THE INDIAN WIND INDUSTRY

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Quick Glance

1. History
2. Statistics
3. Wind States of India
4. The Transition
5. Challenges in accelerating RE growth

Quick Glance

1 History

It all started with the
OIL EMBARGO of 1973.

1 History

1985

First wind turbine commissioned at Verawal in the state of Gujarat

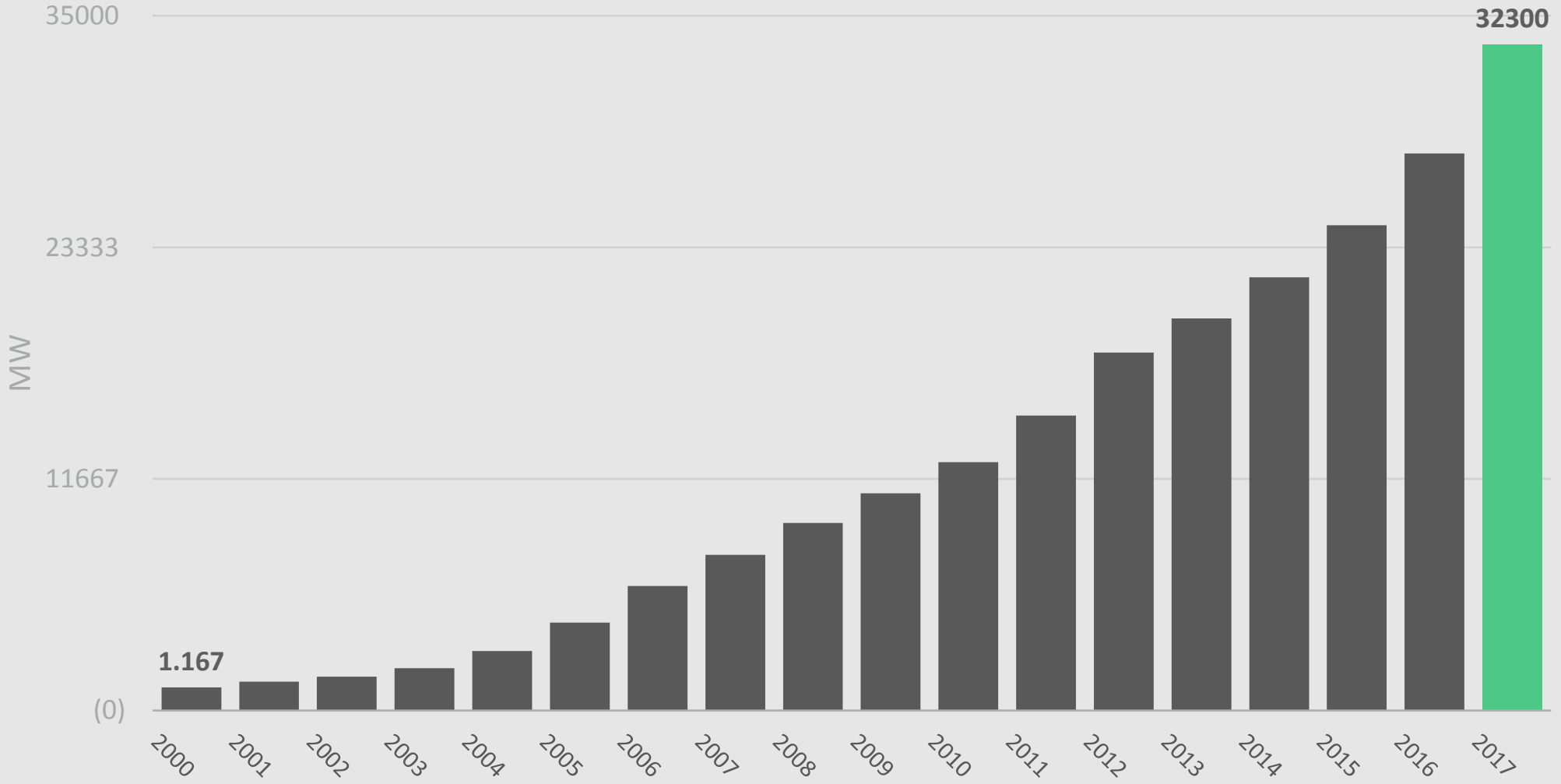
1990

First MW-scale wind project by DANIDA.

