Bureau of Energy Efficiency

सत्यमेव जयते
Government of India
Ministry of Power

german cooperation
DEUTSCHE ZUSAMMENARBEIT

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# ANGAN

## Augmenting Nature by Green Affordable New-habitat

A Courtyard for Revolutionary Change in Building Energy Efficiency

An International Conference on Building Energy Efficiency

9th-11th September, 2019 | Hotel The LaLiT, New Delhi

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THIS PRESENTATION WAS SHARED BY


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FOR THE SESSION:

*"Integration of Renewable Energy in Buildings in India"*

DURING ANGAN 2019

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Augmenting Nature by Green Affordable New-habitat (ANGAN)

# Integration of Renewable Energy in Buildings in India

**Sanjay Dube, President, IIEC**

**10th September 2019**

New Delhi

# About IIEC

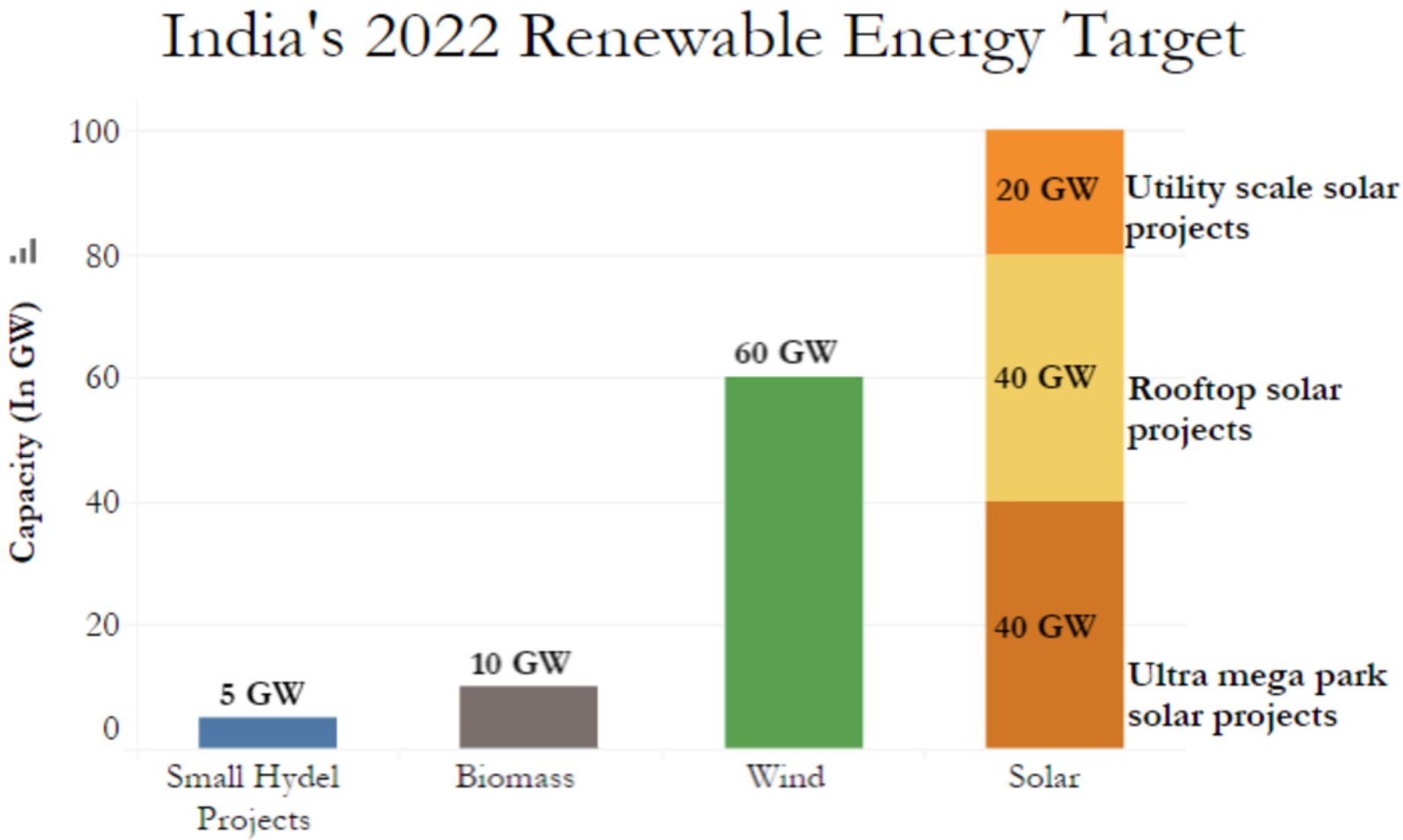
- **IIEC** is a non-governmental, not-for-profit organization, with headquarters in Washington DC, established in 1984 to foster the sustainable energy development in developing countries and countries in transition.
- **Staff** includes energy policy analysts, marketing and finance experts and engineers
- **Clients**: Governments, foundations, multilateral development agencies, and private sector

IIEC
International Institute for Energy Conservation

## MISSION!

***IIEC promotes sustainable energy in industrializing and transitional economies as a tool for socially and environmentally sound economic development***

# India has Set Ambitious Targets for RE



# Perfect Timing to Promote RE Integration in Buildings

## Broad Objective

To design, showcase, implement and monitor building integrated new and innovative Renewable Energy technologies suitable in the Indian context.

