

# Presentation

On

# Government Initiatives for Energy Efficiency at State & National Level for Buildings



Hemant Patil  
Manager(Energy Conservation), MEDA

## OBJECTIVES OF MEDA

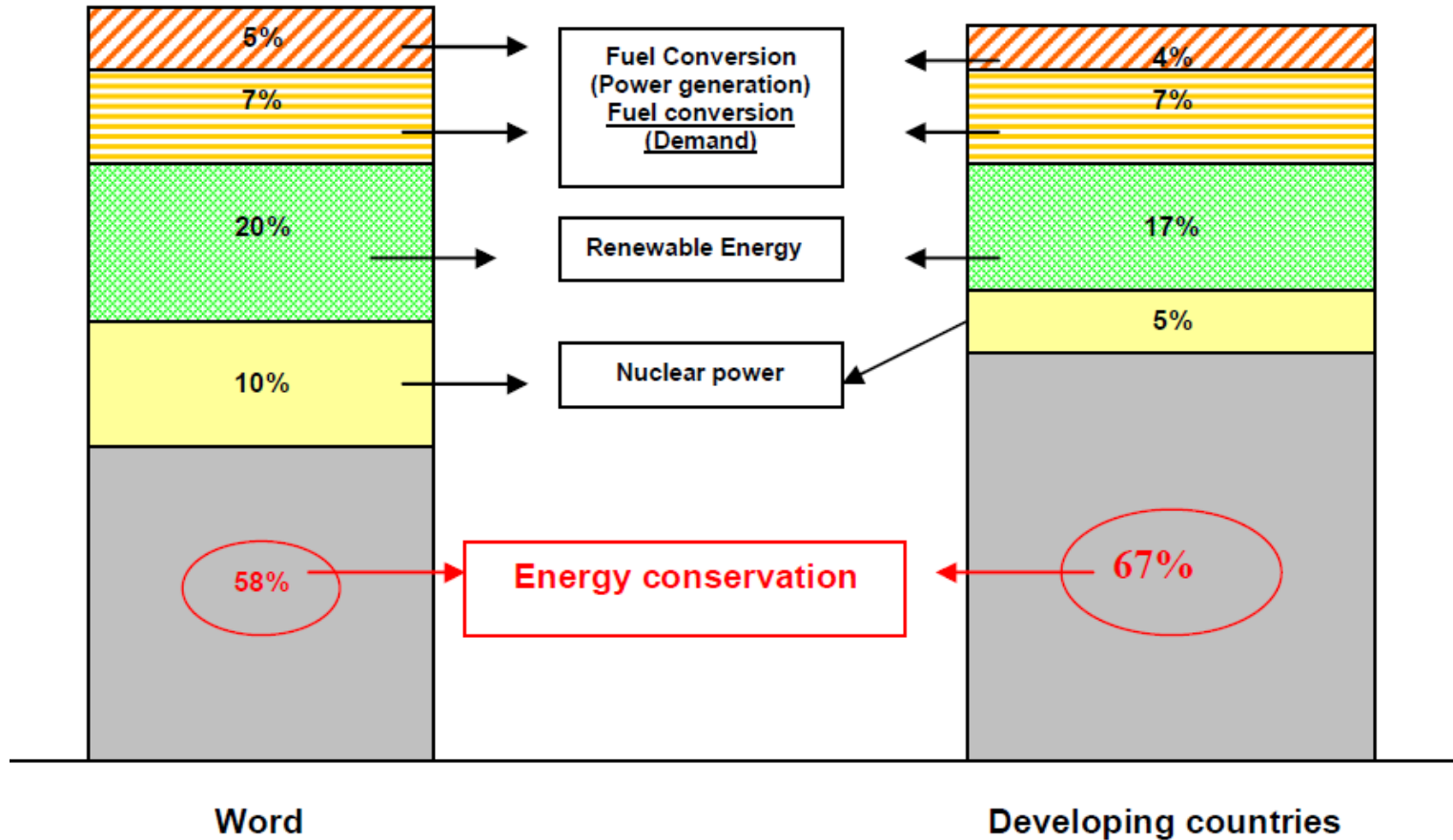
- Promote and Develop, Non-conventional, Renewable and Alternate Energy Sources and Technologies
- **Implement Energy Conservation Act , 2001 and related schemes**
- Assist GOI and GOM in Renewable Energy Programs
- Install Demonstration Projects
- Pursue Power Projects, based on Renewable Energy
- Rural Electrification through Renewable Energy (remote villages)



