

# Renewable Energy (Wind/Solar PV)

## Competitive Bidding Experience from India

***Ashwin Gambhir***  
***Fellow, Prayas (Energy Group)***

SAARC Knowledge Sharing Workshop on Modern Techniques  
including Renewable Energy Auctions for Economizing Renewable Energy Tariff  
9-10 May 2018 in Colombo, Sri Lanka



आरोग्य, ऊर्जा, शिक्षण आणि पालकत्व  
या विषयांतील विशेष प्रयत्न

**Prayas, Energy Group**

# Presentation Outline

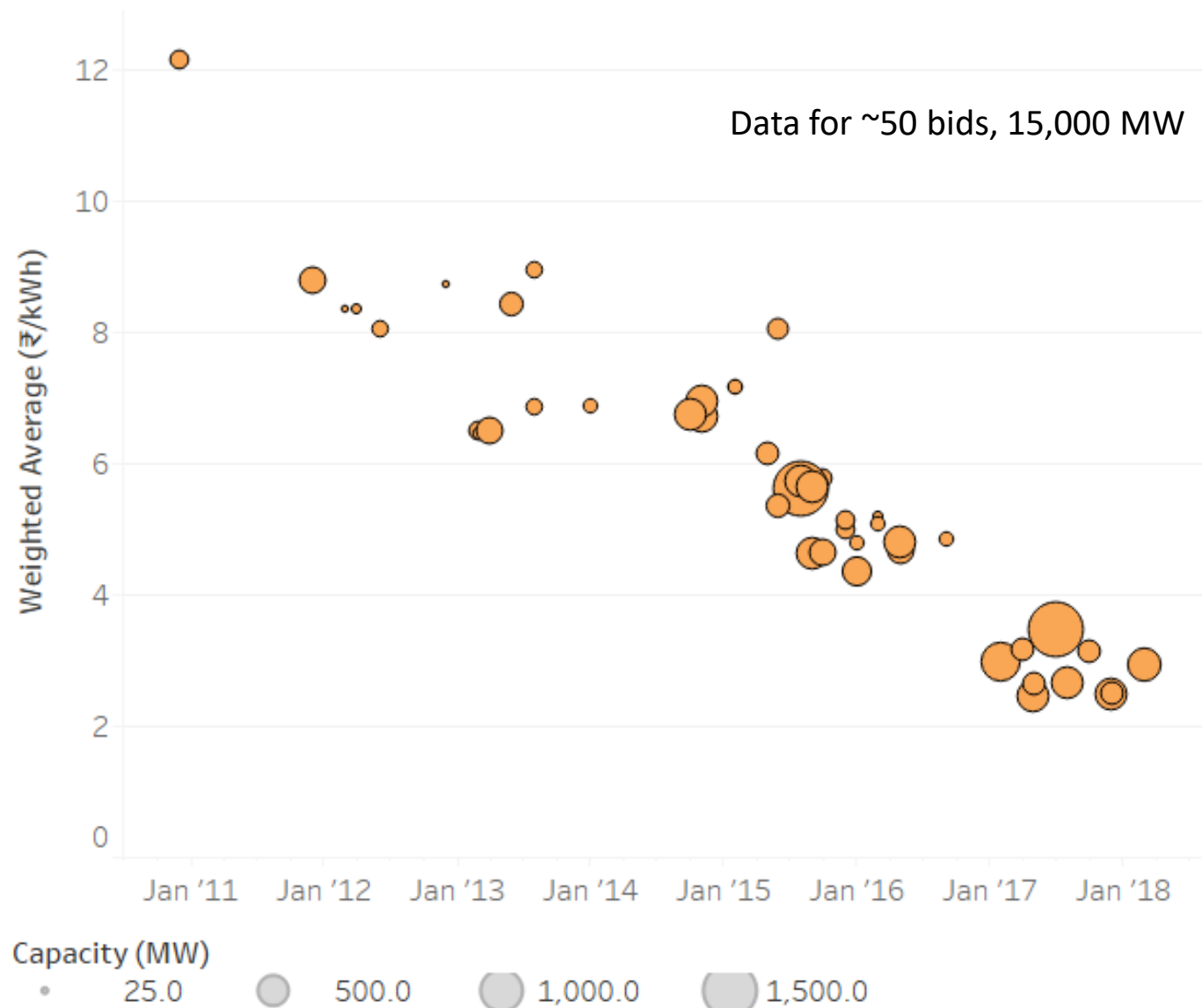
- Experience of competitive price discovery in wind and solar
- Basis for competitive bidding
  - Electricity Act, 2003, national tariff and electricity policies
- Deep dive look into the bidding guidelines, process and an overview of standard bidding documents (Request for Selection (RFS) and Power Purchase Agreement (PPA))
  - Some recent developments in renewable energy bidding
- Conclusions



