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INNOVATING ENERGY

Energy Sector Review and the Roadmap to 2022



Top Energy Trends From India & Across The Globe



EDITOR'S NOTE

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Dear Reader,

Last month, India reiterated and reinforced its climate commitments at the COP26 Summit in Glasgow. All the targets are related, directly or indirectly, to the capacity as well as the efficiency of energy generation and consumption. The commitments are merely the end-goal; it is how we get there that really matters. The journey towards sustainability needs to address several aspects and several industries, among which are power and infrastructure. As 2021 draws to a close, let us take a quick look at the progress that India made on some important fronts and the trends that we can expect to see in the year ahead.

In the period from April-November this year, India augmented its existing renewable energy capacities with an additional 7.32 GW of different types of solar power, 786.55 MW of wind power, 46.2 MW of small hydro power, 30 MW of biomass-based power, 46.5 MW of waste-to-power. The Ministry of New and Renewable Energy tweeted on December 3 that India's total installed non-fossil-fuel-based energy capacity had touched 156.83 GW.

In the year ahead, we are likely to see sharper focus on domestic production of solar panels and other solar equipment. The government has floated multiple tenders to that effect, in recent months. We might also see some solar project developers get into manufacturing themselves. This trend is primarily because of supply chain constraints and the applicability of basic customs duty on imported solar modules and solar cells from April 2022. The momentum of ongoing and new solar projects, which had slowed down over the past year, is likely to ramp up again in the year ahead.

As India works towards achieving RE capacity of 500 GW by 2030, hydrogen, floating solar, and renewable hybrid systems will find their way into the energy mix. Renewable hybrids, in particular, will be important from the standpoint of providing round-the-clock clean energy. The addition of RE capacity will need to be complemented by energy storage systems such as batteries.

Meanwhile, the construction and infrastructure industry too will look at ways to curtail their greenhouse gas emissions. Companies in this sector must go "green" and adopt green certifications like LEED for their current and future projects so as to deliver on the simultaneous and important objectives of sustainability, health, resilience, and equity. The aspects of resilience and equity assume greater importance than any other time in the past because the natural and man-made disasters witnessed across the world in

recent years have strongly underlined the vulnerability of developing nations and economically weaker segments of society.

And, so, as we move into a new year, I invite all of us to reflect and rethink our respective business priorities so that we may not only build a better business but a better social and a better world.

Wish you a happy, healthy & prosperous 2022!

https://mnre.gov.in/the-ministry/physical-progress https://twitter.com/mnreindia/status/1466690931306815488



Global energy goals and pathways for 2022

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The nations across the world have set ambitious and forward-looking targets for net zero emissions. COP26 was a watershed event at many levels, as a myriad of nations announced their climate goals. India is looking to achieve net zero by 2070, China by 2060 and the US and Europe by 2050. We have also witnessed a shifting tide towards clean energy solutions as the world added more than 260 gigawatts (GW) of renewable energy capacity in 2020, exceeding expansion in 2019 by around 50 per cent. We also saw 10.3 per cent uptick in installed renewable capacity, showcasing the changing contours of the energy ecosystem globally.

Now, as we step into 2022, it is pivotal to scrutinize these shifts and chart out the upcoming trends in the energy sector.

Push for energy efficiency

A global push for energy efficiency is imperative. According to IEA, energy efficiency makes up for more than 40% of the emissions abatement needed by 2040. The global growth and development, especially in developing countries will further propel energy consumption. This global demand has to be met sustainability, which will require a metamorphosis of the energy system. Energy efficiency will be the fulcrum around which this transformation will happen.

Emission reduction through technologies

Technological innovation has been driving the global clean energy transition. Now, there is a need to put concerted efforts in implementing innovative abatement measures and technologies. With the plummeting prices for renewable power, it is set to be a mainstay in the global energy mix. We will also witness an ever-increasing integration of technologies into the power system through interventions like smart metering, leading to the creation of a digitalized and smarter grid.

As mentioned earlier, renewable power has continued to grow from strength to strength and commands a lion's share in the global energy mix. We now need to rapidly scale up solar and wind capacities even further. With the power sector becoming greener, electrification will become a crucial economy wide instrument for reducing emissions.

