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India Wind Energy Auctions – The Way Forward

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Abstract: ***As part of its commitments in Conference of Parties (COP21), India under Intended Nationally Determined Contributions (INDCs) (40% from renewables by 2030) plans to establish a total capacity of 175GW renewables by 2022, of which at least 100 Gigawatt (GW) would be solar, 60 GW wind, 5 GW small hydro and 10 GW from biomass [1]. Wind energy installation and generation had taken an early start in India and we already had an installed capacity of about 30 GW by 2016. This paper, discusses the impact of the important decision taken by Government of India in 2016 with regards to fading away of Feed in Tariff (FiT) regime and bringing in competitive bidding in wind energy in the country and tries to assess whether it was the right decision or not and what further steps should be done to ensure that the underlying objective of this transition is fully met. A total capacity of 12.5GW + has been allocated in various central and state government auctions and a detailed analysis in respect of the implementation status and applicable commissioning timelines for the same has been brought out. Further, an analysis has been done to highlight the challenges faced by Wind Power Developers (WPD's) in the timely implementation of the allocated projects. This study brings out the recommendations in regards to changes to be made in the policy, guidelines and tenders to have a sustainable wind energy industry which is a win-win for the government through capacity additions at required pace & competitive tariffs and an economically beneficial ecosystem for both WPD's and Wind Original Equipment Manufacturers (OEMs). Since the impact of wind energy auctions is still being analyzed, this may be one of the first papers and result in setting up of precedent for future papers & numerous case studies revolving around a specific wind power project.***

Keywords: MNRE, Wind Energy, Tariffs, Auctions.

I. INTRODUCTION

In today's high-tech environment, energy has become the impetus for socio-economic development. With ever growing need of electricity and depleting fossil fuel reserves it became evident for adopting newer ways to harness electrical energy from non-conventional recourses. India is already the third largest consumer of energy in the world after United States of America (USA) and China [2] but it is not endowed with abundant energy resources.

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It must, therefore, meet its development needs by using all available domestic resources of coal, uranium, oil, hydro and other renewable resources, and supplementing domestic production by imports. India, one of world's largest economy, continues to grow at a rapid pace. To feed the growing economy comes the increasing dependency on energy-rich nations which is influenced by price fluctuations and geopolitical issues. It has also become inevitable to accelerate the development of advanced clean energy technologies in order to address the global challenges of energy security, climate change and sustainable development. Wind energy is an inexhaustible, renewable, environment friendly, non-polluting and popular alternative source of clean energy.

The cumulative wind energy installed capacity across globe crossed 597 GW by end of 2018 with 50.1 GW alone being added in 2018 [3]. China leads the global wind installations with a capacity of 217 GW, followed by USA at a distant second with a capacity of 96 GW. Cumulative wind installations across globe are capable of providing close to 6% of the global electricity demand. In year 2018, the conventional European markets for wind installations witnessed a decline and were replaced by developing countries such as China, India & Brazil along with some other Asian and African countries.

As on 31st July, 2019, 36686.82 Megawatt (MW) is the installed wind power plant capacity in India which is approx. 45% of overall installed renewable energy capacity in the country [4]. Only 3 countries – China, USA and Germany are having higher cumulative installed wind energy capacities than India [5]. In 1986, India's first wind energy demonstration project of 1.15 MW was set up at Tuticorin [6] and at onset of 34th year, the sector is mired in many issues and not being given the focus it deserves.

The development of wind energy in India has come against a back drop of favorable policy environment with an intermix of subsidies, incentives in initial phase of 1990's and in first decade of 21st century was fueled by FiT regime. The second half of second decade of 21st century witnessed a significant shift in wind industry of India with government focusing on lowering the cost of procurement of electricity by Distribution Companies (DISCOM's). This resulted in introduction of auctions which were initially conducted only for solar sector in the country. Introduction of auction regime catapulted the wind market from being an OEM dominated market to buyer market dominated by WPDs.

II. BRIEF ON DEVELOPMENT OF WIND MARKET IN INDIA PRIOR TO AUCTION

India is the second largest Asian market after China for wind.

The potential for growth of wind energy in India is enormous as can be seen from forecasting and Wind Resource Assessments (WRA) carried out on by National Institute of Wind Energy (NIWE) which estimates the potential as 102 GW at 80 m above ground level (agl) and 302 GW at 100 m agl, spread across 16 provinces out of 37 provinces in India [7]. However, more than 87% of this potential is concentrated in Gujarat, Tamil Nadu, Karnataka, Andhra Pradesh, and Maharashtra – five provinces in southern and western India. The potential is bound to increase considering the availability of Wind Turbine Generators (WTGs) with higher hub heights in the market of more than 120m. With only 36.6 GW installed so far, the country has a sizable untapped potential.

