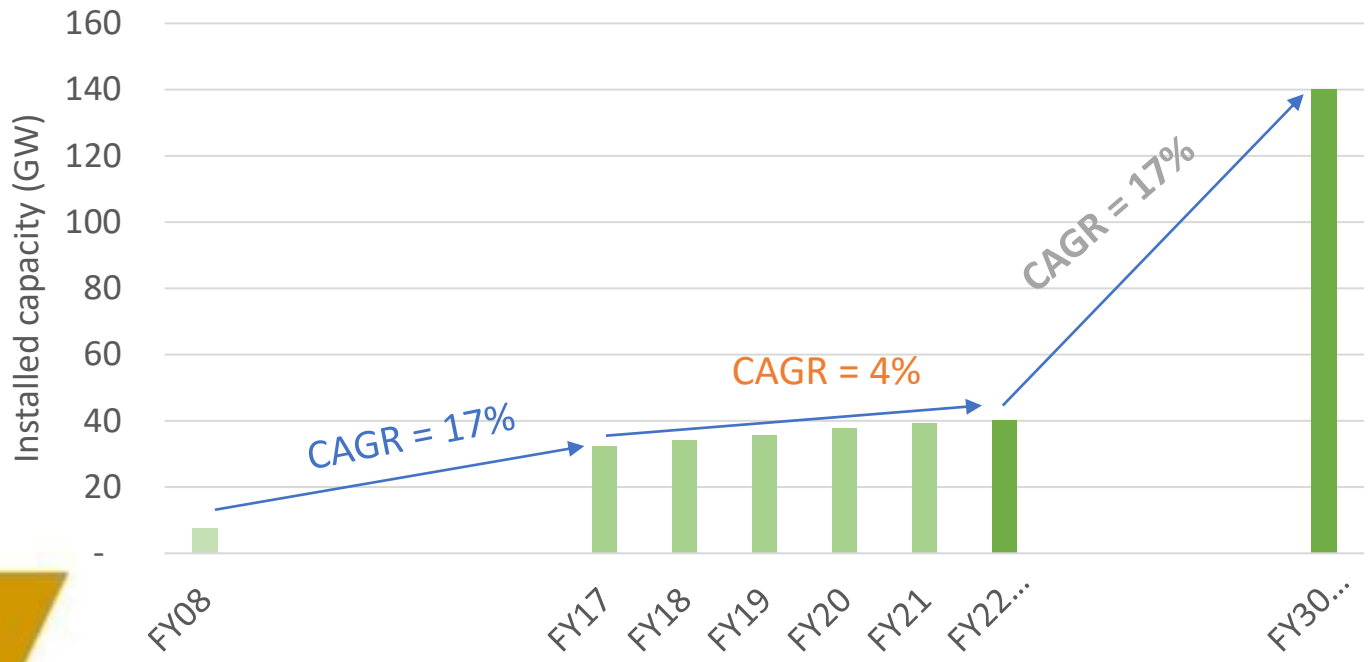
Technical paper presentation

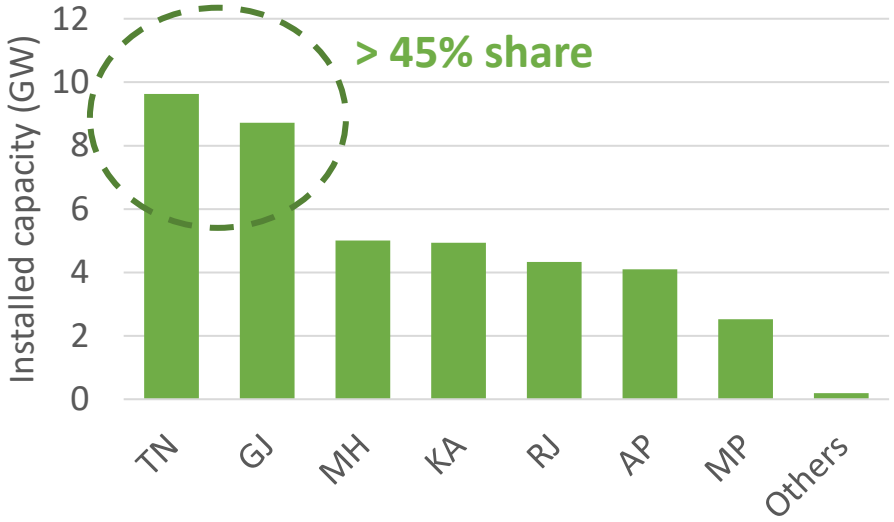
Accelerating wind power deployment in India through decentralised plants

Speaker : *Ashwani Arora, Programme Associate, CEEW*

India's wind energy sector: A snapshot

Share of wind energy in India's installed capacity and generation mix is ~10% and ~5% respectively