Rise of EVs and battery technologies

A shift to electric transportation is already underway and according to IEA, it will rise from 5% of global car sales to more than 60% by 2030. Herein, battery storage will be a key enabler. It will also play a critical role in grid balancing and for ancillary services.

Need for green infrastructure

Emissions reduction for industries and buildings take considerable time and capital. Cutting industry emissions will involve major efforts to build new infrastructure. We would need interventions to reduce the emission intensity of buildings, which can be achieved by the installation of energy efficient appliances and adoption of sustainable practices such as wastewater management, recycling and reuse.

The clean energy transition will not happen in silos and would demand active collaboration between stakeholders such as the government, companies, financial institutions and individuals.

https://www.irena.org/newsroom/pressreleases/2021/Apr/World-Adds-Record-New-Renewable-Energy-Capacity-in-2020 https://www.iea.org/commentaries/how-energy-efficiency-will-power-net-zero-climate-goals https://www.iea.org/news/renewable-electricity-growth-is-accelerating-faster-than-ever-worldwide-supporting-the-emergenceof-the-new-global-energy-economy



What 2022 could hold for India's renewable energy sector

Manoj Gupta

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2022 is a year of many possibilities in the renewable energy (RE) space, almost all of them worth looking forward to. As India works towards its target of installing 500 GW of RE capacity by the year 2030, it is likely that renewable hybrids will constitute a significant part of the energy mix. Hydrogen and floating solar, too, could gain in traction. Such alternative or supplementary clean energy models are important because renewable energy has some inherent challenges.

As RE production is based on intermittent sources such as the sun and the wind, output is intermittent and limited to specific hours of the day, which further leads to lower utilization of transmission lines and creates issues in matching peak power demand with RE output. A renewable hybrid system that combines wind, solar and storage can address these problems. If the energy produced during peak generation hours can be stored and release into the grid during peak demand hours, such a system can produce round-the-clock clean energy to meet the demand through the day. The storage could be in the form of batteries, pumped hydro, or mechanical storage.

According to a report by the Institute for Energy Economics and Financial Analysis and JMK Research, the total wind-solar hybrid capacity in India could reach 11.7 GW by 2023, as the Solar Energy Corporation of India and various State governments incentivize hybrid projects. The Centre is also expected to conduct auctions for round-the-clock and hybrid RE projects, in addition to standalone solar or wind projects. The rapidly falling battery prices will make storage for such projects viable within a few years, further improving the stability and reliability of the grid.

In recent years, there has been considerable interest in floating solar panels. India reportedly has around 15 mega floating solar projects, with a combined capacity of 1.832 GW, in different stages of completion. Floating solar panels have the advantage of being free from the hassles of land acquisition, tree felling, and the resultant compensation. Moreover, they give better output as compared to land-based solar installations. Many government enterprises in sectors like power, oil and natural gas, and manufacturing are pushing for floating solar plants, and we might see increased activity in this space.

Earlier this year, Prime Minister Narendra Modi launched the National Hydrogen Mission in an effort to make India a global hub for the production and export of green hydrogen. This is significant in the light of India's recently announced net zero commitments, as green hydrogen is one of the cleanest forms of energy in the world. As a fuel cell, green hydrogen can replace liquid fuels used for transport. As a raw fuel, it can help in decarbonizing sectors like steel. As a storage option, it can support round-the-clock generation and supply of renewable energy. The production of green hydrogen is emission-free, as it involves electrolysis of water, using electricity generated from solar or wind power. According to media reports, the Centre might introduce a Production-Linked Incentive (PLI) scheme for domestic manufacture of electrolysers. A combination of supportive government policy and industry participation will be necessary to bring down the cost of producing green hydrogen and make it mainstream.

The implementation of ongoing and new solar projects has been adversely impacted over the past couple of years, mainly because of the Covid-19 pandemic and subsequently because of the increase in cost of PV module and it's component as well as the overall impact on supply chain cost. The nationwide lockdown that was introduced in 2020 led to disruptions in domestic supply chains, construction delays, and logistical setbacks. Meanwhile, the procurement of raw materials and components itself was adversely impacted. This is because India used to heavily import solar cells and modules from other countries.

Appreciating the need of local manufacturing by Government and the industry, In past 6-12 months we have seen many tenders floated by the government for local manufacturing of solar panels and components – a trend that is likely continue in 2022 as well. Many project developers are also moving into manufacturing, in view of the supply constraints that are expected to continue in the coming years.

