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GREEN INSIGHTS

Newsletter on "Environment Literacy - Eco-labelling and Eco-friendly Products"

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CLEAN ENERGY

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Ministry of Environment, Forest and Climate Change, Government of India
Environmental Information, Awareness, Capacity Building and Livelihood Programme (EIACP) Programme Centre, Resource Partner on:
Environment Literacy - Eco-labelling and Eco-friendly Products

GREEN INSIGHTS
April-June 2023

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Foreword

Climate change is one of the major challenges of our times, the impacts of which are global & unprecedented in scale. These changes are visible through many examples such as places experiencing changes in their rainfall pattern, resulting in more floods, droughts, or intense rain, as well as more frequent and severe heat waves. The planet's oceans and glaciers have also experienced changes—oceans are warming and becoming more acidic, ice caps are melting, and sea level is rising. To fight this change, many world leaders united at COP 26 in committing to reduce their carbon equivalent emissions.

India also committed to reduce their CO_2 emissions and presented the following five nectar elements (Panchamrit) of India's climate action which is to Reach 500GW Non-fossil energy capacity by 2030, to get its 50 per cent of the energy requirements from renewable energy by 2030, to reduce total projected carbon emissions by one billion tonnes from now till 2030, to reduce the carbon intensity of the economy by 45 per cent by 2030, over 2005 levels and to achieve the target of net zero emissions by 2070.

To achieve these targets, many schemes, incentives, regulations and policy reforms have been introduced which also includes reducing the emissions by transitioning to clean energy. Some of the initiatives taken by the government transportation sector includes introduction of CNG from petrol and diesel, introduction of separate lanes for public transports, electric vehicles, increase in percentage of ethanol mix etc. To understand further, this issue of Green Insights shed light on Clean Energy mainly focusing on Solar Energy and Wind Energy.

Clean Energy

By and large energy is produced from non-renewable resources such as fossil fuels, coals etc. The energy produced from such generation systems releases greenhouse gases such as Carbon dioxide, methane, oxides of sulphur, oxides of nitrogen , carbon monoxide etc. These greenhouse gases pose a great threat to climate change as they will increase the global temperature. As per the IPCC report, If warming reaches 2 degrees Celsius, more than 70 percent of Earth's coastlines will witness sea-level rise greater than 0.66 feet (0.2 meters), resulting in increased coastal flooding, beach erosion, salinization of water supplies and other impacts on human and ecological systems. All these happen because of the ruthless use of non-renewable resources to meet the increasing demands of the ever growing population.

Clean Energy is the energy obtained from sources that do not produce greenhouse gases i.e it does not cause air pollution. Though the terms clean energy and renewable energy are often used together, both the jargons vary slightly in their terminologies. Renewable energy is defined as the natural resources available in abundance and are inexhaustive in nature. The difference between clean energy & renewable energy is that the latter generates pollution in some cases. For example, biogas and biodiesel are obtained from renewable sources of energy that are natural and are available in abundance, but it cannot be considered as clean energy as they pollute the atmosphere on combustion and emit greenhouse gases. Clean energies do not pollute and most of the renewable sources are clean. Whereas, green energy resources are renewable but not all renewable resources will be green. For example, hydro projects are renewable energy sources as they are available in abundance but it cannot be termed green because of deforestations for the building of the hydro dams which damages the environment.

Renewable energy: Natural & available in abundance

Clean energy: Natural, available in abundance & do not produce greenhouse gases eg. solar & wind

When the energy obtained is green and from a renewable sources, it is considered as Clean Energy such as solar energy and wind energy. Green Hydrogen is a clean energy when produced from electrolysis of water and not when produced from Compressed Natural Gas. Energy produced from renewable sources can be considered green when the carbon emitted is captured and stored through CCUS systems. In this way the energy thus produced do not release any carbon into the atmosphere.

Solar & Wind energies are considered as the cleanest energies. The future of these energies looks bright as these are the ones that offer sustainable energy solutions to the ever increasing energy demand of the world's population. In recent years, more number of solar and wind energy installation has been observed worldwide to tackle the carbon equivalent emissions.