Wind energy sector in India has grown steadily since 1983 – the year in which Indian Institute of Tropical Metrology conducted a detailed WRA. In 1993, with formation of Ministry of Non-Conventional Energy Sources (MNES), foundation for financial incentives was laid and this attracted private sector to invest in wind sector resulting in its rapid growth and an installed capacity of 576 MW [8] These incentives were in form of Accelerated Depreciation (AD); a five-year tax holiday on revenues earned from sale of wind electricity; provision of banking and wheeling facilities which varied across states and mandatory electricity procurement from wind plants by State Electricity Boards (Renewable Purchase Obligation (RPO)). A savior in form of Centre for Wind Energy Technology (C-WET) located in Tamil Nadu provided the necessary fillip by carrying WRA on potential windy sites across the country. This was done to as Research and development (R&D) was in nascent stages, absence of technical standards, poor governance practices and lack of regulatory frameworks aggravated delays in land allocation and reduction in tax benefits resulted in late 90's witnessing a deceleration in the growth of the sector.

C-WET evolved preliminary certifications and standardization and trajectory for technological improvements for accelerating the wind energy sector. This resulted in an annual capacity addition of 1,836 MW in 2006, a 2,400% increase from 2000 [8]

These incentives were not restricted to generation side for WPD's only. Encouragement was given to OEMs in form of grant of industry status for manufacturing Small & Medium Enterprises which allowed them to obtain concessional/exemption on customs and excise duties (exemption on specific parts like the rotor, tower, blades, nacelle, wind power controller) as well as foreign investment. This led to setting of OEM players like Suzlon, Wind World, Inox & Regen in Indian market. Foreign OEM's like Nordex, Gamesa and Vestas also established manufacturing facilities in India attracted by concessions provided by state governments.

Major role in helping sector grow was the AD benefit, first introduced in 1994, with a depreciation rate of 100 % subsequently being reduced to 80% in year 2002 before being withdrawn in March 2012 fully [9] AD benefits provided a huge impetus but the focus was only on initial cost of project and no generation performance was accounted for. Thus, OEM's exploited the situation by charging high premium to project cost and helped investors and developers avail tax benefit without the disincentive of lack of low generation.

In 2009, government introduced a Generation-Based Incentive (GBI) that was applicable to all grid-connected wind projects commissioned before 2012 with an aim to facilitate the participation of WPDs and to promote foreign direct investments. When introduced, an additional tariff of INR 0.50 /kWh was offered on generation from wind power plants and could be availed over a period of not less than 4 years but up to 10 years, with a cap of INR 6.2 million / MW, with an annual ceiling of INR 1.55 million / MW. This scheme was applicable for projects commissioned after 17/12/2009 and there was no cap on capacity to be installed [10] The scheme was withdrawn in mid-2012 & second phase was reintroduced in 12th five-year plan which lasted till 31/03/2017 owing to the fall in wind installations and subsequent demands from industry. GBI could not take off in provinces with low wind potential and it became difficult for these provinces to meet their RPO targets. To overcome the issue, the government introduced the concept of Renewable Energy Certificates (RECs) in 2010 - a "green attribute" of renewable energy generation technology and is deemed as power generated from renewable energy sources. However, same has failed to take off owing to aggravating finances of DISCOM's which saw this instrument as merely shelling out money without purchasing actual electricity.

The abrupt removal of these two incentives, resulted in only 1200 MW capacity addition in year 2013. This led to reintroduction of both the incentives in 2014 and capacity addition increased to 2080 MW. Year 2016 turned out to be a blockbuster year for the sector with an addition of 5503 MW helping sector reach cumulative 32,280 MW installed capacity [8] This was the result of reintroduction of GBI and AD in year 2014 for a 2- year project gestation period.

Thus, in short, the sector had been plagued by cyclical commencement of large incentives and abrupt withdrawals which proved to be a boon or bane to installations and were responsible for disruptions in the sector. Sustained growth of sector was witnessed when FiTs were introduced as they guaranteed sale of wind electricity for long tenure at attractive tariffs.

Within states, Tamilnadu dominated the installations during 2004-06 (55% of cumulative installed capacity till then), followed by Gujarat in 2007-08 (37% of annual installations) & Karnataka in 2008-09 (21% of annual installations). In 2009-10, Rajasthan dominated the sector and was followed by Rajasthan during 2012-13 (36% of annual installations), Andhra Pradesh & Maharashtra in 2013-14 (66% of annual installations) and Madhya Pradesh in year 2014-15 (20.51% of annual installations) [11]

One of the most significant changes which the sector witnessed in 2016 was unshackling the industry from chains of FiT regime by introducing the reverse auctions with an aim to help wind energy tariffs fall in the country. Though this change resulted in disruption to the market owing to uncertainty within the industry about certain provisions and safeguarding measures for investment in the auction regime, it has resulted in falling wind tariffs. The auction regime is discussed in detail in next section.

