

Propulsion in Renewable Power Sector (Wind and Solar) in India

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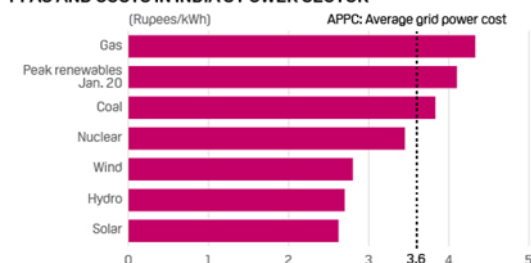
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ABSTRACT

Purpose :

1. To study the Headwinds of momentous change in the Renewable Energy (RE) Sector in India since 2017 and Adaptive Suggestions for Speedy Policy changes in the RE Sector.
2. India's renewable energy progress to date has been that of marginal propulsion owing to the — two steps forward, one step back behavior. Identifying the Friction in new policies and their implementation for better understanding of the rising trends in Clean energy markets.

PPAS AND COSTS IN INDIA'S POWER SECTOR



Source: S&P Global Platts Analytics, CEA, Central Electricity Regulatory Commission

Domestic solar, wind and hydro energy PPA (Power Purchase Agreement) tariffs are now 30-40% lesser than the price of domestic thermal tariffs, and 50-60% less than that of imported coal sourced thermal power costs. A majority of the factors affecting the Solar tariffs are Solar Photovoltaic (PV) module costs, interest rates, Capacity utilization Factor (CUF)'s (differ across states in India, given drastically different solar resource attributes), and cost of financing. Despite all these factors, CUF has the most impact on the Returns from Projects. A 5% drop in CUF can cause a 12% drop in project returns.

3. The speedy growth of native renewable energy can help ameliorate and address India's urgency for Energy security, reduce carbon footprints by decreasing pollution, and issue electricity deflation to help uplift the power distribution companies from bad debts

Keywords

Renewable Energy, Solar, Wind, Energy policy, ISTS scheme, Reverse Bidding

Article Received: 10 August 2020, Revised: 25 October 2020, Accepted: 18 November 2020

Introduction

There is a drastic shift from plain vanilla tenders to complex schemes including manufacturing-linked tenders, offshore wind and solar, solar-wind-storage hybrid tenders, Integrated storage and evacuation based RE tenders, and even completely technology agnostic tenders seeking firm 24x7 power; pushing the industry to be further regulated. The proposed amendments in the form of New Draft (2020) to the Electricity Act, 2003 for increased Electricity tariffs across consumer categories, rigorous contractual enforcements & litigations, and adequate payment security mechanisms for electricity transactions to add thrust to the renewable energy business. These amendments are in conjunction with various new State policies, power trading mechanisms, and RE compliance regulations along with privatization of sector fortifying the existing foundation of the power sector.

This paper will conduct a thorough Strength, Weakness, Opportunity, Threat (SWOT) analysis bringing out major challenges in the new ISTS scheme from SECI. This is a need of the hour considering the erstwhile volatility of regulations and dynamism in the industry.

Further it will study into the Solar and Wind power sector and newly launched ISTS scheme and its impact on India's Renewable Energy Targets. It will analyze the New Draft regulations policies, and case studies of recent policy failures, and propose future recommendations to the Indian power sector. It will also map the hurdles, challenges, and outline successful policies towards achieving these targets.

Literature Review

Draft Petition to Electricity Amendment Act (2013)–2020[1]

Indian Power Ministry has recently issued a draft for the amendment of Electricity Act 2003, the synopsis of the amendments proposed to the Electricity Act, 2003 are as follows:

Electricity Contract Enforcement Authority

The MoP admits that the 2003 Electricity Act dealt with the production and purchase of electricity but failed to resolve the compliance concerns of a contract. Especially after the Andhra Pradesh case, where the state agreed to renegotiate the purchase agreements for solar and wind power, the ministry realized its limits when it came to imposing any state to uphold a contract. At best they could only advise states on electricity-related matters. The detrimental effects of this incident have rippled across the country's renewable energy industry, seriously crippling up investor confidence.

The ministry learned that the power of the contracts allows for investments in the electricity market. Also, various duties under the Electricity Act are delegated to existing electricity regulatory commissions in the states and Centre, including regulatory functions, tariff implementation issues, licensing, and limited powers to resolve disputes.

The draft amendment proposes, as a solution, the setting up of an "Electricity Contract Enforcement Authority (ECEA)." ECEA shall be the sole authority with original jurisdiction to resolve matters relating to the particular fulfillment of obligations arising from the selling, purchase, or transmission of electricity between a generator and licensee or between licensees.

Nevertheless, in any dispute concerning tariffs, the regulatory authority would have no power.

In the event of a violation or infringement of obligations under the contract, the ECEA would have the power to immediately order the party to satisfy its contractual obligations. It will also guide the party to pay the costs for breach of contract or failure to fulfill contractual obligations.

While sharing his insights on the proposed amendment, Aditya K Singh, HSA 's associate partner, Advocates, said, *"Initial years of enforcing the proposed amendment would see specific litigation on the jurisdiction issue. The ministry will need a lot of clarity to understand the purpose behind the proposed amendment. The appointment and dismissal of the Enforcement Authority will be by the Central Government. Developers may welcome this proposition; however, licensees will have difficulty in accepting this proposition. The proposal also suggests that this Authority will normally sit in Delhi; this will also pose a logistic challenge for small developers and state licensees."*

The ECEA must dispose of the matter within 120 days from the date of receipt.

The Electricity authority's orders must be effective as a civil court decree. The Appellate Tribunal for Electricity will hear the Appeal against orders of the Electricity Tribunal.

National Renewable Energy Policy

The draft also notes that a National Renewable Energy Policy for the promotion of electricity generation from renewable energies is established by the Central government

in collaboration with State governments. Also, the Government can also prescribe a minimum percentage of electricity purchases from renewable and hydropower sources here. The draft proposed expanding the scope of purchase obligations for renewable energy to include hydro sources.

Renewable and Hydro Power Purchase Obligation(RPO's and HPO's)

Section 142 of the Electricity Act 2003 earlier specified that if a person is found not to comply with the orders of any regulatory commission, he must pay a penalty of \$100,000 (\$1,318) for each violation and an additional penalty of \$6,000 (\$79) must be paid daily in the event of continued failure. The proposed amendment raised the fine to some \$110 million (\$13,180) instead of some \$100,000 (\$1,318) and some \$100,000 (\$1,318) instead of some \$6,000 (\$79).

