UPSC Daily Current Affairs | Prelim Bits 08-05-2020

Impact of Energy Efficiency Measures Report

- Impact of Energy Efficiency Measures Report was prepared by an Expert agency PWC Ltd, who was engaged by Bureau of Energy efficiency (BEE) for an independent verification to assess the resultant annual savings in energy as well as CO 2 emissions through various initiatives in India.
- Since 2017-18, every year Bureau of Energy Efficiency (BEE) appoints an third party expert agency to conduct study for comparing the actual energy consumption due to different energy efficiency schemes, with the estimated energy consumption, had the current energy efficiency measures were not undertaken i.e. counterfactual.
- The objective of this study is to evaluate the performance and impact of all the key energy efficiency programmes in India, in terms of total energy saved and the related reduction in the CO2 emissions.
- The findings of the report reflect that implementation of various energy efficiency schemes have led to total electricity savings to the tune of 113.16 Billion Units in 2018-19, which is 9.39% of the net electricity consumption.
- Energy savings (electrical + thermal), achieved in the energy consuming sectors (i.e. Demand Side sectors) is to the tune of 16.54 Mtoe, which is 2.84% of the net total energy consumption (approx..581.60 Mtoe) in 2018-19.
- The total energy savings achieved in 2018-19 is 23.73 Mtoe (million Tonne of Oil Equivalent), which is 2.69% of the total primary energy supply (estimated to be 879.23 Mtoe in India) during 2018-19.
- These efforts have also contributed in reducing 151.74 Million Tonnes of CO2 emissions, whereas last year this number was 108 MTCO2.
- The study assesses the resultant impact of current schemes at national as well as state level for the FY 2018-19 and compares it with a situation where the same were not implemented.
- This year the study has identified following major programmes, viz. Perform, Achieve and Trade Scheme, Standards &Labelling Programme, UJALA Programme, Municipal Demand Side Management Programme, etc.

Perform, Achieve and Trade Scheme

- India's Bureau of Energy Efficiency (BEE) launched its 'Perform, Achieve and Trade' (PAT) scheme with the aim to make the industrial sector energy efficient.
- The scheme has set energy efficiency targets for industries, those that fail to achieve targets will have to pay penalty.
- PAT has been launched under the National Mission for Enhanced Energy Efficiency, one of the eight missions under the umbrella National Action Plan on Climate Change, launched in June 2008.
- In its first cycle of three years, the scheme covers eight energy guzzling sectors—thermal power, aluminum, cement, fertilizer, iron and steel, pulp and paper, textiles and chlor-alkali.
- Together, these sectors account for 40 per cent of India's primary energy consumption.
- PAT is a market based mechanism in which sectors are assigned efficiency targets.
- Industries which over-achieve will get incentives in the form of energy saving certificates.
- These certificates are tradeable and can be bought by other industries which are unable to achieve their targets.
- These certificates will be tradeable at two energy exchanges: Indian Energy Exchange and Power Exchange India.
- The price of these certificates will be determined by the market.

Standards &Labelling Programme

- The Bureau of Energy Efficiency initiated the Standards & Labeling programme for equipment and appliances in 2006 to provide the consumer an informed choice about the energy saving and thereby the cost saving potential of the relevant marketed product.
- The energy efficiency labeling programs under BEE are intended to reduce the energy consumption of appliance without diminishing the services it provides to consumers.
- The scheme is invoked for 21 equipment/appliances including 10 for which it is mandatory.
- The other appliances are presently under voluntary labeling phase.
- The estimated savings from these labeling programmes have been about 12000 MW since 2007.
- **Products notified under mandatory appliance**

1. Frost Free (No-Frost) Refrigerator
2. Tubular Fluorescent Lamps
3. Room Air Conditioners
4. Distribution Transformers
5. Room Air Conditioners (Cassette, Floor Standing Tower, Ceiling, Corner AC)
6. Direct Cool Refrigerator
7. Electric Geysers
8. Color TV
9. Room Air Conditioners (Inverter type)
10. LED lamps

Products under voluntary labelling

1. Induction Motors
2. Pump sets
3. Ceiling fans
4. Liquefied Petroleum Gas (LPG) Stoves
5. Washing machine
6. Computer (Notebook/Laptops)
7. Ballast (Electronic/Magnetic)
8. Office equipment's (Printer, Copier, Scanner, MFD's)
9. Diesel Engine Driven Monoset Pumps for Agricultural Purposes
10. Solid State Inventor
11. Diesel Generator
12. Chillers
13. Microwave Ovens
14. Deep Freezers
15. Light Commercial Air Conditioners (LCAC)

UJALA Programme

- UJALA- Unnat Jyoti by Affordable LEDs for All.
- Under the scheme, 20W LED tube lights and BEE 5-star rated energy efficient fans are also distributed to the consumers.
- The 20W LED tube lights are 50% more energy efficient than conventional 40W tube lights and are available for Rs. 220/- per tube, as against the market price of Rs. 400-600.
- The energy efficient fans under the UJALA scheme come with a BEE 5 Star rating.
- These ceiling fans are rated 30% more energy efficient than conventional

fans and are priced at Rs. 1200/- per fan.