## The Project

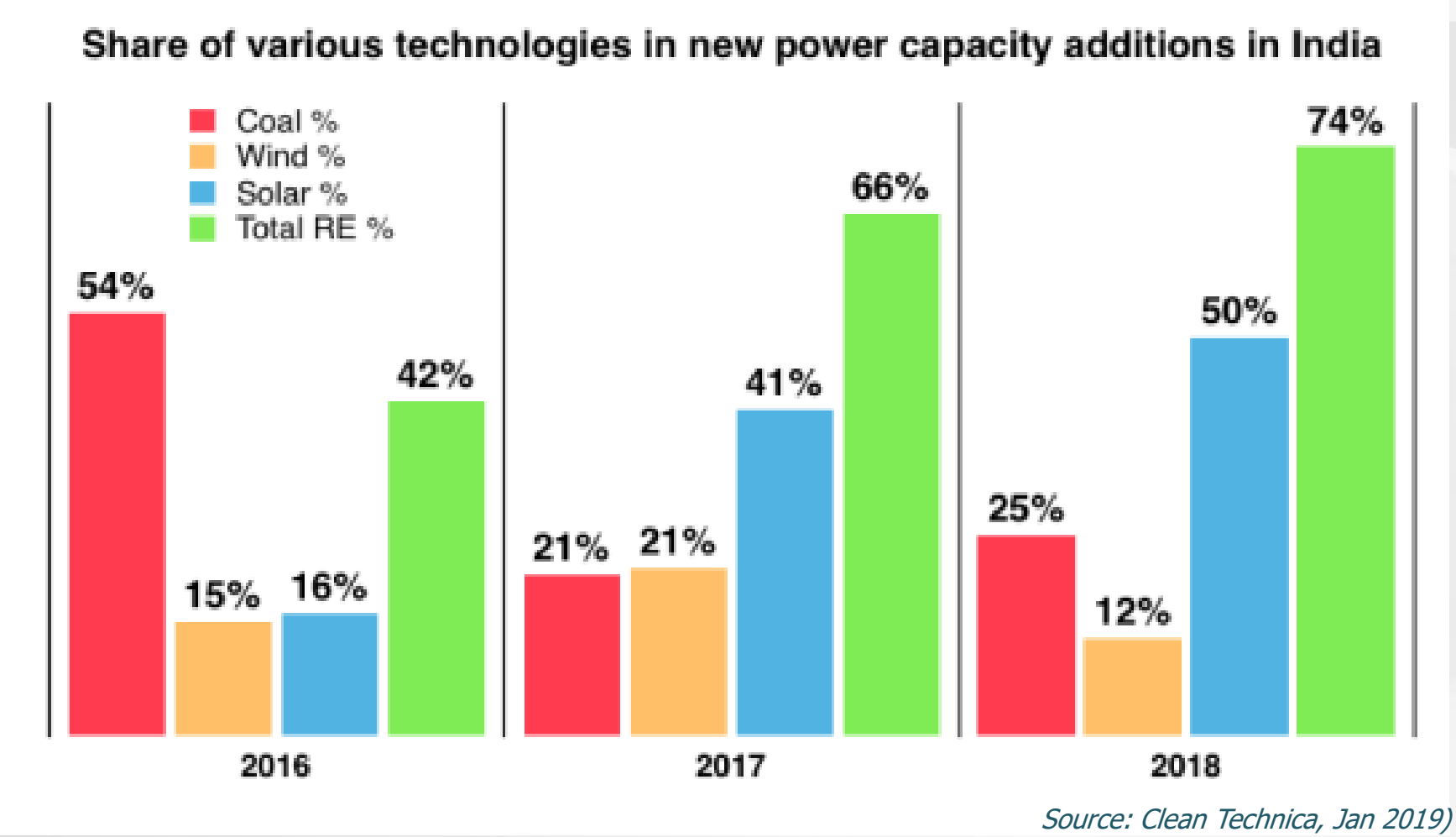
- **3-Year Program –** Started in January 2019 & ending in December 2021. **Funded by Swiss Development and Cooperation (SDC)**
- Working with public and private sector stakeholders to **demonstrate technological interventions for building integrated Renewables**
- Project will **develop** research, monitoring methods, tools and manuals to measure the performance of systems
- Key focus on **dissemination of knowledge products and introduce business models with potential to scale-up**

