

# Low-Carbon Scenario Research Network (LCS-RNet) 2025

## Session 1: 10 Years since Paris Agreement

### DDP Report 2025: Decade of National Climate Action

# India



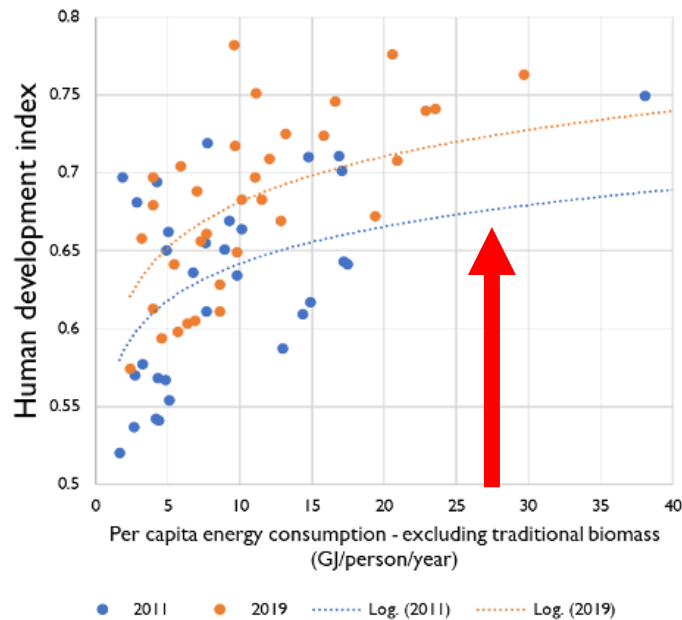
Vidhee Avashia, Jyoti Maheshwari,  
**Saritha Sudharma Vishwanathan**, Amit Garg

December 18, Online (18:15-18:55)

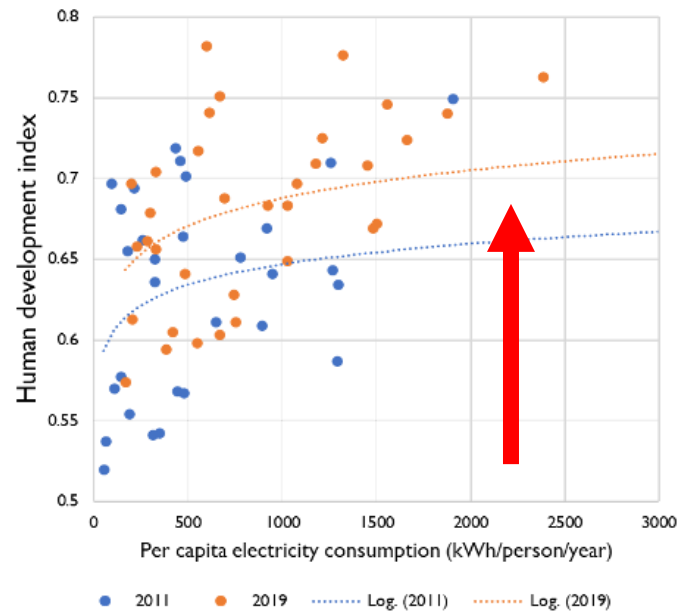
December 18-19, 2025

# India - Development Aspirations and Energy needs

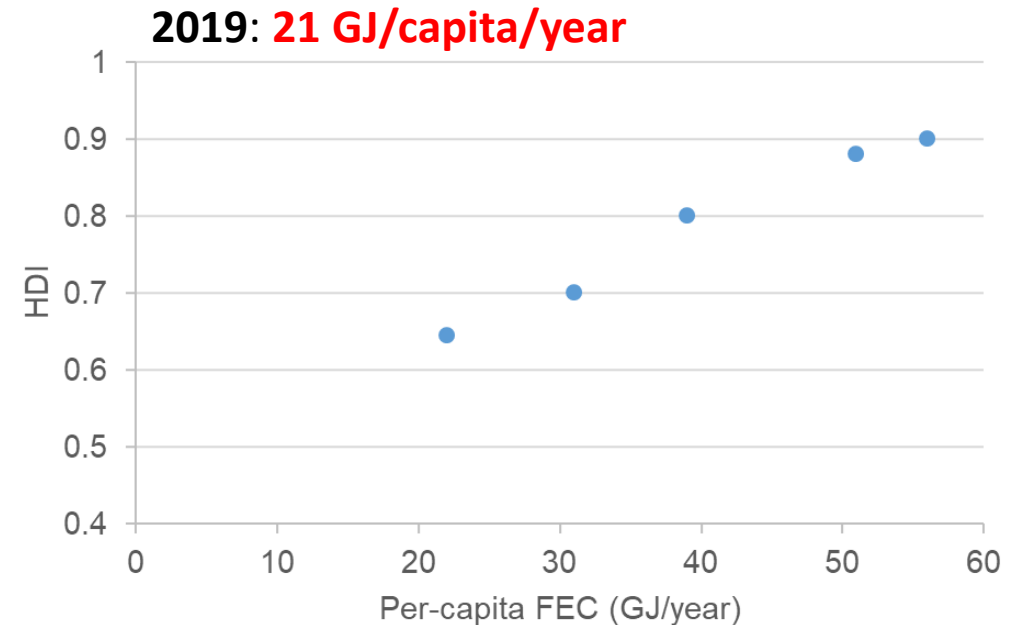
- One of the largest democracies with largest population in the world
- Aspires to be a developed country by 2047 with self-sufficient \$30 Trillion economy
- **Priority:** Energy as well as climate security, however, need to be accessible at affordable prices



