

RENEWABLE ENERGY BANKING- THE ESOTERIC TRUMP CARD IN QUEST FOR ENERGY SECURITY GOALS

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ABSTRACT

Energy is the one aspect in today's era that is both desired and indispensable. It is the one factor that is most required to develop and grow, keeping pace with emerging scientific and technological advancements. Both renewable and non-renewable sources of energy are exhaustively used in order to generate a sufficient amount of energy that serves the needs of society. The well-known fact that pertains to the usage of energy is that there is only a limited amount of energy that can be produced and used, hence, the need to conserve energy arises. Renewable Energy Banking is a silver line among the clouds that can be availed in order to save the excess energy that can be withdrawn at the time of need which is similar to the function of financial institutions that bank money and give loans when demanded. However, this system to conserve energy exists at a nascent stage today and also faces a plethora of obstacles to function smoothly. The energy banking mechanism has to be brought to the larger public domain in order to increase the platitude of its usage.

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KEY WORDS: Renewable Energy, Energy Banking,
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1. INTRODUCTION

The Energy Sector and its contribution to the growth of a nation and its economy is something which doesn't require any introduction. From a domestic household to an industry, all depend on energy; without energy, there can't be any growth. While on one hand as per IMF, India's Projected Real GDP (% Change) is expected to be 6.1% in the year 2023 and 6.3% in the year 2024,³⁴⁴ on the other hand, India is proactively participating in reducing the carbon footprint as a compliance of its obligation to various climate change treaties and the Nationally Determined Contributions (NDCs) and Sustainable Development Goals (SDGs), the challenges like environmental challenges, rising carbon footprint, possible exhaustion of non-renewable resources, and climate change, to name a few in the field of Renewable energy sector needs to be addressed in light of the issues pertaining to Awareness, Availability, Accessibility and Affordability. India's Updated First Nationally

³⁴⁴ International Monetary Fund, *The global recovery is slowing amid widening divergences among economic sectors and regions*, <<https://www.imf.org/en/Publications/WEO/Issues/2023/07/10/world-economic-outlook-update-july-2023>> accessed 24 August, 2023.

Determined Contribution under the Paris Agreement is mentioned herein under³⁴⁵:-

1. “To put forward and further propagate a healthy and sustainable way of living based on traditions and values of conservation and moderation, including through a mass movement for ‘LIFE’– ‘Lifestyle for Environment’ as a key to combating climate change [UPDATED].
2. To adopt a climate friendly and a cleaner path than the one followed hitherto by others at corresponding level of economic development.
3. To reduce Emissions Intensity of its GDP by 45 percent by 2030, from 2005 level [UPDATED].
4. To achieve about 50 percent cumulative electric power installed capacity from non-fossil fuel-based energy resources by 2030, with the help of transfer of technology and low-cost international

³⁴⁵ United Nations Climate Change, *India's Updated First Nationally Determined Contribution Under Paris Agreement*, <<https://unfccc.int/sites/default/files/NDC/202208/India%20Updated%20First%20Nationally%20Determined%20Contrib.pdf>> accessed 1 November, 2022.

finance including from Green Climate Fund (GCF) [UPDATED].

5. To create an additional carbon sink of 2.5 to 3 billion tonnes of CO₂ equivalent through additional forest and tree cover by 2030.
6. To better adapt to climate change by enhancing investments in development programmes in sectors vulnerable to climate change, particularly agriculture, water resources, Himalayan region, coastal regions, health and disaster management.
7. To mobilize domestic and new and additional funds from developed countries to implement the above mitigation and adaptation actions in view of the resource required and the resource gap.
8. To build capacities, create domestic framework and international architecture for quick diffusion of cutting-edge climate technology in India and for joint collaborative Research and Development (R&D) for such future technologies."

In light of India's ambitious NDCs, towards achieving the goals of the Paris Agreement, it's essential that environmentally sustainable and low carbon initiatives are underpinned in all key sectors of the Indian economy. Considering India's quest for featuring in top economies of the world along with attaining the Sustainable Development Goals, it's the need of the hour that the energy sources are also sustainable in the form of Renewable Sources.³⁴⁶ The relevance of renewable energy can be understood from the famous statement by Barack Obama - *"To truly transform our economy, protect our security, and save our planet from the ravages of climate change, we need to ultimately make clean, renewable energy the profitable kind of energy."*

While the whole world has begun to look towards a future based on renewable energy, every nation has its challenges and one probable and feasible solution appears to be in the form of Renewable Energy Banking which can aid in meeting their unique clean energy targets and Sustainable Development Goals. 'Banking of Energy',³⁴⁷ as the name implies, is analogous to depositing money in a bank and retrieving

³⁴⁶ 'Reasons For Increase in Demand for Energy', (BBC) <<https://www.bbc.co.uk/bitesize/guides/zpmmmp3/revision/1>> accessed 11 October, 2022.

