Butoni Wind Farm Project

(Fiji Electricity Authority)

LEARNINGS

Technical Visit & Workshop to Share Best Practices in Renewable Energy
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Uate Biutanaseva
Unit Leader Renewable Generation
Fiji Electricity Authority

Outline

- FEA
- Introduction
- Project Background
- Issues
- Learnings

FEA's Mission and Vision

VISION

"Energising our people and our nation"

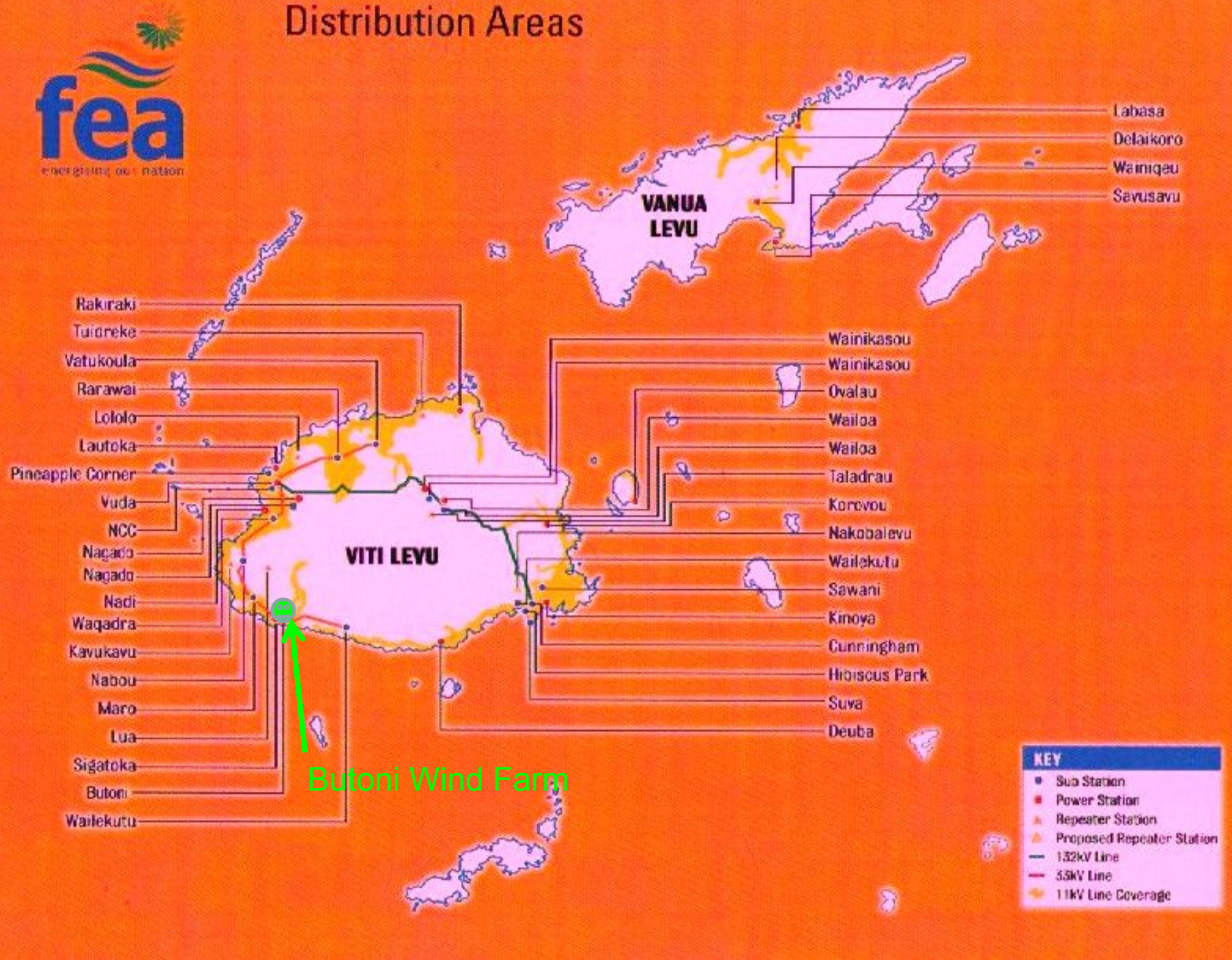
MISSION

"We will provide clean and affordable energy solutions to Fiji and the Pacific. We aim to provide all energy through renewable resources by 2011"

