GREENING THE GRID: INDIA'S TRANSITION AND GLOBAL POLICIES ON RENEWABLE ENERGY

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ABSTRACT

This comprehensive article titled "Greening the Grid: India's Transition and Global Policies on Renewable Energy" explores India's evolving renewable energy sector with a key focus on the legislations, international collaborations, India's position and the goals set by it. The article contains a detailed analysis of the Electricity Act, 2003 and the proposed amendments under the Electricity (Amendment) Bill, 2022 as well as a critical analysis of the same. This article further highlights the key schemes and policies implemented by the Indian Government such as the Carbon Credit Trading Scheme, Bio Energy Program and the National Green Hydrogen Mission. Additionally, the article examines India's international position along with the global renewable initiatives made. In conclusion, there is a critical analysis of the ambitious goals set by India and the challenges associated with such goals like transitioning away from coal while also developing the economy in full motion.

Introduction

The evolution of the energy sector in India has been guided by dynamic legislations and robust frameworks along with active engagement at the global level. At the heart of this evolution lies the Electricity Act, 2003 or "Act" which is the legislation that replaced various outdated frameworks present at that time, along with it, ushering the new era of regulatory oversight, private entities' participation and competition promotion. Along with the sector's evolution came the need to adapt and modernize the said legislation. For this, the Government of India introduced the Electricity (Amendment) Bill, 2022 or "Bill". This Bill seeks to bring in necessary changes or amendments in the present Act with the main purpose of solidifying or making better the regulatory framework along with the integration of renewables in to the electricity grids.

This article seeks to delve into the nuances of the legislative framework, efficacy of the proposed amendments and the policies made by the Indian government. Furthermore, this article also seeks to examine India's role as the global spearhead in the renewable energy sector, highlighting key efforts taken by the country internationally, including, the International Solar Alliance or "ISA", Mission Innovation and the European Union-India Clean Energy and Climate Partnership. Along with the key efforts, the article also explains the goals that have been laid down by the country like the Net Zero Emissions by 2070 and tripling the renewable capacity by 2030 and the challenges that persist with regard to such goals. The article sheds light on the hurdle of transitioning away from coal, de-carbonization strategies along with probable solutions so as to overcome them.

In essence, this article seeks to serve the purpose of being a comprehensive guide to India's journey of renewable energy, legislative reforms, international collaborations, goals and their critical analysis.

Regulatory Framework for Renewable Energy in India

The Indian Government has played a pivotal role for the energy and the electricity sector's development and growth. Understanding the problems and challenges faced by the sector and in response to the deficient legislations present at that time, the Government enacted the Electricity Act, 2003. This comprehensive legislation replaced three acts, namely, the Electricity Act, 1910, Electricity (Supply) Act, 1948 and the Electricity Regulatory

Commissions Act, 1998, consolidating all their powers under one umbrella legislation. Central to the Act's aim was the establishment of a robust regulatory framework which balanced the interests of all the players of the industry. The same is done with the establishment of the State Electricity Regulatory Commissions or "SERC" and the Central Electricity Regulatory Commission or "CERC" outlined in the *Sections 82 and 76*, respectively, handling of all the disputes arising out of the electricity sector are also to be dealt with by the SERC, CERC and the Appellate Tribunal. One of the paramount provisions of the act deals with the delineation of the responsibilities between the central and the state governments. The Electricity Act has helped in the promotion of competition in the sector along with increasing the participation of the private sector, with the help of *Section 6* of the Act, which delicensed the electricity generation, which was previously done only for the public sector. This was one of the most important decisions taken during the time, since this led to injection of much needed investment in the electricity sector along with innovation and a dynamic environment. Understanding the importance of transmission systems in the country, *Section 39* of the Act mandated the creation of Transmission Utilities or "TU's", at the state level as well as the central level. The Section further stated the functions and duties of the TU's. Lastly, the Government also paid heed to the rural areas by providing for a provision that particularly dealt with electrification in the rural areas.[1] Although, the Act was a tremendous and much welcomed legislation for the sector, it has been in power for over two decades now and thereby certain provisions are bound to become outdated, leading to certain drawbacks. For example, the establishment of SERC and CERC was a great step, however, there were inconsistencies, delays in determination of tariff, and lack of enforcement which could have hampered the working of SERC and CERC.