## MEDA TO IMPLEMENT

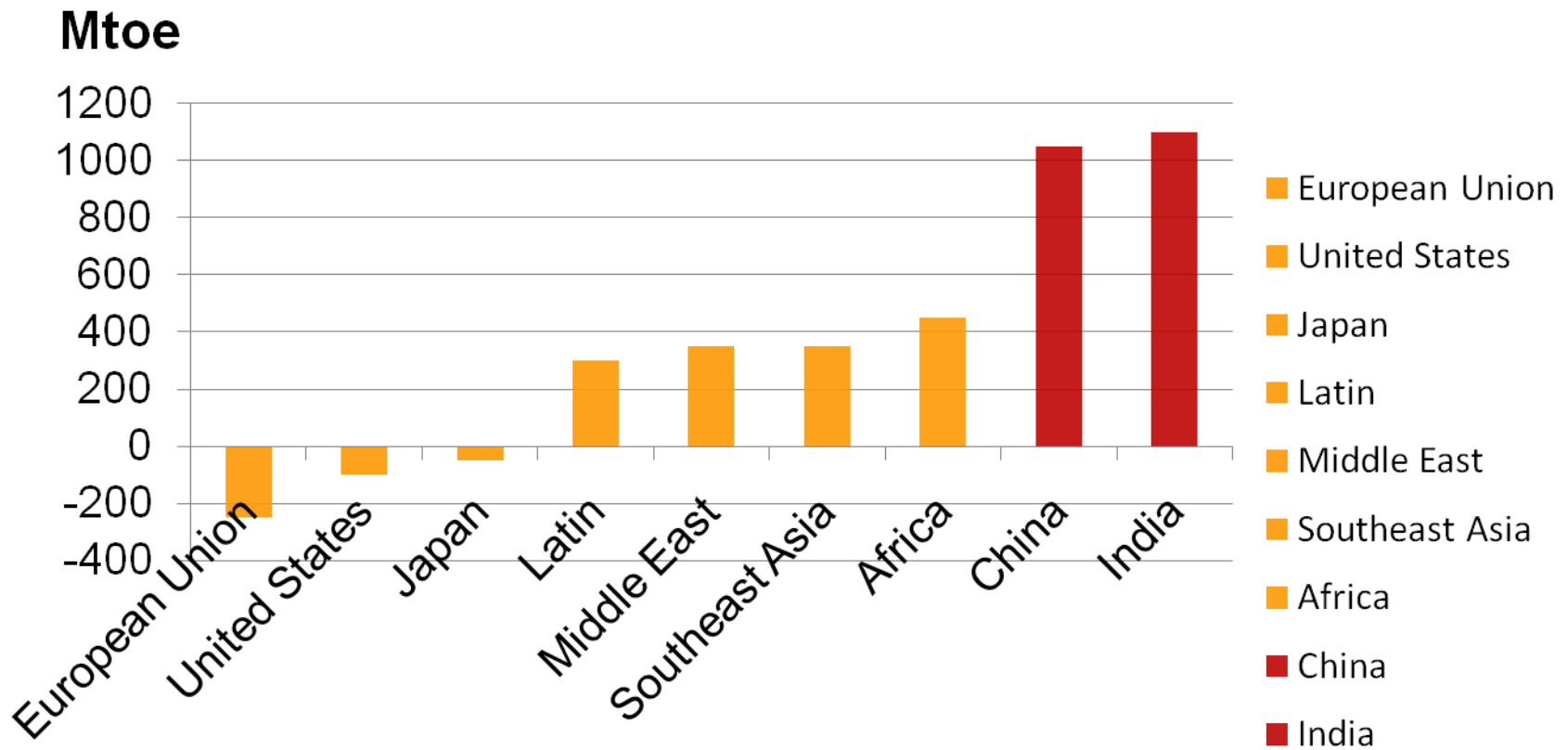
- ❑ The Energy Conservation Act, 2001
- ❑ The Electricity Act, 2003
- ❑ National Electricity Policy & Tariff Policy
- ❑ National Policy on Stand alone systems for rural areas & non-conventional energy system
- ❑ National Policy on Electrification & local distribution in rural areas
- ❑ Work as designated agency for CDM for Renewable Energy Projects.

## CO2 mitigation Tools



# Emerging Economies Dominate Future Energy Demand Growth

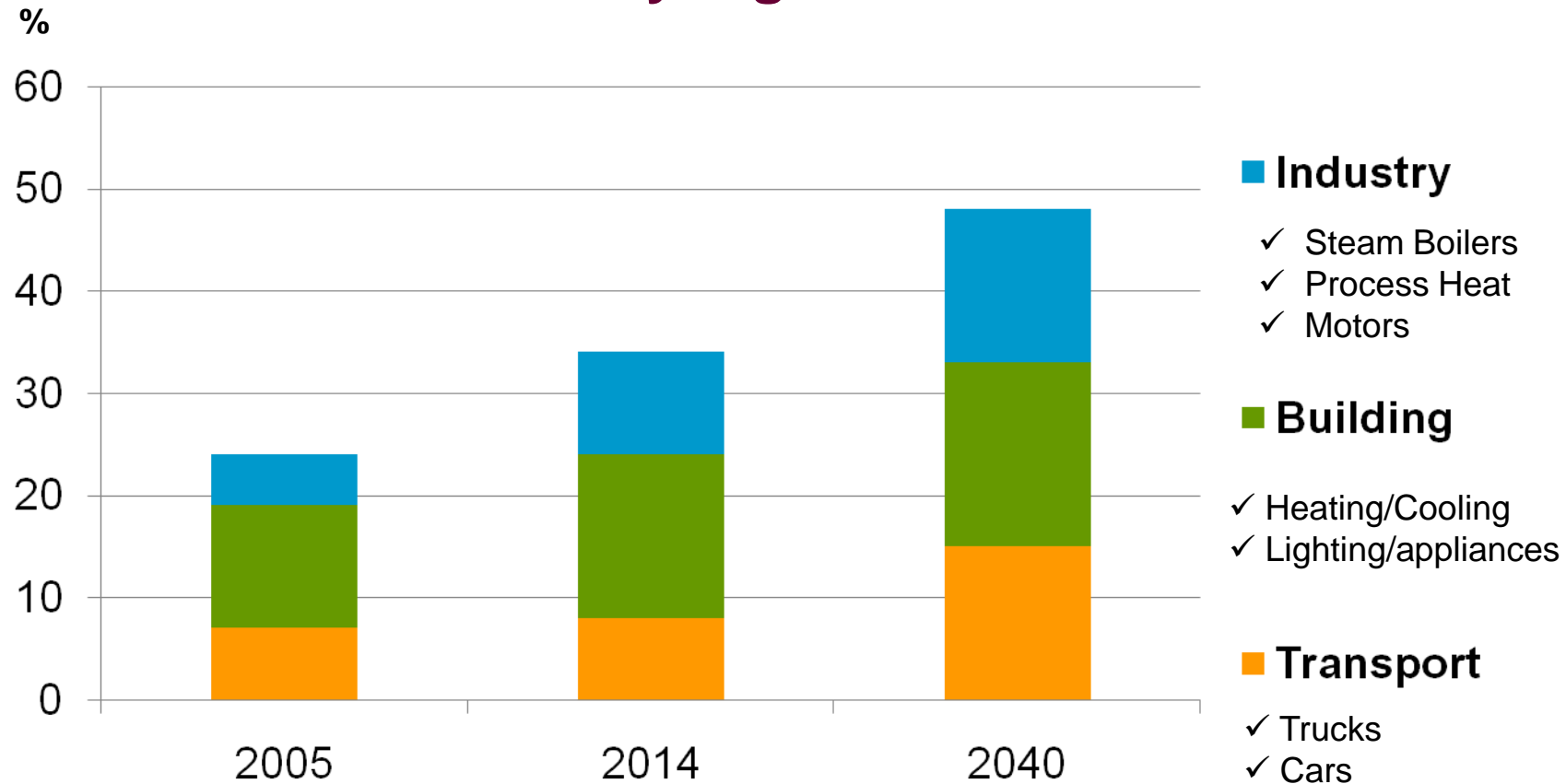
Change in energy demand in selected regions, 2014-2040



