investment in Rs.	Payback period in yrs
1	BEE 5 star energy efficient pumps	70,810	3.00 Lakhs	0.5
2	Super energy efficient BLDC fans	2,02,951	24.90 Lakhs	1.48

Innovative Projects Implemented at Secunderabad station



Innovation Project - 1

Installation of super energy efficient BLDC Fans

- All conventional ceiling fans are replaced with Super energy efficient BLDC fans.
- These fans consume 44% less power than conventional 5 star rated ceiling fans.

Description of parameter	Unit	Value
Average consumption of conventional ceiling fans per day	kWh	1044
Average consumption of BLDC fans per day	kWh	487
Average Difference consumption per day	kWh	557
Percentage of savings	%	44
Average monetary savings per annum	Rs in Lakhs	16.87

Innovative Projects Implemented at Secunderabad station



Innovation Project - 2

Installation of 5 star rated pumps based on the hydraulic data

- All the existing inefficient pumps were replaced by BEE 5 star rated energy efficient pumps.
- The pumps installed were based on the hydraulic data (Delivery yield and depth of the bore).

Description of parameter	Unit	Value
Average consumption of existing pumps per day	kWh	544
Average consumption of new BEE 5 star rated pumps per day	kWh	350
Average Difference consumption per day	kWh	194
Percentage of savings	%	36%
Average monetary savings per annum	Rs in Lakhs	5.9

Utilization of Renewable Resources at Secunderabad station



Renewable energy projects implemented

- ❑ 500 kWp ON Grid solar rooftop power plant.
- ❑ 6000 LPD Solar rooftop hot water plants for hot water requirement.
- ❑ Natural Sun light pipes in general waiting halls.



- With the above, we able to generate 9.63 Lakh units per annum
- This contributes 49.5 % of total energy consumption
- Reduction of carbon emissions by 867 Tons per annum.

Utilization of Renewable Resources at Secunderabad station



Technology	Type of Energy	Onsite/ Offsite	Installed Capacity (kWp)	Generation (Million kWh)	% of overall electrical energy
Solar PV	Electrical	Onsite	500 kWp	0.821	42.2%
Solar PV	Electrical	Onsite	6000 LPD	0.140	7.20%
Natural sun light	Electrical	Onsite	4 No's	0.002	0.12%



Rooftop solar power plant

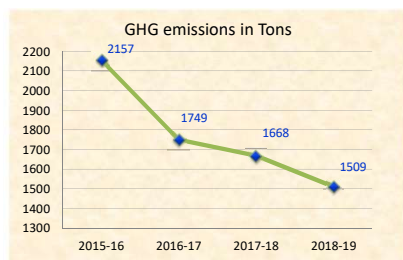


Solar water heater



Natural Sun light pipes

GHG Mitigation at Secunderabad station



- GHG emissions reduced by 30% over a period of 4 years.

Green Supply Chain

Use of Renewable Energy Sources

Use of Energy efficient luminaries

Use of Super Energy efficient fans

Use of Solar power for Hot Water

Use of Energy efficient Pumps

Use of sun light pipes



Projects implemented, Evaluation & Benefits achieved

Sl No	Project description	Benefits in kWh/annum	Benefits achieved in Rs. Lakhs/annum	Evaluation	
				Investment in Lakhs	Payback in years
1	500kW Solar On Grid Plant	82,1250	68.16	330	4.84
2	100% LED lighting in place of T5 technology	1,15,150	9.55	50	5.23
3	BLDC Fans in place of conventional fans	2,02,951	16.81	25	1.48
4	Solar Hot Water Plants	1,40,083	11.62	16	1.37
5	Use of Natural day lighting	2,452	0.20	0.80	0.4
6	Optimization of HVAC loads	1,59,000	13.19	0	0
7	BEE 5 star energy efficient pumps	70,810	5.87	3	0.5
Total		15,11,396	125.4	424.8	

Awards & Achievements of Secunderabad station

Awards

- Secunderabad station is the first Railway station in Indian Railways which earned the distinction of Highest "Platinum" rating by IGBC/CII.



