

# EBC



Energy in Buildings and  
Communities Programme

# Renewable Energy Integration in Building Energy Codes

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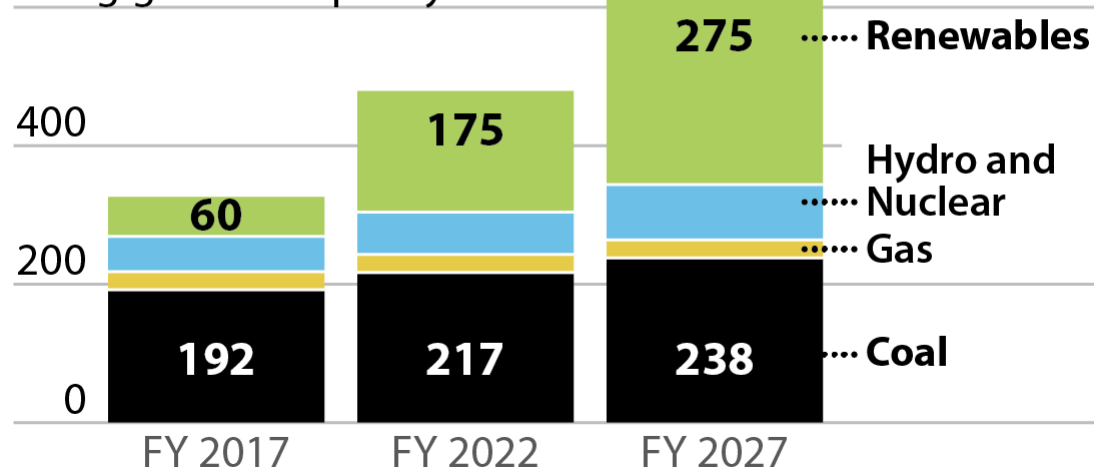
EBC Building Energy Codes Working Group  
Annual Symposium

# National Energy Policy

## India's National Electricity Plan, 2018

Coal gets cut, renewables grow rapidly in the new plan.

600 gigawatts capacity



- Focus on Rooftop Solar
- Calls for subsidy support.
- 40GW target by 2022 from non-grid connected solar is to be achieved.

# Energy Conservation Building Code



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- Applicable to Commercial Buildings – 16 types
- Three versions of ECBC based on Stringency ECBC, ECBC+, Super ECBC
- States to adopt and implement ECBC
- ECBC – Residential, ECONIWAS SAMHITA (ENS)

# Energy Conservation Building Code



## Mandatory Requirements

- Provisions for installation of RE on rooftops or the site. Renewable Energy Generating Zone (REGZ)
- At least 25 % of roof area or area required for generation of energy equivalent to 1% of total peak demand or connected load of the building, whichever is less.
- ECBC+ and SuperECBC building shall fulfil the additional requirements.