The Act has been in power for over two decades now and obviously, there have to be amendments made since the sector has been through many changes during the past years. For tackling the outdated provisions of the Act, the Government has issued the Electricity Amendment Bill, 2022. The Bill while keeping the Act as its foundation, seeks to modernize the electricity and energy sector, while also strengthening the same. The Bill aims to foster the competition, promote transparency, efficiency and renewable energy integration along with consumer empowerment. The Bill, with regard to the renewable energy is quite important owing to the fact that it has been proposed to integrate the renewable energy generation into the mainstream electricity grid through the establishment of renewable energy management

[1] Electricity Act, 2003, Sections 4, 6, 39, 76 and 82, No. 36 of 2003, Acts of Parliament, 2003 (India)

centers as well as renewable energy certificates. Further, another useful amendment relates to the enhancement of ease of doing business by actually streamlining the regulatory process. This is proposed to be done via a single window clearance system for approving the renewable energy projects. Another important proposed amendment is the introduction of the Cross-subsidy Balancing Fund or CBF. The CBF will be set up by the state governments of India. The CBF will be basically used for deficit financing in the case of cross-subsidy for two or more distribution licensees. [2]

Important Schemes with regard to promotion of renewable energy –

- Carbon Credit Trading Scheme, 2023 – Carbon Credit Trading is a revolutionary process wherein a person or company can buy or sell carbon credits. These carbon credits actually give the person or company permission to emit carbon-di-oxide. As per the Scheme rolled out by the Ministry of New and Renewable Energy or "MNRE", one carbon credit shows that one ton of carbon has been avoided from being emitted into the earth or has been removed. The person or Company that acquires this carbon credit can further trade this in the future. Taking a simple example, the Government of India has made or will make a limit for the carbon emissions that can be emitted for different types of industries. Now, say that a Company belonging to a certain industry does not emit carbon up to its limit as set by the Government of India, then the said company can sell this carbon credit to another company that has crossed the carbon emissions limit. On the contrary, the company that has crossed its limit for carbon emissions can buy the carbon credits, so that it can justify it exceeded carbon emissions limit.[3]

- Bio Energy Program - The Ministry of New and Renewable Energy rolled out the Bio Energy Program in the year 2022. This program was the very first Program wherein the Government of India targeted the production of bio energy through the development of biogas plants. This Program will be implemented in two phases, namely Phase I and Phase II, the Phase of the Bio Energy Program has already been started and will go on till the next five years. The Ministry of New and Renewable Energy also introduced the Bio Urja Portal so that the companies applying for the

[2] PRS Legislative Research India, https://prsindia.org/billtrack/the-electricity-amendment-bill-2022 (Last visited 16 April, 2024)
[3] Shalin Verma, Carbon Credit Trading Scheme, 2023 – Key Highlights, EnterClimate (16 April, 2024, 10:47 AM), [https://enterclimate.com/blog/carbon-credit-trading-scheme-2023/

projects relating to bio energy like biogas, bio compressed natural gas, biomass find it easier to apply and can get all the services under one site only, through this site, the applicants can apply for the Central Financial Assistance.[4]

- Green Energy Corridors – Another efficient scheme implemented jointly by the Ministry of Power and MNRE upon realizing that the transmission infrastructure that has been set up by the Central and State Governments is not sufficient in certain areas of the country and the same is leading to loss of energy as well. The Green Energy Corridors scheme was implemented in two phases. The Green Energy Corridors targeted both the interstate and intrastate transmission systems. The interstate transmission systems would have two phases and same for the intrastate transmission systems as per the scheme.[5]

- Scheme of expanding the wind energy projects – The Ministry of New and Renewable Energy came out with the scheme of expansion of wind energy, recognising the importance of wind energy in India and the problems that can be faced the Indian renewable energy developers with regard to developing the wind energy projects since they are very expensive. For dealing with this and attempting to curb this problem, the Ministry of New and Renewable Energy, permitted one hundred per cent foreign direct investment through the automatic route only, which will lead to the Indian developers being able to get finance for the wind energy projects in a much easier manner. Further, as per the Scheme, the Central Government would waive off the interstate transmission charges, the same have been discussed above in detail and lastly, another incentive by the name of Generation Based Incentive was also provided to the wind project developers.

- National Green Hydrogen Mission - When the water is split into hydrogen and oxygen, using renewable energy, it is called green hydrogen. The National Green Hydrogen Mission came into force in the year 2023 and has certain aims including, making India

[4] PIB Delhi, "Ministry of New and Renewable Energy initiates National Bio Energy Program to utilize surplus biomass for power generation", Press Information Bureau, 20 December 2022, 3:38 PM, [https://pib.gov.in/PressReleasePage.aspx?PRID=1885073#:~:text=The%20Ministry%20of%20New%20and,allocated%20for%20the%20Phase%2D1.]

