



**AVANGRID
RENEWABLES**

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April 2021

Lifecycle of a Wind Project

Avangrid Renewables, LLC

A collection of exceptional assets...

One of the largest wind project owners in the U.S. with more than 7.5 GW owned and contracted

>8.3 GW total generation capacity at nearly 70 installed plants

725+ employees at the end of 2016, compared with 12 in 1999

636 MW of CCGT & peaking capacity on the strategic CA-OR border

Represents ~23% of Iberdrola S.A.'s global renewable capacity

US Renewables



Wind

7,500+ MW



Power

536 MW CCGT
100 MW peaking



Solar & Biomass

130 MW Solar
55 MW Biomass

And clean gas generation

...focused on operational excellence and selective growth

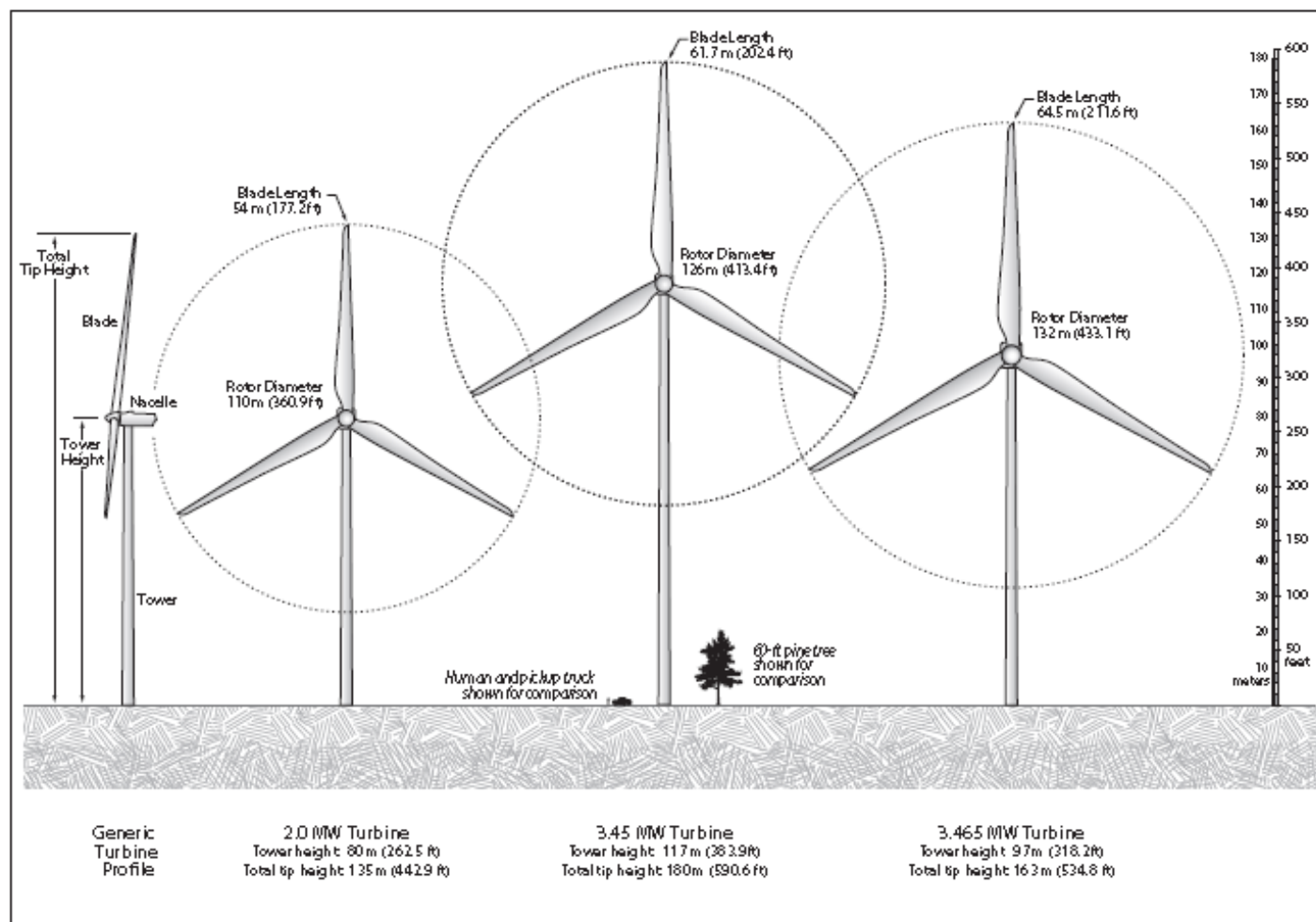
What is a wind farm?

