Ministry of Power
Government of India

Azadi Ka Amrit Mahotsav

Bureau of Energy Efficiency

HANDBOOK OF BEST ENERGY EFFICIENCY PRACTICES OF STATE DESIGNATED AGENCIES

FOR INTERNAL CIRCULATION ONLY

OCTOBER, 2021

MAKING OUR PLANET
HEALTHIER

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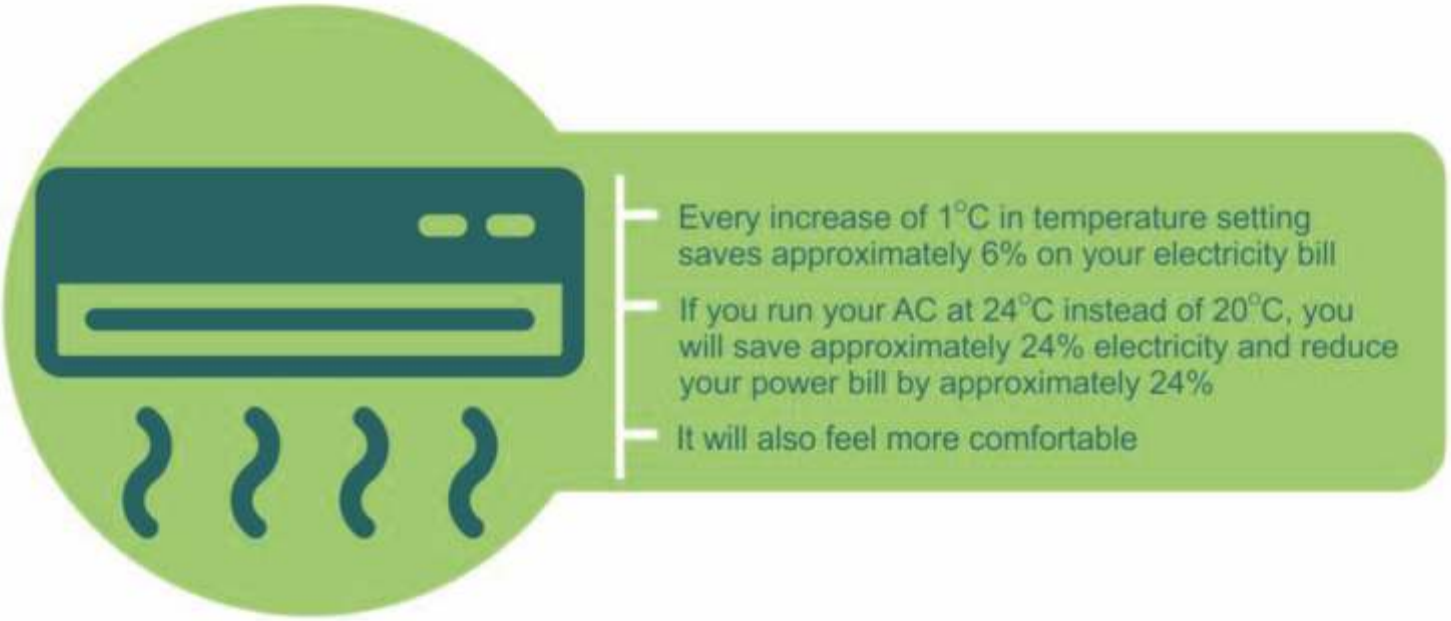
WITH AC@24°



Save money, chill more.

Maintain AC @ 24°C

Ministry of Power
Government of India

BUREAU OF ENERGY EFFICIENCY (BEE)
Ministry of Power, Government of India
4th Floor, Sewa Bhawan
R.K. Puram, New Delhi-110066
Ph: 011-26766700, Fax: 011-26178328/52
Website: www.beeindia.gov.in

Preface

The Energy Conservation (EC) Act 2001 mandates creation of a two-tier organizational structure to promote the efficient use of energy and its conservation in the country with Bureau of Energy Efficiency (BEE) as the nodal agency at central level and State Designated Agencies (SDAs) as nodal agencies at State / Union Territory (UT) level. Section 15(d) of the EC Act stipulates that the State Government / UT Administration may designate any agency at the State level to co-ordinate, regulate and enforce the provisions of the Act within the State/UT. Accordingly, all 36 States/UTs have nominated an SDA in their respective State/UT.

SDAs have a crucial role to play in promoting energy efficiency among energy consumers in all sectors within the State such as agriculture, building, industry/MSME, municipality, and transport, as well as in power generation, transmission, and distribution by undertaking the following activities:

- Demonstration projects and model village campaigns to showcase the effectiveness of energy efficient equipment/appliances/technologies to State Government / concerned State departments facilitating them in large scale replication of these projects.
- Outreach/publicity activities for creating awareness and increasing consciousness of State Government, its concerned departments, and people at large towards the importance and beneficial impacts of energy efficiency.
- Research and innovation activities on energy efficiency.
- Workshops/capacity building programmes to disseminate latest information relating to specific areas/aspects amongst respective stakeholders (Energy Managers/ Energy Auditors, Designated Consumers, Energy Service Companies, Financial Institutions, DISCOMs, Public Works Departments, Urban Local Bodies, Resident Welfare Association, Agriculture Department, etc.) and provide them with the required training on Energy Efficiency and Demand Side Management; etc.

In addition, SDAs in consultation with their respective State Government and various concerned State departments have the responsibility to exercise their powers of inspection, issuing directions, penalty imposition, adjudication, and making rules, conferred by sections 17, 18, 26, 27, and 57 of the EC Act respectively.

In order to facilitate learning amongst peer group, BEE has prepared "Handbook of Best Energy Efficiency Practices of States / SDAs" based on data/information provided by eleven (11) SDAs namely Andaman & Nicobar Islands, Andhra Pradesh, Chhattisgarh, Haryana, Karnataka, Kerala, Madhya Pradesh, Odisha, Sikkim, Uttarakhand, and Uttar Pradesh amassing into a total of twenty-seven (27) "Best Practices". This Handbook is a dynamic book and will be further updated based on best practices shared by States/UTs in future also thereby facilitating continual cross learning among States.

Abhay Bakre
Director General, BEE

Disclaimer

The information on this handbook is collated by Bureau of Energy Efficiency, Ministry of Power by sourcing from various State Designated Agencies (SDAs) without subjecting the same to any expert or independent audit. The purpose of this handbook is only to provide information regarding best practices adopted by the SDAs for energy efficiency. It is not intended to:

a.Form any basis or suggest any idea about any investment nor should the same be used for quoting or relying in any judicial/quasi-judicial proceeding;

b.Form any connection with or be relied upon for any contract or commitment whatsoever.

While reasonable steps are taken to regularly update the information and utmost care is being taken to maintain the accuracy of the information, readers are requested to take into account the prevailing law and Govt. policies and actual information regarding other related factors while forming any opinion, coming to any conclusion or taking any decision.

The editor of this handbook and the sourcing entities of information are not responsible for any direct, indirect, special, coincidental, consequential or any other damages/losses whatsoever and to whomsoever caused, arising out of or in connection with the use or reliance of the information available in this handbook, including any loss of profits, loss of goodwill, data, business interruption, personal injury, or any other pecuniary loss.

In case further information is required kindly contact the BEE for the contact details of the organization concerned.

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1. Andaman & Nicobar Islands

1.1. Enforced complete ban on sale / purchase of "Filament Lamps"

With a vision to safeguard and improve the quality of environment through efficient power consumption for the socio–economic growth, the Administrator of UT enforced a ban on the sale/Purchase of "Filament Lamps". The power saving achieved by promoting the usage of LED lamps would result in reduction of the GHG emissions from the power plants thereby proving to be an indispensable tool in protecting and improving the environment of these serene Islands. "The Filament Lamp Free Campaign" is one of a kind initiative which has garnered immense support from the general public of the islands.

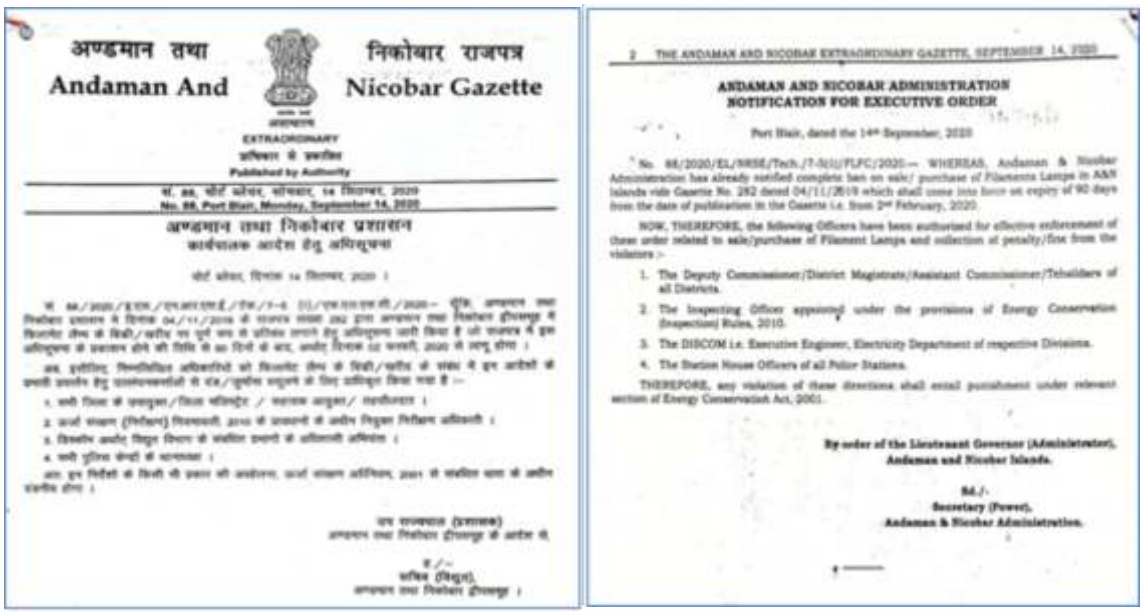
Figure 1: Filament Lamp Free Campaign in A&N Islands

Table 1: Comparison of LED lightening and Filament Lamps

Energy Efficient Lightening (LEDs)	Filament Lamps
Low heat radiation comparatively, with no compromises on illumination levels.	Most of the energy consumed is lost in the form of heat which causes increase in room temperature. Only 5% of the total energy is converted to useful lightening.

Highly efficient	This archaic technology and is extremely inefficient in comparison to the modern energy efficient lighting appliances such as LEDs.
Higher operation life cycle compared to filament lamps	Lower operational life cycle compared to modern energy efficient lights
Consume less energy (1/8-1/10 times) for same illumination levels.	8-10 times higher power consumption for same illumination.
Low power rating eg. 5-8W LED is equivalent to 60W of filament lamp	Higher energy bills

The A&N Administration has notified the ban on sale/purchase of filament lamps in A&N Islands in the Andaman & Nicobar Gazette vide notification No. 282 dated 4th November 2019 under Filament Lamp free Campaign. The notification is reproduced herein below for reference and perusal.



अण्डमान तथा निकोबार राजपत्र
Andaman And Nicobar Gazette

EXTRAORDINARY

Published by Authority

अण्डमान तथा निकोबार प्रशासन

2 THE ANDAMAN AND NICOBAR EXTRAORDINARY GAZETTE, SEPTEMBER 14, 2020

ANDAMAN AND NICOBAR ADMINISTRATION
NOTIFICATION FOR EXECUTIVE ORDER

Port Blair, dated the 14th September, 2020

1. The Deputy Commissioner/District Magistrate/Assistant Commissioner/Tehsildars of all Districts.
2. The Inspecting Officer appointed under the provisions of Energy Conservation (Inspection) Rules, 2010.
3. The DISCOM i.e. Executive Engineer, Electricity Department of respective Divisions.
4. The Station House Officers of all Police Stations.