Furthermore, a further sub-section is included to discuss non-compliance with the requirement to purchase wind and hydropower. The proposed penalty is equivalent to 0.50 (~\$0.006)/kWh for the average deficit in the first year of purchase. If the purchase shortfall occurs in the second, the individual will be liable to pay ~\$0.013 / kWh. The penalty would be somewhere 2 (~\$0.026)/kWh, starting in the second year for the deficit in purchase.

The draft also proposes that the National Load Despatch Center (NLDC), which is liable for optimal electricity scheduling and distribution in different regions, also oversees and controls the inter-regional and inter-state transmission network. It will also have the overall authority to operate the national grid in real-time.

Open Access

The Electricity Act states that on the payment of the stipulated surcharge, along with wheeling charges fixed by the respective state commissions, open access can be given to a customer. Now, the new amendment adds fees for intra-state transmission, and inter-state transmission where appropriate, to the current charges.

In the new reform, the state commission must "progressively will" the open-access surcharge and cross-subsidies according to the tariff framework. There was no mention of tariff policy in the earlier Act.

Payment Security Mechanism

One addition suggested for the Act is to require and make compulsory the load dispatch center to handle the payment protection process before scheduling electricity dispatch. This is intended to preserve the holiness of contracts. Unless the parties to the contract agree unanimously, the payment protection clause can be waived. The ministry is attempting to tackle the massive accumulation of unrealized sales, forcing the sector to hurdle.

Cost reflective Tariff

The ministry has recognized that the tariff calculated by the state distribution firms does not represent the actual cost, which is the leading cause of their poor financial condition.

Therefore, it is suggested that state commissions set the tariff for retail electricity sales without any subsidy. When any subsidy is to be provided to some specific group of customers, it can be paid directly by the Government. The amendment also emphasizes that the tariff must reflect the cost of electricity supply and that it should reduce cross-subsidies and surcharges levied on industrial consumers.

Adoption of Tariff

For tariffs decided by competitive bidding, the tariff must be implemented on time by the relevant commissions, which is no later than 60 days from the date of submission. If the commission fails to agree within 60 days, it will be considered adopted. This plan is a reiteration of what was previously amended by MNRE in its Competitive Bidding Guidelines.

Distribution sub-license and Franchise

It is suggested that the distribution companies (DISCOMs) may employ franchisors or sub-distribution licensees to distribute electricity on their behalf within their supply area in a particular region. However, the DISCOM remains the licensee and ultimately will be responsible for ensuring the quality of the electricity distribution in its supply area. It was announced earlier that the union government had introduced an amendment to the Electricity Act to ensure that the companies applying for power distribution rights also signed the mandatory Power Purchase Agreements (PPAs).

Andhra Pradesh Re-negotiation Attempts for Change in Tariff Episode: Case Study

In the August of 2019, a jurisdiction calling for the review of the state's energy sector status of asset and contract for retrospective re-negotiation and termination of renewable energy projects contracted under the previous Government's administration was called for by the then elected chief minister of Andhra Pradesh Jagan Mohan Reddy; corroborating conspiracy in contract allocation of awards and blaming them for the contractual and financial losses of the state of Andhra Pradesh.

He also commanded a series of actions including the revocation of declarations for high tariff wind and Solar projects, reduction in overpriced tariffs to match with the lowest tariff ever recorded in India; the abrogation of several projects including nearly 21 wind projects (the flagship 600 MW Siemens Gamesa hybrid project, Axis Energy hybrid project, and many other energy storage projects, roughly totaling to 600 MW of scheduled power tender proposals).

As observed in the chart below, the renewable power tariffs for various developers like Azure Power, Tata Power, acme solar, Adani green, etc. with the total portfolio size of 2132 MW Airtel average pricing of 4.54 INR/KWh Ranging from 3.5 to 5.4 5 rupees per kilowatt-hour were Re negotiated To 2.39 rupees per kilowatt-hour average tariff ranging from 2.37- 2.44 rupees per kilowatt-hour. Thereby slashing the disputed feed-in tariffs set by the preceding regime by nearly half.

Developers	Intermediary / Offtaker	Portfolio size considered (MWp)	Average tariff (INR/unit)	Proposed tariff (INR/unit)	Percentage reduction in revenues
Greenko Group companies	NTPC + AP discoms	582	4.50	2.38	-47%
APGENCO	AP discoms	400	3.50	2.44	-30%
SB Energy	NTPC	350	4.63	2.37	-49%
Tata Power	NTPC	300	5.45	2.37	-57%
Azure power	NTPC + SECI	200	5.16	2.37	-54%
ACME Solar Holdings Pvt. Ltd	SECI	150	4.43	2.37	-47%
FRV Power India Pvt. Ltd.	SECI	100	4.43	2.37	-47%
Adani Green - Prayatra Developers	NTPC	50	5.13	2.37	-54%
Total/ average		2132	4.54	2.39	-46%

Note: Proposed INR 2.37/ unit of tariff excludes the trading margin of INR 0.07/ unit for both SECI and NTPC backed payment agreements
Source: CEEW-CEF analysis

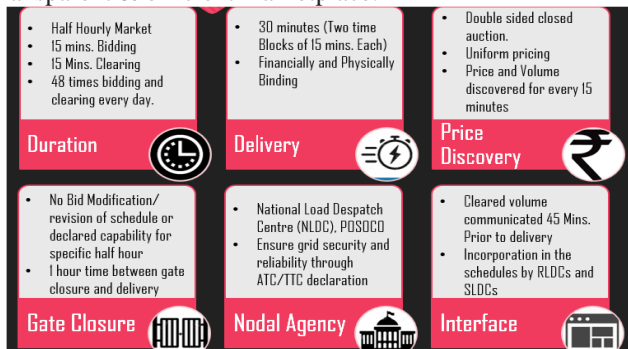
However, the center of the problem for Jagan Mohan Reddy was Andhra Pradesh Southern Power Distribution Company (APSPDC) and Andhra Pradesh Eastern Power Distribution Company (APEPD) as each had made untenable losses of 934 Cr. INR(US\$ 130 m) and 628 Cr. INR(US\$ 90 m) respectively in FY-2018/19. Thus the divide between ACS- Average Cost of supply and ARR- Average Revenue realized/unit of supplied power was preposterously high for APSPDL and APEPDCL at 0.23 & 0.71 Rs./ kWh, respectively.

