

**GOVERNANCE****Indian Railway to be Net Zero Emitter by 2030**

Recently, Indian Railways (IR) has announced that it is likely to become world's first 'net-zero' carbon emitter by 2030. IR is taking a multi-pronged approach to go green and decarbonise - from increasing its sourcing of Renewable Energy (RE) to electrifying its traction network and reducing its energy consumption.

**Key Points****About:**

- **Indian Railways:** IR is the world's fourth largest railway network in terms of size. It is one of the largest electricity consumers in the country.
- 1. **Passenger Services:** Transports 24 million passengers every day across the subcontinent on 13,000 trains covering approximately 67,956 km.
- 2. **Freight Services:** 3.3 million tonnes of freight per day, and thus the fuel requirements are **massive**.
- **Contribution in Total Emissions:** India's transport sector contributes to 12% of the country's greenhouse gas emissions with the railways accounting for about 4% of these emissions.
- **Potential of Emissions Reduction:** The Indian Railways can raise the official target of 50% freight share by 2030, up from its current share of 33%. By shifting freight to rail and optimising truck use, India can reduce logistics costs from 14-10% of Gross Domestic Product and carbon dioxide emissions by 70% by 2050 compared to a business-as-usual scenario.

**Initiatives taken by Indian Railways:**

- **Increased the Amount of Freight:** Indian Railways to increase the amount of freight moved by it from about 35% in 2015 to 45% by 2030 to reduce overall emissions from transportation.
- **Complete Electrification:** Complete electrification of Indian Railways is targeted by financial year 2024. It will be the world's largest 100% electrified rail transportation system by then.
- **Use of Solar Power:** Plans to install 20 GigaWatts (GW) of solar for both traction loads and non-traction loads.
- 1. Built a 1.7-MW solar power plant in Bina, Madhya Pradesh, in July 2020. It is the first solar energy plant in the world to directly power railway overhead lines, from which locomotives draw traction power.
- 2. A 2.5-MW solar project in Diwana, Haryana.
- 3. Work on a third pilot with a capacity of 50 MW has begun in Bhilai (Chhattisgarh).
- 4. A 16-kW solar power plant has been installed as platform shelter at the Sahibabad Railway Station.
- 5. The railways ministry has installed solar panels at over 960 stations and is using solar power to meet railway station energy needs.
- **Participation of Private Sector:** The ministry has included provisions for a Letter of Credit (LC) in the event of railway payment default, as well as a penalty for late payment in the model bidding document for solar power developers. This is to encourage the private sector to participate in the project.

**Challenges:**

- **No-objection certificate for open access:** The No objection Certificate (NoC) for open access to electricity flow for railways in West Bengal, Tamil Nadu, Chhattisgarh, Odisha, Andhra Pradesh, Kerala and Telangana has not been operationalised due to regulatory challenges that the railways are vigorously pursuing. If approval for procuring power through open access is granted in these states, solar deployment may increase.
- **Wheeling and banking provision:** Full deployment of solar potential will become more feasible if states provide wheeling and banking arrangements.
- **Merger of solar purchase obligation and non-solar purchase obligation:** The consolidation of solar and non-solar obligations will allow the railways to meet their Renewable Purchase Obligations.
- **Unrestricted net metering regulations:** Unrestricted net metering for rooftop solar projects would hasten the deployment of railway solar plants.

**Net-Zero Emissions**

- It refers to achieving an overall balance between greenhouse gas emissions produced and greenhouse gas emissions taken out of the atmosphere.
- 1. First, human-caused emissions (like those from fossil-fueled vehicles and factories) should be reduced as close to zero as possible.
- 2. Second, any remaining GHGs should be balanced with an equivalent amount of carbon removal, for example by restoring forests.
- **Global Scenario:**

1. As of June 2020, twenty countries and regions have adopted net-zero targets.
2. The Kingdom of Bhutan is already carbon-negative, i.e. absorbs more CO2 than it emits.
- **Indian Scenario:**
1. India's per capita CO2 emissions – at 1.8 tonnes per person in 2015 – are around a ninth of those in the USA and around a third of the global average of 4.8 tonnes per person.
2. However, overall, India is now the planet's third-largest emitter of CO2, behind China and the USA.
3. Sectors that are the largest emitters:  
Energy>Industry>Forestry>Transport>Agriculture>Building

### INTERNATIONAL RELATION

#### **Declaration for Uighur Muslims**

Recently, 43 countries have signed a declaration, calling on China to ensure full respect for the rule of law for the Muslim Uighur community in Xinjiang. Earlier, in March 2021 several hundred Uighur Muslim women in Turkey staged an International Women's Day march against the extradition agreement of Turkey with China.