By order of the Lieutenant Governor (Administrator),
Andaman and Nicobar Islands.

Sd/-
Secretary (Power),
Andaman & Nicobar Administration.

Figure 2: Gazette notification on complete ban on sale/purchase of filament lamps (ICL) in A&N Islands

1.2. Energy Conservation Week 2020

The Energy Conservation Day is one of the most renowned day for environmental action. Since year 1991, it is observed every year on December 14 and aims to encourage awareness about global warming and climate change and promote efforts which are focused towards optimizing energy resources. Andaman & Nicobar Islands celebrated the Energy Conservation Week from 8th to 14th December 2020.

a) Prize distribution from Power Secretary to winners

b) Energy conservation week prize distribution and closing ceremony

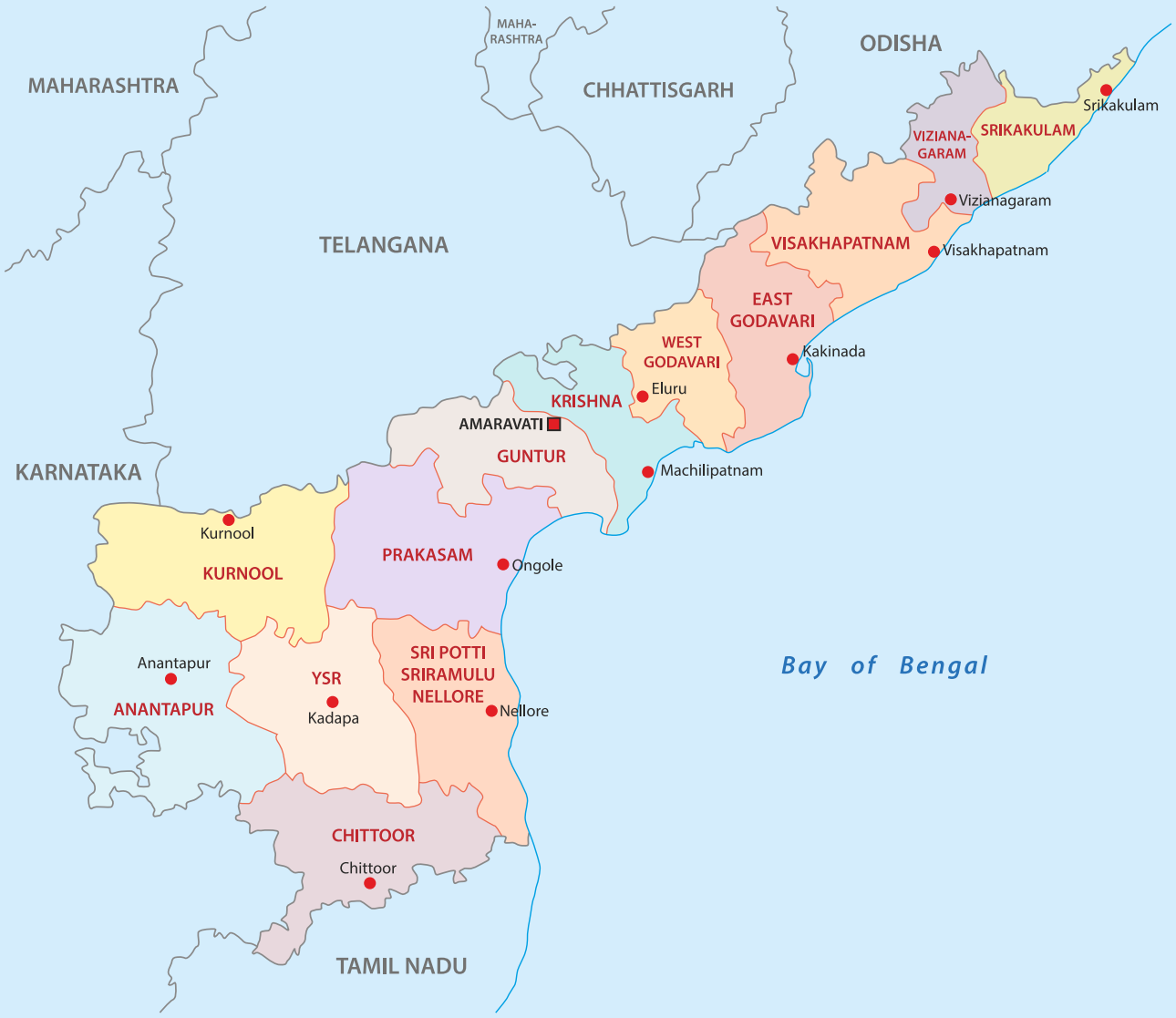
c) Power Point Presentation Competition among college level

d) Prizes and certificate distribution to various competition winners

Figure 3: Energy Conservation Week 2020 Celebration in A&N Islands

During this week-long program, various activities like MCQ, Presentation, Logo designing, slogan writing, memes designing, and poster making competition were conducted for students of schools and colleges. Moreover, to increase awareness amongst general public, a slogan writing competition was organized for all the citizens on the topic 'Energy Conservation and Energy Efficiency', during 19.10.2020 to 24.10.2020. The Energy Conservation Week witnessed an overwhelming response from participants and the event was a huge success. Winners of all the competitions were felicitated on Energy Conservation Day i.e.14.12.2020.

Andhra Pradesh



2. Andhra Pradesh

2.1. Energy efficiency demonstration projects in MSMEs through Internet of Things (IoT) technology – A successful case study.

Andhra Pradesh State Energy Conservation Mission, SDA, Energy Department, and National Productivity Council, GoI entered into Memorandum of Understanding ("MoU") on 20th December 2019. The paramount aim of this MoU to conduct joint activities such as energy audits, technology implementation, renewable energy promotion, capacity building/ awareness generation and to promote cleaner technologies among different MSME sectors in the state of Andhra Pradesh. Accordingly, an innovative low-cost Energy Efficiency demonstration project through Internet of Things ("IoT") technology has been implemented in co-ordination with NPC & IIT, Hyderabad with financial support from the Bureau of Energy Efficiency, GoI.

Applying IoT Technology in MSME: Internet of Things ("IoT") provides means of controlling machines and processes on the shop floor and allows the machine to connect and exchange data with one another through embedded sensors. Hence it enables the owner to monitor the production, oversee work stoppages and retrieve data relating to Energy consumption directly from his/her laptop/android mobile phone, if required direct/control people, machines and processes from a remote location. Timely alerts on critical resources including without limitation power factor, daily production rate, and daily energy consumption assist the owner to sense issues in the factory even when his/her team fails to report them and thus enabling him/her to suggest timely corrective actions.

Selection of the Project Location: M/s. Padma Ceramics, a unit of Ceramic clusters in the East Godavari district of AP under the MSME sector has been selected for implementing IoT based Power monitoring device project.

Benefits to MSMEs by installation of IoT device: This initiative will benefit the state to a great extent in reducing technical losses, maintaining voltage profile, enhancing equipment life, reducing electricity bills, and reducing carbon emissions thereby ultimately protecting the environment and improving quality of life.

Benefits accrued to M/s. Padma ceramics by IoT device:

- Avoided purchase of Power Analyzer which costs around Rs. 2 to 2.5 Lakhs. The cost of an IoT device is around Rs. 10,000/- to Rs. 15000/- only.
- Avoided penalty due to maintaining low power factor and increased the Maximum Demand. Maintaining power factor to almost unity and reducing kVAh and electricity bills.
- Protected high-cost plant machinery/equipment from sudden failure due to voltage fluctuations by continuous monitoring of the 13 electrical parameters and taking corrective action.
- Tentative energy saving per annum is around 11,000 units which leads to a monetary benefit of around Rs. 80,000/-. This is possible due to the identification of capacitor bank's failure through the low power factor alert message.
- For extending the demonstration project to all MSMEs in other districts, BEE, GoI has provided funds amounting to Rs.13 Lakhs for installation of Power monitoring devices in 5 MSME units per district totaling to 13 districts. The project is planned to be implemented through M/s. SKIOT, an incubation firm of IIT Hyderabad, and with the full support and co-operation of the State Industries Department.

2.2. State Energy Conservation Award (SECA)-2020

The State Energy Conservation Mission (SECM), State Designated Agency successfully organized State Energy Conservation Awards (SECA) -2020 for the first time in the state of Andhra Pradesh. The APSECM has started a novel initiative to foster healthy competition among different sectors by organizing State Level Energy Conservation Awards from this year onwards. The objective of this competition is to recognize the exemplary efforts made by Industries and establishments that have put special efforts to reduce specific energy consumption thereby contributing to achieving the goal of energy efficiency. The following sectors which utilize substantial energy are eligible to participate in the SECA- 2020 competition.

Industries

a) Thermal power plants

b) Cement Industries

Building sector

a) Commercial buildings, Corporate offices (above 75 kW Connected Load)

Institutions

a) Municipalities/Municipal Corporations/Water & Sewage boards

National Productivity Council (NPC), an autonomous organization under the Ministry of Commerce & Industry, GoI has assisted the APSECM to conduct SECA-2020 competition by preparing detailed questionnaires, evaluating them and instituting a technical committee for adjudication of the awards.

Figure 4: Sri B. Srinivasa Reddy Energy Minister, GoAP presented SECA 2020 awards

2.3. Energy Conservation (EC) Cells

Andhra Pradesh government issued an order videG.O.RT.89, Dt. 05.11.2020, wherein directions were given to all government departments to set up energy conservation cells in all the government offices within a month. -Given the importance attached to energy efficiency, the State Government has directed to create energy conservation (EC) cells in all the Heads of Department (HoD) offices of the state government, district-level offices and corporation's/societies offices in the State, The Government has directed all district collectors, heads of departments, and chairpersons of corporations and societies to set up the cells (Total of 501 cells) within a month. Notably, APSECM is the state designated agency for the enforcement and implementation of energy conservation and energy efficiency initiatives.

Implementation of energy conservation and energy efficiency measures will be instrumental in aiding all departments, gram panchayats, and urban local bodies to avoid reckless use of energy. A perfect illustration of "lead by example", it is imperative to note that once all government departments implement energy conservation and energy efficiency measures in their respective offices, the general public will be encouraged to follow the suit.

To motivate the officials for achieving this goal, the state accolades the top three departments that achieve substantial savings with 'State Energy Conservation Awards' in the gold, silver, and bronze categories annually.

Objective of Energy Conservation Cells: The purpose of Energy Conservation Cells is to introduce cost-effective, energy-efficient technologies in the State Government departments and promote an energy-conscious culture that encourages sensible decisions concerning energy consumption. In the bigger picture, resultantly, the reduction in total energy demand will occur across all Government departments, positively addressing escalated energy usage and electricity bills.

Functions of Energy Conservation Cells:

i. The Energy Conservation Cell shall champion the cause of conservation of Energy and take all necessary measures for the creation of necessary awareness and bringing about sustainable behavioral change leading to economical consumption of energy.

ii. The main purpose of Energy Conservation Cell is to ensure reduction of energy consumption as well as electricity bills by effectively implementing energy conservation and energy efficiency activities to reduce economic burden among the departments.

iii. To devise measurable and sustainable goals with a clear Action Plan involving Power Utilities in coordination with APSECM, State Designated Agency of Andhra Pradesh.

iv. Compile and recommend best practices and methods to reduce energy consumption in their establishments and thereby APSECM shall propagate and communicate the narrative through case studies, energy-saving booklets/tip sheets to other departments.

v. Facilitate and enforce the efficient use of energy and its conservation in all the respective units of the department encompassing all areas of energy use.

vi. The Energy Conservation (EC) Cell shall meet at least once a month to review the progress of the Energy Efficiency Action Plan of their respective department.

vii. Detailed report of activities of the Energy Conservation (EC) cell of various departments shall be furnished to the Chief Executive Officer, State Energy Conservation Mission (SECM) on monthly basis which shall be forwarded to the Government for consideration.


