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CURRENT AFFAIRS

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UNDERSTANDING DARK ENERGY IN THE UNIVERSE

This article covers "Daily Current Affairs" and the topic details " Understanding Dark Energy in the Universe". This topic has relevance in the Science and Technology section of the UPSC CSE exam.

GS 3: Science and Technology

Why in the news?

The composition of energy in the universe is characterized by a subtle equilibrium among various forms of matter and radiation.

Taking up a substantial 68%, dark energy significantly influences and directs the expansion of the universe.

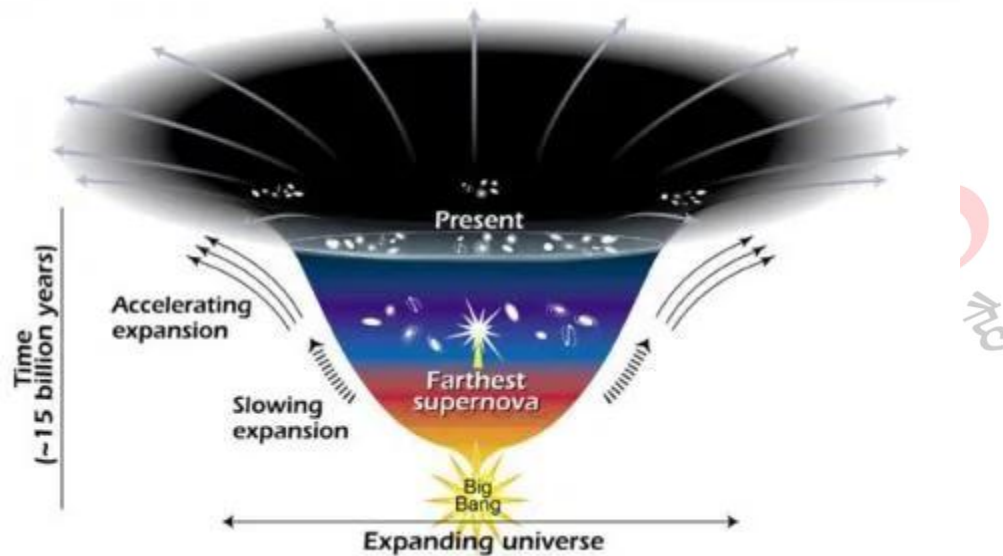
Overview:

Dark energy, a mysterious and enigmatic form of energy, constitutes a substantial portion of the total energy content of the universe. This elusive force is believed to be the driving factor behind the observed accelerated expansion of the cosmos, with approximately 68% of the universe attributed to dark energy, while dark matter accounts for about 27%. Remarkably, all the ordinary matter on Earth and everything observed in the universe with scientific instruments amounts to less than 5% of the total cosmic composition.

Key Points to Grasp about Dark Energy:

- **Invisible Force Steering Expansion:**
 - Dark energy, an unseen force, plays a pivotal role in the accelerated expansion of the universe. Unlike gravity, which attracts objects, dark energy acts as a repulsive force, pushing galaxies away from each other.
- **Characteristics of Space:**
 - Contrary to the conventional idea of space as an empty void, dark energy introduces a new perspective. Space is not merely an empty expanse; it is a dynamic, stretchable medium that responds to the presence of energy.
- **Expansion Dictated by Energy Forms:**
 - The universe's expansion is not uniform, and different forms of energy contribute uniquely to this process. Whether it's matter, radiation, or dark energy, each type influences how a specific region of space expands or contracts.
- **Balancing Act:**

- Dark energy dominates the universe's energy budget, dictating the overall rate of space expansion. Striking a delicate balance with other forms of energy is crucial for the stability of the cosmos.
- **Implications:**
 - The quantity of dark energy holds significant implications for the observable universe. Too much positive energy could result in galaxies moving away faster than light, limiting visibility. Excessive negative energy might lead to the universe collapsing.
- **Diluteness of Dark Energy:**
 - Although it holds a position of dominance, dark energy is remarkably sparse throughout the immense expanse of the universe. In a cubic kilometer, it's as sparse as a single sugar crystal, raising questions about the nature and distribution of this mysterious force.



Possible Explanations of Dark Energy:

- **Property of Space:**
 - Albert Einstein's gravity theory with a cosmological constant suggests that "empty space" possesses its own energy, causing the universe to expand faster as more space comes into existence.
- **Quantum Theory of Matter:**
 - The quantum theory of matter proposes that "empty space" is filled with temporary ("virtual") particles continuously forming and disappearing.
- **Fifth Fundamental Force:**
 - Speculative theories propose a fifth fundamental force to explain dark energy, often referred to as "quintessence." However, none of these theories have been conclusively proven, rendering dark energy as "the most profound mystery in all of science."