- The main objective is to promote efficient lighting, enhance awareness on using efficient equipment which reduce electricity bills and help preserve environment.
- The Electricity Distribution Company and Energy Efficiency Services Limited (EESL) a public sector body of Government of India are implementing the programme.

Demand Side Management Programme

- Demand Side Management (DSM) has been traditionally recognized as one of the major intervention to achieve reduction in energy demands while ensuring continuous development, It is implemented by BEE.
- In recent past, DSM has gained unprecedented importance and has become an integral part of almost all the central and state missions on promotion of Energy Efficiency.
- DSM interventions have helped utilities not only to reduce the peak electricity demands and but also to defer high investments in generation, transmission and distribution networks.
- The initiative has two different components

1. **Agricultural demand side management -** This programme promises energy efficiency through agriculture demand side management by reduction in overall power consumption, improving efficiencies of ground water extraction, reducing subsidy burden on state utilities and also investment in power plants through avoided capacity.
2. **Municipal Demand Side Management (MuDSM) -** The Municipality sector/urban local bodies (ULBs) consume electricity for various utility services like street lighting, water pumping, sewage treatment, and in various public buildings.

- The Municipal Demand Side Management (MuDSM) programme can improve the overall energy efficiency of the Urban Local Bodies (ULBs) which could lead to substantial savings in the electricity consumption, thereby resulting in cost reduction/savings for the ULBs.

Bureau of Energy Efficiency

- The Bureau of Energy Efficiency is an agency of the Government of India, under the Ministry of Power created in March 2002 under the provisions of the nation's 2001 Energy Conservation Act.
- The agency's function is to develop programs which will increase the

conservation and efficient use of energy in India.

- The government has proposed to make it mandatory for certain appliances in India to have ratings by the BEE starting in January 2010.
- The mission of Bureau of Energy Efficiency is to "institutionalize" energy efficiency services, enable delivery mechanisms in the country and provide leadership to energy efficiency in all sectors of the country.
- The primary objective would be to reduce energy intensity in the economy.

Project CARD

- NITI Aayog and the Department of Biotechnology have launched the Consortium for Affordable & Rapid Diagnostics (CARD) to scale up India's capacity to make coronavirus testing kits.
- The move comes after India faced quality issues with Chinese-made antibody testing kits, which are used for disease surveillance and to find out how many people have developed immunity to a disease.
- Project CARD's first goal is to roll out at least 10 million rapid antibody tests for Covid-19 by July.
- Additionally, capacity will be expanded to make reverse transcription polymerase chain reaction (RT-PCR) and other paper-based tests for Covid-19 in the country.

Click here to know more about Covid-19 Testing

Luhman 16A

- Luhman 16 is a binary star system, the third closest system to the Sun after Alpha Centauri and Barnard's star.
- At a distance of about 6.5 light years from the Sun, this pair of brown dwarfs referred to as Luhman 16A and Luhman 16B orbit each other, casting a dim light.
- A group of international astrophysicists have identified cloud bands on the surface of Luhman 16A, one of a pair of binary brown dwarfs in the Vela constellation.
- The researchers have found the actual structure of the clouds that they form bands over one of the pair (Luhman 16A) of brown dwarfs.
- They have used an idea put forth nearly two decades ago by Indian astrophysicist Sujan Sengupta, that the light emitted by a cloudy brown dwarf, or reflected off an extrasolar planet, will be polarised.
- He suggested that a polarimetric technique could serve as a potential tool

to probe the environment of these objects.
- Subsequently, many astronomers detected polarisation of brown dwarfs.
- Understanding the cloud system over a brown dwarf can shed light on the pressure, temperature and climate on the surface of the celestial body.



Brown Dwarfs

- Brown dwarfs are also called failed stars, because their masses are intermediate to the largest planets and the smallest main sequence stars.
- Their masses being too small, they are unable to sustain fusion of their hydrogen to produce energy.
- It is believed that some of the more massive brown dwarfs fuse deuterium or lithium and glow faintly.
- The faintness of the glow proved to be providential in finding the cloud bands.
- Unlike a star whose brightness would be too high, or an extrasolar planet orbiting a star, where the extra light from its star would have to be cut off to make the measurement, the light of the brown dwarfs was just right.