Chhattisgarh
UTTAR PRADESH
JHARKHAND
MADHYA PRADESH
ORISSA
TELANGANA
ANDHRA PRADESH
Bay of Bengal
KORIYA
SURAJPUR
BALRAMPUR
Balrampur
Baikunthpur
Surajpur
Ambikapur
SURGUJA
JASHPUR
Jashpur
BILASPUR
KORBA
Korba
MUNGELI
Mungeli
Bilaspur
Janjgir
RAIGARH
Raigarh
Kabirdham
KABIRDHAM
JANJGIR-CHAMPA
Bemetara
BEMETARA
BALODA
Balod Bazar
BAZAR
RAIPUR
DURG
Durg
Rajnandgaon
MAHASAMUND
Mahasa-mund
RAJNAND-GAON
Balod
BALOD
Dhamtari
DHAMTARI
Gariaband
GARIA-BAND
Kanker
KANKER
KONDA-GAON
Kondagaon
Narayanpur
NARAYAN-PUR
BASTAR
Jagdalpur
BIJAPUR
Bijapur
Dantewada
DANTE-WADA
Sukma
SUKMA

3. Chhattisgarh

3.1. Cool Roof Demo Project

Chhattisgarh has a composite climatic condition where the temperature is very high during summer. To achieve the thermal comfort, air conditioners are popularly used in the State. Commercial Buildings consume more than 50% of their annual electricity only for cooling purposes. The roof of the building is one of the most critical components of the building envelope, which covers only 20 – 25% of the area, but 50% of the heat ingress takes place through that area. Cool Roof Programme is considered one of the premier sustainable solutions to minimize the cooling load of a building without compromising thermal comfort.

Chhattisgarh State Renewable Energy Development Agency (CREDA) has undertaken the project of painting heat reflective paint which has high Solar Reflectance Index (SRI) at various Govt. buildings, like Primary Health Centre, Schools, Offices, etc. This pilot project has exhibited the benefits of this program and has gained considerable traction in a short span of time.

About Project: Heat Reflective Paint technology has the ability to reflect up to 97% of sun rays, dwindling the heat which reduces the internal temperature of a room and subsequently reduces air conditioning operation cost.

Benefit of Project:

I. Reduce the surface temperature of the roof up to 30° C.

ii. Reduce the ambient temperature of the room by 5-8° C. (when the outside temperature is 45° C).

iii. Reduce air conditioning operational costs by up to 19.2%.

iv. Life of project is more than 12 years.

v. High payback.

vi. No maintenance cost & easy to use.

vii. Reduce 'U' Value of roof from 0.5 to 0.2.

At Roof

(Measured when ambient temperature is 43^{0}C)

Without Coating

After Coating

Inside room

Without Coating

After Coating

Figure 5: Comparison of temperature before and after coating on roof of buildings of CG

3.2. BLDC Fan: A new Beginning by Chhattisgarh

When it comes to saving energy, most of us generally neglect ceiling fans. Although, generally we view large appliances like air conditioners or heaters with suspicion for surreptitiously piling up the electricity bill, we fail to understand that the ceiling fans are the all-weather appliances—which keep running all through the day (and even night) and thus cumulatively the fans consume more electricity than we assume them to.

BLDC Technology:

BLDC technology has been in the market for a couple of decades and it is widely implemented in industries which need high torque motors. Until recently, the BLDC technology was never being applied to the ceiling fans. The state of Chhattisgarh identified this opportunity and applied this break-through technology to ceiling fans. The traditional fan uses an induction motor and typically consumes 60-80 watts in comparison to that BLDC fan consume only 28-32 Watt which save about 65 % of electricity.

Advantages of BLDC Ceiling Fan:

i. Lower Electricity Consumption (65% savings)

ii. Longer backup on Inverters (even on Solar)

iii. Improved reliability

iv. Noise reduction

v. Longer lifetime

vi. Low maintenance.

Table 2: Energy Consumption: Ordinary Fans Vs BLDC Fans

Speed Level	Power Consumption (Watt/hr)	
	Traditional Fan (60 Watt)	BLDC Fan (28 Watt)
Stage -1	15.35	4.6
Stage -2	24.2	7.9
Stage-3	35.2	13.7
Stage-4	52.2	23.0
Stage-5	61.0	27.9

CREDA has supplied & installed 2 nos. of BEE 5 star rated 28W BLDC ceiling fans at Energy Education Park, Raipur by replacing the conventional 80W ceiling fans. Further, 57 nos. BEE 5 star rated 50W ceiling fans have been replaced by existing 80W inefficient fans in Govt. Higher Secondary School, Fundhar. The total energy saved by the replacement of a traditional fan with a BLDC fan in 100 days is 18.65 KWh (Fan operates for 09 hr/day (@ 01 hour in Stage-01, 03 hours in Stage-02, 03 hours in Stage-3, 01 hour in Stage-04, and 01 hour in Stage-05)).

3.3. S4R Motors in Pumps

Unfortunately, even though the agriculture sector is a major power consumer, it is also the most inefficient power user in India. Low or free power supply to farmers encouraged the purchase and utilization of local made inefficient and unreliable pump sets. These low and free power incentives over-shadow state and central government budget. The Slip Start Synchronous Run motor (S4RM) has a high potential to reduce this recurring financial burden on the exchequer.

About S4R Motors:

S4RM is a newly launched technology for high power factor i.e. Super-efficient motors. The motor with this technology starts asynchronously and run at synchronous speed in steady state, thereby leading to combined advantages of induction (self-start) & Synchronous motor (high efficiency). As it is a magnet-based motor, the runtime efficiency of the S4RM motor is 5-10% higher than that of an induction motor.

Table 3: Comparison between Induction Motor and S4RM Motor

Sl. No.	Parameter	Induction Motor	S4RM Motor	Implication
1	System Efficiency	Low	High	Energy Saving
2	Starting Current	7 to 8 times FL	4 to 5 times FL	Lower load on existing line
3	Full Load Current	High	Lower	Existing line can be used for more no. of loads
4	Power Factor	Lower (0.75-0.82)	High (close to 1)	Better utilization of existing resources
5	VFD required	No	No	Less no. of components in the system

6	Discharge with Voltage Variation	Variable	Constant	High discharge even at low voltage
7	Initial Cost Implementation	Lower	Little higher	No big investment from customer for new motors.
8	Reliability	High	High	Higher because of less heat
9	RPM	2750-2850	**3000	**FixedRPM

Conclusion:

Verification of Energy Savings for this project undertaken by CREDA is under progress.

Haryana


HIMACHAL PRADESH
CHANDIGARH
Panchkula
Panchkula
PUNJAB
Ambala
Ambala
Yamunanagar
AMBALA
Yamunanagar
Kurukshetra
Kurukshetra
Kaithal
Kaithal
Karnal
Karnal
KARNAL
Sirsa
Sirsa
Fatehabad
Fatehabad
Jind
HISAR
Jind
Panipat
Panipat
Hisar
Hisar
UTTAR PRADESH
Sonipat
Sonipat
Rohtak
Rohtak
Bhiwani
Bhiwani
ROHTAK
Jhajjar
Jhajjar
UNION TERRITORY
Gurgaon
Gurgaon
Farida-bad
Faridabad
Rewari
Mahen-dragarh
GURUGRAM
Rewari
Palwal
Nuh
Palwal
Narnaul
FARIDABAD
Nuh
RAJASTHAN

4. Haryana

4.1. Replacement of conventional lights with LED lights in Govt. Buildings

The Haryana Government has undertaken an initiative to replace all existing inefficient bulbs and tube-lights in the State with energy-efficient LED bulbs and tube-lights. LED lights are not only energy efficient but also have the longer life than the conventional lights. LED bulb save about 88-91% energy as compared to conventional incandescent bulb and 55-50% as compared to CFL, depends on the lumen's requirement. This ultimately results in reduction of the CO2 emission and helps in safeguarding environment.

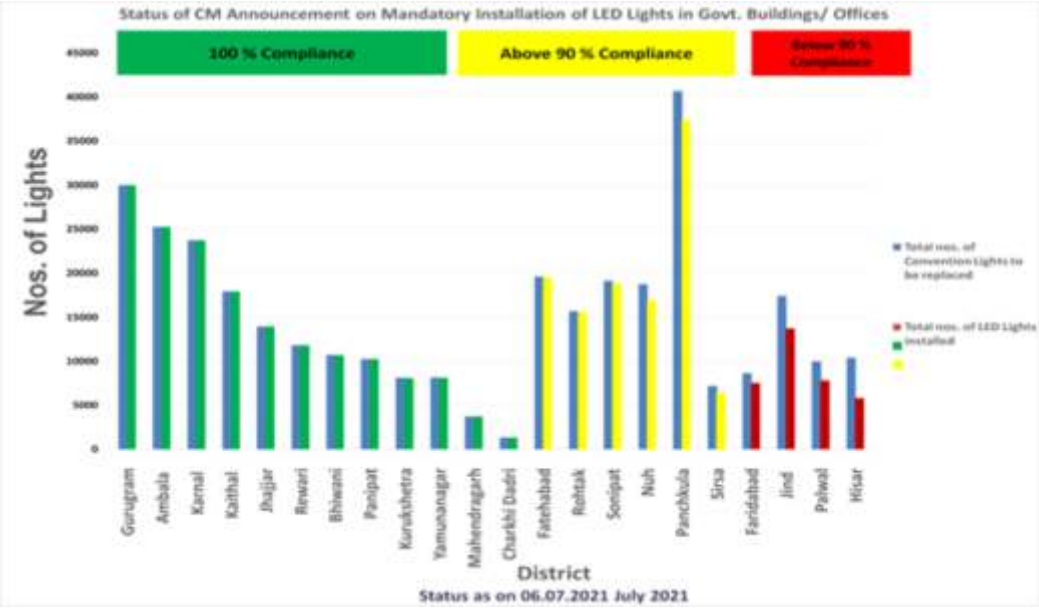
Figure 6: Building of HAREDA

Table 4: Comparison of energy saving through installation of LED bulbs w.r.t. various lighting devices

Present lighting system	Approx. equivalent upgrade system by using LED lights	Potential saving in energy consumption
ICL Bulb 100 W	LED Bulb 9-12 W	88-91 %
Florescent Lamp TL40 W	LED 16-18 W TL	55-60 %
Sodium Vapor 70W	LED 30 W TL	57%
Sodium Vapor 150 W	LED 60 W TL	60 %
Sodium / Metal Halide 250 W	LED 120 W TL	52 %
Sodium 400 W	LED 240 W	40 %
CFL 20 W	LED Bulb 10 W	50%
CFL 11W	LED Bulb 7W	57 %
T5 (28W)	LED Bulb 18 W	35 %

The Department of New & Renewable Energy, Haryana is regularly over-seeing monitoring the replacement of existing inefficient bulbs and tube-lights in the State with energy-efficient LED bulbs and tube-lights. A total of 3.15 lakh nos. conventional indoor and outdoor lights out of 3.32 lakh nos. have been replaced with LED lights. More than 12 districts of Haryana out of 22 nos. districts have already replaced all the conventional lights in Govt. buildings with LED bulbs and LED tube lights. Overall penetration of LED lights in Govt. buildings is more than 94.62%. In addition to this, Municipal Corporations and Urban local bodies are in the process of replacing conventional street lighting fixtures with LED fixtures.