³⁴⁷ *Tamil Nadu State Electricity Board v Tamil Nadu Electricity Regulatory Commission & Others* [2007], Appellate Tribunal of Electricity, Appeal No.98of2010, <https://aptel.gov.in/old_website/judgements/98%20of%2010.pdf>.

it on a need basis, works for both renewable as well as non-renewable energy, however, the scope of the paper is limited to Renewable Energy Banking.

2. RENEWABLE ENERGY BANKING

The energy banking concept works on an “*exchange of electricity for electricity*” basis, wherein as per the arrangement, surplus or unused power generated in a particular period is fed into the grid. This surplus or unused energy, known as banked energy, is then supplied back during periods of low Renewable Energy Generation.

To illustrate:

Unit A has produced Surplus energy or the energy production has been much more than the consumption during a particular period. This surplus or unused energy can be provided to Unit B and will be known as “Banked Energy”. When the needs arise e.g., Unit A's energy supply is depleted, etc., and then the same amount of energy has to be returned by Unit B that it received from Unit A.

This transaction can occur between two or more states or two or more countries. Recently, Nepal and India have agreed to establish an energy banking framework

and have begun implementing it.³⁴⁸ According to the various energy laws and policies, the concept of banking may vary from country to country.³⁴⁹

The energy exchange can work on various mechanisms. Some entities work on an accounting method for the energy exchange, while others, instead of accounting for energy exchange; agree to a banking arrangement in which one system works as a bank and the other acts as a depositor. When the depositor has excess energy, it would deposit it with the other system, and when it requires energy, it would simply withdraw it up to the Mega Watt Hour (MWH) it had placed with the other system.³⁵⁰

³⁴⁸ Bibek Subedi, 'Nepal and India agree on energy banking' (*The Kathmandu Post*, 27 December 2018) <<https://kathmandupost.com/national/2018/12/27/nepal-india-agree-on-energy-banking-deal>> accessed 20 October, 2022.

³⁴⁹ Ramesh Lamsal, 'Nepal Practices Energy Banking; Sends 200 MW Electricity to India' (*Nepal 24 Hours*, 16 July 2019) <<https://www.nepal24hours.com/nepal-practices-energy-banking-sends-200-mw-electricity-to-india/>> accessed 21 October, 2022.

³⁵⁰ Allen J. Wood, Bruce F. Wollenberg, Gerald B. Shelb , 'Power Generation, Operation and Control' (2013) John Wiley & Sons, 3rd Edition <[https://books.google.co.in/books?hl=en&lr=&id=JDVmAaAAQBAJ&oi=fnd&pg=PA17&dq=%E2%80%98Power+Generation,+Operation+and+Control%E2%80%99+\(John+Wiley+%26+Sons,+3rd+Edition\)&ots=CSPZiOkbh4&sig=rOJ0fHC78c0G_Ha-qaBlbVielGg#v=onepage&q=%E2%80%98Power%20Generation%2C%20Operation%20and%20Control%E2%80%99%20\(John%20Wiley%20%26%20Sons%2C%203rd%20Edition\)&f=false](https://books.google.co.in/books?hl=en&lr=&id=JDVmAaAAQBAJ&oi=fnd&pg=PA17&dq=%E2%80%98Power+Generation,+Operation+and+Control%E2%80%99+(John+Wiley+%26+Sons,+3rd+Edition)&ots=CSPZiOkbh4&sig=rOJ0fHC78c0G_Ha-qaBlbVielGg#v=onepage&q=%E2%80%98Power%20Generation%2C%20Operation%20and%20Control%E2%80%99%20(John%20Wiley%20%26%20Sons%2C%203rd%20Edition)&f=false)> accessed 29 October, 2022.

The concept of Renewable Energy banking has started gaining much prominence in light of India's proactive approach to shifting to the renewable sources of energy.