**HDI versus per capita energy consumption**



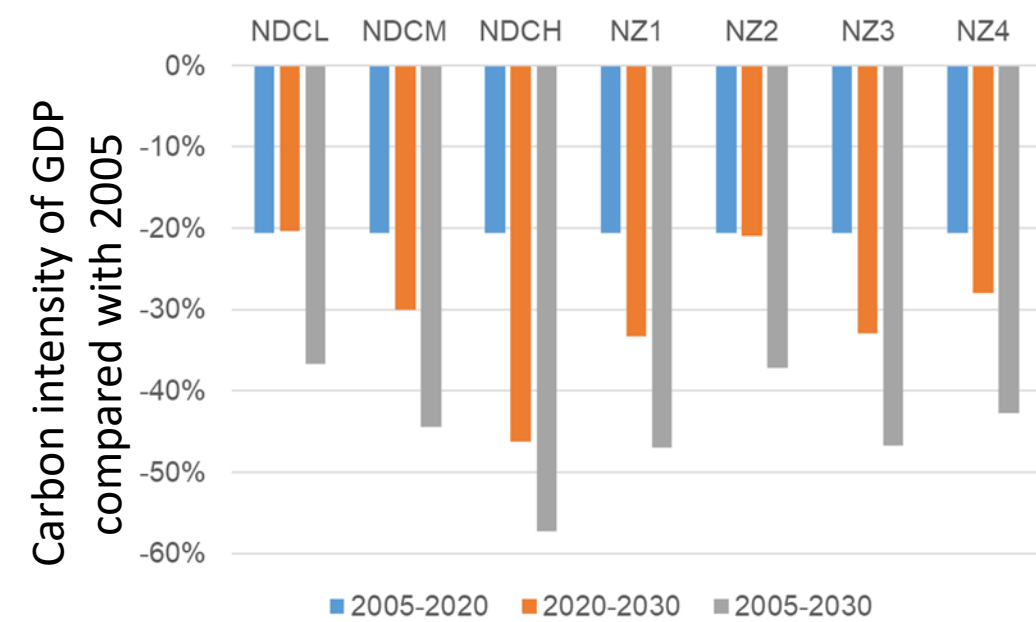
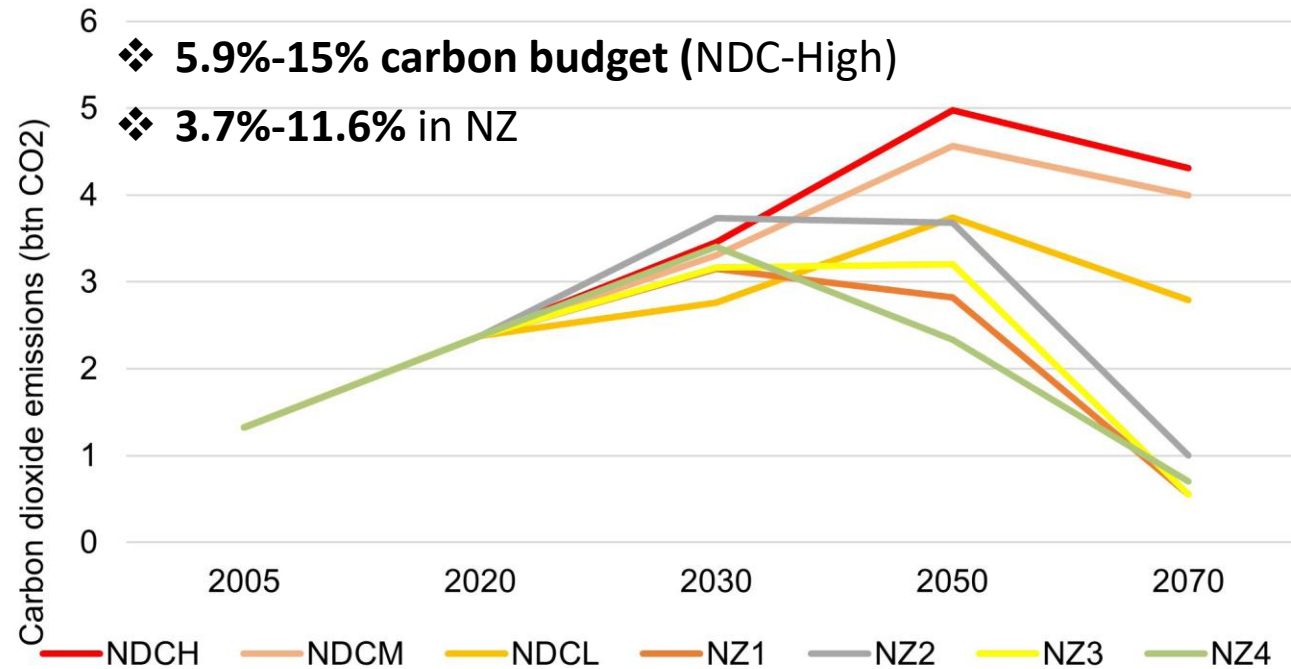
**HDI versus per capita electricity consumption**