III. TRAJECTORY OF WIND ENERGY AUCTIONS

Auction concept in renewable sector in India was introduced in the year 2011 for solar sector which helped the tariff reduce from INR 13/kWh in 2009 [12] to INR 2.44/kWh in 2017 [13], whereas FiT tariffs for wind sector were ranging between INR 3.82/kWh to INR 6.04/kWh [14]. There was an increasing pressure to introduce auctions in the wind sector with the view that similar to solar tariffs, wind tariffs would also fall down with advent of auctions on account of higher competition and efficiency. Also, the DISCOMs had started expressing their unwillingness to purchase expensive wind energy in comparison to competitive solar energy. With this in mind, decision was made to shift from Feed in Tariff regime to a uniform and transparent mechanism to induce a competitive market. Accordingly, wind energy reverse auction – a first, was introduced in year 2016 where the Power Purchase Agreement (PPA) was to be signed with companies quoting the lowest tariff.

The first auction scheme was sanctioned on 14th June, 2016 and Request for Proposal was published in Oct' 2016 for setting of 1 GW Inter State Transmission Projects. The auction was conducted in month of Feb'2017 which helped tariffs fall to a record low of INR 3.46/kWh [15] – a reduction of 9.42% over the lowest prevalent FiT in state of Maharashtra. This illustrated that lower tariffs were workable for the WPDs and OEMs.

The auctions opened the eyes of state governments and under Section 63 of Electricity Act, 2003 states such as Maharashtra, Tamilnadu and Gujarat came up with their own state-based auctions. After first central wind auction conducted by Solar Energy Corporation of India Limited (SECI), next was Tamilnadu 500 MW wind auction in which a capacity of 450 MW was awarded in Sep'2017. This tender saw further saw a fall in tariff by INR 0.04/kWh over tariffs discovered in SECI – I wind auction.

Next round of auction (Phase II) was conducted by SECI in October'17 which saw wind tariffs breach sub level of INR 3/kWh for first time in country and lowest tariff achieved was INR 2.64/kWh [16] – a steep reduction of 23% over tariffs discovered in Phase I auction and reduction of 30% over lowest prevalent FiT tariff. Next auction conducted in the country was by state of Gujarat for 500 MW which saw country achieving the lowest tariff to be discovered under renewable auction both for solar and wind regime of INR 2.43/kWh [17] (another 8% reduction over SECI II auction) in December'17.

Bolstered by falling tariffs, central government came up with 2 more tenders of 2000 MW each in month of February'2018 & April'2018 and these saw tariffs in range of INR 2.44/kWh to INR 2.45/kWh under SECI III and in range of INR 2.51/kWh to INR 2.52/kWh. These last 3 rounds of auctions brought wind tariffs on par with solar tariffs in the country.

State of Maharashtra came up with another 500 MW tender and witnessed tariffs of INR 2.85/kWh. Next in line was National Thermal Power Corporation (NTPC) 2000 MW wind auction, which was reduced to 1200 MW on account of challenges being faced by WPDs which are explained in detail in the subsequent section and saw tariffs settle in range of INR 2.77 to 2.82/kWh. SECI V & SECI VI tenders were for 2000 MW but auction was conducted for lower capacity owing to less participation from WPDs and saw tariffs in range of INR 2.76 to INR 2.83/kWh – an increase which was attributed to unavailability of sites with higher wind potential, evacuation constraints at high windy sites, increase in cost structure of OEMs, reduced competition amongst OEMs, increase in transmission line costs and other associated factors captured in detail in subsequent section.

Another 2 rounds of auction SECI VII & SECI VIII have been conducted and have seen very negligible participation leading to under subscription of tenders and reduction in final auction capacity to 80% of bids submitted. The tariffs discovered are in range of INR 2.79 to INR 2.85/kWh. In between SECI VII & SECI VIII, Gujarat bolstered by lowest record tariff auction brought out another bid of double the size of Phase I. However, even Gujarat Urja Vikas Nigam Limited (GUVNL) – a AAA credit rating DISCOM received a shock when the tender was under subscribed and received bids only for 931.40 MW from 8 bidders. The auction was conducted only for 745 MW and tariffs discovered were in range of INR 2.80/kWh to INR 2.95/kWh. This huge tariff difference resulted in GUVNL asking bid winners to match the lowest tariff of INR 2.80/kWh [18] and only 2 bid winners out of remaining 7 agreed to do so. Thus, the final awarded capacity in GUVNL tender stands at 190 MW.

The auction regime in India can be summed up in Table 1, Tariff trajectory achieved in India is summarised in Figure 2, Developer wise market share under wind auctions is summarized in Figure 3.

As can be inferred from Figure 1, in 2017, only 1.766 GW wind capacity was added to the country's grid and another 1.52 GW was added in the year 2018-2019 indicating that sector has witnessed immense slowdown owing to challenges on the policy & regulatory front, inadequate evacuation infrastructure, acquisition of land, Right of Way management, OEM financials, etc.

