



**“INDIA’S ROLE IN SOLVING THE GLOBAL CLIMATE CRISIS –
THE PROBLEM AND SOLUTIONS”**

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Chaired by:

Al Gore, Former Vice President, United States of America

Hosted by:

Sumant Sinha, Chairman and Managing Director, ReNew Power and
Vaishali Nigam Sinha, Chief Sustainability, CSR and Communications Officer,
ReNew Power





“Global emissions have started going back up again in 2017, after three years of stability. The global economy is growing and the population is growing, therefore, in order to make the overall inevitable growth in emissions compatible with environmental goals, we have to accelerate the sustainability transition.”



- Al Gore, Former Vice President, USA

SCIENTIFIC CONTEXT

If global carbon emissions continue to increase, at the current rate, mean surface temperatures will be on course to break the 1.5°C threshold – and result in deadly, runaway climate change¹. Resultantly, the Intergovernmental Panel on Climate Change predicts² that a significant fraction of the world’s population will be exposed to severe heat waves; coral reefs would decline by 70-90%; a majority of insect species will go extinct and several plant species will be lost; crop yields will fall precipitously; and global mean sea levels would rise by 0.4 meters by 2100 vis –a-vis 2005 levels.

The impact in more vulnerable economies and certainly in India may well be worse. We may see that the sea level rise, increased incidence of coastal floods, and severe heat waves will impact over 200 million people. Declining food availability and climate extremes will expose hundreds of millions further still to vector-borne diseases and push them deeper in to poverty^{3,4}.

In light of preventing runaway climate change – benchmarked by the 1.5°C temperature increase limit – the IPCC introduced the concept of a carbon budget a few years ago. The carbon budget represents the approximate amount of GHG emissions that can be released into the atmosphere beyond which a 2°C average global temperature will be inevitable.

The total carbon budget⁵ is estimated at 2,700 – 2,900 Gigatonnes of CO₂-equivalent (GtCO₂e), of which over 75% – 2,200 GtCO₂e – has already been emitted since 1870. The carbon budget, therefore, allows only for an additional 500 – 700 GtCO₂e before a 2°C rise in global temperature becomes inevitable. That’s all we can emit into the atmosphere before all our scientific climate models show catastrophe and near end of the human species. This reality is closer to realization than many expect – at an emissions rate of approx.. 31.7 GtCO₂e in 2018⁶, we are on course to hitting the lower end of this carbon budget threshold by circa 2034-2035.

To put into local context, India’s emissions have steadily risen to 2.5 GtCO₂e⁷. It should be clear, therefore, that notwithstanding what developed nations do, India will play a critical role in global climate change mitigation⁸.

PARTICIPANTS:

- **Al Gore**, Former Vice President, USA
- **Sumant Sinha**, ReNew Power
- **Vaishali Nigam Sinha**, ReNew Power
- **Dr Stephen Toope**, Vice Chancellor, University of Cambridge
- **Jason Bordoff**, Director, Center for Global Energy Policy, Columbia University
- **Thomas Thune Andersen**, Chairman, Orsted
- **Katherine Hamilton**, Co-Founder & Chair, 38 North Solutions
- **Lord Adair Turner**, Chair, Energy Transition Commission
- **Samir Saran**, President, Observer Research Foundation
- **Madhur Deora**, CFO, Paytm
- **Rajiv Nayar**, CFO, Adani Group
- **Ratul Puri**, Chairman, Hindustan Power Projects
- **Shiv Khemka**, Vice Chairman, SUN Group
- **Alain Carrier**, Senior Managing Director, Canadian Pension Plan Investment Board
- **Sangita Jindal**, Chairman, JSW Foundation
- **Srinivas Kollipara**, CEO, Telangana Startup Hub
- **Jeff McDermott**, Managing Partner, Greentech Capital Advisors
- **Hasnen Varawalla**, Co Head of Banking, Amalgamated Banks of South Africa

