Carbon Market

With COP29 approving standards for establishing an international carbon market, countries aim to create a structured mechanism for trading carbon credits and offsets to meet their climate goals effectively.

What is a Carbon Market?

- A carbon market enables the trading of carbon credits, granting the holder the right to emit one tonne of carbon dioxide (CO_2) or its equivalent.
- These markets operate on the principle of limiting emissions and allocating rights through tradable credits or offsets.
- Origin: Introduced in the U.S. during the 1990s under the cap-and-trade system for controlling sulphur dioxide emissions.

Working of a Carbon Market:

1. Issuance of Carbon Credits:
    - Governments allocate a limited number of carbon credits, restricting total emissions.
    - Each credit permits the emission of one tonne of CO_2.
2. Trading:
    - Companies that need more credits can buy from those with surplus.
    - Market forces determine the price based on supply and demand.
3. Offsets:
    - Companies purchase offsets by funding activities like afforestation or renewable energy projects to balance their emissions.
4. International Mechanism:
    - Articles 6.2 and 6.4 of the Paris Agreement allow cross-border trading of emission reductions.

India's Initiatives in Carbon Markets:

- Perform, Achieve, Trade (PAT) Scheme: Targets industries to improve energy efficiency and trade surplus credits.
- Renewable Energy Certificates (REC): Facilitates trade in renewable energy to meet energy compliance targets.
- Energy Conservation Act, 2022 Amendment: Introduced a domestic carbon trading market to incentivize low-carbon technologies.
- Climate Action: Committed to a 45% reduction in emission intensity by 2030 as part of its Nationally Determined Contributions (NDCs).

Positive Consequences of Carbon Markets:

- Emission Reduction: Imposes financial costs on emissions, encouraging companies to adopt cleaner technologies.
- Economic Efficiency: Allows cost-effective allocation of emission rights through market trading.
- Financial Support for Green Projects: Funds projects like afforestation and renewable energy.

- Global Cooperation: Encourages international partnerships under Paris Agreement mechanisms.

Limitations of Carbon Markets:

1. Loopholes: Lack of stringent monitoring can lead to fraudulent claims or over-allocation of credits.
2. Price Volatility: Fluctuating credit prices can create market uncertainty.
3. Limited Impact on Emission Levels: Without strong caps, markets may fail to drive significant reductions.
4. Accessibility Issues: Small businesses and developing countries may struggle to participate effectively.
5. Criticism of Offsets: Offsets are seen as superficial solutions that don't address the root cause of emissions.

Way Ahead:

1. Stricter Regulations: Enforce robust monitoring and verification to prevent misuse.
2. Capacity Building: Support developing countries in accessing carbon markets effectively.
3. Incentives for Green Projects: Encourage innovative projects to offset emissions.
4. Transparency: Ensure clear guidelines and public reporting of emissions and credits.

Conclusion:

Carbon markets offer a promising mechanism to reduce emissions and achieve global climate targets. However, addressing regulatory gaps, ensuring equity, and fostering international cooperation are essential to maximize their potential and ensure sustainable outcomes.

Rajmarg Saathi

The National Highways Authority of India (NHAI) has launched 'Rajmarg Saathi', a modernized Route Patrolling Vehicle (RPV) system to enhance highway safety, emergency response, and road maintenance efficiency.

About Rajmarg Saathi:

- What it is: Rajmarg Saathi is Upgraded Route Patrolling Vehicles (RPVs) designed for efficient highway patrolling and incident management.
- Aim: Improve highway safety and ensure seamless traffic flow through advanced technology and efficient emergency response.
- Features:
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    - Advanced Design: Closed cabinets with organized shelves for quick access to emergency tools and inventory.
    - AI-Enabled Dashboard Cameras: Captures cracks, potholes, and other road distress data for integration with the NHAI One application for efficient maintenance.
    - Safety Tools: Equipped with modern communication and safety gear to minimize traffic disruptions.
    - Data Collection: Weekly video analytics for better road condition monitoring and maintenance.

Santa Ana Winds

Santa Ana winds are a seasonal weather phenomenon unique to California, characterized by hot, dry, and gusty conditions that significantly increase the risk of wildfires and cause damage across affected regions.

What Are Santa Ana Winds?

- Definition: Santa Ana winds are strong, dry winds that blow from inland deserts toward the coast, significantly affecting Southern California's weather.
- Seasonality: These winds typically occur during fall but can also happen in winter.

How Are Santa Ana Winds Formed?

- High-Pressure Systems: A high-pressure system forms over the Great Basin (northeast of California), creating a strong pressure gradient.
- Airflow Dynamics: The high-pressure forces cooler, north-to-northeasterly winds to flow toward the lower-pressure coastal regions.
- Downslope Effect: As winds descend through mountain passes, the air compresses, warms, and dries out, reducing relative humidity and intensifying the gusts.
- Wind Speed: Gusts can reach up to 80 mph, creating hazardous conditions.