3. INDIAN SCENARIO

The electricity sector in India is primarily governed by the Electricity Act, 2003.³⁵¹ Although, the concept of "Energy Banking" is not defined in the Act, the State Regulatory Commissions have been conferred with the authority to create their own rules and regulations.³⁵² States like Tamil Nadu have implemented energy banking, which allows cooperatives to provide energy to the grid during periods of excess generation in exchange for free supply during periods of low generation.³⁵³ Banking as a concept was introduced by the Tamil Nadu Electricity Board in 1986 to encourage the generation of wind energy. The banking charge was fixed at 2% in 1986 and raised to 5% in 2001.³⁵⁴

³⁵¹ The Electricity Act 2003.

³⁵² The Electricity Act 2003, s 181.

³⁵³ DTE Staff, 'Renewable Energy in India: Tamil Nadu One of The World's Top 9 Green Power Markets' (*Down to Earth*, 20 January 2019) <<https://www.downtoearth.org.in/news/energy/renewable-energy-in-india-tamil-nadu-one-of-the-world-stop-9-green-power-markets-62887>> accessed 26 October, 2022.

³⁵⁴ *ibid.*

Further, Uttar Pradesh Electricity Regulatory Commission in its proposed Captive and Renewable Energy Generating Plants) Regulations, 2019 (hereinafter referred to as CRE Regulations, 2019) has defined the concept of Banking of Energy as: -

Power banking is the procedure by which a Generating Plant sends power to the grid with the goal of exercising its eligibility to drawback this power from the grid for its own use as per the requirements set for thin these Regulations, rather than selling it to a third party or a Licensee.³⁵⁵

Recognizing the importance of Energy Banking in sustainable development, Indian Courts have time and again stressed the need for Energy banking. The Appellate Tribunal in *Tamil Nadu State Electricity Board v Tamil Nadu Electricity Regulatory Commission & Others*³⁵⁶ elaborated upon the concept and importance of energy banking by comparing it with the general concept of banking in Financial Institutions. According to the Tribunal, energy banking is analogous

³⁵⁵ UPERC Draft CRE Regulation 2019, s 6 (1) (c).

³⁵⁶ *Tamil Nadu State Electricity Board v Tamil Nadu Electricity Regulatory Commission & Others* [2007], Appellate Tribunal of Electricity, Appeal No.98of2010availableat<http://aptel.gov.in/old_website/judgements/98%20of%2010.pdf>.

to saving money in a financial bank where money can be deposited and withdrawn as per need. Interest is also earned and hence both the account holders and bank are benefited from this procedure. However, electricity being a commodity which cannot be stored, has to be consumed instantly. For instance, wind energy is periodical in nature and is usually produced in instances when it is not required. In such a case, generator banks supply the energy to a licensee who returns the energy by procuring it from other sources. The Licensee, the banker of electrical energy, earns interest on this banked energy. Thus, the banking rate of electrical energy should be nominal.

In *Beta Wind Farm (P) Limited v Tamil Nadu Electricity Regulatory Commission & Others*,³⁵⁷ the Appellate Tribunal while adjudicating upon the issue of an unusual increase in banking charges held that while the State Commission has the authority to set banking charges, there must be a rationale for its decision to drastically alter the banking charge and the banking period. Shortening the banking period from a year to a month may render the entire financial system ineffective.

³⁵⁷*Beta Wind Farm (P) Ltd v Tamil Nadu Electricity Regulatory Commission, etc.*, Appellate Tribunal of Electricity, Appeal No. 197 of 2012 available at <https://aptel.gov.in/old_website/judgements/judgements%20Appeal%20No.%2045%20oP%202012_31012013.pdf.>

With respect to the banking of Renewable energy, the Appellate Tribunal in *Maharashtra State Electricity Distribution Company Limited v Maharashtra Electricity Regulatory Commission & Others*³⁵⁸ stated that banking of wind energy is a necessary feature for a wind energy generator supplying power to a consumer through open access to be commercially viable. Varied State Commissions provide different financial facilities to wind energy companies in order to fulfill their role of supporting renewable energy under the Electricity Act of 2003. The Tribunal further found that the State Commission's decision to continue the banking facility for wind energy providers is not illegal, and that such a banking facility should not be at the expense of the Licensee's other customers.