Figure 7: Status of mandatory installation of LED lights in Govt. offices in districts across Haryana



Implementation methodologies: To fulfill the objectives of the mission, the following methodologies were adopted:

- Govt. Decision and instructions were circulated to all the administrative sectaries, Deputy Commissioners by Chief Secretary of Haryana.
- Govt. Decision was circulated to all the HoDs, MDs of Boards and Corporations to comply with the Decision of the Govt.
- The New and Renewable Energy Department, Haryana and HAREDA has formed teams at Head Office Level as well as at District level for conducting initial surveys and for collection of data of conventional lights in Govt. buildings.
- Several meetings were conducted at Govt. level and Department level to execute the directions of the honourable CM.
- Regular follow-ups were made will all the stakeholders.
- Field offices of the department have utilized the services of SAKSHAM Yuvas for conducting survey(s) and for monitoring the status of installation of lights in Govt. offices. To know more about SAKSHAM Yuvas initiative please log on to https://www.hreyahs.gov.in/.

This initiative has annual energy saving potential of approx. 457 lakh units and it is estimated that approx. 32,344 Tons of CO2 emission will be reduced.

4.2. Implementation of Energy Saving Measures in existing Civil Hospitals

The Department of New and Renewable Energy, Haryana/HAREDA has provided financial assistance amounting to Rupees One Lac Only (Rs 1.0 lakh/-) to each District for implementation of Energy Saving measures in District Civil Hospitals after receiving financial support from BEE, GoI. Apart from this, several Energy Saving measures were implemented in 4 nos. Civil hospitals of the State.

Case Study: Civil Hospital, Panchkula

- Located in Sector 6, Panchkula.
- Hospital is equipped with advance health care facilities and well qualified & specialized team of Doctors.
- Connected load of the Hospital is 2,391 kW.

- Energy saving measures were implemented at District Civil Hospital Panchkula , for which financial assistance of Rs 6.33 lakh was provided by HAREDA from BEE, GoI Financial support.
- 1165 nos. of inefficient tube-lights have been replaced with LED tube-lights.
- 340 nos. of inefficient fans have been replaced with BEE five star rated fans.
- Avoided Generation capacity through these measures is approx. 50.44 kW and annual energy saving potential is approx. one lakh units.

Govt. Civil Hospital, Bhiwani

- Located at Krishna Colony, Bhiwani, Haryana
- Hospital is equipped with advance health care facilities and well qualified & specialized team of Doctors.
- Connected load of the Hospital is 1,268 kW

- HAREDA has implemented energy saving measures at Govt. Civil Hospital Bhiwani with expenditure of Rs 6.0 Lakh from BEE, GoI Financial support.
- 2,000 nos. of CFL have been replaced with LED lights.
- 305 nos. of inefficient tube-lights have been replaced with LED tube-lights.
- 340 nos of inefficient fans have been replaced with BEE five star rated fans.
- Avoided Generation capacity through these measures is approx. 48 kW and annual energy saving potential is approx. one lakh units.

Govt. Civil Hospital, Karnal

- Connected load of the Hospital is 557.5 kW
- Energy saving measures were implemented at District Civil Hospital Karnal , for which financial assistance of Rs 3.22 lakh was provided by HAREDA from BEE, GoI Financial support.
- 390 nos. inefficient fans have been replaced with BEE five star rated fans.
- Avoided Generation capacity through these measures is approx. 10 kW and annual energy saving potential is approx. 30 thousand units.

Govt. Civil Hospital, Faridabad

- Connected load of the Hospital is 700 kW
- Energy saving measures were implemented at District Civil Hospital Faridabad , for which financial assistance of Rs 6.0 lakh was provided by HAREDA from BEE, GoI Financial support.
- 351 nos. inefficient fans have been replaced with BEE five star rated fans. 495 nos conventional Tubelights were replaced with LED lights. 1150 nos. CFL replaced with LED lights
- Avoided Generation capacity through these measures is approx. 43 kW and annual energy saving potential is approx. one lakh units.

Karnataka


BIDAR
Bidar
MAHARASHTRA
Gulbarga
TELANGANA
GULBARGA
Bijapur
BIJAPUR
Yadgir
YADGIR
Bagalkote
BELAGAVI
BAGALKOT
GULBARGA
Raichur
RAICHUR
Belagavi
BELAGAVI
KOPPAL
Dharwad
Gadag
GOA
DHARWAD
GADAG
Koppal
Bellary
BELLARY
ANDHRA PRADESH
Karwar
UTTARA KANNADA
Haveri
HAVERI
Davanagere
DAVANAGERE
Chitradurga
SHIMOGA
Shimoga
CHITRADURGA
CHIKBALLAPUR
UDUPI
CHIKKAMAGALURU
TUMKUR
Chikballapur
Udupi
Chikmagalur
Tumkur
BANGALORE RURAL
HASSAN
Kolar
BANGALORE
KOLAR
Hassan
Mangalore
DAKSHINA KANNADA
BANGALORE URBAN
Ramana-gara
MYSORE
MANDYA
RAMANA-GARA
ARABIAN
Madikeri
Mandya
Mysore
KODAGU
MYSORE
CHAMARA-JANAGAR
TAMIL NADU
SEA
Chamarajanagar
Mahé (PUDUCHERRY)
KERALA

5. Karnataka

5.1. KREDL Corporate office building with super ECBC Compliance

To showcase the effectiveness of energy efficient devices and technologies through practical demonstrations in buildings and to facilitate the State Government in replicating these demonstration projects through various departments/agencies.

The new KREDL Corporate office building and Demonstration Park at Nagarbhavi, Bengaluru has been constructed keeping in view the Super Energy Conservation Building Code (ECBC) compliance requirements.

- The Building has two basement and ground +6 floors with the Built-up Area, of 12,362 m^2
- WWR of the building is 34.3% (Window area - 1550m^2 Wall area 4511m^2)
- AAC Blocks are considered for building external walls of the building
- Double Glazing glass with U Value- 1.5 W/m^2 K, SHGC- 0.23 and VLT – 42%
- HVAC/Air Distribution VRF system
- BEE star rated appliances and Electrical Systems

Table 5: Summary of the Project

Particulars	**Design Case**	**Proposed Case**
Total Electricity consumpti on in kWh/Year	17,08,687	8,83,420
EPI kWh/m2/Year	107.9	71.46
EPI Ratio	**0.66**	
Expected energy savings in kWh/year	8,25,267	
Expected energy savings in %	**48%**	
Particulars	**Design Case**	**Proposed Case**
CO2 emission reduction per year in tonnes	685	
Project Cost in Rs.	50.05 crore	51.14 crore
Incremental Cost in Rs.	1,09,64,350.03	
Incremental cost in % w.r.t to the project cost	2.2	
Payback Period	1.9 years	

The Project Cost: Rs. 50.04 Cr and the incremental cost to comply with Super ECBC is around 2.2%. The annual Energy Savings is about 8,25,267 Units and reduction of CO2 is 685 tonnes.

5.2. Implementation of Energy Efficiency projects at selected Govt. Schools/ hostels across the State

Objective:

Promotion of energy efficiency in schools is to make the next generation more aware and conscious about efficient use of energy resources. To imbibe these values at an early age, the students at elemental and higher educational level were taught about the concepts of energy efficiency, sustainability, culture of energy saving and environmental consciousness.

Activity Impact:

More than 15,000 school students have developed consciousness towards energy efficiency and are going to be instrumental in shaping the future of energy landscape of the country. Under this programme, the KREDL has implemented the project at the selected 397 Govt. schools and 29 residential schools and hostels. In this project, the KREDL has actually implemented the project at the ground level which shall be monitored for a period of three years. The following energy efficient electrical gadgets have been installed at the aforementioned Government schools/ hostels.

Table 6: Status of installation of EE gadgets in Government schools

EE Gadgets	Quantity (Nos)
20 W LED Tube lights	12,401
9 W LED Bulbs	4,118
50 W EE Fans	1,857
35 W & 80W LED Street lights	525 & 360
24 W LED Street lights	650

Benefits:

- Annual Energy Savings - 17,96,060=00 kWh
- Annual Ton of Oil Equivalent Savings - 154.46 Toe
- Reduction of CO2 emission mitigation - 1472.76 tons /Year
- 397 Govt. schools & 29 residential schools benefited with better illumination & cordial atmosphere.
- Reduce energy costs & Increase security and safety.
- Opportunity to introduce students to important energy and environmental issues.
- Improve student performance & Improved learning environment.

5.3. Implementation of energy efficient electrical gadgets at Common amenity centers in selected villages under Model Energy Efficient Village Campaign Programme

Objective:

To showcase the energy saving benefits to the local authorities and make the general public more aware about efficient use of energy resources by replacing low energy efficiency Electrical gadgets with energy efficient electrical gadgets.

Activity Impact:

Based on the post implementation audit conducted by the SDA along with the vendor, it was observed that the replacement drive resulted in annual savings of 2.65 Lakh kWh, equivalent to 22.819 TOE of energy is saving. Under this programme, the KREDL has implemented the project at common amenity centers across the five grama panchayaths (25 villages) of Holalkere taluk, Chitradurga dist. In this village campaign project, the KREDL has essentially implemented the project at the ground level which shall be monitored for a period of three years. The following energy efficient electrical gadgets have been installed at the selected villages.

Table 7: Status of installation of EE gadgets in selected villages

EE Gadgets	Quantity (Nos.)
20 W LED Tube lights	1,220
9 W LED Bulbs	1,080
50 W EE Fans	496
80 W LED Street lights	480

Benefits:

- Annual Energy Savings – 2,65,344 kWh
- Annual Ton of Oil Equivalent Savings – 22.82 Toe
- Reduction of CO2 emission mitigation – 217.58 tons /Year
- More than 25 villages common amenity centres like Govt. Hospitals, Post offices, Panchayath offices, Govt. Schools, Anganwadis, Temples, Samudayabhavana, Milk diaries, other Govt. office/ Service centers benefited with better illumination & cordial atmosphere.
- Reduce energy costs & Increase security and safety.
- Opportunity to introduce general public to important energy and environmental issues.
- Improve working performance & contributed to clean environment.

Kerala


Kasaragod
KASARAGOD
KARNATAKA
KANNUR
Kannur
Mahe
(PUDUCHRRY)
WAYANAD
Kalpetta
KOZHIKODE
Kozhikode
MALAPPURAM
Malappuram
PALAKKAD
Palakkad
TAMIL NADU
Thrissur
THRISSUR
ERNAKULAM
Kakkanad
IDUKKI
Painavu
ARABIAN
KOTTAYAM
Kottayam
Alappuzha
ALAPPUZHA
PATHANAMTHITTA
Pathanamthitta
SEA
KOLLAM
Kollam
THIRUVANAN-
THAPURAM
THIRUVANANTHAPURAM

6. Kerala

6.1. Webinar calendar for Kerala

Energy Management Centre –Kerala ("EMC") has organized a webinar series titled "Energy Efficiency in all Walks of Life – from lamps to Boilers" from 5th June 2020 to 22nd March 2021. As part of the webinar series, EMC has prepared a webinar calendar which has been published on the EMC website and their social media handles. EMC has also forwarded the calendar to all the stakeholders as well as all Government Departments. The advantages of preparing webinar calendar are:

- Ease of conducting webinars, since it is already scheduled and identified the resource persons.
- Participants get an overall idea of webinar timings, duration, area, and topics covered as well as the profile of resource persons.
- Since the timing of the webinars are published well in advance, the participants can schedule their activities accordingly to attend the webinar.
- Circulation and notification of the program gets convenient.
- Resulted in creating a pool of resource persons.
- Since the dates are allocated for one year, it is convenient to conduct them without affecting day to day activities.
- Reduced background works for each webinar, thereby reducing the working time to conduct the webinar.
- Easy to prepare reports after conduct of webinar.