Introduction

- FEA's first wind farm feeding into the national grid from Sigatoka region
- The Butoni Wind Farm Site is located in the south-western part of the Viti Levu Island of Fiji near Sigatoka township.
- The average elevation of the main ridge is about 220 mASL.
- The wind regime is dominated by south-easterly trade winds with small occurrences of sea breezes.

Distribution Areas



Project Background

- 2003
  - The FEA in line with its mission to produce all energy by renewable sources by the year 2011 decided to embark on a wind farm project.
  - FEA and Pacific Hydro Ltd (PHL) met with Department of Energy (DOE) and made site visits to all the sites where DOE had already taken wind measurements.

Project Background

- 2004
  - Butoni, one of the sites close to where wind data was collected by DOE was chosen due to:
    - easy accessibility,
    - proximity of the Butoni ridge to the FEA grid
    - and Sigatoka being an area of increasing development,

SEL decided to install a wind monitoring tower on the Butoni ridge to get more accurate wind data.

Project Background

- Initial data collected put Butoni in the low wind speed category with average wind speeds recorded at 4 - 6m/s. Project deemed financially uneconomical by PHL based on the development cost and the expected energy generation.
- FEA decides to pursue project on own accord as JV partner (PHL) pulls out of the project.
- PB Power (Australia) taken onboard by FEA as principal consultants to prepare documentation for tender.
- International tender called by FEA in Q4 2004

Project Background

2005

- March 2005 – memorandum of understanding and confidentiality agreement signed between Vergnet and FEA
- July 2005 – design, supply and installation contract was signed between Vergnet Pacific and FEA for a 10MW Turnkey Wind Farm Project.
- Civil tender specification prepared by Vergnet. Civil scope included road works, platforms works, drilling and concrete works.

Project Background

- Environmental Impact assessment concluded with final approval from Department of Environment
- Landowners sent on an excursion in New Caledonia in October to visualise what a wind farm looks like and the impact on their land.
- Full landowner and NLTB consensus to lease FEA land for the wind farm granted in November 2005
- Official start date of the contract was agreed to be **23 November, 2005** by both parties. Vergnet's 14 months period from ground works to commissioning commenced on the 23rd.

Project Background

- 2006
  - Commissioning start April 2006 and last turbine commissioned in August 2007

Wind Farm Data

The wind farm is made of:

- 37 wind turbines (GEV-MP 275)
  - Horizontal axis, 2 blades
  - Tower Height of 55m & Rotor Dia of 32m
  - Collapsible tower
- Each having a rated power output of 275KW
- Total rated capacity 10MW

The Performance Warranty under this Turnkey Contract is 11.3GWH for a period of one year at an average wind speed of 5.47m/s.