Further, with respect to the concessions, the Appellate Tribunal in *Madhya Gujarat Vij Company Limited v Ankur Scientific Energy Technologies Private Limited & Others*³⁵⁹ held that the Renewable Energy Certificate (REC) Regulations, 2010 provide that a renewable energy-based independent power plant (IPP) that supplies power to a third party through open access is entitled to concessionary benefits such as

³⁵⁸*Maharashtra State Electricity Distribution Company Limited v Maharashtra Electricity Regulatory Commission & Others* [2014] SCC Online APTEL 166.

³⁵⁹*Gujarat Energy Transmission Corporation Limited v Gujarat Electricity Regulatory Commission* [2015] SCC OnLine APTEL 8.

transmission/wheeling charges, among other things. If the competent State Commission allows it, such an IPP can also benefit from REC at the same time.

Time and again, courts have ruled in favor of banking of the energy, specifically the renewable energy and endeavored to discipline the whole process of energy banking.

4. ESSENTIALS OF ENERGY BANKING

i. BANKING AGREEMENT

The energy generator must enter into a banking agreement with a distribution/transmission licensee in order to use the banking facilities supplied by a particular State. This type of agreement lays out the entire framework that the parties must adhere to. It may include provisions such as how much energy can be banked, who can bank the energy, and when surplus energy can be injected or withdrawn, among other things.

ii. GRID DISCIPLINE

Maintaining grid discipline amongst the entities is of utmost maintenance. Energy generators are typically provided with a banking facility to allow them to inject

surplus energy into the grid. Without the consent of the appropriate authority, the energy generator cannot inject such surplus.

In the case of *Renew Wind Energy (AP) Private Limited v Karnataka Electricity Regulatory Commission & Others*³⁶⁰ wherein electricity was injected without the consent of State Load Dispatch Centre, the Tribunal determined that such behavior amounted to grid indiscipline and could jeopardize grid security. Tribunal held that “Whether the energy pumped is renewable or non-renewable, grid indiscipline cannot be accepted.” The Tribunal also held that the energy injected cannot be stored and must be spent immediately.

iii. BANKING PERIOD

The time period during which energy is banked is referred to as the banking period. It is commonly done on a monthly basis, i.e. energy banking is done on a monthly basis.

³⁶⁰*Renew Wind Energy (AP) Private Limited v Karnataka Electricity Regulatory Commission & Others* [2017] SCC OnLine APTEL 59.

iv. BANKING CHARGES

Banking costs are fees charged on energy generators for using the energy banking process. It is a type of tariff that must be paid when electricity is sent from a generator to a distribution licensee. The State Regulatory Commissions are in responsibility of determining and computing banking charges in accordance with the rules of their individual tariff. The charges for renewable and non-renewable energy are different.

v. UNUTILISED BANKED ENERGY

It is not required that surplus supplied into the grid be fully used. Ideally, the fate of such unutilized energy is decided at the conclusion of each Financial Year based on the terms and circumstances of the banking arrangement. The unutilized surplus energy is not carried over to the next year as a general rule.

5. NEED FOR ENERGY BANKING

i. CLEAN ENERGY GOALS

India has always been an advocate of clean energy at the international forum and is the world's third largest producer of renewable energy, with 40% of its installed

electricity capacity coming from non-fossil fuel sources.³⁶¹ However, there are certain challenges in the transitional path from non-renewable energy to renewable energy. Out of the 3As, that are: Availability, Accessibility and Affordability, when it comes to renewable energy in India, the first challenge comes with the Availability. To elaborate, most of the states in India, receive abundant Sunlight throughout the year except for few winter months, still the solar energy accounts only for 14.9% of total share in energy production.

Table 1

Source-<https://powermin.gov.in/en/content/power-sector-glance-all-india>

INSTALLED GENERATION CAPACITY (FUELWISE) AS ON 30.09.2022		
CATEGORY	INSTALLED GENERATION CAPACITY(MW)	% of SHARE IN TOTAL
Fossil Fuel		
Coal	204.079	50.0%

³⁶¹Ministry of New and Renewable Energy, *Renewable Energy in India* (FeaturesID:151141)<<https://pib.gov.in/FeaturesDetails.aspx?NoteId=151141&ModuleId%20=%2022>>.