What can be achieved?

- 0.7 HDI at 31 GJ/capita/year
- 0.8 HDI at 39 GJ/capita/year
- 0.9 HDI at 56 GJ/capita/year

# CO<sub>2</sub> Emissions (Billion tonnes) – NDC and Net-Zero



- **Peaking years** differ across scenarios
- **Agriculture** non-CO<sub>2</sub> emission estimation (residual ~ 360 MtCO<sub>2</sub>e in 2070)
- **Industry sector:** **hard to abate** (residual ~ 1200 MtCO<sub>2</sub>e in 2070). Need to push NZ through Green Hydrogen produced mainly by nuclear (and bioenergy, solar and wind)
- **Multiple transitions must happen almost simultaneously across fuels and end-use sectors.**

# Tracking – India's commitment under Paris Agreement

Targets by 2030	INDC (First NDC) (2015)	Updated NDC (2022)	Status as of Nov. 2024	Comments
<b>Emissions intensity</b> reduction of GDP (from 2005 level)	33-35%	45% [NDC 3 updated]	36% in 2020 from the 2005 level (India's BUR 4)	On track
<b>Share of non-fossil fuel</b> electric power capacity (from 2005 level)	40%	50% [NDC 4 updated]	50.1% of the total non-fossil fuel power capacity achieved as of July 2025	Achieved
<b>Additional carbon sink</b> (billion tonnes of CO <sub>2</sub> equivalent) (BtCO <sub>2</sub> e)	2.5-3 BtCO <sub>2</sub> e	2.5-3 BtCO <sub>2</sub> e [NDC 5, no update]	Additional carbon sink of 2.29 BtCO <sub>2</sub> e created in 2021 <sup>6</sup>	On track

# Tracking – India's commitment under Paris Agreement (2)

Targets by 2030	INDC (First NDC) (2015)	Updated NDC (2022)	Status as of Nov. 2024	Comments
<b>Net Zero</b> by 2070 target	Not applicable	Not in NDC	Mentioned in LT-LEDS 2022.  Net Zero to be achieved by 2070.	The document is not clear if the NZ includes or excludes non-CO <sub>2</sub> emissions.
<b>Lifestyle</b> for Environment ( <b>LiFE</b> )	NDC Goal 1	First goal of the updated NDC  [NDC1 goal modified and promoted as global mass movement]	Encourage energy saving measures such as using LED lights, setting AC temperatures to 24-26°C, keeping electronic devices in energy-saving mode, utilizing smart switches for frequently used appliances, etc.	Reflects principle of climate justice.  Mindful production and consumption. Pro circular economy ( <b>SDG9, SDG 11, SDG12</b> )  Yield co-benefits in reduced air pollution and improved health ( <b>SDG3</b> )