# Energy Conservation Building Code

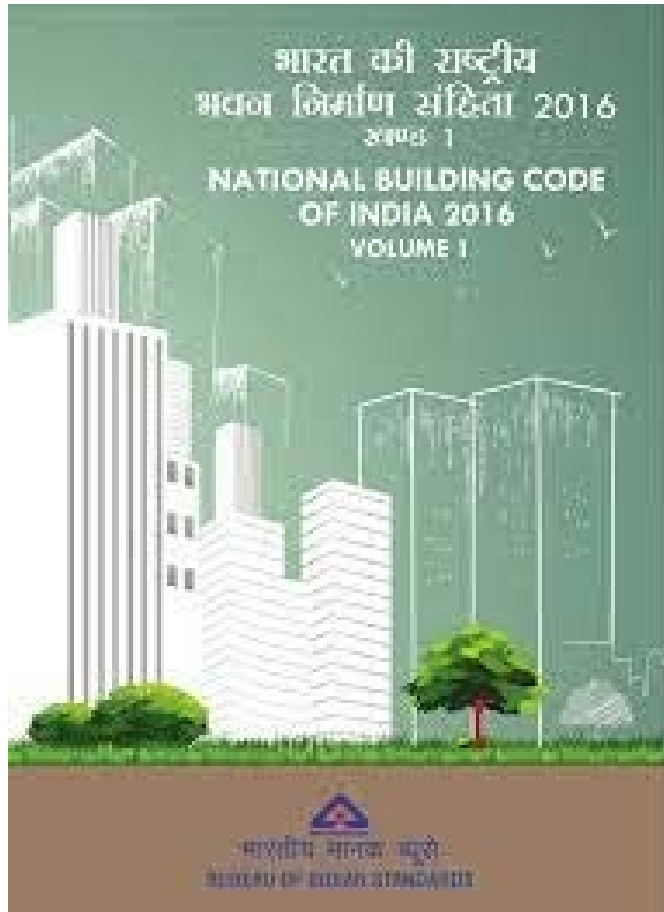


<b>ECBC</b>	<b>Minimum Electricity to be Generated in REGZ</b>
All building types except mentioned	Min. 2% of Electrical load
Star Hotel > 20,000 m <sup>2</sup> Resort > 12,500 m <sup>2</sup> University > 20,000 m <sup>2</sup> Business >20,000 m <sup>2</sup>	Min. 3% of Electrical load
<b>ECBC+</b>	<b>Minimum Electricity to be Generated in REGZ</b>
All building types except below	Min. 4% of Electrical load
Star Hotel > 20,000 m <sup>2</sup> Resort > 12,500 m <sup>2</sup> University > 20,000 m <sup>2</sup> Business >20,000 m <sup>2</sup>	Min. 6% of Electrical load

# National Building Code Requirements



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- Section 21.2 of NBC, Solar Energy Utilization
- Plots having size 500 m<sup>2</sup> and above shall install SPV.
- To be used for in-house utilization or for transfer to the grid.
- Local authorities to amend building by-laws and approval mechanism

# National Building Code Requirements

# EBC



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<i>Sl No.</i>	<i>Building Type</i>	<i>Plot Size</i>	<i>Generation Requirement</i>
(1)	(2)	(3)	(4)
i)	Residential (Plotted houses)	100 m <sup>2</sup> and above	1 kWp or 5 percent of connected load, whichever is higher
ii)	Residential (Group housing)	All sizes	Minimum 5 percent of connected load
iii)	Business, educational buildings having connected load of 30 kW and above	500 m <sup>2</sup> and above	5 kWp or 5 percent of connected load, whichever is higher
iv)	Mercantile, hotels, motels, assembly, industrial and institutional buildings	500 m <sup>2</sup> and above	for buildings having connected load of: a) 50-1 000 kW — 10 kWp or 5 percent of connected load whichever is higher b) Above 1 000 kW — 50 kWp or 5 percent of connected load whichever is higher

# National Building Code Requirements



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- 21.2.2 of NBC - **Solar Water Heating System**
- Residential buildings - 4 000 m<sup>2</sup> and above;
- Plotted houses having plot area of 250 m<sup>2</sup> and above;
- Hostels for schools, colleges and training centers for more than 100 students;
- Institutional buildings; and Assembly buildings
- Subject to a minimum of 25 liter per day hot water yield for each bathroom and kitchen.



# MoHUA Model Guidelines (2016)



## **Lighting :**

Multistory residential and group housing societies, apartment complexes shall have 15% of the total external lighting load

For commercial, institutional, industrial, mixed use buildings

Shall have 5% of the total lighting load

# MoHUA Model Guidelines (2016)

## Solar Hot Water System : 20% requirements



- Industries where hot water is required for processing
- Hospitals and Nursing homes
- Hotels, Motels and Banquets halls
- Jail Barracks, Canteens.
- Multi Family Residential Units
- Plotted Development having plots size more than 500M<sup>2</sup>
- All Government buildings

# State Level Policies: Grid SPV



## 13 States have published SPV Policy

Andhra Pradesh Chhattisgarh, Gujarat, Haryana, Karnataka, Kerala, Manipur, Punjab, Rajasthan, Uttar Pradesh, Tamil Nadu, Uttarakhand and West Bengal.

## 19 SERCs have notified regulations for netmetering/feed-in-tariff

Andhra Pradesh, Chhattisgarh, Delhi, Haryana, Karnataka, Kerala, Tamil Nadu, Uttarakhand and West Bengal, Andaman & Nicobar, Chandigarh, Dadra & Nagar Haveli, Daman & Diu, Lakshadweep, Pondicherry, Goa, UP, Rajasthan and Odisha.

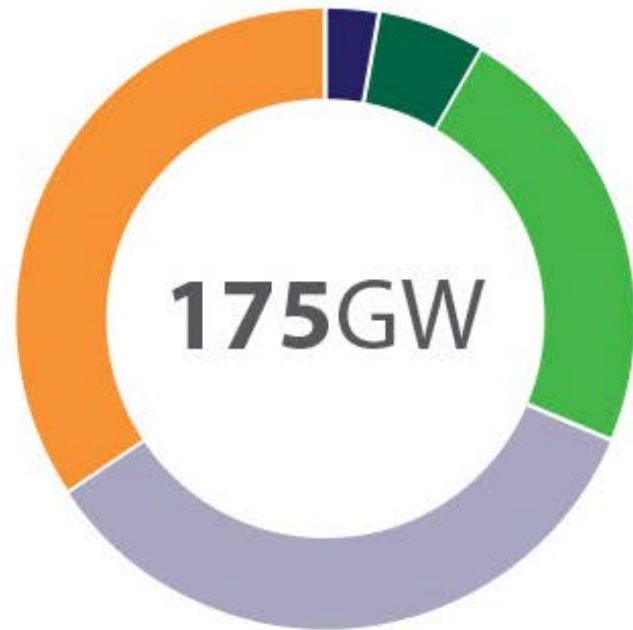
## 4 states have adopted policies in the building bye laws