[5] Mohan Gupta, India Sanctions Green Energy Corridor Phase – II Project: Boosting Renewable Energy Transmission in Ladakh (17 February, 2024, 4:24 PM), [https://solarquarter.com/2024/02/21/india-sanctions-green-energy-corridor-phase-ii-project-boosting-renewable-energy-transmission-in-ladakh/]

the largest developer of green hydrogen as well as the largest supplier of green hydrogen all around the globe, secondly, the National Green Hydrogen Mission aims to increase the opportunities in the country by creating export mechanisms for green hydrogen and obviously, the main aim of all the renewable energy policies and schemes, which is to lower the dependency on fossil fuels in India. For achieving the goals and aims as stated out in the National Green Hydrogen Mission, the MNRE has come forward with the two step programme called the Strategic Intervention for Green Hydrogen Transitioning One (SIGHT -1) and Strategic Intervention for Green Hydrogen Transitioning Two (SIGHT - 2).[6]

International Policies and India's Global Position

Internationally, India has garnered significant international recognition in the renewable energy sector. In the Conference of Parties, Paris in the year 2015, India, in partnership with France, conceptualized the International Solar Alliance. The concept of International Solar Alliance was conceptualized with the main purpose of using of solar energy. This alliance has been a successful one owing to the participation of a lot of countries, as of this year, a total of 116 countries have become signatory to the International Solar Alliance and countries have 94 ratified to the same. The ISA is focussed on the sun and solar energy, henceforth, the ISA has an aim to deliver solar energy solutions which are actually cheaper and affordable as well as technologically advanced. It further seeks to help the under developed nations and the small island countries to deliver impacts with regard to solar energy.[7]

In the same COP, India also revolutionized the Mission Innovation. The concept of Mission Innovation was actually a worldwide concept or initiative also involving participation from the European Union. The main purpose of this Mission was to speed up the revolution of clean energy and help in the transition to renewable energy from fossil fuels along with having a focus on achieving the broad goals set at the Paris Agreement. As per the Indian Prime Minister's Mission Innovation, the same was to be implemented in certain phases. After the Conference of Parties, the very first phase of the Mission Innovation was implemented, this

[6] PIB, Delhi, "Year End Review 2023 of Ministry of New & Renewable Energy", Press Information Bureau, 3 January 2024, 4:12 PM, [https://pib.gov.in/PressReleasePage.aspx?PRID=1992732]
[7] International Solar Alliance, https://isolaralliance.org/about/background (Last visited 16 April, 2024).

phase was to be implemented for five years. In this first phase, innovation was sought in the following three areas –

- Smart Grid Connectivity
- Having off the grid access to energy to electricity
- Biofuels that are sustainable and affordable[8]

Perhaps, the most transforming meet in relation to renewable energy and where India stands, took place rather recently, in 2023, when India itself hosted the G-20 Summit in the capital, New Delhi. The main topic of discussion was renewables, which was an absolutely huge deal for the renewable energy sector in India. The major topics of discussion in the G-20 Summit were –

1. Green Development at a faster pace keeping in mind finance for the climate and life in general
2. Growth of all the nations at an acceleration, inclusivity for all and resilience also.
3. The Sustainable Development Goals as set out in the Paris Agreement and the progress with the regard to them
4. Preparing a digital infrastructure for the public of the nations
5. Developing the nations with a prime focus on women as well

One of the most important outcome of the G20 Summit was the New Delhi Consensus. This Consensus sought to triple the renewable the countries' renewable capacity by the year 2030 and remarkably, the New Delhi Consensus saw hundred percent acceptance from the member states. [9]

India also has a partnership with the European Union called the European Union – India Clean Energy and Climate Partnership, another significant step. This Partnership was established in

[8] PIB, Delhi, "Mission Innovation", Press Information Bureau, 19 March 2021, 5:16 PM, [https://pib.gov.in/Pressreleaseshare.aspx?PRID=1706083]
[9] G20 India, https://www.g20.in/en/g20-india-2023/new-delhi-summit/new-delhi-summit.html (Last visited 15 April 2024)

the year 2016 and the aim of the Partnership is to collaborate with each other in the matters of clean energy technologies as well as innovation in the technologies. Following are the main areas wherein the partnership is trying to work in relation to innovation of technologies –

