

Go Green – Need of A Time and Efforts

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'Green' aptly means the eco-friendly sustainability and socio-ecological performance. Over the years ever increasing and dominating industrialisation led to environmental degradation impacting global socio-economic order, climate change and natural imbalance. Strategic issues like carbon footprint, energy crisis have been seriously debated targeting mission 'Go green' for net zero adopting green technology, practices and processes in industry. Globally, with India no exception, sincere and dedicated efforts are in place for an alternative to existing technological and growth processes and practices towards clean and green environment for sustainable development, growth, prosperity and well-being.

Globally increasing environmental awareness acts as catalyst for empowering socio-ecological regime through green initiatives for innovative sustainable development and growth. Strategic green growth over the years with energy credits has been focussed on renewable energy and reducing dependency on fossil fuel for sustainable development preserving natural resources.

Globally, huge investment in promoting clean energy and important decline in fossil fuel-based power generation may lead to probable Net Zero in coming five decades. Paradigm shift and focus on the blossoming electric vehicle market would reduce transport vehicle emissions and reduced oil consumption probably by 50% over the next three decades and the dependency on coal and oil-based power generation would shift to gas-based technologies.

Green, clean environment friendly energy

Natural dependency for energy and electricity needs over the decades on fossil fuels globally and India being no exception, renewable energy resources and also nuclear power are contributing very effectively for clean and green environment with low carbon footprint, efficiency and flexibility. India's green energy sector gets a major boost and impetus in current scenario and also way ahead for cleaner and greener environment with sustainable growth and development.

In Indian pretext, energy mix plays a vital role with non-renewable (fossil fuel, nuclear) and renewable energy (solar, hydel, wind, geothermal, biomass etc) resources in fulfilling the requirement. India energy resources with total estimated reserves of 361.41 billion of coal tonnes, 46.20 billion tonnes of lignite, 653.02 million tonnes of crude oil, 1149.46 billion cubic meters of natural gas under non-renewable category exists as on 01.04.2024.

The total potential for renewable power generation in the country as on 31.03.2023 is estimated at 2,109,654 MW with solar (7,48,990 MW) wind (1,163,856 MW) large hydro power (133,410MW), small hydro power (21,134 MW), biomass (28,447 MW) and bagasse-based cogeneration 13,818 MW. India's Energy mix has been seeing a shift from more conventional resources of energy to renewable sources. The financial year 2022-23 has witnessed a growth of 12.20% over last year in the installed capacity of RES (Renewable Energy Sources, other than Hydro) under utility; while that of thermal sources grew only at 0.49% Out of the total installed

generation capacity of renewable sources of power in 2023, installed capacity of Solar power including roof tops accounted for about 53.4%, followed by Wind power (34.1%) and Bio Power & Waste to Energy (8.2%) (Source: https://mospi.gov.in/sites/default/files/publication_reports/EnergyStatistics_India_publication_2024N_0.pdf).

Nuclear power: A viable alternative

Nuclear power is a clean and environment friendly source of electricity capable of providing long-term energy security in a sustainable manner. Nuclear power provides 10 per cent of the world's electricity, The growth of the Indian nuclear power programme is imperative to meet the twin goals of energy security and sustainable development. Globally, cleaner and green nuclear power as electricity source is slowly moving from traditional to latest technology driven small modular reactors (SMRs) and Microreactors having efficiency, economics and flexibility. This decade is primarily being focussed on development of SMR with efficacy in Argentina, Canada, China, Russia, South Korea and the United States of America. These are advanced nuclear reactors that have a power capacity of up to 300 MW(e) per unit and are physically small with assembly and transportation facility at location and generate low carbon fission electricity relatively at low cost. These can be installed effectively meeting increasing energy demand. Microreactors, designed to generate electrical power typically up to 10 megawatts are best suited for regions inaccessible to clean, reliable and affordable energy with electrical output, providing low-carbon power for industry and the population.

India's commitment to Net Zero emissions by 2070, wherein steps to increase the share of nuclear power capacity from 1.6%, (6.7 GW- as on May 2023) to 22.5 GW by 2030 electricity mix of India. (India's Statement at Nuclear Energy Summit Brussels 2024: Chairman, Department of Atomic Energy, India, www.linkedin.com/pulse/comment-indias-statement-nuclear-energy-summit-2024). India remains committed to expand peaceful applications of nuclear technology, both in power and non-power sector, while ensuring the security of nuclear and radiological materials. India has a robust nuclear safety culture and impeccable safety record.

Renewable Energy: A game changer

Several green trends are emerging as game-changers based on digitalisation, decarbonisation, decentralisation principles. Renewable energy evolving in pace to establish new milestones and innovations. Size of market of renewable energy has grown exorbitantly at global to local scale. When we factor in the manufacture, installation, and maintenance of electric vehicles, solar energy plants, wind and tidal power generation plants, hydrogen plants, and decentralized energy grids, enormous business, growth, infrastructural and financial opportunities are perceived. Indian policy is to create a balance between environmental awareness with economic development and generate employment.

Visualising zero carbon times ahead, solar, wind, hydro, tidal, geothermal, hydrogen energy and other minor renewal technologies are extremely popular, affordable and accessible in every scale of operation from smaller to large units and farms outperforming the fossil fuels as a significant and pertinent alternative for clean, green environment and sustainable growth.

Advantages of renewable energy are its availability, continuity, lower maintenance needs, economic, environmentally friendly, self-reliant, commercially viable with minimal wastes, creates infrastructural means and job-oriented market.

The wind energy sector with offshore wind energy potential for an initial capacity of 1 gigawatt is a game changer as a big opportunity for the growth.

Compressed biogas (CBG) for transport and cooking is a long-suggested alternative for a new phase of green growth for India would help in reducing in some way dependency on crude oil.

Bio-manufacturing and bio-foundry to provide environment-friendly alternatives such as biodegradable polymers, bio-plastics, bio-pharmaceuticals and bio-Agri-inputs would transform consumption trends.

Coal gasification targets of 100 tonnes to replace petroleum products would control price hikes and applications.

Green hydrogen and bio ethanol are also viable alternative to minimise carbon foot print with Rs 600 crore for National Green Hydrogen Mission or Rs 117 crore for bioethanol.

On clean transport through metro and Namo Bharat rapid rail transit systems and also through boosting and developing electric vehicle (EV) ecosystem (interim budget 2024-25, Govt of India). Big onus is being imparted on critical minerals and related geopolitics involving, supply chains, improvising technologies and decentralisation for exploration and exploitation would help in strengthening the economy.

The strengthening and popularising solar technologies at grass root rooftop solar panels and helping in generating economical electricity for domestic purpose and commercialization and also charging electric vehicles would ease in decarbonisation. Sufficient budget has been allocated to achieve this socio-economic paradigm of self-reliance on electricity and application.

India being fifth largest economy needs an extra push to sustain and continue the spirit of growth and development through clean, green environment and sustainable growth and robust infrastructure to achieve third largest economy by 2030. The push towards a gas-based economy, emphasis on EVs, big push to renewable sources especially solar, wind, biomass, application of critical minerals and digital innovation across energy system would necessarily help in achieving self-reliance, self-sustained infrastructure and robust economy for growing to developed nation.

Bottom line

Strong political will, robust economy, inclusive growth maintaining socioeconomic order maintaining a balance between clean green environment and sustainable development are the key factors for growth and sustenance.

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