Uttar Pradesh, Chhattisgarh, Haryana and Chandigarh

# India's Renewable Energy Targets



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**5GW**  
Small hydro



**10GW**  
Biomass



**40GW**  
Rooftop solar



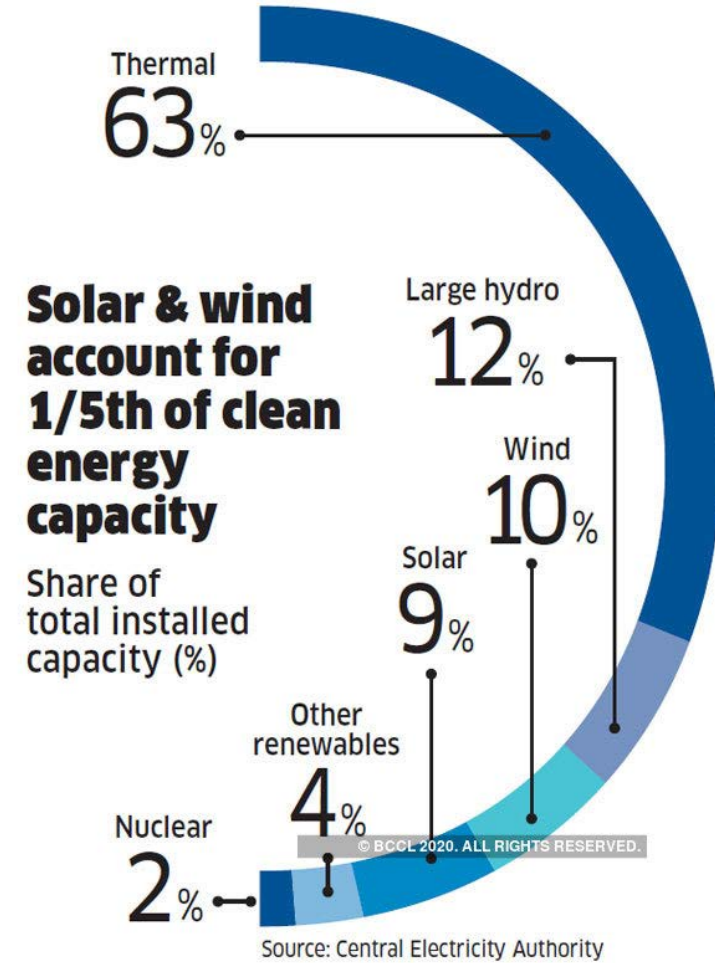
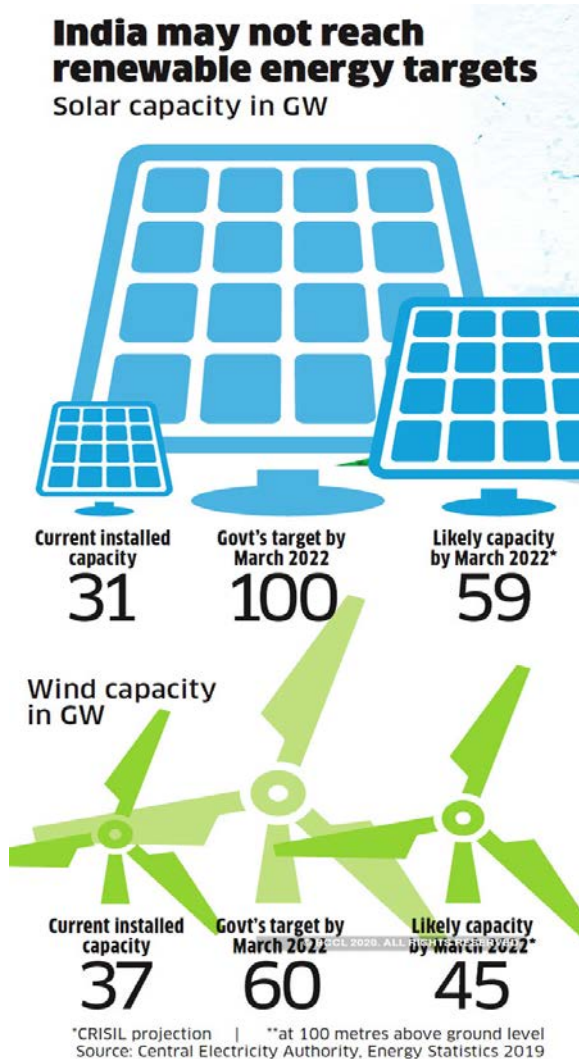
**60GW**  
Wind



