

India's Journey towards an Emission Free Future

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Abstract: India is a fast developing economic power with a GDP growth rate of close to 9% in 2021. With a population of close to 1.4 billion, there is a fast and expanding appetite for sources of energy to fuel the economic activities associated with this growth and expansion. As the need for sources of energy grows so does the acknowledgement that the energy sector contributes majority of the total greenhouse gas emissions of the country. Despite the fact that the per capita energy consumption in India at 7063 KWH remains significantly lower than the world average of 20993, it is essential for the country to work towards mitigating potential harm to the environment and the climate change impact. This becomes particularly important when one realises that it is essential that the Government increase the per capita energy consumption to ensure inclusive development of the country. Climate change a real concern facing the world today. International cooperation is essential to managing climate change and the potential risks of inaction and benefits of action extend far beyond the environment; global economies and security will suffer if countries do not take collaborative action towards minimising the impact of greenhouse emissions. The first part of the paper will look at the energy scenario in India in context of the commitment made in the Glasgow pact. The second part will look at a list of steps undertaken by the government and analyse effectiveness. Finally this paper will attempt to critically evaluate these steps towards their effectiveness in achieving the ambitious goals set by the Government.

Keywords: Sustainability, COP26, India, Emissions

1. Introduction

India – Surging energy needs and a need for sustainability

India is a fast developing economic power with a GDP growth rate of close to 9% in 2021 [GDP Growth (Annual %)-India.]

Data,

<https://data.worldbank.org/indicator/NY.GDP.MKTP.KD.ZG?locations=IN>. With a population of close to 1.4 billion, there is a fast and expanding appetite for sources of energy to fuel the economic activities associated with this growth and expansion. As the need for sources of energy grows so does the acknowledgement that the energy sector contributes majority of the total greenhouse gas emissions of the country. Despite the fact that the per capita energy consumption in India at 7063 KWH remains significantly lower than the world average of 20993, it is essential for the country to work towards mitigating potential harm to the environment and the climate change impact. This becomes particularly important when one realises that it is essential that the Government increase the per capita energy consumption to ensure inclusive development of the country.

Climate change a real concern facing the world today. International cooperation is essential to managing climate change and the potential risks of inaction and benefits of action extend far beyond the environment; global economies and security will suffer if countries do not take collaborative action towards minimising the impact of greenhouse emissions.

COP26 and India's commitment

COP stands for Conference of the Parties, and the summit was attended by the countries that signed the United Nations Framework Convention on Climate Change (UNFCCC) – a treaty that came into force in 1994. Cop26 is the 2021 edition of the united nations annual climate change conference. It saw almost 200 countries coming together to commit to take action on climate change. The aim of the UK COP26 Presidency was to keep alive the hope of limiting the

rise in global temperature to 1.5C, and the Glasgow Climate Pact does just that.

Combined with increased ambition and action from countries, 1.5C remains in sight, but it will only be achieved if every country delivers on what they have pledged. India announced that it would be net zero by 2070. 'Net zero' refers to the year by which Greenhouse gas emissions produced will be balanced by those that are absorbed. The objective of this paper is to understand this commitment, analyse the steps undertaken by the Government over the last few years towards the same and evaluate its effectiveness.

The Paris Agreement was agreed at COP21 in 2015. For the first time ever it saw almost every country around the world enter into a legally binding commitment to reduce emissions. It was 'top down' in that every country – no matter how big or small – signed up to cutting carbon emissions to limit global warming to well below 2 degrees and ideally to 1.5 degrees above preindustrial levels; and it was 'bottom up' in that it left room for each individual country to decide how they would get there. These were called Nationally Determined Contributions (NDCs). The Paris Agreement also set out ambitious goals on adaptation and on finance, recognising that many people around the world are already experiencing the impacts of a changing climate, and that support-financial, technical and capacity building – would be needed.

The first part of the paper will look at the energy scenario in India in context of the commitment made in the Glasgow pact. The second part will look at a list of steps undertaken by the government and analyse effectiveness. Finally this paper will attempt to critically evaluate these steps towards their effectiveness in achieving the ambitious goals set by the Government.

The Indian Government made the following commitment during his speech at the COP26. These are called the five nectar elements, Panchamrit, to deal with the environmental challenge facing the world. [National Statement by PM AT

Volume 11 Issue 9, September 2022

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COP26 Summit in Glasgow.” *Prime Minister of India National Statement by PM at COP26 Summit in Glasgow Comments*,

https://www.pmindia.gov.in/en/news_updates/national-statement-by-pm-at-cop26-summit-in-glasgow/?tag_term=pmspeech&comment=disable.]

First– India will reach its non-fossil energy capacity to 500 GW by 2030.

Second– India will meet 50 percent of its energy requirements from renewable energy by 2030.

Third– India will reduce the total projected carbon emissions by one billion tonnes from now onwards till 2030.

Fourth– By 2030, India will reduce the carbon intensity of its economy by less than 45 percent.

And fifth- by the year 2070, India will achieve the target of Net Zero. These Panchamrits will be an unprecedented contribution of India to climate action.

India – a growing economy

The Government of India has its work cut out to provide affordable energy to its growing population while ensuring energy access to all and ensuring high efficiencies in the operations. The intent to provide energy security to its 1.3 billion people will have far-reaching impact on India’s energy portfolio as it embraces clean energy pathways. By committing to ambitious goals in the COP26, India has established itself not only as a large energy consumer but also a nation driving transformation in the energy sector by driving aggressively non fuel based capacity while also working on initiatives educating and motivating consumers to move to alternative less polluting energy sources.

As captured by the world energy trilemma index [Oliver Wyman. “WORLD ENERGY Trilemma Index.” World Energy Council], for a growing economy like India it is essential to look at the following three aspects when devising its energy policy:

- 1) Energy Security –the ability meet current and future energy demand, while building a capacity to withstand and respond to system shocks.
- 2) Energy Equity – the ability to provide universal access to reliable affordable and abundant energy
- 3) Environmental sustainability – Ability to mitigate and avoid environmental degradation and climate change impact.

