# Transforming to a net zero energy system

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Net zero emission by 2050 is emerging as the latest war cry on the climate front. India is under diplomatic pressure to join the net zero club. Top government officials are debating whether to set a target for net-zero greenhouse gas emissions by 2050. Doing so would mean an overhaul of a coal-reliant energy sector, transport, heavy industry and even the nation's sluggish bureaucracy.

**In news:** Net zero emission energy transition achievable by 2050: Niti Aayog CEO
**Placing it in syllabus:** Environment
**Dimensions**

- Background
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- Global Scenario

## Content:

### Background:

- India is the world's third-biggest carbon emitter after China and the United States and thus is vital in the fight against climate change currently focused on reaching zero emissions by mid century
- India's energy demand is projected to grow by more than any other nation over the next two decades
- India's percentage carbon dioxide ($CO_2$) emissions rose slower in 2016-19 than in 2011-15 but was much above the world average of 0.7%, according to an analysis published in Nature Climate Change

- By comparison, China posted a 0.4% increase in 2016-19 and the United States registered a decline in emissions of 0.7%, though in absolute numbers they dwarf India's emissions.
- In 2020, when the pandemic dented economic growth, India's emissions fell 9.7% to a little more than the world average of 9.6%.

### Push for Net Zero Emissions Target

- The goal of net zero has caught on after the Intergovernmental Panel on Climate Change (IPCC) mentioned, in its 2018 report, about limiting global warming through net zero emissions by mid-century.
- IPCC did not attempt a common definition of net zero. The notion of net zero ranges widely enough to include net zero carbon emissions, net zero greenhouse gas emissions, carbon neutrality, deep decarbonisation or simply put, long-term low-carbon growth.
- Achieving a net zero emission target implies that all remaining human-caused greenhouse gas (GHG) emissions are balanced out by removing GHGs from the atmosphere in a process known as carbon removal.
- This may be achieved by various modes, including restoring forests or through direct air capture and storage (DACS) technology, according to the World Resources Institute.

## Report by TERI:

- The Energy and Resources Institute (TERI) in collaboration with Shell released a report titled "India: Transforming to a net-zero emissions energy system"
- The report opines that achieving net-zero emissions for India is technologically possible but challenging.
- The report states that "India needs a suitable policy

and innovation driven context to deploy clean energy technologies on a massive scale. It requires more and faster deployment of large-scale solar, wind and hydro power to enable greater electrification. It also requires the development of new fuels, such as liquid biofuels and biogas, as well as hydrogen produced from electrolysis."

- The report suggests a huge push towards renewable energy, target 13 per cent hydrogen in final energy including as a fuel for industry and transport, and transform bioenergy, with liquid biofuels surpassing petroleum products by 2040.
- Other suggestions include, "investment in processes, technologies and end uses to improve energy intensity per unit of GDP by almost 60 per cent by 2050, adopt economic mechanisms, such as carbon trading and/or pricing to facilitate re-allocation of capital and resources to support commercialisation of new fuels and technologies."

## Areas for Action:

***Accelerate Clean Technologies:***

- To reach a net-zero emissions energy system by 2050, India needs to deploy cleaner energy technologies on a mass scale.
- It requires more widespread and faster deployment and adoption of large-scale solar, wind and hydro power – replacing coal – to power greater electrification across the country, both in rural and urban areas.
- In tandem, it requires the development of new fuels, such as liquid biofuels and biogas, to help drive the decarbonisation of the agricultural and transport sectors. And, over time, India requires hydrogen produced from electrolysis to manage carbon emissions from hard-to-abate sectors such as heavy industry and heavy commercial vehicles.

### *Support Energy Efficiency and Low Carbon Choices*

- Targeting net-zero emissions by around mid-century sets a tight adoption timeline and will challenge the widespread use of current energy technologies.
- New energy technologies and efficient practices will need to be advanced in all sectors of the economy.
- Every choice made from now on will be important, due to the long lifespan of energy infrastructure.
- Specific challenges could be overcome through modal shifts, such as a focus on high-speed
- rail as an alternative to domestic air travel or the use of 3D printing technologies for local
- manufacturing, rather than relying on long-haul freight from manufacturing centres.

### *Remove Unavoidable Emissions*

- Both aviation and heavy transport will require solutions ranging from synthesised hydrocarbon fuels, initially from biomass, to the use of hydrogen or possibly stored electricity for some short routes.
- These could take several decades to mature, which requires **balancing the emissions from these sectors with carbon removal** using nature or technology.

### *Better Bureaucracy:*

- India will also have to give its under-funded environmental regulators more resources and power, and ministries will need to get better at translating policy into action.
- For decades, the nation has disappointed in efforts to improve crumbling infrastructure, extend access to public services and root out corruption.
- One solution could be to set up a climate change commission, similar to bodies established in the U.K. and New Zealand, to monitor progress and help devise

mechanisms to achieve long-term emission reductions


## Global Scenario:

- Around 58 countries, accounting for more than half of the world's emissions, have announced net zero emission targets so far, according to Climatewatchdata.org.
- Only six parties, including the United Kingdom and New Zealand, have legally binding net zero emissions targets while 26 parties presently have it in their policy documents.
- In September 2020, China announced that it will peak its GHG emissions by 2030 and achieve carbon neutrality before 2060.
- The White House announced on January 27, 2021 that President Joe Biden will take steps to put the United States (US) on an "irreversible path" to a net zero economy by 2050.

## India's Challenges:

- The real issue in adopting a net zero goal lies in political and economic constraints. net zero in the energy system is technologically feasible in the long-run, but economically challenging.
- 2050 is a dateline whose validity depends on four factors – high penetration level of renewables in the energy system, high level of electrification of energy grids, introduction of cost-effective green hydrogen-based economy, and biomass based biofuel production at scale.

- Despite these measures, there will still be a humongous amount of carbon left in the system that we have to resort to artificial ways of carbon removals continuously at a massive scale.
- India’s challenge has deepened because, in at least 12 of the G20 economies, the net zero goal has either been adopted or is under discussion, with China being one among the latest entrants to the club.
- A net zero goal by 2050 is not an unqualified demand of the Paris Agreement, which only asks the signatories to furnish their commitments in a time-frame of five or 10 years.
- There is, of course, an expectation that each country will develop a long-term low-emission strategy for growth.

**Mould your thought:** India’s sustainable energy transition is the cornerstone for achieving net-zero emissions. Evaluate.

***Approach to the answer:***

- Introduction
- Discuss the emissions scenario in India
- Discuss the areas of action to achieve Net Zero Emissions
- Discuss India’s Challenges in this regard
- Conclusion