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Climate SAR सार

Climate Science And Research

CLIMATE ACTION FOR NET ZERO

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FROM EDITOR

The 2023 is seen to be the warmest year in the past 1,25,000 years. The month of September in 2023 has already set highest temperature record beating all previous years. In 2021, the Earth on average was about 1.1°C warmer than it was in the pre-industrial era. According to the Inter-governmental panel on climate change (IPCC), global temperature increase has to be limited to 1.5°C in the year 2050. For this by 2030, global greenhouse gas emissions are required to be curtailed by 45%, so as to achieve global Net Zero target.

In this context more than 140 countries have taken pledge to reduce greenhouse gas emissions as part of their climate action plan. 28th Session of the Conference of Parties (COPs) to the UNFCCC being held in Dubai from November 30-December 12, 2023 has the main task to stock take targets of Parties to Paris Agreement on Climate Change, and move towards Net Zero.

The Climate Change Research Institute (CCRI) has started this Bulletin of 'Climate Science and Research' – Climate SAR for wider dissemination of information and education about environment & climate change. The theme of this issue of ***Climate SAR Bulletin*** *is "Climate Action For Net Zero". In this issue you learn about the how we can make efforts to reach net zero targets.*

We welcome your feedback!

Dr. (Mrs.) Malti Goel
President, CCRI

ABOUT NET ZERO TARGET

Net zero means cutting greenhouse gas emissions to reach zero emission as far as possible, with any remaining emissions re-absorbed from the atmosphere by oceans and forests.

A Net Zero world calls for a complete transformation of how we produce and consume energy. The energy sector is the source of around three-quarters of total greenhouse gas emissions. Replacing fossil fuels viz. coal, gas and oil with renewable as energy sources, is vital for reducing carbon emissions.

UN Secretary-General António Guterres in March 2022 has established a High-Level Expert Group on the Net Zero emissions commitments of non-state entities. More than 9,000 companies, 1000 cities, 1000 educational institutions, and over 600 financial institutions have joined the Race to Zero, pledging to take rigorous, immediate action to halve their emissions by 2030. Emissions of other greenhouse gases are also to be curtailed.

Key Pillars of making the global energy system carbon free are - energy efficiency, renewables, hydrogen, hydrogen-based fuels, and CCUS.

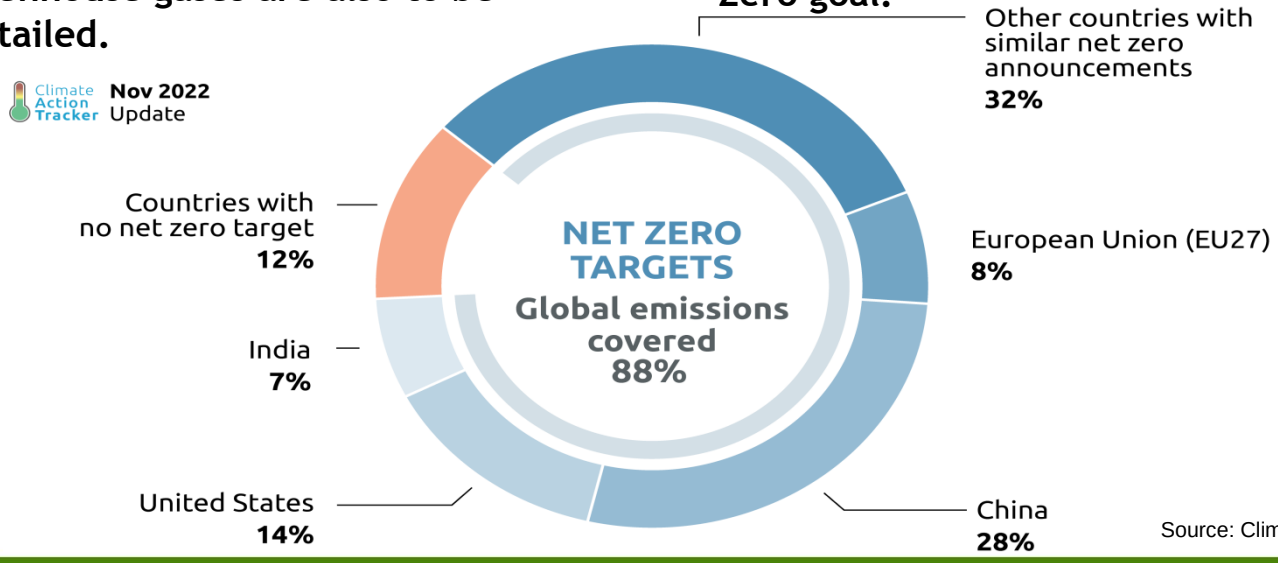
ENERGY EFFICIENCY AND NET ZERO

Improving energy efficiency means using less energy to achieve the same or even better outcome. There are many benefits. For example;