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Lignite	6,620	1.6%
Gas	24,824	6.1%
Diesel	562	0.1%
Total Fossil Fuel	2,36,086	57.9%
Non-Fossil Fuel		
RES (Incl. Hydro)	164,930	40.4%
Hydro	46,850	11.5 %
Wind, Solar & Other RE	118,080	29.0 %
Wind	41,666	10.2 %
Solar	60,814	14.9 %
BM Power/Cogen	10,206	2.5 %
Waste to Energy	495	0.1 %
Small Hydro Power	4,899	1.2 %
Nuclear	6,780	1.7%
Total Non-	171,710	42.1%

Fossil Fuel		
Total Installed Capacity (Fossil Fuel & Non-Fossil Fuel)	407,797	

One of the reasons for less contribution from the most promising source of energy is the issue of availability. Solar energy maybe available in the state of Rajasthan throughout the year but for a couple of winter months, but is not abundantly available in the state of Himachal Pradesh (HP) in abundance. So, for the state of HP, despite being available, it's not a favorable source of energy due to irregular sun exposure. If energy banking is used widely, the interstate as well as intrastate energy exchange can be facilitated which has the potential of increasing the dependency on renewable energy like solar energy. So, for the part of the year when solar energy is not available, it can be arranged through the Energy banking mechanism solving the major energy crisis. Same arrangement can be done for hydroelectricity.

If Energy Banking is used in its true spirit, then India's aim of Universal electrification which is the

Electrification of 99.99%³⁶² of the households in India, a major milestone towards attaining the Sustainable Development Goal target 7.1 of providing universal access to affordable, reliable, and modern energy services by 2030, can also be achieved.

ii. CLIMATE CHANGE OBLIGATIONS

India has always shown its willingness to emerge as a leader in order to fight climate change. The country's vision is to achieve Net Zero Emissions by 2070, in addition to attaining the short-term targets which include³⁶³:

- Increasing renewables capacity to 500 GW by 2030,
- Meeting 50% of energy requirements from renewables,
- Reducing cumulative emissions by one billion tonnes by 2030, and
- Reducing emissions intensity of India's gross domestic product (GDP) by 45% by 2030.

³⁶²Household Electrification Status available at <<https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1989801#:~:text=2021%20all%20the%20States%20have,2021>>.

³⁶³Ministry of New and Renewable Energy, *Renewable Energy in India* (FeaturesID:151141) <<https://pib.gov.in/FeaturesDetails.aspx?NoteId=151141&ModuleId%20=%202>>.

The only sustainable way of attaining these goals is a switch from non-renewable to renewable sources of energy. However, considering the issues of 3As, (Availability, Accessibility and Affordability) associated with the renewable source of energy makes it essential that Energy banking model is implemented.

iii. MEETING VARIED ENERGY DEMANDS

Renewable sources are inherently intermittent and variable in nature leading to a lack of sync in the demand cycles, which can be understood from the Table 2 and Table 3 mentioned below. One of the technological solutions to this intermittency is the physical storage of energy, and thus, storage technologies are critical to a transition to Renewable Energy. Until physical storage options are cost-competitive and scalable, which as of date is not, banking of energy works as the best alternative to promote RE generation. Since, the mechanism works similarly to the general Banking, it's easier to adopt as compared to the technological advances which require long years of research, development and finances.

Total Generation and growth over previous year in the country during 2009-10 to 2022-23:-

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Table 2-

Source: <https://powermin.gov.in/en/content/power-sector-glance-all-india>

Year	Total Generation (Including Renewable Sources) (BU)	% of Growth
2009-10	808.498	7.56
2010-11	850.387	5.59
2011-12	928.113	9.14
2012-13	969.506	4.46
2013-14	1,020.200	5.23
2014-15	1,110.392	8.84
2015-16	1,173.603	5.69
2016-17	1,241.689	5.80
2017-18	1,308.146	5.35
2018-19	1,376.095	5.19
2019-20	1,389.102	0.95
2020-21	1,381.855	-0.52
2021-22	1,491.859	7.96

Year	Total Generation	
	(Including Renewable Sources) (BU)	% of Growth
2022-23*	846.180	10.67

* Up to September 2022 (Provisional), Source: CEA

Power Supply Position

The power supply position in the country during 2009-10 to 2022-23:

Table 3-

Source: <https://powermin.gov.in/en/content/power-sector-glance-all-india>

	Energy				Peak			
	Requ remen t	Avail abilit y	Surplus(+)/ Deficits(-)		Peak Dema nd	Peak Met	Surplus(+) / Deficits(-)	
	(MU)	(MU)	(MU)	(%)	(MW)	(MW)	(MW)	(%)
2009	8,30,59	7,46,6	-	-10.1	1,19,1	1,04,00	-	-

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	Energy				Peak			
-10	4	44	83,95 0		66	9	15,15 7	1 2. 7
2010 -11	8,61,59 1	7,88,3 55	- 73,23 6	-8.5	1,22,2 87	1,10,25 6	- 12,03 1	- 9. 8
2011 -12	9,37,19 9	8,57,8 86	- 79,31 3	-8.5	1,30,0 06	1,16,19 1	- 13,81 5	- 1 0. 6
2012 -13	9,95,55 7	9,08,6 52	- 86,90 5	-8.7	1,35,4 53	1,23,29 4	- 12,15 9	- 9. 0
2013 -14	10,02,2 57	9,59,8 29	- 42,42 8	-4.2	1,35,9 18	1,29,81 5	- 6,103	- 4. 5
2014 -15	10,68,9 23	10,30, 785	- 38,13 8	-3.6	1,48,1 66	1,41,16 0	- 7,006	- 4. 7
2015 -16	11,14,4 08	10,90, 850	- 23,55 8	-2.1	1,53,3 66	1,48,46 3	- 4,903	- 3. 2

	Energy				Peak			
2016 -17	11,42,9 29	11,35, 334	- 7,595	-0.7	1,59,5 42	1,56,93 4	- 2,608	- 1. 6
2017 -18	12,13,3 26	12,04, 697	- 8,629	-0.7	1,64,0 66	1,60,75 2	- 3,314	- 2. 0
2018 -19	12,74,5 95	12,67, 526	- 7,070	-0.6	1,77,0 22	1,75,52 8	- 1,494	- 0. 8
2019 -20	12,91,0 10	12,84, 444	- 6,566	-0.5	1,83,8 04	1,82,53 3	- 1,271	- 0. 7
2020 -21	12,75,5 34	12,70, 663	- 4,871	-0.4	1,90,1 98	1,89,39 5	-802	- 0. 4
2021 -22	13,79,8 12	13,74, 024	- 5,787	-0.4	2,03,0 14	2,00,53 9	- 2,475	- 1. 2
2022 -23*	7,91,05 3	7,85,7 22	- 5,331	-0.7	2,15,8 88	2,07,23 1	- 8,657	- 4. 0

* Up to September 2022 (Provisional), Source: CEA

6. CHALLENGES

i. IMPLEMENTATION ISSUES

Undoubtedly, in order to realize the SDGs and NDCs, currently, Renewable Energy Banking is the best solution available. However, the mechanism suffers from implementation issues. For instance, in the past few years, several states have placed different kinds of restrictions on banking of RE, jeopardizing the purpose of Renewable energy Banking (see Table 4) e.g., Gujarat and Maharashtra, have moved from annual to monthly banking, and that banking provisions are likely to be restricted further to time of day or daylong across most states. In some states such as Andhra Pradesh and Tamil Nadu, banking facilities have been withdrawn altogether. However, Tamil Nadu's decision to completely withdraw Banking facility has been held as "extremely radical" by APTEL, in January 2021³⁶⁴. It held that the preferential treatment of RE is a stated policy of the Government of India towards its commitments to climate action under the Paris Agreement, and SERCs must consider the same while taking decisions.

³⁶⁴*Tamil Nadu Spinning Mills Association v Tamil Nadu Electricity Regulatory Commission*[2018], Appellate Tribunal of Electricity, Appeal No. 191 of 2018.

Electricity (Promoting Renewable Energy Through Green Energy Open Access) Rules, 2022 [RE OA Rules] were notified by the Union Government in June 2022. The aim was to provide the users with a consistent approach to energy. However, the structure of the rules neglects the discretion of states that leads to failure of the whole energy exchange mechanism.

In March 2019, APTEL, while reviewing a petition against Karnataka ERC'S order to reduce banking period to six months, held that banking is a physical support to RE generation. In Karantaka, peak wind generation is in the months of May- September and if banking is not allowed throughout the year then surplus energy will not be available for consumption during peak demand months (January- March).