Different legal and political actions have resulted in a slow resolution of the retrospective renegotiation complications. The Union and AP government reached an agreement on the disputed PPAs in December 2019, stating that they shall not be Renegotiated or revisited. The AP State government was also asked to pay 280 crore INR (US\$ 38.5 m) discoms dues within 10 days. Some developers who had outstanding PPA dues with the state Discom such as Hero Future Energies and Mytrah, Azure Power reported that they received these payments.

Across Indian states, aggressive tariff capping of bidding auctions and retrospect Renegotiations have been a common issue. As a result of this; since 2016, India has observed a 30-50 % decline in wind energy tariffs. Simultaneously, the last decade has observed a steep decline of 80% for solar energy tariffs from the precipice of 12 to 15 Rs./KWh. However, financially distressed discoms are now being worried about the upcoming two decades of contractual terms at rates way higher than today's cost of replacement. Nevertheless; such an attempt to escape from the legally binding contract has been an indication of a false economy; violating the rule of law before new low-cost renewable energy capacity investment can occur.

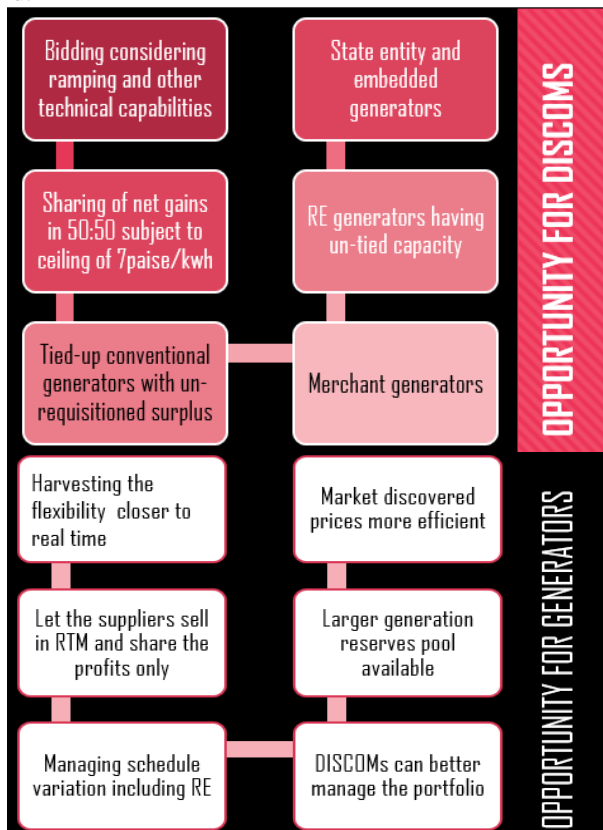
Therefore, such short-termism is certain to reap massive long-term ramifications like the proliferation of the State and India's fundamental renewable investment risks. Maintaining, upholding, and fortifying the compliance of legal contracts as for India to achieve its long-term target for doubling /even tripling of India's renewable electricity generation upto 2040; not only to keep up with the growing electricity demand but also for Exports. It shall also help to maintain India's economic growth rate and improve it's ranking for ease of doing business thereby attracting major foreign investors towards green energy projects in India.

REAL-TIME MARKETS is designed with an aim to help Discoms & Gencos to trade power with even greater flexibility on power exchanges just one hour before the actual delivery. With RTM, both sellers and buyers now get an opportunity to continuously manage their portfolio optimally through a transparent & efficient marketplace.



Source: Self Created Graphics

- Discoms can handle their portfolio of power purchases in an optimum manner and do not need to tie up excess energy. This will help in cost optimization of power procurement and providing customers with stable supply because any last-minute power demand can be easily purchased from the Real Time Market (RTM).
- RTM will help address grid management problems due to the erratic and unpredictable nature of renewable energy production and thereby lead to the introduction of higher quantities of renewable energy resources into the grid.
- RTM will result in shorter tendering times, faster scheduling, and specified processes enabling participants to access resources across the competition-promoting all-India grid.



Source: Self Created Graphics

Gujarat Land Policy reaping Hurdles for Wind Power

Ever since India adopted the reverse bidding mechanism for tariffs in June 2017: SECI and NTPC have conducted auctions for about 10GW of onshore wind power; which resulted in an early negative impact on costs and profit margins owing to tariffs reducing by nearly half.

The power developers allocated this renewable energy capacity were permitted to Commission it anywhere across India at locations rich in wind resources, with an obligated responsibility to procure the land for these projects themselves. This resulted in intractable land acquisition issues and projects were unable to kick-off due to unaffordability, nonavailability, or litigation issues.

Gujarat Case Study

Through various feasibility studies and energy mapping exercises, it has been established that Gujarat and Tamil Nadu states are India's best locations for wind power (onshore and offshore).

When in 2018, winning wind power contract developers who secured bids by SECI and NTPC's auctions vociferously raised concerns over inaccessibility to suitable land for in Gujarat since State government had already reserved land for state-sponsored wind projects; forcing auction bid awardees of the center to look for expensive private land alternatives.

The responsibility for the provision of project transmission lines and grid connectivity to the developer projects was ambiguous between State and Center; further delaying the commissioning of wind energy projects in Gujarat in 2018.

The paucity of available land rich with wind power resources led to a muted response in the following wind energy tenders. To counterbalance this dearth of land resource and the added cost of expensive private land, a 10-15 % hike in wind tariffs was enforced as a regulatory risk by the developer's community.

Gujarat's Land Policy for Green Energy Projects

To resolve these rising issues, the State Government of Gujarat in 2019, announced its 1:2 expanded land policy for Green energy projects to resolve the conflict. Under which they allocated 30GW of land for solar, wind, and solar-wind hybrid capacity. Of which land worth 10 GW was allocated to state-backed discoms and the rest 20 GW worth of land was made available for projects supported by the State and the Center.

However, such clarity of policy was a bit too delayed for those developers who had already won bids and their proposed projects approached their respective commissioning deadlines. It hit hardest to those developers who had already purchased expensive land. Such higher costs of capital impacted their tendering calculations, lowered the yields, and upset their investors. Furthermore; the developers sought clarification on the criteria of allocation of land following the renewed policy of the Gujarat government.

Despite such policy declarations, the SECI wind auctions were postponed four times thereafter.

The January 2020 tendering round had bid participation below the minimum requirements for the auction to proceed, even at a proffered rates of 2.93 INR/ kWh tariff cap. The new tender deadline for the same was postponed to 24 January 2020. Despite a better tariff price and a credible off-taker(SECI), the wind auction failed to highlight the persisting issues related to wind power.