***Significant growth in energy demand in emerging economies requires a renewed focus on energy efficiency to provide least cost pathways***

# Action on Energy Efficiency Must Begin to Match its Potential

## Share of energy consumption covered by mandatory efficiency regulations



***Energy efficiency policies are being introduced in more countries and sectors; they continue to slow demand growth, but more can be done***

## FOSSIL FUELS-WORLD & INDIA'S RESERVES



Fossil Fuel	World's Reserves (Proven)	India's Reserves (Proven)	% of World Reserves	Remarks on Indian Reserves
Coal	984 billion tonnes	84,414 million tonnes	8%	* will last for 200 years
Crude Oil	140.4 billion tonnes	658 million tonnes	0.46%	will last for 16 years
Natural Gas	144.8 trillion cubic meter	628 billion cubic meters	0.43%	will last for 23 years

# Growths in Installed Capacity and Per Capita Consumption (kWh)

<b>Particulars</b>	<b>2006</b>	<b>2012</b>	<b>2017</b>	<b>2022</b>	<b>2027</b>
Installed Capacity (GW)	124	225	333	512	790
Per Capita Consumption (KWh)	631	1000	1300	1900	2800



## ENERGY CONSERVATION ACT, 2001

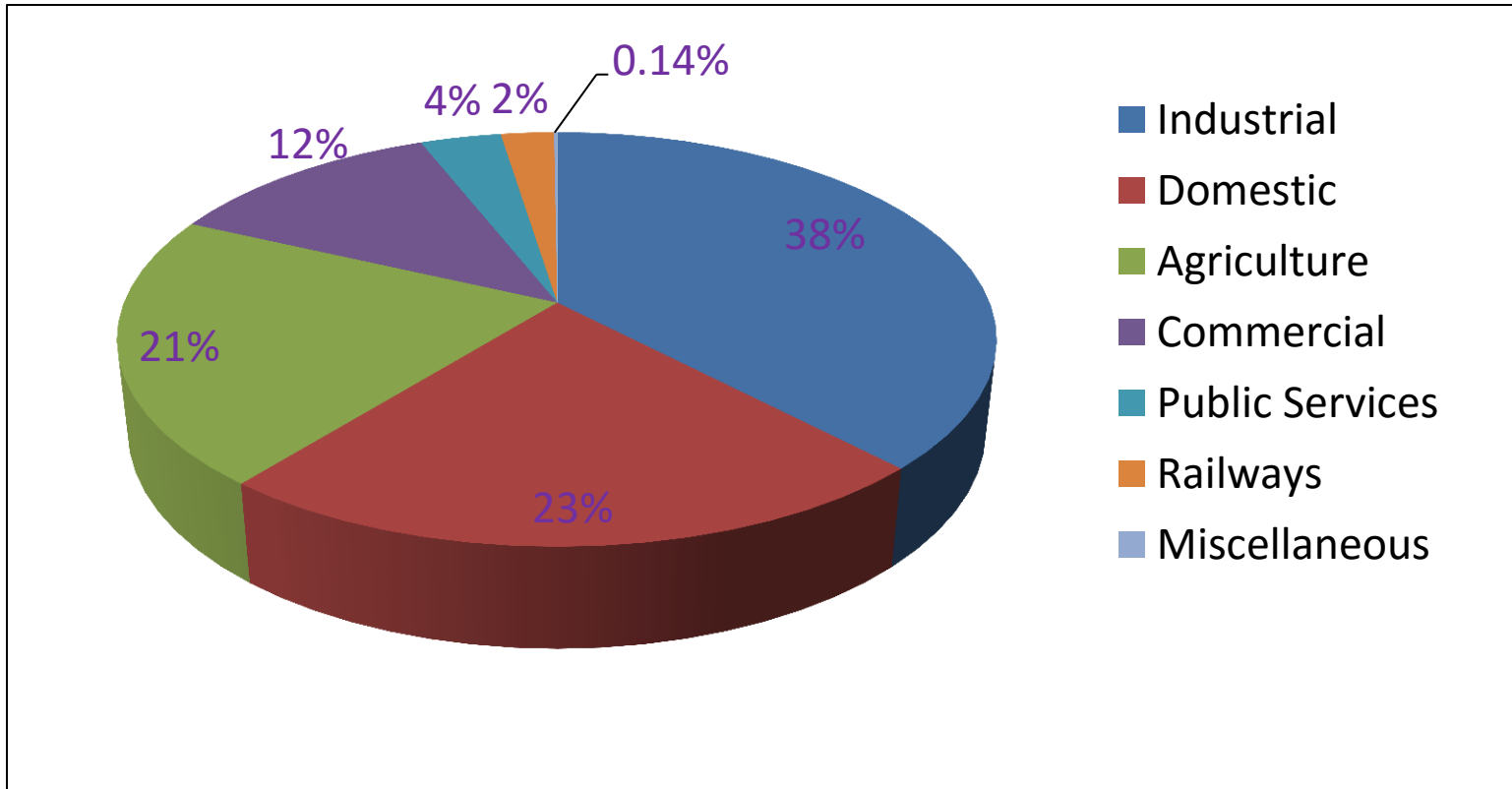
- Energy Conservation has emerged as one of the key policy priority in India's energy sector since the enactment of Energy Conservation Act 2001.
- Subsequently, the Bureau of Energy Efficiency (BEE) was established in 2002 under the MoP with the mission to assist in developing policies and strategies to primarily reduce the energy intensity of the Indian economy.
- The State Designated Agencies (SDA)s are statutory bodies set up by states to implement energy conservation measures at the state level;

