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## Wind Energy Investment in Bonaire: Insights from a manufacturer perspective

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- Investing in utility-scale renewable energy in the Caribbean
- Challenges in the development of renewable energy in the Caribbean
- The example of the Bonaire wind-diesel power plant
- Enercon in Central America and the Caribbean

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## Why investing in renewable energy in the Caribbean?

- Real need for green energy (to reduce carbon emissions)
- High energy costs due to costly imported fuel
- Good wind and solar resources
- International community is willing to support the region
- Utility-scale pilot projects led to “lessons learned” and helped developing a new industry (developing capacity, creating jobs etc.)

# What investors consider before investing in the Caribbean?



- > higher contingencies required
- > higher financing rates
- > bigger equity required
- > often supported by development banks
- > “less attractive” region for investment

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- Small islands/markets (different regulation, tax systems, legal framework) except French/Dutch Antilles.
- Undeveloped infrastructure (harbor, roads) or inappropriate for utility-scale projects
- Complicated and unpredictable weather conditions (hurricanes)
- Old diesel power plant have not achieved their lifetime yet (financial breakeven)
- Requires partnerships with local parties (for a proper development, for the maintenance of the plant)
- Self-financed projects: different from Europe where you have PPAs and “take or pay PPAs”
- Projects require parity with fossil based power plants to be competitive. Yet, the last years fuel prices have been low...

- Difficulty to integrate RE in off-grid/micro-grid systems w/o high investments (battery etc)
- Few experienced promoters
- Banks, manufacturers and other stakeholders don't know the Caribbean and cannot afford expensive and time costly due diligences (legal, tax).
- Few or no subsidies, so less returns for RE projects (depending on wind/solar resources)
- Lack of sovereign-guaranteed or state-backed PPA
- Custom and tax procedures (some countries never imported such equipment before)
- Few standardized approaches



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Active and Reactive Power

Voltage Dips (low voltage ride through)

Frequency (balance between generation and consumption)

Absorb and store energy in case of wind production when no consumption

Switch from the wind farm to the diesel-generators

## MONITORING SYSTEM

Wind turbines:  
12xE-44 900kW  
(11MW)

Storage system:  
Set of batteries  
(3MW for 2min)

Diesel generators:  
5xMAN 2.850kW  
(14MW)

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2008

Construction of the wind farm La Gloria, in Costa Rica, 55MW

2009

Construction of the wind farm Bonaire in the Netherlands Antilles, 11MW

2012

Construction of the wind farm Valle Central in Costa Rica, 15 MW

2015

Opening of a Sales and Project Management Office in San José, Costa Rica

2016

Increase in the team: 2 new Sales Managers and 1 Project Manager

- Top-Notch Technology (gearless turbines, grid integration features, 30 years+ experience)
- Wide product range to fit all sites (especially very strong wind sites)
- Full-cover O&M contracts adapted to the local infrastructure
- Possibility to offer EPC contracts in some countries;
- Possibility to offer energy storage systems for the Caribbean
- Best advices from our local team, support from the development to the operation of wind farms (knowledge of the country-specific aspects) backed by Germany and Brasil
- Close contact with our local and international clients

# Thank you for your attention!

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