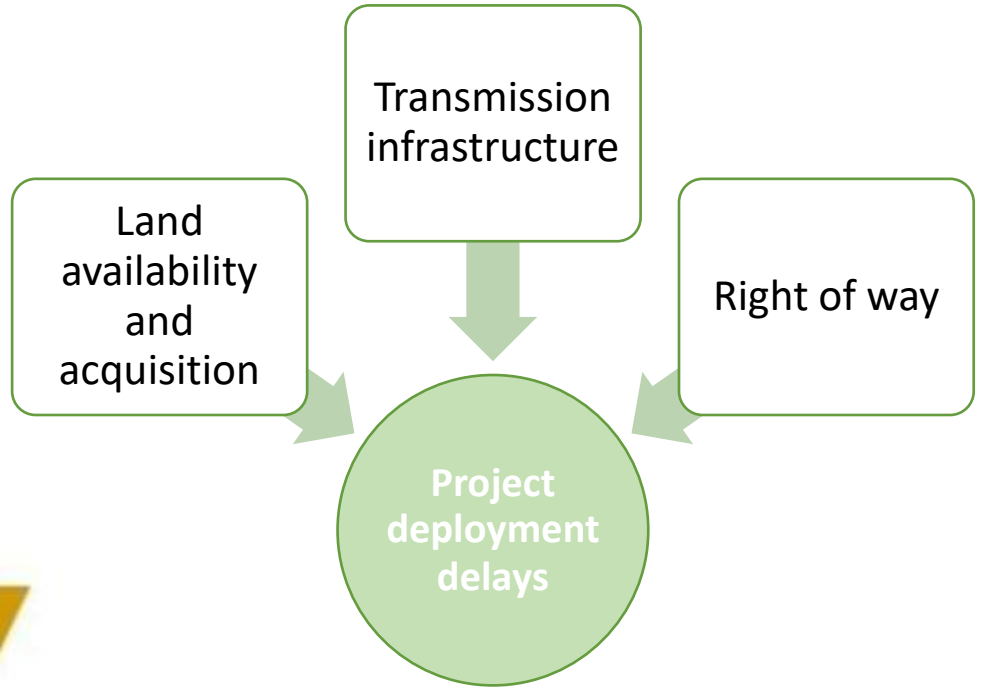




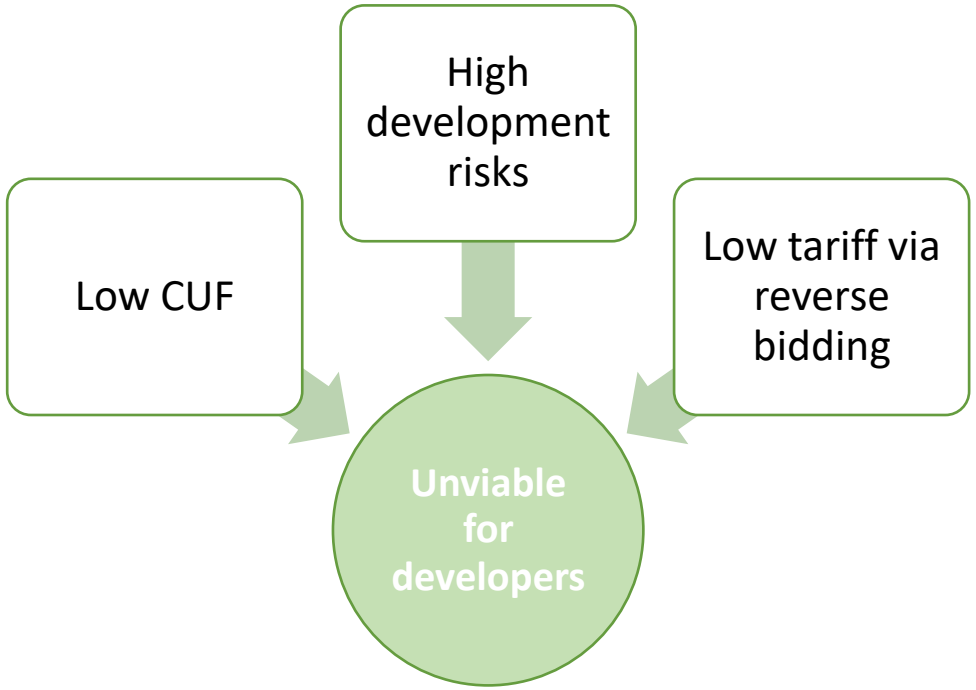
Source: CEA reports

Current challenges and possible solution

Challenges associated with high concentration of WPPs in high speed wind pockets



Parallel focus need to be towards low-medium wind-rich states to achieve 140 GW by 2030



Small scale decentralised WPPs in low-medium wind rich states is one of the potential solutions