- **Preparing Regulatory Framework for energy efficiency in India which includes:**

- Standards and Labels for appliances & equipment
- **Energy Conservation Building Code (ECBC) for commercial buildings.**
- Energy Consumption norms for energy intensive industries
- Demand Side Management (DSM) programme for existing building, streetlights, agricultural pumping and SMEs.
- Certification of Energy Auditors and Managers

*Energy Conservation Act was amended in 2010 on the recommendations of the Committee on Sub-ordinate Legislation*

# MAHARASHTRA ENERGY SCENARIO



**Source:** Electricity Consumption Data from Economic Survey of Maharashtra 2015-16

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# Energy Conservation Building Code (ECBC)

# Energy Conservation Codes & Green building rating systems in India

**Green Rating for Integrated Habitat Assessment (GRIHA)**

**Energy Conservation Building Codes (ECBC)**

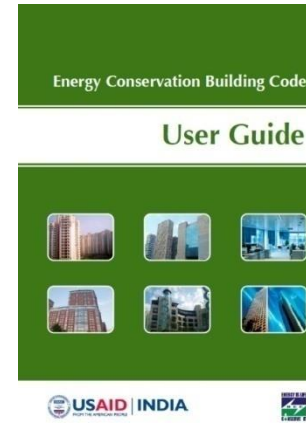
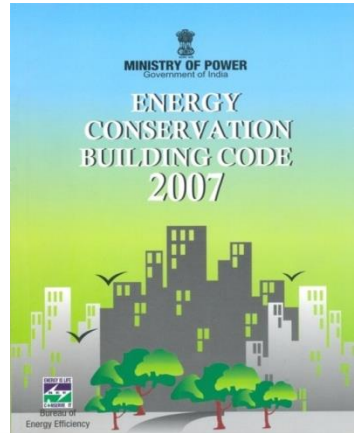
**Indian Green Building Council (IGBC)**

**Eco-Housing**

**Indian Green Building Council (IGBC)**

**US Green Building Council (USGBC) LEED**

# Energy Conservation Building Code (ECBC)



The objective of ECBC is to provide minimum requirements for energy efficient design and design of buildings and their systems

The Energy Conservation Building Code (ECBC) launched by BEE in 2007 (amended 2010) under the Energy Conservation Act 2001.

The rules relating to Energy Conservation Building Codes can be notified under clause (a) of section 15 of clause (l) of sub-section (2) of section 56, for buildings with a connected load of 100kW or contract demand of 120 kVA and above and intended to be used for commercial purposes;

## Why ECBC?

- Increase in built up space in India from 4.5 billion sq. m in 2010 41 billion sq.m by 2030 (projected) (Source: cbalance and Fair conditioning program)
- It is also projected that by 2030, 60% of the commercial space in India will be air-conditioned, 40% urban homes with at least 1+ AC.
- Commercial energy consumption growth has increased from 28,201 Gwh in 2003-04 to 46,685 Gwh in 2007 – 08, an increase of 65% (SOURCE: Central Electricity Authority. 2009. General Review 2009)
- The share of Air Conditioning in commercial building energy consumption is also projected to rise from 23% in 2012 to 55% in 2030
- 66% of building stock is yet to be constructed. (SOURCE: USAID ECO- III Project)

## Why ECBC?

- Estimates based on simulation models indicate ECBC compliant buildings can use 40 – 60% less energy than conventional buildings
- It is projected that a nationwide mandatory enforcement of ECBC will yield annual energy savings to the tune of 1.7 billion kwh
- At the lowest estimate, this implies an annual saving of nearly Rs. 6 billion; with new rates for commercial establishments, this amount would be far higher
- It has been estimated that the implementation of ECBC for commercial buildings with connected load above 100kW, will lead to energy savings to the tune 65 Million units which can supply electricity to 40,000 rural families for a year without additional installation of power plants, at current rate of commercial growth in cities.