- Turbines
- Roads
- Met towers
- Operations and Maintenance Bldg.
- Power lines
- Substation
- Point of Interconnect (POI)



Turbines

No industry standard anymore



Foundation



Foundation



Foundation



Turbine Erection



Roads, met towers, O&M buildings



Collector lines, substation, gen-tie, POI



National Control Center (NCC)

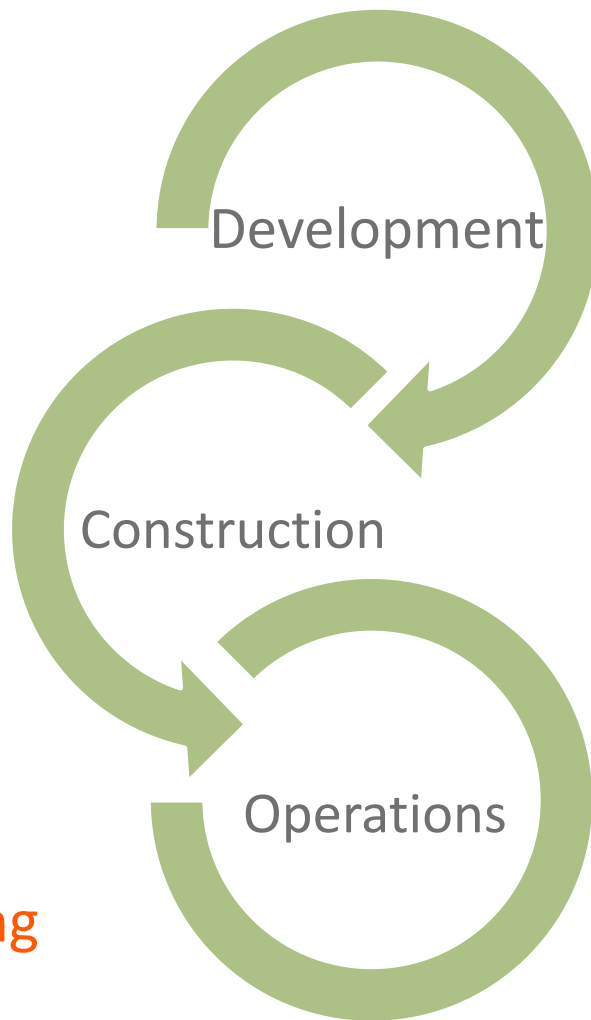


Wind Energy: Life of a successful project

Prospecting
Siting
Studying

12-24 months

Maintenance
Repowering
Decommissioning



Development

Construction

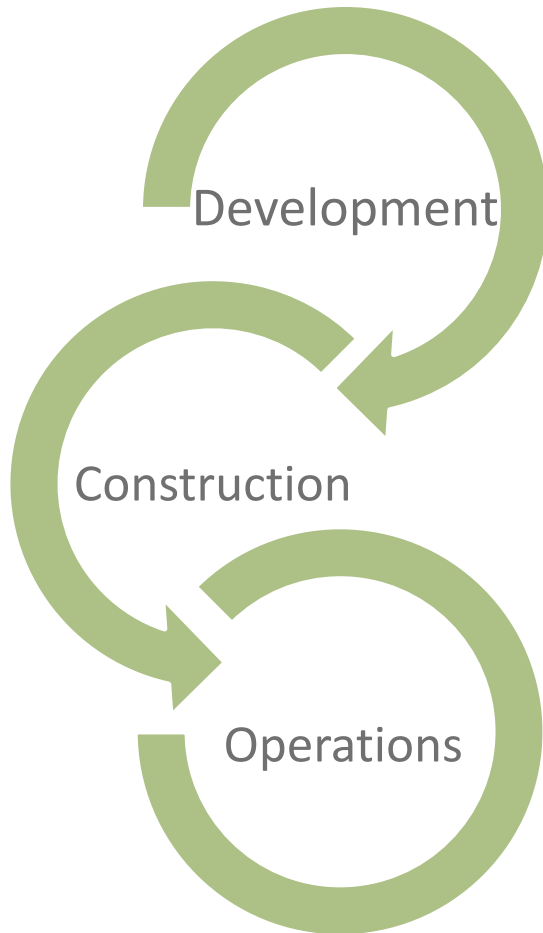
Operations

2-7 years

Procurement
Building
Reclamation

25-40 years+

Newer elements to lifecycle



Production Tax Credit
Qualification

Power Purchase Agreement
(PPA)

Pre-Construction Phase

Strategic Transactions

Development hurdles = Risks to investment

- Poor wind resource
- Turbine availability
- Community opposition
- Unwilling landowners
- No buyer/offtake opportunities
- Transmission constraints
- Constructability concerns – slopes, geotech, etc.
- Procurement issues
- Biological constraints – wetlands, threatened and endangered species
- Siting Constraints - Military training routes/radar

All of which adds cost and risk to a project

A silhouette of a three-bladed wind turbine stands on a dark hill against a vibrant sunset sky. The sky transitions from a bright orange glow near the horizon to a deep blue at the top, with scattered clouds catching the low light. The turbine's tower and nacelle are clearly defined against the bright part of the sky.

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