One of the most important reasons for sharp fall in wind tariffs was on account of limited capacity allocation of wind energy projects in 2017 and huge capacity available with OEM's, pressure on WPDs for equity deployment which lead to cut throat competition and resulted in heightened tariff war. The initial correction in tariff was also on account of technological improvements in WTGs resulting in reduced pricing and improved efficiency with higher capacity WTGs (> 2.2 MW). E.g.: EN 131- 2.5 MW WTG of Envision make with Hub Height of 120 m and Rotor Diameter of 131 m (2nd highest in the country) after GE WTG with rotor diameter of 132m. Another model, of Nordex AWP -140 3 MW with Hub height of 120m and Rotor diameter of 140 m (will be the largest rotor when finally installed in December'2019). Auction regime has resulted in reduced margins of OEMs and lower Internal Rate of Returns for WPDs.

Table - I: Summary of Wind Tenders in India

Tendering Agency	Capacity Initially Tendered	Capacity Finally awarded	Lowest Tariff	Highest Tariff	No of Tenders
SECI – Wind	12200	9470.8	2.44	3.46	9
SECI – Hybrid	2500	720	2.69	2.7	1
NTPC	2000	1150	2.77	2.82	1

GUVNL	1500	690	2.43	2.8	2
TANGEDCO	500	450	3.42	3.43	1
MSECL	500	500	2.85	2.87	1

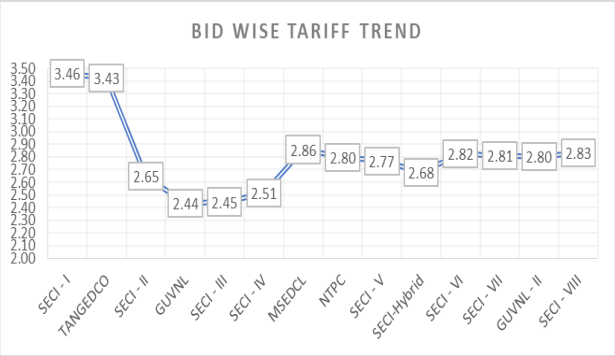

Figure 1. Tariffs Discovered under various Wind Auctions

IV. CHALLENGES IN PROJECTS UNDER EXECUTION UNDER VARIOUS WIND AUCTIONS

Markets trend show that out of the total allocated capacity of 12.55 GW, about 3000 MW should have been commissioned so far as per the tender timelines against which actual commissioned capacity stands at 1481 MW only. In fact, SECI wind Phase I auction of 1000 MW has achieved a commissioning capacity of only 673 MW till 30th August, 2019. All these projects were supposed to be commissioned in October'2018 indicating a

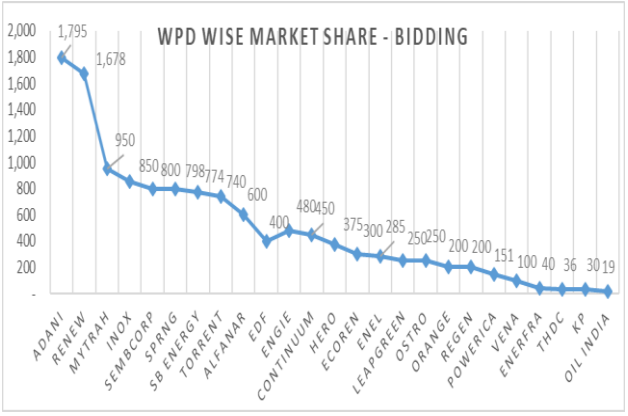

Figure 2. Wind Power Developers Capacity Won Under Auctions

delay of almost a year from scheduled commercial operation date. Low tariffs mean that projects invariably have to be established at locations with high wind speeds resulting in most of WPDs establishing these plants in states of Gujarat and Tamilnadu – the windiest states in the country. These states shall house 8485 MW of plants bid under the central government (SECI & NTPC tenders) which is close to 67% of projects allocated across India. This has resulted in a lot of challenges in acquisition & allocation of land and securing evacuation in these states.

