Bureau of Energy Efficiency

सत्यमेव जयते
Government of India
Ministry of Power

german cooperation
DEUTSCHE ZUSAMMENARBEIT

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THIS PRESENTATION WAS SHARED BY

Hanumanta Ayeppa

KREDL

FOR THE SESSION:

“Policy Implementation and Enforcement”

DURING ANGAN 2019

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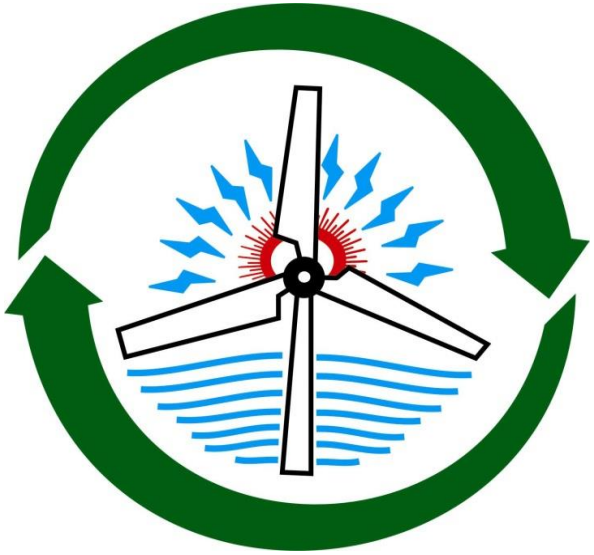
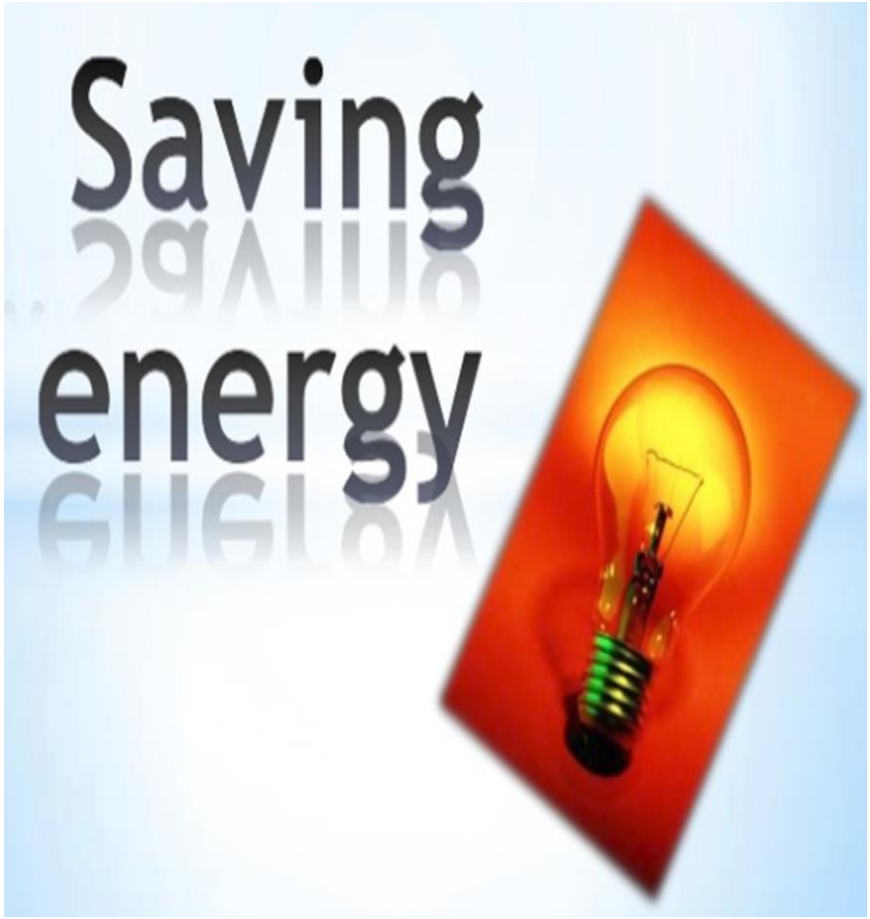


KARNATAKA RENEWABLE ENERGY DEVELOPMENT LIMITED

(KREDL)


Saving
energy


ENERGY
EFFICIENCY
FOR A
SUSTAINABLE
FUTURE

Energy Conservation and Energy Efficiency

- The human society has seen through four levels of fuels. The first fuel is **wood**, second fuel is **oil**, the third fuel is **nuclear**, the fourth fuel is **green sources**, like solar, wind etc.

  Now, we are already talking of the **fifth fuel**? Which is not a hardware fuel in the conventional sense? It is **Energy Efficiency**.

- The Energy Conservation and Energy Efficiency is the c**heapest, easiest and fastest** way to save energy. The reason is
  - To set up a power plant it takes – **5 years**
  - To set up a Transmission line it takes – **1 year**.
  - To plan energy conservation it takes – **1 month**.
  - To promote energy conservation it takes – **1 hour**
  - But to save energy it needs only – **1 second**.

- An energy efficient economy is imperative for **energy security, energy productivity and human sustainability.**

Energy Conservation and Energy Efficiency

- Energy savings is a National cause and all of us will have to join hands and make all efforts in making India an energy efficient economy and society so that, not only do we develop fast by using clean and green energy, but also **sustained life on planet Earth**.

- One unit of energy saving can mitigate **0.86Kg to 1.3Kgs of CO2 emission**

- The per capita consumption in India is around **1150 units**, which is quite less than the World average of **2500 units**.

- The **electricity savings between 65 & 90 Billion units** can be made annually in commercial buildings, agriculture and municipal sector.

Climate Change – Effects in India

- ✓ Large size of Population particularly living in rural areas
- ✓ Poverty and Unemployment
- ✓ High Dependence on agriculture
- ✓ Longest Coastal line
- ✓ Majority of Livelihoods are based on natural resources
- ✓ 2/3rd rain-fed areas
- ✓ Extreme Climatic events like drought, cyclones, temperature variation, etc

Action Plan on Climate Change

- Climate Change poses a grave challenge to sustainability of social and economic development, livelihoods of communities, and environmental management in developing countries like India. India has pursued a strong domestic agenda to counter climate change while engaging constructively with the international community in advancing actions to address this global challenge.

- The National and international climate action and policy landscape have evolved since the formulation of National Action Plan on Climate Change (NAPCC). As per the Paris agreement to **limit the global mean temperature within 2 degrees and working towards to limit 1.5 degrees**.

Nationally Determined contributions

India has officially submitted its NDCs on 2nd October 2015. The following targets form the core of India's NDC:

- To put forward and further propagate a healthy and sustainable way of living based on traditions and values of conservation and moderation.
- To adopt a climate friendly and a cleaner path than the one followed hitherto by others at corresponding level of economic development.
- To reduce the emissions intensity of its GDP by 33 to 35% by 2030 from 2005 level.
- To Achieve about 40% cumulative electric power installed capacity from non fossil fuel based energy resource by 2030 with the help of transfer of technology and low cost international finance including from Green Climate Fund(GCF).
- To Create an additional carbon sink of 2.3 to 3 billion tonnes of CO2 equivalent through additional forest and tree cover by 2030.

Nationally Determined contributions

- To better adapt to climate change by enhancing investments in development programmes in sectors vulnerable to climate change, particularly agriculture, water resource, Himalaya region, coastal regions, health and disaster management