Source:

1. https://www.cii.in/sectors aspx?enc=prvePUj2bdMtgTmv PwvisYH+5EnGjyGXO9hLECvTuNsdd4UMpGp0Zgxc80wpSgZt
2. https://www.cleanenergycouncil.org.au/
3. https://www.ceew.in/research/energy-transitions
4. https://wecindia.in/wec-india-publications/
5. https://www.twi-global.com/technical-knowledge/faqs/clean-energy#WhatDoesCleanEnergyMean

Solar Energy & Wind Energy

Solar Energy

The amount of sunlight that strikes the earth's surface in an hour and a half is enough to handle the entire world's energy consumption for a full year. Solar energy is the energy obtained from sun's radiation. It is available in abundance. The energy obtained from sun is then converted to electrical energy and thermal energy. These conversions happen through solar technologies such as photovoltaic (PV) panels or through mirrors that concentrate solar radiation or through solar heating and cooling processes. This energy can be used to generate electricity or be stored in batteries or as thermal storage.

Solar Energy Technologies

Photovoltaic (PV)

Photovoltaic cells are used in solar panels. When the sun's rays fall onto the solar panels, the energy from the sunlight is absorbed by the PV cells. This energy creates electrical charges that move in response to an internal electrical field in the cell, causing electricity to flow. PV cells can be used to power anything from small electronics such as calculators, road signs, at homes and for large commercial businesses. Photovoltaic technology uses semiconductor materials to generate power. When radiations or photons of light fall on the PV cell, it excites them to higher energy state. These free flowing electrons are then captured to generate electric current. The more light gets absorbed, the more electricity will be produced by photovoltaics.

Concentrated Solar Power (CSP)

Concentrated solar power (CSP) is an approach to generating electricity through mirrors. The mirrors reflect, concentrate and focus natural sunlight onto a specific point, which is then converted into heat. The heat is then used to create steam, which drives a turbine to generate electrical power. The process can be repeated continuously because CSP technology can store the heat produced. It can therefore be used on days where there is no sun, or before sunrise and after sunset.

Solar Energy Statistics in India

(Source: MercomIndia)

Solar leads among renewables and accounts for 13.22% of India's total installed power capacity and 34% of the total installed renewable capacity in Q1 2022. India had installed a record 10 GW of new solar capacity in 2021, a big jump of 210% year-over-year (YoY) compared to 3.2 GW installed in 2020.

Source:

1. https://www.energy.gov/eere/solar/how-does-solar-work
2. https://www.seia.org/initiatives/about-solar-energy
3. https://www.brunel.net/en/blog/renewable-energy/concentrated-solar-power#anchor1
4. https://www.epa.gov/rhc/solar-heating-and-cooling-technologies
5. https://www.mercomindia.com/share-solar-rises-india-power-capacity

Wind Energy

Wind energy is the byproduct of the sun. The sun's uneven heating of the earth's atmosphere, earth's irregular surfaces with its mountains and valleys, and its revolution around the sun, combine to create wind. Hence, wind is in bountiful supply as long as sun's rays heat the atmosphere, making it a sustainable resource. Driven by R&D, supportive policies and falling costs, globally wind power has grown rapidly.

Wind turbines are mounted on the tower above 100meters to capture most of the faster and turbulent wind. Turbines catch the wind's energy with their propeller-like blades. Usually, two or three blades are mounted on a shaft to form a rotor. The low-pressure air pocket then pulls the blade toward it, causing the rotor to turn. This is called lift. The force of the lift is actually much stronger than the wind's force against the front side of the blade, which is called drag. The combination of lift and drag causes the rotor to spin like a propeller, and the turning shaft spins a generator to make electricity.

Wind Energy Statistics in India

(Source: IWTMA (Indian Wind Turbine Manufactures Association))

In the early 1980's, the Department of Non-conventional Energy Sources (DNES) came into existence with the aim to reduce the dependence of primary energy sources like coal, oil etc. in view of the Country's energy security. The DNES became Ministry of Non-conventional Energy Sources (MNES) in the year 1992 and now from 2006, the Ministry was renamed as Ministry of New & Renewable Energy (MNRE). The growth of Renewable Energy in India is enormous and Wind Energy proves to be the most effective solution to the problem of depleting fossil fuels, importing of coal, greenhouse gas emission, environmental pollution etc. Wind energy as a renewable, non-polluting and affordable source directly avoids dependency of fuel and transport, can lead to green and clean electricity.

