

28th AIM International Workshop

Long Term Strategies towards Net Zero for India



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COP26: India's Updated

1. To put forward and further propagate a healthy and sustainable way of living based on traditions and values of conservation and moderation.
2. To adopt a climate friendly and a cleaner path than the one followed hitherto by others at corresponding level of economic development.
- 3. To reduce the emissions intensity of its GDP by 45 per cent by 2030 from 2005 level.**
- 4. To create an additional carbon sink of 2.5 to 3 billion tonnes of CO₂ equivalent through additional forest and tree cover by 2030.**
- 5. To achieve about 50 per cent cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030 with the help of transfer of technology and low-cost international finance including from Green Climate Fund (GCF).**
- 6. Indian Railways to become Net Zero by 2030.**
- 7. India to become Net Zero by 2070.**
 - Initiatives already launched by India – International Solar Alliance (with France), Coalition for Disaster resilient Infrastructure,
 - Most recent being One Sun-One World-One Grid (with UK) at COP26 last year.



GHG Emission Intensity of GDP



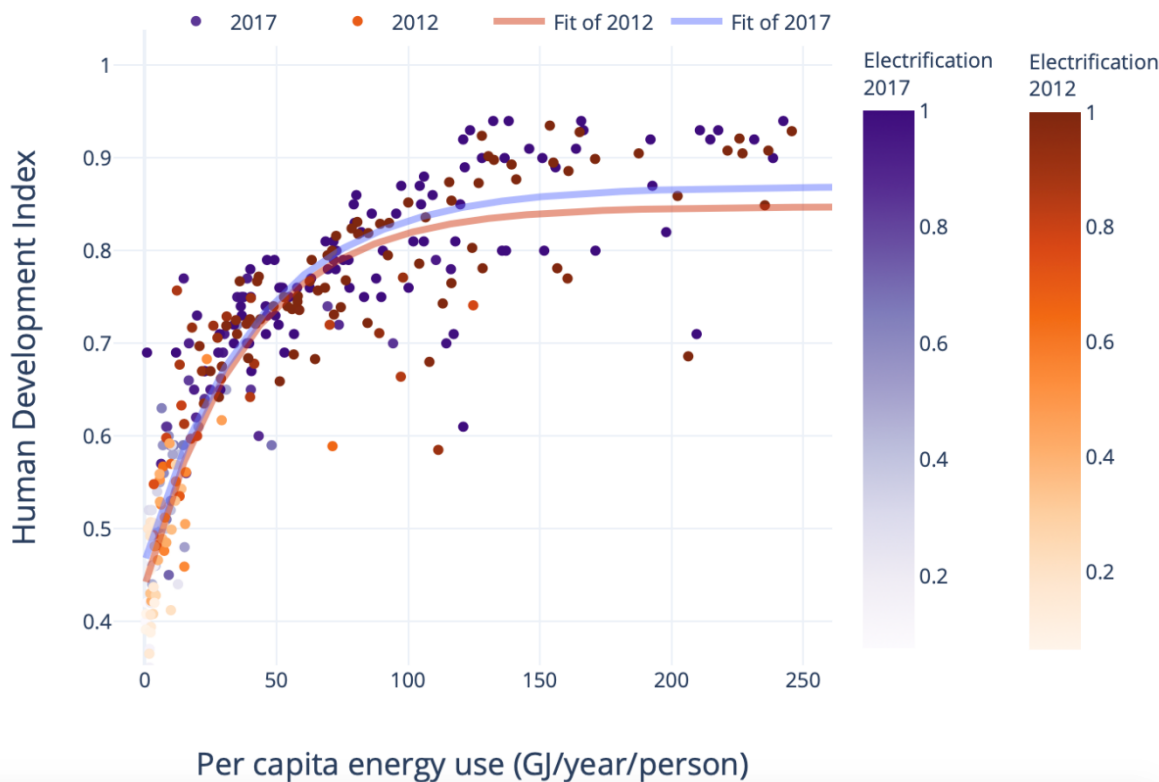
Year	GHG/GDP Intensity (Ton/Rs. Crore) (Without Agriculture, Base Year 2005)		GHG/GDP Intensity (Ton/Rs Crore) (With Agriculture and LULUCF, Base Year 2005)	
	2005	231		299
2010	193	-16.58%	242	-19.15%
2014	183	-20.98%	223	-25.38%
2016	176	-23.85%	210	-29.78%
2020	163	-29.40%	201	-32.77%
2030	102	-41.15%	134	-44.63%

Source: India's BUR-3 (MOEFCC 2021). Highlighted values are our estimates for the years 2020 and 2030.