India is ranked 75th in the World Energy Trilemma Index (WETI) 2021 published by the World Energy Council. The overall trilemma score is 53.1 and the scores of energy security, energy equity and environmental sustainability are 61.2, 47.1 and 50 respectively. Since 2000, India has been continuously striving to achieve energy equity by having better electricity accessibility and clean cooking facilities. However, the scores are low for sustainability and energy

security, with little improvement. The rest of the paper will focus on the steps undertaken and planned by the Government to improve its score on Environmental sustainability, however these need to be evaluated keeping in mind energy security and equity.

Importance of tracking and monitoring

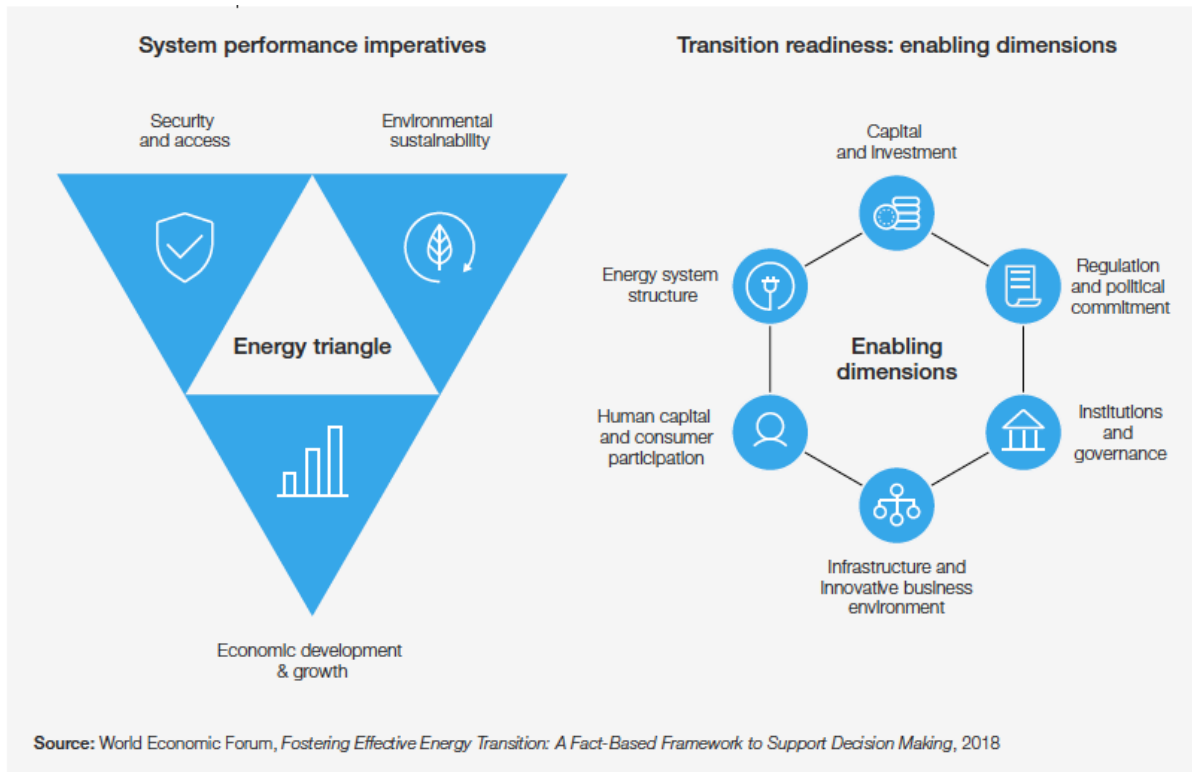
India is a diverse country and it will not be pragmatic to apply the same policy in every state and cascade the same agenda of energy transformation across various states. It requires in-depth analysis and strategic decision-making to come up with an appropriate energy transformation strategy for each state depending on the geographical complexities of the state. : The Government of India has to ensure affordable and reliable energy to all and reduce its dependence on fossil-based energy by accelerating the clean energy transition. Both of these present significant challenges. To help the Government achieve these objectives in context of a diverse group of states, NITI Aayog has developed the State Energy & Climate Index (SECI) [Niti Aayog. “STATE ENERGY & CLIMATE INDEX ROUND-1.” Apr. 2022] which measures the state’s efforts for improving the energy sector.

The index has been designed to assess and identify the scope for improving the performance of states and to help them efficiently manage their energy resources. This will provide the states with valuable information which would empower them to formulate and implement suitable policies. In addition it strives to encourage healthy competition among the states as the country strives to move towards a future with clean energy. The index has a preliminary set of 27 Key Performance Indicators (KPIs) covering the following 6 parameters

No	Parameter	Weight
1	DISCOM’s performance	40%
2	access, affordability & reliability of energy	15%
3	clean energy initiatives	15%
4	energy efficiency	6%
5	environmental sustainability	12%
6	New initiatives	12%

India – its journey towards sustainability

To assess India’s journey this paper will use the Energy transition index framework developed by the world economic forum. The ETI framework [*Fostering Effective Energy Transition 2021 Edition-World Economic Forum*. https://www3.weforum.org/docs/WEF_Fostering_Effective_Energy_Transition_2021.pdf.] is composed of two equally weighted sub-indices: the current energy system performance and the enabling environment for the energy transition. An effective energy transition can be defined as a timely transition towards a more inclusive, sustainable, affordable and secure energy system that provides solutions to global energy-related challenges, while creating value for business and society, without compromising the balance of the energy triangle.



System performance provides an assessment of a country’s energy system performance across three key priorities:

- the ability to support economic development and growth
- universal access to secure and reliable energy supply
- environmental sustainability across the energy value chain

The progress on energy transition in a country is determined by the extent to which a robust enabling environment can be created. This includes political commitment, a flexible regulatory structure, a stable business environment, incentives for investments and innovation, consumer awareness and the adoption of new technologies. The ETI measures progress along these dimensions in the transition readiness sub-index.