# Tracking – India's commitment under Paris Agreement (3)

Targets by 2030	INDC (First NDC) (2015)	Updated NDC (2022)	Status as of Nov. 2024	Comments
<b>Adaptation</b> component	NDC Goal 6	Adaptation is actively promoted with multifaceted approach.	Adaptation Communication submitted to UNFCCC. National Adaptation Plan is under preparation	Aligns with sustainable development and climate resilience across regions.
<b>Mobilization of funds</b>	NDC 7	Remains same	Around US\$ 4.5 trillion worth of investments is required by India till 2040 to develop infrastructure, to improve economic growth and community wellbeing	Aligned with article 4.4 of the UNFCCC
<b>Building capacities</b> [national and international cooperation]	NDC 8	Remains same	Fostering innovation and collaboration in the field of climate technology, integrate advanced solutions, promote R & D for future technology, etc.	Aligned with article 4.5 of the UNFCCC

# Development priority, India still raising its ambitions

Mapped more than 600 policies focused on mitigation and adaptation

	Measures	Pre-Paris	Post-Paris
<b>Power</b>	National Solar Mission Renewable Energy  Retirement of Coal Plants T&D Losses reduction	20 GW by 2020 100 GW of Solar by 2020  No initiative No scheme was present	100 GW by 2022. 175 GW by 2022 and 450 GW by 2030.  170 thermal generation units retired by 2018. Ujwal Discom Assurance Yojana (UDAY) scheme, reduce losses to 15%.
<b>Industry</b>	Perform, Achieve and Trade (PAT)	PAT Cycle I (2012-13 to 2014-15) with 478 designated consumers (DCs) across 8 sectors	PAT Cycle II (2016-17 to 2018-19) with 621 designated consumers (DCs), across 11 sectors i.e. 3 new sectors (petroleum refinery, railways and DISCOM).
<b>Transport</b>	Electric Vehicle  Ethanol Blended Program  Metro Rail  Freight Rail  Road Construction Speed	No scheme was launched  5% Ethanol Blending  Metro rail coverage is limited to 4-5 major cities of India. No scheme.  ~11 km/per day	The number of electrified two-and three-wheelers has grown by more than 60% each year on average since 2015. 30:30 target 10% Ethanol Blending by 2022 and 20% by 2030  In 2020, over 650 km of metro rail was operational in 18 cities of India. Dedicated freight corridor: Increase freight rail share to 45%  ~28 km/per day

# Development priority, India still raising its ambitions

	Measures	Pre-Paris	Post-Paris
<b>Buildings</b>	Standards and Labeling programme LPG Connection  Green Buildings  Buildings Energy Efficiency Programme	It covered sectors such as air conditioners, ceiling fans, refrigerators, TVs  No scheme was launched  No scheme was launched  No scheme was launched	Currently, the programme covers <b>26 appliances</b> of which 10 appliances are under the mandatory regime. As on December 2020, a total of <b>287.4 million households have LPG connections</b> (including PMUY beneficiaries). Green building footprint was <b>7.61 billion sq.ft.</b> with total number of <b>5918 green buildings</b> as on October, 2020 Building energy efficiency projects completed in <b>10,344 buildings</b> including Railway stations and Airports till May 2020.
<b>Agriculture</b>	Neem Coated urea application Energy Efficient Pump Programme	No production of neem coated urea  Only <b>2209 EE pump</b> sets have been replaced in pilot project at Solapur district.	Both imported and indigenously produced urea available in the country is neem coated since 2016. <b>N2O emissions reduce by ~20%</b>  <b>74,136 EE pumps</b> have been installed by EESL
<b>Waste</b>	Sanitation (Swachh Bharat Abhiyan)	No scheme was launched.	More than 6.2 million individual toilets and 0.59 million community and public toilets have been constructed. CH4 recovery projects planned.
<b>Water</b>	Micro-irrigation	Area covered under micro-irrigation was <b>7.73 million hectare</b> till 2015.	Area covered under micro-irrigation was <b>8.7 million hectare</b> till November 2019.
<b>Hydrogen</b>	National Hydrogen Mission	No mission/scheme was launched	<b>Reduce fossil fuel imports</b> (reduce expenditure) Mobilize investments, create jobs, reduce 50 Mt CO2/year
<b>CDR</b>	CCUS scheme	No scheme was launched	Subsidies covering 50-100% of project costs. Industrial integration with electricity sectors



# Adaptation – Essential for India

In 2023, India submitted its **Adaptation Communication (AC)** to the UNFCCC, focusing on agriculture, water management, forestry, and disaster risk reduction.