i. Energy efficiency improvements lead to reductions in energy consumption and carbon emissions.

ii. Improving energy efficiency can help ensure that energy access to more people without necessarily increasing the overall energy demand.

iii. A comprehensive approach that combines energy efficiency improvements with an expansion of renewable energy sources is likely to be most effective path to achieving Net Zero goal.



Source: Climate Action Tracker

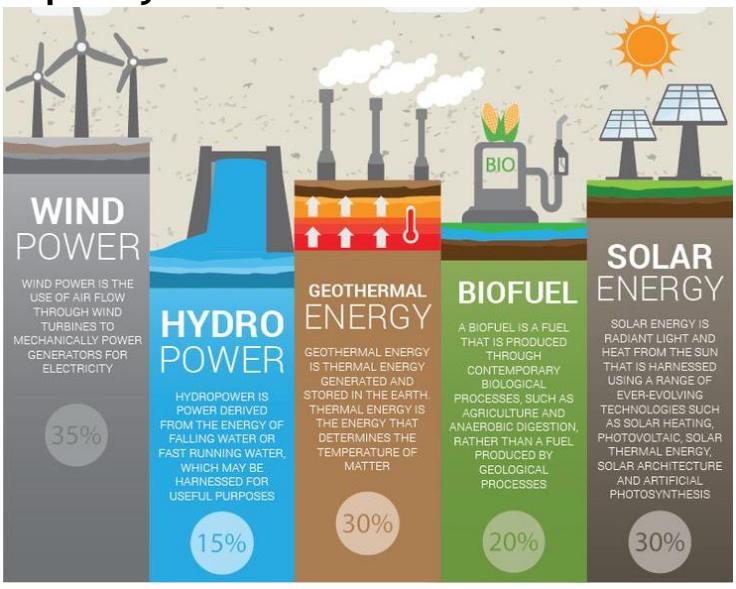
WHY RENEWABLES IS VITAL TO NET ZERO?

Renewable energy sources do not produce carbon emissions in electricity generation processes. They are replenished naturally. Renewable energies like solar, wind, biomass and hydroelectric & geothermal power, are therefore indispensable in a transition to net-zero emissions.

> *The amount of sunlight that strikes the earth's surface in an hour and a half is enough to handle the entire world's energy consumption for a full year.*
>
> - US Office of Energy Efficiency and Renewable Energy

TRENDING RENEWABLE ENERGY

Hydropower . Hydropower is one of the oldest sources of energy. It generated 40% of the global energy capacity in 2022.



Hydropower technology is undergoing a transition by run-of-river and pump storage systems.

Wind Power. The global wind capacity became 830 GW in 2021 with China having a share of 70%, the US coming second with 14% and Brazil third with 7% share. India has achieved more than 42GW wind power capacity.

Solar Power. Solar energy can turn into electricity in many ways using sun light, heat and chemical energy. It has become much more affordable in the recent years. Global solar installations reached 350.6 GW in 2023, according to *TrendForce*.