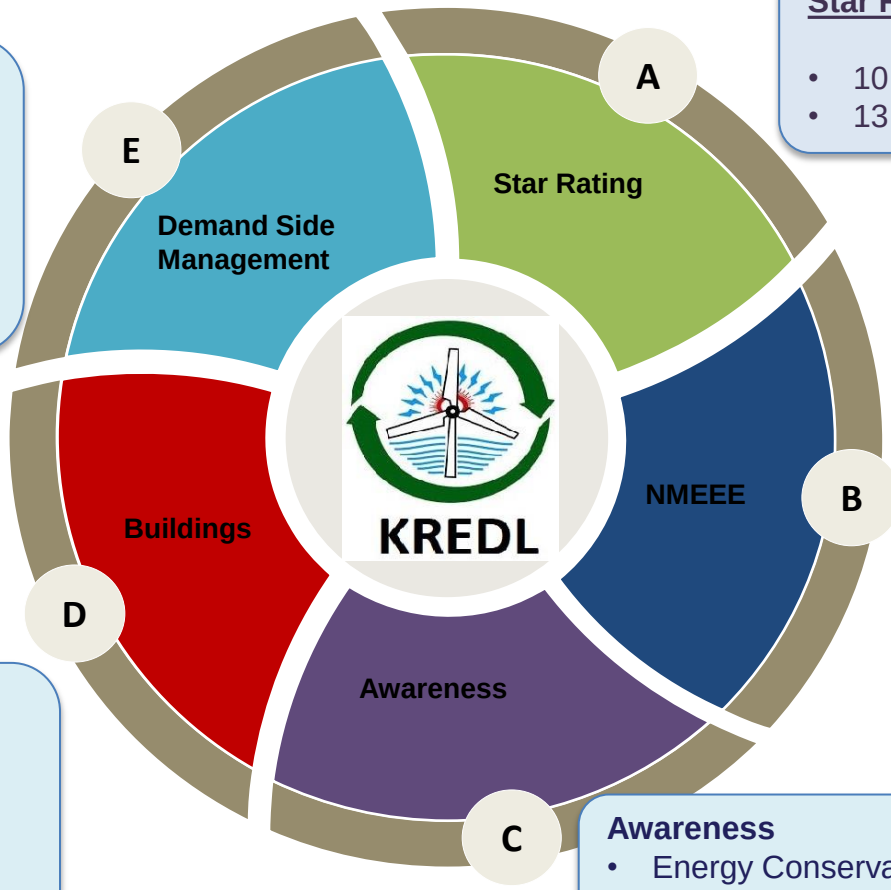
- To mobilize domestic and new and additional fund from developed countries to implement the above mitigation and adaption actions in view of the resource required and the resource gap.

- To build capacities, create domestic framework and international architecture for quick diffusion of cutting edge climate technology in India and for joint collaborative R&D for such future technologies

ENERGY CONSERVATION & ENERGY EFFICIENCY PROJECTS SCHEMES

ENERGY CONSERVATION & ENERGY EFFICIENCY PROJECTS SCHEMES

Demand Side Management
- Agriculture DSM
- Municipal DSM
- Energy Efficiency in SMEs
- Capacity Building of DISCOMs



Star Rating of Appliances
- 10 Mandatory Labelled Appliances
- 13 Voluntary Labelled Appliances

National Mission for Enhanced Energy Efficiency
- Perform, Achieve & Trade (PAT)
- Energy Efficiency Financing Platform (EEFP)

Buildings
- Energy Conservation Building Codes
- Retrofit in old buildings
- Residential Building Guidelines

Awareness
- Energy Conservation Awards
- Painting Competition
- State Designated Agencies

List of Notifications / Regulations issued by GoK to promote Energy Conservation activities in the State

Sl. No	Govt. of Karnataka Notification No.	Particulars
1.	EN/41/PSR/2006,dt:.01/09/2007	Constitution of the Karnataka State Energy Conservation fund to promote, develop, implementation of pilot projects etc…
2.	EN/396/NCE/2006,dt:13/11/2007	Mandatory use of **Solar Water Heating System** in industries, Hospitals, Govt. offices, Hotels, Residential Buildings, Commercial Buildings, etc.
3.	EN/87/EMC/2009,dt:18/11/2009	Power saving by use of Electronic Ballast(Choke)
4.	EN/342/NCE/2008,dt:20/11/2008	Mandatory use of **Energy Efficient Pump Sets** confirming to Bureau of Energy Efficiency
5.	EN41VSC2013 dated: 05.09.2014 (27.11.2014)	**Energy Conservation Building Code -2014**

List of Notifications / Regulations issued by GoK to promote Energy Conservation activities in the State

Sl. No	Govt. of Karnataka Notification No.	Particulars
6.	EN 52 VSC 2015 dated:31.10.2015	**Mandatory use of LED lights** in Govt. buildings.
7.	EN 1 VSC 2016 dated: 20.01.2016	Mandatory use of **Energy Efficient BEE 4/5 star rated pump sets** for drinking water supply in City / Town / Grama Panchayath under Social Welfare Department & Rural Development and Panchayat Raj Department.
6.	EN 1 VSC 2016 dated: 14.07.2016	Mandatory use of **BEE 5 Star rated electrical appliances** in Government & Public Under taking Department.
7.	EN 119 VSC 2017 dated: 07.06.2017	Mandatory use of **Energy Efficient BEE 4/5 star rated distribution transformers**.

Enforcement of the Energy Conservation Act in the State

- The Honourable KERC has appointed an "**Adjudicating Officer**" for adjudging under section 26 of the EC Act -2001 vide notification No CT/02/15 Bengaluru dated: 01.12.2015.

- The KERC has notified the "**Demand Side Management Regulations**" vide notification No. Y/04/10 dated: 28.07.2015. The DSM cells have been constituted in all the DISCOMs and many DSM activities have been taken up.

- KERC has announced the **rebate of 50 paisa per unit or a maximum of Rs. 50 /installation/month** for the consumers those who have **installed solar water heaters.**

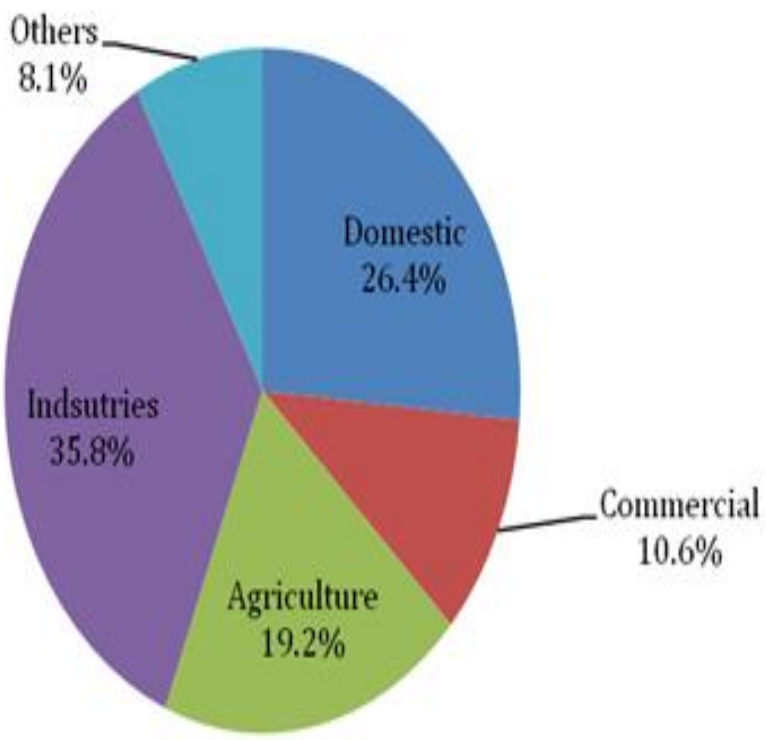
- As per the **KERC tariff order 2019, to promote the use of energy efficient LED / Induction street lights by local bodies** a concessional tariff is fixed to **Rs.5.30 per unit** instead of **Rs.6.30 per unit** i.e. a rebate of Rs. 1.0/ unit.

- As per the Quality control order by Gov. of India, **Minimum energy performance standards for line operated 3phase induction motors in India shall be IE2 class** applicable from 01st Oct 2017..The same is adopted in the state

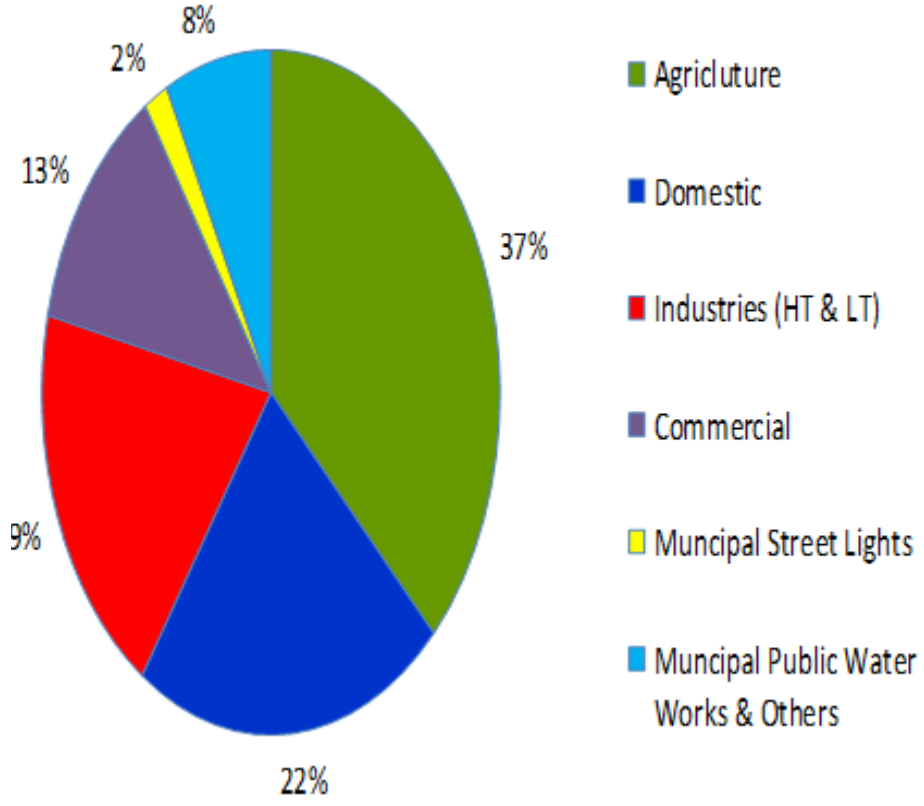
- **226.65 Lakhs LED Bulbs & Tubes were distributed** under **"Hosabelaku Yojana". Annual Energy savings about : 29,43,521 MWh**