In 2021, India scored an ETI of 53 with system performance scored at 58.2 and transition readiness at 47.3. The rest of the paper will look at some of the key initiatives undertaken by the Indian Government making large strides towards its goal of achieving its emission targets.

Growth in renewable energy capacity [*Fostering Effective Energy Transition 2021 Edition-World Economic Forum*. https://www3.weforum.org/docs/WEF_Fostering_Effective_Energy_Transition_2021.pdf.]

In the past decade, we have witnessed an unprecedented acceleration of the energy transition. Two examples illustrate the point: the growing speed of renewable energy penetration (particularly wind and solar), and the important strides made in energy access. These changes have been facilitated by several factors, among which technological advancement and growing political support stand out. However, extraordinary as this evolution has been, there

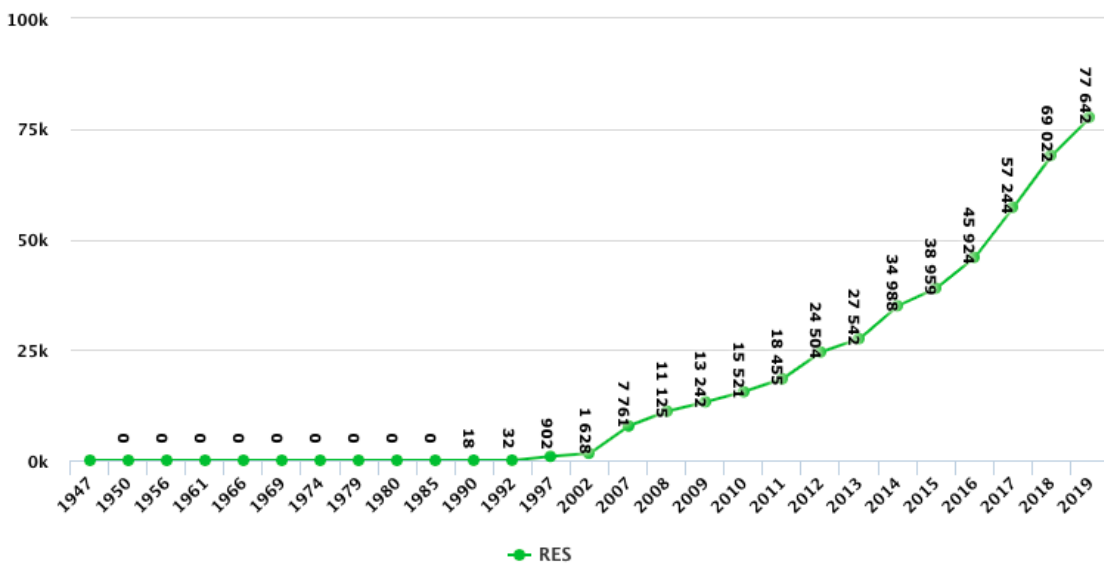
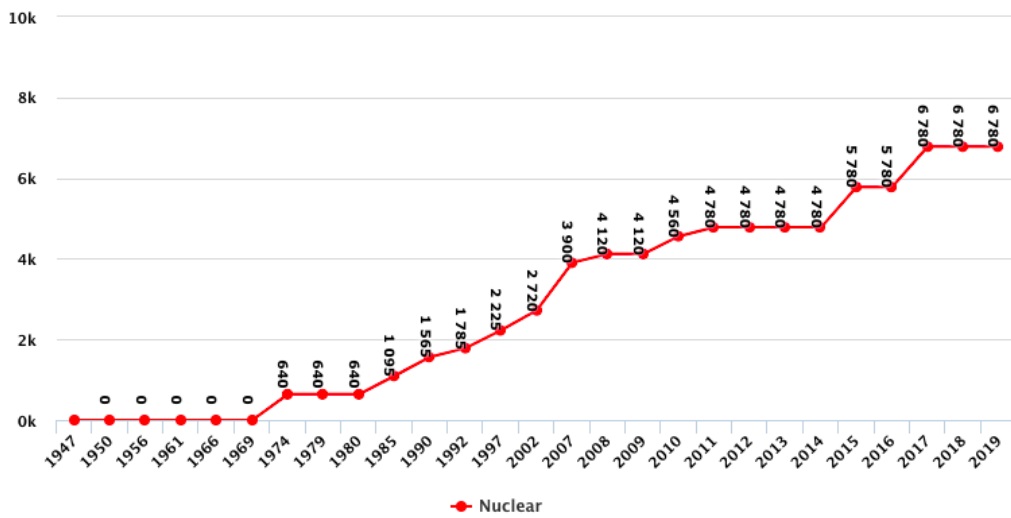
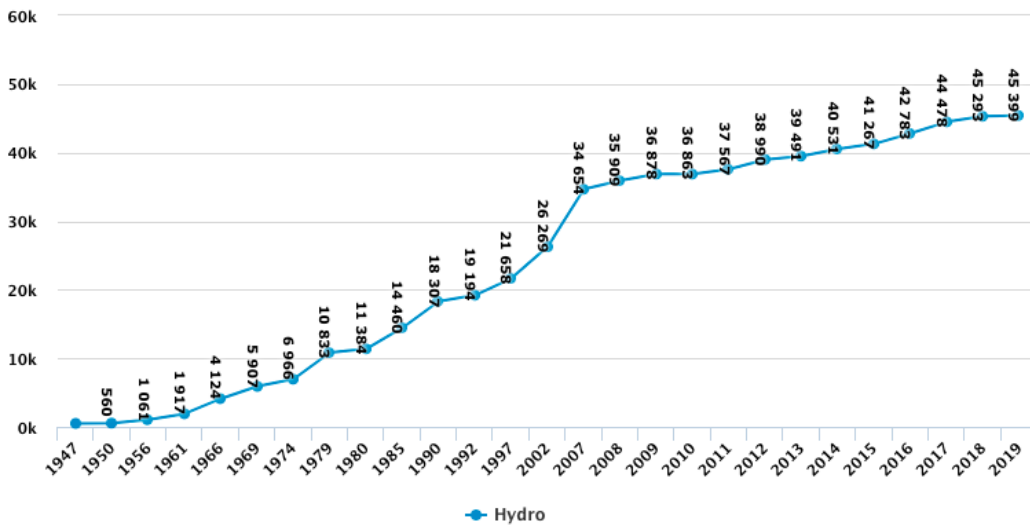
remain some critical challenges to delivering sustainable and affordable energy while improving access and security.