1. Rooftop Solar
2. Offshore Wind Energies
3. Smart Grids
4. Biofuels[10]

India has been very straightforward in the international forums and platforms about the goals it plans on keeping. Majorly, India has kept a goal of achieving five hundred gigawatts of installed renewable energy capacity by the year of 2030. This was envisaged by the G-20 meeting held in New Delhi as discussed above when all the member nations agreed to triple their renewable energy capacity by the year 2030. Further, after the implementation of the National Green Hydrogen Mission, India has set its eye on the goal of producing five million tonnes of green hydrogen by the year 2030. In the COP 26, India openly and internationally stated that it targets to achieve net zero emissions by the year 2070. The Net Zero Emissions 2070 basically means that the total greenhouse gases emitted by a country into the atmosphere should be equal to the total emitted greenhouse gases which have been removed from the atmosphere resulting in zero greenhouse emissions. [11]

Conclusion

The Electricity (Amendment) Bill, 2022 is a much welcome step and amendment for the growth and evolution of the sector, however, every coin has two sides, henceforth, and it is safe to say that the said Bill also has drawbacks. Major drawback of this Bill is that the proposed amendments lead to the Centre getting more power. For example, with regard to grant of licenses, the proposed amendments clearly state that the Central Electricity Regulatory

[10] European Commission- Energy, Climate Change, Environment- India,https://energy.ec.europa.eu/topics/international-cooperation/key-partner-countries-and-regions/india_en (Last visited 16 April, 2024).

[11] PIB, Delhi, "India is committed to achieve the Net Zero emissions target by 2070 as announced by PM Modi, says Dr. Jitendra Singh", Press Information Bureau, 28 September 2023, 6:38 PM, [https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1961797]

Commission will have the power to grant the licenses and not the State Electricity Regulatory Commission, which not only gives extra power to the Centre but also has the inherent problem that the State Commissions do obviously have much more knowledge of the ground level conditions present in their respective states. Furthermore, as per the Electricity Act, the CERC was to take orders from the Central Government and the SERC's were to take orders from their respective state governments, however the proposed bill has provisions which have empowered the Centre to give directions to the SERC's.

In relation to the India's international stance, it is clear that India enjoys a dominant and respectable position internationally and the goals set by India in the international stage are also quite remarkable. Achieving the goal of tripling the renewable capacity by 2030 seems quite achievable, however it is the goal of reaching Net Zero by 2070 which seems farfetched and rather tough to achieve. This is said because of the fact that India is a vastly developing economy and country and looking at the trajectory of developed nations such as the United States of America and United Kingdom, during the time they were in their developing stage, the emission of carbon and greenhouse gases is very high and to simultaneously develop and grow and reduce emissions is a tremendously tough task. Further, a report titled, "Synchronizing energy transitions towards possible Net Zero for India: Affordable and Clean Energy for All", which was launched by the Principal Scientific Adviser to the Government of India has clearly stated that this goal of achieving Net Zero by 2070 is not at all possible without the use of nuclear energy. Further, whole of the electricity sector has to get decarbonized so as to achieve this function, which is again improbable. Moreover, the report has envisaged that in India, coal is projected to not just be used for at least the next two decades but to actually be the backbone of the energy system. To mitigate this, the Report has laid down that carbon-di-oxide removal technologies are of utmost importance and policies have to be put in place for the same.[12]

Another reason for stating that it will be very tough to achieve the Net Zero Emissions by 2070 is the rating given by the Climate Action Tracker, which is an internationally renowned scientific project which actually tracks the growth of the countries towards their climate goals, rates India's progress towards the net emissions zero goals as 'very poor'. Further, the climate

[12] PIB, Delhi, "Launch of the report on energy transitions to achieve India's net-zero targets", Press Information Bureau, 3 April, 2024, 9:58 PM, [https://pib.gov.in/PressReleseDetailm.aspx?PRID=2017103#:~:text=Net%2Dzero%20is%20not%20possible,and%201.0%20btCO2%20in%202070]

action tracker has evaluated the country's policies and actions taken with regard to the goal as 'highly insufficient', also the climate action tracker has stated that India has actually provided no information with relation to its intent to establish a cycle to review the intermediate targets.[13]

[13] Climate Action Tracker, https://climateactiontracker.org/countries/india/net-zero-targets/, (Last visited 16 April 2024)