6.2. Energy efficient Fire & Rescue Buildings of Kerala

Around 98 buildings were identified, and the list was handed over to EMC by the Kerala Fire and Rescue Department. As the 98 buildings are LT consumers, the preliminary energy audit of these buildings was performed through EMC empaneled energy audit firms. The preliminary energy audit has been completed. Implementation of energy conservation opportunities have been initiated which include the following activities.

- Replacing all inefficient lamps with energy efficient LED lamps.
- Replacing all inefficient ceiling fans with BEE star rated fans.

Madhya Pradesh

7. Madhya Pradesh

7.1. MoU with Rajiv Gandhi Proudyogiki Vishwavidyalaya (RGPV), State Technical University

RGPV has been engaged for following activities:

I. Development of course curriculum for Technical Institute on Energy Efficiency, Energy Conservation, and Energy Management for all streams at
   - BE (Graduation & Post Graduation)
   - Polytechnic
   - ITI level

ii. Formation of Energy Club in Engineering and Polytechnic colleges across the state

iii. Development of tip sheets/brochures on Energy Conservation in English and Hindi providing information regarding efficient use of utilities for Engineering Colleges, Diploma engineering & ITI students

Implementation status:

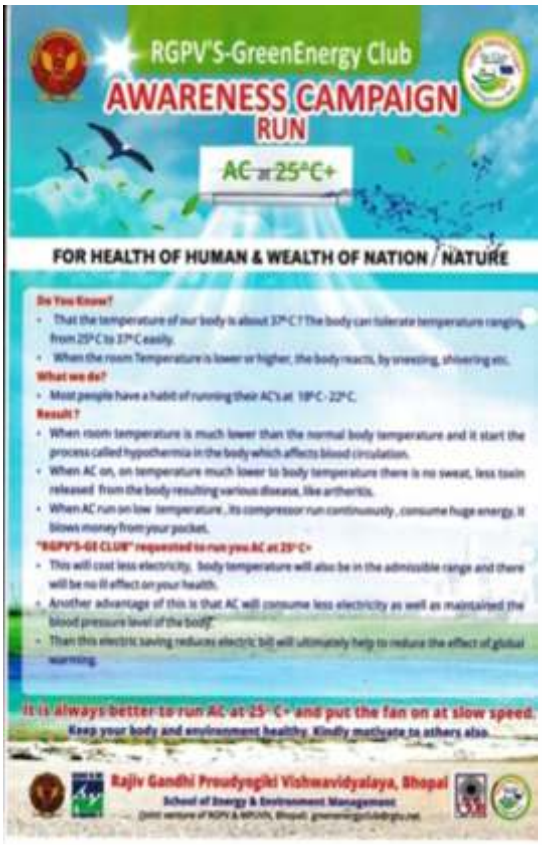
I. Draft course curriculum for technical institute for Energy Efficiency, Energy Conservation and Energy Management for all streams at BE/Polytechnic/ITI level has been received and comments have been given.

   Status: Syllabus has been approved by academic council and executive council.

ii. 21 green energy clubs have been formed/instituted at various technical institutes across the state.

   Status: Various activities like Elocution competition/ Debate competition/ Quiz competition/ Slogan competition/ Essay competition are being conducted on regular basis. Innovation ideas in the field of energy conservation and energy management are also been taken.

iii. Formation of tip sheet and brochures are under final stage of consideration.



7.2. Charging Infrastructure for E-Vehicle

Charging Infrastructure for EVs were set up in 2017 for Demonstration Purpose.

i. 3 Nos. of AC charging infrastructure.

ii. 1 Nos. of DC charging infrastructure.

- Charging infrastructure has been setup in in state secretariat for charging of Vehicles.
- DC charger is being used in our office premises for charging of six E-Vehicles.
- One AC charger located in the vicinity of our office premise is being placed for public charging.
- Charging is being done through solar energy.
- Wide publicity has been done across the state.

Key Features AC charger:-

AC Supply System	3 - Phase, 5 Wire AC System (3Ph. + N+PE)
Nominal Input voltage	3ø, 414V (+6% and - 10%)
Input Frequency	50Hz
Input Power	15KVA

Key Features DC charger:-

AC Supply System	3 - Phase, 5 Wire AC System (3Ph+N+PE)
Nominal Input voltage	3ø, 415V (+6% and - 10%)
Input Frequency	50Hz
Input Power	20KVA

7.3. Energy Club in Government Schools

i. 466+ energy clubs formed in government schools

ii. 45 districts of the state covered through MPUVN's network of District Renewable Energy Officers.

Objectives:-

- Sensitizing the students on use of energy efficient gadgets and appliances.
- Increasing awareness of students for efficient use of electricity.
- Sensitizing students on the relevance & significance of energy conservation.

Implementation:-

Step 1- Sensitization of students and teachers through lectures by our DREO's.

Step 2- Appointment of energy leader (Teacher), energy monitor (student).

Step 3- Energy Assessment of the school premises through energy assessment booklet developed by MPUVN.

Step 4- Distribution of energy efficient gadget (Name Gadgets – LED Bulbs / LED Tube light / Energy Efficient Fan) based on energy assessment study done by the students.

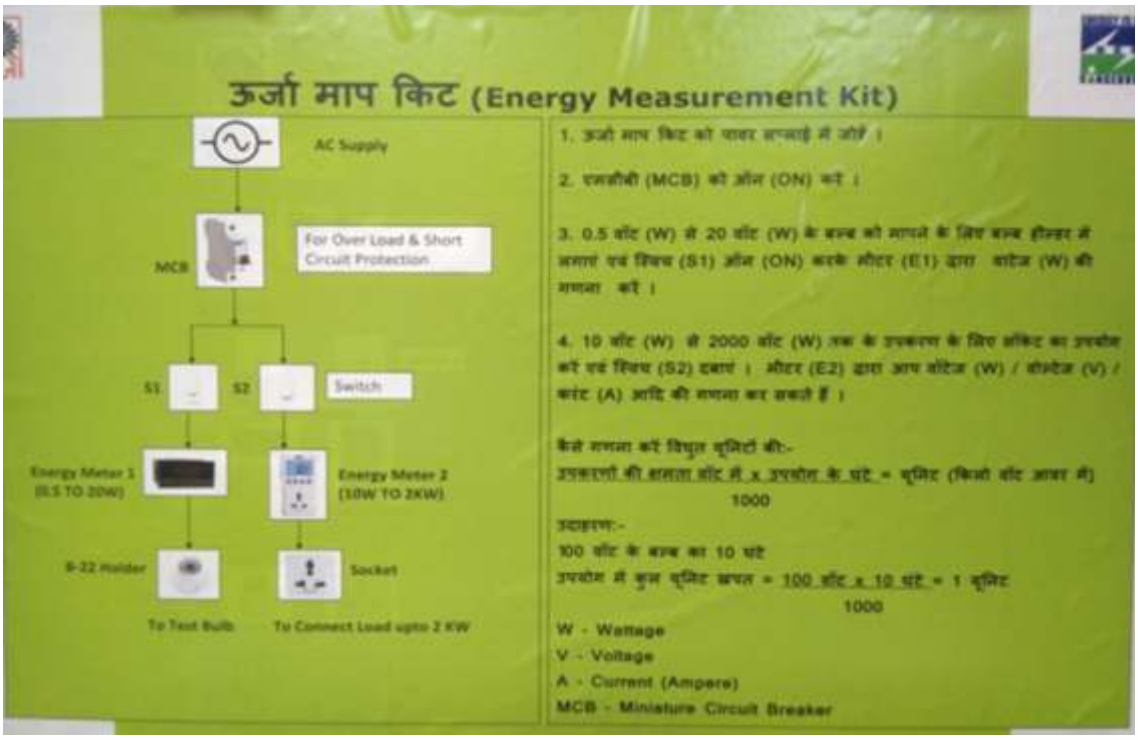
Step 5- Various activities like Elocution competition/ Debate competition/ Quiz competition/ Slogan competition/ Essay competition are being conducted on regular basis.

Step 6- Impact assessment

Energy Audit Booklets (including Energy Calculator):-

Energy Measurement Kit:

- It can calculate energy consumption of various electrical devices ranging from 0.5W to 2000W.
- The Kit has two energy meters with range of one meter as 0.5 W to 20 W and for another meter as 10 W to 2kW.
- This kit will be vital for students to monitor/measure energy consumption of the devices by themselves.
- Directions for use of Kit have been clearly mentioned.



7.4. Expression of Interest for appropriate technology-based applications or solutions for improvement of energy efficiency in appliances and equipment

The EOI has been floated in order to assess and establish merits, scalability, adaptability, affordability and transferability of suitable new, emerging or established technologies which can add significant value to efficiency improvements in appliances and equipment utilized by various consumer segments.

Proposal score guide	Score					
	0	1	2	3	4	5
Technology	Technology risk is high		Technology risk is moderate		Proven technology and risk is low/ no risk	
Innovation	Not innovative in national or international market		Not innovative in national market but or moderately innovative in international market		Moderately national technology and well demonstrated in international market	

Project	Project not developed at all and least chance of delivery sooner	Project partially developed and able to move forwards fairly quickly	Project well developed and deployable/ implementable within a year on ESCO
Commercial	No real commercial benefits in terms of energy efficiency; not eligible for commercial funding in India	Moderate commercial benefits in terms of energy efficiency; possible eligibility for commercial funding in India	Strong commercial benefits in terms of energy efficiency; eligible for commercial funding in India
Proponent	Very limited financial, technical or project delivery capacity of project proponent	Moderate financial, technical or project delivery capacity of project proponent	Robust financial, technical or project delivery capacity of project proponent
Market	Start - ups/ R&D level evolution; not scaled operations	Some producers/organizations active; successful demonstration projects at many locations	Established market; multiple producers/ suppliers

7.5. Innovation challenges for Energy Efficiency Projects

- "Innovation Challenges in energy systems to increase energy efficiency", in collaboration with the state technical university.
- The initiative has been introduced to promote Energy Management and Energy Conservation Technologies through various innovative ideas of students/scholars across the state.

Criteria of the scheme:-

- Projects for mass application.
- Technologies for Easy implementation.
- Technical and economical viabilities.

Application/Proposal invited for Innovations in the following areas:-

- Renewable Energy based System and technologies.
- Energy Conservation in Building / Equipment.
- Energy Efficiency opportunities in Domestic/ Agriculture/Transport/ Rural House Hold Sectors.
- Energy Efficiency opportunities in Space conditioning / Refrigeration.
- Energy Efficiency opportunities in Pumping & Motors.

Implementation Procedure:-

Submission of Applications/proposals.