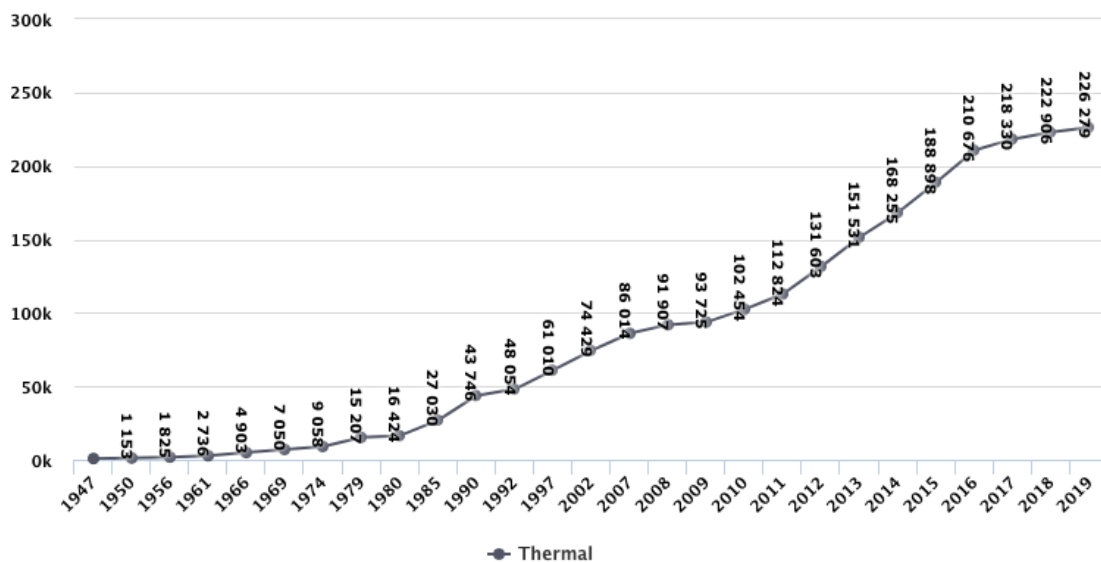
Summary of all India installed capacity (IN MW) of power stations as on 31/05/2022

Source	Capacity in MW	% share
Coal	204079.50	51%
Lignite	6620.00	2%
Gas	24879.21	6%
Diesel	509.71	0%
Thermal Total	236088.42	59%
Hydro	46722.52	13%
Wind	40706.38	10%
Bio Power	10682.36	3%
Solar	56951.33	14%
Nuclear	6780.00	2%
Renewable Total	166729.00	41%
Grand Total	402817.40	100%

In COP21 in Paris [Portal, National Power. *National Power Portal*, <https://npp.gov.in/dashBoard/cp-map-dashboard>], India pledged as its NDC (Nationally Determined Contribution) that it will achieve 40 % of its installed power generation capacity from non-fossil fuel sources by 2030. India achieved this milestone in 2021- the first country to have achieved its NDC 9 years in advance. Its non-fossil fuel installed capacity is over 159 GW and further its has 78 GW under installation and 25 GW under bid. During the year 2021-22 (Upto Jan, 2022), about 10,266 MW of Renewable Capacity, consisting of 9,068 MW from Solar, 854 MW from Wind, 55 MW from Small Hydro, 77 MW from Bio Power and 213 MW from Hydro based capacity has been added.

(https://powermin.gov.in/sites/default/files/uploads/MOP_Annual_Report_Eng_2021-22.pdf)





Investment in local capital and developing local champions can be a key transmission mechanism for social capital, jobs, skills and other economic benefits, adding further resilience to the energy transition. A good example of this is ReNew Power [9 *Fostering Effective Energy Transition 2021 Edition-World Economic Forum*. https://www3.weforum.org/docs/WEF_Fostering_Effective_Energy_Transition_2021.pdf], India's leading renewable energy independent power producer. Goldman Sachs was an early investor, providing \$470 million in cumulative funding at different stages. As ReNew Power grew, it attracted a network of institutional investors, including the Asian Development Bank, the Canada Pension Plan Investment Board and JERA, the largest power generation company in Japan. This early investment in ReNew Power allowed it to become a leader in India and catalysed development of the domestic capital market through a first-of-its-kind public-private partnership green bond issue.

Leadership in Solar power-International Solar Alliance
[Balls, Jonathan. "India's International Solar Leadership: Walking the Talk?" ORF, 8 Dec. 2021, <https://www.orfonline.org/expert-speak/indias-international-solar-leadership-walking-the-talk/>]

India is taking a lead when it comes to solar projects and initiatives, although it can benefit from strengthening monitoring and tracking of its initiatives towards public accountability. The International Solar Alliance (ISA) is a collaborative platform for increased deployment of solar energy technologies as a means for bringing energy access, ensuring energy security, and driving energy transition in its member countries. The ISA works to develop and deploy cost-effective and transformational energy solutions powered by the sun to help member countries develop low-carbon growth journeys. It is an evidence to India's leadership in solar power as the ISA was conceptualised and initiated as a joint effort by India and France during COP21 in 2015.