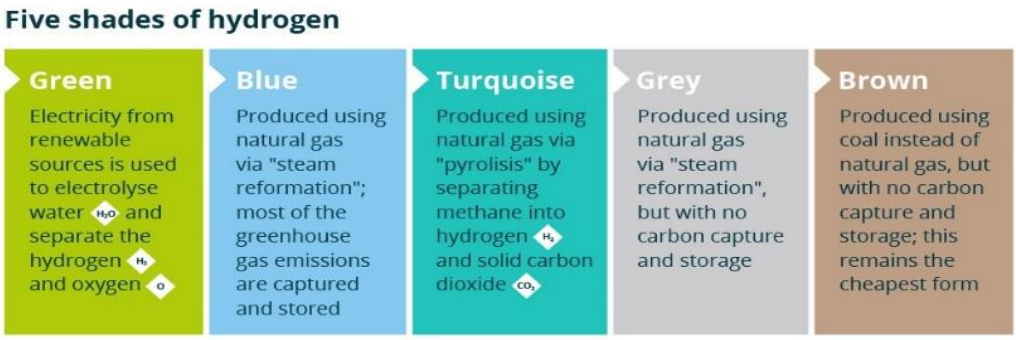
Geothermal Power . It is the energy coming from deep down the Earth sub-surface. Geothermal power has grown to 16GW in 2021 and its share is expected to increase several times more. Currently, geothermal energy is used in 26 countries. The US is its biggest producer.

Biomass Power. Different organic matter that comes from plants or animals can be used to produce energy using advanced technology. Biomass is a versatile source of energy. Having more plants will also remove more CO2 from the atmosphere. Afforestation and Reforestation including Bio - Energy with Carbon Capture and Storage (BECCS) and Direct Air Capture of excess CO2 are other options for CO2 Sequestration.

HYDROGEN: IMPORTANT PIECE IN THE NET- ZERO PUZZLE

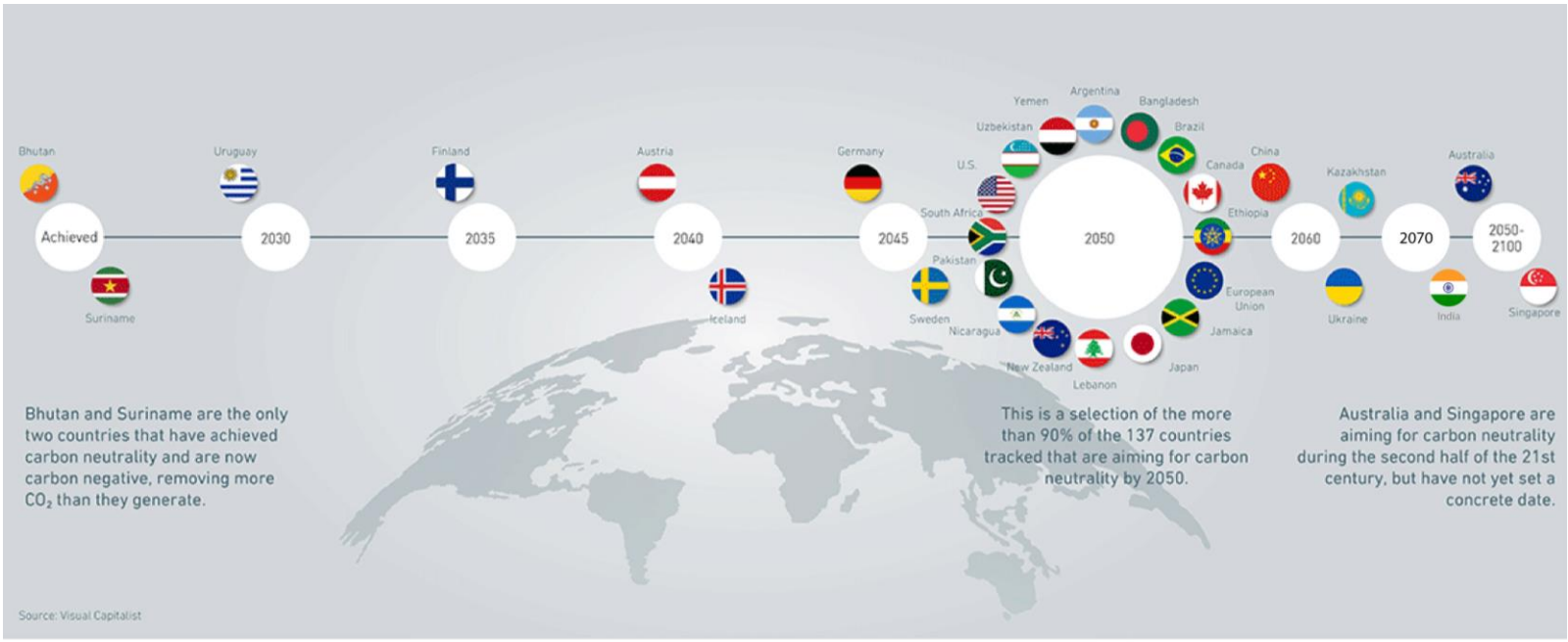
Hydrogen is an important element in an effort to reduce greenhouse gas emissions and move towards Net Zero. Hydrogen has no carbon and therefore has potential to be a clean, versatile, and low-carbon energy source that can be used in a variety of applications, from Transportation and Industry to Power generation. Hydrogen can be produced from different sources in many ways and attains different color nomenclatures as below.