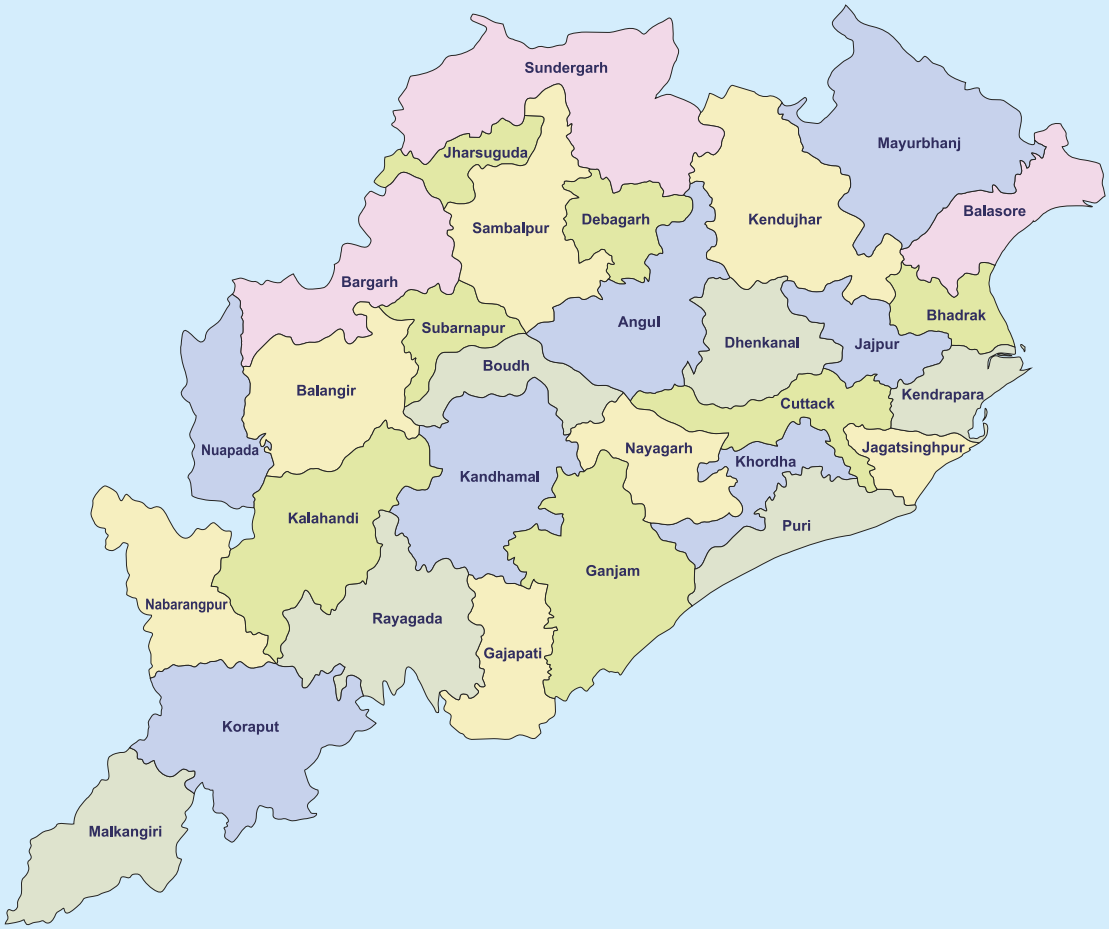
Announcement of 10 participants selected by Expert Committee

Power Point Presentation

Announcement of finalist

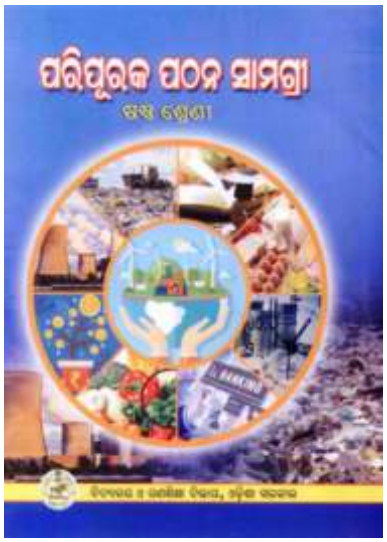
Selection of winner/ Prizes (1^{st}/2^{nd}/3^{rd} and Consolation Prizes)

Odisha

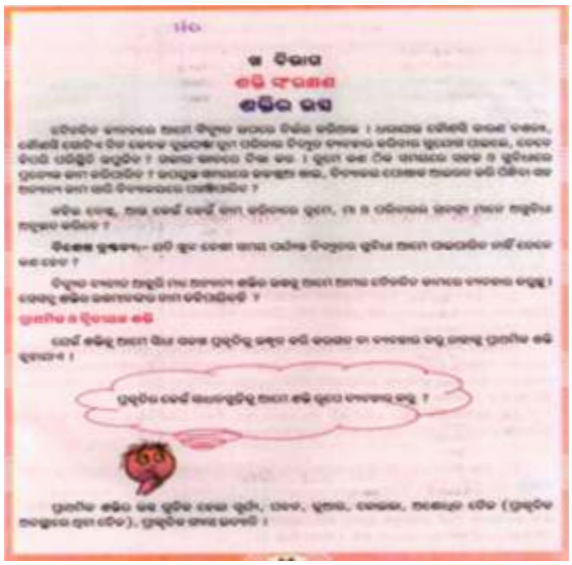

Sundergarh
Mayurbhanj
Jharsuguda
Sambalpur
Debagarh
Kendujhar
Balasore
Bargarh
Subarnapur
Angul
Bhadrak
Dhenkanal
Jajpur
Boudh
Balangir
Cuttack
Kendrapara
Nuapada
Nayagarh
Khordha
Jagatsinghpur
Kandhamal
Kalahandi
Puri
Ganjam
Nabarangpur
Rayagada
Gajapati
Koraput
Malkangiri

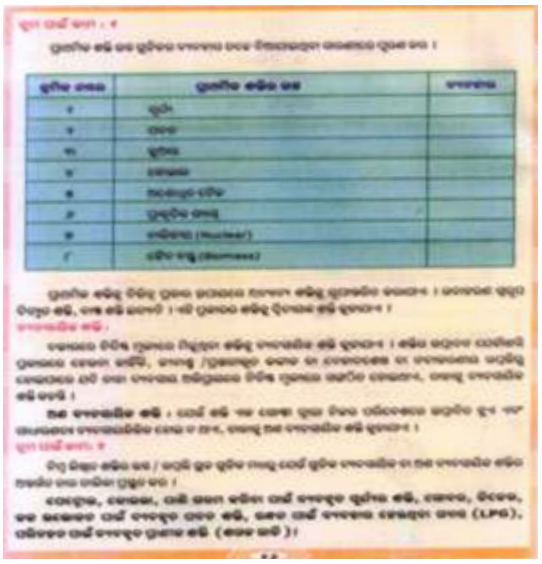
8. Odisha

8.1. Inclusion of chapter on energy efficiency in school curriculum of state education Board



Under school awareness programme, SDA Odisha has been implementing many initiatives for encouraging and motivating school children to build critical thinking with respect to energy conservation and energy efficiency. Adding another maverick initiative to the endeavor, SDA Odisha has successfully introduced a chapter on energy efficiency in the school curriculum of class VI, VII &VIII in Odia language. The aforementioned chapters are added to the supplementary reading material of class VI, VII & VIII for Academic Year 2021 onwards. The course contents have derived its necessary elements from the umbrella Energy Conservation (EC) course content developed by Bureau of Energy Efficiency (BEE) with support from National Council of Educational Research and Training (NCERT) for 6th to 10th standard students. The contents have been developed in an exhaustive and comprehensive manner giving a vivid idea to the young minds about Energy, its justifiable utilization and the need for its conservation. Moreover, with this curriculum, the students are taught about the positive impact of energy conservation and energy efficiency in ensuring sustainable development, mitigating Global Warming and balancing the Climate Change amongst others. School and Mass Education Department, Govt. of Odisha has extended their valuable inputs for conversion of text module in Odia language which is imperative to reach a wider audience. The department shall also seek all the necessary administrative approvals for inclusion of the text module in school curriculum.

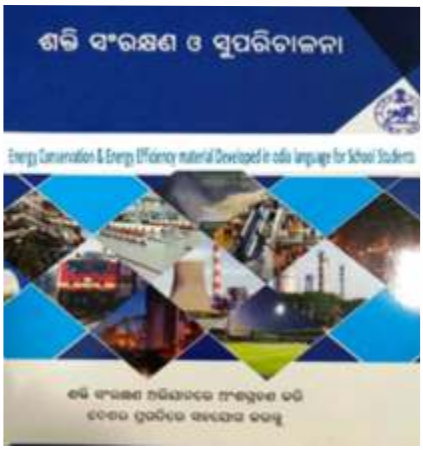




8.2. Creation of 1000 nos. of Energy Club in Odisha

Under Student Capacity Building Programme of BEE, 1000 nos. of Energy Clubs have been instituted in Odisha covering all 314 blocks for the FY-2020-21. The timeline for the implementation of Energy Club programme, proposed fund and fund flow chart have been duly approved by the Energy Department, Govt. of Odisha. Centre for Environmental Studies (CES) under Forest and Environment Dept. has

been assigned the charge of nodal agency for co-coordination and monitoring. CES is managing 11,000 Eco-clubs in the state having a rich foothold in every nuke & corner of the state. Estimated fund amounting to Rs 1.2 Cr. has been released to the nodal agency from state fund for FY-2020-21 to kick start the programme.



Details of activities to be undertaken in Energy Clubs:

i. Conducting training Programs on energy efficiency.
ii. Debate, Quiz & Science competition on energy efficiency.
iii. Organizing skits/plays/dramas on energy efficiency.
iv. Energy Auditing, taking part in the SDA proposed activities from time to time.

Present status:

Teacher's training programmes have been initiated.

8.3. OMFED Energy Efficiency Improvement Project in Dairy Sector: Utilization of State Energy Conservation Fund

Introduction to OMFED:

The Orissa State Co-operative Milk Producers Federation Ltd. (OMFED) was registered on 28th January, 1980 with the Registrar, Co-operative Societies Odisha. The federation operates in the entire state of Odisha through its 11 diaries. Bhubaneswar Dairy is the largest diary amongst the eleven diaries, having present capacity of 3.5 lakhs Ltr. Milk per day. Bhubaneswar OMFED Dairy comprises of two Dairies i.e Dairy-I and II. Initial design capacity was 60 KLPD in the year 1985.

Objectives of IGEA:

The broad objective of Investment Grade Energy Audit (IGEA) was to review the current energy consumption scenario, monitor and analyze of the use of energy and explore the energy conservation options in various load centres of the Dairy including without limitation submission

of a detailed project report containing recommendations for improving energy efficiency with cost benefit analysis and technical specifications for any retrofit options along with the list of suppliers / manufacturers of energy efficient technologies.

Scope:

The scope of the work included a detail study for energy conservation options of various energy sources like Electricity and Fuel oil in the Dairy and recommend actions for reducing the same. The study included:

- Electrical Distribution System,
- Lighting System,
- Heating, Ventilation & Air-Conditioning System (HVAC system),
- Diesel Generator (DG) Sets,
- Water Pumping System,
- Thermic Fluid Heaters / Boilers,
- Motor Load Survey, and
- Energy Monitoring & Accounting System.

Energy Scenario at OMFED Dairy during IGEA:

- Contract Demand – 1394 kVA
- Avg. Monthly Consumption – 2,72,207 kWh
- Furnace Oil Consumption – 2,600 Ltr./day
- Annual Electricity bill was around Rs.1.33 crores (Rs 4/kWh)
- Annual Furnace oil bill was around Rs.3.36 crores (Rs 34,630/tonne)
- Specific Energy Consumption (2009-10): (kWh/Metric tonne of Milk handled) = 56.750

Findings of IGEA:

- It was observed that the maximum electrical energy consumption was for the refrigeration of chilled water generation and for cold rooms. The other significant electrical energy use was for homogenizers, compressed air system and effluent treatment plant equipment.