India is demonstrating its leadership in the area of solar power via the following –

- 1) Concessional lending for solar projects-India has earmarked US \$2 billion to international concessional financing for solar by 2025, operationalised through the long-running Indian Development and Economic Assistance Scheme (IDEAS). Under the scheme, India's publicly owned Export-Import (EXIM) Bank extends concessional financing to partner countries for solar projects. The governments who utilise these lines of credit must identify projects, which must be delivered by Indian companies and majorly use Indian goods and services.
- 2) Sharing of expertise in solar projects – India is also sharing its experience with solar projects and technology internationally. This makes the concessional lending under IDEAS extremely popular.
 - a) It is supporting other countries to develop utility-scale solar parks. The Indian-led ISA has initiated a solar parks programme. The government of India has further funded a project preparation facility, to be offered by India's EXIM Bank.
 - b) India is promoting demand aggregation for the deployment of off-grid solar goods overseas, through ISA. Put simply, this is a policy to bulk buy and distribute solar goods. ISA has a current programme running tender processes to discover the lowest prices at which manufacturers will supply various off-grid solar goods. The theory is that this will lead manufacturers to lower costs. India had significant domestic success with this policy, most notably bulk buying hundreds of millions of LED lights.
 - c) India wants to support partner countries to deploy solar mini-grid systems, drawing on its domestic expertise. ISA is running a dedicated mini-grids programme, focused on identifying business models to scale their deployment.
- 3) ISA has been developing a 'STAR-C' programme, to build a network of technical training, entrepreneurship, and research and innovation centres. It has further partnered with India's ITEC to offer a Master's level trainers programme, and is offering 'Solar Fellowships' for mid-career professionals. PM Modi has said that India will fund 500 training places annually for ISA members. India has a strong track record here, and both

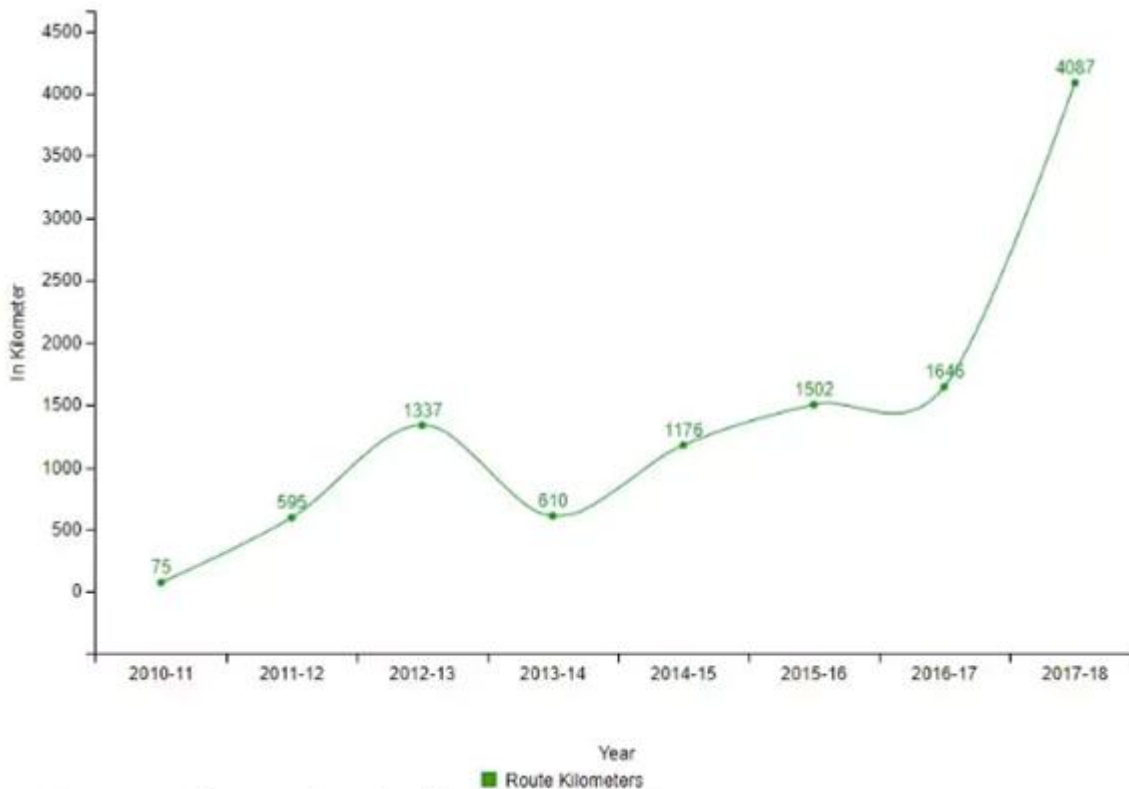
ITEC and ISA training will be offered to many more in the coming years.

assist in harvesting the gains from the work being done in the area.

One big challenge that India faces in establishing its leadership in the space of solar power is the lack of publicly available data and reports. Limited public data means limited information on progress, and outcomes of India’s programmes, and an assessment of progress is extremely difficult. If the government wants to establish its leadership, a little more attention to making project and execution details more transparent is required. While India’s commitment is evident, it could work on monitoring and accountability to the international community will definitely

