

Assignment no. 2: Brahmanvel wind farm.

case study.

Description:

The objective is development of wind power in the state of Maharashtra, India to provide renewable, renewable power to the Maharashtra western regional electricity grid. This project leads to reduced greenhouse gas emissions because it displaces electricity from fossil fuel based electricity generation plants.

The project harnesses renewable resources (wind energy) in the region & there by displacing non-renewable natural resources ultimately leading to sustainable economic & environmental development. The project is owned by Parakh Agro Industries & is having the responsibility of operation & maintenance of the wind farm.

The main purpose of the project activity is to generate electrical energy through sustainable means using wind power resources, to utilize the generated output & selling it to the State grid & to contribute to climate change mitigation efforts.

Project's Contribution to Sustainable development

Ministry of India has stipulated the following indicators for Sustainable development for CDM (Clean Development Mechanism) project approval guidelines. The project met several Sustainable Development Objectives including:

- leads to alleviation of poverty by establishing direct & indirect employment benefits during accomplishment & operation of project activities.
- Developing the local economy & create jobs & employment, particularly in rural area which is a priority concern for the government of India.
- Development of road network & important of electricity quality, frequency & availability as the electricity is fed into a deficit grid.
- Contribution towards the policy objectives of Government of India & Government of Maharashtra of incremental capacity from renewable resources.

- CO₂ abatement & reduction of green-house gases emission through the development of renewable technology.
- Reducing natural resources including land, forest, minerals water & ecosystems.

Details of physical location.

The wind farm is located at Brahmaneri village at Dhule district in the state of Maharashtra. The location has been chosen based on Average wind speed, maximum wind speed & wind gust. The average speed is 20.4 kmph, Maximum wind speed is 29.1 kmph & wind gust is 25.9 kmph. Dhule is located in the North-western part of Maharashtra state. The geographical location of Dhule is 20° 55' 57" N & 74° 46' 11" E.

The salient features of the project are as follows.

- Higher efficiency. so Designed to achieve increased efficiency & coefficient of power (cp).
- Minimum stress & load & well balanced weight distribution.

enlarge loads lower Static & dynamic

- Shock load - free Operation in Advanced hydrodynamic fluid coupling absorbs peak loads & variations.
- Maximum power effect factor: High speed asynchronous generator with a multi-stage intelligent switching compensation system delivers power factor upto 0.99
- climatic shield - Hermetically sheltered, advanced over-voltage & lightning protection system.
- Unique micro-pitching control: Unmatched fine pitching with oil resolution to extract every possible unit of power.
- Grid friendly: Grid friendly design generators harmonics free pure sinusoidal power.

Operating Data:

1. Rotor height : 84 m
2. Hub height : 65 m
3. cut in speed : 3 m/s
4. Rated speed : 12 m/s
5. cut out speed : 25 m/s
6. Survival speed : 47 m/s

Rotor :

1. Blade : 3 Blade horizontal axis
2. Swept Area : 8217 m^2
3. Rotational Speed : 13.9 to 20.8 rpm
4. Regulation : Pitch regulator

Generator :

1. Type : Asynchronous 4/6 poles
2. Rated Output : 250 / 1250 kW
3. Rotational Speed : 1006 / 1506 rpm
4. Frequency : 50 Hz

Gear Box :

1. Type : Integrated (1 planetary & 2 Helical)
2. Ratio : 74.971 : 1

Yaw System :

1. Drive : 4 electrically driven planetary gearbox
2. Bearings : polyamide slide bearings

Braking System :

1. Aerodynamic Brake : 3 independent systems with blade pitching
2. Mechanical Brake : Hydraulic fail safe disc braking system

Control Unit :

Programmable microprocessor & unit,
 light speed data communication,
 active multilevel security,
 Sophisticated Operating Software,
 advance data collection, and
 monitoring & control Option, UPS
 backup, Real time Operating
 indication.

DetailsPart # 1

- Commissioning
- 2 turbines, Vestas V 82/1650
(power 1650 kW, diameter 82 m)
- total nominal powers = 3,300 kW
- Operational
- Onshore wind farm.

Part # 2

- Commissioning.
- 82 turbines, Suzlon 566/1250
(power 1250 kW, diameter 66 m).
- Operational.
- Onshore wind farm.
- Location - Latitude $21^{\circ}9'34.8''$
Longitude $74^{\circ}11'21.6''$
Geodetic System: WGS 84.

Part # 3.

- 5 turbines : Micon .
- Total nominal power : 3000 kw .
- Operational .
- Onshore wind farm .

Part # 4.

- 4 turbines : Neg micon NM 750
(power 750 kw, diameter 44m) .
- Total nominal power : 3000, kw .
- Operational .
- Onshore wind farm .

Part # 5.

- 20 turbines : Neg micon NM 44/750
(power 750 kw, diameter 44m) .
- Total nominal power : 15,000 kw .
- Operational .
- Onshore wind farm .
- Localisation : Latitude : $21^{\circ}9'34.8''$
Longitude : $74^{\circ}11'26.6''$
Geodetic System : WGS84

Part # 6.

- 22 turbines : Micon M1500 - 750/a
(power 750 kw, diameter 48.2m) .
- Total nominal power :
- Operational .
- Onshore wind farm .
- Localisation : Latitude : $21^{\circ}9'34.8''$
Longitude : $74^{\circ}11'26.6''$
Geodetic System : WGS84 .

Part # 7.

PJ NO: 68

- 16 turbines : Suzlon 552/600 (power 600 kw, diameter 52 m)
- Total nominal power = 9600 kw
- Operational
- Onshore wind farm.

Part # 8.

- 375 turbines : Suzlon 564/1250 (power 1250 kw, diameter 64 m)
- Total nominal power = 431,250 kw

Part # 9. Operational
Onshore wind farm.

Developer : Parakh Agro Industries.
Localisation :

Localisation - Latitude : $21^{\circ} 9' 54.8''$
Longitude : $74^{\circ} 11' 01.6''$
Geodetic System : WGS 84

Part # 9.

- 4 turbines : Suzlon 582/1500 (power 1500 kw, diameter 82 m)
- Total nominal power = 6000 kw
- Operational.
- Onshore wind farm

Part # 10.

Total nominal power = 11,00 kw
Operational.
Onshore wind farm.

- Developer : Tata power company limited.
- Localisation - Latitude : $21^{\circ} 9' 34.8''$
Longitude : $74^{\circ} 11' 21.6''$
Geodetic System : WGS 84.

• Conclusion :

The Bhramanvel wind farm, located in Dhule district of Maharashtra contributes 528 MW of electricity to Maharashtra grid system by the use of renewable resources.

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