

Cabinet approves Strategic Partnership Agreement between MNRE & IRENA

(GS Paper 3, Environment)

Why in news?

- Recently, the Union Cabinet was apprised of a Strategic Partnership Agreement signed between the Ministry of New and Renewable Energy (MNRE) and the International Renewable Energy Agency (IRENA).

Aim:

- The aim of the Agreement is to drive ambition, leadership and knowledge on green energy transitions based on renewable energy in India.
- The Agreement will help India's energy transition efforts and will also help the world in combating climate change.



Areas of cooperation:

- The areas of cooperation as envisaged in the Strategic Partnership Agreement will support India in achieving its ambitious target of 500 GW of installed non-fossil fuel electricity capacity by 2030.
- This in-turn will promote Atmanirbhar Bharat.

The salient features of the Agreement include enhanced cooperation in the following areas:

- Facilitating knowledge sharing from India on scaling-up renewable energy and clean energy technologies
- Supporting India's efforts on long term energy planning
- Collaborating to strengthen the innovation climate in India
- Moving towards cost-effective decarbonisation through catalysing development and deployment of green hydrogen.

Way Forward:

- Thus, the Strategic Partnership Agreement will help India's energy transition efforts and will also help the world in combating climate change.

India successfully tests high-speed expendable aerial target ABHYAS

(GS Paper 3, Defence)

Why in news?

- Recently, India successfully flight-tested the indigenously developed high-speed expendable aerial target (HEAT), ABHYAS, from the Integrated Test Range (ITR) in Chandipur off the Odisha coast.
- The target aircraft was flown from a ground-based controller in a pre-designated low-altitude flight path, which was monitored by various tracking sensors deployed by the ITR, including radar and an electro-optical targeting system.



Developed by:

- ABHYAS is **designed & developed** by Aeronautical Development Establishment of Defence Research and Development Organisation (DRDO).

Key features of ABHYAS:

- The air vehicle was launched using **twin under-slung boosters** which provide the initial acceleration to the vehicle.
- It is **powered by a small gas turbine engine** to sustain a long endurance flight at high subsonic speed.
- The target aircraft is equipped with **Micro-Electromechanical Systems-based Inertial Navigation System** for navigation along with the Flight Control Computer for guidance and control along with Indigenous Radio Altimeter for very low altitude flight and Data Link for encrypted communication between the Ground Control Station and Target Aircraft.
- The vehicle is programmed for fully autonomous flight.

India Forum for Nature-Based Solutions Launched

(GS Paper 3, Environment)

Why in news?

- The **National Institute of Urban Affairs' (NIUA) Climate Centre for Cities (NIUA C-Cube)**, World Resources Institute India (WRI India) and their partners launched **India's first national coalition platform for urban nature-based solutions (NbS)** at the 11th World Urban Forum in Poland.



Significance:

- Ecosystem-based services and Nature-Based Solutions are fast emerging as cost-effective and sustainable ways to address climate change induced challenges such as heat, urban flooding, air and water pollution and storm surges.
- Along with **mitigating the impact of climate change**, NbS also helps in providing **multiple ecosystem benefits** along with addressing various societal challenges including building resilience of the underserved and vulnerable urban communities who are most affected by climate change induced catastrophes.

The India Forum for Nature-based Solutions aims to create a collective of NbS entrepreneurs, government entities and like-minded organisations, to help scale urban nature-based solutions by

- Defining a shared language and by communicating benefits that inform actions at the local level including scaling up of existing NbS interventions.
- Driving investment and strengthening delivery mechanisms through multi-stakeholder coordination.
- Mainstreaming urban ecosystem-based services and nature-based solutions in India through informing policy, plans and project interventions