Reverse auctions with aggressive ceiling tariffs coupled with the concentration of wind resources in certain regions have resulted in the following challenges that are impeding the growth of the sector:

A. Land Availability

As per Schedule VII of constitution of India, Land, is a state subject and regulations related to its acquisition vary from state to state. Revenue Land is allocated on lease for project life whereas Private land needs to be taken on lease or bought out but it needs to be converted into non-agricultural land for installing the WTG which is a tedious task in India. Some other challenges in acquisition of land are as highlighted below:

- **Change in allocation of land allotment policy by Gujarat:** Over last 1.5 years, Government of Gujarat vide its various orders stated that revenue land was to be given only for bid winners in state conducted bids (GUVNL) and not to bid winners of central tenders. Probably, this was result of Fear of Missing out (FOMO) on low tariffs and procurement at high tariff for own requirement.
- **Land Ceiling Limits Issue:** States like Tamilnadu and Karnataka have land ceiling limits unlike other states where the same is exempted for renewable projects. At a time, an entity cannot hold more than 30 standard acres (~120 acres) in Tamilnadu and any holding in excess of that requires permission from cabinet.
- **Change in Land Use:** Non-Agricultural (NA) conversion takes lot of time in states like Karnataka and Tamilnadu with Karnataka taking more than 12 months for final issuance - a time period which is high resulting in non-compliance with lenders requirement who cannot create mortgage on non-NA parcels. Tamilnadu created a flutter with Tamilnadu Combined Building Rules, 2019 issued in Feb'2019 by stating that all land related approvals will be processed through this rule. But they never withdrew the Land Revenue Code resulting in overall process uncertainty.
- **Land Blocking Issue:** In state of Tamilnadu, DISCOM issues a clearance for installation of WTGs (Noted for Records). Large amounts of land parcels are blocked since 2011 with old WTG models. As a result, serious WPDs are finding it difficult to scout a clear land parcel with distance of 5 times rotor diameter/ 7 times of rotor diameter of another installed WTG or blocked land parcel.

Announcements of large bids and anticipated future bids has resulted in land acquisition being an arduous task resulting in high wind areas being utilized completely and WPDs have to shift invariably to sites with lower wind speeds which increases the tariffs. All these challenges result in WPD's incurring higher land costs thereby impacting their return and tariffs to be bid-out.

B. Transmission infrastructure availability

Most of the wind tenders have commissioning timelines of 24 months from date of issuance of Letter of Award (LOA). Commissioning new substations requires three years of gestation period. Tenders floated by central government agencies allow for the power to be evacuated on Inter-State Transmission System (ISTS). Under Central Electricity Regulatory Commission (CERC) Connectivity regulations, 2009,

OEMs/ WPDs/ land developers in anticipation of future business were able to block connectivity on various Central Transmission Utility - Powergrid Corporation of India Limited (PGCIL) substations even if they have not won a bid or not and as a result the evacuation capacity of said substation remained underutilized which resulted in genuine cases of bid winners not able to find the locations for their projects. The issue has been partially addressed through new connectivity guidelines released on 15th May, 2017 but still lot of challenges remain.

With limited high wind potential sites, congestion at PGCIL substations has reigned supreme and ensuing chaos has ensured. An inadvertent need to install, enhance, upgrade and augment the transmission network is present as most windy locations are located far from load centers where electricity can be consumed. Government of India recognized the same and has started implementing Green Energy Corridor program with an aim of establishing substations with an aggregate capacity of 19,000 mega volt amperes (MVA) and installation of 8,500 circuit kilometers of transmission lines in eight states with high renewable – solar and wind potential by March 2020. If the transmission capacity is not implemented within timelines, chances of projects failing to achieve commissioning timelines are bound to increase and WPDs would have to target lower wind potential sites having evacuation available which would result in higher tariffs.

C. Insolvency / weak financial condition of Wind OEM's

Indian OEM's like Suzlon, Inox and Regen are facing liquidity/bankruptcy issues. Suzlon in fact has been dragged to National Company Law Tribunal and Senvion in foreign markets has filed for insolvency. All these 4 OEM's together were supplying WTGs to about 25% of allocated capacity. This has resulted in financing issues for projects utilising these WTGs. Lenders are apprehensive of funding these projects (which is typically 70 to 75% of the project costs) as major concern revolves around the capacity of these firms to carry out execution and operations of the projects. This has led to reduced competition among OEM's and as a result prices of WTGs have gone up, impacting the returns of WPDs and tariffs to be bid-out.

D. Financial Health of DISCOM's

Many DISCOMs have not been paying to the WPD's within the due date. The receivables vary from 3 to 18 months for some of the DISCOMs against 1-month payable period. This puts lot of financial pressure on the WPDs as it becomes a very big challenge to service debt & interest to the lenders. Even the Working Capital sanction is not beyond 6 months. The Ministry of Power (MoP) has recently issued a letter dated 17th July, 2019 asking all DISCOMs to comply with the guidelines as per PPA signed and open a Letter of Credit for 1 month without which they will not be able to schedule and procure the power. This would address the issue of not having further receivables but still solution needs to be found to address the existing receivable position else there is risk of the projects being classified as Non-Performing Assets. This has an impact on the credit rating of WPDs and also results in paying high working capital costs, thereby impacting their returns and tariffs to be bid-out.

E. Permits and Approvals

There are various regulatory approvals and permits which lack clarity in terms of process and are hence beyond the control of the WPD. These lead to delays which are not linked to PPA's.