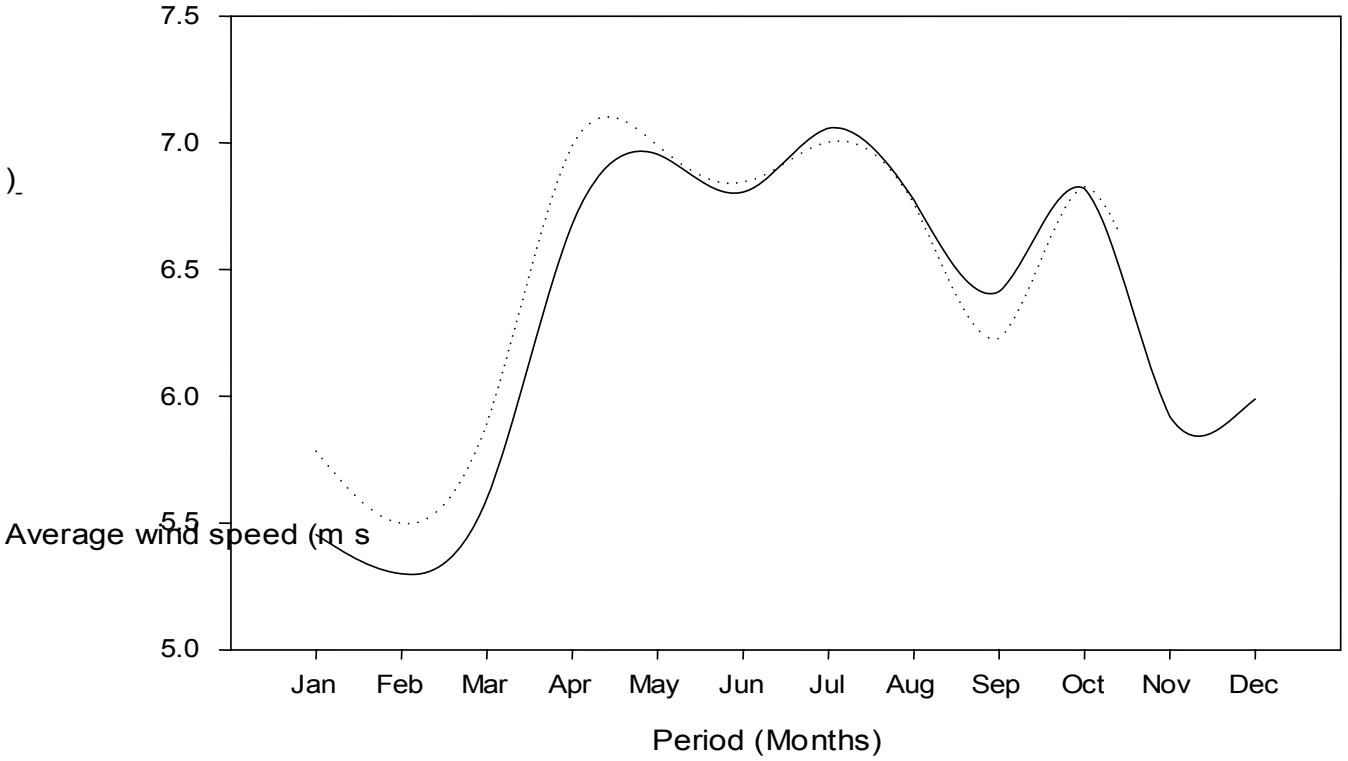
Issues

- Landowners
  - Land approvals for the project were finally issued in November 2005.
- Surveying error
  - The initial errors by the Surveyors contributed to significant delays.
- Re submission of specifications
  - A lot of the works on the road lost momentum during the Christmas break due the re-drafting of the civil specifications. The contractor did not had clear instructions during this period on what specifications to follow.
- Drilling contractor
  - Lack of a competent drilling contractor has caused some delay on the overall project plan as well.