Moreover, the Government of India has decided to impose 40 percent basic customs duty on solar modules and 25 percent on solar cells from April 2022. This move will make imports costlier and encourage local manufacturing, forever changing the dynamics of India's solar industry. It wouldn't be surprising to see many new and ongoing projects get executed rapidly over the next few months in a bid to avoid the new customs duty. We could see the commissioning of at least 4–5 GW of solar energy projects by the 31st of March and up to 12–15 GW by the end of 2022.

The year ahead could hold some very significant announcements by the government, pertaining to tenders for RE projects; the domestic manufacturing of RE equipment and battery storage; MoUs and joint ventures for electrolysis facilities and the manufacture of electrolysers; expression of interest in offshore wind projects, and more. It has been reported that the Centre could set up a joint committee of the Ministry of Power and the Ministry of New and Renewable Energy to draw up an action plan for scaling India's RE capacity by 2030 and to decide on important aspects like the technologies to be used, the energy mix, the storage requirements, and the regulatory framework for attracting foreign investments. We are in for an exciting time.

https://economictimes.indiatimes.com/industry/renewables/2030-renewable-energy-target-panel-to-be-set-up-soon-for-mission-500gw/articleshow/8826710 4.cms?from=mdr



Buildings: The next frontier for the implementation of energy efficiency

Puneet Sharma Senior Architect Colliers

Sustainable architecture and design are basically a strategy to reduce the negative impact of building material, construction, and design on the built environment. The onus of implementing efficient energy saving systems lies on the construction industry, wherein it needs to thoroughly study the site landscape, storm water and electrical energy consumption before executing a project.

Every day, more and more people are realizing the importance of saving energy to reduce the damage to the environment. An array of strategies is being implemented in public building designs to safeguard our environment. The upfront cost of energy efficiency and sustainability solutions may be higher in some cases, however the reduction in maintenance at later stages not only saves money but also improves our air quality and overall surroundings. Green buildings are imperative for a sustainable future. Data shows that buildings with certified green ratings hold higher value than the other buildings. In the commercial sector, most of the international stakeholders/occupiers generally has showcased a preference for organisations, which are certified and hold international values. Higher demand also pushes up the rental of the buildings, which in turn helps in recovering the upfront costs of implementing the sustainable and renewable energy sources in the building. Data shows that green buildings command a 10% increase in value, when compared to the non-certified buildings.

The need for the more sustainable ecosystem is greatly required, now more than ever. As per various surveys, it is expected that around 70% of overall population of India will move to cities by 2050. This will lead to an uptick in the demand for construction industries and buildings. Even now, heavy machineries used in building construction still run on the petroleum and other fossil fuels. Sometimes, inefficient electricity use results in increased consumption of fossil fuel as well. There are many strategies that can minimise this. Few of them are listed below:

- Use of Renewable energy
- Use of sustainable materials
- Maximising the natural light and ventilation
- Adaptive reuse/ Morphable designs
- Efficient technologies to reduce the waste

We are increasing seeing the emergence of tools and software, which can analyse the structure stability, understand the MEP coordination and examine any issue which can occur in the future related to the construction and coordination. Tools like "Building Information Modelling" commonly known as BIM, Navisworks have made the coordination of services and 3D modelling of building remarkably easy. We can now analyse most of the details beforehand getting into construction. These tools are there not only to make building more energy efficient but also to make sure that the negative impact of the construction and functioning of the building on the environment is minimal.

India currently holds the world's 5th largest solar power plant. With 36.03GW in 2021, it is already producing 54TWh of electricity. Energy demand in the country is expected to grow further in the coming decades. Similarly, the wind power generation capacity of India has increased drastically over the years. India also has a total of 40GW wind power installed capacity and holds the 4th ranking in the world. These achievements not only promote the use of renewable energy but also generate the awarenesss among the people to substantially cut the power consumption and understand climate change.