¹ Climate Clock: How Long Until Earth Warms To 1.5 Degrees Celsius? Chelsea Szmania - <https://www.inverse.com/article/51531-how-long-till-global-temperatures-reach-1-5-degrees-celsius>

² Half a Degree and a World Apart: The Difference in Climate Impacts Between 1.5°C and 2°C Of Warming <https://www.wri.org/blog/2018/10/half-degree-and-world-apart-difference-climate-impacts-between-1-5-c-and-2-c-warming>

³ Global Warming Impacts on India Will Be Huge: Ipccl Dinesh Sharma - <https://www.thehindubusinessline.com/news/science/global-warming-impacts-on-india-will-be-huge-ipcc/article25157254.ece>

⁴ 2°C Rise in Temperature Catastrophic For India, Say Scientists Tribune News Service - <https://www.tribuneindia.com/news/nation/2-c-rise-in-temperature-catastrophic-for-india-say-scientists/665138.html>

⁵ Carbon Countdown Clock: How Much Of the World's Carbon Budget Have We Spent? Nick Evershed - <https://www.theguardian.com/environment/datablog/2017/jan/19/carbon-countdown-clock-how-much-of-the-worlds-carbon-budget-have-we-spent>

⁶ Global Carbon Budget 2018 <https://www.earth-syst-sci-data.net/10/2141/2018/>

⁷ Janssens-Maenhout, G., Crippa, M., Guizzardi, D., Muntean, M., Schaaf, E., Olivier, J.G.J., Peters, J.A.H.W., Schure, K.M., Fossil CO₂ and GHG emissions of all world countries, EUR 28766 EN, Publications Office of the European Union, Luxembourg, 2017, ISBN 978-92-79-73207-2, doi:10.2760/709792, JRC107877 http://edgar.jrc.ec.europa.eu/booklet2017/CO2_and_GHG_emissions_of_all_world_countries_booklet_online.pdf

⁸ India To Surpass China As World's Largest Energy Growth Market: BP <https://economictimes.indiatimes.com/industry/energy/oil-gas/india-to-surpass-china-as-worlds-largest-energy-growth-market-bp/articleshow/68010822.cms>

See below a table of annual emissions of CO2 by country:

COUNTRY NAME	ANNUAL EMISSIONS GTCO2E (2015) ⁹
China	9.084
USA	4.998
EU	3.201
India	2.066
Russia	1.469
Japan	1.142
Global	31.107



“I think its very important on this issue of transitioning the energy system to simultaneously understand that we do need to go much faster and its absolutely technologically and economically possible. There is no way to get to a zero carbon economy which does not involve two things- One a dramatically increasing role of electricity within the economy and two, the decarbonisation of electricity.”

- Lord Adair Turner, Chair, Energy Transitions Committee



⁹ IEA CO2 Emissions from Fuel Combustion, OECD/IEA, Paris, 2017 http://wds.iaea.org/wds/pdf/Worldco2_Documentation.pdf

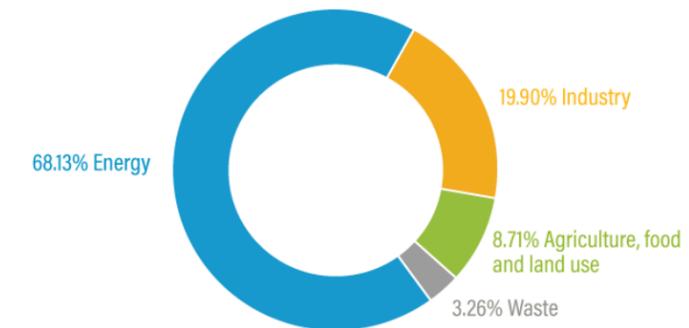
WHERE INDIA STANDS TODAY

Where is all our CO2 coming from?



Over two-thirds¹⁰ of India's emissions come from the energy sector – including electricity generation and transport. 20% of our emissions are from industries. The remaining emissions come from agricultural and forestry sources, water based sources, and waste dumps across the country.