In contrast to feed-in tariffs (FiTs), the reverse bidding mechanism has dramatically brought down wind power tariffs from INR 4-5 / kWh to INR 2.44-2.88 / kWh since its implementation in 2017. The long-term strategy on a potential infrastructure expansion, which seeks to reach 100GW of wind by 2030, ensures that the wind sector remains moderately optimistic, given its initial friction of marginal profits as a result of tariff regime adjustments.

Although, the paucity of specifications on other project intricacies, such as grid connectivity, land, and other regulatory approvals, significantly insulted the sector's momentum, curtailing investment, and job opportunities. The magnitude of these sequences of events is witnessed by ReGen Powertech, Suzlon, and Inox Wind's ongoing financial distress, undermining investor, and banking confidence.

Although, in this case, the developers already knew about the need for procurement and acquisition of land for their projects, the industry would certainly benefit from improved government policy support and coordination. Efficient coordination on these issues needs to be established between central and state governments which would help smoothen India's energy transition by speeding National renewable infrastructure investments as well as reducing India's excessive dependency on expensive, inflating petroleum imports.

Insufficiency of State Government-backed Wind Energy Projects

The latest roll-out of India's wind power capacity was primarily issued by the central government. Since the advent of reverse bidding mechanism in 2017; 14.5GW of wind capacity has been auctioned (2.2GW of which with no takers) by Centre versus only 1.25GW of wind capacity projects auctioned by state governments: Gujarat (750 MW) and Maharashtra (500MW). State governments must exploit their wind capacity to attract investment and create jobs in the state. Dispensing a myriad range of locations would both boost the energy grid reliability and help meet critically important national targets. States may include companies as project owners, allowing for the diversification and offtaking of guarantees by third parties, thus reducing main project risks.

Research Methodology

1. Conducted a thorough **Bibliometric analysis** of the articles, journals, publications, blogs, news pieces, Govt. reports, Third-party reports, to collate data on new and upcoming trends in the changing renewable energy sector in India.
2. Studied various past Bids and tenders for Solar and Wind projects by SECI under the ISTS (Inter-State Transmission System) network for bid prices, e reverse

auctions, their success rates, investors, winning tariffs, regulatory charges and bid selection criterion for understanding the competitiveness of Solar and wind to Thermal power.

3. Studied the Electricity Act 2003 and the Draft Amendment of electricity Act, 2020; including its comments and suggestions. To understand the contractual changes, the new open-access norms, reallocation of roles for state regulatory Commission for smooth transitioning for the privatization of state and union territory discoms.

4. Attended **Webinars and Forum discussions** on Upcoming trends in Solar and Wind energy, foreign Investments, and partnership for new technology projects. Also added insights from conversations with my mentor during my **Internship** with Hinduja Renewables Energy Private Limited.

5. Undertook the **Case study** approach to analyze the Andhra Pradesh case for understanding the changes required in communication and coordination between Central electricity regulatory commission and State Electricity Regulatory Commission concerning their roles and responsibilities and liability towards clearance of dues. Also, understanding the recent abnormalities between developers, State Govt. and Center over the paucity of resourceful lands for Wind Energy Bids through the Gujarat case.

6. Tracked State-owned Discom's quarterly and annual RE performance reports to check the renewable purchase obligation (RPO compliance) over the past year to understand the drawbacks in policy systems resulting in increasing non-compliance.

Results And Analysis

After a thorough study of various blogs, articles, reports, and comments by veterans in the sector, the following conclusions can be drawn from the adoption of ISTS bids by SECI and it's impact on the markets and the developer community.

If passed, the EA 2020 will have impacts on the following:

1. Electricity tariffs across consumer categories will rise
2. Contractual enforcement will become stricter - litigations may rise.
3. Electricity transactions without adequate payment security mechanisms will not be allowed.

Renegotiations Of Tariffs And Aggressive Capping

Since the transition of the market to e-reverse bidding auctions and Inter-State Transmission System (ISTS) based Schemes by SECI for electricity procurement, nearly 60 GW of wind and solar power has been allocated for 25-year tenures at below 3 Rs/ kWh (~USD 42 / MWh) with close to zero indexation. Which is an accomplishment in itself and a giant step towards India's target of 175GW by 2022.

Despite low tariffs like Rs2.44 / kWh (US\$34/ MWh) for wind and solar, there is a silent increase in financial risks to investors rendering them unrealistic. These risks are owing to :

High banking and wheeling charges,	Higher maintenance costs,	Weather fluctuations,	Faulty transmission network infrastructure
Transmission losses,	Land unavailability,	Lack of skilled manpower,	Inadequate storage facility.

Renewable energy generators are now contemplating over the low range of tariffs at 2.6- 2.8 Rs. /kWh and to be unfeasible and unhealthy in the current context owing to policy instability and headwinds of contingencies relating to project execution.

Indian reverse bidding auctions set tariff limits (upper and lower) which developers have to adhere to, especially via state-owned discoms. Developers find the tariff caps too competitive and stressed, with the possibility of high risks versus returns making them increasingly reluctant to take part in auctions. Around March-December 2019 approximately 7 GW of auctions received no response.

Taking into account the location's renewable energy capacity and metrics like microclimatic analysis of solar irradiation, wind speeds, and the proportionate risk/credit profiling of the discoms involved, the upper tariffs for each contract must be amended accordingly. Financial trade markets follow the obvious pattern: *the higher the risk, the higher the tariff needed to make the project viable, the higher the returns.*

Ministry of power & respective state governments need to communicate closely with developers and investors to come to terms with targeted returns and find consensus on appropriate risk attributes.

Staunchly low tariff limits based on market discoveries observed in past auctions with consistent parameters (dropping interest rates, no import duty, transparent and reliable policy infrastructure support, govt. coverage policy for risks of land acquisition, integration, grid access) are not feasible anymore. Silent absence in tender responses by Private sector and renewable energy developers throughout 2019 is strong testimony that only appropriate risk-return profiling can promise private capital mobilization.

Also, there have been several occasions when state-owned discoms have attempted to renegotiate tariffs fixed at reverse bidding auctions after the award of the tender, highlighting the underlying sovereign risk issues.

Therefore we conclude an important principle of Indian tendering:

"Higher risk increases the cost to consumers in the form of tender price results. the higher the risk, the higher the cost to consumers in the form of tender price results."

It procrastinates the techno-commercial metamorphosis of India's energy landscape, with all the added incentives of reducing pollution, cutting carbon emissions, and fortifying India's energy security.