Electrification of Indian Railways

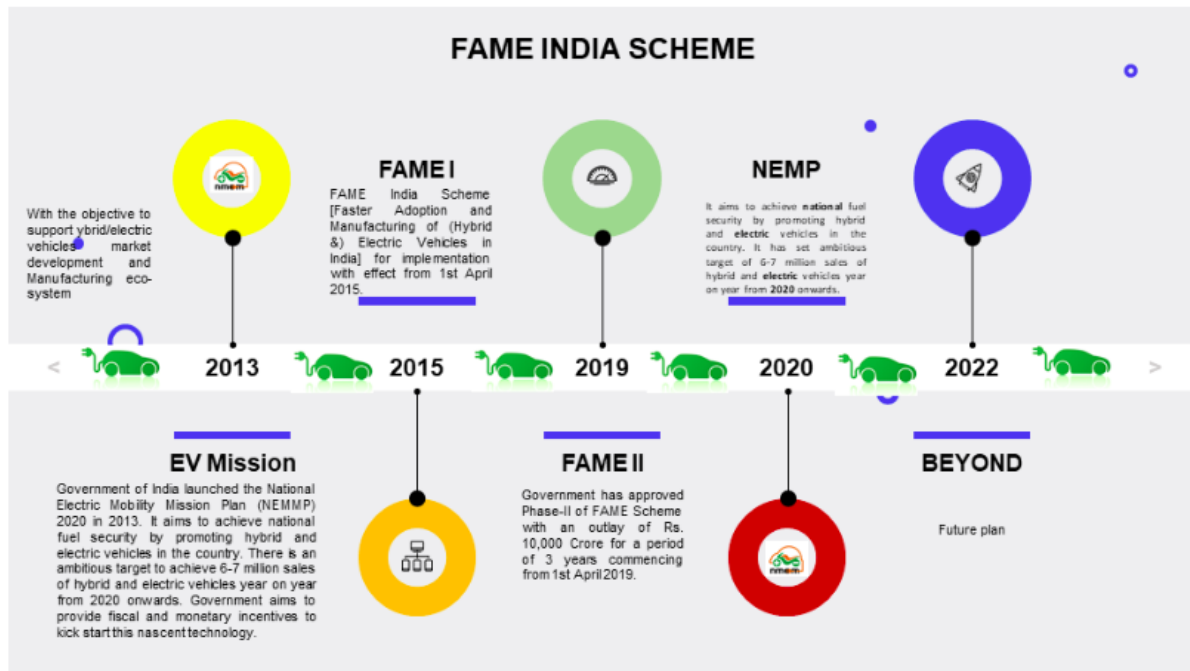
Indian Railways, the life line of India, is taking the lead in reducing the nation’s dependence on petroleum-based energy by rapid electrification of railway tracks. The Central Organization for Railway Electrification (CORE) has been set up in 1979 under the Ministry of Railways with the main objective of electrification of railway tracks on Indian Railways. The Central Organization for Railway Electrification (CORE) along with other organizations has planned to electrify entire broad-gauge network routes of Indian Railways by December 2023.¹¹



Sources: data.gov.in; visualize.data.gov.in

National electric mobility mission plan [Chapter 2- Progress of Electrification in Indian Railways.”] Faster Adoption and Manufacturing of (Hybrid &) Electric Vehicles in India (FAME-India) Scheme is launched under

National Mission on Electric Mobility in 2011/ National Electric Mobility Mission Plan 2020, unveiled in 2013. The scheme aims to encourage progressive induction of reliable, affordable and efficient electric and hybrid vehicles.



Manufacturers and infrastructure providers of electric vehicles receive this incentive in the form of subsidies.

Fame India Scheme operates in two phases. These are,

- The first phase of Fame India Scheme started in 2015 and was functional till 31st March 2019.
- The second phase of this scheme started in April 2019 and will continue till 31st March 2022.

The Government has decided to further extend Fame India Scheme Phase II till 31st March 2024.

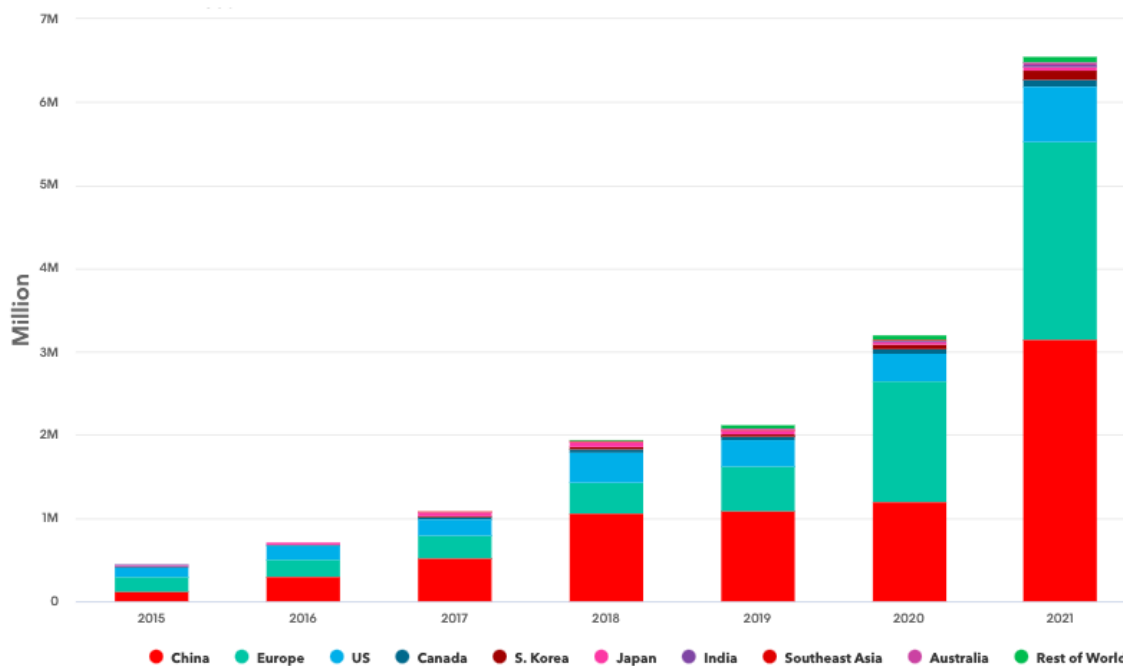
As per FADA (Federation of Automobile Dealers Associations) sourced industry statistics, retail sales of EVs hit their highest at 429,217 units in FY2022, up 218% on FY2021's 134,821 units, and up 155% on FY2020's 168,300 units. From the looks of the fast-increasing EV sales in the recently-concluded first quarter (April-June 2022) of the ongoing fiscal year, FY2023

¹²*DIDM Dash Board-Heavy Industries.*
<https://fame2.heavyindustries.gov.in/dashboard.aspx>.

bids fair to set a new record and also beat FY2022 numbers by a large margin. The surge in sales can be attributed to an increase in the availability of products in the market, high petrol, diesel and CNG prices, state subsidies and sops offered under FAME II. It also helps that there is growing consumer awareness about the need to use eco-friendly transport.