**LT-LEDS** integrates adaptation, particularly in urban development, with a focus on sustainable urbanization, energy, and material efficiency in buildings.

**State Action Plans on Climate Change (SAPCCs)** are also a critical contributor in tailoring national priorities to regional vulnerabilities and local contexts.

**Example:** Heat Action Plans (HAPs)- Long-term resilience integrating public health, urban planning, and climate science.

**Local HAPs** influenced the National Disaster Management Authority (NDMA) to create a national framework for heatwave management.

**National Mission on Sustainable Agriculture (NMSA)** focusing on Improved crop seeds, livestock and fish cultures, water use efficiency, pest management, improved farm practices, soil and nutrient management, agricultural insurance, credit support, markets, access to information and livelihood diversification, etc.

# Climate Finance

## Mitigation Financial Flow:

About USD 57.3 billion in 2021/22 - Growing at rate of 20% in spite of COVID19

Around 34% came from public sources

## Adaptation-related Financial Flows:

Increased by almost 3 times between 2019-20 and 2021-22.

About 98% of the USD 14.7 billion (total finance flow) for adaptation came from state and central govt. budgets.

**Private investment** is crucial for climate action and requires to be scaled up.

## Transparency matters!!!

**2021:** Securities Exchange Board of India (SEBI), launched the *Business Responsibility and Sustainability Report (BRSR)*, a disclosure framework mandatory for top 1000 listed companies.

**2024:** RBI issued a "*Disclosure framework on climate-related financial risks*" - climate risk assessments, green lending frameworks, and potential stress testing for banks. Aligned with the EU CSRD, the US SEC's climate disclosure rules, Task Force on Climate-related Financial Disclosures (TCFD) recommendations, IFRS S2 (Climate-related Disclosures)

**2025:** India introduced a draft *Climate Finance Taxonomy* to guide and standardize green investment, prevent greenwashing and align capital flows with national goals supporting mitigation, adaptation and transitions of hard-to-abate sectors.

# Governance

## Governments

- **NDCs** have been prepared by an expert committee
- **LT-LEDS:** Ministries that govern the resources, electricity, industry, transport, urban, agriculture, forestry and land use sectors were brought together under seven taskforces. Additional consultations with state governments, think tanks, research organizations, civil society and private sector representatives.

## Financial Institutions

- **Specialized public financial institutions** like the Indian Renewable Energy Development Agency (IREDA), Power Finance Corporation (PFC), Rural Electrification Corporation (REC) and National Bank for Agriculture and Rural Development (NABARD)
- **India Infrastructure Finance Company Ltd (IIFCL)** is a Government of India owned company, green and sustainable projects.
- In 2015, **National Investment and Infrastructure Fund (NIIF)** was established. This is a sovereign-anchored investment fund, to augment and channelize capital for the infrastructure and related sectors including renewable energy.
- **International Financial Services Centre (IFSC)** and the **International Financial Services Centres Authority (IFSCA)** – a unified regulatory body to attract foreign capital and sustainable/green finance.

# International Cooperation

## Global Initiatives[selected]

- International Solar Alliance (**ISA**) [Mitigation, co-led by India and France]
- One Sun, One World, One Grid (**OSOWOG**) [Mitigation, co-led by India and United Kingdom]
- Leadership Group for Industry Transition (**LeadIT**) [Mitigation – Industry, co-led by India and Sweden]
- Mission Innovation [Mitigation – Hydrogen, Bioenergy, Smart grids, CCUS]
- World Economic Forum's **First Movers Coalition** – Panchamrit, **LiFE**
- Global Biofuel Alliance [Mitigation]
- Coalition for Disaster Resilient Infrastructure (**CDRI**) [Adaptation, Co-chair]

## Global **South-South** collaboration (100+ countries)

### 2023: G20 Presidency (India) – Sustainable Finance WG

- Need for transfer of climate finance
- **Low-cost climate finance** by developed countries and multilateral development banks (MDBs) for implementation of climate actions by the developing countries.
- **Insurance** and **re-insurance** sectors have to be involved through MDBs.

# **Thank You**

## **for taking out time!**

**Vidhee Avashia (Lead Author)**

vidhee@iima.ac.in

**Saritha Sudharmma Vishwanathan (Co-author & presenter)**

sarithasv@iima.ac.in