Amendments In The Tendering Process For Risk Reduction

The ministry of power revised the tender building regulations for wind power auction in August 2019 to

recapture the interest of developers towards wind power investments.

The amendments were as follows:

- **Land acquisition:** It relaxed the earlier mandatory provision allowing developers to locate the project property within 7 months of signing the PPA (Power Purchase Agreement) to now locate property at any time within the commissioning time period.

- **Generation shortages penalty:** the penalty for any generation shortage from the declared annual capacity utilization factor (CUF) of wind projects has been decreased from 75 % to 50 % of the contract tariff.

- **Late commissioning payment:** Compensation rates were raised for contracts started earlier than the project date, increasing from 75% to 100% of the contract tariff.

- **Contract date:** The contract date for SECI solar and wind tenders has shifted from the earlier 18 month period between the contractor and SECI when the PPA was signed. Within the current rules, developers have an extended 18-month timeline after power supply agreement (PSA) between SECI and the State distribution companies

The Ministry for New and Renewable energy also plans to terminate ceiling tariffs for wind energy tenders from SECI. It will be a positive change for attracting developers as it permits them to compete at tariffs compliant to their risk-return outcomes. These improvisations will regain the balance between risks and returns.

The no show attitude towards the new SECI tender however shows that problems in the wind power market are already challenging and considerably broader than only a few unfavorable contractual terms. Despite the versatile deadlines for land purchases, developers were unable to locate sufficient property at the right price. Any improvement in the confidence of developers is unlikely unless the issue is dealt with effectively.

Discussions

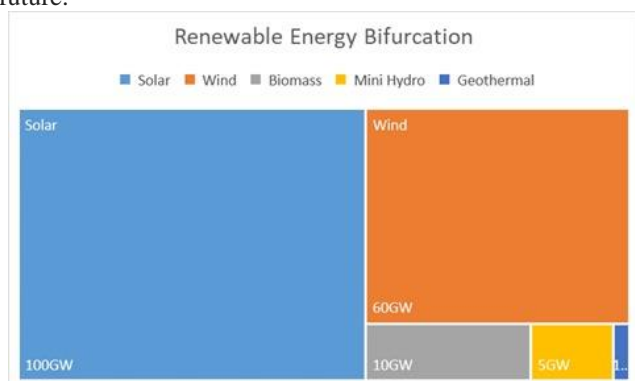
New Regulations And Policies Energy (Power)

The current Union government of India has targeted to generate 175 GW of grid-connected renewable energy by the year 2022: 100 GW -Solar, 60 GW-Wind, 10 GW-Biomass, and 5 GW- mini hydropower in addition to 1 GW-geothermal energy. In 2018 the National Electricity Plan Charted objectives to achieve 275 GW of renewable energy by 2027, which would make the Renewable Energy share 44% of installed capacity and 24% of the power generated.

Utility-scale renewables

India's Dependency has been inclined towards Renewable purchase obligations (RPOs), renewable generation obligations (RGOs), renewable energy certificates (RECs), the speedy depreciation of renewable energy assets for commercial and industrial (C&I) consumers, and lately on competitive tenders for utility-scale renewables. The RPOs allow a share of their power from renewable sources from DISCOMs, energy suppliers, and other customers. State Electricity Regulatory Commissions carry out the determination of the RPO trajectories and compliance

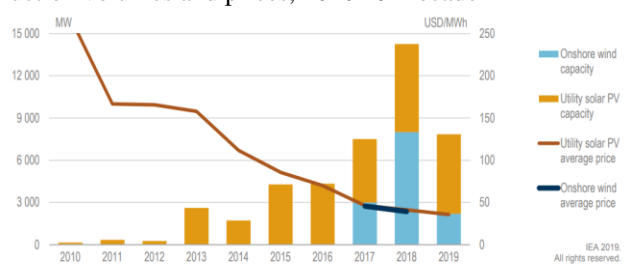
monitoring. In June 2018, the demand for RPO increased from 17% to 22% overall: 10.5% from wind, 6.75% from solar, and 10.5% from non-solar renewable sources by 2022. They'll need to be increased to meet a 450 GW target for the future.



Source: Self Created Chart

SECI conducts large-scale central solar park auctions and has issued contracts for 47 parks with a total capacity of more than 25GW. Solar parks' key concept is to provide a "plug-and-play" platform for projects so renewable power developers can redirect their energies to other issues related to project creation and risks. MNRE has finally made amendments to the competitive bidding regulations with provisions to reduce the off-taking risks, mitigate the downfall in revenue from curtailment, and minimize land acquisition delays in the SECI auctions.

Auction volumes and prices, 2010-19 Decade



Source: EIA 2019

Note: The right axis reflects prices in USD/MWh which won at the auctions.

Solar rooftop - PV module

The Indian government has allocated a target of 40 GW to rooftop solar under the 175-gigawatt renewable energy for residential and commercial use by 2022. MNRE has implemented guidelines to Launch Phase II - Grid-Connected Solar Rooftop Project. As also issued RPOs, several rooftop auctions, and other initiatives to propagate installation of rooftop solar PV on govt. buildings across states of India.

Other policies to promote and facilitate solar rooftop projects are:

- provide central funding to projects for private, educational, public, and government and institutional buildings;
- suggest states to enforce net or gross metering and adhere to tariff orders;

(c) Include a Model MOU, PPA and CAPEX Agreement for Government Sector Rooftop Projects; and

(d) appoint experts to advise public-sector undertakings to undertake rooftop projects in ministries and departments.

In February 2019; total monetary support of Six and half billion USD by 2022 for promoting solar use among farmers was sanctioned by the Cabinet Committee on Economic Affairs (CCEA). Despite India's expensive retail tariffs for power (net metering systems) in 28 states with State wise different tariff frameworks, solar deployment is gaining momentum.

Offshore wind

The Government of India in collaboration with the European Union has estimated an offshore wind capacity of the 10-20 GW area. Animation tendering is expected soon for 1 GW on a white paper in association with the European Union for Risk identification in supply chain and industry infrastructure, as India is a novice in the Offshore turbine energy sector.

First Offshore Wind Project of India (FOWPI): Funded by the European Union (EU) In support with MNRE and National Institute of Wind Energy (NIWE) to exploit the offshore wind energy potential in India and provide technical expertise for preliminary evaluation and cost-effective production of offshore wind in India. Preliminary evaluations for Tamil Nadu and Gujarat have been performed so far.