# SCOPE OF ECBC

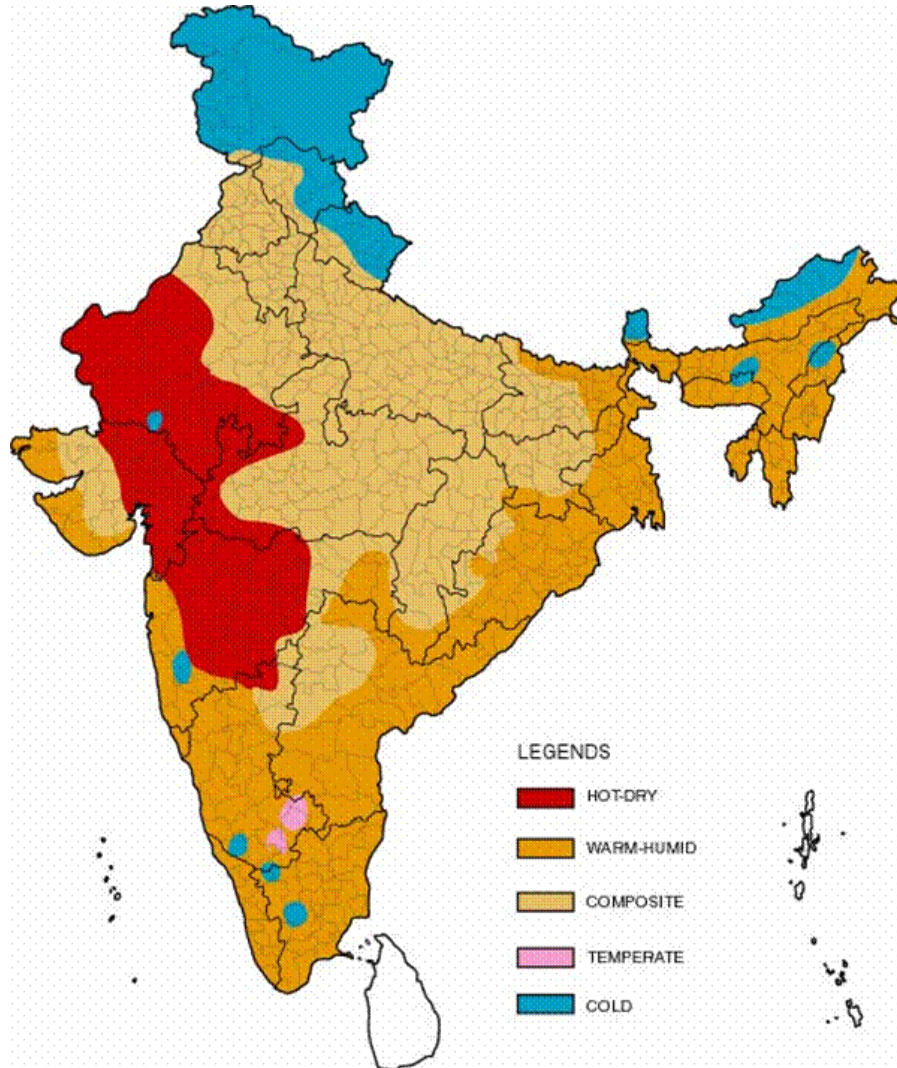
- **New buildings with:**
  - Connected load in excess of 100 kW OR
  - Contract demand in excess of 120 kVA
- **Also applies to Additions & Major Renovations**
- ✓ **Addition + Existing building area > 1000 m<sup>2</sup>**
- ✓ **Renovated portions of a 1000 m<sup>2</sup> or larger building**
- **On conflict with safety regulations, safety regulations will precede**

# ECBC: TYPES OF BUILDING COVERED

- **Large Commercial Buildings**
- **Office Buildings**
- **Large Amenity Buildings**
- **IT Parks**
- **Government Buildings**
- **Hospitals**
- **Retail Malls**
- **Hotels**