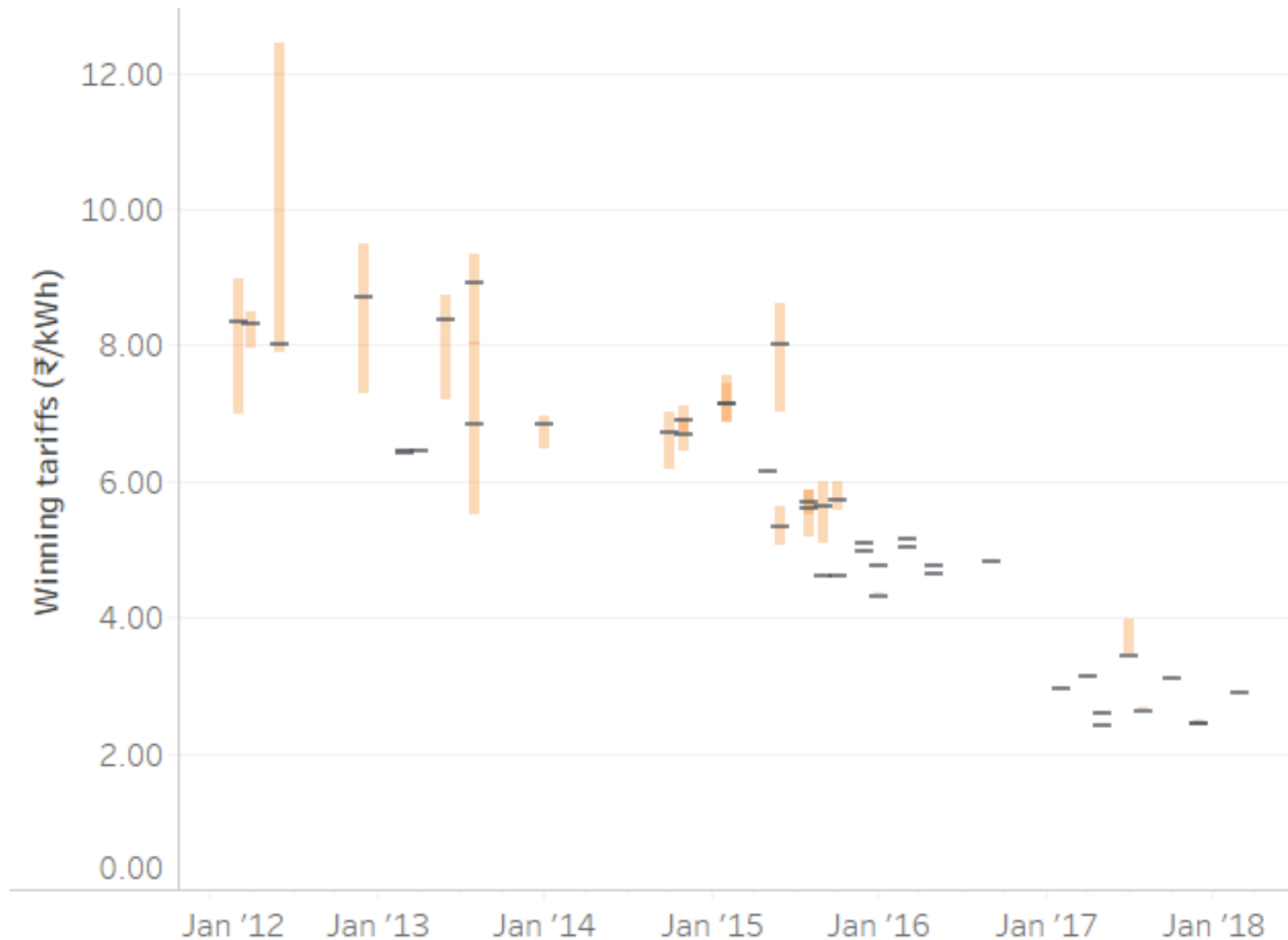
# Price discovery in wind and solar PV