Investment Business Models

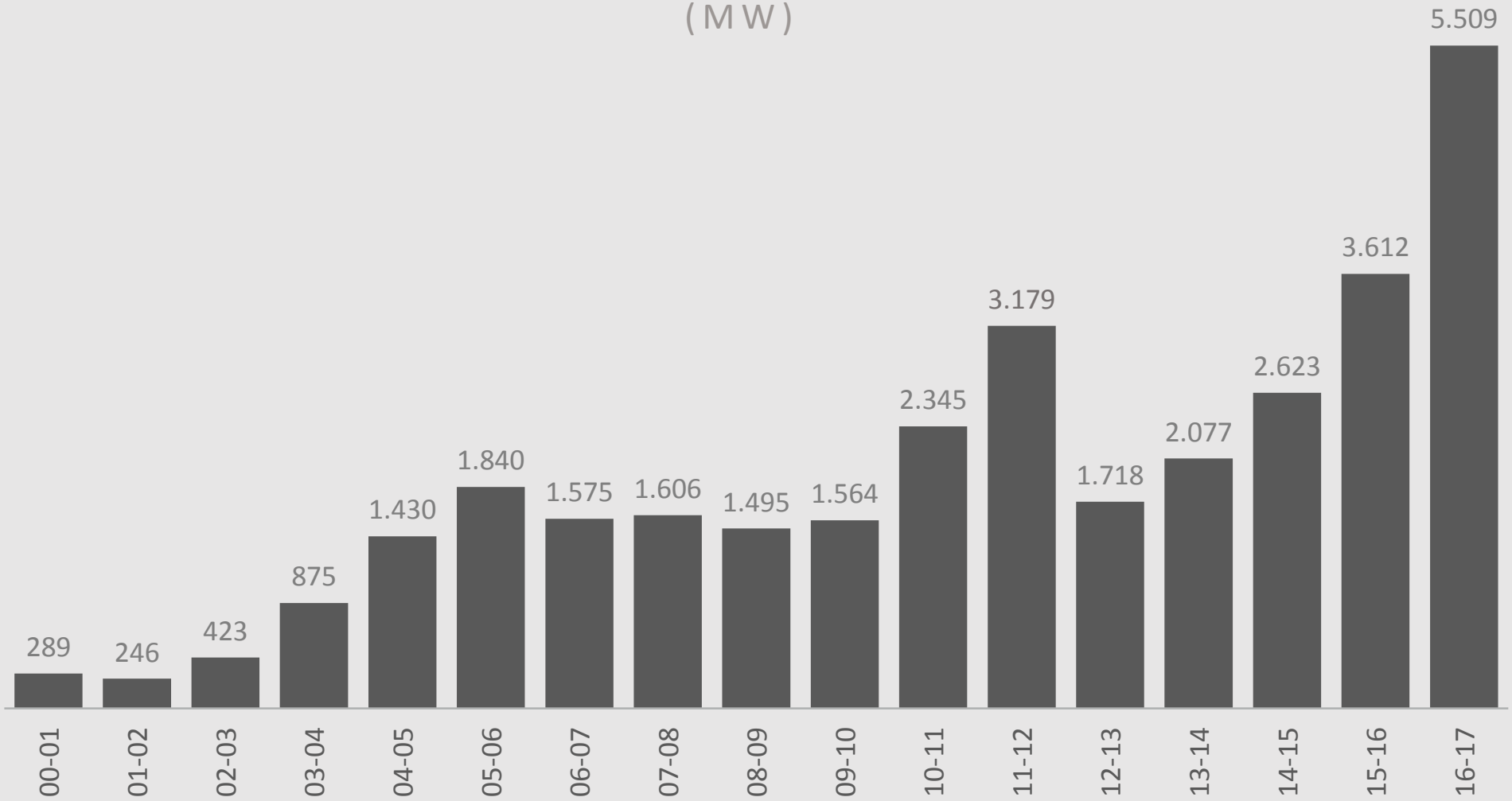
1. Captive Consumption
2. Power Sale

Cumulative Wind Installations



Source: GWEC, 2011 & Private

Annual Wind Installations



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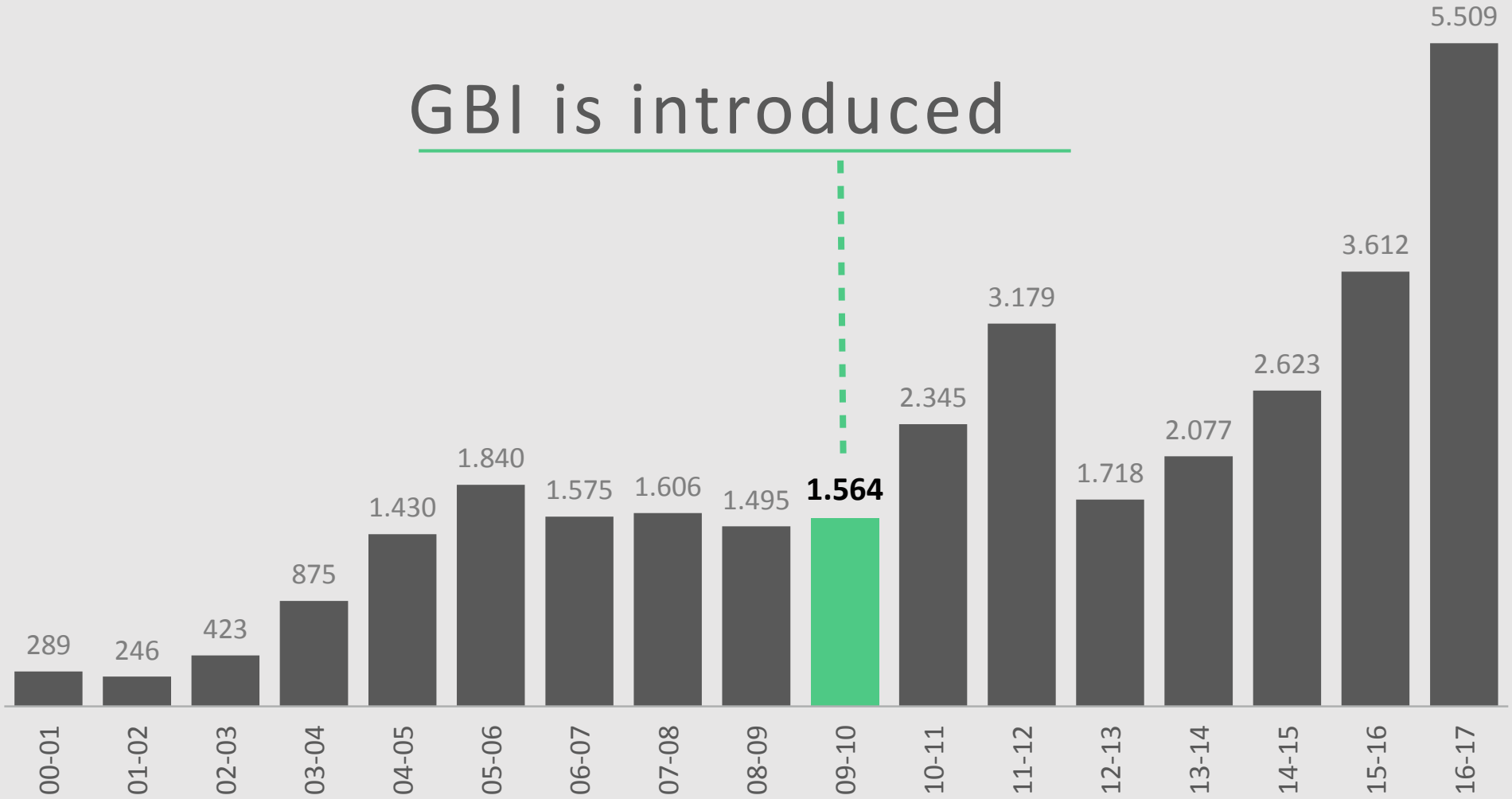
Annual Wind Installations

(MW)