- **67,137 No.s of Energy Efficient BEE star rated fans** were distributed under **"Pavana Yojana". Annual Energy savings about: 6243 MWh**

Sector wise electricity consumption



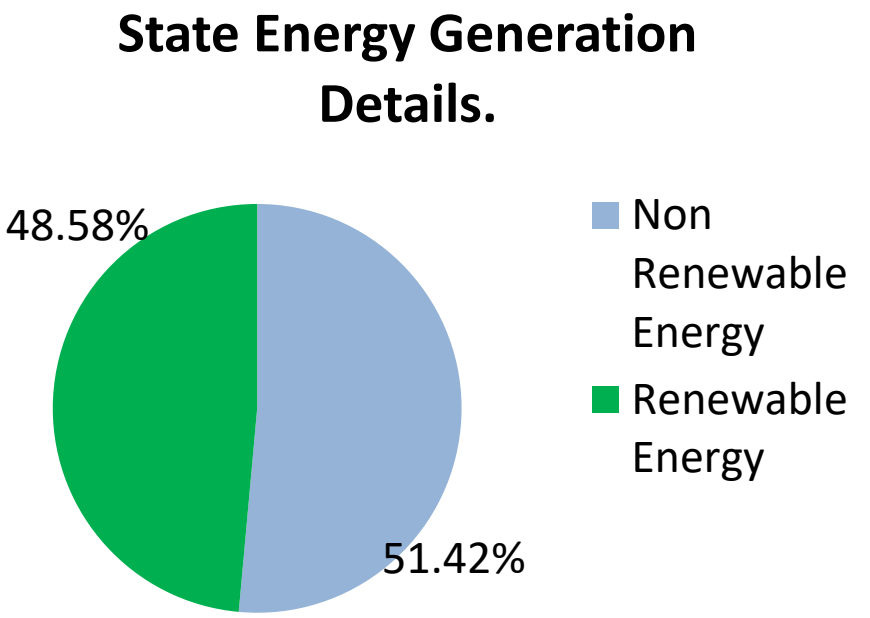
In India



In Karnataka

Renewable Energy Progress in Karnataka

Sl. No.	RE Sources	Commissioned Capacity in MWs
1	Wind	4787.54
2	Hydroelectric power	877.46
3	Solar	6202.55
4	Rooftop, IPDS, 13th Finance Commission, Suryaraitha	221.27
5	Co-gen	1731.16
6	Bio Mass	134.03
Total		13954.00



Total Installed Power Capacity : 29,118 MW and Renewable Energy (RE) constitutes 48.58% (as on Aug 2019)

The GoK has proposed "**The Karnataka Renewable Energy Policy 2019-23**" in 2019 to promote and **harness the Renewable Energy and Energy Efficiency potential** in the state.

Why Policy ?

To sustain continuous growing requirement of power in the Country and due to depleting conventional energy sources and geographical challenge in the environment, relying only on the supply-side option is not an economically viable option. There is a need to increase the end-use efficiency which would, in turn, result in a reduced demand to be met.

Energy Efficiency policy

- This is generally seen to be a key area for a wide range of efficiency improvements and fuel switching techniques.
- This will encourage the promotion and large-scale deployment of energy efficiency measures to all the Sector in one framework.
- These programmes are to save energy in all demand sectors.

Energy Conservation and Energy Efficiency Policy

- The Government of Karnataka and KREDL have also undertaken several measures at **EC & EE Policy**, Regulatory and programme implementation level for promotion of EE sector in the state
- This policy will provide a long-term vision for driving **Energy Efficiency and Energy Conservation across different consumer categories in the State.**
- The Framed policy aims to conserve around **602 million kWh** of electricity consumption and would result in avoiding fossil fuel-based generation capacity addition of around **367 MW** in the medium term during the policy period of FY 2019-23.

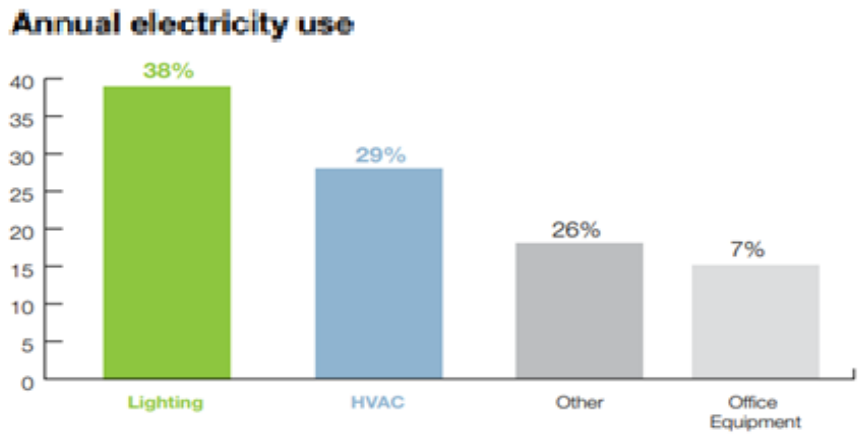
Energy Conservation and Energy Efficiency Policy

Sl. No.	Consumer Category	Savings Target -Policy Period (Proportion of Energy Savings Potential)	Savings Target (MUs)				Savings Target - Policy Period (MUs)
			2019-20	2020-21	2021-22	2022-23	
1	Municipal- Street Light	6.45%	21.72	22.09	22.47	22.85	89.14
	Municipal- Public Water Works	3.20%	9.42	10.52	11.60	12.69	44.22
2	Domestic	4.20%	23.87	29.45	35.04	40.62	128.98
3	Agriculture	3.20%	49.71	59.85	69.99	80.13	259.68
4	Commercial	3.20%	12.15	14.43	16.70	18.98	62.24
5	Industries (HT and LT)	1.25%	3.30	4.00	4.69	5.39	17.36
Total			**120.16**	**140.33**	**160.48**	**180.65**	**601.63**

ENERGY CONSERVATION
in
BUILDING SECTOR

Building's Electricity Consumption in Karnataka

- Buildings are the major consumers of energy in their construction, operation and maintenance phase.
- Taking the utilization of consumption into consideration, it is necessary to design a building focusing on energy conservation aspects.
- **Building accounts for 33-35% of total energy consumption in Karnataka, with Commercial Sector and Residential sector** accounting for **13% and 22% respectively.**
- Building energy use is **growing annually at the rate of 9%.**



Commercial Buildings Scenario

- The total built up area of commercial building is expected to touch **1.9 Billion meter square** by 2030 from the 2015 figure (**847 million meter square**), a growth of three times.
- About **1 Billion meter square** of commercial buildings are yet to be built, and also there is a huge scope for energy conservation.
    - **Energy Efficiency market for commercial buildings**
    - Energy consumption – 71 Billion units/Annum
    - Potential savings – 20 Billion units/Annum
    - Investment Potential – Rs. 15,000 Crore to 21,000 Crore.
- The upcoming smart cities mission is focused on sustainable urban infrastructure development. Energy efficient building is one of the matrix recommended for smart cities and ECBC will provide a regulatory frame work for accomplishing building energy efficiency as a part of the Nation.