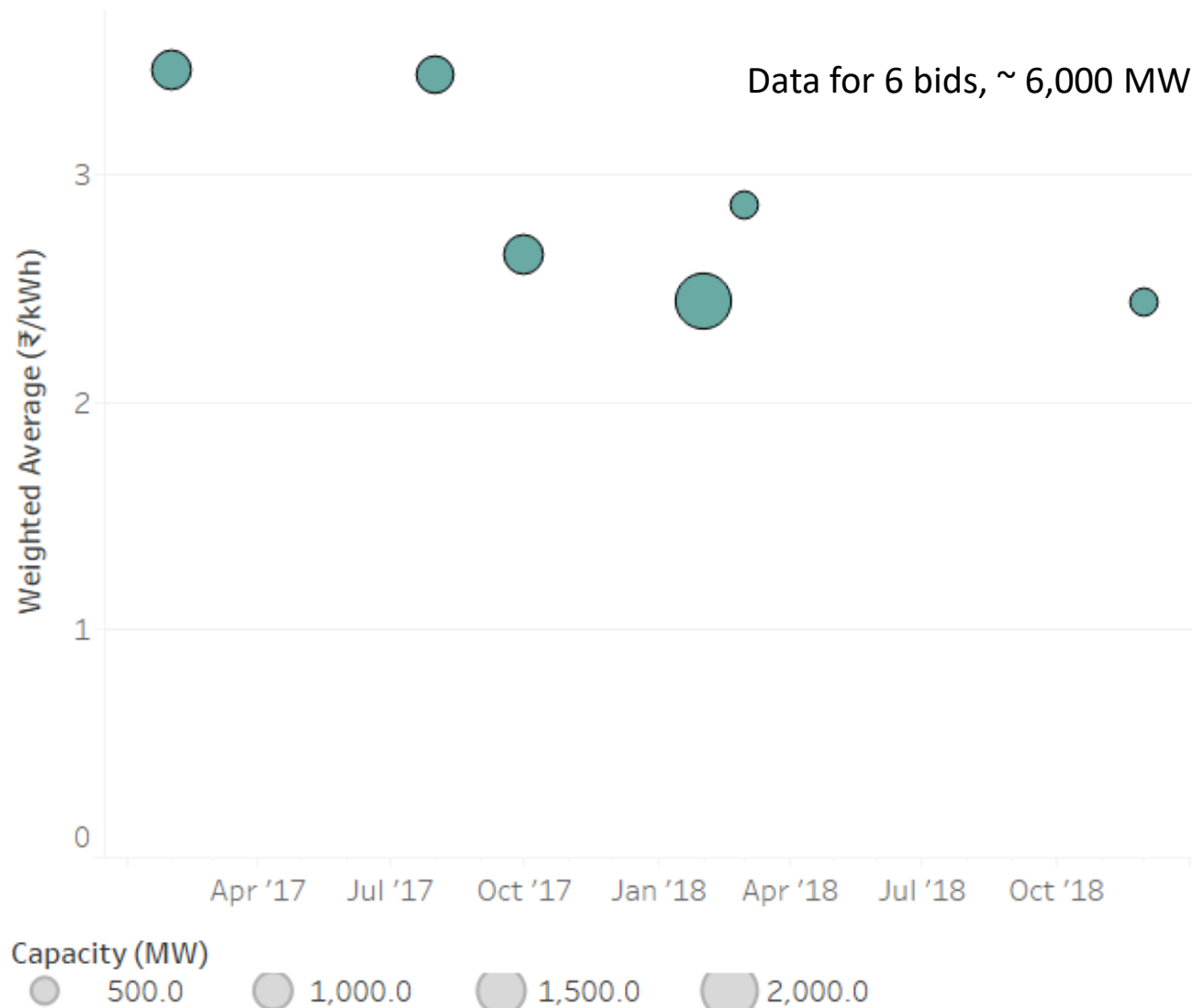
# Trends in solar tariffs in India (2010-2018)