The Green Hydrogen and Green Ammonia are hydrogen and ammonia produced by way of electrolysis of water using renewable energy.



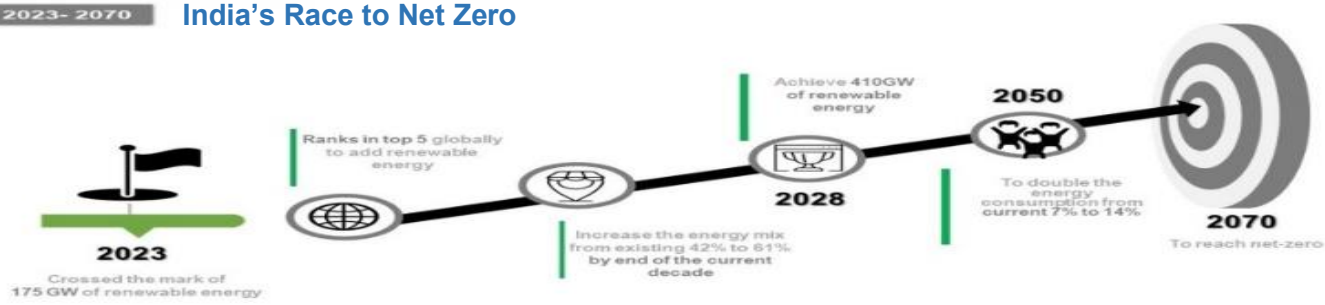
Globally, hydrogen Initiatives aim to support the development of low-cost, high-performance hydrogen technologies. This includes research and development for hydrogen production, storage, and transport, as well as other hydrogen-fuel based technologies.

The countries have set target year for reaching net-zero.



India has launched a National Green Hydrogen Mission (NGHM) on 4th January 2023 with a budget of nearly INR 20 million. The Mission will lead to decarbonisation of the economy. It will help in reduced dependence on fossil fuel imports, enable India to assume technology and market leadership in Green Hydrogen.