MOST OF INDIA'S EMISSIONS COME FROM THE ENERGY SECTOR



Source: GHG Platform India.



“If you look at India's evolution over the next several years, given the GDP growth and the size of the economy, we already account for 10% of carbon emissions of the world. If we were to double the size we are at right now, that number is going to go up on an absolute basis. And that certainly will not be good for carbon emissions globally.”

- Sumant Sinha, Chairman and MD, ReNew Power

¹⁰ By the Numbers: New Emissions Data Quantify India's Climate Challenge <https://www.wri.org/blog/2018/08/numbers-new-emissions-data-quantify-indias-climate-challenge>



Tackling each of these segments is critical to combating climate change. To comprehensively work towards sustainable development in India, there are six areas that will require razor sharp focus:

- Renewable Energy
- Robust Transmission Network
- Batteries
- Electric Vehicles
- Industrial solutions
- Water management
- Waste management

“India has a quarter of an energy consumption compared to China which itself is a quarter of that of US, per capita. As India aspires to double, or triple its per capita electricity consumption in the coming decade, that’s really why there is a special urgency for us to really work with the Indian government and within the Indian context, to see how we can make that transition happen through lower carbon forms of development. And that can lead us to developing our very own template of development, which then can perhaps be used in other developing countries.”

- **Sumant Sinha**, Chairman and MD, ReNew Power



“Offshore wind has become fully competitive with conventional technologies in Northern Europe, as cost has been reduced by more than 60% since 2012. This has been possible, because governments have provided the industry with a tangible and ambitious pipeline of new projects, along with stable framework conditions. This created visibility and enabled the industry to invest, to innovate and to grow and mature.

India is well-positioned to benefit from this development and we therefore welcome the government’s ambitions of building 5 GW offshore wind by 2022 and 30GW by 2030.”

- **Thomas Thune Anderson**, Chairman, Ørsted

1. Renewable Energy Scenario:

Of our 350 GW installed electricity generation capacity¹¹, coal and gas account for 220 GW, large hydro 45 GW, renewables 74 GW, and nuclear power totals to a mere 7 GW. To be sure, the actual share of generation of renewables is only 7.5% given lower utilization rates of solar and wind energy technologies. India’s goal is to increase this to 40% by 2030, which will require 300 GW of new renewables capacity addition and, consequently, limiting additional conventional energy capacity to 75 GW in the coming decade. New technologies like floating solar and offshore wind will play a crucial role in enabling us to reach this target.

2. Transmission Infrastructure:

A stronger transmission grid will allow intermittent renewable energies to flow seamlessly. Green Energy Corridors including ISTS and HDVC lines, smart grids, regional RE management centers and robust load management systems will provide the right evacuation and interconnection infrastructure to absorb more renewable energy.

3. Smart Hybridization and Batteries:

On intermittency, hybridizing solutions including wind and solar power along with storage – both utility-scale and smaller, off-grid storage – might provide a viable solution in tackling the problem of variability of renewables – i.e. the sun doesn’t shine 24-hours and the wind doesn’t blow consistently all the time. Domestic manufacturing infrastructure for high-capacity, longer-life batteries would facilitate larger-scale deployment of storage for power generation plants and improve grid stability further, especially with as much as 350 GW of renewables capacity expected to come online by 2030. Our leadership in the renewables space, led worldwide by International Solar Alliance and Global Solar Council as well as within the country by India Energy Storage Alliance will streamline development in energy storage, mini grids and EVs.

¹¹ Power Ministry of India <https://powermin.nic.in/en/content/power-sector-glance-all-india>



4. Electric Vehicles:

The government has announced its intent to decarbonize the entire transportation sector by 2030. This is encouraging and good news. Adoption of Battery Electric Vehicles (BEV) will grow with widespread charging infrastructure, improved mileage, battery-swapping technologies and falling unit costs for domestically manufactured components. BNEF forecasts sales of EVs globally to rise to 30 million in 2030, led by China (50% of the global EV market)¹². Though EV sales in India may constitute only 7% of total auto sales by 2030, this might still result in over 10 million BEVs¹³ being sold annually thereon. At an average battery capacity of 35 kWh per vehicle, this would translate to 350 GWh in power demand every year.