# Roadmap for implementation of ECBC in Maharashtra

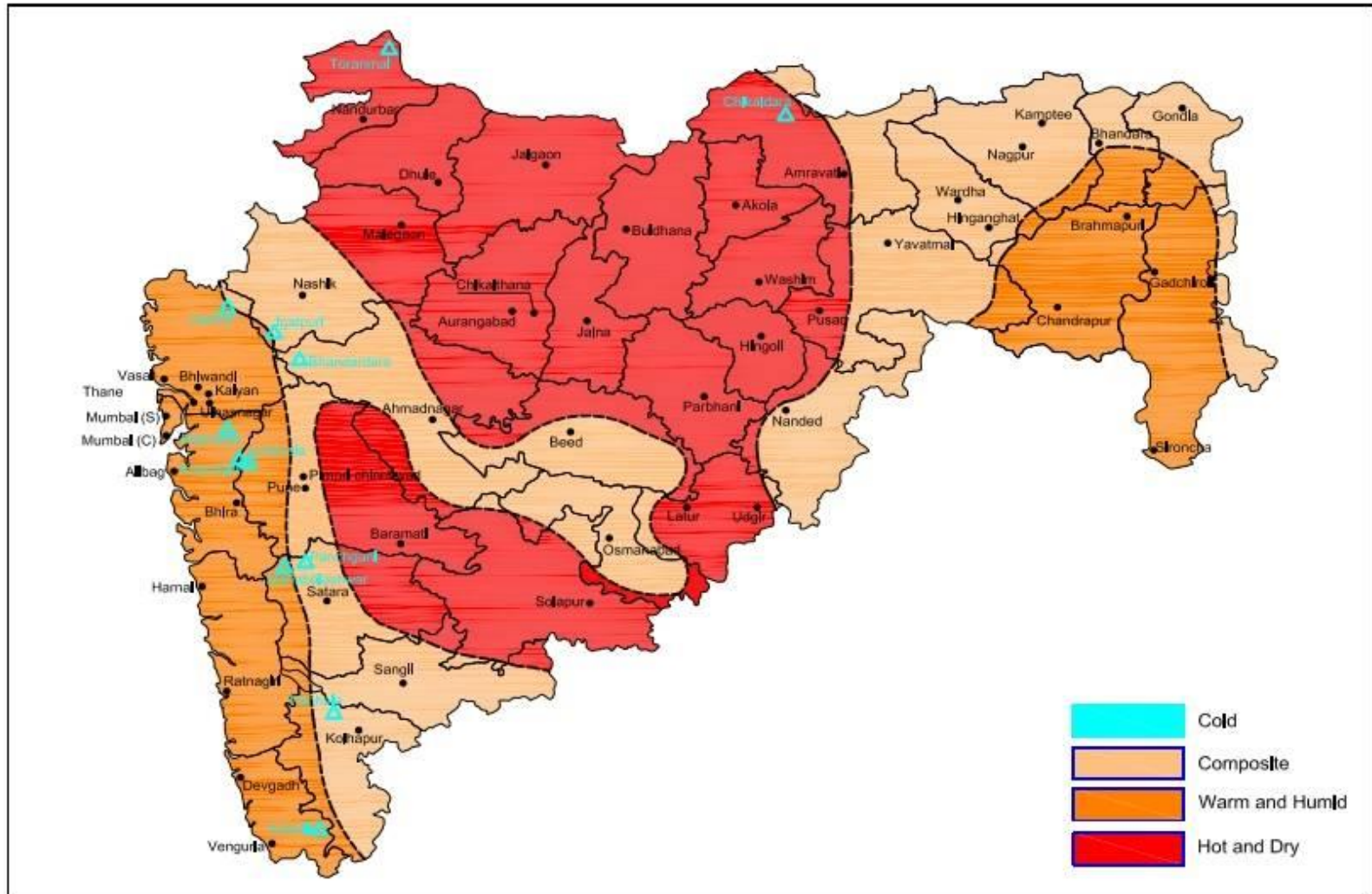
# Climatic Zones of India as per ECBC 2007



Identifies 5 climate zones in India and suggests different compliance for different zones

- Hot – Dry
- Warm – Humid
- Composite
- Temperate
- Cold

# Climate Classification for Maharashtra



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# Proposed Implementation model for Maharashtra

# Proposed Implementation model for Maharashtra

The Third Party Assessor (TPA) model has been accepted by key stakeholders, UDD & MEDA and other stakeholders with whom dialogue and consultation took place as appropriate for enforcement of the Code in Maharashtra.

## Activities Proposed for Stakeholders by MEDA

S.No.	Stakeholder	Proposed Activity
1	ULB and Govt. Officials, Developers, Builders and Financial Institution, Decision Makers	Awareness and training
2	Administrators	Administrative requirements training
3	Professionals – Architects, Engineers, MEP Consultants, Green Building Professionals	Capacity Building
4	ECBC Assessors	Awareness and Capacity Building
		Examination for Accreditation and Empanelment of Assessors
5	Trainers	Training of trainers for awareness and capacity building
6	Project Promoters, Developers, Occupants of Commercial buildings	Awareness



## Establishment of ECBC Cell

- BEE had proposed to create ECBC Cells in the relevant departments of the State Government under European Union (EU) programme.
- Energy Deptt., GoM has given the consent letter to BEE for creation of ECBC cell under the European Union (EU) programme in the State.
- Accordingly, MEDA has established ECBC Cell in the office.
- The purpose of creation of ECBC Cell in the State is strengthening the capacities of the MEDA and also to expedite the capacity building programme.
- Coordination with all relevant stakeholders for integration of ECBC provisions within the building regulations including compliance mechanisms
- Assist in the issuance of ECBC notification & capacity building.

## Impact of ECBC Maharashtra: On Building owner



- Increase in cost of construction for commercial buildings: **7-10%**

- Savings in energy per year for individual buildings: **30-35%**



- Return on additional investment for individual buildings: **3-5 Year**

## Initiatives taken by CPWD

- **Central Public Works Department (CPWD) has adopted the GRIHA Green Building Rating System**
- **CPWD has prepared the Green Building Norms under Section 6A of CPWD Works Manual 2012**
- **According to these norms All CPWD constructions shall henceforth be Green.**
- **Irrespective of whether the clients require certification for Green construction or not,**
- **CPWD shall have internal certification by its own officers. For internal certification, CPWD shall follow GRIHA rating system of TERI.**

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# Initiatives Taken By Government of Maharashtra

## PWD , GoM Initiative for Green Buildings

- Public Works Department, GoM has issued the GR No.BDG2016 / P.K.133/ Buildings-2, dated 8<sup>th</sup> July, 2016 for implementation of Green Building Concept for building projects of GoM.
- GR states that the development of all upcoming Government buildings & renovation of existing buildings to be carried out as per Green Building ratings.
- The audit of buildings to be done by the agencies like GRIHA, LEED, IGBC etc.