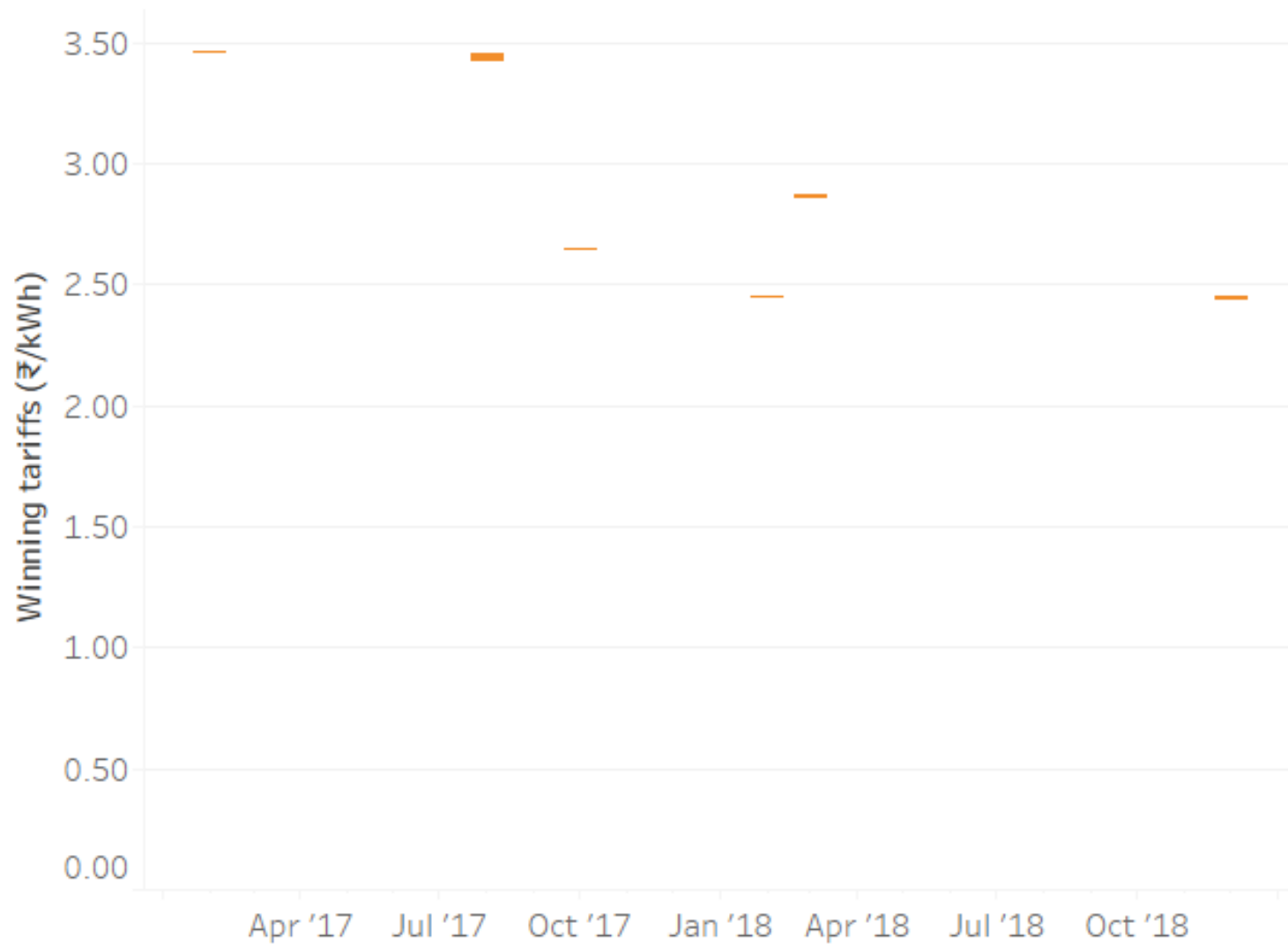
# Variation in winning bids – solar PV



# Trends in wind tariffs in India (2017-18)



# Variation in winning bids – wind



# Basis for Competitive bidding for Renewables

- **Electricity Act, 2003:**

- **promoting competition** is one of the key objectives
- Section 63: Notwithstanding anything contained in section 62, the Appropriate Commission **shall adopt the tariff** if such tariff has been **determined through transparent process of bidding in accordance with the guidelines** issued by the Central Government.

- **National Electricity Policy, 2005:**

- Set tariff with appropriate differential with conventional sources till such time it could be **procured through bidding and compete with conventional sources**.
- needs promotion for sustained growth, but efforts needed to reduce costs by **promoting competition within such projects**

- **National Tariff Policy, 2016 amendment:**

- States shall endeavor to procure power from renewable energy sources **through competitive bidding to keep the tariff low**
- Procurement of power by Distribution Licensee from renewable energy sources **shall be done through competitive bidding**
- Central Government may notify, from time to time, **an appropriate bid-based tariff framework for renewable energy**





- Bidding Guidelines
  - Objectives
  - Applicability
  - Jurisdiction
  - Conditions to be met by Procurer/Developer



# Objectives of these guidelines

- **Solar PV (3<sup>rd</sup> August, 2017)**
  - **a) To promote competitive procurement** of electricity from solar PV power plants, by distribution licensees, to protect consumer interests;
  - **b) To facilitate transparency and fairness in procurement processes** / and to provide for a framework for an Intermediary Procurer as an Aggregator/Trader for the inter-state/intra-state sale-purchase of long-term power.
  - **c) To provide standardization and uniformity in processes and a risk-sharing framework between various stakeholders**, involved in the solar PV power procurement, thereby encouraging investments, enhanced bankability of the Projects and profitability for the investors.
- **Wind (8<sup>th</sup> December, 2017)**
  - Provide a framework for procurement of wind power through a **transparent process** of bidding including **standardization of the process** and defining of the **roles and responsibilities** of various stakeholders. Enable Utilities to procure wind power at **competitive rates** in a cost effective manner.



# Applicability, intermediary procurer

- Applicability of guidelines
  - Long term procurement by DISCOMs
  - **Solar PV:** >5 MW
  - **Wind:** >5 MW at one site and min bid capacity of 25 MW for intra-state projects; >50 MW at one site and min bid capacity of 50 MW for inter-state projects
- Intermediary Procurer
  - may be required either **to aggregate** the solar power purchased from different Solar Power Generators and sell it to the distribution licensee, or **to enhance the credit profile**.
  - Here procurer would be a **‘trader’**, would sign PPA with generator and Power Sale Agreement (PSA) with end procurer (DISCOM)
  - Would earn a trading margin, decided by ERC or mutually agreed.



# Jurisdiction, Conditions to be met by Procurer

- **Jurisdiction**
  - SERC of state where DISCOM located, if single DISCOM procuring
  - CERC if, combined procurement by DISCOMs from different states
  - CERC if, sale of power from Central generating stations (e.g. NTPC)
- Preparation for inviting bids, project preparedness; conditions to be met by Procurer
  - Bid Documentation - Prepare the bid documents in accordance with these Guidelines and Standard Bidding Documents (**RfS, PPA, PSA**) notified by the Central Government, seek approval of Appropriate Commission for deviations, if any, in accordance with the process
  - Inform Appropriate Commission about the initiation of the bidding process.
  - If project site specified by Procurer, procure clearance by relevant authority of land lease/land agreement, clearance by Solar Park Developer for Implementation Agreement.