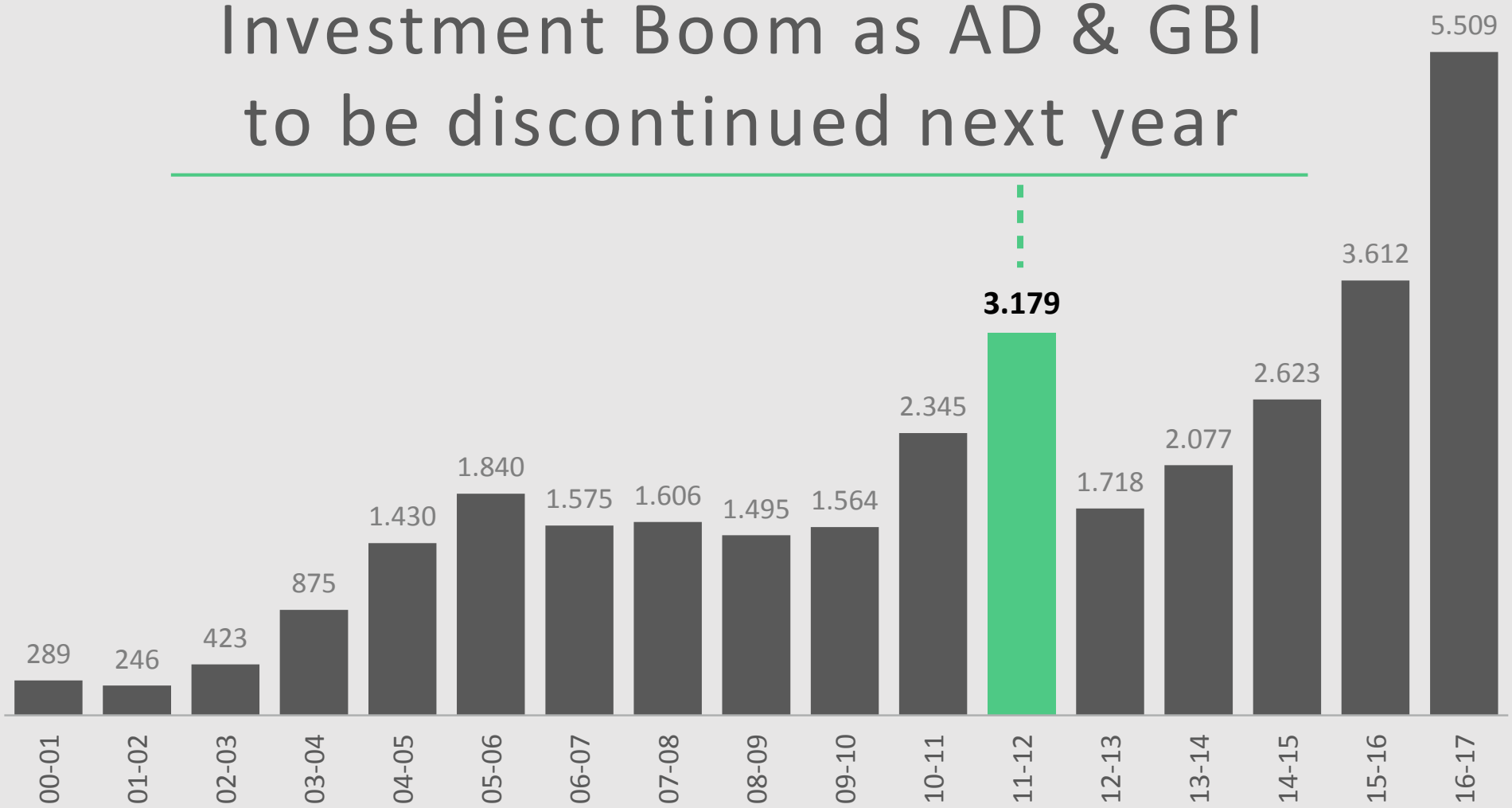


Source: GWEC,2011 & Private

Annual Wind Installations

(MW)

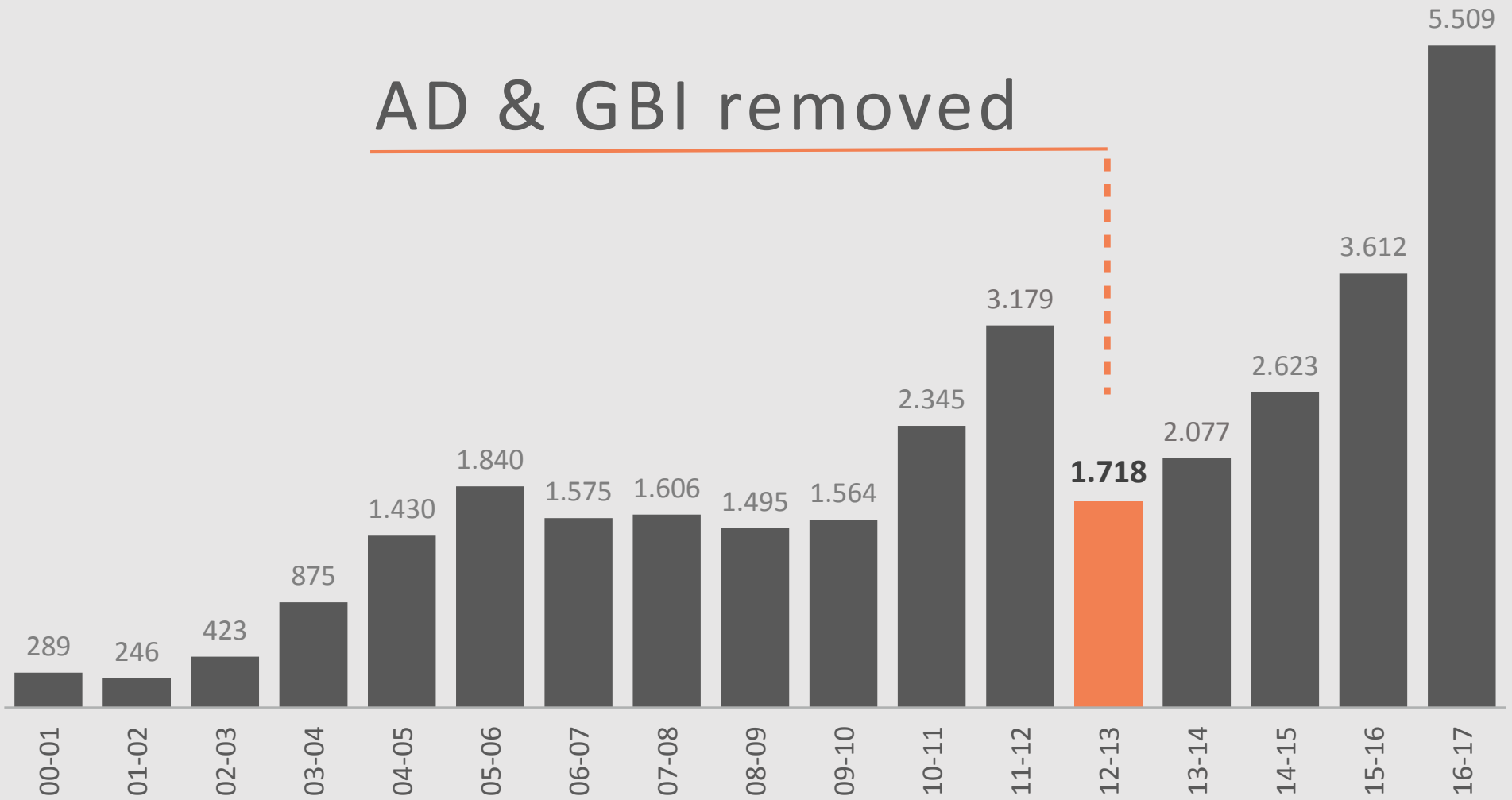
Investment Boom as AD & GBI to be discontinued next year