With this change, the government is now making it mandatory for the buildings to have the solar cells installed at site. This is not just a norm but also a lifelong commitment to uphold the intrinsic worth of efficient and sustainable living. While a good design is essential, operations, functioning and maintenance of the building is also significantly important. In Indian conditions it is highly recommended that we use more earthy materials, along with thermal barriers like the greenery on the roofs of the houses and buildings. This reduces the heat load and cooling energy costs considerably. Apart from material selection and thermal barriers, it is equally important to understand the local climatology of the site before designing the building. After incorporating the climate factor, we can decide on the

- Shape and orientation of the building
- High-performance glazing and window system
- Controlled ventilation and Insulations.

The above parameters are a must to make the energy efficient buildings, which are a prerequisite for a better and sustainable future.



Inclusive Sustainability is core to creating a resilient world

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If there is anything the last two years have taught us—both related to the global health pandemic and the continued rise of catastrophic climate events—it is that developing nations and economically and socially vulnerable segments of populations face heightened risk to natural disasters and man-made crises. The progress so far on COVID-19 vaccinations exemplifies this point. More than five billion vaccine doses have been administered globally. However, a detailed accounting of vaccination data shows that only a little over one percent of people in low-income countries have received a vaccine dose. Almost 84 percent of all doses administered so far have been to people in high-income and upper middle-income countries. This global disparity is causing a growing discourse around the world for a more equitable distribution of vaccines.

On the climate front, countries like Afghanistan, Pakistan and India have suffered the highest numbers of internal displacements of their population due to natural disasters such as storms and floods. It's clear that developmental strategies and efforts – both national and international – need to take a more inclusive view of the vulnerable and less fortunate.

Climate change is the greatest existential threat of our lifetime. A special report released recently by the Intergovernmental Panel on Climate Change (IPCC) said that it is very likely that global warming will cross the threatening level of 1.5°C between 2030 and 2052 if it continues to increase at the current rate. The IPCC has called for deep cuts in greenhouse gas emissions and encouraged a net zero approach to prevent disastrous consequences. Meanwhile, more than five years after the Paris Climate Accords, the pace of climate action is far less than what is required to meet the moment. It is only in the last year or two that there has been a flicker of urgency in announcing net zero goals.

And implementation matters. According to a PwC analysis earlier this year, only about eight percent of the world's Fortune 500 companies had pledged to become net zero – an indication of the current chasms that exist between awareness, intent, and action. This is partly because most people do not even know how to go about developing and implementing a net zero strategy. Even among those companies who have announced net zero goals, there are many who are unsure of the best way to proceed. Bridging these gaps and translating climate goals into on-the-ground actions must be one of the top priorities, if not the topmost one, for business leaders.

More importantly, the solutions that businesses and governments envision must be based on a comprehensive, long-term, and data-driven view. They simply cannot be fragmented. We still have a chance to rebuild our communities and our world in a sustainable and equitable manner. This will require multiple stakeholders to unite under the common goal of creating a healthy, resilient world that is equipped to deal with unforeseen crises. We need to become resilient. Making infrastructure as "green" as possible – either from the planning, design and construction stages itself, or through the retrofitting of existing structures – is one of the most obvious and effective ways of delivering on all four objectives: sustainability, health and wellness, resilience, and equity.

Today, green building certifications like LEED are not only associated with energy-efficient, environment-friendly building design but are also recognized as useful tools for creating a healthier working environment for the inhabitants of our buildings and public spaces. Around the world, green buildings are being created in line with resilience-enhancing designs, technologies, materials, and overall best practices. Social equity, while often talked about and acknowledged as important, must be further integrated into greening and construction initiatives. The latest version of LEED, LEED v4.1, promotes socially responsible practices with its Social Equity Pilot Credits, which are designed to address social equity from the perspective of all people, businesses, and communities that are touched or impacted by a building. This is tremendously important that we are paying attention to even those that we directly do not see in the construction process.

Green financing is also starting to go mainstream. Today, mutual fund managers expect companies to take concrete actions towards mitigating climate change; to care not only about profits, but also about people and the planet. Large investors and advisors are now more favorably inclined to supporting ESG-related (environmental, social and governance) shareholder proposals. They are eager to show leadership here because they know that taking a leadership stance on issues that are important to people increases brand loyalty.

But the pace of green investments needs to accelerate further. A sizeable percentage of current and future investments should be aimed at addressing long-standing or anticipated issues that could get in the way of project execution and end-goals. The International Energy Agency said recently that global investments in energy projects – especially renewable energy and green projects – need to more than double from their current level by the year 2030 for the world to meet its net zero emission goal by the middle of this century.