Rishabh

INDIA'S STEADY WAY IN THE SHIPPING VALUE CHAIN: INDIA'S FIRST CENTER OF EXCELLENCE FOR GREEN PORTS AND SHIPPING

(This article is from 'Official website of the Ministry of Ports, Shipping and Waterways, Government of India', 'The Hindu', 'Indian Express', 'United States Agency for International Development', 'Sansad TV's program Sarokar', 'Energy and Environment An interdisciplinary journal that invites energy policy analysts, natural scientists and engineers, as well as lawyers and economists to contribute to mutual understanding and learning 'Official website of the Institute of Marine Engineers, Government of India' and 'PIB. It also includes the suggestions of the Yojana IAS team. This article is specifically related to the 'Development of Indian Economy, Ministry of Shipping, Transport and Waterways, Environment and Ecology' section of the UPSC Civil Services Examination. This article is related to 'India's Sustainable Direction in Shipping Value Chain: India's First Center of Excellence for Green Ports and Shipping' under 'Daily Current Affairs').

General Studies: Development of Indian Economy, Ministry of Shipping, Transport and Waterways, Environment and Ecology.

WHY IN DISCUSSION / NEWS ?

Union Minister of Ports, Shipping & Waterways and AYUSH Shri Sarbananda Sonowal announced India's first National Center of Excellence for Green Ports and Shipping (NCoEGPS). The objective of the Center is to develop a regulatory framework and road map for adoption of alternative technologies to promote carbon neutrality and circular economy (CE) in the sector of Ministry of Ports, Shipping and Waterways in India. India aspires to increase the share of renewable energy in the total power demand in all its major ports, which is currently less than 10 percent, to 60 percent, to be met through power generated by solar and wind energy. India's first National Center of Excellence for Green Port & Shipping (NCOEGPS) has been launched by the Government of India at the recent "INMARCO 2022" held in Mumbai. .

OBJECTIVE : -

To promote carbon neutrality and financial economy in India and to make ports and shipping more environment friendly.

INMARCO is a quadrennial international maritime conference and exhibition, hosted by the Institute of Marine Engineers (Government of India). That is, INMARCO organizes this program every four years by presenting its report on developing a road map for green ports and adoption of alternative technologies for shipping.

INDIA'S FIRST CENTER OF EXCELLENCE FOR GREEN PORTS AND SHIPPING (NCOEGPS) :

INTRODUCTION:

- It is a flagship initiative of the Ministry of Ports, Shipping and Waterways (MOPSW) as part of the Sagarmala Program of the Ministry of Ports, Shipping and Waterways towards providing green solutions in the Ministry of Shipping and Waterways. Will work under the framework of.

- The information and implementing partner for this project is **The Energy and Resources Institute (TERI)**.

AIM OF THE CENTER OF EXCELLENCE:

- The objective of the Center is to develop a regulatory framework for green shipping and a road map for adoption of alternative technologies to promote carbon neutrality and circular economy (CE) in the shipping sector in India.
- Green shipping is the practice of using less resources and energy to transport people and goods by ship to protect the global environment from environmental pollutants and greenhouse gases (GHGs) produced by ships.
- **India aims to increase the share of renewable energy in the total power demand of each of its major ships to 60% from the current share of less than 10%.**
- It will be implemented with the help of solar energy and wind energy.
- Center of Excellence is a team, a shared facility or a unit that provides the best leadership, practice, research, collaboration and training in a single location for a particular area.
- It promotes innovation.



OBJECTIVES OF INMARCO :

- Its main objective is to strengthen 'Make in India' in the field of ports, shipping and waterways and engineering by developing cutting-edge technologies and application products in this sector under '**Make in India Scheme**'.
- The aim is to provide the most appropriate solutions to various challenges in these areas by enabling innovations.
- One of its main objectives is to create a competent work force for the industry equipped with state-of-the-art theoretical and practical knowledge by creating a pool of capable manpower.
- Its main objective is to identify and analyze the complex problems of this sector and provide assistance in solving the issues, in order to provide self-reliance to India in

technology development through scientific study and providing short-term solutions through the technical branch.