# Site arrangements, if site specified by Procurer

- These need to have been initiated by the Procurer before issuance of the RfS and completed prior to the PPA being executed
- **Land: (Solar)** Identification of 100% land and provision of documents / agreements to indicate in-principle availability of at least 25% of land at the initiation of bidding, and possession of 90% of land within 1 month of the execution of the PPA and the balance 10%, within 2 months thereafter.
- **No Objection Certificate (NOC) / Environmental Clearance** (if applicable)
- **Forest Clearance** (if applicable) for the land for the Project.
- **Approval for Water** from the concerned authority (if applicable).
- **Letter from STU/CTU confirming technical feasibility of connectivity to STU/CTU substation**, except in cases where the concerned STU/CTU has notified, sub-station wise spare capacities for feasibility of connectivity.
- If site is a **‘Solar Park’** developed as per the “Guidelines for Development of Solar Parks” issued by MNRE, procurer shall ensure preparatory activities mentioned above have been **initiated and completed by the SPPD**.
  - Responsibilities of the SPPD flow from the “Guidelines for Development of Solar Parks”, and Implementation Support Agreement, which defines the relationship between the SPPD and the Solar Power Generator.



# If site selected by Generator

- Identification of 100% of land at bid submission and within 7 months of execution of PPA, lease agreement to establish possession/right to use in name of Generator. Wherever private land is used, lease provision to allow transfer of land to lenders / procurer in case of default by generator.
- All other clearances same as noted previously.
- *Wind bidding guidelines do not mention anything about site selection by Procurer or an equivalent Wind Park.*
  - *Implicit that site will always be selected by Developer.*



# Bid Structure



# Bid structure for Solar PV

- Min size of package 50 MW to have economy of scale, exceptions possible
- Bidder has to quote for an entire package
- Procurer may also choose to specify the maximum capacity that can be allotted to a single bidder keeping in mind expected competition and need for development of the market
- Bid either in MW/MU (Capacity of Energy)
- Bidding Parameter: Procurer may opt for either 'Tariff' or 'Viability Gap Funding (VGF)'.
  - **Tariff:** Can be fixed/levelised for 25 yrs or escalating with pre-defined quantum of annual escalations fixed in Rs./kWh and number of years. Can specify upper ceiling for tariff, as that notified by the ERC. May note existing incentives like GBI etc. to developers.
  - **VGF:** Specify pre-determined tariff payable and max VGF available, bidders specify VGF needed, can offer tariffs lower than pre-determined tariff; specify a suitable VGF safeguard mechanism in case the Project is not developed and/or operated in accordance with the Project agreements.





# Bid Structure for Wind

- Specify total wind capacity to be procured in MW
- Min 25 MW (with at least 5 MW at one site) for intra-state projects and min 50 MW for inter-state projects
- Procurer may also choose to specify the maximum capacity that can be allotted to a single bidder keeping in mind expected competition and need for development of the market
- **Bidding Parameter:**
  - Tariff quoted by bidder. Procurer may specify upper ceiling (benchmark) for tariff. Tariff can be fixed/levelised for 25 yrs or escalating with pre-defined quantum of annual escalations fixed in Rs./kWh and number of years.
  - Procurer may also opt for e-reverse auction for final selection of bidders. May note existing incentives like GBI etc. to developers.



# Power Purchase Agreement (PPA)



# PPA – Wind/Solar

- **1. Period:** minimum **25 yrs** from commissioning, can be extended as mutually agreed and approved by Commission, provided land and transmission infrastructure permits it.
- **2. Capacity Utilization Factor:**
  - Min CUF - **22% (Wind); 17% (solar)**
  - Generator will declare CUF at time of signing PPA (wind)/bid submission (solar) and can revise it once within one year of COD (wind)/signing of PPA (solar).
  - **Variation permitted** (solar: +10% to -15% for 10 yrs, +10% to -20% till end of PPA) / (wind: not less than 90% of declared CUF)), lower limit relaxed to the extent of availability of grid.
  - If energy supplied falls below minimum CUF, **penalty (min 75% (wind) / 25% (solar) of PPA tariff)** for shortfall in energy to be paid by generator to procurer. Penalties may be prescribed on amount of shortfall, higher shortfall may attract higher penalties and vice versa.
  - If **availability > max CUF**, Generator free to sell to other entity provided first right of refusal with procurer @ 75% of PPA tariff.
- Procurement in energy terms (solar): range of permissible capacity of the plant in terms of MW(AC) shall be clearly specified. Specify the Contracted Energy Quantity (CEQ), including a minimum supply obligation below which the developer will be required to pay damages to the Procurer and a guaranteed energy offtake upto which the Procurer will be bound to purchase all energy generated and supplied by the developer.