महाराष्ट्र शासनाच्या अधिपत्याखालील इमारत  
प्रकल्पांकरिता "हरित इमारत संकल्पना"  
(Green building Concept) राबविणेबाबत..

महाराष्ट्र शासन  
सार्वजनिक बांधकाम विभाग  
शासन निर्णय क्र. बीडीजी २०१६/प्र.क्र.१३३/इमारती-२  
मंत्रालय, मुंबई ४०० ०३२  
दिनांक :- ८/७/२०१६

**प्रस्तावना :-**

महाराष्ट्र शासनाच्या अधिपत्याखालील विविध भागांच्या इमारती सार्वजनिक बांधकाम विभागामार्फत बांधण्यात येतात. सद्यःस्थितीत या सर्व शासकीय इमारतींचे नकाशे व आराखडे महाराष्ट्र शासनाच्या वास्तुशास्त्रज्ञांमार्फत प्रचलित पध्दतीने तयार करण्यात आले आहेत/येतात.

२. जागतिक स्तरावर अत्याधुनिक पध्दतीने मोठमोठे इमारत प्रकल्प उभारण्यात येतात. त्यामुळे बांधकाम क्षेत्रात पर्यावरणासाठी मोठे आव्हान ठरत आहे. इमारत प्रकल्पांचे बांधकामाच्या वेळी सर्वसाधारणपणे ४० टक्के उर्जेचा वापर होतो. तसेच इमारत बांधकामाच्या विविध क्रियांमुळे अंदाजे ५० टक्के हवेचे व पाण्याचे प्रदूषण तसेच ४२ टक्के हरित वायू विसर्जन व जवळपास ५० टक्के क्लोरोफ्ल्युरोकार्बन्सची निर्मिती होते.

३. आजच्या प्रगत युगात मोठमोठे निवासी व व्यापारी इमारत संकुले उभारण्यात येत आहेत. यामुळे सदर इमारतीतील उर्जेचा वापर मोठया प्रमाणात वाढला आहे. एकूण वीजेच्या मागणीपैकी ५० टक्क्यांहून अधिक वीजेचा वापर विविध इमारतींमध्ये दैनंदिन गरजांसाठी होत आहे. यामुळे वीजेचे भारनियमन करणे बंधनकारक झाले आहे.

४. वाढत्या शहरीकरणामुळे तसेच बांधकाम व्यवसायातील स्पर्धेमुळे इमारतींच्या दिखारूपणास अतिशय महत्त्व प्राप्त झाले आहे. यामुळे आवश्यकता नसतानाही पर्यावरणावर प्रतिकूल परिणाम होणा-या संकल्पना पुढे येत आहेत. परिणामी वातानुकूलन यंत्रणा तसेच अंतर्गत प्रकाशासाठी जास्त उर्जेचा वापर होत आहे. तसेच अंतर्गत सजावटीसाठी घातक वायू निर्माण होणा-या साधनांचाही वापर करण्यात येत आहे.

५. उपरोक्त सर्व बाबींमुळे एकूणच वीजेचा वापर मोठया प्रमाणावर वाढला आहे. त्यानुषंगाने अतिरिक्त वीजनिरमिती करणे आवश्यक झाले असून त्याकरिता होणारा खर्चही मोठया प्रमाणात जास्त आहे. सध्याची एकंदरीत आर्थिक स्थिती पहाता वीजनिरमितीकरिता होणा-या खर्चांमुळे अर्थव्यवस्थेवर अतिशय ताण पडण्याची शक्यता आहे व हे परवडण्याजोगे नाही. त्यामुळे वीज बचत हा एकमेव पर्याय शिल्लक राहतो व त्यादृष्टीने "हरित इमारत संकल्पनेचा" (Green building Concept) विचार करणे क्रमप्राप्त झाले आहे. यानुषंगाने पर्यावरणाचे संतुलन राखणे तसेच नैसर्गिक उर्जास्रोतांचा वापर इमारतींच्या प्रकल्पांमध्ये समावेश करणे अत्यावश्यक आहे.

६. वरील सर्व वस्तुस्थिती पहाता, महाराष्ट्र शासनाच्या अधिपत्याखालील विविध नवीन इमारतींचे संकल्पनेचा "हरित इमारत संकल्पनेचा" (Green building Concept) वापर करून नकाशे व आराखडे तयार करणेच्या दृष्टीने धोरणात्मक निर्णय घेणे शासनाच्या विचाराधीन आहे.

शासन निर्णय क्रमांक: बीडीजी २०१६/प्र.क्र.१३३/इमारती-२

७. त्याचप्रमाणे अस्तिवातील महत्त्वाच्या इमारतींचे मोठया प्रमाणावर दुरुस्ती हाती घेण्यात येणा-या कामांमध्येही "हरित इमारत संकल्पनेचा" (Green building Concept) लक्षात घेऊनच कामे हाती घेणे अपेक्षित आहे.

**शासन निर्णय :-**

वरील प्रस्तावनेत नमूद केलेल्या परिस्थितीचा विचार करून यापुढे इमारत प्रकल्पांचे नकाशे व आराखडे तयार करताना खालील सूचनांचे काटेकोरपणे पालन करण्यात यावे :-

(अ) महाराष्ट्र शासनाच्या अधिपत्याखालील सर्व इमारतीचे संकल्पनेचा "हरित इमारत संकल्पनेचा" (Green building Concept) वापर करून नकाशे व आराखडे तयार करावेत.