Receiving Platinum Rating from Hon'ble Ministry of Railways



Awards & Achievements of Secunderabad station



Awards

- Participated in National Energy Conservation Awards in 2017, Secunderabad Station bagged Certificate of Merit in Railway stations category over Indian Railways.



Receiving NEC Award-2017 Certificate from Director of BEE at New Delhi

Awards & Achievements of Secunderabad station



Awards

- Secunderabad station Awarded with Excellent energy efficient unit in National Awards for Excellence in Energy Management by CII on 18th of Sep-19



Awards & Achievements of Secunderabad station



Awards

- Got placed in Hon'ble Prime Minister's Book of Innovations in 2017, Secunderabad station stood at 29th place out of 70, which was released by Hon'ble Prime Minister of India on the name of "New Beginning".



Hon'ble Prime Minister's Book of Innovations

Awards & Achievements of Secunderabad station



Awards

- Secunderabad station is certified with ISO14001:2015 for Facility Management
- The station has also achieved the ISO-9001 Certification for quality management and train management.
- Station has also recognized as most cleanest railway station over Indian Railways by Ministry of Railways



ISO 14001:2015 Certification

Awards & Achievements of Secunderabad station



Awards

- This Station has been awarded National tourism Award for the year 2016-2017.
- This station has also bagged 3rd place in station beautification over Indian Railways.
- Last but not least, this station has also shortlisted for JSW-TOI initiative 'Earth care' Awards -2019.



Receiving National Tourism Award



Station beautification with cheriyal painting



Energy Conservation measures implemented at Sanchalan Bhavan



Salient features of Sanchalan Bhavan



Connected load
750 KW

Annual Energy
consumption
6.21 Lakh units
per annum

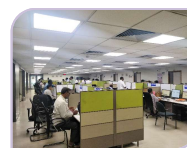
Major Loads

- HVAC plants
- Lifts
- Lighting
- Pumps
- Servers & printers

Energy Objectives achieved by



- Use of latest technology High efficacy LED luminaries.
- Use of BEE 5star rated Inverter type, eco-friendly refrigerant Air-conditioners.



LED Lighting



Inverter type AC units

Energy Objectives achieved by

- Use of Super energy efficient BLDC fans.
- Use of Occupancy sensors & Energy Savers for HVAC loads
- Use of Sun light pipes.



Super energy efficient BLDC



Occupancy sensors



Natural day lights



Energy Savers

Energy Objectives achieved by

- Use of BEE 5 star rated energy efficient pumps
- Employee involvement through training, seminars and group discussions



Star rated pump



Employee training

Energy Saving Projects implemented at Sanchalan bhavan

- Reducing the Energy consumption by focussing on installation of renewable sources, Energy efficient alternatives, latest advance technology for energy monitoring & optimization techniques.

Following are the some of the major energy saving projects:

Encon projects implemented in 2016-17

Sl No	Project Description	Savings in kWh/Annum	Investment in Rs.	Payback period in years
1	20 kWp On Grid solar plant	32,850	16.10 Lakhs	5.86
2	Optimizing of HVAC loads	1,66,650	0	0
3	Energy savers for AC units	24,268	0.6 lakh	0.30

Energy Saving Projects implemented at Sanchalan bhavan

Encon projects implemented in 2017-18

Sl No	Project Description	Savings in kWh/Annum	Investment in Rs.	Payback period in yrs
1	100% LED lighting	45326	3.5 Lakh	0.93
2	Replacement with Scroll Type Compressor in chiller plants	125350	30 Lakh	2.88
3	Natural Sun Pipes	1314	0.75 Lakh	6.87

Encon projects implemented in 2018-19

Sl No	Project Description	Savings in kWh/Annum	Investment in Rs.	Payback period in yrs
1	Replacement with Star rated Inverter type AC units	111690	22.5 Lakhs	2.41
2	Super energy efficient BLDC fans	34288	7.68 Lakhs	2.69
3	Provision of APFC panel	34920	1 Lakh	0.345

Innovative Projects Implemented at Sanchalan bhavan



Innovation Project - 1

Installation of super energy efficient BLDC Fans

- All conventional ceiling fans are replaced with Super energy efficient BLDC fans which consumes 44% less power than conventional 5 star rated ceiling fans.