Programmes to promote EE in building sector

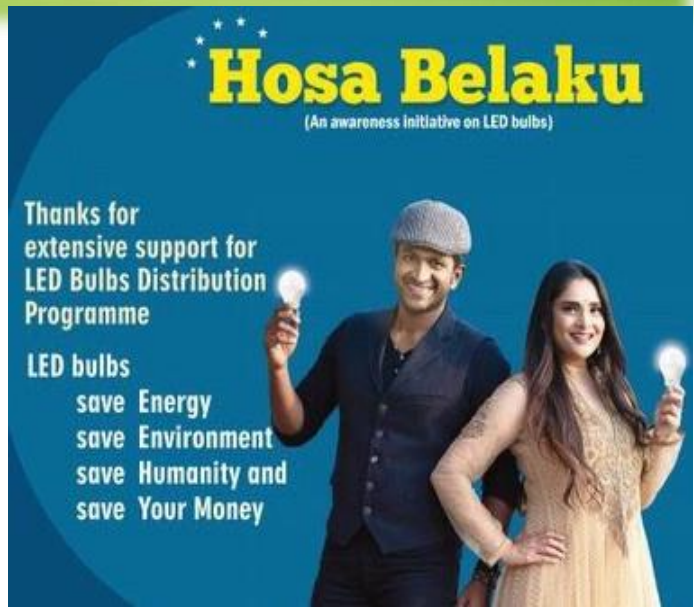
- Replacement of conventional incandescent bulb by **9W LED bulb** and replacement of T12/T8 tube lights by **20W LED** tube lights under **"Hosa Belaku" Yojana.**
- **226.65 Lakhs LED Bulbs** were distributed

  Annual Energy savings: 29,43,521 MWh
- **4,10,836 Nos. of LED Tube lights** were distributed

  Annual Energy savings: 17,994 MWh

- **67,137 Nos. of Energy Efficient BEE star rated fans** were distributed under **"Pavana Yojana".**

  Annual Energy savings: 6,243 MWh



Programmes to promote EE in Building Sector

GoK has issued Order for the Mandatory use of Solar Water Heaters since 2007.

- This Scheme is applicable for the buildings having Built-up area of more than 600 Sq. Ft. and **Built in the site area of 1200 Sq.ft and above**

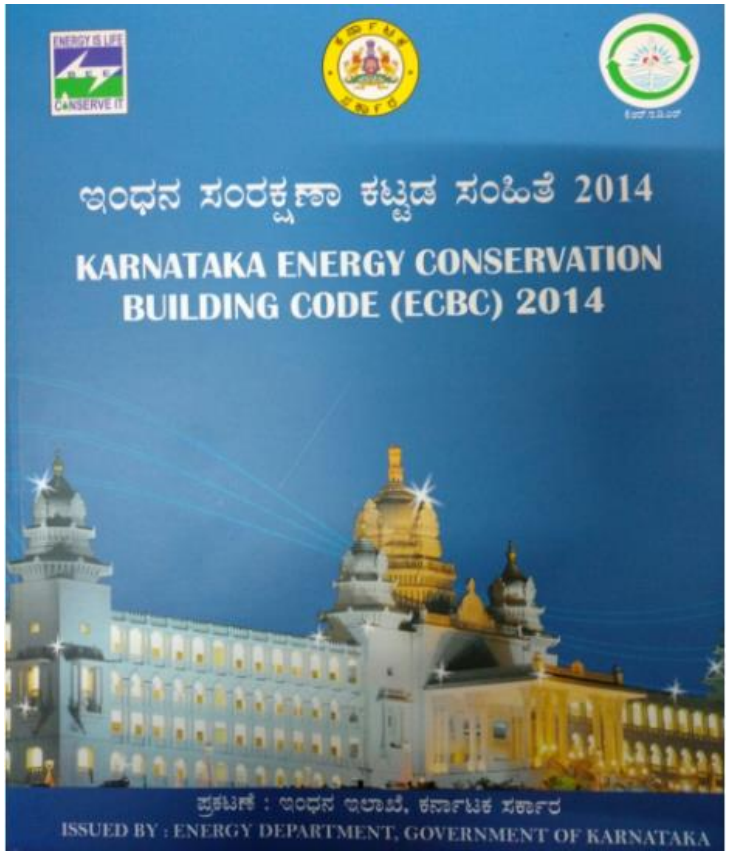
- As on date more than about 20 lakhs Solar Water Heaters have been installed by the consumers of various categories.

- KERC has announced the **rebate of 50 paisa per unit or a maximum of Rs. 50 /installation/month** for the consumers those who have **installed solar water heaters.**

Karnataka ECBC

- **ECBC is necessary for improving the energy efficiency and its utilization in the building sector of the State.**
- The **Bureau of Energy Efficiency (BEE) introduced the Energy Conservation Building Code (ECBC) as a voluntary policy measure in 2007** under the Energy Conservation Act (EC ACT) 2001 to reduce the adverse impact of buildings on the environment.
- The **EC Act, under section 15 (a) give power to the States to amend ECBC to meet its regional and local requirements and under the provision of the section (18) of the act,** the State Government may issue directions for implementing ECBC.
- The Code provides the technical details to the Architects and Engineers to apply Energy Conservation principles and techniques in their designs for new buildings as well for carrying out alteration to the existing buildings.

Karnataka ECBC – 2014 Guide Book



GOVERNMENT OF KARNATAKA

ENERGY SECRETARIAT

NOTIFICATION

NO. EN41VSC2013, Date: 05.09.2014

Government of Karnataka gazette notification dated: 27th November 2014 (Part - IVA)

In exercise of the powers conferred by section 18 of the Energy Conservation Act 2001 (52 of 2001)

Section 18

THE GAZETTE OF INDIA
MINISTRY OF LAW, JUSTICE AND COMPANY AFFAIRS
(Legislative Department)

New Delhi, the 1st October, 2001/ Asvina 9, 1923 (Saka)

THE ENERGY CONSERVATION ACT, 2001

(No 52 OF 2001[29th September 2001])

Power of Central Government or State Government to issue directions

18. The Central Government or the State Government may, in the exercise of its powers an performance of its functions under this Act and for efficient use of energy and its conservation, issue such directions in writing as it deems fit for the purposes of this Act to any person, officer, authority or any designated consumer and such person, officer or authority or any designated consumer shall be bound to comply with such directions.

Explanation– For the avoidance of doubts, it is hereby declared that the power to issue directions under this section includes the power to direct –

(a) regulation of norms for process and energy consumption standards in any industry or building or building complex; or

(b) Regulation of the energy consumption standards for equipment and appliances.

The state of Karnataka has modified ECBC to suit to its local requirements and a notification was issued in the **Gazette of Government of Karnataka (part IV-A) on 27th November 2014.**

Karnataka ECBC - 2014

- The ECBC is applicable to all buildings or building complexes in the urban area that have a **connected load of 100 kW or greater, or a contract demand of 120 kVA or greater, or having conditioned area of 500 m^2 or more and used for commercial purposes.**

- **KECBC 2014 :** Purpose is to provide minimum energy-efficient standards for design and construction of commercial buildings

- ECBC encourages energy-efficient design or retrofit of building so that it does not constrain the building function, comfort, health, or the productivity of the occupants.

- The directives will ensure construction of energy efficient buildings with reduced electrical energy demand. **The Energy Conservation Building directives compliant buildings are expected to consume about 30%-40% less energy than the conventional building.**

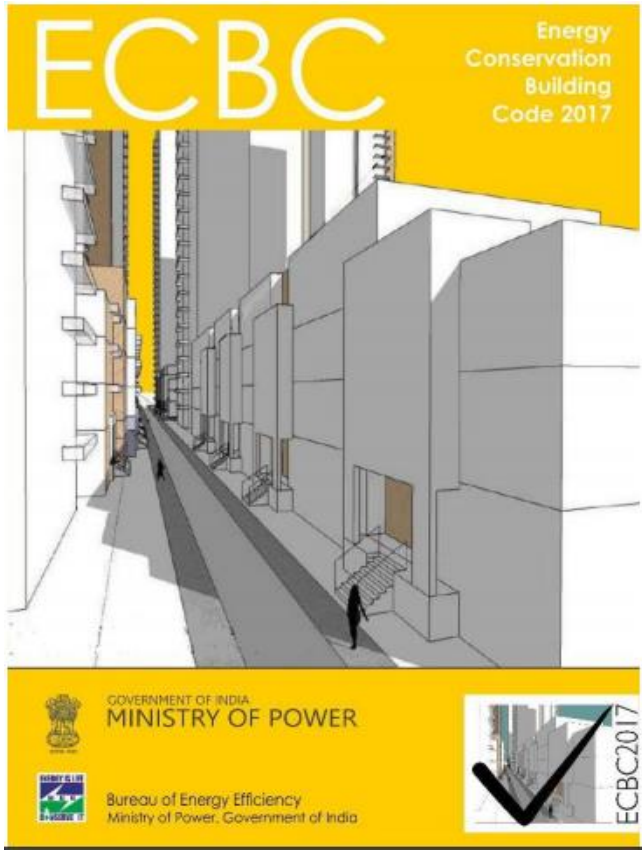
Updated ECBC

- The Building Energy Codes are updated regularly to catch up with the curve of technology maturation and to set higher benchmarks for building efficiency.