Source: GWEC,2011 & Private

Annual Wind Installations

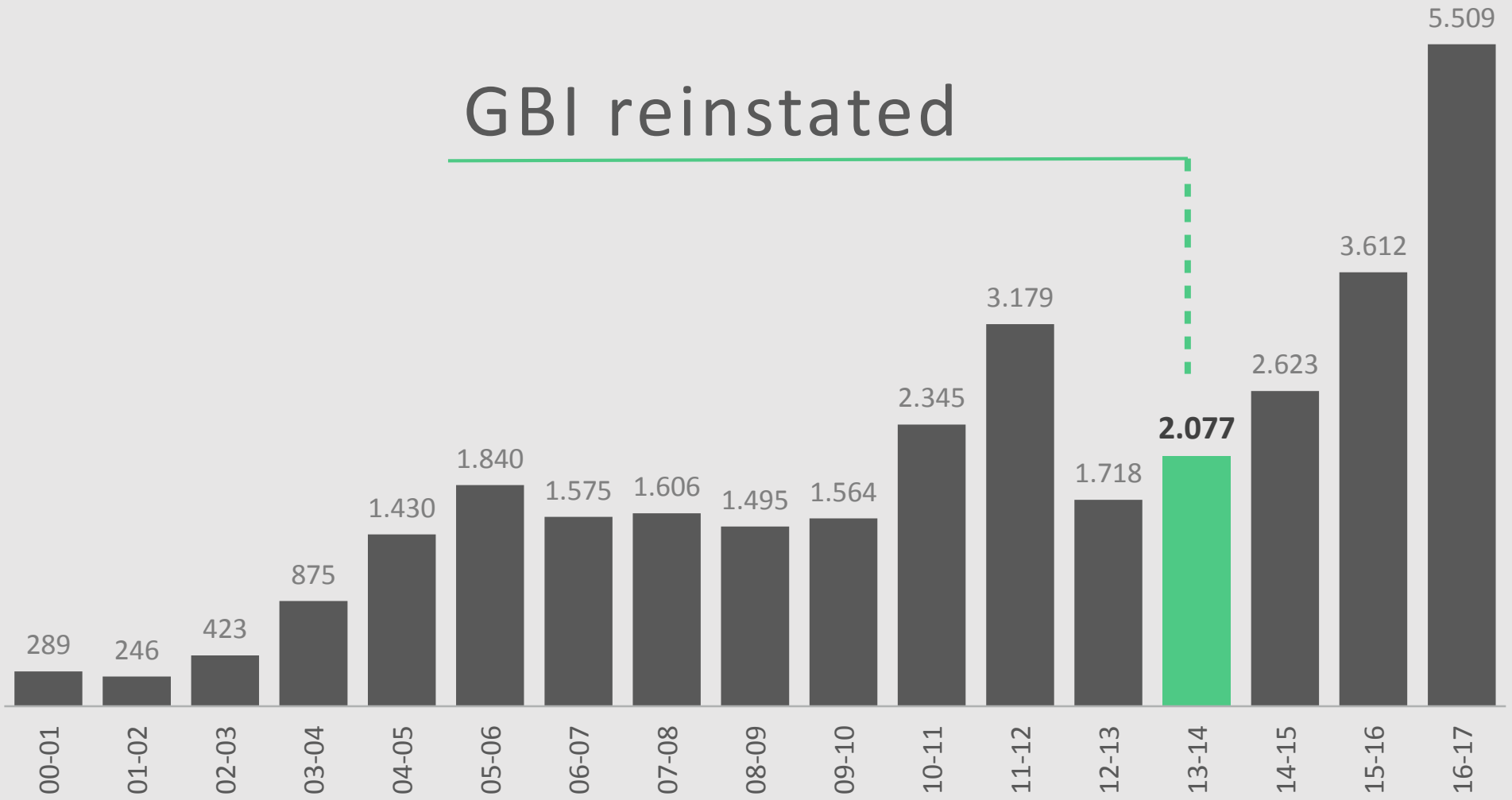
(MW)