The bottom line is that it is time to focus on net zero goals by coming together on a global scale to ensure the health and vitality of future generations, particularly the most vulnerable among us. Every strategy and every action plan we implement in the future must be created with the understanding that if it doesn't work for the weakest among us, it simply isn't good enough.

https://www.ipcc.ch/sr15/chapter/spm/ https://www.pwc.com/gx/en/issues/reinventing-the-future/take-on-tomorrow/business-achieving-net-zero.html

Top energy trends from India & across the globe

• Acquisitions in green energy sector jump 300% in Jan-Oct

According to a study by CEEW Centre for Energy Finance (CEEW-CEF) and the International Energy Agency (IEA), the total value of acquisitions in India's renewable energy sector surged by more than 300% to \$6 billion in the first ten months of 2021 (till October) from less than \$1.5 billion reported in 2020. Additionally, the spike in global conventional fuel prices such as crude oil, gas and coal is now playing out in the solar space with module prices touching 28 cents per kilowatt-hour (kWh), the highest since 2019. This sharp jump in prices is on account of China's worst-ever power shortage, with factories running on limited days.

• The pricing of project debt finance for solar photovoltaic (PV) and wind declined

CEEW-CEF and IEA, in its recent Clean Energy Investment Trend report, highlight that the interest rates for solar PV and wind project debt fell by around 100 basis points to a range of 9.25-10.00 per cent in the period July 2020 to June 2021 from prominent non-banking financial companies (NBFCs), with even cheaper debt available from banks (8.75-9.50 per cent). This was primarily because the Reserve Bank of India maintained an accommodative monetary policy to support the domestic economy amid the disruption caused by the COVID-19 pandemic.

Total FDI inflow in the power sector reached US\$ 15.36 billion between April 2000 to June 2021

India's power sector is going through significant change redefining the industry outlook. Total FDI inflow in the power sector reached US\$ 15.36 billion between April 2000 to June 2021, accounting for 3% of the total FDI inflow in India. By 2022, solar energy is estimated to contribute 114 GW, followed by 67 GW from wind power and 15 GW from biomass and hydropower. The target for renewable energy has been increased to 227 GW by 2022. In FY22 (until October 2021), the total thermal installed capacity in the country stood at 234.44 GW. Installed capacity of renewable, hydro and nuclear energy totalled 103.05 GW, 46.51 GW and 6.78 GW, respectively.

• Indian companies finally jump on the ESG bandwagon

As the hope of restricting global warming to 1.5 degrees recedes rapidly, there is a dire need for companies to reorganize their business processes to contain the worst excesses of climate change. Many companies including Reliance Industries Ltd (RIL), HDFC Bank, Vedanta Ltd and JSW Energy have jumped on the bandwagon to go carbon neutral in the next few decades. Some of these companies are also recalibrating their businesses to hit net-zero emission deadlines. They are tapping into newer pools of capital and shoring up valuations to attract investors in these reorganized entities, while enhancing shareholder value. India ranks a lowly 120 among 165 countries in its progress towards achieving all 17 SDGs (sustainable development goals), lower than SAARC counterparts Sri Lanka, Nepal and Bangladesh.

• EPA Finalizes Greenhouse Gas Standards for Passenger Vehicles, Paving Way for a Zero-Emissions Future

The Environmental Protection Agency (EPA) is finalizing the most ambitious federal greenhouse gas (GHG) emissions standards for passenger cars and light trucks ever. The final standards, for Model Years (MY) 2023 through 2026, leverage advances in clean car technology to unlock \$190 billion in net benefits to Americans, including reducing climate pollution, improving public health, and saving drivers money at the pump. EPA is planning to initiate a separate rulemaking to establish multi-pollutant emission standards under the Clean Air Act for MY 2027 and later that will speed the transition of the light-duty vehicle fleet toward a zero-emissions future consistent with President Biden's Executive Order. Commenting on the matter, EPA Administrator Michael Regan said, "At EPA, our priority is to protect public health, especially in overburdened communities, while responding to the President's ambitious climate agenda. Today we take a giant step forward in delivering on those goals, while paving the way toward an all-electric, zero-emissions transportation future."





For more information, please contact us



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