- In alignment with current market scenario and advanced technologies, **Bureau of Energy Efficiency (BEE) has updated ECBC and notified ECBC-2017 in June-2017**

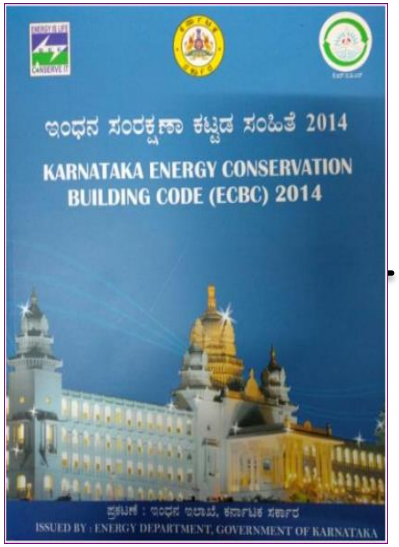
- The BEE had given directions to all SDAs regarding **updation of the ECBC for the States as per the provision under section 15(a) of Energy Conservation Act 2001.**

- The KREDL with the support of ECBC Cell has **prepared the Draft KECBC Code-2019 and KECBC Rules 2019 in line with the BEE ECBC-2017.**



Preparation of Draft KECBC Code 2018 and KECBC Rules 2018

KECBC 2014



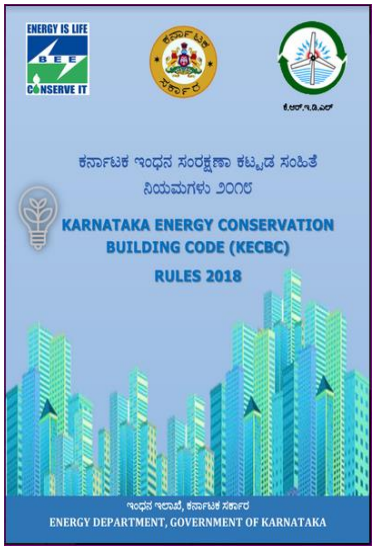
December 2017

Present

Code

+

Rules



- Inclusion of 3 level of compliance and encouraging to achieve higher energy efficiency standards.
- New specification on building envelope for various building type based on the climatic condition.

Draft KECBC Code 2019

- Inclusion of 3 level of compliance and encouraging voluntarily to achieve higher energy efficiency standards.

  i. Energy Conservation Building Code Compliant **(ECBC) Building**
  ii. Energy Conservation Building Code plus **(ECBC+) Building**
  iii. Super Energy Conservation Building Code **(SuperECBC) Building**

- New specification on building envelope for various building type (6 types) based on the climatic condition.
- **Solar based Energy generation provision**, has to be provided to satisfy with the code.

➢ This directives **compliant buildings will ensure construction of energy efficient buildings with reduction of 40-50% electrical energy demand less energy than the conventional building**.

ECBC Major activities in the State.

1. Kumara Krupa Govt Guest House

- Kumara Krupa Guest House is a model ECBC compliant building has been constructed in the State.

- It has been built with 8 floors (G+7) and majorly comprising conditioned rooms and meeting halls (160 regular & 40 VIP rooms).

- The total built-up area of the building is about 19,875m^2.

- Building Envelope : AAC Cavity Wall, Insulation, Heat reflective tiles, Recessed windows, High performance glazing glass, UPVC window frame.

- For HVAC, air cooled VRF system is considered for cooling conditioned area and service hot water of 25% is met by solar water heater.

- Electrical Power: BEE star rated appliances, transformers and APFC (Automatic Power Factor Controllers) are considered.

- In this **project the estimated annual Energy Savings is about 7 lakh units. And reduction of CO2 is 570 Tons.**

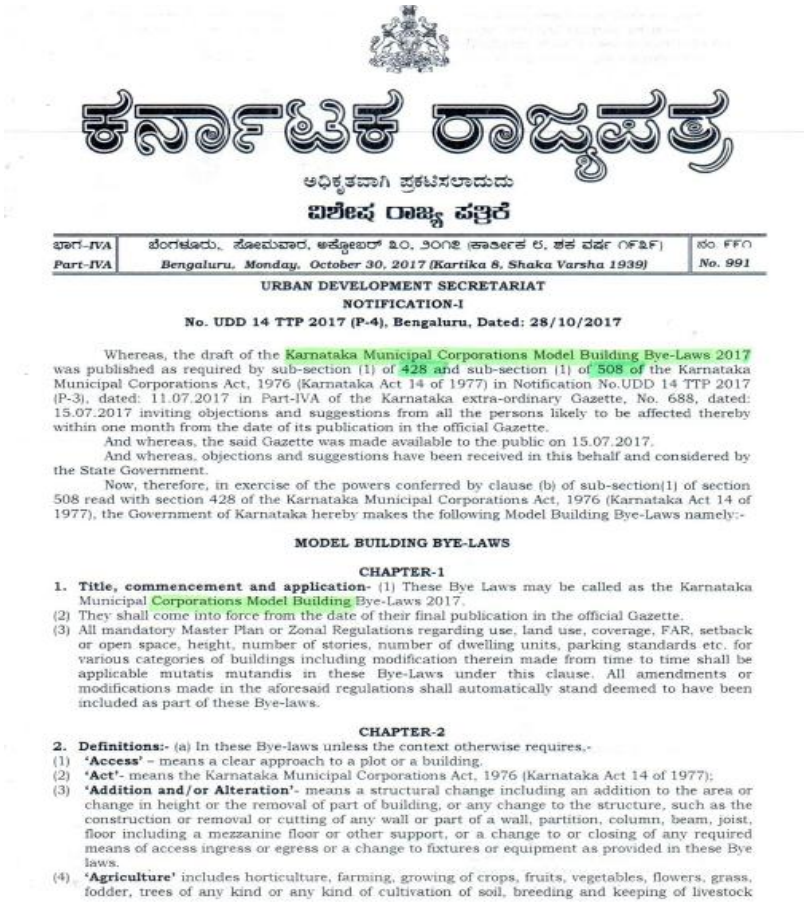
Status of ECBC compliant buildings in the state

Sl No	Projects Name
	Projects Completed
1	Kumara Krupa Guest House, Bengaluru
2	Hubbali court complex
3	D.C. office complex at Mysuru
4	Government Engineering College, Thalkala, Yelburga
5	Chamundi Hill Parking lot at Mysuru
	Projects Under Construction
1	Lokopayogi Bhavana, Kalburgi
2	Meditation Centre Nyaya Degula- Bengaluru
3	Bowring and lady Curzon hospital
4	KREDL Demonstration Building

Sl No	Projects Name
5	Medical college, Chitradurga
6	Medical college, Bagalkote,
7	Medical college, Tumakuru
8	Medical college, Haveri
9	Multi Speciality Hospital for K.R. Hospital at Mysuru
10	Higher education Academy, Dharwad
11	Yadgiri Institute of Medical Science
12	Thirumala Guest house
13	Gouribidhanur Court Complex
14	Administrative block for mokshagundan, Visveswaraya centre for training in skill development, Chikkaballapur"
15	Mechanical block UVCE, Bengaluru
16	Office for women development corporation, Bengaluru
17	District office complex- Chitradurga
18	Bidari Art Gallery - Bidar
19	Sir M. Vishveshwaraya Research Centre- Bengaluru
20	Super Speciality hospital - Premises of Hassan Institute of Medical

Inclusion of ECBC in Karnataka State By-Laws, 2017

The UDD had included ECBC in their Model Building Bye-Laws, which was notified in the Gazette on 28.10.2017, the same was submitted to BEE.



ಕರ್ನಾಟಕ ರಾಜ್ಯಪತ್ರ

ಅಧಿಕೃತವಾಗಿ ಪ್ರಕಟಿಸಲಾದುದು

ವಿಶೇಷ ರಾಜ್ಯ ಪತ್ರಿಕೆ

ಭಾಗ-IVA Part-IVA | ಬೆಂಗಳೂರು, ಸೋಮವಾರ, ಅಕ್ಟೋಬರ್ ೩೦, ೨೦೧೭ (ಕಾರ್ತೀಕ ೮, ಶಕ ವರ್ಷ ೧೯೩೯) Bengaluru, Monday, October 30, 2017 (Kartika 8, Shaka Varsha 1939) | ಸಂ. ೯೯೦ No. 991

URBAN DEVELOPMENT SECRETARIAT

NOTIFICATION-I

No. UDD 14 TTP 2017 (P-4), Bengaluru, Dated: 28/10/2017

Whereas, the draft of the Karnataka Municipal Corporations Model Building Bye-Laws 2017 was published as required by sub-section (1) of 428 and sub-section (1) of 508 of the Karnataka Municipal Corporations Act, 1976 (Karnataka Act 14 of 1977) in Notification No.UDD 14 TTP 2017 (P-3), dated: 11.07.2017 in Part-IVA of the Karnataka extra-ordinary Gazette, No. 688, dated: 15.07.2017 inviting objections and suggestions from all the persons likely to be affected thereby within one month from the date of its publication in the official Gazette.