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#### **Key Points**

#### **About the Declaration:**

- The declaration was signed by the US and other countries accusing China of human rights violations and ethnic cleansing against the Uighur Muslims. Similar declarations in 2019 and 2020 condemned China for its policies in Xinjiang, where United States has accused Beijing of carrying out genocide.
- It also called for access to Xinjiang for independent observers, including the UN High Commissioner for Human Rights.
- It noted the existence of a large network of 'political re-education' camps in Xinjiang Uighur Autonomous Region, where over a million people have been arbitrarily detained.

#### **China's Stand:**

- China has long denied accusations of ethnic cleansing. It also denounced the declaration and termed it as a plot to hurt China's image.
- China claims its camps to be 'educational centres' where the Uighurs are being cured of "extremist thoughts" and radicalisation, and learning vocational skills. However, in actuality, they are brutal incarceration camps.

#### **India's Stand:**

- The Indian government has maintained near silence on the Uighur crisis.

#### **Uighur Muslims**

#### **About:**

- The Uighurs are a predominantly Muslim minority Turkic ethnic group, whose origins can be traced to Central and East Asia. The Uighurs speak their own language, similar to Turkish, and see themselves as culturally and ethnically close to Central Asian nations.

- The Uighurs are considered to be one of the 55 officially recognized ethnic minority communities in China. However, China recognises the community only as a regional minority and rejects that they are an indigenous group.
- Currently, the largest population of the Uighur ethnic community lives in the Xinjiang region of China.
- 1. A significant population of Uighurs also lives in the neighbouring Central Asian countries such as Uzbekistan, Kyrgyzstan and Kazakhstan.
- 2. Xinjiang is technically an autonomous region within China — its largest region, rich in minerals, and sharing borders with eight countries, including India, Pakistan, Russia and Afghanistan.

**Persecution of Uighurs:**

- Over the past few decades, as economic prosperity has come to Xinjiang, it has brought with it in large numbers the majority Han Chinese.
- 1. They have cornered the better jobs, and left the Uighurs feeling their livelihoods and identity were under threat.
- 2. This led to sporadic violence, in 2009 culminating in a riot that killed 200 people, mostly Han Chinese, in the region's capital Urumqi.
- Uighur Muslims for decades have suffered from abuses including persecution, forced detention, intense scrutiny, surveillance and even slavery.
- China claims that Uighur groups want to establish an independent state and, because of the Uighurs' cultural ties to their neighbours, leaders fear that elements in places like Pakistan may back a separatist movement in Xinjiang.

**Way Forward**

- China must close its “Vocational Training Centers,” release the religious and political prisoners from prisons and detention camps.
- It should adopt multiculturalism and accept the Uighurs and other Turkic Muslims of China as ordinary citizens equal to native Chinese.
- All the countries should reconsider their position and urge China to immediately stop the persecution of Muslims and the prohibition of Islam in Xinjiang.

**BIODIVERSITY & ENVIRONMENT****Fourth Assembly of ISA**

- Recently, the fourth general assembly of the International Solar Alliance (ISA) was held. A total of 108 countries participated in the assembly, including 74 member countries, 34 observer and prospective countries, 23 partner organisations and 33 special invitee organisations.

**Key Points**

- **About the International Solar Alliance (ISA):**
  1. The ISA is an intergovernmental treaty-based organisation with a global mandate to catalyse solar growth by helping to reduce the cost of financing and technology.
  2. ISA, co-founded by India and France during the 2015 climate change conference in Paris has assumed centre-stage for India's attempts at a global climate leadership role.
  3. ISA is the nodal agency for implementing One Sun One World One Grid (OSOWOG), which seeks to transfer solar power generated in one region to feed the electricity demands of others.
  4. India has allotted 5 acres of land to the ISA in National Institute of Solar Energy (NISE) campus, Gurugram and has released a sum of Rs. 160 crore for creating a corpus fund, building infrastructure and meeting day to day recurring expenditure of the ISA up to the year 2021-22. NISE is an autonomous institution of the Ministry of New and Renewable (MNRE) and is the apex National R&D institution in the field of Solar Energy.

**Highlights of the Assembly:**

- **Solar Investments:**
  1. A promise to achieve USD 1 trillion global investments in solar energy by 2030.
  2. A Solar Investment Action Agenda and a Solar Investment Roadmap will be launched at COP26 (United Nations (UN) Climate Change Conference).
- **On One Sun One World One Grid (OSOWOG):**
  1. Gave a green light to the “One Sun” political declaration for the launch of Green Grids Initiative - One Sun One World One Grid (GGI-OSOWOG) at COP26.
- ✓ **OSOWOG:** The concept of a single global grid for solar was first outlined at the First Assembly of the ISA in late 2018.
- ✓ **COP 26 Green Grid Initiative:** The aim of this initiative is to help achieve the pace and scale of reforms to infrastructure and market structures needed to underpin the global energy transition.
- **New ISA Programmes:**

1. New ISA programmes launched on management of solar PV panels & battery usage waste and solar hydrogen programme. The new Hydrogen initiative is aimed at enabling the use of solar electricity to produce hydrogen at a more affordable rate than what is available currently (USD 5 per KG), by bringing it down to USD 2 per KG.