**Implemented by the Consortium Led by IIEC and Supported by EDS, BASE and Meghraj Capital Advisors**

# Why Integrate RE in Buildings in India

- Buildings of the Future in India – Need increased integration of renewable energy and smart grid technologies;
- RE Technology Integration – Will play a key role in promotion and implementation of programs like Demand Response and District Cooling;
- Increased Integration of RE – Can complement the effective implementation of EE in buildings;
- Increased Opportunities – Will lead to showcase and scale-up new and available RE technologies use in India. Will also promote technology transfer from other countries;
- Innovative Business Models – Will emerge and help in transforming building sector market (The market is also looking at low or zero energy buildings);
- Market Opportunities – To promote the use of green cooling and how this can promote the integration of EE and RE in buildings.
- How 'Buildings as Micro Grid Model' can work in India;

# RE Technology Share in New Power Generation is Increasing




*Source: Clean Technica, Jan 2019)*

# How the Project is Going to Contribute

Goal: Drive the market to implement RE technological integration

Design Business Models with Scale-up Potential

Success Depends on Timing about Decision Making:

- At the design stage, or
- At a later stage

Selection of Commercially Viable Technologies

**How?**

**Solutions to Include:**

- Technologies
- Providers, distribution channels
- Financing instrument
- Current policy/regulation
- Incentives
- Maintenance
- Guarantees
- Marketing/ promotion
- etc.

# Stakeholders and Motivational Factors

## STAKEHOLDERS:

- Technology providers
- Public and private sector developers
- Financing institutions
- End users
- Utilities
- Regulators
- Smart grid service providing agencies
- Insurance companies
- Building Managers and Service Providers

## MOTIVATIONAL FACTORS:

- Competitive difference for developers
- Improved CSR image
- Possible access to climate/green/concessional funding from national/international agencies
- Lower electricity bills
- Energy security
- Better comforts
- Better brand value
- Unique designs
- Improved social status

# Policy Environment is Getting Better

**Policies for Promotion of RE:**

- **Inter-Connection:** It is possible to connect renewable electricity to the grid.
- **Net Metering:** Introduced in many states to allows the flow of information and monitoring both to and from the customer.
- **Time-of-Use Rates:** Utilities can charge Day/Night and seasonal rates.
- **Feed-In Tariffs:** Long-term financial incentives to customers who generate electricity with renewable technologies.

# Codes and Rating Systems Also Promote RE

- RE mandatory for certain types of buildings- Under ECBC and model building bye-laws  Green Building Rating systems:
- RE is mandatory for buildings in GRIHA,
- RE integration in buildings is not mandatory in IGBC rating systems.
- Provision of credit points for RE integration.
- RE system is either based on installed capacity or on energy generation.

| Green Building Rating Systems in India | |
|---|---|
| India Green building Council (IGBC) | CII |
| Leadership in Energy and Environmental Design (LEED) | GBCI |
| Green Rating for Integrated Habitat Assessment (GRIHA) | TERI |
| Excellence in Design for Greater Efficiencies (EDGE) | IFC |

| Technology | NBC | ECBC | GRIHA | IGBC |
|---|---|---|---|---|
| Solar thermal | √ | √ | Mandatory on-site RE generation to offset a part of the annual energy consumption | Non-mandatory credit points |
| Solar PV | √ | Mentions generation from RE at the rooftop or at the site | | Non-mandatory credit points<br>Provision for both on and off-site RE generation |
| Wind | √ | | | |
| WTE | √ | | | |
| Geothermal | √ | | | |

# Market Drivers Indicate Towards Opportunities to Invest?

**End-users/Clients**

- Where is the demand? (eg. **deficit** 10 million houses in urban areas in 2018
- Rising demand for Residential, offices, commercial and other categories of buildings/housing

→

- Government's Target 2022 – **Housing for all**
- Growing Market size – **US$ 1 Trillion by 2030 from US$ 120 Billion in 2017**
- Government is committed to make India – a **$5.0 Trillion Economy by 2024**

Source: IIEC Research

# Clean Energy Financing in India is Growing

## Financing of Clean Energy

- Key players (lender/investor) in green/sustainable/real state and mortgages

→ SBI green bond (2018) - $ 650 Mn.
YES Bank (2015) - $ 140 Mn
CLP India (2016) - $ 85 Mn
Axis Bank (2016) - $ 500 Mn

- Need to improve access to more competitive financing conditions

- Introduction of competitive mortgages / Green financing

→ Public funding?
International funding?
Guarantees?
Insurance?

Source: IIEC Research

# How the Project is Aligned with National Programs

## Ministry of Housing and Urban Affairs (MoHUA)

- Ministry has a **Climate Smart Cities Program**
- The program is focussing on **102 cities** across different states in India
- The project will contribute to the indicator – **"Percentage of Electrical Power from Renewable Energy Sources in the City"** under the key pillar of the program – **"Energy and Green Buildings".**

## Ministry of New and Renewable Energy (MNRE)

- The project will contribute to the achievement of **227 GW target** of Govt. of India
- The project activities are aligned with **'New Technologies' initiative** of MNRE
- The project activities are aligned with **Rooftop Solar Program** of Ministry.

# Thank You

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