5. Energy for Industry

On managing industrial emissions and improving resource efficiency, industry should begin utilizing renewable sources of energy for industrial processing through concentrated solar thermal technologies, thereby limiting our dependence on conventional and liquid fuels.

6. Water Management:

Beyond electricity and transportation, a looming crisis relates to our management of water resources. The NITI Aayog estimates¹⁴ around 600 million Indians suffer from acute water shortage already. Furthermore, our water demand is slated to double the available supply by 2030, possibly more. The Governments' supportive policies on inter-state utilisation of water resources, community mobilisation for supply of rural drinking water, restoration of water bodies and augmenting river streams are critical in water resources management. Recycling wastewater and repurposing water for irrigation must be integrated in to society's overall ethos. Only 30% of the currently generated wastewater is currently treated¹⁵. Desalination of seawater, driven by solar energy, could be another source of harnessing two abundantly available resources to boost our current desalination capacity.

7. Waste Management:

We need to be building more waste-to-energy plants and incentivizing local governments to manage waste more efficiently. The Government's policies and the Swachh Bharat program have streamlined this well, for instance, Indore's municipal waste management¹⁶ – through their own biomechanics based waste segregation technology – has cleared out 13 lakh tonnes of garbage in six months; and Gurugram's integrated solid waste management plant¹⁷, is generating 25 MW of power from 2,500 tonnes of waste daily. India generates 1.4 lakh tonnes of waste each year, out of which industrial wastes and biogas alone has the potential to produce over 1 GW in power and heat¹⁸.

CONCLUSIONS:

Supporting the sustainable development of 16% of the world's population gives us a strong impetus to leverage our global leadership in combating climate change. A faster-than-expected transition from coal to renewable electricity is essential to reduce CO2 emissions from our energy spectrum. Innovative and efficient ways of managing our industrial processes and waste is prerequisite to supporting a sustainable, circular economy.

There is a strong case for optimism on climate action through rapid decarbonisation of the economy. You can look back at projections in the lighting industry for example and they said LEDs will have 40% of the market but now they have 95% of the market in less than 5 years. A great economist in the US in the last century said- Things take much longer than you think they will, but then they happen much faster than you thought they will.

- **Al Gore**, Former Vice President, USA

¹² Electric Vehicle Outlook 2018 | Bloomberg New Energy Finance <https://about.bnef.com/electric-vehicle-outlook/>

¹³ All Electric Passenger Vehicle Sales in India by 2030: Value proposition to Electric Utilities, Government, and Vehicle Owners, Ernest Orlando Lawrence Berkeley National Laboratory, Jan. 2017, <https://www.osti.gov/servlets/purl/1364441>

¹⁴ Composite Water Management Index, NITI Ayog, June 2018 http://www.niti.gov.in/writereaddata/files/document_publication/2018-05-18-Water-index-Report_v56B.pdf

¹⁵ Composite Water Management Index, NITI Ayog, June 2018 http://www.niti.gov.in/writereaddata/files/document_publication/2018-05-18-Water-index-Report_v56B.pdf

¹⁶ This Indore Ias Officer Has a Solution For India's Garbage Problem <https://theprint.in/governance/this-indore-ias-officer-has-a-solution-for-indias-garbage-problem/178668/>

¹⁷ Biggest Waste-to-energy Plant To Come Up in Gurugram - Times Of India Shubhra Pant - <https://timesofindia.indiatimes.com/city/gurgaon/power-from-waste-biggest-plant-in-gurgaon/articleshow/63562106.cms>

¹⁸ Industrial Waste Generation and Management in India http://www.eai.in/ref/ae/wte/typ/class/india_industrial_wastes.html