Description of parameter	Unit	Value
Average consumption of conventional ceiling fans per day	kWh	213.5
Average consumption of BLDC fans per day	kWh	119.5
Average Difference consumption per day	kWh	94
Percentage of savings	%	44
Average monetary savings per annum	Rs in Lakhs	2.85

Innovative Projects Implemented at Sanchalan bhavan



Innovation Project - 2

Installation of BEE 5-Star Rated Inverter Type A/C in place of Non-Star A/C

- All old and Inefficient Non Star rated Air-Conditioners were replaced with 5 Star Inverter A/Cs. which consumes 33% lesser power than conventional Air-Conditioners.

Description of parameter	Unit	Value
Average consumption of Old A/Cs per day	kWh	918
Average consumption of BEE 5-Star Rated Inverter Type A/C per day	kWh	612
Average Difference consumption per day	kWh	306
Percentage of savings	%	33
Average monetary savings per annum	Rs in Lakhs	9.27

Utilization of Renewable Resources at Sanchalan bhavan



Renewable energy projects implemented



- ❑ 20 kWp ON Grid solar-rooftop power plant.
- ❑ 500 LPD Solar rooftop hot water plants
- ❑ Natural sun light pipes to utilization of maximum day light

- With the above, we able to generate 0.36 Lakh units/ annum
- Reduction of carbon emissions by 32 Tons per annum .

Utilization of Renewable Resources at Sanchalan bhavan



Technology	Type of Energy	Onsite/ Offsite	Installed Capacity (KWp)	Generation (kWh)	% of overall electrical energy
Solar PV	Electrical	Onsite	20 kWp	32,850	5.2%
Solar Hot Water Plants	Electrical	Onsite	500 LPD	11,671	1.9%
Natural sun light	Electrical	Onsite	3 Nos	1,314	0.02%



Solar plant

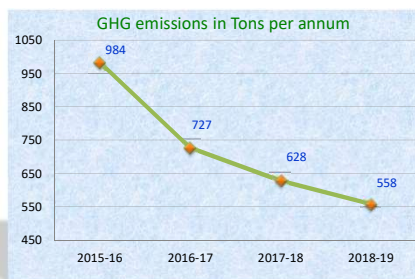


Solar water heater



Natural Sun light pipes

GHG Mitigation

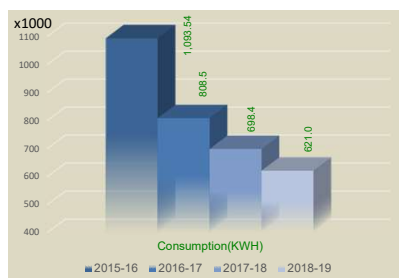


- GHG emissions reduced by 43% over a period of 4 years.

Projects implemented, Evaluation & Benefits achieved

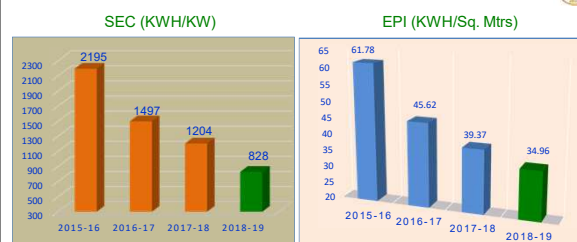
Sl No	Project description	Benefits in kWh/annum	Benefits achieved in Rs. Lakhs/annum	Evaluation	
				Investment in Lakhs	Payback (Years)
1	20kWp Solar On Grid Plant	32580	2.7	16	5.86
2	100% LED lighting in place of T5 technology	45326	3.76	3.5	0.93
3	BLDC Fans in place of conventional fans	34288	2.85	7.68	2.69
4	Optimization of HVAC loads	166650	13.83	0	0
5	Replacement with Inverter type AC units	111690	9.3	22.5	2.01
6	APFC Panel	34920	2.9	1	0.344
7	Replacement with scroll compressor used in HVAC plants	125350	10.4	30	2.88
8	Use of Natural day lighting	1314	0.11	0.75	6.88
Total		5,52,118	45.85	81.43	

Sanchalan bhavan Energy Scenario



- Consumption has reduced by 47% from 2015-16 to 2018-19 even though Connected load increased by 50%.