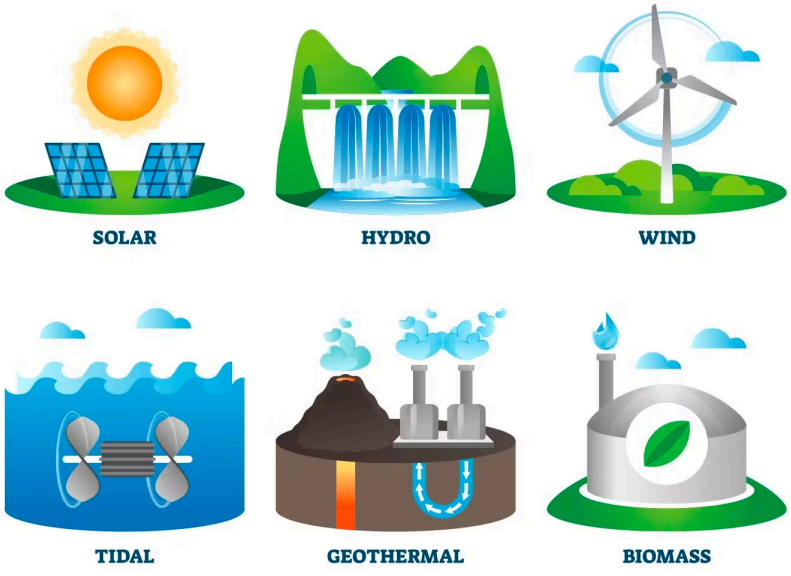
With an installed capacity of 42633 MW (March 2023) of Wind Energy, Renewable Energy Sources (excluding large Hydro) currently accounts for 30.08% (125160 MW) of India's overall installed power capacity of 416059 MW (31.03.2023). Wind Energy holds the major portion of 34.06% of total RE capacity among renewable and continued as the major supplier of clean energy.

The Government of India has fixed a target of 500 GW of Renewable Energy by 2030 out of which 140 GW will be from Wind. The Wind Potential in India was first estimated by National Institute of Wind Energy (NIWE) at 50m hub-height i.e. 49 GW but according to the survey at 80m hub height, the potential grows as much as 102 GW and 302GW at 100 Meter hub height. Further a new study by NIWE at 120m height has estimated a potential 695GW. One of the major advantages of wind energy is its inherent strength to support rural employment and uplift of rural economy. Further, unlike all other sources of power, wind energy does not consume any water- which in itself will become a scarce commodity. Overall the future of Wind Energy in India is bright as energy security and self-sufficiency is identified as the major driver. The biggest advantage with wind energy is that the fuel is free, and also it doesn't produce CO_2 emission. Wind farm can be built reasonably fast, the wind farm land can be used for farming as well thus serving dual purpose, and it is cost-effective as compare to other forms of renewable energy. (Numerical Data Source: CEA, NIWE, MNRE)

Source:

1. https://www.indianwindpower.com/wind-energy.php#:~:text=With%20an%20installed%20capacity%20of,2023).
2. https://www.irena.org/Energy-Transition/Technology/Wind-energy
3. https://www.nrel.gov/research/re-wind.html

Initiatives by Government of India to boost India's renewable energy sector



- On November 19, Prime Minster Mr. Narendra Modi dedicated the 600 MW Kameng Hydro Power Station in Arunachal Pradesh to the country. The project, which covers more than 80 kilometres and costs about Rs. 8,200 crore (US$ 1 billion), is located in Arunachal Pradesh &West Kameng District.
- On November 9, Minister for Finance & Corporate Affairs, Ms. Nirmala Sitharaman, approved the final Sovereign Green Bonds framework of India. The Paris Agreement& Nationally Determined Contribution (NDC) targets will be further strengthened by this approval, which will also aid in attracting foreign and domestic capital to green projects.
- In the Union Budget 2022-23, the allocation for the Solar Energy Corporation of India (SECI), which is currently responsible for the development of the entire renewable energy sector, stood at Rs.1,000 crores (US$ 132 million).
- In the Budget, the government allocated Rs. 19,500 crore (US$ 2.57 billion) for a PLI scheme to boost manufacturing of high-efficiency solar modules.
- In February 2022, Nepal and India agreed to form a Joint Hydro Development Committee to explore the possibility of viable hydropower projects.
- In August 2022, Norfund, who manage the Norwegian Climate Investment Fund, and KLP, Norway's biggest pension company, signed an agreement to buy a 49% share of a 420 MW solar power plant in Rajasthan for Rs. 2.8 billion (US$ 35.05 million).
- India has generated 47.64 BU of solar power in the first half of 2022, a 34% YoY increase.
- Investment in renewable energy in India reached a record US$ 14.5 billion in FY22, an increase of 125% over FY21.
- Delhi's Indira Gandhi International Airport (IGIA) has become the first Indian airport to run entirely on hydro and solar power. Around 6% of the airport's electricity requirement is met from the onsite solar power plants.
- Ayana Renewable Power Pvt Ltd (Ayana) announced plans to set up renewable energy projects totaling 2 gigawatts (GWs) with an investment of Rs. 12,000 crore (US$ 1.53