And whereas, the said Gazette was made available to the public on 15.07.2017.

And whereas, objections and suggestions have been received in this behalf and considered by the State Government.

Now, therefore, in exercise of the powers conferred by clause (b) of sub-section(1) of section 508 read with section 428 of the Karnataka Municipal Corporations Act, 1976 (Karnataka Act 14 of 1977), the Government of Karnataka hereby makes the following Model Building Bye-Laws namely:-

MODEL BUILDING BYE-LAWS

CHAPTER-1

1. **Title, commencement and application-** (1) These Bye Laws may be called as the Karnataka Municipal Corporations Model Building Bye-Laws 2017.
(2) They shall come into force from the date of their final publication in the official Gazette.
(3) All mandatory Master Plan or Zonal Regulations regarding use, land use, coverage, FAR, setback or open space, height, number of stories, number of dwelling units, parking standards etc. for various categories of buildings including modification therein made from time to time shall be applicable mutatis mutandis in these Bye-Laws under this clause. All amendments or modifications made in the aforesaid regulations shall automatically stand deemed to have been included as part of these Bye-laws.

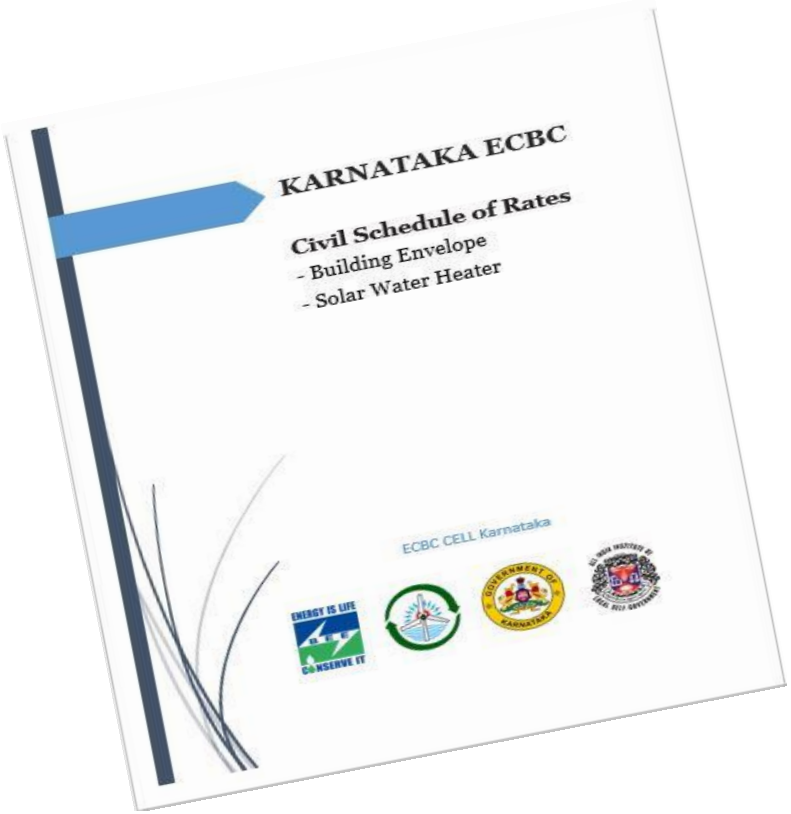
CHAPTER-2

2. **Definitions:-** (a) In these Bye-laws unless the context otherwise requires,-
(1) **'Access'** – means a clear approach to a plot or a building.
(2) **'Act'**- means the Karnataka Municipal Corporations Act, 1976 (Karnataka Act 14 of 1977);
(3) **'Addition and/or Alteration'**- means a structural change including an addition to the area or change in height or the removal of part of building, or any change to the structure, such as the construction or removal or cutting of any wall or part of a wall, partition, column, beam, joist, floor including a mezzanine floor or other support, or a change to or closing of any required means of access ingress or egress or a change to fixtures or equipment as provided in these Bye laws.
(4) **'Agriculture'** includes horticulture, farming, growing of crops, fruits, vegetables, flowers, grass, fodder, trees of any kind or any kind of cultivation of soil, breeding and keeping of livestock

Sl. No.	Medium	Environmental conditions
3(b)		Treatment of wet waste and sanitary waste on site (organic dry waste also is preferred) using Organic waste composter/Vermiculture pit or any other approved technology shall be installed with a minimum capacity of 0.3 kg /person/day must be installed.
4	Sewage Treatment Plant	Onsite sewage treatment of capacity of treating 100% waste water to be installed, where the sewer lines of the building cannot be connected to city level sewerage system. In case the sewer line of the building can be connected to the city level sewerage system, the relaxation on the size of STP shall be obtained from the competent Authority. Treated waste water shall be reused on site for landscape, flushing, cooling tower, and other end-uses. Excess treated water shall be discharge into the city level sewerage system or as per CPCB norms. Natural treatment systems shall be promoted. Sludge from the onsite sewage treatment, including septic tanks, shall be collected, conveyed and disposed as per the Ministry of Urban Development, Central Public Health and Environmental Engineering Organisation (CPHEEO) Manual on Sewerage and Sewage Treatment Systems, 2013.
5	Energy	Compliance with the Energy Conservation Building Code (ECBC) of Bureau of Energy Efficiency shall be ensured. Buildings in the States which have notified their own ECBC, shall comply with the State ECBC. Details as notified by the Government shall be followed. All lighting and other electric fixtures shall be of low energy consumption (Electrical Appliances – BEE Star and Energy Efficient Appliances) Concept of passive solar design that minimize energy consumption in buildings by using design elements, such as building orientation, landscaping, efficient building envelope, appropriate fenestration, increased day lighting design and thermal mass etc. shall be incorporated in the building design. Wall, window, and roof u-values shall be as per ECBC specifications.

Revision of Karnataka PWD Schedule of Rates

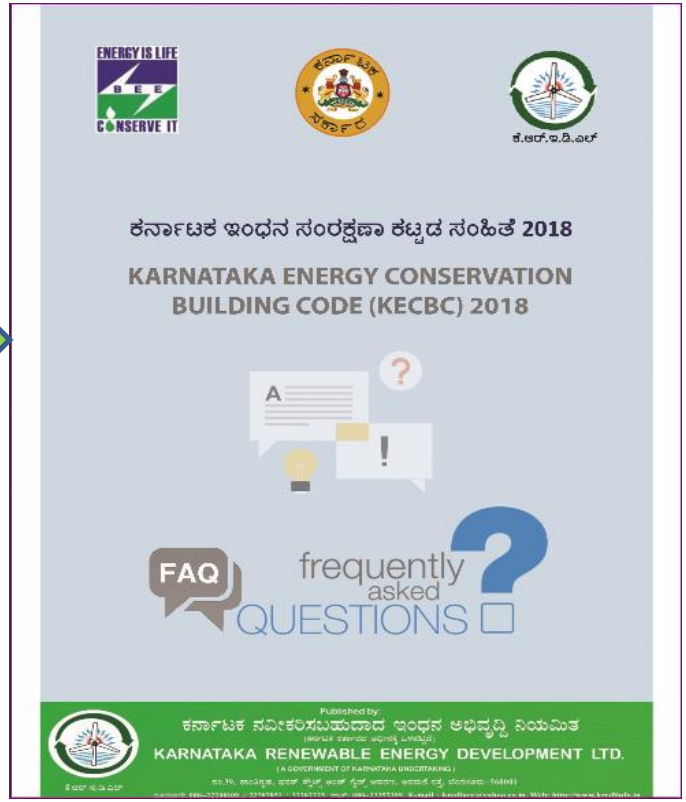
- The list of building energy efficient materials (Civil and Electrical) with the detailed specifications has been prepared in consultation with the Stakeholders.
- A separate chapter on Energy Efficient materials - Civil was added and published by the PWD in State SoR during December 2016.



