

THE SUN NEVER SETS FOR A GREEN FUTURE

Abstract

India strongly advocates the concept of “Vasudhaiyva Kutumbakam” meaning and signifying “One Earth-One Family-One Future”. In this context, the emphasis is on usage of sustainable sources of energy. Out of the various renewable sources, Solar and Wind Energy together constitute around 89% of the Cumulative Installed renewable energy capacity. Though India is in the forefront with respect to renewable energy in the global scenario, there is a lot more to be done to achieve the committed targets under the SDGs with respect to energy mix. Here the CMAs have new opportunities in their area of expertise.

INTRODUCTION

The Sun is known to have been worshipped since ancient times and even today in India significantly through the powerful “Surya namaskar” which is regarded as one among the better ways to absorb the solar energy (energy from the sun) at the level of an individual striving for higher level of consciousness. Further, Indians are also aware of the healing power of the Sun in curing various ailments and hence attach a great significance to “Surya Namaskar” and “Surya Anjali”. The various temples in India, for example the Konark Sun Temple (Puri), Katarmal Sun Temple (Almora), Surya Mandir (Gwalior) and Modhera Sun Temple (Mehasana District) dedicated to Sun God bear testimony of the reverence to the solar deity. Elsewhere, there is a Sun temple in Beijing, China and quite a few in Egypt.

In fact, the Indians believe that the “Pushpaka Vimana” used by King Ravana which resembled the Sun was a solar powered device as also the “Sudarsan Chakra” of Lord Krishna. The Rowdree Darpan yantra is an energy weapon device, which combines the solar rays of the sun and produces



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heat and light that was capable of melting anything in sight and has the energy to absorb the powerful sunrays. The predominant energy sources include solar glow, use of crystals and electric and ether power. It is believed that they were used to design and make vimanas (aircrafts), both for combat and transportation that ran on solar energy.

The 19th and the 20th century saw the growth of the British Empire estimated to have control over around 25% of the land mass of the Planet Earth consisting of colonies across continents. During this period, the phrase “the sun never sets on the British empire” was popularly used to describe the extent of its vastness. However, with the colonies becoming independent, the attachment of the colonies to the Commonwealth gradually declined and the balance of global power has shifted largely with the US and to a lesser extent the EU. However, though the sun has finally set on the British empire, it is up to the

world leaders to ensure that OUR SUN does not set on the globe.

It is pertinent to note that the Indian government has been from time to time initiating appropriate steps for sustainable development such as “Rural Electrification Supply Technology” (REST). Our Hon’ble Prime Minister had extended the call for connecting the global solar resources through the vision of ‘One Sun One World One Grid’ (OSOWOG) with the concept that ‘The Sun Never Sets’ and is always shining at some geographical location, globally, at any point of time. India has made its presence felt as it took the G20 leadership in 2023 with the theme “Vasudhaiyva Kutumbakam” meaning and signifying “One Earth-One Family-One Future”. It is in this context that the emphasis is on harnessing and utilizing such sources of energy that are infinitely available and has least economic, environmental and social impacts from a sustainability point of view.

SUSTAINABLE SOURCES OF ENERGY

Broadly, the sources of energy can be classified into two categories: -

- ⊙ Non-renewable sources of energy and
- ⊙ Renewable sources of energy

The principal difference between the non-renewable sources of energy and the renewable sources of energy is that while the former cannot be replenished, the latter is capable of being replenished at a rate equal to or faster than the rate of their utilization.

There are four non-renewable sources namely oil, Natural Gas, Coal and Nuclear energy. Except for nuclear energy, the other three sources are collectively also referred to as fossil fuels, which were formed over times immemorial from the dead plants. The long-term reliance on non-renewable sources is not sustainable since over a period of time the availability of energy from these sources is finite and constantly depleting. Besides in the case of fossil fuels, apart from limited availability, their burning releases greenhouse gases into the atmosphere thereby causing adverse environmental impacts. In the case of nuclear energy, though prima facie, it does not have such adverse environmental impacts as fossil fuels, the very high upfront

costs and possible shortages in Uranium make it an unattractive option. The fact that fossil fuels constitute around 80% of energy sources globally makes such dependence unsustainable and hence the drive towards renewable energy sources.

There are five renewable sources namely solar energy, wind energy, geo-thermal energy, Bio-energy and Hydropower. In addition to these five sources, Ocean Energy is also being explored and in terms of potential availability over a long period, it is believed that it far exceeds the requirement.