Off-grid solar PV

At both national and state levels, various schemes are made available to promote off-grid electrification, primarily through solar technologies. For instance, Deen Dayal Upadhyaya Gram Jyoti Yojana (DDUGJY) scheme of 2015; to promote the adoption of decentralized power distribution through off-grid facilities, primarily mini-grids, in rural India. The Off-Grid and Decentralized Solar PV System were developed in 2017 to promote the implementation of unique solar PV applications in street lighting and groundwater extraction for rural neighborhoods by providing financial support to the implementing agencies.

From the study of various ids and trends of ISTS schemes in various State as well as national bids, the following inference could be drawn from the Developer's perspective.

SWOT Analysis of the Inter-State Transmission System (ISTS) Scheme by SECI

Strengths

- ISTS where the power generated in one resource-rich state could be transferred to other renewable deficient states.
- The ISTS auctions have triggered significant changes from the previous state-specific feed-in tariff (FiT) system to market-driven pan-India processes.
- In line with the Government's proposal for 175 Gigawatts of renewable energy by 2022, target-based capacity additions and changes to solar power based on market-discovered tariffs.

- **Waiving off the Inter-State Transmission System (ISTS) charges** and losses for cross border sale of solar and wind power for ISTS projects commissioned up till March 8th 2022.
 - Sanctioning 100 % **Foreign Direct Investment (FDI)** under an automatic route.
 - Release of standardized bidding guideline-based notification allowing bidders to Cost-effectively procure solar and wind power at competitive rates.
 - Publicly Notifying the state-wise **Renewable Purchase Obligation (RPO) targets** up to the year 2022 and the penalty for non-compliance.
 - Execution of the **Green Energy Corridor project** facilitating Regional and national grids integration of large scale renewable energy (solar and wind) capacity additions.
 - The sustainable Integration of all regional grids would lead to the efficient use of limited natural resources by moving power from resource-centric regions to Load-centric regions.
- ISTS is also paving the way for a competitive energy market to promote power exchange across regions.

Weakness

- Infrastructure is still not in place for storage and Safe Transmission of power from producer state to consumer state.
- In losses of production, at least 10 states are losing about 1/3 of the power supplied to their customers. The situation has worsened with state distribution companies grappling to pay for the electricity purchased to the generation companies, thereby leading to the inability of some Gencos to produce/generate electricity.
- Despite the National Democratic Alliance (NDA) government's 2.86 trillion INR proposal to implement the preliminary Atal Distribution System Improvement Yojana (ADITYA), aimed at reducing power Transmission and distribution losses and aggregate technical and commercial losses by half (21.4% to 12%). **In 2020, AT&C (Aggregate Technical and Commercial Loss) Losses still stand at 19.01 %**, indicating a clear failure of the proposal.
- The widening divide between the cost of electricity bought (average cost of supply) and the cost of electricity supplied and distributed (average revenue realized) is yet to be breached which is the rising concern.
- The Nation's electricity value chains are impaired at the distribution stage, Contaminated by issues like a low collection of dues, an increase in the average power purchase cost, inadequate tariff hike and subsidy disbursements, and mounting dues from government departments. Thereby creating an urgency to make a policy framework for cash collections; to eradicate the weakest link by strengthening electricity Discoms.
- With this background, the Centre aims to change several reforms in the proposed National tariff policy with regards to penalties on gratuitous load shedding, nonallowance of losses more than 15% in tariff, and limiting the cross-subsidy surcharges.
- **AT&C loss reduction efforts** have been slow and erratic.

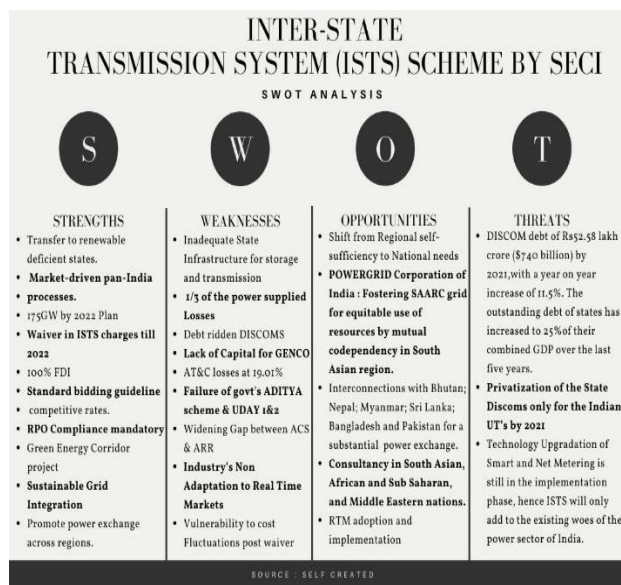
- Owing to the waiver of ISTS charges until 2022, the industry is not prepared for the increase or hike in cost fluctuations owing to numerous regulatory charges
- The industry has still not adapted to the idea of Real-time markets and Power trading in all parts of India.

Opportunities

- ISTS stimulates a shift of mindset from Regional self-sufficiency to catering to National needs and requirements.
- POWERGRID Corporation of India has established a firm position in the South Asian power markets and is a catalyst in the constitutionalizing of the SAARC grid for equitable use of resources by mutual codependency. It has also been instrumental in fostering interconnections between India & Bhutan; India & Nepal; India & Myanmar for substantial power exchange. It has also mapped the feasibility for an underwater power connection between India and Sri Lanka and a 500 megawatt Amritsar - Lahore HVDC link between India and Pakistan.
- It has also emerged as a consultant to many National clients & International clients, including many South East and South Asian, African and Sub Saharan, and Middle Eastern nations.
- RTMs would provide distribution companies (DISCOMs) with an opportunity to access the market in order to meet any requirements of the last minute. The real-time market for PXIL would be a first-time game-changer in the electricity market. It will encourage generators who have even long-term PPAs to participate in the country's vibrant power market. The RTM would present a vibrant market-based platform for the DISCOMs, as well as conventional and renewable generators, to better manage their power requirements in a planned, efficient, and transparent fashion.

Threat

- India's State Power Distribution companies are anticipated to reach a cumulative debt burden of approximately Rs 52.58 lakh crore (\$740 billion) towards the end of the financial year 2020, which is a year on year increase of 11.5%. "The outstanding debt of states has increased to 25% of their combined GDP over the last five years," according to a recent Reserve Bank of India (RBI) report.
- **Privatization of the State Discoms** is being fast-tracked only for the Indian UT's by 2021 despite non-clearance of past dues and squaring of accounts with gencos. For example; Deloitte Consulting is the chosen partner for overseeing the smoothed transitioning of privatization of the Chandigarh union territory's Discom.
- **Technology Upgradation of Smart and Net Metering** is still in the implementation phase, hence ISTS will only add to the existing woes of the power sector of India.
- **Failure of Both of UDAY schemes** to alleviate the DISCOMs from their financial burdens.