(ब) अस्तिवातील महत्त्वाच्या इमारतींचे मोठया प्रमाणावर दुरुस्ती हाती घेण्यात येणा-या कामांमध्येही "हरित इमारत संकल्पनेचा" (Green building Concept) लक्षात घेऊनच दुरुस्तीविषयक उपाययोजना कराव्यात.

(क) पर्यावरणाचे संतुलन राखणे तसेच नैसर्गिक उर्जास्रोतांचा वापर इमारतींच्या प्रकल्पांमध्ये समावेश करणेबाबत नियोजन करावे.

(ड) संबंधित मुख्य अभियंता यांनी हरित इमारती बांधकामानंतर त्या इमारतींचे परिरक्षण (Audit) हे Leeds अथवा IGBC सारख्या मान्यताप्राप्त संस्थांकडून करून घ्यावे व त्यांचे प्रमाणपत्र उपभोक्ता विभागाकडे पाठवावे.

सदर शासन निर्णय महाराष्ट्र शासनाच्या [www.maharashtra.gov.in](http://www.maharashtra.gov.in) या संकेतस्थळावर उपलब्ध करण्यात आला असून त्याचा संगणक संकेतांक २०१६०७०८१५५५१६७३१८ असा आहे. हा आदेश डिजीटल स्वाक्षरीने साक्षांकित करून काढण्यात येत आहे.

महाराष्ट्राचे राज्यपाल यांच्या आदेशानुसार व नावाने,

Sanjay Uttarwar

( सं.मु.उत्तरवार )  
कार्यासन अधिकारी

प्रत,

१. मंत्रालयीन सर्व विभाग.
२. अ.मु.स (सा.बां)/सचिव (रस्ते)/सचिव (बांधकामे), सा.बां.विभाग, मंत्रालय
३. सर्व मुख्य अभियंते, सा.बां.प्रा.विभाग व (विद्युत) विभाग
४. मुख्य वास्तुशास्त्रज्ञ, महाराष्ट्र, राज्य, मुंबई
५. सर्व अधीक्षक अभियंते, सा.बां.मंडळ व (विद्युत) मंडळ
६. सर्व कार्यकारी अभियंते, सा.बां.विभाग व (विद्युत) विभाग
७. संचालक, उपवने व उद्याने, मुंबई
८. सर्व अधिकारी व कार्यासन अधिकारी, सा.बां.विभाग, मंत्रालय
९. निवडनस्ती (इमारती-२ कार्यासन).

Digitally signed by Sanjay Uttarwar  
DN: cn=, ou=Government Of Maharashtra,  
ou=DY ENGR AND DESK OFFICER,  
postalCode=400032, st=Maharashtra,  
2.5.4.20=cab21a5449660ded981a3eca  
806321e245c3a783f622e29d3e10801  
83, c=Sanjay Uttarwar  
Date: 2016.07.08 16:04:55 +05'30'

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# **Green Building Initiative by Municipal Corporations in the State**

# Incentives by Pune Municipal Corporation(PMC)

**Discount in premium charges for developers for GRIHA certified Green Buildings:**

The developers coming up with new construction projects in the jurisdiction of Pune Municipal Corporation will get the following discounts on the premium charges payable to the corporation, as per the star rating awarded by GRIHA Council.

Rating	Point Scored		Discount in Premium
	GRIHA	SVA GRIHA	
***	71-80	36-40	5%
****	81-90	41-45	10%
*****	91-100	46-50	15%



# Incentives by Pune Municipal Corporation(PMC)

Refund of up to 15% of premium for IGBC Certified

**Green Buildings:**

- ❖ 5% for silver rating
- ❖ 10% for gold rating
- ❖ 15% for platinum rating



Indian Green Building Council  
*Greening India since 2001*

## Incentives by Pimpri-Chichwad Municipal Corporation (PCMC)

- PCMC has taken a proactive initiative to reduce the environmental footprint generated by the building industry.
- The first municipal corporation in the country to make a conscious effort towards promoting sustainable development and wise use of natural resources by adopting GRIHA & SVA GRIHA national rating system for green buildings in India.
- **Buildings which can get rated under GRIHA**
- All buildings (except for industrial complexes), which are in the design stage, are eligible for certification under GRIHA.
- Buildings include: offices, retail spaces, institutional buildings, hotels, hospital buildings, healthcare facilities, residences and multi-family high-rise buildings.

## Incentives by Pimpri Chichwad Municipal Corporation(PCMC) for GRIHA Rating



**Discount in premium for developers:**

**The developers in Pimpri Chinchwad Municipal Corporation will get the following discounts on the premium amount of building permission charges, as per the level of rating awarded by GRIHA .**

**Discount in premium :-**

Points Scored	Rating	Discount in Premium
50-60	1 Star	10%
61-70	2 Star	20%
71-80	3 Star	30%
81-90	4 Star	40%
91-100	5 Star	50%



## Incentives by Pimpri Chichwad Municipal Corporation(PCMC) for SVA GRIHA Rating

Depending on the level of SVA GRIHA star rating, the developer can avail discount in the premium as mentioned in the table below:

Discount in property tax All residential buildings, commercial complexes, individual houses, bungalows which comply with the SVA GRIHA criteria shall be eligible for the rebates.

Points Scored	Rating	Discount in Premium
25-30	1 Star	10%
31-35	2 Star	20%
36-40	3 Star	30%
41-45	4 Star	40%
46-50	5 Star	50%

Points Scored	Rating	Discount in Property tax
25-30	*	5%
31-35	**	8%
36-40	***	10%
41-45	****	12%
46-50	*****	15%

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**HANDS**

**IN CONSERVING IT**

**Thank You**