From 2023- 2070 India's Race to Net Zero



HARNESSING GREEN HYDROGEN IN INDIA

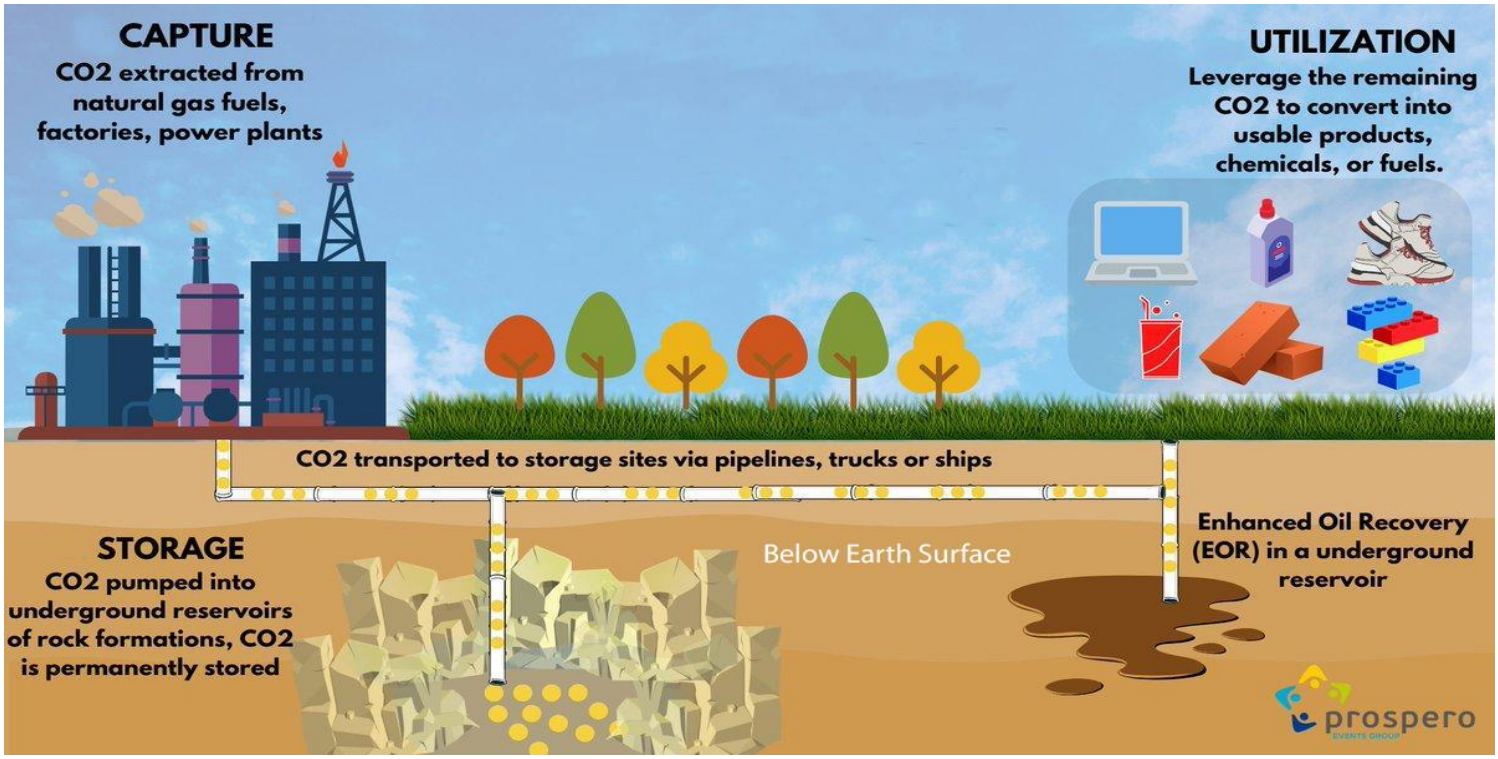
- Hydrogen demand could be four folds by 2050 (nearly 10% of global demand)
- Green Hydrogen is crucial for sectors such as fertilizers, refining, methanol, maritime shipping etc.
- India needs to form Green Hydrogen Corridors. Three hydrogen corridors should be developed across the country based on state grand challenges
- Governments provide grants to start-ups as well as support entrepreneurs to produce Green Hydrogen
- Promote export of Green Hydrogen and green hydrogen-embedded products through a global hydrogen alliance.
- Make Green Hydrogen competitive vis-a-vis grey hydrogen
- Encourage market development using the industrial clusters and viability gap funding.
- Develop Green Hydrogen standards and a labeling programme.

Source – Niti Aayog

NITI AAYOG POLICY FRAMEWORK ON CCUS

Carbon Capture Utilization and Storage (CCUS), involves capturing the gas and utilizing or storing it away from the atmosphere. Adaption of CCUS becomes important as a CO2 reduction strategy for abatement of CO2 from high energy intensive sectors, such as steel, cement, oil, gas, fertilizers and petrochemicals. It would have a critical role to play in meeting the Net Zero targets.

According to the Niti Aayog Framework Policy on CCUS, India plans to cut about 750 mtpa CO2 emissions by CCUS in 2050. It is estimated that the CCUS projects will also lead to a significant employment generation. About 750 mtpa of carbon capture by 2050 can create employment opportunities for about 8-10 millions on full time equivalent (FTE) basis in a phased manner.



Carbon Capture, Utilization and Storage

The CCUS can provide a wide variety of opportunities to convert the captured CO2 to different value-added products which include; green urea, food and beverages, building materials, chemicals (methanol and ethanol), polymers, bio-plastics and enhanced recovery of oil (EOR), thus contributing substantially to a Circular Economy.

'The UN Climate Summit in Dubai (COP28) offers an unprecedented opportunity to change the course and create a better world for people, nature and the climate.'

NET ZERO *Vanishing Carbon Footprint*

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