The following table shows the cumulative installed capacity of the renewable energy sources as at 31st March, 2024

	Sector	Cumulative Installed Capacity (GW)	% to Total
1	Solar Power	81.81	57.0%
2	Wind Power	45.89	31.9%
3	Bio- Energy	10.94	7.6%
4	Small Hydro	5.00	3.5%
	Total	143.64	100.0%

Source: <https://mnre.gov.in/annual-report-2023-24/>

In the following paragraphs, the salient points of the principal sources of renewable energy in India namely Solar and Wind Energy which together constitute around 89% of the Cumulative Installed renewable energy capacity are discussed: -

Solar energy

India being a tropical country receives on an average 2300 to 3200 hours of sunshine in a year, which translates to more than 5000 trillion Kwh of solar radiation – far in excess of India’s peak energy needs. There is ample scope for promoting solar energy in rural India which directly contributes to lesser use of non-renewable energy in rural households. Gradually doing away with the use of fossil fuels which leads to continuous depletion of natural resources, solar energy is a handy substitute keeping in mind India’s sustainable future.

Globally, China with an Installed Capacity of

710 GW and USA at 200 GW rank first and second respectively. India ranks third in solar energy with an Installed Capacity of 81.81 GW as at 31st March, 2024 (90.76 GW as at 30th September, 2024). However, as regards solar energy potential of India, as per GWp (Giga Watt potential) peak estimates made by National Institute of Solar Energy (NISE), the 31 states and the Union Territories combined have a GWp of 748.98. Thus, it can be seen that the potential for harnessing solar energy is very much underutilized (Installed Capacity in GW as a percentage of GWp is just about 11%). It highlights the reasons for the prominence given in India for Solar Energy, which currently accounts for 57% of the total installed capacities of the renewable energy mix.

Wind Energy

Wind energy is also a prominent source in the renewable energy mix currently accounting for around 32% of the total installed capacities of the renewable energy mix. Like Solar Energy, Wind Energy plays a major role in reducing the carbon footprints and helps the country in reducing the intensity of its emissions thereby moving closer to achieving the SDG targets.

Wind energy capacity is mainly concentrated in the Southern, Western and North-Western states. The following table depicts the state-wise break up of the installed capacity in respect of wind energy: -

	States	Installed Capacity in MW	% to Total
1	Gujarat	11722.72	25.55
2	Tamil Nadu	10603.54	23.11
3	Karnataka	6019.61	13.12
4	Maharashtra	5207.98	11.35
5	Rajasthan	5195.82	11.32
6	Andhra Pradesh	4096.65	8.92
7	Madhya Pradesh	2844.29	6.20
8	Telangana	128.10	0.28
9	Kerala	63.50	0.14
10	Others	4.30	0.01
	Total	45886.51	100.00

Source: <https://mnre.gov.in/annual-report-2023-24/>

Globally, China with an installed capacity of 441.89 GW, USA with 148.02 GW and Germany with 69.46 GW rank first, second and third respectively. India with an Installed Capacity of 45.89 GW currently ranks fourth.

Over the last decade, the wind power generation has grown from 33768 MU in FY 2014-15 to 83385 MU in FY 2023-24 representing a CAGR of 10.57%. India's onshore wind potential is estimated at 132 GW. Its current installed capacity is around 34.8% of its wind power potential, which highlights the unutilized potential. This does not include the potential of offshore wind energy. India is a peninsula having a coastline of around 7500 kms which offers exciting wind energy generation potential. According to the Annual Report 2023-24 published by the Ministry of New and Renewable energy, National Institute of Wind Energy (NIWE) – Chennai has been designated as the nodal authority for facilitating offshore wind energy projects. The strategy paper developed by the said ministry in September 2023 indicates an auction trajectory till 2029-30 to the extent of 37 GW (37000 MW).

Around 70% of the wind power generation generally comes during the months of May to September, at which time, India receives the South - West Monsoon. The contrary is true with respect to Solar energy which can be generated during the day in the non-monsoon period. Further, generally during the night most of the wind power is generated. This points to a scenario wherein solar energy and wind energy in India are complimentary to each other.

RENEWABLE ENERGY AND SDGS

193 nations are signatories to the UN mandated 17 Sustainable Development Goals (SDGs). Most of the member nations have committed to certain specific targets under the respective SDGs. One of the 17 SDGs is SDG7, which has set the goal to “**Ensure access to affordable, reliable, sustainable and modern energy for all**”. This SDG is not only closely linked to renewable energy, but also connected to the actions to combat climate change and helps in smoothening the pathway for achieving certain other SDGS. Considering the various benefits that emanate from the increased use of renewable energy, the member nations

have agreed to increase substantially the share of renewable energy in the global energy mix by the year 2030.

