

PROJECT FACT SHEET

LUDERITZ WIND POWER PLANT

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Introduction and Background

In 2018, Namibia Power Corporation (NamPower) crafted its new [Corporate and Strategic Business Plan](#) for the period 2019-2023. In-line with the new corporate strategy and business plan, the NamPower Board of Directors approved the implementation of new generation projects in June 2018 under the “Strategic Pillar, Ensuring Security of Supply”.

These projects were later considered by the Minister of Mines and Energy and a determination was made in October 2018 by the Minister that 220MW of Power Generation should be developed where:

- 150MW would be allocated to NamPower;
- 70MW would be allocated on a competitive procurement basis as per current government procurement laws to IPPs for implementation.

At a Board Meeting on 8 November 2018, the NamPower Board ratified the implementation of the following projects as part of NamPower’s 150MW allocation.

- 20MW PV Power Project;
- 40MW Wind Power Project;
- 40MW Biomass Power Project; and
- 50MW Firm Power Project.

NamPower is thus advancing the development of its proposed 40 MWe Luderitz Wind Power Plant. The proposed power plant will be developed as an Engineering Procurement and Construction project and will be owned and operated by NamPower where the majority of the costs for the project will be funded from NamPower’s balance sheet.

NamPower is committed to supporting and achieving the government objectives as set-out in the national planning policies, and in particular the [National Integrated Resource Plan \(NIRP\)](#) and the [5th National Development Plan \(NDP5\)](#).

Considering Namibia's ideal conditions for wind power plants at certain coastal areas, coupled with the objectives set out in NIRP and NamPower’s strategic roadmap to expand the penetration of renewables within the energy mix; wind power plants are considered ideal for

Project Objectives and Rationale

The objectives of the Luderitz Wind Power Plant, herein after referred to as the “Project” are to:

- Reduce the overall NamPower tariff to the customer by introducing the most affordable “new-build” renewable energy to the Namibian grid;
- Supporting renewable commitments prescribed in the Renewable Energy Policy and National Energy Policy; and
- Providing renewable energy outside of the typical solar PV dispatch profile.

SWOT Analysis

The Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis for the Wind Power Project is summarised in Figure 1.

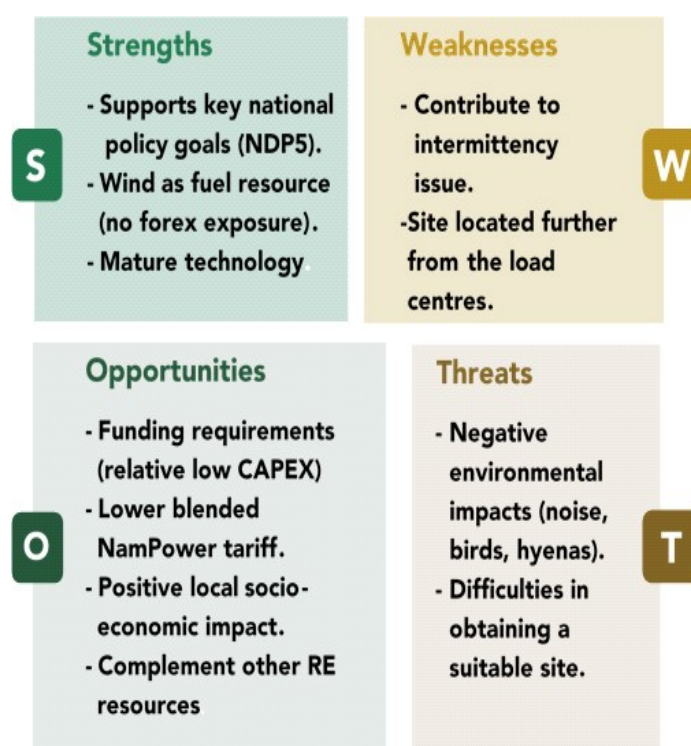


Figure 1: Project SWOT Analysis

Technical Description and Site Details

Following a thorough site selection, with stringent site evaluation criteria, the area between Elizabeth Bay and Luderitz Town was identified as the most preferred site and was thus recommended for the new 40 MW Wind project development. The execution period of the project from contract award to completion date is expected to be approximately fourteen (14) months.