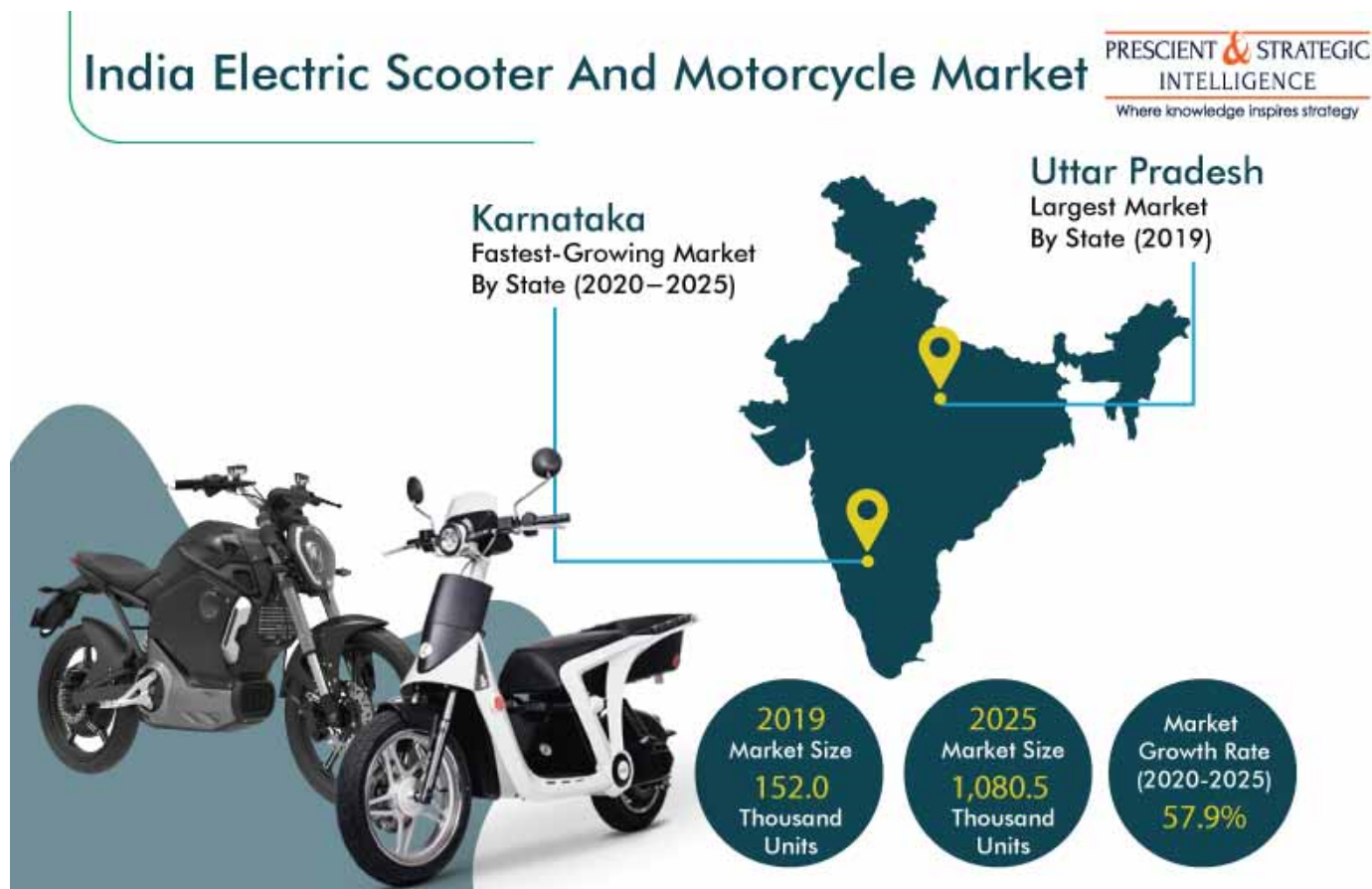
Cities4Forests initiative:

- 'India Forum for Nature-based Solutions' is led by the National Institute of Urban Affairs' Climate Centre for Cities (NIUA C-Cube) and anchored by World Resources Institute India (WRI Indija) under the Cities4Forests initiative.
- It is supported by Caterpillar Foundation, Department of Environment, Food & Rural Affairs (DEFRA), Govt. of United Kingdom and Norway's International Climate and Forest Initiative (NICFI).

Report on Future Penetration of Electric Two-Wheelers in the Indian Market (GS Paper 3, Science and Tech)

Why in news?

- Recently, NITI Aayog and TIFAC launched a report titled ‘Forecasting Penetration of Electric Two-Wheelers in India’.



Details:

- Using a tool made by NITI Aayog and TIFAC, **eight scenarios have been developed for analyzing the future penetration** of electric two-wheelers in the country.
- In an optimistic scenario, the report forecasts **100% penetration of electric two-wheelers in the Indian market by FY 2026–27**.
- In another scenario, which is technology driven and where current incentives are withdrawn by 2024, the report predicts 72% penetration by 2031.

The eight scenarios considered are:

- Challenged Diffusion
- Performance Driven
- Low Battery Cost
- Technology Driven
- Incentive Driven
- Battery Cost Challenged
- Same Performance
- Optimistic

Future scenarios:

The future scenarios have been constructed on the basis of three major factors that influence the market penetration of electric two-wheelers:

- demand incentives
- cost of battery

- c) vehicle performance in terms of both range and power

Four broad constraint levels:

Four broad constraint levels have also been identified for the eight scenarios, in terms of installed vehicle manufacturing capacity and available charging infrastructure:

- a) full constraint (where both vehicle production and charging infrastructure are constraints)
- b) production constraint (where only vehicle production is a constraint)
- c) charge constraint (where only the charging infrastructure is a constraint)
- d) no constraint.

Highlights:

- In the ‘Technology Driven’ scenario, if an R&D programme manages to enhance the range and power of electric two-wheelers by 5% annually between FY 2023–24 and 2025–26, and by 10% in FY 2026–2027, then the penetration of electric-two wheelers may reach about 72% in FY 2031–32—even with no extension of demand incentives.
- The sale of electric two-wheelers may cross 220 lakh units in FY 2028–29 under the ‘Optimistic’, ‘Same Performance’ and ‘Battery Cost Challenged’ scenarios.
- It may reach 180 lakh units under the ‘Technology-Driven’ scenario. Under the ‘Incentive Drive’ scenario, the sale is expected to reach only 55 lakh units in FY 2031.
- If there is sufficient installed capacity of electric two-wheelers and charging infrastructure, then sale (which finally reaches about 250 lakh units) may at some point even surpass the production under the ‘Optimistic’, ‘Same Performance’ and ‘Battery Cost Challenged’ scenarios.