IMPORTANCE OF INMARCO:

- **INMARCO Mission is a major effort towards realizing the Lifestyle for the Environment (LiFE) movement as it aims to transform ports and make the shipping sector eco-friendly.**
- **India's first National Center of Excellence for Green Ports and Shipping will work with all ports, shipping and maritime states of India to understand their local problems and offer solutions through a scientific approach.**

RELATED INITIATIVES LAUNCHED BY GOVERNMENT OF INDIA:

- **The ports also aim to reduce carbon emissions per tonne of cargo by 30% by 2030.**
- **The Maritime Vision Document 2030 is a 10-year blueprint on India's vision of a sustainable maritime sector and vibrant blue economy.**
- **India has been selected as the first country under the Green Voyage 2050 project of the International Maritime Organization (IMO) to conduct a pilot project related to green shipping.**



GREEN VOYAGE 2050 PROJECT:

- **The Green Voyage 2050 project is a project launched in May 2019 between the Government of Norway and the International Maritime Organization (IMO), which aims to transform the shipping industry into a low-carbon emitting future.**
- **The global partnership will help Small Island Developing States (SIDS) and Least Developed Countries (Least Developed Countries) meet their commitments to climate change and energy efficiency targets relevant to international shipping by supporting the inaugural IMO Greenhouse Gas (GHG) Strategy. Developed Countries-LDC is supporting the developing countries.**
- **One of the important objectives of Green Voyage 2050 is to encourage global efforts to demonstrate and test technology solutions.**

REPORT PRESENTED BY THE STANDING COMMITTEE ON NATIONAL INLAND WATERWAYS:

- Inland waterways are a navigable river and canal system. **The Inland Waterways Authority of India (IWAI)** regulates and develops national waterways for inland shipping and navigation.

MAJOR FINDINGS AND SUGGESTIONS OF THE COMMITTEE INCLUDE THE FOLLOWING: OPERATION OF NATIONAL WATERWAYS:

- At present there are a total of 111 notified national waterways in India, out of which 23 have been made operational.
- Due to financial and staff constraints, the **Ministry of Ports, Shipping and Waterways** has said that 63 national waterways are currently not being developed by the ministry.
- A committee constituted by the Ministry of Ports, Shipping and Waterways of India has suggested that these 63 waterways should not be developed at present as it is impractical.

INTERMODAL CONNECTIVITY FOR TRANSPORTATION OF CARGO:

- Under intermodal connectivity for transportation of cargo, the committee has said that connectivity of waterways with major ports, railways and roads will reduce the burden of transportation of cargo and will also reduce the cost of logistics.
- The Committee has suggested that in case of newly notified waterways, connectivity with rail, road and ports should be dealt with at the project completion stage itself.

LOW SHARE OF WATERWAYS:

- The average share of waterways in freight traffic in India is about **2%, compared to 4% in the USA, 14% in China, 48% in Vietnam and 49% in the Netherlands.**
- **India aims to increase the share of this sector to 5% by the year 2030.**
- The Committee has recommended that the Ministry prepare an action plan on an urgent basis to harness and develop the potential of waterways as a sustainable transit option and tourism service.

IMPORTANT FACTS :-

- The center will utilize a number of technological measures to support the shipping and shipping sector and address various problems faced by the industry through scientific research.
- It will also provide valuable education, applied research and technology transfer in maritime transportation at local, regional, national and international levels.

This center will focus on 5 broad areas-

- **Policy, Regulatory and Research,**
- **Human Resource Development,**
- **Network- key partners and strategic partners,**
- **Exploration- scope of work, results, projects and resources,**
- **Attached - Scope of work, results, projects and resources.**

PRACTICE QUESTIONS FOR PRELIMINARY EXAM:

Q.1. Consider the following statements with reference to India's first National Center of Excellence for Green Ports and Shipping (INMARCO).

1. INMARCO is a quadrennial international maritime conference and exhibition, hosted by the Institute of Marine Engineers (Government of India).
2. INMARCO Mission is a major effort towards realizing the eco-friendly lifestyle movement.
3. The Green Voyage 2050 project is a project launched in May 2019 between the Government of Norway and the International Maritime Organization (IMO).
4. India aims to increase the sector's average share of waterways in freight traffic to 5% by 2030.

Which of the above statement/statements is correct?

- A. Only 1, 2 and 3
- B. only 2 and 4
- C. None of these.
- D. All of these .

Answer-D

PRACTICE QUESTIONS FOR MAIN EXAM:

Q.1. What is Sagarmala Project? How INMARCO is helpful in promoting carbon neutrality and financial economy in India and making ports and shipping more environment friendly? Discuss logically.

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