- It was indicated that there was an energy saving potential of around 28% with an initial investment of Rs 250.95 lakhs, which was later revised to 340 lakhs due to increase in Boiler capacities from 2TPH to 4TPH.

Finance Mechanism and Approval:

- The funding proposal placed before State Level Steering Committee (SLSC) chaired by Principal Secretary, Energy Department for consideration to finance OMFED from Odisha State Energy Conservation Fund (OSECF) under Revolving Investment Fund (RIF) mechanism. The stipulated loan would be an interest free loan to be paid back in 6 years (as per this contract).
- OMFED shall return 50% of monthly energy savings achieved through the energy efficiency project into RIF on a quarterly basis.
- OMFED was required to sign an Energy Performance Contract with the EIC (Electricity) and provide a bank guarantee of matching amount.
- The terms of the contract shall be for a minimum period of 6 years or till the investment is recovered completely from the signing of the contract and can be extended by mutual consent if required.
- OMFED shall commence repayment of minimum 50% of monthly savings computed based on projection of energy saved with the use of energy efficient equipment to RIF, within one month from the date of installation and commissioning of the efficient machineries / equipment.
- If the investment is not returned within the contract period i.e. 6 years, the balance amount shall be returned to the RIF as a lump sum or can be recovered from the bank guarantee if felt necessary by SDA Odisha.
- After the proposal was approved by SLSC, OMFED was sanctioned fund Rs.3.41 Cr, out of which funds of Rs. 1.38 Cr. has been released till date against matching Bank Guarantee (BG) furnished by OMFED.

Works Completion Status:

Sl. No.	Description	Date of Completion	Funds Invested in Rs	Monthly Savings in Rs
1	Power factor improvement	Apr-2015	2,50,608	30,000
2	Replacement of FDC in cold store	July-2016	14,65,786	49,549
3	Replacement of ammonia compressor	July-2017	43,00,128	5,36,760
4	Reduction of contract demand		60,069	98,800
5	Replacement of FTL, SV lamp and Metal Halide lamp both indoor and outdoor lighting.	Aug-2016	3,48,029	36,900
6	4MT Boiler Room Civil work	April-2019	33,99,984	-

Completed but running under trial runs:

Sl. No.	Description	Date of Completion	Funds Invested in Rs	Monthly Savings In Rs
1	4MT Boiler and Machineries	April-2021	40,02,894	28,00,000

Ammonia Compressors

Force Draft Coolers

Boilers

Figure 8: Glimpses of EE improvement project in OMFED Dairy, Bhubaneswar

8.4. Odisha State Energy Conservation Awards

The Odisha State Energy Conservation Award (OSECA) which was launched in 2015 is expected to promote a state level recognition to the selected entities that have made systematic and continued attempts for efficient utilization and conservation of energy in previous years. The scheme envisions a multiplier effect that will help other enterprises and stakeholders working in the area of energy conservation in the State to emulate the success stories of these award-winning units.

The process starts with constituting of an awards committee comprising SDA Officials, External organizations like NPC, DISCOMs etc. Thereafter, an advertisement is published in various leading English and Odia newspapers, SDA Website and also websites of DISCOMs. Consequently, all the forms and information documents are uploaded on the website of SDA Odisha. Sample of the forms and information sheets are presented below:

GOVERNMENT OF ODISHA

OFFICE ORDER

1.	[illegible]	Chairman
2.	[illegible]	Member
3.	[illegible]	Member
4.	[illegible]	Member
5.	[illegible]	Member
6.	[illegible]	Member
7.	[illegible]	Member Convenor

OFFICE OF THE ENGINEER-IN-CHIEF, ELECTRICITY-CUM-PRINCIPAL CHIEF ELECTRICAL INSPECTOR (ODISHA)
POWER HOUSE SQUARE, UNIT-V, BHUBANESWAR
TEL. NO:0674-2394873, Fax: 2391255/ 2391024
Email: sdaorissa@nic.in/eic-epces@nic.in

Bureau of Energy Efficiency

Department of Energy

INVITING LEADERS IN THE FIELD OF ENERGY CONSERVATION OF ODISHA

Odisha State Energy Conservation Awards-2019

The Office of Engineer-in-Chief cum Principal Chief Electrical Inspector under The Department of Energy, Govt. of Odisha, as the State Designated Agency (SDA), Odisha invites applications from IT Industries, Commercial Buildings Hospitals, Educational Institutions, , Hotels, MSMEs, Power Generation Companies (IPP & CPP) and Domestic prosumers (consumers with grid connected roof top solar power generation) of Odisha who have been making systematic attempts for efficient utilization and conservation of energy, for conferring State Energy Conservation Awards for 2019 based on their performance during Financial Year 2018-2019. The last date of receipt of completed applications is **7th December 2019.**

For further details and to download the application forms, please visit the website: eicelectricityodisha.nic.in Email-: sdaorissa@nic.in

The authority reserves the right to accept / reject any application without assigning any reasons thereof.

EIC(E)-cum-PCEI & SDA (O)

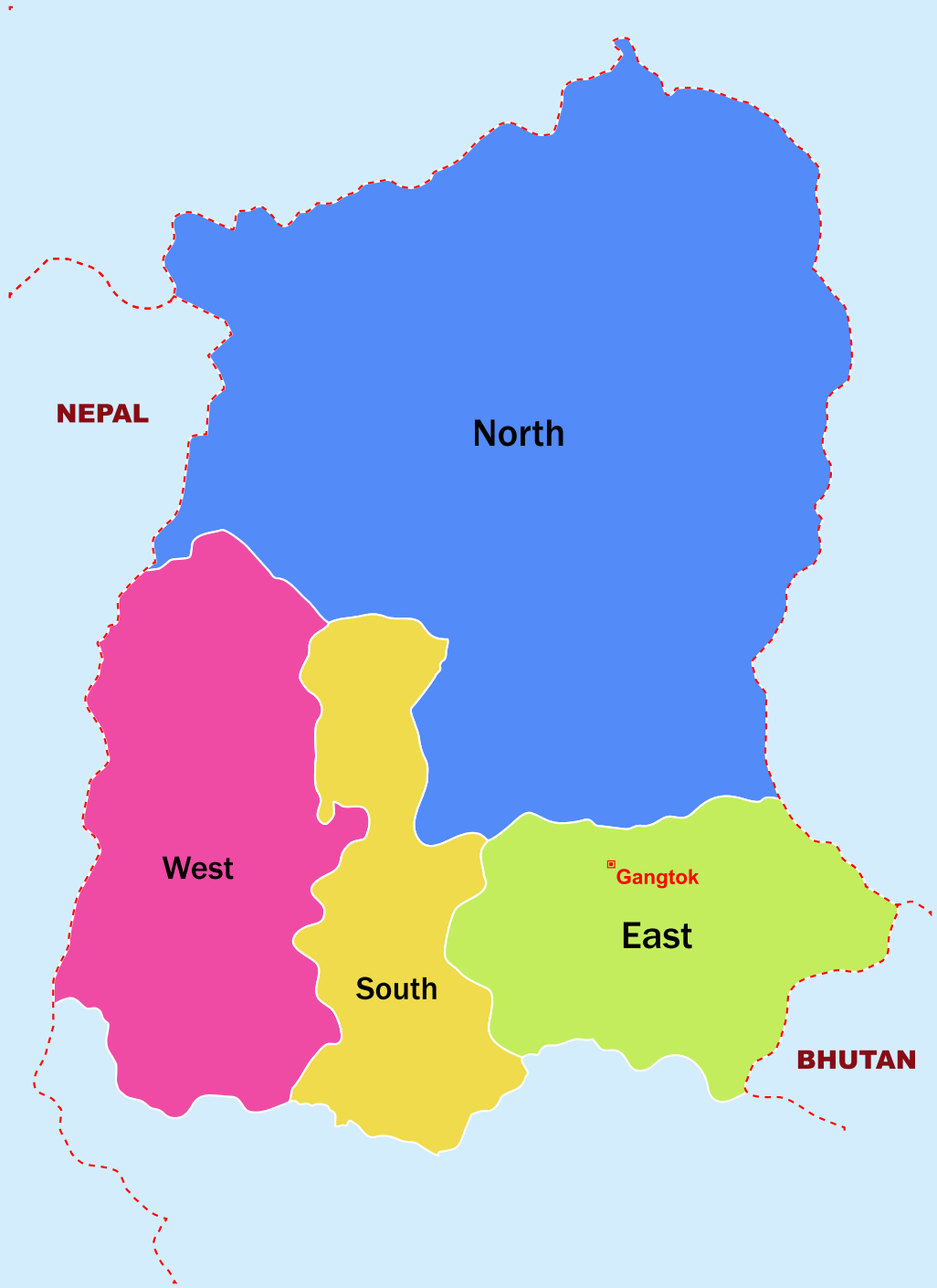
After nominations are received, evaluation is carried out by committee. Sample evaluation sheet is presented below which is graded as per evaluation criteria uploaded on portal beforehand so that all participants know in advance.

The Award winners are invited to the State Level celebrations of the National Energy Conservation Day on December 14th which is usually presided over by Hon'ble Minister, Energy, Govt of Odisha and Principal Secretary, Energy Department, Odisha. The prestigious awards carry a plaque and a citation. A brief description of the energy saving activities they have carried out is also presented.

The activities carried out by the Award recipients are published in the report and circulated among various stakeholders.

Press briefings and media coverage are released to showcase the award winning entries and to spread the message of Energy Conservation.

Sikkim



9. Sikkim

9.1. Energy Efficient Appliances Loan

The State of Sikkim has undertaken various initiatives to promote the efficient use of energy and its conservation in the State. The Central Govt. supported SDAs in preparation of action plan, building institutional capacity of SDA, to perform their regulatory, developmental and promotional functions in their respective states, by way of technical assistance, guidance and funding etc. SDA has been supported to develop a five-year Energy Conservation Action Plan, customized to local needs aiming at and delivery of the EC Act mandates.

Through this fund State Designated Agency, Sikkim have conceptualized a scheme called "Energy Efficient Appliances Loan" to encourage power consumers to procure energy efficient electrical appliances through this scheme.

The schemes "Energy Efficient Appliances Loan" have the following features for implementation:-

a) The State Designated Agency, Sikkim shall provide fund to the financial institution for disbursement of loan.

b) Performa invoice of appliances shall verify and recommend by SDA, Sikkim.

c) Limit of maximum loan amount shall be Rs 1.00 lakh only.

d) Maximum loan period is only for 3 years.

e) Financial institution shall be responsible for recovery of loan.

f) Loan shall be given for the above listed appliances with 5 stars label only.

g) Schemes is for only C & D grade government employees.

h) Financial institution shall be responsible for delivery of only approved or recommended appliances from the dealers with digital supporting documents or photos with the product.

i) State Designated Agency, Sikkim shall have legal right to verify the products at the premises of borrower.

j) State Designated Agency, Sikkim shall disburse interest free grant of Rs 1.00 crore to the financial institution in first phase.

k) Financial institution is required and obligated to repay the instalments on monthly basis from the fund recovered from borrowers and remit it to the account of State Energy Conservation fund. Sikkim State Co-operative Bank Ltd, Gangtok along with detail statement of fund.

l) Financial institution may levy one-time administrative charges @ 3% only on loan amount to the SDA.

m) Reconciliation of fund shall be done quarterly between FI & SDA.

n) This scheme shall be launched for the employees of the west district in first phase.