# PPA – Wind/Solar (2)

- **3. Repowering:** Allowed during PPA duration, but procurer only obliged to buy at PPA terms and excess generation as per previous provision.
- **4. Payment security:**
  - **Directly by procurer from generator:**
    - revolving Letter of Credit (LC) of amount not less than one month of average billing;
    - Payment security fund to support at least 3 months of payment;
    - Procurer may choose to provide State Govt. Guarantee in legally enforceable form to cover energy charges and termination compensation if any.
  - **Intermediary procurer:**
    - Intermediary procurer will provide one month LC and 3 month payment security fund to Generator.
    - End procurer shall provide one month LC and state govt. guarantee.
    - May also give 3 month payment security fund.



# PPA – Wind/Solar (3)

- **5. Force Majeure:** PPA shall contain provisions with regard to force majeure, Generator will inform procurer within 15 days from start of force majeure and Procurer shall take decision within 15 days from receipt of intimation.
- **6. Generation compensation for off-take constraints**
  - **Transmission infrastructure not ready (only for solar):** Energy loss for this time period proportional to minimum of 19% or specified CUF will be compensated by procuring excess generation at PPA tariff over next three yrs.
  - **Grid Unavailability (beyond 50 hours in contract year):**  $\text{Generation loss} = \text{avg generation per hour during contract year} \times \text{hours of grid unavailable}$ . Either this loss can be paid off by procurer or excess generation by generator equal to this loss can be procured at PPA tariff in the next three years.
  - **Backdown:** Ideally no backdown should happen due to must run status accorded as per IEGC. If it happens (except in cases of grid security or safety of equipment or personnel),  $\text{compensation} = 50\% \times \text{avg generation during the month when backing down too place} \times \text{PPA tariff}$ . Such compensation cannot exceed max CUF and will be settled annually.



- Other provisions

- Default, Change in law
- Bidding process, submission and evaluation
- Contract award, bank guarantees and financial closure
- Commissioning



# Default (detailed in RFS)

- **Generator Event of Default:** e.g.: delay in commissioning, fails to supply power in terms of the PPA, effectuates a change in control or shareholding of its promoters in breach of the provisions of the PPA etc. Upon being in default, the Generator shall be liable to pay to the Procurer, damages, as detailed in the PPA. Additionally, lenders shall be entitled to exercise their rights of substitution, in accordance the PPA and in concurrence with the Procurers.
- **Procurer Event of Default:** e.g.: failure to pay the monthly bills within the stipulated time period or repudiation of the PPA. Procurer shall novate its part of the PPA to any third party, subject to consent from the Generator. If above not possible, generator may terminate PPA and require procurer to either a) take over project by paying termination compensation = Debt + 150% of equity or b) pay damages for 6 months with assets being retained by developer.



# Change in law

- Any of the following events after the last date of the bid submission, including
  - (i) the enactment of any new law; or
  - (ii) an amendment, modification or repeal of an existing law; or
  - (iii) the requirement to obtain a new consent, permit or license; or
  - (iv) any modification to the prevailing conditions prescribed for obtaining an consent, permit or license, not owing to any default of the Solar Power Generator; or
  - (v) any change in the rates of any Taxes which have a direct effect on the Project. However, Change in Law shall not include any change in taxes on corporate income or any change in any withholding tax on income or dividends. Specifically for wind power it would also not include customs duty on imported equipment





# Bidding process and RFS document

- Single stage two envelope **e-bidding**, may follow with **e-reverse bidding**.
- Invite generators to participate in RFS
- **Pre-bid conference**, provide written interpretation of bid document if needed, any clarification and revision to SBDs will be uploaded on website of procurer (min 7 seven days for bid submission after this)
- **RFS Document, standard provisions**
  - **Bid responsiveness**: Bid evaluated only if responsive, bidder is not a willful defaulter, no major litigation pending or threatened against bidder which may cast doubt on ability to undertake project.
  - **Qualification criteria**: Technical – Past experience; Financial – Net worth (min 20% of Capex), liquidity
  - **Earnest Money Deposit (EMD)**: in form of a bank guarantee to be forfeited in case of failure to sign PPA within time period.
  - Compliance of **FDI rules** by foreign bidders.



# Bid Submission and Evaluation

- Consortium of bidders permitted
- Non refundable processing fee.
- Submit separate technical and price bids.
- Bid-guarantee in the form of an EMD along with the bids.
- Procurer shall constitute **Evaluation Committee** with minimum 3 members, with at least one having expertize in financial matters/bid evaluation.
- To ensure competitiveness, the minimum number of qualified bidders should be **two**.



# Contract Award, bank guarantees, financial closure

- **Contract Award:** Signing of PPA.
  - After conclusion of bidding process, evaluation committee will certify as appropriate that the bidding process and the evaluation has been conducted in conformity to the provisions of the RfS.
  - For the purpose of transparency, the Procurer shall, after the execution of the PPA, publicly disclose the name(s) of the successful bidder(s) and the tariff quoted.
  - Distribution licensee or the Intermediary Procurer, as the case, shall approach the Appropriate Commission for adoption of tariffs by the Appropriate Commission in terms of Section 63 of the Act.
- **Bank guarantees**
  - **EMD** in form of bank guarantee along with response to RFS, not more than 2% of Capex.
  - **Performance Bank Guarantee (PBG)**, not more than 5% of capex, to be submitted at time of signing PPA.
- **Financial Closure: Within seven months** of execution of PPA, failing the aforesaid, the Procurer shall encash the PBG.