Source:

1. https://pib.gov.in/FeaturesDeatils.aspx?NoteId=151141&ModuleId%20=%202
2. https://www.investindia.gov.in/sector/renewable-energy
3. https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1847812
4. https://www.ibef.org/industry/renewable-energy
5. https://pib.gov.in/PressReleasePage.aspx?PRID=1913789

Events (January - March 2023)

1. Aap le no otlo - A platform for Give & Take set up at Gokul Ashram Shala, Gota Ahmedabad.

2. Ms. Divya Namboothiri, Programme Officer CERC EIACP PC- RP delivered a session on “Importance of Ecolabels, Ecofriendly products and Sustainable Lifestyle” for the Law students at CERC, Ahmedabad

3. CERC- EIACP PC-RP promoted Mission LiFE by conducting a session on Sustainable Consumption, Sustainable Lifestyle, sustainability through ecolabels and certifications for the representatives of voluntary consumer organisation from 18 districts and talukas of Gujarat.

4. Consumer Education and Research Centre- Environmental Information, Awareness, Capacity building & Livelihood Programme (EIACP), Programme Centre- Resource Partner, Ahmedabad participated and exhibited in the National Workshop on LiFE held on 30.01.2023 at Indira Paryavaran Bhawan MoEF&CC, New Delhi

5. Ms. Divya Namboothiri, Programme Officer, CERC- EIACP PC- RP addressed the students from Gujarat Vidyapeeth, Randheja on 07 categories under LiFE Mission and promoted Sustainable Consumption, Eco-labelling and Eco-friendly products.

6. Awareness on LiFE Mission conducted in Randheja, Gujarat Vidhyapeeth covered in young leader newspaper on 15 February 2023

गुजरात

गूजरात विद्यापीठ रांधेजा में ग्राहक सुरक्षा एवं पर्यावरणलक्षी जीवनशैली व आजीविका के राष्ट्रीय मानक विषय पर कार्यशाला आयोजित

रासला कैंप में पिता ने बेटे को चाकू मारा

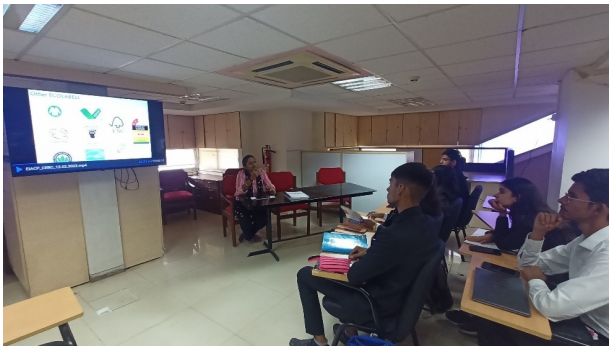
7. CERC EIACP- PC, Resource Partner on 'Environment Literacy - Eco-labelling & Eco-friendly Products' conducted a session for 50 students from V.R.Shah high school Ahmedabad on "Contribution of Science in our daily lives through LiFE Themes".

8. CERC-EIACP PC-RP conducted a session on 7 categories under LiFE Mission & promoted Sustainable Consumption, Eco-labelling & Eco-friendly products for the 150 students from St. Xavier' College of Ahmedabad.