Proposed deployment model

Small/medium investors and developers

5 MW to 50 MW WPPs in land near STU

Substation
< 10 MW WPP: 11/22/33 kV
10 MW to 50 MW WPP: 33kV and above

State transmission network

Offtaker: Discoms, other obligated entities

Benefits

- ✓ Boost small/medium scale investors, and developers
- ✓ Decentralised development
- ✓ Utilise spare STU capacity
- ✓ Local job creation
- ✓ Equitable energy transition

LCoE for decentralised WPPs

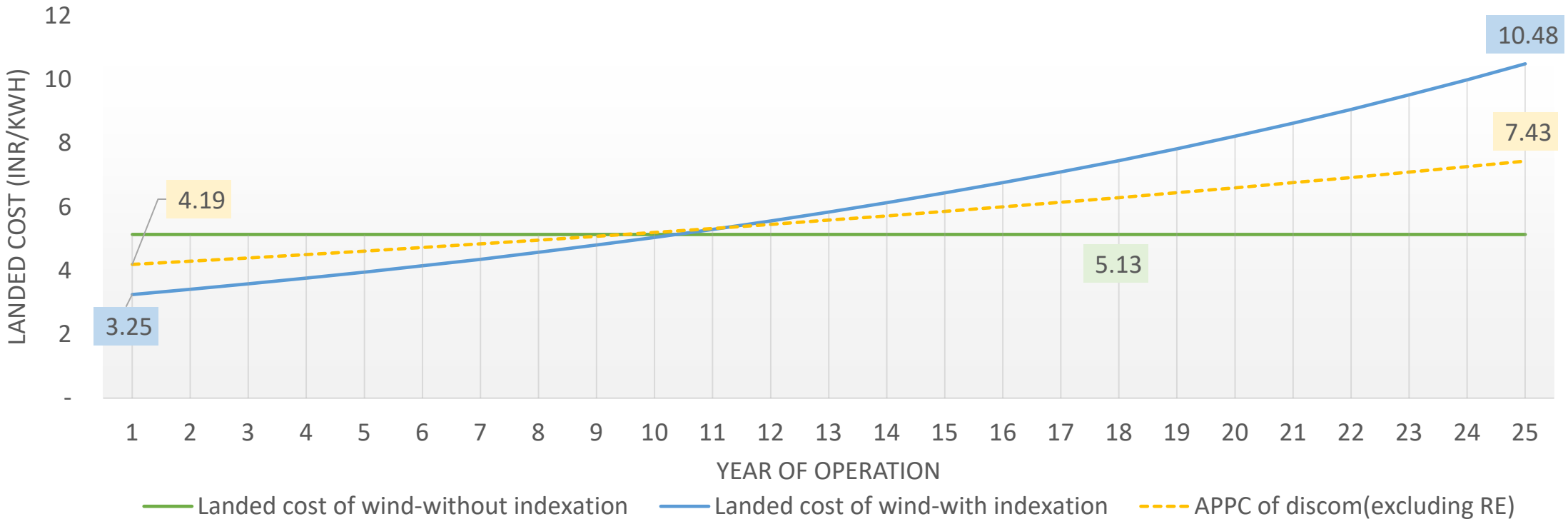
Wind zones	Annual mean WPD (W/m^2)	Average wind speed (m/s)	Expected average CUF (%)	LCoE (INR/kWh)
Zone I	200-250	5.6 to 6.0	22%	4.87
Zone II	250-300	6.0 to 6.4	25%	4.29
Zone III	300-400	6.4 to 7.0	30%	3.57
Zone IV	400-450	7.0 to 8.0	35%	3.06
Zone V	>450	>8.0	>40%	2.68