Table 4-

Source- [IEEFA/JMK India: New restrictions on banking of power risk curbing renewable energy growth | IEEFA](#)

Renewable-rich states that allow Banking	% Allowed	Settlem ent	Ch ar ge s
BIHAR	100%	MONT HLY	2 %
GUJARAT	100%	VARIE	V

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		S	A R I E S
HARYANA	100%	ANNUAL	Rs. 1.5 0/ k W h
CHATTISGARH	100%	ANNUAL	2%
KARNATAKA	100%	ANNUAL	2%
MAHARASHTRA	100%	MONTHLY	2%
RAJASTHAN	25%	ANNUAL	10 %
UTTAR PRADESH	100%	ANNUAL	6 %
MADHYA PRADESH	100%	ANNUAL	5 %

ii. DISCOMFORT AMONGST THE DISCOMS

Discoms or the Distribution Companies, act as an interface between electricity generators and end consumers by purchasing energy from generators and

supplying it to the end users like agricultural, industrial, commercial, and residential users. Role of a healthy Discom is indispensable in the Power market. However, due to cost factors³⁶⁵i.e., variable cost of power at the time of injection and withdrawal of the banked energy, Discoms are resisting the concept of Energy Banking.

To illustrate:

In monsoon season, owing to regular winds, wind generation is at its peak whereas agricultural demand is low at this time of the year. Surplus wind energy is absorbed by Discoms by backing down low-cost thermal generation. The saved or the banked energy is utilized during summer when discoms have to supply expensive power to supply the banked energy. Discoms suffer financial plight due to unit-to-unit adjustment as banking facilities are used by RE developers who seek permission for higher capacity which is higher than their stated drawl requirement.³⁶⁶

Discoms's discomfort with the Energy Banking has been dealt with by APTEL in the *Roba Dychem Private Limited*

³⁶⁵Rishabh Sethi, Balaji Raparthi, Ashish Kumar Sharma, 'Open Access: Stakeholders' Perspective' (TERI, 2020) <[Open-Access.pdf \(teriin.org\)](#)> accessed 1 November, 2022.

³⁶⁶ibid.

and MERC and Ors.,³⁶⁷ where banking was used as a reason to impose restrictions on Open Access (OA) beyond contracted demand.

iii. COST FACTOR

Be it the discom discomfort or resistance for energy banking or less use of energy banking, the root cause lies in the fact that the cost of banking facilities has not been ascertained or fully understood. To date, discoms have not been successful in making a case before the APTEL proving that the banking increases the cost, however considering the gravity of the matter APTEL has criticized State Electricity Regulatory Commissions (SERCs) for failing to analyse the impact of banking which has led to the current state of ad hoc regulations and has suggested that CEA conduct the study on the financial health of Discoms due to Energy Banking. The outcome of the study is awaited, however, a study (Jain & Jain, 2020)³⁶⁸ based on the topic 'Cost of Electricity banking under open-access arrangement: A case of solar electricity in India' claims that banking service provided by discoms to an open-access customer buying solar energy from an independent power producer can increase

³⁶⁷*Roha Dyechem Private Limited and MERC and Ors.* [2021], Appellate Tribunal of Electricity, Appeal No. 319 of 2018.

³⁶⁸Sourabh Jain, Nikunj Kumar Jain, 'Cost of electricity banking under open-access arrangement: A case of solar electricity in India' [2020] 146, 776- 778.

the cost of solar electricity by 20-30%, which is still cheaper than storage.

The situation warrants a better awareness and understanding of the energy banking mechanism by Discoms which can be achieved only when there is clarity and uniformity in the regulations governing Energy banking.

iv. LACK OF UNIFORM REGULATION

As discussed earlier the RE OA Rules recognise the importance of banking, however there are ambiguous provisions which is watering down the whole purpose of energy banking.

For instance,;

Rule 8³⁶⁹ which provides about the mechanism of Banking states that

8. Banking. – (1) Banking shall be permitted at least on a monthly basis on payment of charges to compensate additional costs, if any, to the distribution licensee by the Banking and the Appropriate Commission shall fix the applicable charges.

(2) The permitted quantum of banked energy by the

³⁶⁹ Renewable Energy Open Access Rules 2003, Rule 8.

Green Energy Open Access consumers shall be at least thirty percent of the total monthly consumption of electricity from the distribution licensee by the consumers.