The Green Energy Transmission Corridor by the central government is aimed at increasing regional transmission capacity and to leverage emerging green energy-concentrated areas. Given the disparity, India's geographic location of solar and wind resource-rich states on the western, southern, and eastern coasts, inter-state power transmission capabilities from energy surplus regions to deficient ones will improve load balancing capabilities.

Conclusion And Recommendations

The Strength of India's economy, the capacity and magnitude of its electricity market, and the long term goals for the transformation of the electricity sector make it one of the most popular destinations for RE sector investments. Data from Saur Energy, Economic Times and Outlook India shows that when backed by policies and good governance, India can entice 500-700 bn. USD of investment in the coming decade into its renewable energy and power grid sectors.

Policy Recommendations

The government strongly needs to advocate and bolster policy support with transparency while maintaining high levels of contractual sanctity, transparent and accountable DISCOM payment mechanisms, increased power deficits and borrowings by State owned Discoms to lubricate India's transition to international energy markets.

- Fortify cooperation and interaction between Union and state governments, financial institutions, State Discoms, and developers/generators;
- Reinforcing domestic solar PV module and cell manufacturing (currently at has a limited capacity of about 3GW for solar PV cells and nearly 8 GW for solar PV modules, and solar energy generation with off-take commitments, stronger tariff limits, and promoting Exports.
- Use one standard, fixed, National tariff rationalizing GST on solar and wind power systems. Currently at 18%, can be reduced to 15% for IPP's, and increased to 20% for C&I under open access.
- Repairing land acquisition and distribution of grid connectivity-related technical and technological bottlenecks; for renewable energy projects. Rechannelling focuses on renewable energy asset hubs and commercial solar parks. Along with State governments mitigating uncertainties of land acquisition and grid access while growing investment risk and ensuring defunct non-cultivable land is preferred. This helps capitalise and leverage gains from wastelands and redundant badlands of India.
- Diversification and promoting potential third parties to procure renewable energy through corporate (PPAs), with the Indian Solar Energy Corporation (SECI) and NTPC introducing state-wise wind and solar contracts. It helps lay a foundation for Corporate Sourcing Norms for procurement of Renewable energy in India, as suggested by IRENA (International Renewable Energy Agency) which in turn promises the sector with stable demand and increasing revenue.
- Declaring results based on Discom assistance by change schemes for discom revival, liquidation of discom

Other Renewable Energy Initiatives In India

RE10073: A global initiative born as a collaboration of influential businesses committed to 100 % absolute renewable electricity. They function together to substantially augment renewable energy demand and improve delivery. Supported by The Climate Group in association with CDP, RE100 aims to unite the most contextually relevant, consistently innovative, and clairvoyant businesses in the world that are leading the transition to a net zero-carbon economy by pledging to 100 percent renewable energy solutions in operations. Internationally, by February 2018, 125 multinationals had committed to the RE100.

WBCSD's Rescale Project: India Corporate Renewable Ppa Forum

REscale, an operational initiative by the world's leading businesses to accelerate clean energy deployment by coherent working. It founded the India Renewable Energy Corporate PPA Forum in 2017 considering them as a significant instrument for accelerating the deployment of renewable energy.

The report was released by the Indian Corporate Renewable PPA Forum in 2018. Speeding up corporate renewable energy procurement in India. The India Corporate Renewable PPA Forum, building on this research, Meets two times a year to brainstorm and strategize its biannual PPA market and policy.

GREEN POWER MARKET DEVELOPMENT GROUP, INDIA: an initiative to increase the participation of renewable energy in C&I (commercial and industrial) industry's energy use by addressing policy recommendations, regulatory mechanisms, and renewable market shortcomings impeding the renewable energy sector growth. GPMDG partners with govt. bodies and other related entities to aid the member companies strategize their renewable energy goals voluntarily and achieve them.

Green Energy Transmission Corridor

dues and amend the Electricity Act to introduce hefty penalties on reneging of any kind of contract. The government will assist the distribution companies so long as loss reduction trajectories are adhered to. Also, the deviating distribution companies will be penalised.

- Privatizing parts of the power generation market, or encouraging private competition to drive the implementation of innovation and technology. Eg. Privatisation of Union territory DISCOMS by 2021.
- Planning for expanding and modernizing the transmission network, and incorporating the connectivity and integration needs of RE hotspots on a large scale. Eg. Green Energy Corridor Project.
- Analyzing and formulating tariff ceilings (Upto 3Rs/ kWh) by analyzing market tariff standards and evaluating risks; to minimize risk as well as lower tariff prices sustainably.
- Upgrading domestic as well as foreign access to funding and capital for both large and small renewable energy players, alleviating the Indian Renewable Energy Development Agency's (IREDA) balance sheet capacity. Projecting perennial capital flow to the Power Finance Corporation (PFC) because of its currently unsustainable losses from non-performing thermal power assets.

Need for Improvisation in Coordination between Central and State Govts. for Renewable Energy Projects Implementation

India's energy sector's functional structure is both top-down as well as bottom-up; where state govts. are responsible for fulfilling their domestic electricity needs first, while the center is involved in developing and bidding power projects.

Union government bodies; SECI and NTPC have played a fundamental role by outlining and guarding a strong national policy and legal framework to enable India's energy transition. They are also signatories to solar and wind energy PPAs thereby leveraging the central government's Positive credit rating to lower contract costs, aiding State Discoms, and thus consumers.

Although the primary deployment of capacity additions to renewable energy is via SECI and NTPC, it has also been awarded by Indian state governments through state Discoms.

Limitations

Crucial deterrents slowing and log jamming the growth of India's renewable energy sector, including:

Contra productive commercial duty on solar module imports

The Two-year trade export-import duty imposed to support the domestic solar industry in July 2018 has proven inefficient and destructive. While shuffling exporting countries' market share; the imposed duty taxes have neither reduced foreign imports nor improvised the competency of domestic solar cells produced, solar projects have been significantly slowed down. To reduce India's dependency on Chinese solar cells and modules amidst the tensions between the countries India is considering to levy an import duty of

20-25% on the solar module and 15% of solar cell for a year beginning from August 2020 and in the subsequent year 40% on the solar module and 25% for solar cells. This move is to protect India's local manufacturing industry by making it self-sufficient at the same time meeting Prime Minister Narendra Modi's target of hundred gigawatts of solar energy by 2022.