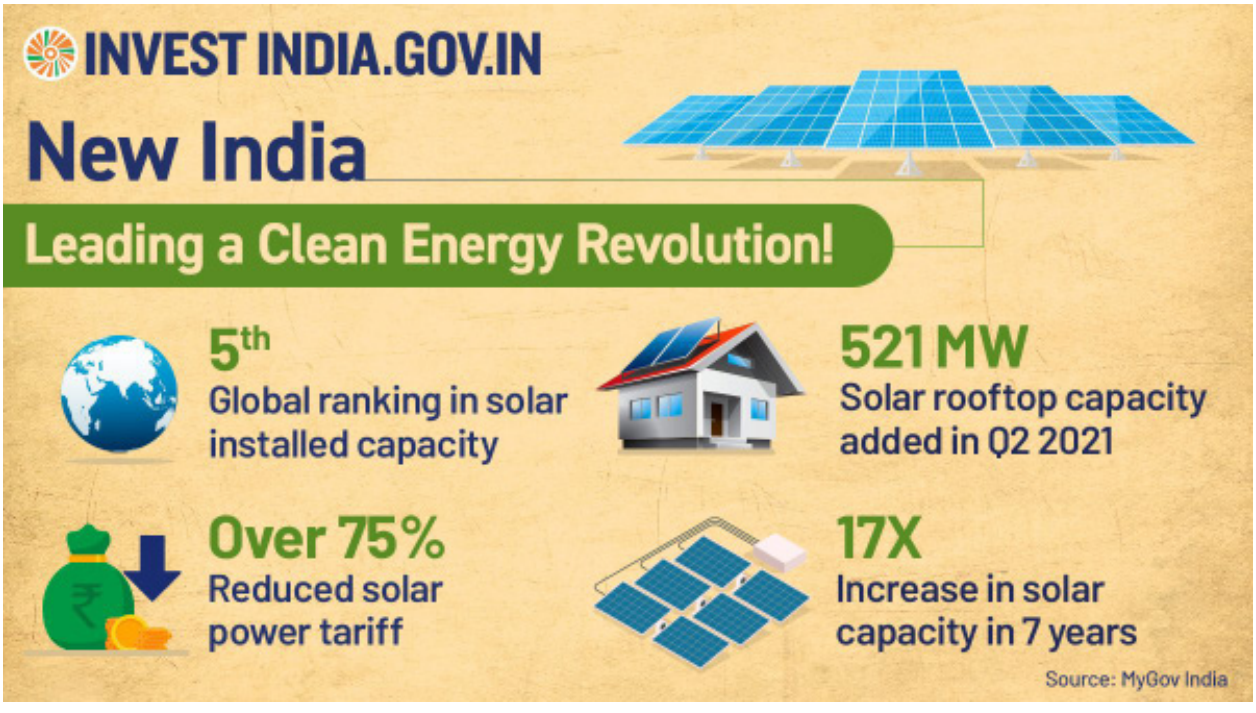
9. CERC EIACP PC-RP conducted a session on 7 categories of LiFE Mission, mainly focusing on Sustainable Food System Adopted for the students of Gujarat Vidhyapith Randheja, Gandhinagar. We also organised a Slogan writing competition on "Sustainable Food System Adopted".

10. CERC EIACP PC RP celebrated earth day with school students by engaging them in best out of waste activities.

11. Ms. Divya Namboothiri, Programme Officer held session on Mission LiFE, Eco label, Millets and Sustainable Lifestyle with law interns at CERC



12. Consumer Education and Research Centre is organized a 2 day workshop on "Greenmosphere for LiFE" for school students on 21st & 22nd April. The workshop aimed to nudge students to lead a sustainable lifestyle. It consisted of participative activities and interactive sessions on all of the seven topics of LiFE.



Environmental Information, Awareness, Capacity Building and Livelihood Programme acronymed as EIACP erstwhile Environmental Information System (ENVIS) was implemented by the Ministry of Environment, Forest & Climate Change by end of 6th Five Year Plan as a Plan Scheme for environmental information collection, collation, storage, retrieval and dissemination to policy planners, decision makers, scientists and environmentalists, researchers, academicians and other stakeholders. MoEF&CC has identified Consumer Education and Research Centre (CERC), Ahmedabad, as one of the Resource Partner to collect and disseminate information on "Environment Literacy - Eco-labelling and Eco-friendly Products". The main objective of EIACP Programme centre- Resource Partner is to disseminate information on Environment literacy, Eco-products, International and National Eco-labelling programmes.

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