Energy Parameters of Sanchalan Bhavan



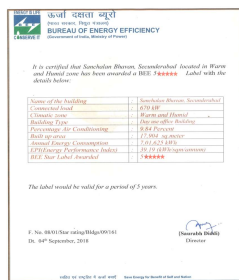
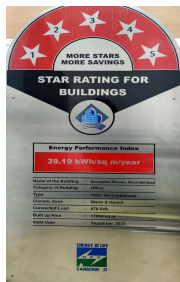
- SEC (KWH/KW) has reduced by 62.2% from 2015-16 to 2018-19.
- EPI (KWH/Sq. Mtrs) has reduced by 43.4% during the same period.

Awards & Achievements of Sanchalan bhavan



Awards

- Sanchalan Bhavan Building awarded with BEE Highest rating (5 star rating) by Bureau of energy efficiency



Awards & Achievements of Sanchalan bhavan



Awards

- Sanchalan bhavan got Certificate of Merit in Office building category in National Energy Conservation Awards 2016 by Bureau of Energy Efficiency
- Sanchalan Bhavan building Bagged National 2nd prize in Energy Conservation in 2017 by Bureau of Energy Efficiency.



GM/SCR Receiving second prize for Sanchalan bhavan in NECA-17 from Hon'ble Minister of Power (Independent charge)

Awards & Achievements of Sanchalan Bhavan



Awards

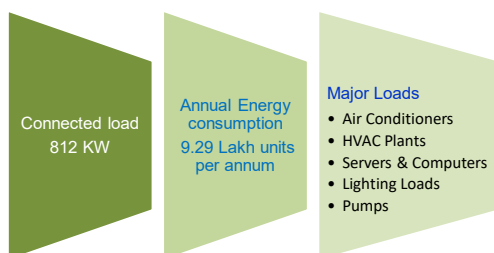
- Sanchalan Bhavan building Awarded with Energy efficient unit in National Awards for Excellence in Energy Management by CII on 18th of Sep-19



Energy Conservation measures implemented at PRS/SC



Salient features of Passenger Reservation System complex



Energy Objectives achieved by



1) Operating Precision AC units instead of 104Ton AC plant during night time:

- ❖ Switching OFF 104 Ton chiller plant by provision of 2 x 5.5 Ton & Switch ON 4 no of 3 Ton split AC units from 08.00 PM to 08.00 AM in server room

Energy Savings/Annum	3 Lakh kWh
Monetary Savings/Annum	24.6 lakh INR
Investment	40 lakh INR



Energy Objectives achieved by



2) Provision of VFD drive for AHU :

- ❖ Variable frequency drive provided for AHUs to reduce the motor load as per demand requirements

Energy Savings/Annum	22265 kWh
Monetary Savings/Annum	1.78 lakh INR
Investment	0.65 lakh INR



Energy Objectives achieved by



Energy Savings/Annum	63072 kWh
Monetary Savings/Annum	5.16 lakh INR
Investment	9.9 lakh INR



Energy Savings/Annum	47970 kWh
Monetary Savings/Annum	4.01 lakh INR
Investment	1.1 lakh INR

Awards & Achievements of PRS/SC

- Passenger Reservation System Complex Building/SC again bagged National 1st prize in Energy conservation office building category in 2018 by BEE.



Awards & Achievements of PRS/SC

- Passenger Reservation System Complex Building/SC bagged state 1st prize in government Building sector in 2018 by TSREDCO.



We continue our Journey
in quest of Excellence

Thank you!