Issues

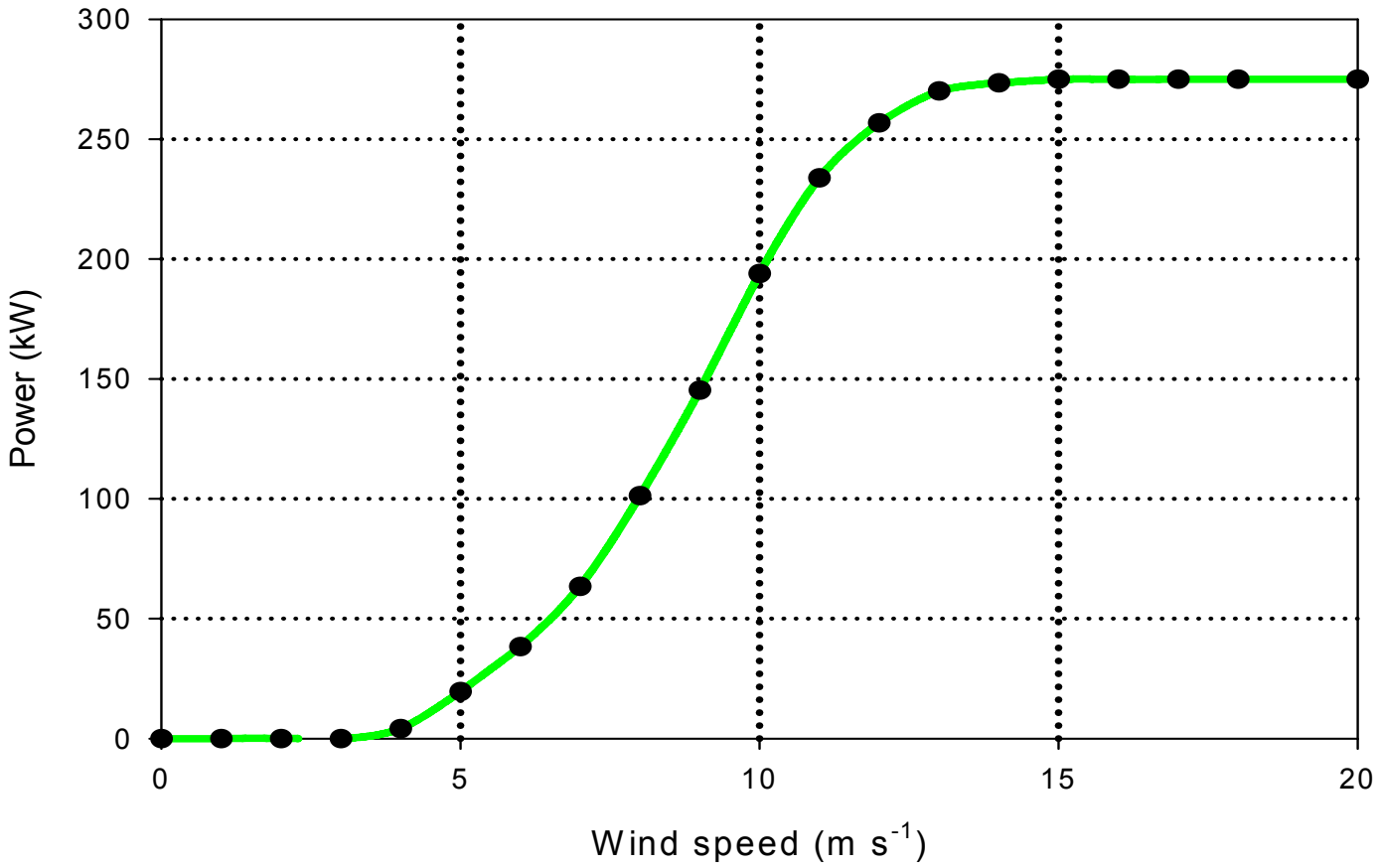
- Weather
- Lack of proper design of roads and platforms
- Lack of understanding by Vergnet of local conditions and design tolerances.
- Full understanding of the Agreement/Contract when dealing with overseas companies.
- Having a proper O&M Agreement in place well before the actual operation starts.