**Some Solar Energy Initiatives of India:**

- **National Solar Mission (a part of National Action Plan on Climate Change):** To establish India as a global leader in solar energy, by creating the policy conditions for its diffusion across the country as quickly as possible.
- **INDC's target:** It targets installing 100 GW grid-connected solar power plants by the year 2022. This is in line with India's Intended Nationally Determined Contributions (INDCs) target to achieve about 40% cumulative electric power installed capacity from non-fossil fuel based energy resources and to reduce the emission intensity of its GDP by 33 to 35% from 2005 level by 2030.
- International Solar Alliance (ISA) and One Sun One World One Grid (OSOWOG)
- **Government Schemes:** Such as Solar Park Scheme, Canal bank & Canal top Scheme, Bundling Scheme, Grid Connected Solar Rooftop Scheme etc.
- **First Green Hydrogen Mobility project:** National Thermal Power Corporation Limited (NTPC) Renewable Energy Ltd (REL) signed a Memorandum of Understanding with the Union Territory of Ladakh to set up the country's first Green Hydrogen Mobility project. Green hydrogen is produced by electrolysis of water using renewable energy (like Solar, Wind) and has a lower carbon footprint.

**SCIENCE & TECHNOLOGY****White Dwarf**

Recently, an international team saw a white dwarf losing its brightness in 30 minutes, which usually takes a period of several days to months. This peculiarity in brightness of white dwarfs can be referred to as switch on and off phenomena.

Using the Hubble Space telescope and Transiting Exoplanet Survey Satellite (TESS), astronomers have identified several white dwarfs over the years.

**Key Points****About White Dwarfs:**

- **Formation:**
- 2. White dwarfs are stars that have burned up all of the hydrogen they once used as nuclear fuel. Such stars have very high density. A typical white dwarf is half the size of our Sun and has a surface gravity 1,00,000 times that of Earth.
- 3. Stars like our sun fuse hydrogen in their cores into helium through nuclear fusion reactions.
- 4. Fusion in a star's core produces heat and outward pressure (they bloat up as enormous red giants), but this pressure is kept in balance by the inward push of gravity generated by a star's mass.
- 5. When the hydrogen, used as fuel, vanishes and fusion slows, gravity causes the star to collapse in on itself into white dwarfs.

- **Black Dwarfs:**

1. Eventually - over tens or even hundreds of billions of years - a white dwarf cools until it becomes a black dwarf, which emits no energy. Because the universe's oldest stars are only 10 billion to 20 billion years old there are no known black dwarfs.
2. It must be noted that not all white dwarfs cool and transform into black dwarfs.

- **Chandrasekhar Limit:**

1. Those white dwarfs which have enough mass reach a level called the Chandrasekhar Limit.
2. At this point the pressure at its center becomes so great that the star will detonate in a thermonuclear supernova (explosion).

**Switch on and off Phenomena:**

- The white dwarf, which is discussed, is part of a binary system called TW Pictoris, where a star and a white dwarf orbit each other. The two objects are so close to each other that the star transfers material to the white dwarf.
- As this material approaches the white dwarf it forms an accretion disk or a disk of gas, plasma, and other particles around it.
- As the accretion disk material slowly sinks closer towards the white dwarf it generally becomes brighter.
- Also there are cases when the donor stars stop feeding the white dwarf disk. However, reasons for this are still not clear.
- When this happens the disk is still bright as it "drains" material that was previously still there. It then takes the disk about 1-2 months to drain most of the material.

- However, TW Pictoris' drop in brightness in 30 mins was totally unexpected and it may be due to the process called magnetic gating. Magnetic gating happens when the magnetic field is spinning so rapidly around the white Dwarf it creates a barrier disrupting the amount of matter the white dwarf can receive.

**Significance:** This discovery will help understand the physics behind accretion – how black holes and neutron stars feed material from their nearby stars.

#### Chandrasekhar Limit

- Chandrasekhar Limit is the maximum mass theoretically possible for a stable white dwarf star.
- A limit which mandates that no white dwarf (a collapsed, degenerate star) can be more massive than about 1.4 times the mass of the Sun.
- Any degenerate object more massive must inevitably collapse into a neutron star or black hole.
- The limit is named after the Nobel laureate Subrahmanyan Chandrasekhar, who first proposed the idea in 1931.
- He was awarded the Nobel Prize in Physics in 1983 for his work on the physical processes involved in the structure and evolution of stars.