Explanation: For the purposes of this rule, the expression—Banking means the surplus green energy injected in the grid and credited with the distribution licensee energy by the Green Energy Open Access consumers and that shall be drawn along with charges to compensate additional costs if any:

Provided that the credit for banked energy shall not be permitted to be carried forward to subsequent months and the credit of energy banked during the month shall be adjusted during the same month.

As per the first provision, SERCs can notify a longer banking duration which can be bi- annually or annually also, which would allow consideration of state-specific context. However, in the explanation to the clause, the RE OA Rules clarify that “the credit for banked energy shall not be permitted to be carried forward to subsequent months and the credit of energy banked during the month shall be adjusted during the same month.” This seems to be inconsistent with the first provision. If the explanation is taken into consideration, then the banking duration is limited only on monthly basis due to which the renewable sources of energy like

Solar and Wind energy will severely suffer.

Further, Rule 9 of the Electricity (Promoting Renewable Energy Through Green Energy Open Access) Rules, 2022³⁷⁰, provides all the charges that are to be levied, say

- (a) Transmission charges;
- (b) Wheeling charges;
- (c) Cross subsidy Surcharge;
- (d) Standby charges wherever applicable

Besides these charges, no other charge is to be levied. The rule states that the Cross-subsidy surcharge shall be as per the provisions of tariff policy notified by the Central Government under the Act and the standby charges, wherever applicable, shall be specified by the State Commission.

The rule is silent with respect to the parameters of charge determination and has not addressed Transmission charges and Wheeling charges leading to the exercise of discretion by the Central Government as well as the State Commission.

Lack of clarity and ambiguous provisions in the latest rules of 2022 is leading to a docket explosion before the

³⁷⁰ Renewable Energy Open Access Rules 2003, Rule 9.

courts and tribunals which is going to do no good to the Energy security goals.

7. SUGGESTIONS AND RECOMMENDATIONS

Attaining the Energy Security goals along with the compliance of the Climate Obligations can be viable only when more and more avenues of renewable energy are explored. One of the viable and sustainable means to shift from a non-renewable source of energy to a renewable source of energy organically is Energy banking mechanism. However, as discussed earlier, the banking mechanism is facing various challenges at the implementation as well as regulatory levels. In order to promote Renewable Energy mechanisms, the following measures are recommended

Establishment of uniform, clear and binding regulatory framework providing

- i. Rights, duties and Powers of various stakeholders
- ii. Pricing mechanism
- iii. Penalties for violation
- iv. Adjudicating Authority different from the existing Tribunals and Courts

Considering the concept of Energy Banking is

analogous to the concept of Financial Banking, its need of the hour that a watchdog (similar to RBI) is established which can exercise both monitoring as well as regulatory control over the stakeholders.

Secondly, the involvement of the private sector and PPP (Public-Private Partnership) Models also needs to be explored at a much wider level to promote orderly growth and healthy competition in the field of Energy Banking.

Since, the concept of energy banking is still evolving and facing discomfort from stakeholders like Discoms, research and study need to be conducted which can address the issues and challenges and provide viable solutions.

8. CONCLUSION

Despite being the forerunner in Energy Security Goals and rich and diverse in renewable sources of energy, India is lagging behind Europe and China in renewable energy deployment³⁷¹ because of various impediments in the effective use and implementation of the

³⁷¹ S Dinakar, 'Here's why Indian renewable energy plan pales in front of Europe and China' (*Business Standard*, 19 December 2022) <https://www.business-standard.com/article/specials/here-s-why-indian-renewable-energy-plan-pales-in-front-of-europe-and-china-122121900936_1.html>.

renewable sources of energy. Considering the need of the hour in order to fulfil the Energy Security goals, banking of renewable energy appears as the best mechanism. Though many authors consider “Energy Banking” as a short-term solution and attaining technical advancement in the field of Storage of Renewable energy as the long-term solution, it’s beyond any iota of doubt that “Energy Banking” works on Banking mechanism just like a financial transaction so it’s clean and effective and less hazardous to the environment and any technical advancement can’t come without compromising the environment. If proper studies and research are conducted and the regulatory as well as implementation issues are addressed than Renewable Energy Banking can be used as an esoteric trump card not only in attaining Energy Security Goals but also in attaining Climate Obligations as well as Universal Electrification which will be Available, Accessible and Affordable for all.