Source: GWEC,2011 & Private

Annual Wind Installations

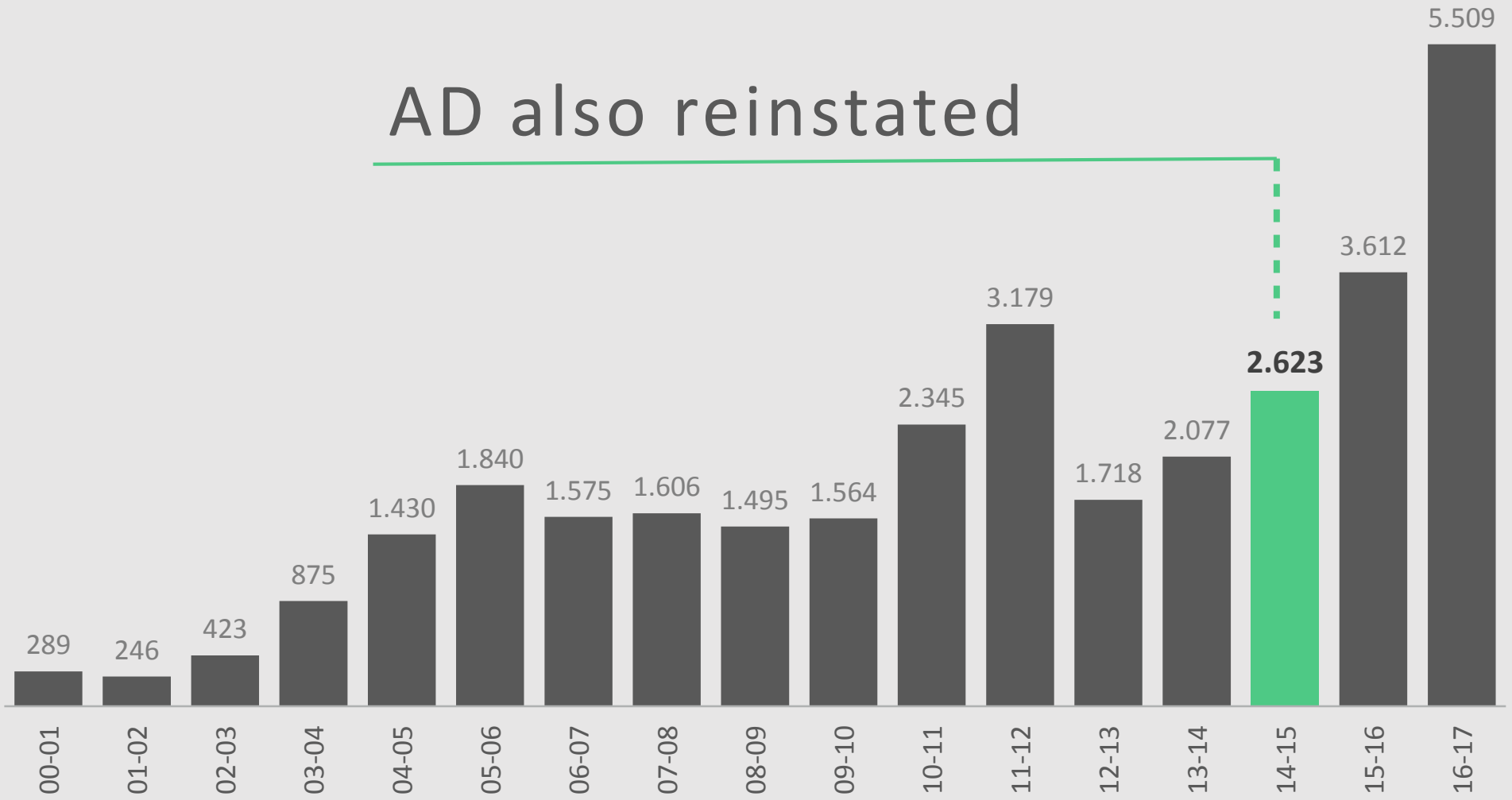
(MW)



Source: GWEC,2011 & Private

Annual Wind Installations

(MW)



Source: GWEC,2011 & Private

Annual Wind Installations

(MW)

GBI to be removed and AD to be halved from April 2017

Source: GWEC,2011 & Private

Before

Policy Environment

1. Accelerated Depreciation (80%)
2. Generation Based Incentive (50p/unit)
3. Third-Party Sale of Electricity
4. Banking and Wheeling
5. Customs and Excise Duty Exemptions (for OEM)

Now

Policy Environment

1. Accelerated Depreciation (80%) /2 = 40%
2. ~~Generation Based Incentive (50p/unit)~~
3. Third-Party Sale of Electricity
4. Banking and Wheeling
5. Customs and Excise Duty Exemptions (for OEM)

32 GW

Installed

60 GW

National Wind Energy Mission (NWEM) (by 2022)