## Minimum paid up share capital held by promoter

- Successful bidder, if being a single company, shall ensure that its **shareholding** in the SPV/project company executing the PPA shall **not fall below 51%** at any time prior to 1 year from the COD, except with the prior approval of the Procurer.
- In case the successful bidder shall be itself executing the PPA, then it shall ensure that its promoters shall not cede control (shall mean the ownership, directly or indirectly, of more than 50% (fifty per cent) of the voting shares of such Company or right to appoint majority Directors) till 1 (one) year from the COD
  - In this case it shall also be essential that the successful bidder shall provide the information about its promoters and their shareholding to the Procurer before signing of the PPA with Procurer.
- In the event the Solar Power Generator is in default to the lender(s), lenders shall be entitled to undertake “**Substitution of Promoter**” in concurrence with the Procurers.



# Commissioning

- **Part Commissioning:** Allowed, Solar - minimum 50 MW, Wind - minimum 50% of capacity of 50 MW (whichever is lower)
- **Early Commissioning:** permitted for full commissioning as well as part commissioning of the project even prior to the SCD, subject to transmission connectivity and LTA. Procurement at 75% of PPA tariff during the period.
- **Commissioning Schedule:** 18 months (wind), 13 - 15 months (solar)
- **Commercial Operation Date (COD):** Date on which the commissioning certificate is issued.
- **Performance Monitoring:** Continuous monitoring of resource, generation and submission to NIWE (wind), submission to MNRE, procurer (solar) and also grant access to remote monitoring portal of power plant.



# Time table for bid process/commissioning

| No. | Event                                                                                                                                                                     | Elapsed Time (Days) from Zero date                                                                                              |           |
|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|-----------|
|     |                                                                                                                                                                           | Solar PV                                                                                                                        | Wind      |
| 1   | Date of issue of RfS Project specific draft Power Purchase Agreements and other draft Project Agreements, and the PSA, if applicable.                                     | Zero date                                                                                                                       | Zero date |
| 2   | Bid clarification, pre-bid conferences, opening of online Data Room to share all Project specific details including site, if specified by Procurer etc. & revision of RfS | In case of any change in RfS document, the Procurer shall provide the bidders additional time in accordance with the Guidelines |           |
| 3   | RfS Bid submission                                                                                                                                                        | 30                                                                                                                              | 30-45     |
| 4   | Evaluation of bids and issue of LOI                                                                                                                                       | 120                                                                                                                             | 75        |
| 5   | Signing of PPA and the PSA (if applicable).                                                                                                                               | 150                                                                                                                             | 105       |
| 6   | Identification of 100% land and lease in developer's name. Tie up financing                                                                                               | ~210 days from PPA (7 months)                                                                                                   |           |
| 7   | Commissioning time after PPA signing                                                                                                                                      | 13-15 months                                                                                                                    | 18 months |

5/1/14

# Transmission Connectivity and Long Term Access



# Transmission Connectivity

- **Responsibility and cost** of getting transmission connectivity and Long Term Access (LTA) will be **entirely with Generator** (where site not specified)
- Solar, wherein site specified or case of solar park, capex for transmission line and substation may be paid by generator, SPPD or relevant implementation agency.
- **Interconnection / Metering point** shall be the low voltage bus bar of the STU / CTU substation for solar and bus bar of the STU / CTU substation at which the wind power is injected (wind).
- For interconnection with grid and metering, generators will abide by grid code, connectivity standards, other regulations issued by ERCs/CEA. Generators will comply with F&S, DSM regulations and responsible for liabilities related to LTA and connectivity.
- **Transmission of power upto interconnection point will be responsibility of generator at his own cost. All transmission charges and losses beyond interconnection point will be borne by procurer.**





## Connectivity and LTA – risk...

- Under SECI bids, entire responsibility of connectivity and LTA is with developer.
- As the site is known to the potential developer, work towards the connectivity agreement and bay agreement **does/can** begin prior to bidding.
- However LTA can only be applied for after signing the PPA and knowing the procurer (state) and hence withdrawal point.
  - COD date is fixed as soon as PPA signed, however LTA availability **may not** be assured in same time frame.
  - Bays and connectivity given out on First Come First Serve (FCFS) basis and could be already occupied in some sub-stations. Already acute problem for wind power projects in Gujarat.
  - Need for greater coordination between MNRE/SECI and CTU, CEA.