- **Tariff Adoption:** As since 2017 all wind capacity allocation is being done through competitive auctions, for which the tariff adoption by the ultimate buyers i.e. various DISCOMs should be done under Section 63 of Electricity Act but still they have been approaching the respective regulators to adopt tariffs under Section 86 1b of Electricity Act. Rather than being a procedural matter it has become a decision-making matter for the project to go ahead or not. Also, the PPA's haven't provided any linkage of the tariff adoption timeline with PPA SCOD. So WPDs are in a limbo as the lenders are not ready to disburse any funds till tariff adoption happens, which results in stoppage of construction activity and on the other side, there are timelines for achieving Financial Closure (FC) and commissioning, where substantial delay penalties are applicable for not achieving these milestones.
- **Ministry of Défense & Civil Aviation approval:** Lot of high wind potential sites (Kutch & Jamnagar belt on western coast) in state of Gujarat are located in vicinity of defence airports and radars. Owing to fighter jets flying at lesser heights, high structures cause obstacles and thus these require No Objection Certificate (NOC) from defence authorities if located within 20 kms of such airbase/airstrip. These NOC's are challenging task to obtain as the process is not clearly laid and is very time consuming. Leads to uncertainty and project delays.

F. Appropriate provision of risks in PPAs

Various provisions in PPA as mentioned below have not appropriately covered the uncertainties which impact project timelines and returns.

- **Change in Law (CIL):** Change in regulation by CERC/SERC is not covered under CIL provision in PPAs, for example the CEA regulation requiring HVRT (High Voltage Ride Through) capability in WTG, similarly the DSM (Deviation Settlement Mechanism) Regulations etc have all financial implications which need to be addressed. Also, the WPD needs to be compensated for the carrying cost for any CIL needs to be brought out clearly.
- **Force Majeure (FM):** The FM provision needs to be expanded as lot of issues are not getting covered.
- **Extension of Time (EOT):** The EOT provision needs to cover the CIL events affecting the WPD.
- **Termination Compensation:** The termination compensation and supplementary bill payments under the PPA needs to be secured by SECI/NTPC rather than making it back to back on financial week DISCOMs, else it should be secured by the State Government Guarantee under the Power Sale Agreement (PSA) as provided for tariff payment obligation.

MNRE has set-up a Dispute Resolution Mechanism (DRM) to address the unforeseen disputes outside contractual agreements but some of these need immediate resolution.

G. Applicability of LTA charges for commissioning delay

All projects which are under central tenders are invariably connected to Inter State Transmission System. A Long Term Open Access (LToA) Agreement is signed between WPD and PGCIL for allowing WPDs to use the evacuation infrastructure from a specified date. This date is provided by WPD keeping in mind the project commissioning timeline.

On account of inherent challenges highlighted above, there are project delays and these timelines are missed. In such cases, PGCIL levies Point of Connection (PoC) charges on WPDs from LToA operationalization date. It is reiterated that the interstate transmission charges are waived off on projects which are commissioned on or before 31st March, 2022 i.e. these charges are socialized. The charge levies are being requested to be waived off in case of project delays for reasons beyond the control of WPDs and also linking of LToA operationalization with SCOD under PPA so that in case of any extension provided in SCOD, the same gets applicable for LToA automatically.

H. Curtailment Issue

Despite having been accorded "must – run" status to renewable projects in the country, various states are asking renewable generators to back down. Usually these instructions are given verbally and upon MNRE insistence, they have started sending mail mentioning grid security as reason without substantiating the same. MNRE has issued a circular mentioning that deemed generation will be considered for electricity curtailed for reasons other than grid security issues. MNRE has further clarified that the fixed charge to be considered for this payment will be the PPA tariff with the DISCOMs.

I. PPA Renegotiation

In a falling tariff trajectory, as has been witnessed in both solar and wind sector in India, it is very important to maintain the legal sanctity of the contracts signed i.e. the Power Purchase Agreement (PPA). The same is being seen in case of Andhra Pradesh where old PPA's signed at tariffs higher than current levels are being questioned and renegotiation being attempted. This has badly shaken the confidence of the investors and lender community in this sector. All WPDs had to seek legal recourse to save their projects and continue receiving dues for the power sold and ensuring projects are allowed to supply power.

J. Financing Challenges

The renewable projects in India are primarily being financed by Non-Banking Financial Companies (NBFCs). After the IL&FS Financial Services default, the liquidity in the sector has seen a big squeeze resulting in sharp increase in the borrowing cost of WPDs. Also, with all the sectoral challenges mentioned earlier, the lenders are losing interest in the sector and don't want to lend to the sector willingly and are being extremely conservative. They have started asking for lower Debt: Equity (D:E) ratios, high coverage ratios, are appraising projects on P90 generation basis, lower tenure debts, they want corporate guarantees from WPDs for any contractual defaults (like PPA renegotiation etc.), penal interests are being put for delays in project delays, security creation etc, high early repayment charges are being asked. All these significantly impact the projected returns of WPDs & creating issue in project construction.