102 GW

Potential at 80m hub height

302 GW

Potential at 100m hub height

3

Wind States of India

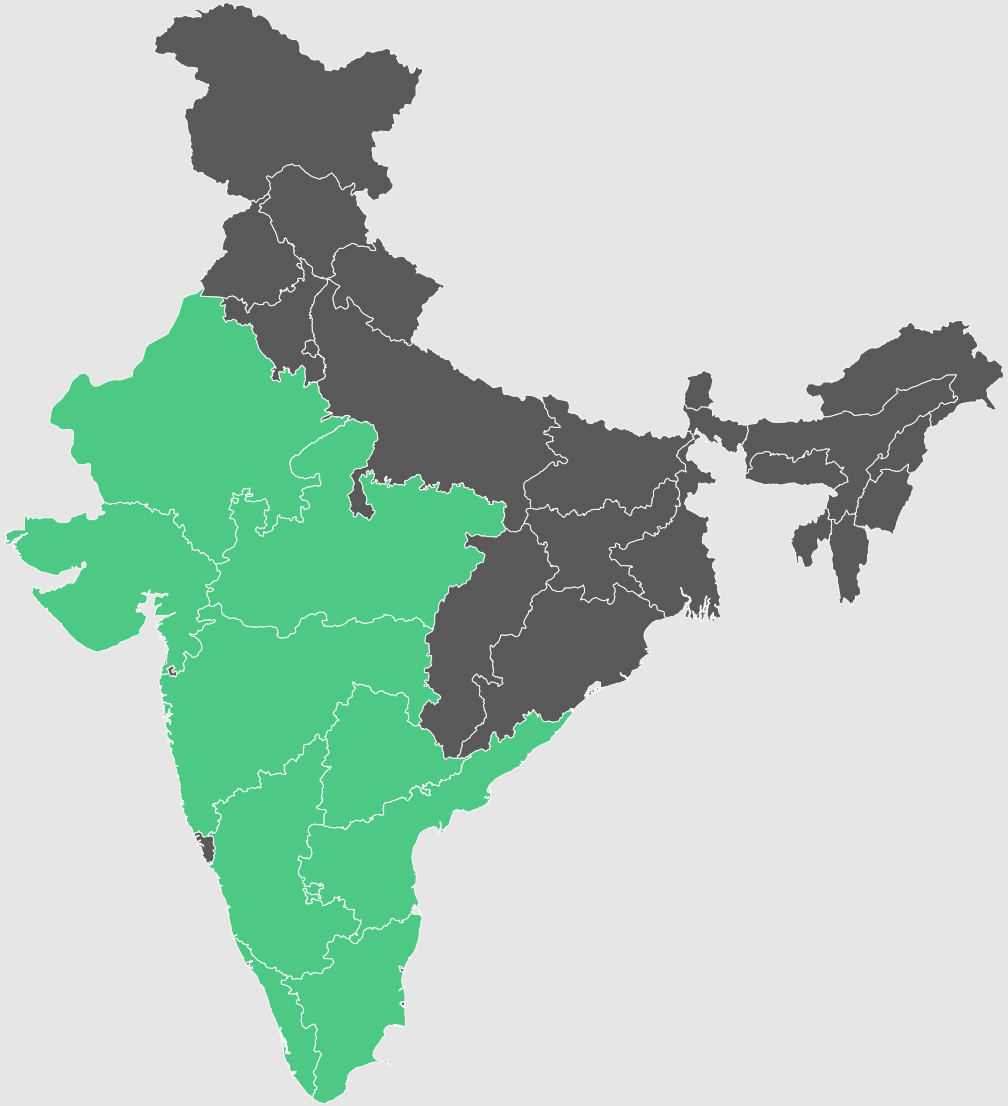
RAJASTHAN

GUJARAT

MAHARASHTRA

KARNATAKA

KERALA



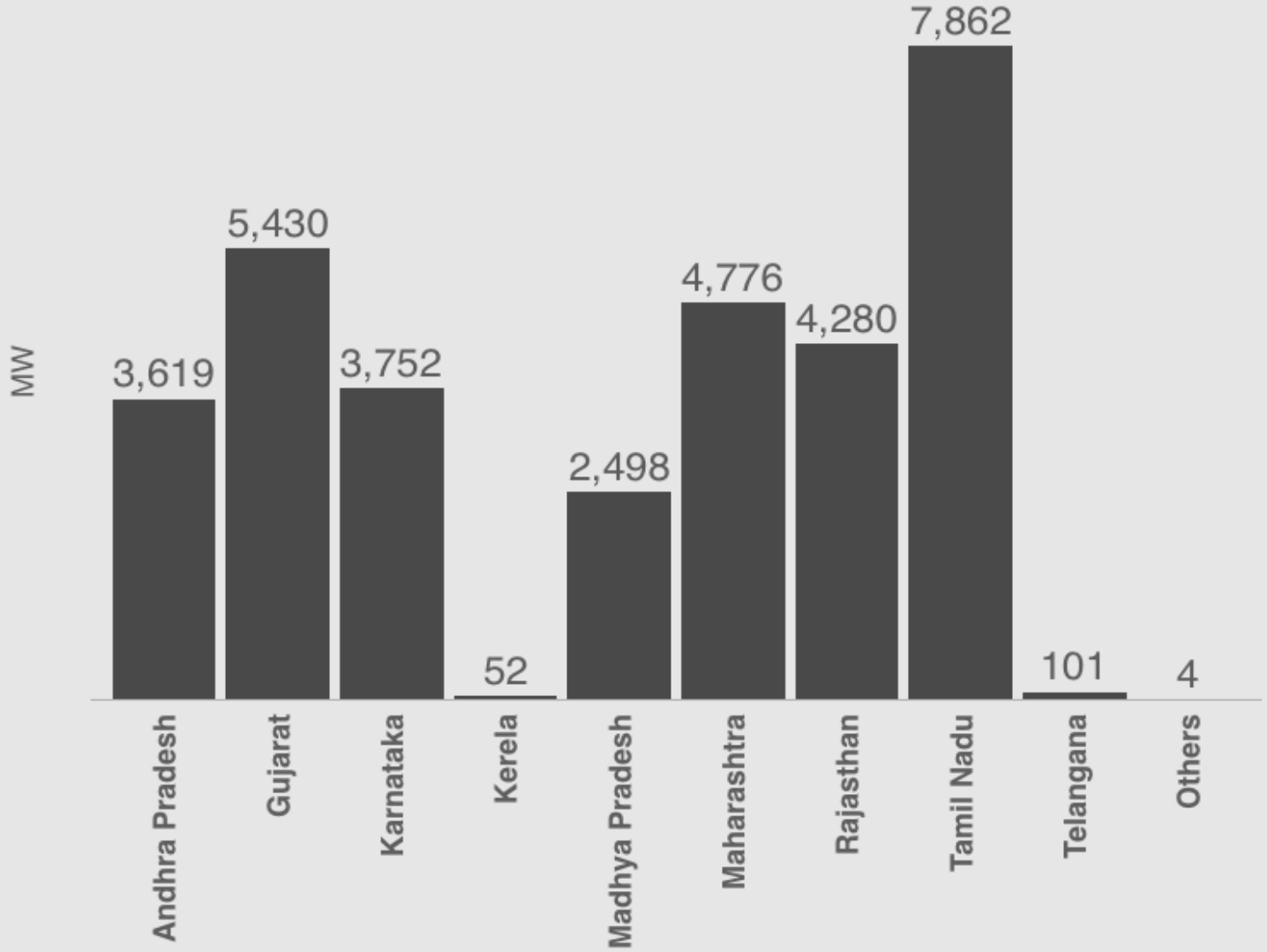
MADHYA PRADESH

TELANGANA

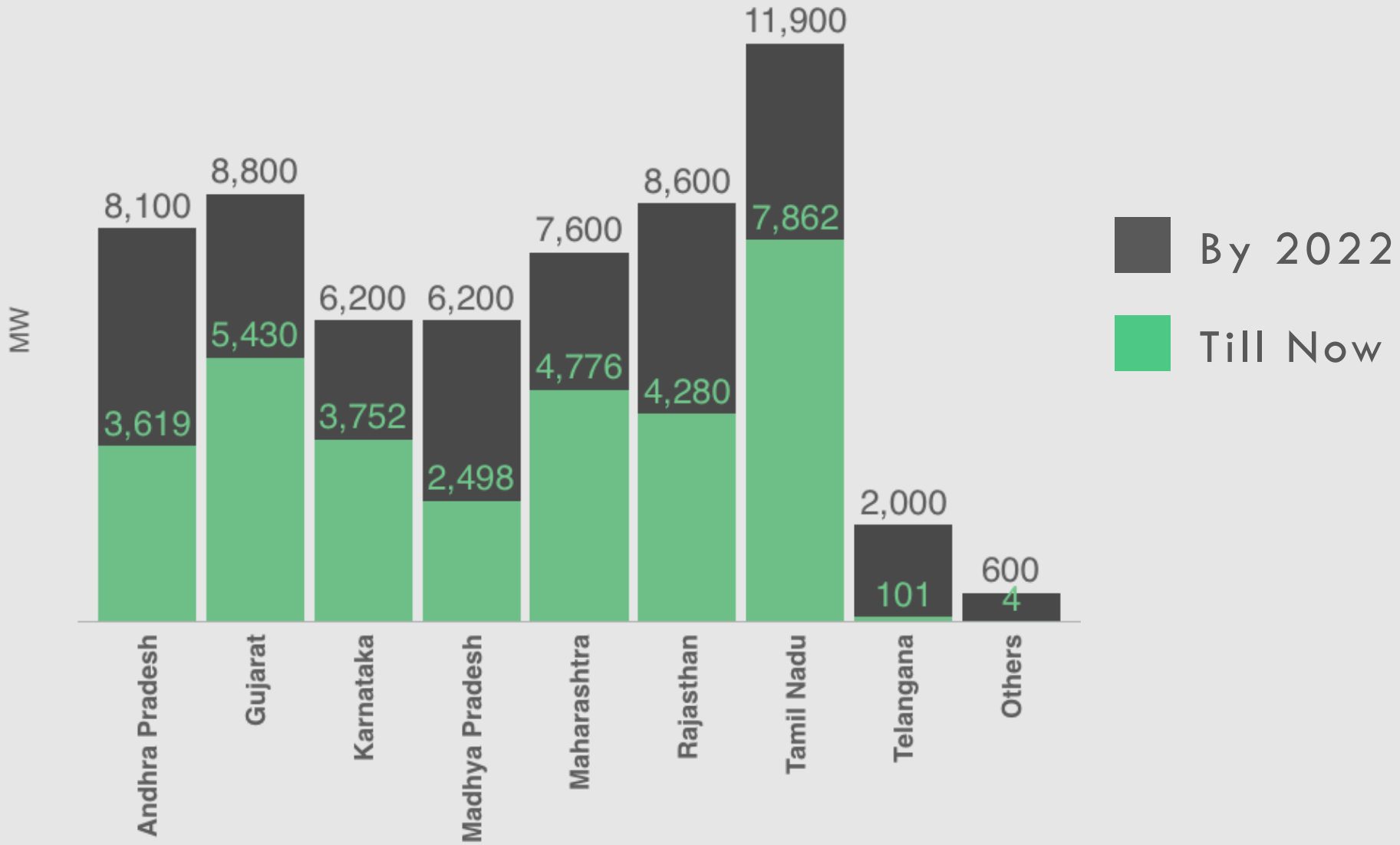
ANDHRA PRADESH

TAMIL NADU

State-wise Cumulative Installation



State-wise Cumulative Installation Target