Uttarakhand

10. Uttarakhand

10.1. Utilization of State Energy Conservation Fund

Under the Energy Conservation Act-2001, the Uttarakhand Govt. has established the Energy Conservation Fund in 2013 and subsequently an EC fund rules were formulated for Uttarakhand. To operationalize the State Energy Conservation Fund (SECF), a State Level Steering Committee (SLSC) has been constituted for the purposes of regulating and controlling the fund under able Chairmanship of Chief Secretary, Uttarakhand. As per the SECF rules, a separate fund is required to be earmarked as Revolving Investment Fund ("RIF") for undertaking energy efficiency projects in the state.

This RIF may be used to finance the implementation of energy efficiency projects in the building of Central Govt, State Govt, Central or State Government undertakings among others. Additionally, RIF may also be needed/utilized for financing the energy efficiency public utility projects such as street-lighting or common area lighting projects, public drinking water pumping stations. UREDA has implemented the following projects from RIF Fund:

- Replacement of existing inefficient pump sets with energy efficient pumps at the various drinking water schemes operated by Uttarakhand Jal Sansthan.
- Energy Audit and implementation of Energy Audit Recommendations in the SMEs of Uttarakhand through interest free loan.

Replacement of existing inefficient pump sets with energy efficient pumps in the various locations of Uttarakhand Jal Sansthan

A. Replacement of 2 Nos. of existing inefficient pump sets with energy efficient pumps of Jincy pumping station- II at Mussoorie by Uttarakhand Jal Sansthan. Total cost of the project was 60.00 Lacs. Project investment was commissioned through Revolving Investment Fund. Uttarakhand Jal Sansthan is required to repay the fund to UREDA in the form of achieved savings. The replacement of 2 Nos. of inefficient pumps with energy efficient pumps has resulted in saving of approx. 32000 units. The savings have been achieved by improving the efficiency of the existing pumps by efficient pumps from 47.4% to 58.7%. The energy efficient pumps were installed in December 2017 and January 2018, respectively.

B. Replacement of 2 Nos. of existing inefficient pump sets with energy efficient pumps of 1.5 MLD scheme at Pauri by Uttarakhand Jal Sansthan. Total cost of the project is 62.60 Lacs. The project was financed through Revolving Investment Fund. Uttarakhand Jal Sansthan repaid to UREDA in the form of achieved savings. Estimated saving from the project is Rs. 20.00 lac per month.

C. Replacement of 2 Nos. of existing inefficient pump sets with energy efficient pumps of 1.5 MLD scheme at Masso, Srinagar-Pauri by Uttarakhand Jal Sansthan. Total cost of the project is 67.89 Lacs. Project was financed through Revolving Investment Fund. Uttarakhand Jal Sansthan repaid to UREDA in the form of achieved savings. Estimated savings from the project is Rs. 10.99 lac per month.

Photographs of Jincy Pumps installed at Mussoorie

Table: The details of savings by installation of energy efficient pump sets of Jal Sansthan

Sl. No.	Name of Scheme	Name of Pump House	Estimated Cost (Rs In Lacs)	No. Of Pump set instal led	Discharge of Pump (PLM)		Average Monthly Energy Expense (Rs In Lacs)		Energy Saving (Monthly) (Rs In Lacs)	Energy Saving (Yearly) (Rs In Lacs)	% Monthly Energy Saving
					Old Pump	New Pump	Old Pump	New Pump			
1	2	3	4	5	6	7	8	9	10	11	12
1	Jincy Pumping scheme	Jinci Stage IInd	60.00	2	900	1200	11.59	9.84	1.75	21.00	15.10
2	Srinagar-pauri 1.50 MLD Pumping Water Supply Scheme	MPS Srinagar	62.60	2	700	1500	3.69	2.04	1.65	19.80	44.72
		IPS Masso-IInd	67.89	2	700	1500	3.63	2.13	1.50	18.00	41.32
Total			**190.49**	**6**			**18.91**	**14.01**	**4.90**	**58.80**	**25.91**

A. UREDA and Jal Sansthan have conducted a third party inspection of installation sites by University of Petroleum and Energy Studies for the performance check of the pumps.

Before implementation of the program at Srinagar-Pauri scheme

To explore the possibilities of Energy Saving in pump-sets of 1.5 MLD scheme at Srinagar-Pauri, Uttarakhand Jal Sansthan (UJS) approached Uttarakhand Renewable Energy Development Agency (UREDA) to conduct Investment Grade Energy Audit (IGEA) of Two numbers of pumps each at Srinagar and Chatkot where Energy Audit was conducted to know the present energy consumption and efficiency of the pumps along with the recommendations mentioned by the Energy Auditor.

Based on the Energy Audit, following were the recommendations of Energy Auditor in IGEA report

- Replacement of 02 Nos. of inefficient pumps by energy efficient pumps each at Srinagar and Chatkot.
- Training of pump operators.
- Proper instrumentation to monitor the performance of the pumping units.
- Improvement in pre-filtration of raw water so as to reduce wear and tear of impeller through construction of sedimentation basins and rapid sand filtration units.
- Improvement in the power factor.

After conducting energy audit and following the recommendations of the Energy Auditor, UJS has installed two numbers of Energy Efficient pumps each at Chatkot.

After implementation of the program at Srinagar-Pauri scheme

The Energy Audit of energy efficient pumps was conducted by M/S University of Petroleum and Energy Studies, Dehradun jointly with Uttarakhand Renewable Energy Development Agency (UREDA) in the month of October 2017 at Srinagar and Chatkot.

On comparison of two stages it is inferred that efficiency level has improved from 47% to 71% for Srinagar pumps and efficiency level

has improved from 51% to 71% for Chatkot pumps which is clear indicator of improvement in energy efficiency and is in line with the performance mentioned in the IGEA report.

Details of RIF fund used in 05 SMEs for the implementation of Energy Audit Recommendations:

In order to improve energy efficiency amongst the Industrial consumers, interest free loan was provided to SME industries from RIF for carrying out the energy audit and implementation of energy efficient measures. The total RIF fund was divided in such a way that 20% of the total amount was to be used for energy audit and 80% of the total amount was to be used for the implementation of energy audit recommendations. The loans were disbursed in such a manner that 100% of the amount was to be released for conducting the Energy Audit and 50% of amount or maximum upto 25 Lakh Rupees, whichever is lower, was to be released for the implementation of the energy conservation measures as recommended by Energy Auditor in the report only after the evaluation by UREDA. Total 5 industries were provided the interest free loan as per the following details:

Sl. No.	Name of the Firm & Address	Investment made in Rs. Lakhs	Annual Savings in (kWh)	Annual Monetary Savings in Lakhs	SPP (Years)	50% or upto Rs. 25 Lakhs whichever is minimum		Received Amount from industries (in Rs.)
						50% (in Rs.)	Upper Limit Rs. 25 Lakhs (released amount) (in Rs.)	
1	M/s 'Rhydburg Pharmaceuticals Ltd., Dehradun, C-2 & 3 SIEL, Selaqui Dehradun Uttarakhand - 248197	54.37	174114.8	26.18	2.08	27.19	25.00	25.00
2	M/s 'Agarwal Drugs Pvt. Ltd., SIDCUL Haridwar, Plot No. 24, Sector 6 B,I.I.E, Sidcul, Haridwar	55.76	147604	25.5	2.19	27.88	25.00	25.00
3	M/s 'Affline Steel Pvt. Ltd. SIDCUL Haridwar, Plot No. 98 Sec-7 Sidcul Haridwar	76.3	1235888	88.6	0.86	38.15	25.00	25.00
4	M/s 'DurgaPolyplast Pvt. Ltd., SIDCUL Haridwar, Plot No.116 Sector 6A Sidcul Haridwar	56.5	587774	33.5	1.69	28.25	25.00	25.00
5	M/s 'RA Brothers, SIDCUL Haridwar Plot No. 22, sector -7, iie, Sidcul Haridwar 249403	19.63	10816	8.89	2.21	9.82	9.82	9.82
	Total	**262.56**	**2156196.80**	**182.67**		**131.28**	**109.82**	**109.82**

Uttar Pradesh

11. Uttar Pradesh

11.1. SDA Website: www.upsavesenergy.com

A dedicated website i.e. www.upsavesenergy.com for UP SDA has been developed, through which Energy Saving Campaign has been started in the year 2015. The objective of this campaign is to motivate and train the students, teachers and guardians for Energy Conservation. UPSDA has also distributed awards and certificates to schools under this campaign that had reduced the energy consumption of their campus and also motivates society to do so. In the year 2019, UPSDA has extended this campaign for Industries & Buildings establishments and this campaign was converted from one vertical (School up to 12 Class) to two vertical as Educational Institutions: School up to class 12(Vertical 01) & Organization other than Educational Institutions (Vertical 02). Before the extension of the Energy Saving Campaign, UPSDA has also conducted State Energy Conservation Award for Industries, Buildings, Financial Institutions and Architects in 2016, 2017 & 2018. From the Year 2021 onwards, UPSDA has decided to conduct Energy Saving Campaign through Uttar Pradesh State Energy Conservation Award. Initially, this award is to be distributed in the following 10 categories on the basis of reduction in energy consumption as well as how the participants motivate the society for energy conservation.

- Schools up to class 12th
- Industries (Connected Load upto 1 MW)
- Industries (Connected Load More than 1 MW)
    - Fertilizer, Chemical, Chlor-Alkali, Paper & Pulp
    - Cement, Aluminium, Iron-Steel, Textile, Automobile
    - General Group (Consumer Goods, Dairy, Drugs & Pharmaceuticals, Food Processing Unit, Refinery, Petrochemicals, Foundry etc)
- Thermal Power Plant
- Sugar Industries
- Commercial Building (Connected Load Upto 100 KW, not less than 20KW)
- Commercial Building (Connected Load above 100 KW)
- Higher Educational Establishments (University, Professional Institutions, Colleges, Polytechnics etc)
- Govt. Building

- o Connected Load 20KW and above
- Financial Institutions

The outcome from Energy Saving Campaign through website www.upsavesenergy.com:

- More than 14000 schools have benefited by website.
- More than 1000000 students have been trained for Energy Conservation.
- More than 500 Energy Club have been established in schools.
- More than 5000 teachers have been trained across the State for Energy Conservation.
- More than 300 on-campus training programs have been organized on Energy Conservation.
- More than 350 on-campus Gosthi programs have been organized on Energy Conservation.
- More than 1000 Organizations / Building Establishments / Industries are registered on the website.
- More than 100 Awards have been distributed for the "Energy Saving Campaign" through the website.
- More than 500 subscribers have been registered as a subscriber.

Agriculture Demand Side Management (AgDSM):

- More than 5000 nos. of agriculture pumps have been replaced by energy-efficient submersible pumpsets with smart panels.
- UPNEDA have signed MoU with Petroleum Conservation Research Association (PCRA) for conducting several awareness workshops for the agricultural sector wherein the farmers are trained about on electric and diesel pumps among other things. Till date, about 560 energy efficiency training workshops were organized in which attended by about 17000 farmers.

Energy Efficiency Curriculum in Polytechnic.

Energy Efficiency curriculum was developed in 2018. The exhaustive curriculum was made mandatory for all courses of Engineering Diploma Courses in Uttar Pradesh starting from July 2018 batch for the fourth semester. Moreover, three Training programs with duration of three days each were organized to train Teachers of 166 Government Polytechnics to equip them to instruct and teach the energy efficiency subject efficiently.

BUREAU OF ENERGY EFFICIENCY (BEE)
A statutory body under Ministry of Power, Government of India
4th Floor, Sewa Bhawan, R.K. Puram, New Delhi-110066 (INDIA)
Ph: 011-26766730, 011-26194771, 772 | Fax: +91 11 26178352
www.beeindia.gov.in /beeindiadigital /beeindiadigital