Revised NDC: reduce India's GHG/GDP by 45% during 2005-2030

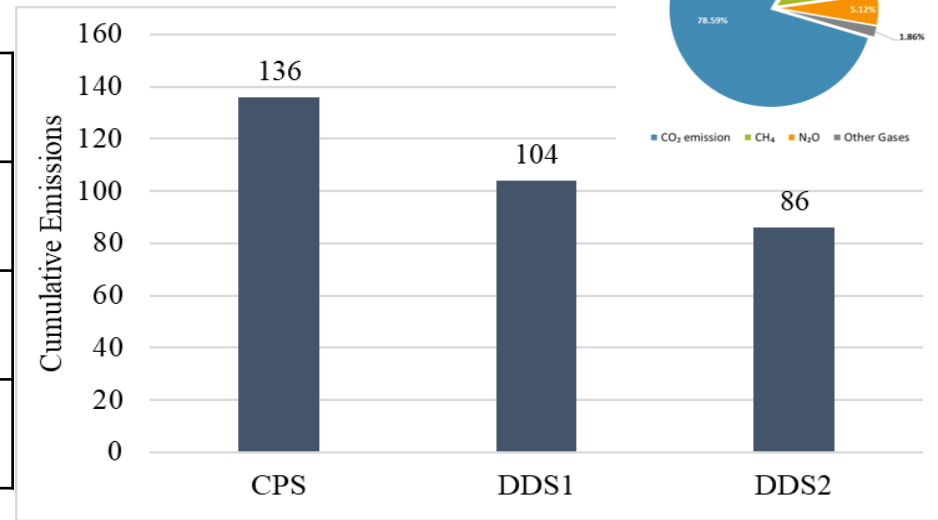
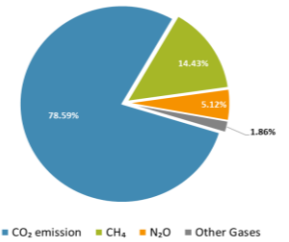


Role of energy in human development



- High correlation between low human development index (HDI) and low per capita energy use (UNDP, 2016)
- Energy required for human development decreasing consistently – reasonable HDI (above 0.7) was achievable at
 - **100 GJ/person in 1975,**
 - 60 GJ/person in 2005,
 - 50 GJ/person in 2012, and
 - **30 GJ/person in 2017** (Garg, 2020; UNDP, 2016) – primarily due to electrification.
- Electrification allows for more efficient conversion of primary energy into usable services.
- **Similar analysis to be carried out across different income levels? (Data?)**

India Cumulative Emissions



Scenario	Cumulative Budget	CO ₂ /capita
CPS (including LULUCF)	142 136	3.1
DDS1 (including LULUCF)	114 104	1.66
DDS2 (including LULUCF)	98 86	1.35

Notes: Carbon budget 2020-2050 in billion ton-CO₂e
Ton CO₂e/capita is for year 2050

Cumulative CO₂ budget reduction 2020-2050:

CPS to DDS1 is upto **28 bt-CO₂**
including LULUCF, it will be upto **32 bt-CO₂**

CPS to DDS2 is upto **44 bt-CO₂**
including LULUCF, it will be upto **50 bt-CO₂**

Cumulative CO₂ budget: India needs room for development, results **within range of global models**.

India's historical **cumulative emissions sum less than 5% from 1850 to 2019**.

Based on remaining carbon budget from 2020 for 2C global warming limit (~ 900-2300 GtCO₂) (AR6 WGI SPM)

India's future carbon budget share ranges between

- ❖ **5.9%-15%** in CPS scenario and
- ❖ **3.7%-11.6%** in DDS scenarios

Discussion (1)

India will not be net zero by 2050 under any scenario.

For the world to be net zero by 2050, the developed countries therefore need to have ambitious plans to be net-negative energy systems. Additionally, more work is required on the management of carbon sinks (natural and geo-engineered).

Need to involve **multi-national/transnational businesses and industry** in climate change discussions and actions (for technology transfer, financial investment and capacity building).

Some of the **top Indian businesses have committed to become net zero and internalize carbon price** gradually, but it must be an international consolidated expression by large businesses.

International investments for sustainable transitions in India is critical.

International support and facilitation is required to create a **vibrant carbon market** in India and link it with other carbon markets around the world. This will enhance economic efficiency of GHG mitigation all over the world.

Discussion (2)

Any energy is better than no energy

Coal is a global concern with 12 countries (China, India, USA, Indonesia, Australia, Germany, Russia, Japan, South Africa, South Korea, Poland, and Turkey) accounting for 88% of global coal consumption.

There must be therefore a **global solution for coal phase down**, including technology and financial transfers.

It would require **at least one generation to phase out** an entrenched energy system.

International embargo on coal financing will therefore only create financial headwinds against it and will delay its phase down.

Developed countries and India will need to collaborate for **incentivizing solar** (power, building), **wind** (power), **BECCUS** (power, industry, agriculture), and **green hydrogen fuel transformation** (industry, transport) technologies in the next 2-3 decades.

- India has **bilateral S&T cooperation agreements** with 83 countries. Technologies are required to upscale DDS scenarios.
- **South-South collaboration** is also possible between India, other developing and least developing countries especially in South East Asia and Africa for solar and bioenergy.

Net-zero is for the basket of **all six GHGs and not CO2** alone.

Bringing back the **adaptation discussion** to the table along with net-zero.

Thank You

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