Way Forward:

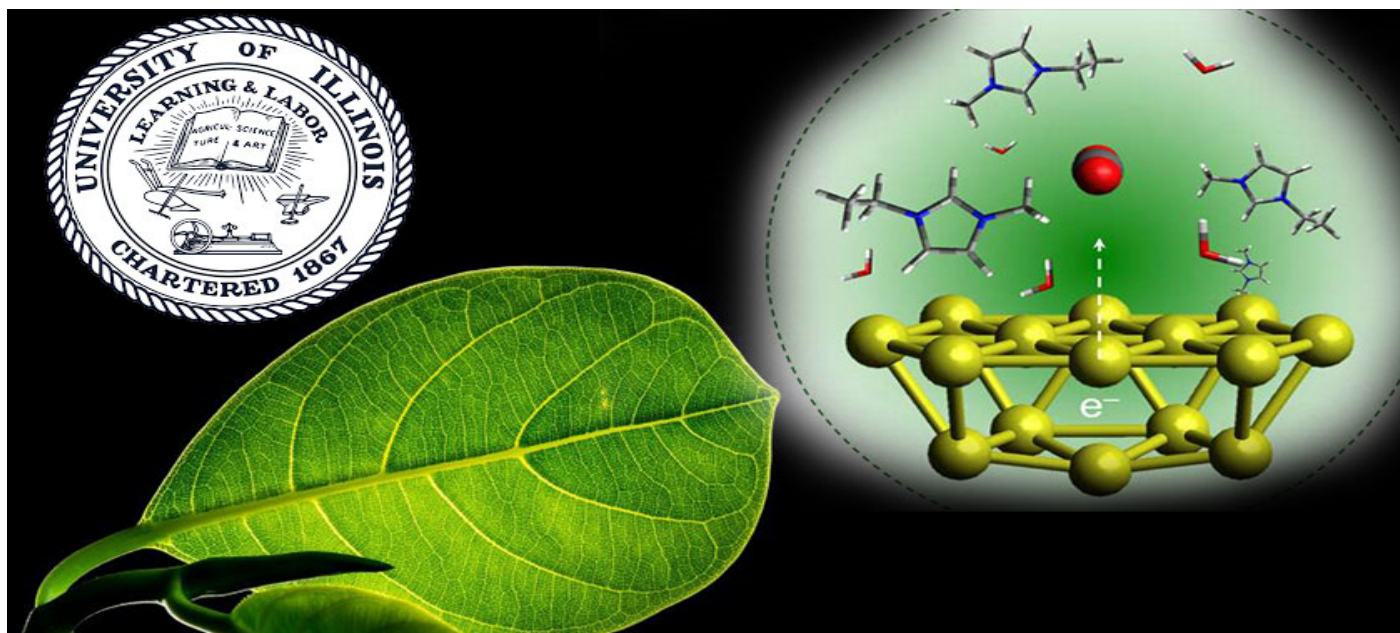
- The report provides important insights into the required infrastructure, manufacturing capability, policies, and technology-development priorities in the area.
- The scenarios can be used by government agencies, the industry, and academic/R&D institutions for evidence-based analysis of policies, market scenarios and technology development strategies.

Scientists debut artificial photosynthesis

(GS Paper 3, Science and Tech)

Why in news?

- Recently, Scientists from from UC Riverside and the University of Delaware have now come up with a new way to replicate the process of photosynthesis without sunlight.



What is Photosynthesis?

- Photosynthesis is a process that converts sunlight into energy and plant life thrives due to this phenomenon, as they use solar energy to break it down to create oxygen and energy in the form of sugar using water, and carbon dioxide.

Key Highlights:

- Scientists have bypassed the need for biological photosynthesis altogether and create food independent of sunlight by using artificial photosynthesis.
- The study stresses two steps **electrocatalytic process to convert carbon dioxide, electricity, and water into acetate**, the form of the main component of vinegar.
- The acetate thus created is consumed by food-producing organisms in the dark to grow.

Mechanism:

- They team used electrolyzers are devices that use electricity to convert raw materials like carbon dioxide into useful molecules and products.
- The amount of acetate produced was increased while the amount of salt used was decreased, resulting in the highest levels of acetate ever produced in an electrolyzer to date.

Outcome:

- The study reveals that a wide range of food-producing organisms can be grown in the dark directly on the acetate-rich electrolyzer output, including green algae, yeast, and fungal mycelium that produce mushrooms.
- Yeast production is about 18-fold more energy-efficient than how it is typically cultivated using sugar extracted from corn.

Way Forward:

- This technology is a more efficient method of turning solar energy into food, as compared to food production that relies on biological photosynthesis.
- The team has also submitted its design to Nasa's Deep Space Food Challenge where it bagged the phase 1 prize.