Weak coordination for renewable energy projects between the Union and the state governments.

Confusion postponement and mismanagement in interstate and intrastate transmission connectivity, auctions, and land acquisition issues are resulting in delays and heavy cost overruns for developers thereby jeopardizing their project costs and economies.

Delays in payment by State Discoms

Repayment delay due to the abysmal condition of debt-ridden discoms continues to be a major threat. DISCOMS owe a total of Rs 90,655 crore to power generation firms in June 2019, according to portal PRAAPTI (Payment Ratification And Analysis in Power procurement for bringing Transparency in Invoicing of generators). The implementation of the new payment protection system from August 2019 is apparently increasing payment dues but the government will ensure that the system is regulated appropriately.

Delay in subsidy release, overdue on payments from state government departments, inefficient recovery of revenue, and delay and influence in tariff implementation are key reasons for discoms' losses.

Privatisation of State Discoms

Under the Aatam Nirbhar Bharat, the Union government decided the privatization of distribution companies (discoms) in the Union Territories (UTs) by January 2021 and is also seeking help from private players like Deloitte for the Feasibility and Execution for the same.

Discoms' losses on account of power supply termed as aggregate technical and commercial (AT&C) were at 22.1 percent in FY19 and as per provisional data, it stands close to 19.19 percent in FY20.

States	FY20 AT&C losses (%)	FY20 Losses (Rs Cr)
Uttar Pradesh	30.3	-819.79
Madhya Pradesh	25.27	-1192.13
Jharkhand	36.06	-308.81
Karnataka	14.3	3975.02
Haryana	18.03	-184.23
Assam	21.21	-242.29
Goa	10.79	35.44
Gujarat	8.51	245.92

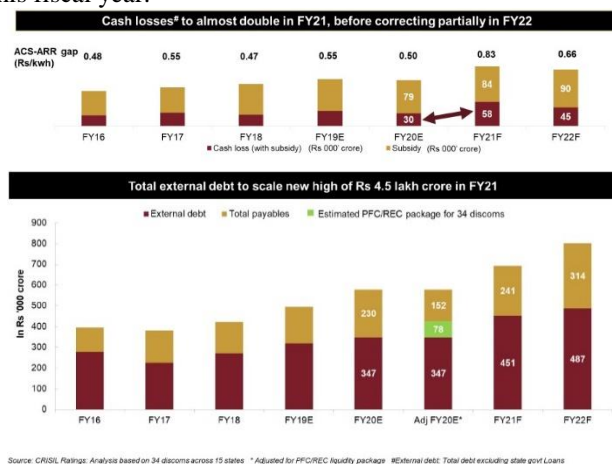
Provisional Data/Unaudited data for FY20 reflects Q4 data only for 2 states. Source: UDAY portal

Some states like Uttar Pradesh, Madhya Pradesh, Assam, Jharkhand, Karnataka, Goa, Haryana, and Gujarat have shown interest in privatizing their loss-making discoms.

"The power ministry is also looking at encouraging Public Sector Undertakings for the discom business in a Joint Venture (JV) with private companies. In the month of May, NTPC a PSU under the ministry had shown interest in acquiring BSES led discoms in Delhi. The idea is also to aggressively push for franchisee models where a private company can help a particular discom to bridge the gap in revenue collection inefficiencies." - CNBCTV18, June 6, 2020.

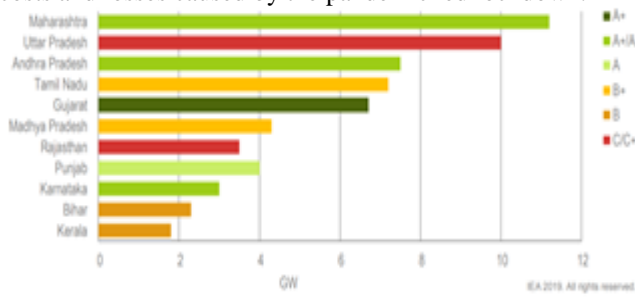
Abysmal condition of Debt-ridden state Discoms

Discoms with poor payment records; are adversely affecting power generation firms, at the same time augmenting the stress in the banking sector. The debt burden of these discoms is expected to hit an all-time high of ₹4.5 trillion this fiscal year.



Despite the central government announcing Rs.90000 crore liquidity line loan assistance for state Discoms against receivables as a part of the 20 trillion rupees stimulus package to settle a significant portion of the overdue bills to gencos; it has not found many takers as some states are absolutely against providing guarantees for the loans to implement the mandatory Reform measures.

According to the CRISIL report; only one in five state Discoms has the potential of servicing debt through budgeted subsidies and own cash flows. It is likely to worsen for this fiscal year of 2020 because of weak demand for power in the background of an already low base, rising costs and losses caused by the pandemic led lockdown.



Solar PV capacity required to achieve 2022 targets & financial health of the State DISCOMs

Increased financial risk arising from high tariff thresholds; Tariff free negotiations and regulatory contradictions in the tendering cycle

In India, high tariff caps are a common issue in auctions and retrospective renegotiations. Few states and subsidies pursue undue coercion from renewable energy providers to reduce the total expense of a legally binding deal that was signed before the wind and solar tariffs fall. This short-termism comes at an immense long-term cost in reducing the market risk profile of India and exposes foreign creditors to sovereign risk issues.

Poor growth of transmission infrastructure and balancing of power

India's potential for transmission line networks grew with renewable energy between the financial year 2015-16 and financial year 2017-18 with a total of 25,000 circuit kilometers; although consistently reducing year on year thereafter. Lately, the downturn in the Clean Energy Projects seems to have reduced the importance of the development of new transmission facilities.

A negative spiraling impact on India's Clean Energy goal is seen in the slower progress of Transmission infrastructure.

Fiscal restrictions on smaller producers of clean energy

Sovereign Creditor risks, regulatory uncertainties, unpredictable payment mechanisms all pose needless funding limitations for the Green power (RE) industry. The idle or non-performing thermal power plants smother funding for the clean energy markets of India. Given India's ambitious 450GW Clean energy goal by 2029/30, and necessary upgrade to the national grid network; a need for new investment of US\$ 500-700bn is imperative. Smaller municipal developers would require domestic capital, too. In order to keep India's green energy strategy on track, India has to vacate liquidity within the domestic banking sector at the earliest

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