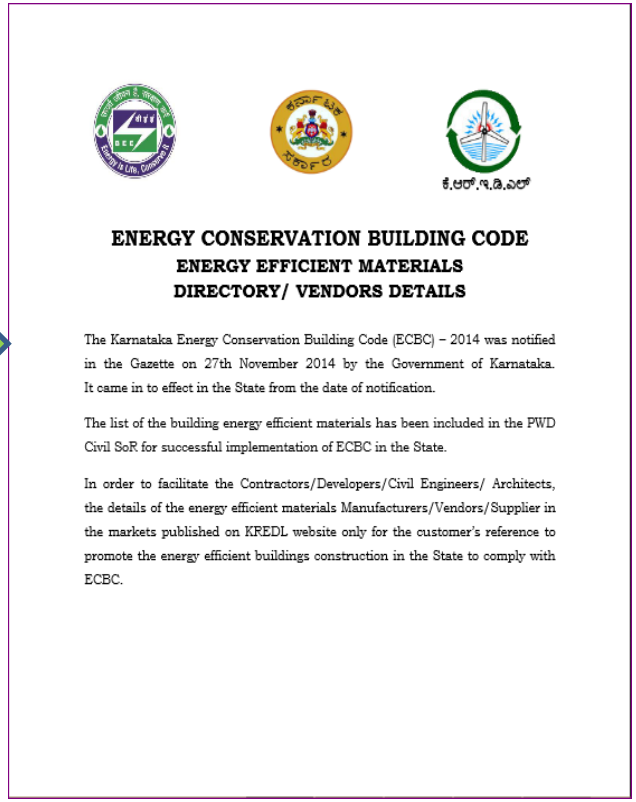
Frequently Asked Questions (FAQs) and Vendor details

100 Nos. of FAQs and details of the list of Energy Efficient Building Materials (Civil & Electrical) along with vendor details have been published on KREDL website for the reference of the stakeholders, developers etc.

FAQs



Vendor Details



ECBC CELL ACTIVITIES in the State

Provide technical assistance for ECBC implementation and enforcement in the state

* ECBC implementation Roadmap
* Technical Assistance for the notification of ECBC code, Rules and Building bye Law
* Updation of energy efficient materials and products for the inclusion in SoR

Survey of Commercial Buildings (Existing & Upcoming) projects in the State falling under the preview of ECBC.

* Data collection of buildings (which are Under scope of Karnataka ECBC i.e., >100kW or 120kVA) energy consumption from DISCOMs.

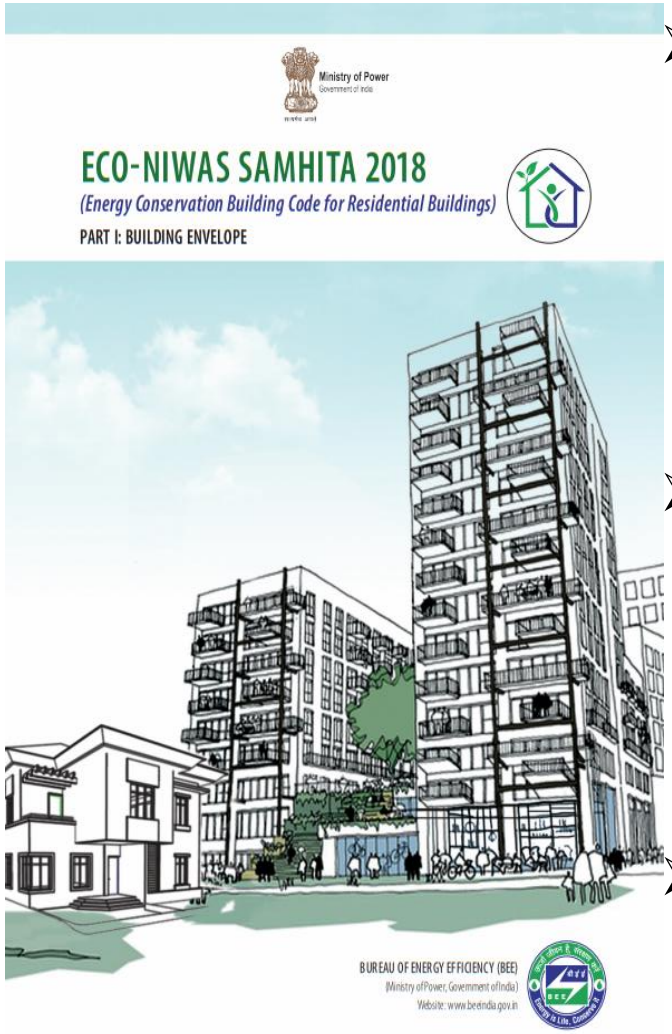
Technical assistance to commercial buildings to ensure ECBC compliant design

* Identify potential commercial projects and collection of the building details in discussion with ULB/SDA/stakeholders
* Perform energy simulation using Design Builder Software to analyses energy efficient strategies/technologies

Assisting in conducting awareness programmes and simulation training for stake holders

* Organise training A, training B and training C programmes
* To make the use of design builder software for simulation of the buildings.

Energy Conservation Building Code and Building labelling program for Residential buildings



- Bureau of Energy Efficiency (BEE) has recently launched the **ECBC-Residential part-1 (building envelope) on 14 December 2018** .

For **"Residential buildings" with plot area ≥ 500m2**

- The BEE is in the process of developing the Energy Conservation Building Code (building envelope, common area services and equipment & appliances) and **Building labelling program for Residential buildings (ECBC-R part 2).**

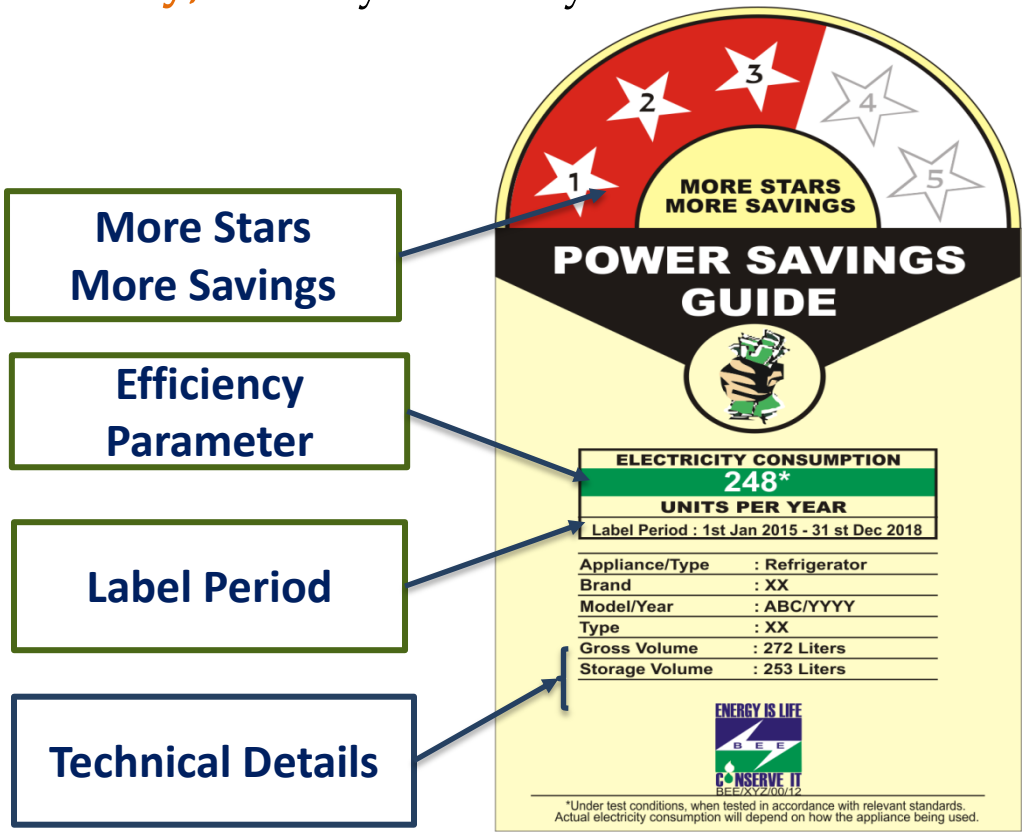
- These programs aim to **set minimum requirements for the energy efficient design** and construction of the residential buildings.

Star Labelling Programme

The Standards and Labelling Scheme (S&L) is one of the major thrust areas of BEE. The scheme was **launched on May, 2006** by Ministry of Power.