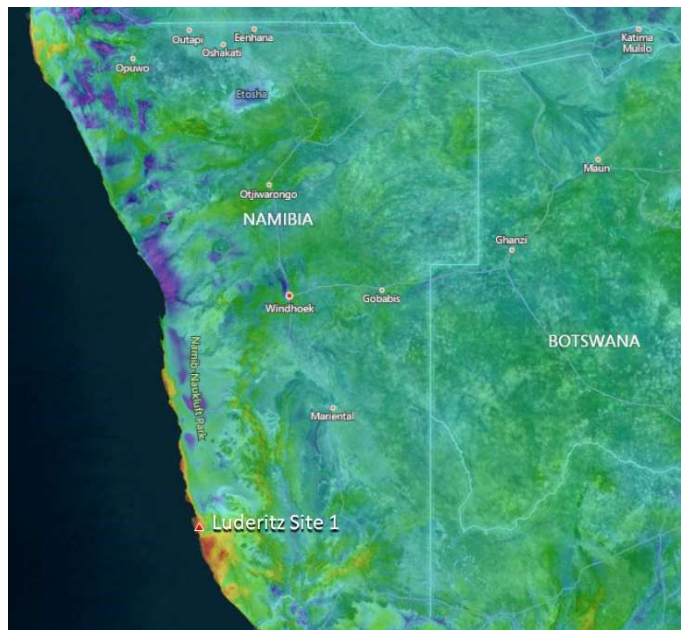


Figure 2: Wind Resource Map of Namibia

Certain constraints do exist within the identified area in “Site 1” (see Figure 3), due to other developments, environmental considerations as well the sites proximity to the Luderitz airport. A micro-siting study is currently underway to evaluate the terrain, land optimisation, turbine placement, accessibility and transmission line routing.



Figure 3: Preferred site location

The technical description and site details are listed below in Table 1.

Table 1: Location and Description

Location and Description	
Plant Capacity:	40 MW Maximum export capacity (MEC)
Location:	Located approximately 9 km from the seashore, 20 km south of Luderitz.
Coordinates:	26°48'7.23" S; 15°10'12.99"E
Wind Turbine generator Type:	Horizontal-axis wind turbine (HAWT) generator, up-wind turbines
Power control:	Pitch & torque regulation, with variable speed;
Distance from nearest main road:	14 km

Wind Resource

Based on satellite data, the Elizabeth Bay site was found to be one of the best wind resources in Namibia, with a mean wind speed of 9.21 m/s at 100 m above ground level and estimated capacity factors of approximately 50%. The wind resource and site parameters of the preferred site are indicated in Figure 4 below.

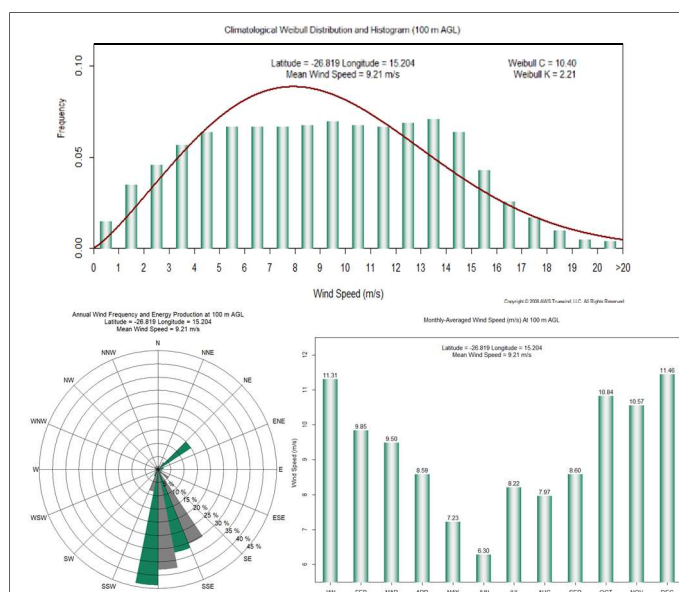


Figure 4: Site 1 Wind Data and Site Parameters

Project Structure

The intended project structure is depicted in Figure 5, indicating the key stakeholders involved.

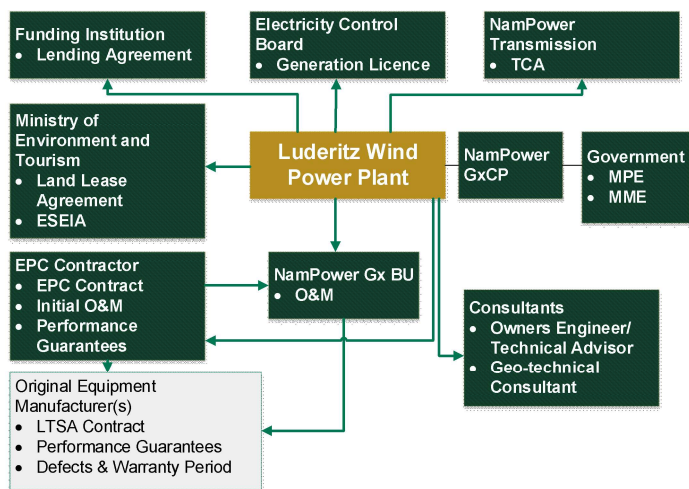


Figure 5: Project Structure

The Wind Power Plant will be developed, owned and operated by NamPower, where NamPower will appoint an EPC contractor to construct the power plant. Figure 5 provides the project structure which illustrates the key stakeholders and the following key agreements:

- **Lending Agreement** – It is envisaged that the Project will be balance sheet financed, however NamPower may want to lend against its balance sheet to leverage its resources. If NamPower decides to follow this route, a Lending Agreement will be entered into with the respective Funding Institution;
- **Generation Licence** – NamPower will apply for a generation licence from ECB to operate;
- **Transmission Connection Agreement** – NamPower Gx Capital Projects will enter into a Transmission Connection Agreement (TCA) with NamPower's Transmission Business Unit for connection of the power plant to the Namibian grid;
- **Consultants** – NamPower will procure consultants to assist in providing the following specialised knowledge and expertise on the development and execution of the Wind Power Project:
 - Technical Advisor and Owner's Engineer will provide technical support and assistance in managing the EPC contract to NamPower;
 - Environment Practitioner to compile the ESIA and obtain the Environment Clearance from MEFT;
 - Geotechnical Consultant to assess the geotechnical, hydrogeological and

topographical conditions for the site in order to mitigate possible subsoil risk.

- **EPC Contract** – NamPower will procure an EPC Contractor to engineer, procure and construct the power plant through a transparent and open international competitive bidding process. The procurement of the EPC Contractor will follow the Public Procurement Act;
- **LTSA** – NamPower will enter into a Long-term Service Agreement (LTSA) with the Original Equipment Manufacturer (OEM) to conduct major maintenance and overhaul activities on main equipment.

As the envisaged project structure for the Wind Power Project relies on the project being procured by NamPower's balance sheet, a Power Purchase Agreement (PPA) will not be required.

Procurement Methodology

The procurement of an Engineering, Procurement and Construction (EPC) Contractor for the Project will be completed within the provisions of the Namibian Public Procurement Act, No.15 of 2015. This procurement falls above NamPower's threshold, and will therefore be administered through the Central Procurement Board of Namibia (CPB) on behalf of NamPower.

The contract between NamPower and the successful bidder (EPC Contractor) will be based on the FIDIC Conditions of Contract for EPC/Turnkey Projects (Silver Book), 2017 edition.

The EPC procurement process is expected to be an open advertised bidding process through a single stage with two envelopes, i.e. technical and financial proposals. The scope of the EPC Contractor will include the following:

- Design, manufacture, erection, test and commissioning of a 40MW wind power plant
- Provide full turnkey-wrap scope of services, including transportation, insurance, customs and duties and a 2 year Defects Notification Period as per FIDIC;
- Subcontract all possible local works/services to Namibian companies in order to achieve a minimum local content spend of 10% of the total EPC contract value;
- Ensure that all unskilled and semi-skilled labour which are employed are Namibian citizens; and

- Supervise (as required) the O&M of the Plant during the first two years of operation, as well as include expected OEM LTSA requirements in the EPC contract specification.

Plant Operation and Maintenance

The key parameters for the Project are provided in Table 2 below. The wind turbine generators are expected to be horizontal axis wind turbines (HAWTs) with the appropriate class for the wind conditions on site.

Table 2: Key parameters

Description	Value	Unit
Installed Capacity	40	MW
Annual Capacity Factor	± 50	%
Energy per year	175.2	GWh
Wind data hub height	100	m

NamPower will operate and perform the first-line maintenance on the Luderitz Wind Power Plant. The OEM will be responsible for major maintenance on the plant for the duration of the LTSA.

The EPC Contractor will be responsible to achieve the annual performance guarantees and hence deploy requisite supervision and support services as required in order to meet the annual performance guarantees under the EPC Contract.

NamPower staff will be trained by EPC Contractor personnel to ensure that the necessary knowledge has been transferred in order for NamPower to operate and maintain the plant.

Environmental Considerations

The preservation of the biodiversity in the Project area and the protection of sensitive fauna (bird life and brown hyenas) and flora are key considerations in addressing the environmental impacts of the project. Through consultations with key stakeholders, specific Project guidelines have been proposed to minimize the environmental impact of the Project.

Capital Budget

The Project will be corporate financed through NamPower's balance sheet. NamPower's Financial

Statements are reported in NamPower's Annual Report, (Investor Relations section of the NamPower website, www.nampower.com.na).

NamPower is seeking corporate funding from institutional lenders in order to bring the Project to fruition.

The total cost of the Project is estimated at N\$ 1,053,003,000 at an assumed exchange rate of NAD/USD 14.

Value Proposition

The value proposition of the Project is demonstrated in the cost difference between the energy generated by the Project and the corresponding energy imported from Eskom. The NPV avoided cost of the Project at various discount rates (on USD exchange rate of 14 NAD) is summarised in Table 3 below.