Moderate wind speed zones have high LCoE

Source: Authors' analysis

A case study for Maharashtra discom

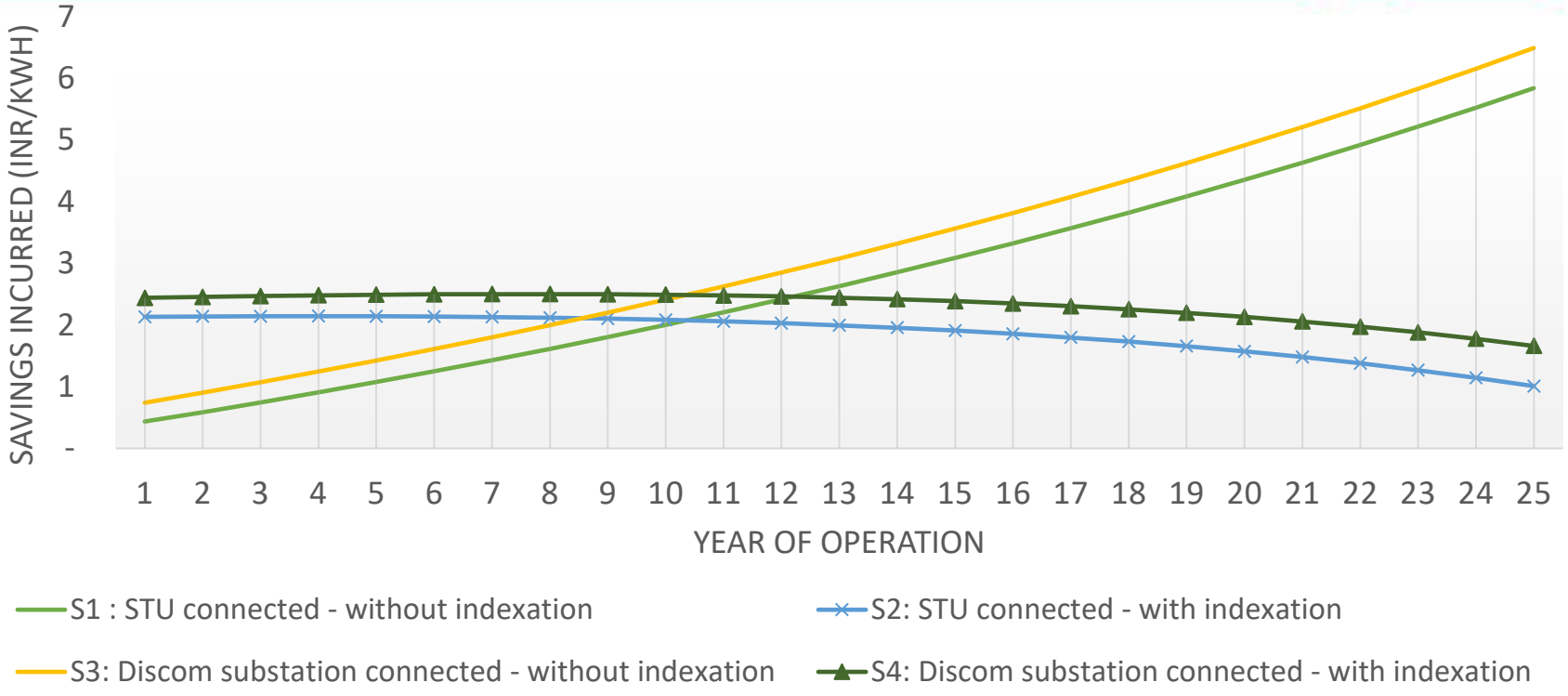
Landed cost for decentralised WPPs



Source: Authors' analysis

A case study for Maharashtra discom

- **Savings** calculated as difference between avoided cost for the discom and landed cost
- Avoided costs considered are:
  - Fixed cost
  - Variable cost
  - Non-solar RPO penalty cost



Net savings for discom	S1	S2	S3	S4
INR per kWh	0.85	0.85	1.02	1.02
INR Crore for 50MW	279	279	336	336

Source: Authors' analysis

A case study for Maharashtra discom

Cost	Estimate
Grid balancing	INR 19 – 21 crores per annum (expected to reduce with new dispatch and market mechanisms)
Benefits to state/discom	**Estimate**
Lease rentals	INR 5 – 15 lakhs per annum
Land conversion charges, if applicable	~INR 68 lakhs
Discom savings	INR 279 - 336 crores over 25 years
Employment	30 jobs in construction and commission 25 jobs in operation and maintenance 8 jobs in business development and design

Enablers for implementation

- Central procurement guidelines for WPPs < 25MW (intra-state) and < 50MW (inter-state)
- Frequent development of updated wind resource maps, and easy access
- Load flow studies to identify spare capacities at STU
- Development / digitization of land database
- Single-stage permits and clearances for setting up infrastructure
- Payment security mechanism for small and medium-scale players
- Mechanisms to reduce the upfront impact of high tariff

Decentralised WPP needs innovative procurement mechanisms

Mechanisms must ensure the following:

- ✓ Attract large number of bidders, ensuring competitiveness
- ✓ Sustainable price discovery
- ✓ Reduce risk of under-bidding
- ✓ Reduce delays in project deployment

Additional analysis under progress:

- ✓ **Plausible power procurement mechanism(s) and associated regulatory assessments**
- ✓ **Implementation framework for central programme/scheme**: Assessment of different phases of implementation with possible facilitation framework for offtakers

Thank You

For discussions/suggestions/queries email: ashwani.arora@ceew.in, disha.agarwal@ceew.in, saxena.payal1@gmail.com
https://www.ceew.in/

India Smart Grid Forum
CBIP Building, Malcha Marg,
Chanakyapuri,
Delhi-110021
Website: www.indiasmartgrid.org

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