Performance



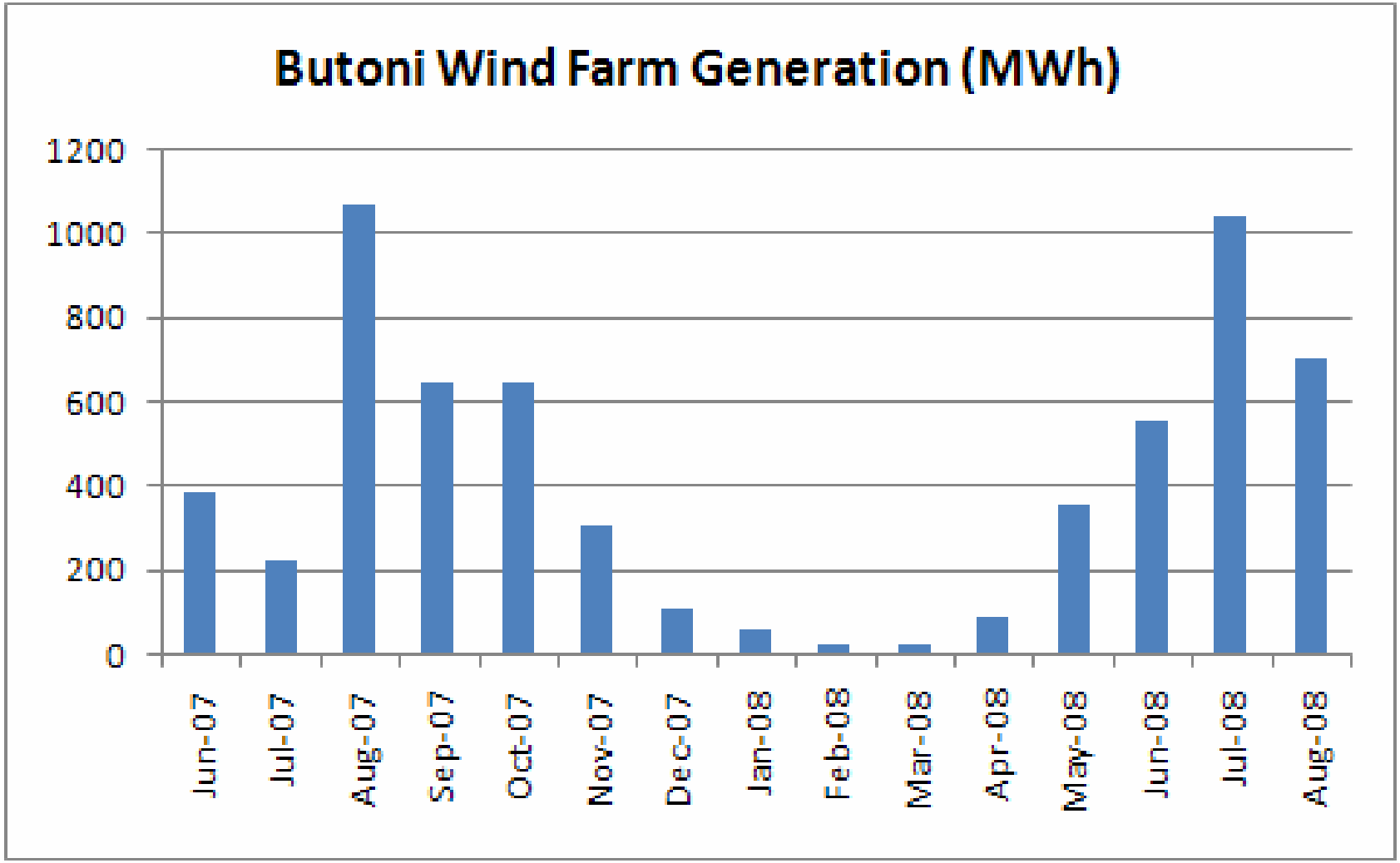
Monthly Wind Speed in Fiji, according to NASA

Performance



Power Curve for a Vergnet GEV-MP275 turbine (manufacturer's data)

Performance



Performance

- Annual Average Wind speed recorded at the windfarm during the first year was ≈ 4.96 m/s
- Capacity Factor for first year of operation at 5.2% compared to 12% as manufacturer performance contract
- O&M Cost expected to increase after few years of operation – due to wear & tear and component life

Learnings

- Land for any development must always be dealt in advance due to the process involved plus uncertainty with the landowners themselves

- Involvement of plant users during design stage of any development is absolutely vital.

- Proper understanding of the agreements or contracts for each project is a must to avoid issues, extra costs and delays.

- Proper storage of any project data and documents is very important – from investigation to operation

Learnings

- Proper closing off projects – sign off for achievable design outputs

- Proper management of contractors or subcontractors is very important as mistakes or errors always lead to delay of project completion and increase in costs. Project management skills are a must for timely and smooth flow of project activities.

- Consider the maintenance cost carefully during selection stage of plant and equipment.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Tool Box


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