Table 3: Project Value Proposition

Discount Rate	NPV Avoided Cost (mil NAD)
10%	NAD 2074 million
13%*	NAD 1445 million
16%	NAD 1048 million

* The maximum nominal return on asset as allowed by the ECB

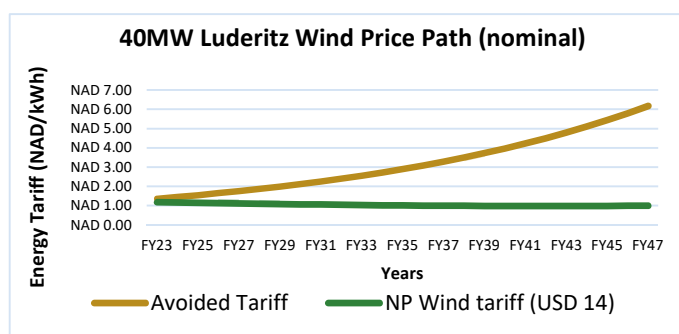


Figure 6: Expected avoided tariff

Risk Assessment

In 2018, NamPower conducted a risk assessment workshop with internal stakeholders to identify all the anticipated Project risks in terms of the risk category (i.e. environmental, commercial, legal and technical) and in terms of the project phase (i.e. procurement, construction and operation). The key risks identified during the development phase of the Project are listed as follows:

- Wind turbine components are eroded by wind carried sand;
- New procurement process creates delays;
- Construction within the diamond area and national park could create delays;
- Exchange rate fluctuates adversely;
- Project is delayed due to COVID-19 international pandemic; and
- The large and complex works standard bidding documentation is not ready in time.

A risk assessment workshop will be held with the successful EPC Contractor to update the risk register for the construction and operation phases of the Project.

Project Schedule and Progress

The key milestones of the Project are summarised in Table 4 below.

Table 4: Project Completed Tasks

Completed Tasks	Completion Date
Procurement of wind resource measurement Contractor	11-July-19
Procurement of Technical Advisor / Owner's Engineer	01-Nov-19
Complete micro-siting study	22-Nov-19
EIA Screening Report approval	30-Jan-20
Avifaunal Scoping Report approval	04-Feb-20
All approvals obtained for Wind Mast construction in restricted area	17-Feb-20
Public Participation Meetings	27-Feb-20
Pre-Construction Bird Monitoring Interim Report Quarter1 approval	24-Mar-20
Public Participation Report 1 approval	03-Apr-20
Draft Scoping Report (submission)	05-Jun-20

The following next steps are required to bring the project to its execution phase.

Table 5: Key Next Steps for the Project

Key Next Steps
Secure the lease agreement for the Project site (in progress) and rezone (if necessary) the site via the Ministry of Land Reform
Install a wind mast and weather station and measure the wind resource for bankable data acquisition in progress
Procure the services of a geotechnical and hydrological consultant to perform the required survey and studies on site
Complete the Environmental and Social Impact Assessment for the site and obtain other relevant permits and authorisations as required
Develop the standard bidding document and technical specification in order to procure the services of the EPC Contractor
Secure the lease agreement for the Project site (in progress) and rezone (if necessary) the site via the Ministry of Land Reform
Install a wind mast and weather station and measure the wind resource for bankable data acquisition in progress

Project Key Milestones

The key milestones of the Project are summarised in Figure 7.

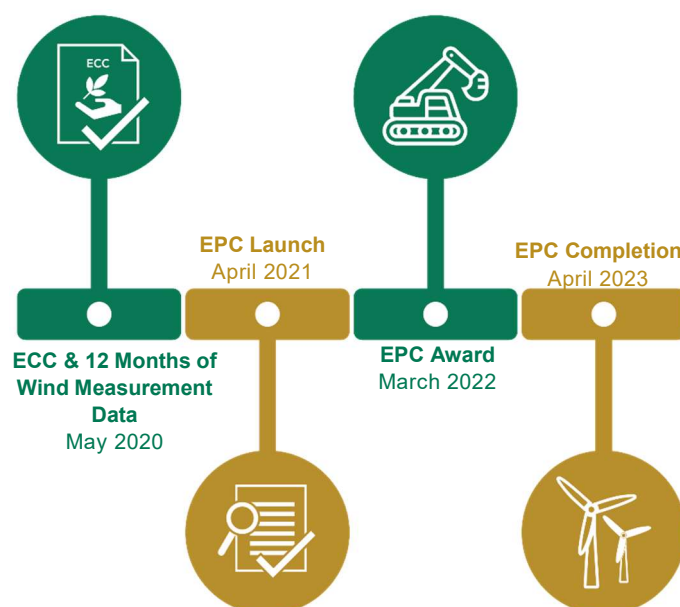


Figure 7: Project Development Timeline

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