Tiger

- Tigers are at the top of the food chain and are sometimes referred to as “umbrella species" that is their conservation also conserve many other species in the same area.
- India accounts for majority of the 3,500-odd tigers that are scattered among Bangladesh, Bhutan, Cambodia, China, Indonesia, Laos PDR, Malaysia, Myanmar, Nepal, Russian Federation, Thailand and Vietnam.
- India’s five tiger landscapes are- Shivalik Hills and Gangetic Plains, Central Indian Landscape and Eastern Ghats, Western Ghats, North-East Hills and Brahmaputra Plains, and the Sundarbans.
- Global Tiger Day (July 29th) was observed for the first time in 2010 at the St. Petersburg Tiger Summit in Russia when all 13 tiger range countries came together for the first time with the commitment of doubling the number of wild tigers by 2022.
- Global Tiger Recovery Plan which outlines how each country can contribute to the ambitious goal, known as TX2.

Tiger Census

- National Tiger Conservation Authority (NTCA) conducts a tiger census

across India every 4 years.
- The first was conducted in 2006, followed by 2010 and in 2014.
- The Census (2014) had reported 2,226 tigers in the country, up from 1,706 in 2010.
- The fourth tiger census (All India Tiger Estimation 2018-19) was released in May 2019.
- 2018 tiger census used more technology including a mobile app named “MSTrIPES” for the very first time to store information of the counting.
- Tiger census 2018 covered the northeast India that was not included in the previous census.
- For the very first time three neighboring countries Bhutan, Nepal and Bangladesh helped in counting the number of tigers all across India, especially in the region with mutual borders in the 2018 tiger census.

Sundarbans

- Spread over 4,262 sq km, the Sundarbans has mangrove cover in 2,125 sq km in India alone.
- A large part of the Sundarbans forest, the world's largest mangrove reserve and one of the most unique ecosystems in South Asia recognized as UNESCO World Heritage site, lies in Bangladesh.
- It's a part of the world's largest riverine delta, formed by Ganga, Brahmaputra and Meghna rivers.
- The whole tract of forest reaches about 100-130 km inland from the confluence.
- The Sunderban Tigers are excellent swimmers, they swim for long distances regularly, and at times even 2-3 kms wide big river confluences.
- Hence, the tigers here kill and eat everything, from crabs to human beings.
- Life in these mangrove forests is a challenge for these tigers due to muddy soil, sharp pneumatophores, changing water level due to tides twice a day, salinity of water and scarcity of prey.
- It is actually a wonder how tigers have been surviving in such hostile conditions.
- According to the latest census the number of Royal Bengal Tigers in Sundarbans has risen to 96, up by eight.

Project Tiger

- Project Tiger was launched in 1973 with 9 tiger reserves for conserving national animal Tiger.

- Currently, the Project Tiger coverage has increased to 50, spread out in 18 tiger range states.
- The tiger reserves are constituted on a core/buffer strategy.
- The core areas have the legal status of a national park or a sanctuary, whereas the buffer or peripheral areas are a mix of forest and non-forest land, managed as a multiple use area.
- It is an ongoing Centrally Sponsored Scheme of the Ministry of Environment, Forests and Climate Change providing central assistance to the tiger States for tiger conservation in designated tiger reserves.

National Tiger Conservation Authority

- The National Tiger Conservation Authority (NTCA) is a statutory body of the Ministry, with an overarching supervisory/coordination role, performing functions as provided in the Wildlife (Protection) Act, 1972.
- The NTCA was launched in 2005, following the recommendations of the Tiger Task Force.
- It was given statutory status by 2006 amendment of Wildlife (Protection) Act, 1972.

Styrene Gas

- Styrene is a flammable liquid that is used in the manufacturing of polystyrene plastics, fiberglass, rubber, and latex.
- Styrene is also found in vehicle exhaust, cigarette smoke, and in natural foods like fruits and vegetables.
- Short-term exposure to the substance can result in respiratory problems, irritation in the eyes, irritation in the mucous membrane, and gastrointestinal issues.
- And long-term exposure could drastically affect the central nervous system and lead to other related problems like peripheral neuropathy.
- It could also lead to cancer and depression in some cases.
- Recently Styrene gas has leaked from plant owned by electronics giant LG, Vizag in Andhra Pradesh has claimed at least 11 lives and affected thousands of residents.

Source: PIB, The Hindu, Indian Express, Economic Times



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