#### IMPORTANT FACTS FOR PRELIM

#### Konkan Shakti 2021

Recently, India and the UK started Konkan Shakti 2021, the first-ever tri-services joint exercise. It started off the west coast of India.

Earlier, the Gorkha Rifles (Frontier Force) of the Indian Army was awarded a Gold medal in the Cambrian Patrol Exercise, which was held in Wales (the UK).

#### Key Points

##### Aim:

- To derive mutual benefits from each other's experiences and also showcase the continuing cooperation between the two countries.
- It is also aimed at training troops in the conduct of Humanitarian Aid and Disaster Relief Operations by coalition forces in an opposed environment.

#### Other Joint Exercises between India and UK:

1. Navy: Konkan
2. Air Force: Indradhanush
3. Military: Ajeya Warrior

#### DAILY ANSWER WRITING PRACTICE

**Qns.** The Climate finance has remained skewed towards mitigation, without ensuring a balance between adaptation and mitigation. Discuss the various mechanisms to achieve Climate finance. (250 words)

**Ans:**

#### Introduction

Climate finance refers to local, national or transnational financing – drawn from public, private and alternative sources of financing -that seeks to support mitigation and adaptation actions that will address climate change. Climate finance is needed for mitigation, because large-scale investments are required to significantly reduce emissions. Climate finance is equally important for adaptation, as significant financial resources are needed to adapt to the adverse effects and reduce the impacts of a changing climate.

#### Body

##### Climate finance has remained skewed towards mitigation

- Climate finance has also remained skewed towards mitigation, despite the repeated calls for maintaining a balance between adaptation and mitigation.
- The 2016 Adaptation Gap Report of the UN Environment Programme had noted that the annual costs of adaptation in developing countries could range from \$140 to \$300 billion annually by 2030 and rise to \$500 billion by 2050.
- According to OECD, currently available adaptation finance is significantly lower than the needs expressed in the Nationally Determined Contributions submitted by developing countries.

##### Various mechanisms to achieve Climate finance

- **Multilateral funds:** The largest multilateral climate funds are the Climate Investment Funds (CIFs), Green Climate Fund (GCF), Adaptation Fund (AF), and Global Environment Facility (GEF).
- Funds provided by developed country governments from national budgets. Includes Assessed and Voluntary contributions.
- Sources that contribute to national budgets, dependent on national decisions. E.g.: Domestic carbon taxes, Phase out of fossil fuel subsidies

- Sources that contribute to national budgets, dependent on international agreements. E.g.: Financial transactions tax, Border carbon cost levelling Carbon exports optimization tax
- Funds collected internationally pursuant to an international agreement. E.g.: Carbon pricing for international aviation
- Leveraged private sector funds
- Non-concessional loans

**Conclusion**

There still doesn't exist an operational definition of what counts as "climate finance" or "new and additional". Clarifying these definitional and accounting issues in a consultative way, with an eye on post-2025 actions, would go a long way towards increasing trust and scaling up collective action.

Delivering on climate finance is fundamental to trust in the multilateral process. Regrettably, while developing countries will continue to pressure developed countries to live up to their promises, the history of climate negotiations is not in their favour.

**DAILY QUIZ**

Q1. Consider the following statements about Mount Harriet:

1. It is the second highest peak in the Andaman and Nicobar Islands.
2. It is believed to be named after British artist and photographer, Harriet Christina Tytler, who was the wife of Lord Mountbatten.

Which of the statements given above is/are correct?

- 1 only
- 2 only
- Both 1 and 2
- Neither 1 nor 2

Q2. Consider the following statements about the James Webb Space Telescope:

1. It is a joint venture between the US (NASA), European (ESA) and Japan (JAXA).
2. It will provide improved infrared resolution and sensitivity over Hubble Space Telescope.

Which of the statements given above is/are correct?

- 1 only
- 2 only
- Both 1 and 2
- Neither 1 nor 2

Q3. Consider the following statements:

1. The Earthshot Prize is an award set up by the Rockefeller Foundation to honour five finalists between 2021 and 2030 for developing solutions to fight the climate crisis.
2. India's Vidyut Mohan's technology that recycles agricultural waste to create fuel was named among the winners of the coveted prize.

Which of the statements given above is/are correct?

- 1 only
- 2 only
- Both 1 and 2
- Neither 1 nor 2

Q4. Consider the following statements:

1. The Food Safety and Standards Act, 2006 replaced the Prevention of Food Adulteration Act, 1954.
2. The Food Safety and Standards Authority of India (FSSAI) is under the charge of Director General of Health Services in the Union Ministry of Health and Family Welfare.

Which of the statements given above is/are correct?

- 1 only
- 2 only
- Both 1 and 2
- Neither 1 nor 2

Q5. India enacted The Geographical Indications of Goods (Registration and Protection) Act, 1999 in order to comply with the obligations

- ILO
- IMF
- UNCTAD
- WTO