4 The Transition

23rd February 2017

3.46 INR / kWh

About 4.6 Euro cents / kWh

5 Challenges in accelerating RE growth

1. Implement stable, predictable and sustainable policy frameworks
2. Adapting grid infrastructure to accommodate renewables
3. Develop policy mechanisms that reduce financing and manufacturing costs with consequent lower off-taker risks

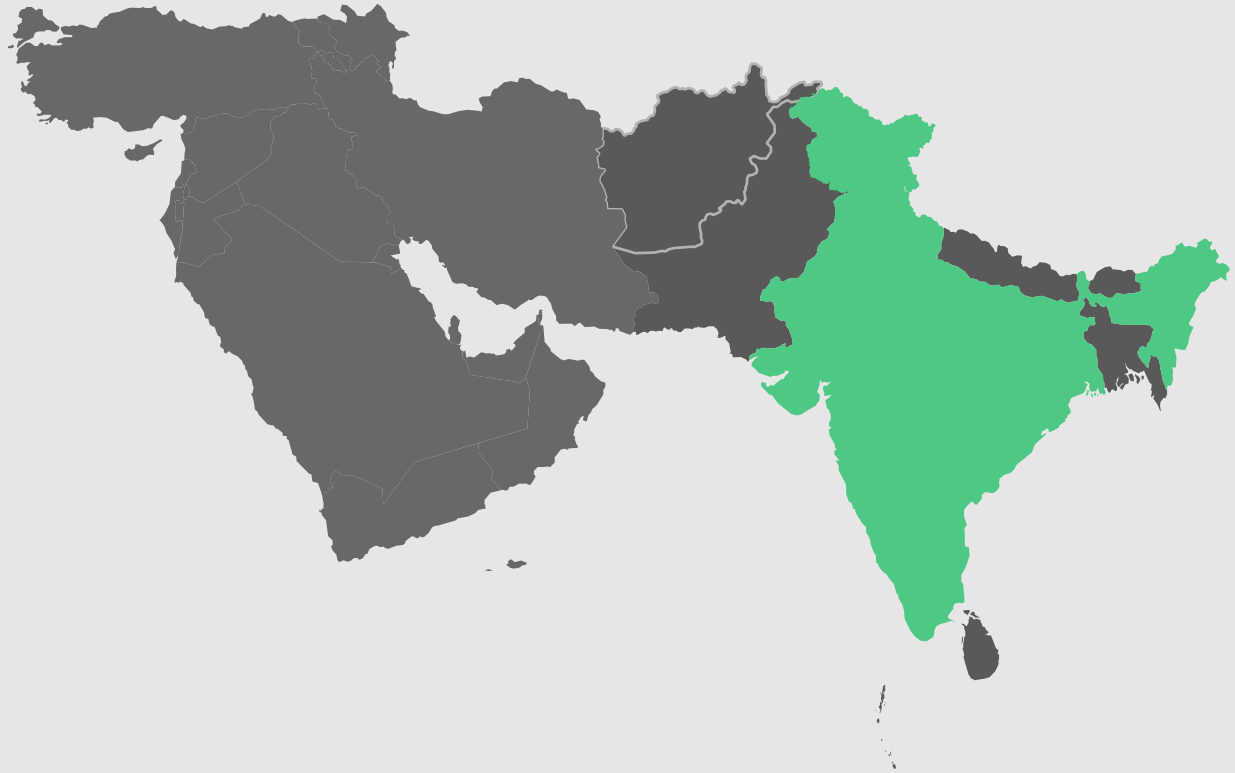
Why India?