While the incentives [“Ev Sales in Q1 Already 49% of Entire FY2022.” *https://www.autocarpro.in, https://www.autocarpro.in/analysis-sales/%E2%80%8Bbev-sales-in-india-cross-210-000-units-in-q1--charge-towards-new-record-in-fy2023-92164.*] provided by the Government are helping the electric mobility plan of the country, there is a need to accelerate such initiatives. About 30% of new two-wheelers sold in the world are electric, but in India new cars will do this feat only by 2030. For India, it will take another decade to reach 30% electrification. Globally by 2040 electric cars will outsell the internal combustion engine ones with a market share of about 60%, electric two-wheelers with 77%, and the overall electric fleet with 47%, reveals the Electric Vehicle Outlook 2022 report by Bloomberg NEF.

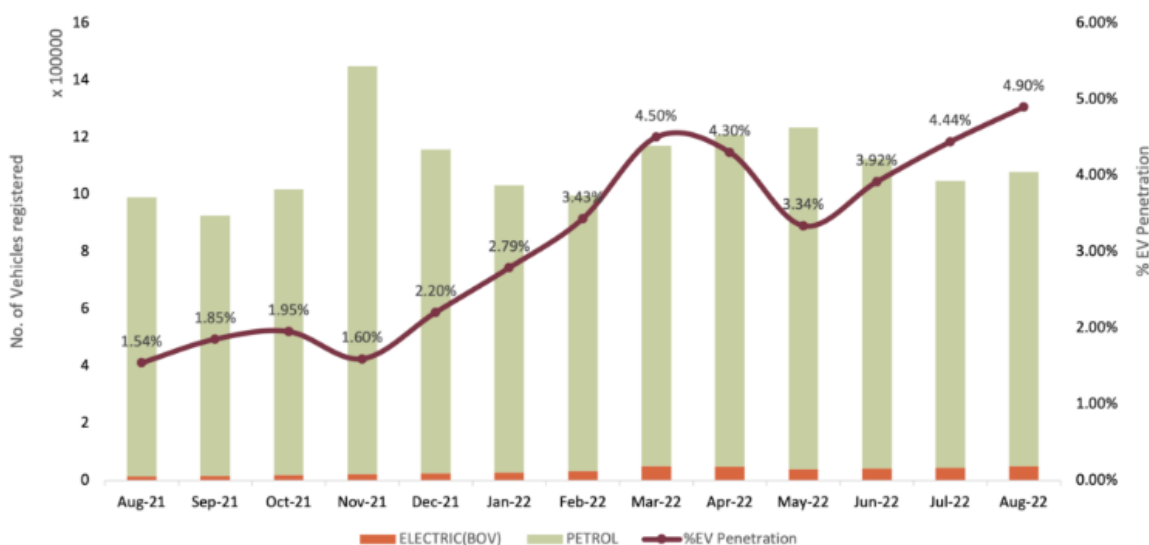
Global passenger EV sales by market



By 2025 [Evo Report 2022: Bloombergnef: Bloomberg Finance LP.” BloombergNEF, <https://about.bnef.com/electric-vehicle-outlook/>], EVs hit 10% of global passenger vehicle sales, rising to 28% in 2030 and 58% in 2040 the report pointed out. Price parity between EVs and internal combustion vehicles is reached by the mid-2020s in most segments, but there is a wide variation between geographies. For instance, small vehicles in India and Japan do not hit parity until after 2030 due to very low average purchase prices in these segments, the report mentioned.

Industry experts believe that price factor coupled with infrastructure limitation will not be able to give desired demand boost to EVs in India and the country will see about 8% new EV car sales by 2030. [15www.ETAuto.com. “A Deep-Dive into World EV Market: In India, Only 8% of New Car Sales Will Be Electric by 2030 against 28% Globally, Says Report-Et Auto.” ETAuto.com, 12 May 2021, <https://auto.economictimes.indiatimes.com/news/passenger-vehicle/cars/a-deep-dive-into-world-ev-market-in-india-only-8-of-new-car-sales-will-be-electric-by-2030-against-28-globally-says-report/82570153>]

EV Penetration in 2W Sales from Aug-21 to Aug-22



Source: Vahan Dashboard. Data as per 1335 out of 1410 RTOs. Note: Low speed Electric 2 Wheelers data is not included

From a long term point of view [India's Electric Vehicle Sales Trend: August 2022 • Evreporter.” EVreporter, 7 Sept.

2022, <https://evreporter.com/indias-electric-vehicle-sales-trend-august-2022/>] India needs to keep in mind that it is not

just the tail pipe emissions that contribute to the environmental degradation – much of the emissions happen during manufacturing and end of life phase. The Government needs to ensure that electric vehicles and their sub systems are manufactured to minimise avoidable environmental damage.

Establishment of Innovation centres [NITI Aayog, and UK government. “Roadmap for Development of an Innovation Centre for Electric Mobility”]

Limited awareness continues to be one of the main limitations that impede the growth of electric vehicles in the country. Increasing awareness is the key with helping the rapid growth of adoption of electric vehicles. In addition to development of national web portal (e-AMRIT web portal), development of an app (e-AMRIT mobile app) and development of several state level awareness portals (e-VEG, TSEV, EV Jagruthi) etc the Government plans to set up innovation centres for electric mobility. These centres will help to explain the benefit of electric mobility and promote the acceptance of new technology. It will also provide an opportunity to charge point operators to demonstrate the availability of charging points. It will provide Indian customer with confidence that the necessary infrastructure is now available for electric vehicles and encourage them to transition. Several innovation centres across the globe have been able to promote new ideas and technologies. The Electric Vehicle Experience Centre and Arnold Clark Innovation Centre are two such centres set up in the UK. While Electric Vehicle Discovery Centres are set up by Plug’n Drive in Canada.

As of December 2021, EV penetration in India is 0.8%-still early days. To achieve target electrification of 70 percent for commercial cars, 30 percent for private cars, 40 percent for buses, and 80 percent for two and three wheelers by 2030, the technology needs to mature and be adopted at a rapid rate.