K. Tariff Caps

Bolstered by the high competition in the sector and falling tariffs, Government of India started setting up tariff caps (since SECI VI tender) in the tenders. But soon the WPDs started experiencing all the challenges mentioned above leading to cost escalations, delays and substantial reduction in their projected returns. The tariff cap of INR 2.85/kWh was deemed too low for the available sites. The interest of WPDs faded away and SECI IV tender which in fact was oversubscribed was the last one to witness this participation. SECI V RfP was issued for 2000 MW but with waning interest the capacity to be auctioned was reduced to 1200 MW which resulted in barely filling of barrel. SECI VII & SECI VIII tenders owing to tariff caps have seen very less participation owing to presence of tariff caps. In fact, SECI VIII attracted only 2 bidders with capacity of 550 MW out of 1200 MW which was subsequently reduced to 440MW to carry an e- reverse auction process. MNRE needs to relook at the level of tariff cap very seriously, else the sector growth could be heavily impacted from hereon.

V. CONCLUSION

India wants to install 60 GW of wind energy capacity by 2022 which means in the next 4 years it would have to add another 24 GW capacity. The central and state government through various competitive auctions have already allocated more than 12.5GW+ capacity of which only about 1.5GW capacity has been installed so far. This means another 12GW would need to be allocated over the next 1.5 years so that the current and new pipeline is installed by 2022 helping the government to meet its target of 60GW.

Also, the capacity which is supposed to be installed up to Nov'19 is 5000 MW, close to 55% is running behind schedule and seems shall miss the commissioning deadline. This shows that there are some key issues which the government would have to address in order to fulfill its target.

The growth of wind sector till date has been turbulent as schemes and regulations for promotion of sector has been introduced, withdrawn and reintroduced without due consideration. MNRE has called these moves a necessary "course correction" to develop a competitive market. With falling tariffs, concepts of GBI, AD, FiT have become obsolete and auctions are the new norm. One needs to ensure that wind does not lose its position vis-à-vis solar as solar costs fall further, which in all likelihood is going to be the case. But generation needs to be there at night as well and wind is best suited among both to ensure this.

Though India has successfully transitioned from FiT to auction based regime, many legacy issues and systemic problems still persist which have been highlighted in Section IV. Land issues can be sorted out by providing government land for setting-up the projects and getting bidding done for those specific areas and bid winners to be allocated land accordingly. For various state land matters, government should push for various states to declare land for renewable projects as deemed converted and removing land ceiling limits.

Evacuation constraints could be set-off by carrying substation-based bidding considering the evacuation infrastructure built, even though this may result in a slight increase in tariffs. Also, state level substations could be considered for bidding from where power could be evacuated to PGCIL network. Transmission infrastructure availability can also be sorted by incentivizing the contactors for an early commissioning which would be on lines with timelines stipulated in the tender.

With schemes like UDAY, UDAY 2.0, franchise model to improve collections efficiency and possible carriage and content separation on cards, financial health of DISCOM's in all likelihood shall improve. Tariff adoption issue can be sorted out by amending the electricity Act, 2003 & National Tariff Policy, 2006 and stating that power procurement and ceiling tariff adoption needs to be approved by regulatory commission prior to 15 days of date of auction. A contract once signed needs to be sacrosanct and should not be opened up as it sends wrong signals to investors. In long run, with an increasing mix of renewables, grid management issues are bound to surface owing to load demand mismatch. Possibility of battery storage mechanism to store energy during such imbalances will help solving the issues in long run. Another aspect is that deviation settlement be done at pool level to reduce the burden of penalties on individual WPD. All government agencies need to work together to resolve the Ministry of Defence issues. The DRM is a good initiative but some of the larger and prevalent issues like time extension for tariff adoption need to be addressed by MNRE immediately rather than going through DRM. The PPA shortcomings need to be again addressed immediately for prevalent issues and specific matters to be addressed on case basis through DRM and for future bids a more bankable PPA needs to be made as a standard bidding document. Tariff Caps, if required, be set, but they need to factor in the prevailing scenario and feasible project locations in the country. As of now, tariff caps do not factor in various cost escalations - the interest required on working capital, cost to be spent on sorting local issues, curtailment problem, increased financing costs, increased WTG cost, lower wind sites, longer transmission lines, various charges and penalties, etc. and are set without detailed analysis of reasons recorded in writing.

Wind power in India has made great strides with less than 1 GW in year 2000 and stands at 36 GW in 2019. Winds actually have blown in favorable directions and resulted in brisk growth for the sector. The sector is at such crossroads where optimists believe that some way out will emerge and conservatives do not.