## Possible options for the LTA risk sharing

- Pro-active transmission planning and development preceding generation.
- The bidding guidelines should be modified to enable CTU/STU being party to the process, with some defined level of responsibility.
- Possible changes in bidding framework (mix of case 1 and case 2)
  - pre-identify 10-20 substations as injection points and few states as drawal points. Connectivity and LTA would be assured for such bids after CTU/STU gives undertaking.
- Parallel bidding of new transmission / strengthening as identified for the wind/solar generation bid.
- Allowing the developer to begin work on transmission line upto sub-station prior to granting connectivity agreement at own risk.
- New draft from CERC outlining *“Procedure For Grant Of Connectivity To Projects Based On Renewable Sources To Inter-state Transmission System”*  
([http://www.cercind.gov.in/2018/draft\\_reg/PRO11.pdf](http://www.cercind.gov.in/2018/draft_reg/PRO11.pdf))

५४१

# Some interesting developments

- **Postponing of solar bids on several occasions, poor response to bids**
  - 1 GW solar PV tender by MSEDCL (postponed 4 times)
  - Karnataka (once), allowed 550 MW out of the 1200 MW bid for which prices received were below ceiling rate. But no reverse bidding.
- **‘Change in Law’ uncertainty; pass through of safeguard duty of imported panels**
  - MNRE later issued a clarification (2/4/18) to the solar bidding guidelines stating, "As per Clause 5.7.2 of said Guidelines, the term 'Change in Law' includes any change in the rates of any Taxes which have a direct effect on the Project. To remove uncertainty, it is hereby clarified that the term 'change in the rates of any taxes' as mentioned in clause 5.7.2 of solar bidding guidelines includes "change in rates of taxes, duties and cess."
- **Cancellation of solar bids by GUVNL**
  - Sep, 2017, 500 MW, price Rs 2.65-2.67/kWh
  - March, 2018, 500 MW, price Rs 2.98-3.06/kWh
  - Eventually GUVNL board resolved to cancel the bid, as “discovered were on the higher side” as per clause 3.22 of the RFS which allows the procurer the right to annul the bidding process “at any stage without assigning any reasons”



# Delay in meeting conditions subsequent

- MPPMCL
  - Procurer cancelled the PPA due “*delay in achieving conditions subsequent*” and invoked bank guarantee for the same delay. Essentially a 16 day delay in procuring 100% in the developers name even after a 9 month extension beyond the 210 day timeline.
- High Court: ReNew Clean Energy Private Ltd Vs MPPMCL & Ors
  - Renew Power filed a Writ Petition (12432 of 2017) at the MP HC against the respondent’s stand regarding cancellation of PPA due to “*delay in achieving conditions subsequent*” of project and invocation of bank guarantee for the same delay.
  - The Court maintained that MPPMCL’s invocation of bank guarantee was valid as per clause 2.1 in the PPA, and while the reasons for delay did not come under force majeure, the petitioner had no alternate remedy for the same.
  - Hence, while the prayer of quashing the order of termination was allowed, the HC upheld the invocation of bank guarantee by MPPMCL for the delay.
- Supreme Court: MPPMCL Vs ReNew Clean Energy Private Ltd & ANR
  - In response to this, MPPMCL filed a Civil Appeal at the SC to rescind the PPA. The Court upheld the HC’s verdict and ordered the respondent to pay the fine of Rs. 119 million in the form of invoked bank guarantee while still setting aside the order on termination of contract.



# New bidding frameworks needed for...

- Solar + Storage Tendering (A&N Islands)
  - EPC + O&M of 2 x 10 MW (AC) Grid interactive Solar PV Power Project integrated with 8 MWh BESS.
  - O&M period-10 years; Warranty period-1 year; Commissioned within 18 months from LOA; Winning bid: Rs 132.7 crore (USD 20.291 million)
  - AP planning a project with 120 MW solar, 40 MW wind, 20-40 MWh storage
  - Bidding framework, technical/performance standards and price will have to account for multiple applications which could be available simultaneously (non-trivial)
- Offshore Wind
  - EoI for 1 GW of projects off the coast of Gujarat issued.
  - Subsequently bidding
- Hybrid Wind and Solar
  - Draft hybrid policy, 10 GW planned.
  - First such project (50 MW wind + 28.8 MW solar captive) commissioned in Karnataka, April, 2018; Transmission remains at 50 MW



# Conclusions

- Highly competitive price discovery under bidding process, both for solar and wind.
- Transmission connectivity and LTA could soon become a bottleneck and major risk factor.
  - New framework to minimise risk, better risk allocation
  - Lesser risk for solar since resource not very site-specific, existence of solar parks.
  - CTU/STU must proactively plan and build transmission corridors for renewable energy, considering long term targets and likely resource locations.
- Will soon need newer bidding frameworks for offshore wind, wind-solar hybrids, wind/solar + storage etc.
- Further, will need to prepare for competition across renewables (wind vs solar etc.) and further still competition across all generation sources (renewables vs coal, gas etc.)
- Long term targets and frequent bids necessary until DISCOMs internalize least cost planning incl. renewables.



# THANK YOU

ashwin@prayaspune.org



Prayas Energy Group  
[www.prayaspune.org/peg](http://www.prayaspune.org/peg)