Star Label Says

- More stars more savings
- Efficiency parameters
- Brand & Model details
- Applicable dates of standard
- Technical Parameters
- Manufacturing year



List of Appliances

Mandatory

- Frost Free Refrigerator
- Tubular Florescent Lamp
- Room Air Conditioners
- Distribution Transformer
- Room Air Conditioner (Cassette, Floor Standing)
- Direct Cool Refrigerator
- Color TV
- Electric Geysers
- Variable Capacity Inverter Air Conditioner
- LED Lamps

Voluntary

- Induction Motors
- Pump Sets
- Ceiling Fans
- LPG-Stoves
- Washing Machine
- Computer (Notebook/Laptops)
- Ballast (Electronic/Magnetic)
- Office Equipment's (Printer, Copier, Scanner, MFD's)
- Diesel Engine Driven Mono-set Pumps
- Solid State Inverter
- DG Sets
- Chillers
- Microwave ovens

Savings showing for Financial Year 2018-2019			
Energy Savings since 2011	142.7 BU	Energy Savings in 2018-2019	22.17 BU

ENERGY CONSERVATION
in
INDUSTRIAL SECTOR

PAT Scheme

A market based mechanism to enhance cost effectiveness of improvements in energy efficiency in energy-intensive large industries and facilities, through certification of energy savings that could be traded. (**Perform Achieve and Trade**)

Sl. No	Sector	Energy Consumption Norm in MTOE
1	Thermal	30000
2	Iron & Steel	30000
3	Cement	30000
4	Aluminium	7500
5	Fertilizer	30000
6	Paper & Pulp	30000
7	Textile	3000
8	Chlor-Alkali	12000
9	Railways	70000
10	Discoms	86000
11	Refineries	90000
12	Commercial Building	1000
13	Petrochemicals	100000

Outcome – PAT 1 (2012 – 2015)

Achievement in Karnataka : *Target: 0.223 mtoe*

Achievements: 0.36 mtoe or 4186 million units /annum.

Mitigation of CO_2 : 0.5 million tons

Achievement: Savings of 8.67 million tonnes of oil equivalent

Energy Saving

5635 MW
8.67 mtoe

1.25% of India's
total primary energy supply

Emission Reduction

31 Million tonnes of CO2

1.93% of India's
total emissions

Capacity building

5000+ Engineers and operators

13718 Energy Auditors & Managers

219 Accreditation

Savings

Saved due to **energy consumption**

Rs 9,500 Crores

Investment

Encouraged investments for energy efficient technologies

Rs 24,517 Crore invested

Recommendations

- Mandate use of energy-efficient motors where economical (i.e., IE3 and IE4).
- Equipment monitoring should be on a regular basis.
- Consider installing a building automation system (BAS) or an energy management system (EMS).
- Development of technology-specific demonstration project for various industrial clusters.
- Energy Savings through Heat Recovery is the best identified as part of an overall energy conservation of the industrial process or facility.
- Installation of Back Pressure Turbine to eliminate throttling from HP to LP steam and recover power.
- Smart Meter implementation.

ENERGY CONSERVATION
in
MUNICIPALITY SECTOR

LED STREET LIGHTS PROJECT UNDER GOK FUND:

BESCOM JURISDICTION:

- The work has been completed at ***92 villages*** in the jurisdiction of BESCOM.
- ***6915 Nos.*** of inefficient lamps are replaced by LEDs.
- The annual energy savings achieved from the above projects is ***10,40,950 kWh***

GESCOM JURISDICTION:

- The work has been completed at ***79 villages*** in the jurisdiction of GESCOM.
- ***10,375 Nos.*** of inefficient lamps are replaced by LEDs.
- The annual energy savings achieved from the above projects is ***18,66,951 kWh***

MESCOM JURISDICTION:

- The work has been completed at ***37 villages*** in the jurisdiction of MESCOM.
- ***9,563 Nos.*** of inefficient lamps are replaced by LEDs.
- The annual energy savings achieved from the above projects is ***15,12,237 kWh***

MODEL ENERGY EFFICIENT VILLAGE CAMPAIGN PROGRAMME

Under this programme, the existing low efficient incandescent lamp / FTL Home lighting and HPSVL/MVL/FTL street lights were replaced by appropriate capacity **Energy Efficient LED lights and Fans at 12 selected villages across the State.**

- Belagumba, Byadarahalli, Cheluvyanapalya and Kothagondanahalli villages in Magadi taluk, Ramanagara Dist
- Nidasale, Kammidoddi, Hunuganahalli and Siddayanapalya villages in Kunigal taluk, Tumker Dist.
- Khathaghatta, Ajjahalli, Torechakanahalli, Kallimaledoddi in Maddur Taluk, Mandya Dist.
- Annual energy savings achieved is about

  12,06,020 kWh

LED STREET LIGHTS - DEMONSTRATION PROJECTS

Under this programme, the existing low efficient SV/MV/FTL Lamp Street Light Fixtures were replaced by appropriate capacity **Energy Efficient LED Street Lights at 15 selected towns across the State**.

- Annual energy savings achieved is about ***22,56,491 kWh***

LED STREET LIGHTS PROJECT (VILLAGE LIMITS)

Under this programme, the existing low efficient SV/MV/FTL Lamp Street Light Fixtures were replaced by appropriate capacity **Energy Efficient LED Street Lights** in all the jurisdictions of Distribution companies, totaling to **361 villages.**






Annual energy savings achieved is about ***82,98,163 kWh***

SMART ENERGY SAVER UNITS IN THE STREET LIGHT CIRCUITS

Under this programme, **Energy Saver Units were installed at Bengaluru and Mysuru cities.**

- ✓ Annual energy savings achieved from **150 Nos of Energy Saver Units** is about ***4,79,352kWh***

Radio Frequency based led street lights at IISC campus, Bengaluru

- ✓ The annual energy savings achieved is 1,32,221 kWh

Recommendations

- Replacement of **low efficient street lighting lamps with new energy efficient technology such as LED**.
- Installation of **Radio frequency-based street lights** with centralised control and monitoring system in the major cities;
- Installation of street light with Supervisory Control and data acquisition (SCADA).
- Monitor Energy Audit of Municipal buildings and commercial buildings which have a connected load of 100kW or contract demand of 120kVA or more according to KECBC 2018 (Karnataka Energy Conservation Building Code). Implementation of identified energy efficiency measures;
- **Adoption of RTPV** (Roof Top Photo Voltaic) on the Municipal buildings

ENERGY CONSERVATION in AGRICULTURAL SECTOR

Agriculture has accounted for the largest share of the total electricity consumption in the state over the last five years. Energy consumption in agriculture is mainly through the use of irrigation pumps, and other electrical farming equipment.

State Project : Surya Raitha

This scheme proposes to provide net metered **solar water pumps with high energy efficient**. Farmers who previously drew energy from the grid will now be encouraged to export excess energy generated by their solar water pumps and earn a tariff for net energy exported thereby completely eliminating energy usage for agriculture in the converted pumps.

The State Govt. has installed 5872 Nos. of Solar water pump sets across the State

Recommendations

- Replacement of existing low efficient agriculture pump sets with energy efficient pump-sets (four/five star rated pump-sets)
- Installation of Solar Water Pump sets to manage irrigation without depending on grid connection.
- Use drip irrigation for specific crops. Drip systems can conserve up to 80% water and reduce pumping energy requirement
- Use of Smart Control Panel that has a SIM card and a Smart Meter, which will enable a farmer to switch on or switch off these pumps through his mobile and sitting at the comfort of his home

Successful energy conservation requires a **GOVERNANCE & INSTITUTIONAL STRUCTURE**

Stakeholders	Roles and Responsibilities
High-Level Programme Approval Committee for EE	➢ Enforcing implementation of EE Policy in the State; ➢ Approve overall EE & EC action plan submitted by the Nodal Agency for the policy period; ➢ Evaluate and approve the annual action plan at the beginning of each financial year; ➢ Approve the fund required for implementation of EE & EC activities identified in the action plan; ➢ Review and approval of the energy savings report submitted by the Nodal Agency at the end of each financial year; ➢ Resolving policy level issues for accelerating deployment of energy efficiency programmes; ➢ Review and approval of consolidated energy savings report for the entire policy period; ➢ Suggest necessary modifications and amendments in the policy to State government

Financial Mechanism

In order to finance the various initiatives under this Policy, the State Government proposes that nodal agency or sector-specific responsible departments may explore possible avenues for contributing to the fund:

- Grants from Green Climate Fund (GCF) and Green Energy Fund (GEF)
- Carbon Cess
- Projects implemented under State Energy Conservation Fund (SECF) as Revolving Investment fund (RIF).
- Credit line/ Loans from Banks
- Corporate Social Responsibility (CSR) funds

Thank You!!