REFERENCES

1. Press Information Bureau. (2018, July 19). A target of installing 175 GW of renewable energy capacity by the year 2022 has been set. Retrieved from https://pib.gov.in/Pressreleaseshare.aspx?PRID=15
2. Global Energy Statistical Yearbook 2019. (n.d.). Retrieved September 21, 2019, from Enerdata: https://yearbook.enerdata.net/total-energy/world-consumption-statistics.html
3. World Wind Energy Association. (2019, June 04). Wind Power Capacity Worldwide Reaches 597 GW, 50,1 GW added in 2018. Retrieved September 21, 2019, from World Wind Energy Association: https://wwindea.org/blog/2019/02/25/wind-power-capacity-worldwide-reaches-600-gw-539-gw-added-in-2018/
4. Central Electricity Authority. (2019, July 31). All India Installed Capacity. Retrieved September 21, 2019, from http://cea.nic.in/reports/monthly/installedcapacity/2019/installed_capacity-07.pdf
5. Press Information Bureau. (2018, December 10). Year End Review 2018 – MNRE. New Delhi, New Delhi, India. Retrieved from https://pib.gov.in/newsite/PrintRelease.aspx?relid=186228
6. Down To Earth. (2019, January 20). Renewable energy in India: In 33 years, India struggled to exploit just 12% of its wind energy potential. Retrieved September 21, 2019, from Down To Earth: https://www.downtoearth.org.in/news/energy/renewable-energy-in-india-in-33-years-india-struggled-to-exploit-just-12-of-its-wind-energy-potential-62885
7. Press Information Bureau. (2015, December 14). Wind Power Potential at 100m agl. Retrieved September 21, 2019, from Press Information Bureau: https://pib.gov.in/newsite/PrintRelease.aspx?relid=133153
8. Saji, S., Kuldeep, N., & Tyagi, A. (2019). A Second Wind for India's Wind Energy Sector: Pathways to Achieve 60 GW. (E. a. Council on Energy, Ed.) New Delhi, New Delhi, India. Retrieved September 21, 2019, from https://www.ceew.in/sites/default/files/CEEW-A-Second-Wind-for-India-Wind-Energy-Sector-17July19.pdf
9. Sud, T., Sharma, R., Sharma , R., & Kitson , L. (2015, April). India's Accelerated Depreciation Policy for Wind Energy. Retrieved September 21, 2019, from https://www.iisd.org/sites/default/files/publications/india-accelerated-depreciation-policy-wind-energy-case-study.pdf
10. Press Information Bureau. (2011, December 16). Generation Based Incentive Scheme. Retrieved from Press Information Bureau: https://pib.gov.in/newsite/PrintRelease.aspx?relid=78829
11. Ministry of New & Renewable Energy. (2014, December 31). STATE-WISE & YEAR-WISE WIND POWER INSTALLED CAPACITY (MW). Retrieved from Ministry of New & Renewable Energy: https://mnre.gov.in/state-wise-year-wise-wind-power-installed-capacity-mw
12. Energy & Petrochemicals Department, Government of Gujarat. (2009, January 6). Gujarat Solar Policy 2009. Gandhinagar, Gujarat, India. Retrieved from https://geda.gujarat.gov.in/Gallery/Media_Gallery/Solar_Power_policy_2009.pdf
13. Press Information Bureau. (2017, May 12). Historic low Tariff of Rs. 2.44 per unit discovered in Bhadla Phase-III Solar Park in auction by SECI. Retrieved February 24, 2019, from http://pib.nic.in/newsite/PrintRelease.aspx?relid=161755
14. Jethani, J. K. (2016, November 21). Wind Power Policy in India. New Delhi, New Delhi, India. Retrieved from https://mnre.gov.in/file-manager/UserFiles/Wind-Power-Conf.-by-JKJ-MNRE-21112016.pdf
15. Ministry of New and Renewable Energy. (2017, May 04). Sanction for the Scheme for setting up of 1000 MW ISTS - connected wind power projects. New Delhi, New Delhi, India. Retrieved from https://mnre.gov.in/sites/default/files/schemes/Scheme-1000MW-ISTS-Wind-project.pdf
16. Press Information Bureau. (2017, October 05). India gets Lowest Wind Tariff of Rs. 2.64 per kWh in second Wind Auction of 1000 MW. New Delhi, New Delhi, India. Retrieved from https://pib.gov.in/newsite/PrintRelease.aspx?relid=171394
17. Prateek, S. (2019, April 18). Tariff a Bone of Contention Between Indian Wind Stakeholders and Government Agencies. Retrieved from https://mercomindia.com/tariff-bone-of-contention-indian-wind/
18. Prateek, S. (2019, July 11). Gujarat Asks Winners of its 1 GW Wind Auction to Match the Lowest Tariff. Retrieved from https://mercomindia.com/gujarat-wind-auction-lowest-tariff/

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