India’s target is to get 50% of its energy from renewable resources by 2030, and to reduce total projected carbon emissions by one billion tons. Also, by the year 2070, India plans to achieve the target of Net Zero emissions. To deal with climate challenges and accomplish the targets set forth, the CO₂ emissions absolutely have to be controlled. Given the urgency and necessity of addressing climate change, electrification of mobility is bound to play a critical role in meeting this goal. Adopting to EV will act as a behavior change that will be aimed at individuals as well as communities to adopt climate friendly mode in transport sector. The setting of new infrastructure for electric vehicle would also require more human resources. This would create livelihood options for communities as more jobs would be created by shifting towards clean energy transport.

Efficiency

Another key area where the Government of India is taking remarkable initiatives is that of energy efficiency. The Government of India has made impressive progress in recent years in increasing citizens’ access to electricity and clean cooking. The priority is now shifting towards energy security and affordability as demonstrated by India’s

successful energy market reforms. Energy efficiency will remain important in order to realise these priorities as India continues to develop economically.

Energy Efficiency Services Limited (EESL) is a Super Energy Service Company (ESCO), which enables consumers, industries and governments to effectively manage their energy needs through energy efficient technologies. EESL is implementing the world’s largest energy efficiency portfolio across sectors like lighting, buildings, industry electric mobility, smart metering, agriculture, etc. at an enormous scale. EESL’s energy efficiency solutions have saved India over 47 billion kWh energy annually while reducing 36.5 million tones of carbon emission. Some of the programs under the EESL that are working towards taking India to its desired goal are as follows-

- Under UJALA scheme, LED bulbs, LED Tube lights and Energy efficient fans are being provided to domestic consumers for replacement of conventional and inefficient variants
- The National Motors Replacement Programme (NMRP) shall offer appropriate technical specifications (as per IS-12615) keeping in mind key customer pain points viz. high initial costs, high operating and maintenance costs and quality of the products.
- EESL is implementing the Energy Efficient Pump Programme to distribute BEE 5-star energy efficient agricultural pumps and ensures a minimum of 30% reduction in energy consumption with smart control panels which can be remotely operated to enhance the ease of operation of pumps by the farmers. Pilot projects have been completed in Maharashtra, Karnataka and Rajasthan
- EESL is implementing the Buildings Energy Efficiency Programme to retrofit commercial buildings in India into energy efficient complexes. Through these future ready solutions, EESL is creating a market for clean energy in India
- Smart Meter National Programme aims to replace 25 crore conventional meters with smart meters in India. Smart meters are connected through a web-based monitoring system which will help to reduce commercial losses of utilities, enhance revenues and serve as an important tool in power sector reforms.
- With the goal of integrating energy efficiency into India’s cooling sector, EESL has initiated a first of its kind, Super-Efficient Air Conditioning programme. Consumers can buy the Super-Efficient Air Conditioners distributed by EESL at prices that are comparable to the most energy efficient ACs in the market.
- EESL is implementing Atal Jyoti Yojana (AJAY), a sub-scheme under Off- Grid and Decentralized Solar Application Scheme of MNRE. Under AJAY, Solar LED Lights are being installed in rural, semi-urban and urban areas which don’t enjoy adequate coverage of power.
- EESL has undertaken a retrofit of its office air-conditioning and ventilation system to address concerns about poor air quality and the risk of airborne transmission of COVID-19. This is a part of a larger initiative to “Retrofit of Air-conditioning to improve Indoor air quality for Safety and Efficiency” developed for healthy and energy efficient buildings in partnership

with U.S. Agency for International Development's (USAID) MAITREE program.

Due to the rapid growth of the economy, energy use has continued to increase. Structural factors such as movement towards more energy-intensive transport modes, increased appliance ownership and building floor areas have added to the continued increased energy use. Fortunately, energy efficiency improvements in India have limited the impact of this increase in energy use on the environment. For a fast developing country like India where the energy usage is bound to increase with economic growth, improvement in efficiency are absolutely essential to balance the economic and environmental objectives of the growing nation.

2. Conclusion

The evidence available establishes the intent of the Government to move towards an emission free 2070. Whether it is adding to renewable capacity, promoting electric mobility, adoption of new technology towards the same the Government is driving multiple initiatives towards its commitment in COP26. India is truly making giant strides towards an affordable, cleaner and secure energy sector. However to truly have a shot at net zero target by 2070, given its burgeoning population and economics expansion Government will need to significantly strengthen and then successfully implement its climate and energy policies. Successful achievement of goals will be dependent on transparent practices and continuous monitoring and tracking of progress. International cooperation will be required to benefit from the synergies possible from the countries who might be ahead in terms of technological innovation and adoption of green practices.

A major push to improve energy efficiency is particularly important for India as it strives to make energy available to all of its young and consumption hungry population. The technologies required to achieve this already exist to a large extent, the need for policy actions and Government commitment cannot be undermined. Policies should limit or disincentivize the use of emission heavy technologies and encourage and incentivize the use of alternative and green technologies. Mandates and standards are vital to drive consumer spending and industry investment into the most efficient technologies. In addition Government needs to drive innovation especially in areas of advanced batteries, bio energy, carbon capture and so on. Government spending on research and development needs to be reprioritised; subsidy reduction on fossil fuels can lead the way. The innovation centres planned by the Government can lead the way to some extent but more consistent and committed approach might be required in the long run to drive wide scale adoption by its citizens.

Social and economic impact on the citizens should also be considered while making these policy decisions. There are bound to be substantial new opportunities for employment in the new sectors that will grow and develop while displacement of communities is to be expected from areas that will see withdrawal of support and finance. The necessary structural changes are bound to cause

unemployment in communities that will need to be supported and retrained/reemployed by the Government.

All stakeholders need to play their part. The wide-range of measures adopted by the Indian government in the net zero pathway help to frame, influence and incentivise the purchase by consumers and investment by businesses. This includes how energy producers invest in new greener ways of producing and supplying energy services, how businesses consuming energy invest in necessary equipment, and how consumers cool and heat their homes, power their devices and travel.

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