**60GW**  
Solar photovoltaic

*Graphic © Asia Briefing Ltd.*

# RE Generation Status





# Building bylaws amendment

## Roof top SPV



### **New Delhi**

- SPV Module Hight Relaxation
- No Additional Approval
- Must construct temporary structure to support SPV



### **Haryana**

- 5% of the sanctioned load of private hospitals, educational institutes covering an area greater than 500 square yards.
- Mandatory Energy Conservation Building Code

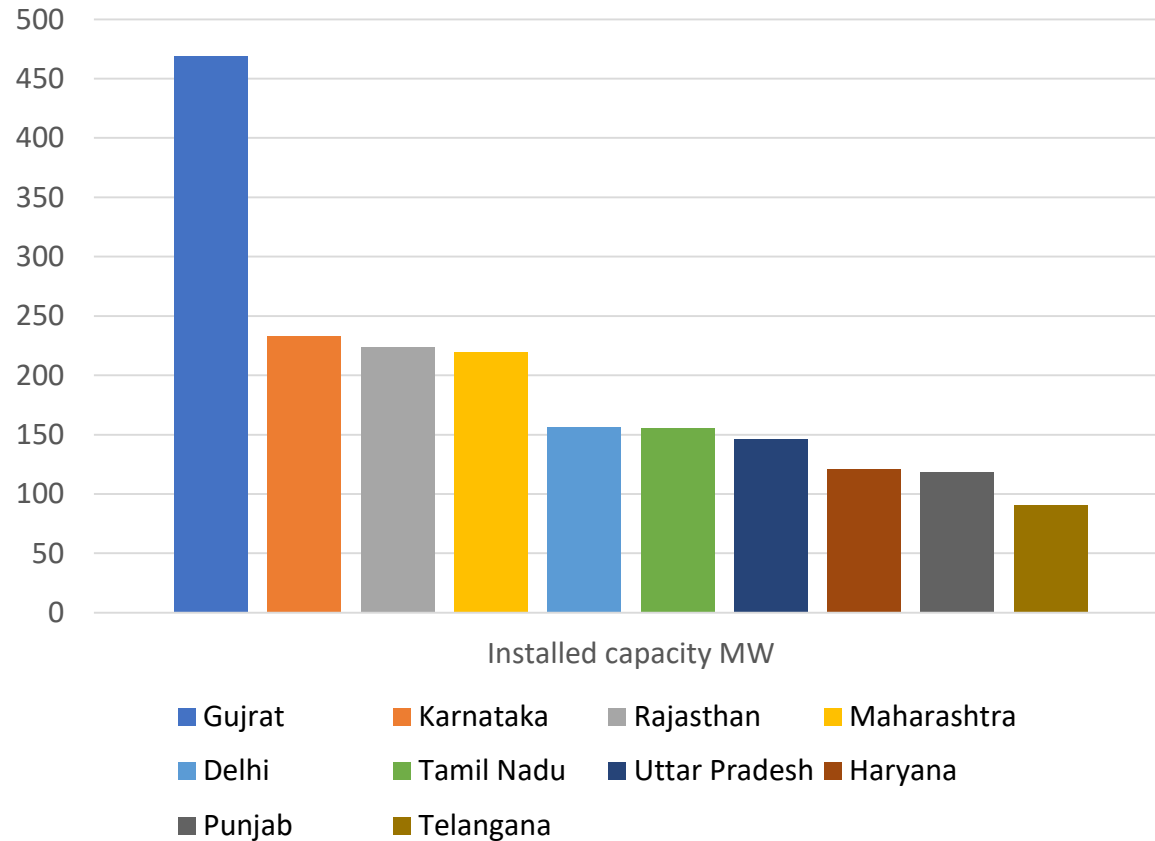
# Need for Integration in Building Codes



- Regulated and Enforced
- Minimum Performance ensured
- Drives National Policies, Vision and Targets
- Promotes opportunity for new technologies
- Promotes investment and market competition

# Rooftop SPV Success

State wise Rooftop Solar PV installed capacity



- Gujarat installed 50K subsidized Roof top SPV in Residential Sector as on 2 March 2020
- 79k residential consumers have installed rooftop solar of around 322-megawatt (MW) capacity as on 2 March 2020 availing central financial assistance (CFA) from MNRE



## Challenges & Gaps : Rooftop SPV

- Lack of Information
- Small size and high financing costs
- Barriers in scaling-up RESCO model
- Enforcement of ECBC & Model Building Bylaws
- Energy Performance Monitoring
- Institutional barriers- compliances, permits and prescriptive codes – need to emphasise on performance-based assessment



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**Thank you**  
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