Regions Affected by Santa Ana Winds:

- Primary Impact Area: Southern California, particularly areas around Los Angeles, San Diego, and Ventura counties.
- Secondary Impact: Parts of Baja California and other coastal regions may also experience similar conditions.

Impacts of Santa Ana Winds:

- Wildfire Risk: The hot, dry winds rapidly dry vegetation, creating ideal conditions for wildfires to ignite and spread.
- Structural Damage: High wind speeds can damage buildings, power lines, and trees.
- Health Effects: Dust and allergens stirred by the winds can worsen respiratory conditions.
- Power Disruptions: Utility companies may implement precautionary power outages to prevent wildfire ignition from downed lines.

Jalvahak Initiative

The Indian government has launched the Jalvahak initiative to promote long-haul cargo transportation via inland waterways.

About the Jalvahak Initiative:

- What It Is: Jalvahak is a cargo promotion scheme designed to incentivize the movement of long-haul cargo through India's national waterways.
- Ministry Involved: Launched by the Ministry of Ports, Shipping & Waterways (MoPSW).
- Implementing Agency: The initiative is implemented jointly by the Inland Waterways Authority of India (IWAI) and Inland & Coastal Shipping Limited (ICSL).
- Aim:

- Promote environmentally sustainable cargo transportation.
- Decongest roads and railways by shifting freight movement to waterways.
- Foster economic growth through efficient logistics.

- Features:

- Incentive for Long Haul Cargo: Offers up to 35% reimbursement on operating costs for cargo transported over 300 km via waterways.
- Validity: Initially valid for three years.
- National Waterways Covered:
    - NW1: River Ganga.
    - NW2: River Brahmaputra.
    - NW16: River Barak.
- Scheduled Service: Fixed-day sailings between key locations like Kolkata, Patna, Varanasi, and Pandu (Assam).
- Transit Times: Transit durations are predefined, ensuring timely delivery.
- Modal Shift Target: Aim to achieve 800 million tonne-kilometres of cargo movement by 2027.

Solid Phase Alloying

A groundbreaking study highlights the potential of solid phase alloying to transform metal scrap into high-performance alloys without traditional melting processes.

About Solid Phase Alloying:

- What is Solid Phase Alloying?
  - Definition: Solid phase alloying is a technique to create metal alloys directly from scrap without melting, enhancing their properties.
  - Purpose: Upcycles metal scrap into high-performance alloys for various industrial applications.
- Science Behind Solid Phase Alloying
  - The process operates entirely in the solid state, eliminating the need for bulk melting.
  - Utilizes friction and heat generated through high-speed rotation to blend and disperse metals uniformly.
- The Process:
  - Material Input: Aluminium scrap is mixed with copper, zinc, and magnesium.
  - Shear Assisted Processing and Extrusion (ShAPE):
    - A rotating die creates frictional heat, combining the metals into a uniform alloy.
  - Outcome: The final alloy matches the strength and performance of products made from primary aluminium.
- Benefits of Solid Phase Alloying:
  - Energy Efficiency: Eliminates energy-intensive melting, reducing manufacturing costs.
  - Sustainability: Reduces waste by recycling industrial aluminium scrap.
  - Improved Properties: Produces durable, high-strength alloys comparable to new materials.
  - Versatility: Enables the creation of new alloys for 3D printing technologies.
  - Cost-Effectiveness: Low-cost feedstock from scrap leads to affordable high-performance materials.

POSH Act, 2013

The Supreme Court is hearing a PIL on applying the POSH Act to political parties, questioning their status as workplaces and Internal Complaints Committees (ICC) compliance.

About POSH Act:

- What is POSH Act?
    - Sexual Harassment of Women at Workplace (Prevention, Prohibition, and Redressal) Act, 2013.
    - Objective: Protect women from sexual harassment at workplaces and ensure a mechanism for redressal.
- Important Sections of the Act:
    - Section 3(1): Prohibits sexual harassment at the workplace.
    - Section 4: Mandates the formation of an Internal Complaints Committee (ICC) in every workplace.
    - Section 9: Details the procedure for filing a complaint within three months of the incident.
    - Section 13: Discusses the inquiry procedure and actions against the accused if found guilty.
- Who is Covered Under the Act?
    - Employees: Includes permanent, temporary, contract workers, interns, and volunteers.
    - Workplace: Includes offices, public and private institutions, houses, hospitals, transport, and places visited during employment.
- Features of the POSH Act:
    - ICC Formation: Requires at least one external member with expertise in addressing sexual harassment.
    - Wide Definition of Workplace: Covers places visited during employment and extends to remote work settings.
    - Employer Responsibility: Ensures compliance, raises awareness, and reports annual compliance status.
    - Penalties: Non-compliance attracts fines and reputational damage for the organization.
- Judicial Judgments on POSH Act:

- Vishaka vs. State of Rajasthan (1997): Laid down guidelines for workplace sexual harassment, which later became the foundation for the POSH Act.
- Kerala HC (2022): Held that political parties are not workplaces under the Act due to the absence of an employer-employee relationship.