The Central Government through the Ministry of New and Renewable Energy (MNRE) has taken many initiatives to fuel the adoption of renewable energy in India to pave the way for achieving its commitments in its renewable energy targets, reducing GHG emissions to move to a regime of green and clean energy. The said Ministry's annual reports contain the details of these initiatives and their status.

At present around 31% of India's energy requirements are met from renewable sources. However, India on its part has committed to an ambitious target of satisfying 50% of India's energy requirements from renewable energy by 2030 and increasing non-fossil fuel power generation capacity to around 40% of the total power generation capacity. As per an estimate in the World Investment Report 2023 by UNCTAD, developing countries like India face an annual investment deficit of about USD 4 trillion as they work to achieve the SDGs by 2030. It is also necessary to develop practical solutions to the problems of variations and fluctuations in the generation, supply and evacuation of energy generated from renewable sources which impacts the stability of the grid, all of which in combination makes it imperative to make timely investments in technologies and solutions for storage of energy, Grid Infrastructure, Prevention of power loss during transmission / distribution and robust strategies for managing variations in demand for energy.

In the background of these challenges, India has consciously committed to enhance international co-operation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology.

ROLE OF CMA

Apart from the known role of a CMA with respect to energy consumption management, the emerging professional opportunities for a CMA can be perceived in 3 distinct aspects: -

Strategic Management: The use of renewable

energy offers distinct cost advantages vis-à-vis use of non-renewable sources of energy. CMA's with engineering background / knowledge will be in a better position to evaluate the Cost Benefits Analysis of various technologies and processes of power generations from the power plant, their transmission to sub-stations and finally distribution to the end customer. CMA's in general are best equipped to handle / advise on not only capital budgeting and investment decisions relating to the viability of the existing infrastructure vis a vis the smart grids, but also in monitoring the progress and performance evaluation as critical inputs to the strategic decision making and management process.

Sustainability: Following the global emphasis on ESG, business entities are beginning to give more importance to various non-financial parameters including ESG KPIs such as Energy Intensity, Waste Management, GHG emissions etc. not only for itself but also for entities in the value chain. Considering that the energy sector is going to be the sector which needs to be geared up substantially to not only fuel India's ambitious growth targets but also add the dimension of Sustainability, the requirement for professionals in this domain in the emerging scenario is expected to grow multi-fold. CMAs with expertise in this sector and believing in greater emphasis on substance over form are slated to get handsome opportunities.

Accountability, Accessibility and Awareness (AAA): It is rightly said that well planned is half done. But what is not immediately understood is that both "half planned or only planned" is not well done. This highlights the importance of the planning and execution management of the Project and the related operations. CMA's play a vital role in the functioning of the project management team through their inputs to the Project Monitoring and Control mechanism, Project Cost Management and Management of the Project Infrastructure, so that project costs are kept within sanctioned limit and there are no time overruns. The timely dissemination of relevant and reasonably authentic data and information through a balancing of top-down and bottom-up approach is the minimum requirement for highlighting red flags which enables prompt demonstrable corrective action. This will go a long way in strengthening Public-Private-Participation

which are invariably the mechanism which must be adopted. This takes care of Accountability, Accessibility and Awareness. CMA's can also play a major role in enabling the use of AI and other techniques and technologies in relation to Project Management.

WAY FORWARD

Perhaps the biggest threat to the green future is the dynamics of the current balance of power which is oscillating between US and its allies on one hand and the Russia-China bloc on the other with each one of them vying for exclusive global supremacy at the cost of not only endangering the achievement of the SDGs but also posing a fundamental question mark over the entire gamut of global sustainability. The fall-out is obvious because if this is a continuing trend, it will push up multi-fold the demand for non-renewable sources of energy at a cost which will, apart from disturbing global peace also cause irreparable damage to the ecology and pose a serious threat to the well-being and the very existence of the people at large. The situation calls for a transparent balancing approach to preserve the environment for a green future. It is here that the neutral part of the world, that comprises mainly of the backward, developing or emerging economies as also some developed economies are possibly looking for a fresh and more effective global order as the UN mandated efforts for peace and green future have not really

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yielded sustainable results consequent to polarization by the power blocs and warring groups. India has advocated, demonstrated and shown the

potential way forward in balancing the conflicting priorities in such a manner that a right approach through consensus is developed to address the concerns relating to long term sustainability. This is very well reflected in India's progress with respect to use of renewable energy and the way energy consumption is managed. If globally it is done this way, the sun will never set for a greener future. **MA**

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Academic Excellence

Congratulations!!!



Our heartiest congratulations to CMA Prof Gaddam Naresh Reddy, Member of the Institute, for being appointed as Registrar of Prestigious Osmania University.

We wish CMA Gaddam Naresh Reddy, the very best for all his future endeavours.