1. One of the lowest Levelised Cost of Energy (LCOE) of about 5 US cents / kWh
2. Total installed wind capacity of 32.3 GW with over 300 BU generated till date
3. India Ranked 2nd in Ernst & Young Renewable Energy Country Attractiveness Index (May 2017)
4. Foreign manufacturers are welcomed under preferred “Make In India” program and will be benefited with a lower cost of delivery in the long run

Why India?

5

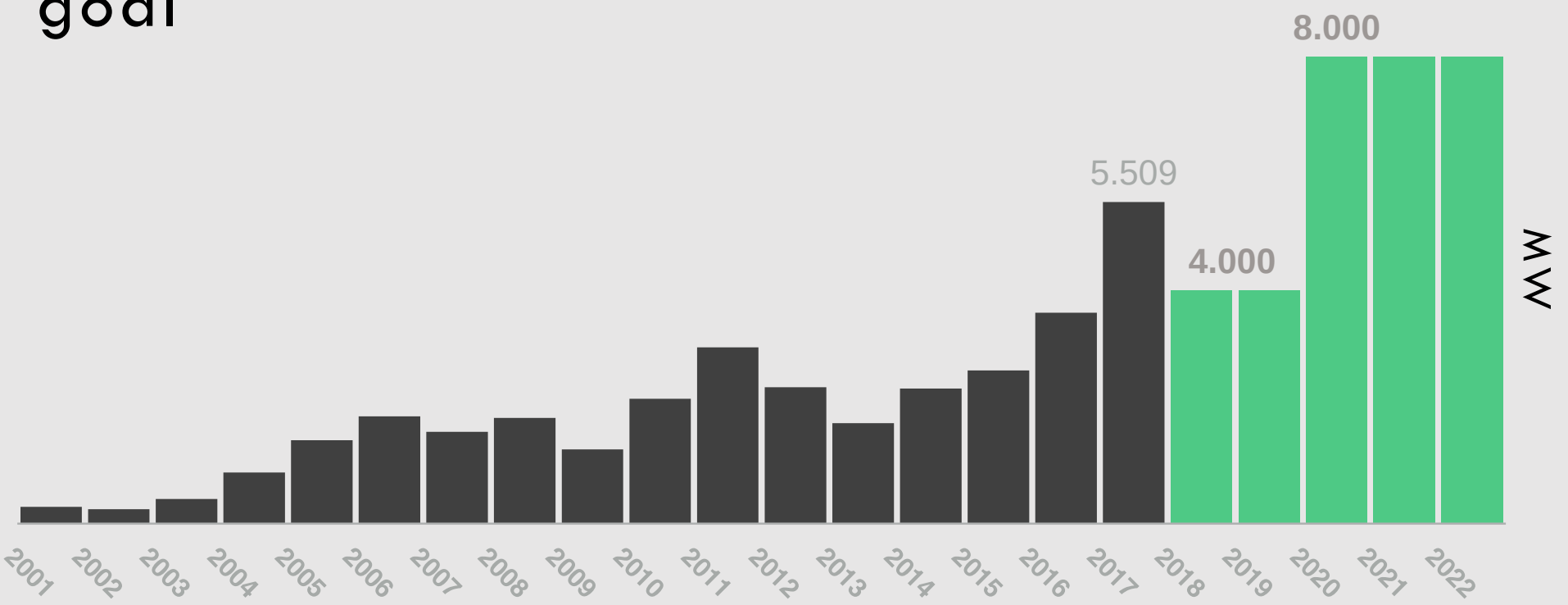
Reduced export costs to:
SAARC, Far-East & Gulf markets



Why India?

6

Wind market in India to grow to annual average of 5.8GW till 2022 to achieve the NWEM wind goal



Manufacturers

1	Gamesa	2050 MW
2	Suzlon	1779 MW
3	Inox	656 MW
4	GE India	427 MW
5	Regen Powertech	326 MW

Technological

8 Entry Barriers

1. Dearth of Good Wind Sites
2. Need to Vet Wind Assessment Studies
3. Power Transmission Challenges
4. Dearth of onsite skilled labor

Regulatory

8 Entry Barriers

5. Complicated subsidy structure which involves many entities like MNRE, IREDA, State's Nodal agency etc.
6. Delays in signing PPAs
7. Delay in acquiring statutory clearances for land, Right of Way for Power lines etc.
8. Land Acquisition of government land

Investment

8 Entry Barriers

9 Expensive Loans

10 Payment delays by some utilities

11 Only one year of moratorium

Entry Essentials

1. Provide all services:
    1. Acquiring Land
    2. Get required permissions and approvals
    3. Get the PPAs signed and handle other administrative paperwork
    4. Execute the wind project
    5. Provide O&M services for the wind turbines

Entry Essentials

2. Partnership with a local wind company
    1. Handle legal and other administrative work.
    2. Provide aid in obtaining all government permissions for land, power evacuation, forest clearance power purchase agreement (PPA)

Developer Activities

1. Land Identification (based on NIWE met mast data)
2. Land Acquisition
3. Minimum 1 year wind site data collection (with taller met mast)
4. Micro-siting survey

Developer Activities

5 Project Feasibility study by a credible consultant

6 Verify with past performance data of other wind turbines in neighboring areas

7 Techno-commercial study of the site to assess financial feasibility.

8 Prepare Detail Project Report (DPR) for financial closure

Developer Activities

9 Get State approval of the DPR

10 Project construction bound by strict deadlines as per sales agreement

11 Get approval of zoning and site from the nodal agency of the State

12 Get power evacuation permission from local transmission utility

Developer Activities

13 Get power purchase agreement with the utility for sale of power

14 Provide operation & maintenance service

15 Setup mechanism payment recovery / generation credit for wheeling of energy generated

Thank You