



Developing Wind Project Capital & Operating Cost Forecasts A Benchmarking Approach

Sean P. Noonan, P.E.
Sargent & Lundy Consulting

Sargent & Lundy

Powerful
ideas
since 1891
sargentlundy.com

BACKGROUND

Understanding wind project life cycle costs, including capital investment and operating costs, is essential to promoting a successful project and projecting future cash flows.

Comparing operating costs of an existing asset to industry norms also provides insight into the operational performance of the project under consideration.

Sargent & Lundy utilizes a benchmarking approach to forecast capital expenditures (CAPEX) and operational expenditures (OPEX) based upon known costs for projects with similar characteristics and commercial arrangements.

Examples of site-specific characteristics that may affect project CAPEX and OPEX include:

- Wind turbine make and model
- Project size (capacity)
- Project location and energy market
- Operations and maintenance (O&M) strategy
- Project vintage (operating projects)
- Owner size

OBJECTIVES

This presentation:

1. Presents known project inputs and reporting that can be utilized to develop CAPEX and OPEX forecasts
2. Highlights the various life-cycle cost components that must be considered
3. Identifies project variables that have the most significant effect on project costs

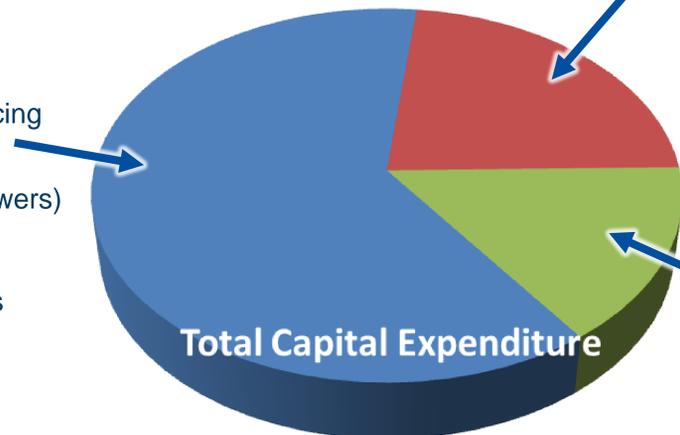
METHODOLOGY

Sargent & Lundy's involvement in the development and operation of over 200 wind projects enables a unique perspective on the factors that affect project capital and operating costs. As part of our internal cost and performance benchmarking process, we maintains a database of cataloged project operating expenses, operating performance, development costs, lifecycle operating cost forecasts, and commercial agreements. This data forms the basis of our wind project cost and performance benchmarking assessments.

CAPITAL EXPENDITURES

Turbine Supply Agreements provide insight into turbine pricing trends

- Turbine generators (incl. towers)
- Transportation and delivery
- SCADA system and options
- Commissioning support
- Warranty



EPC Contracts cover project construction labor and materials

- Site Improvements
- Foundations
- Collection system and substation
- Wind turbine erection
- Engineering and management

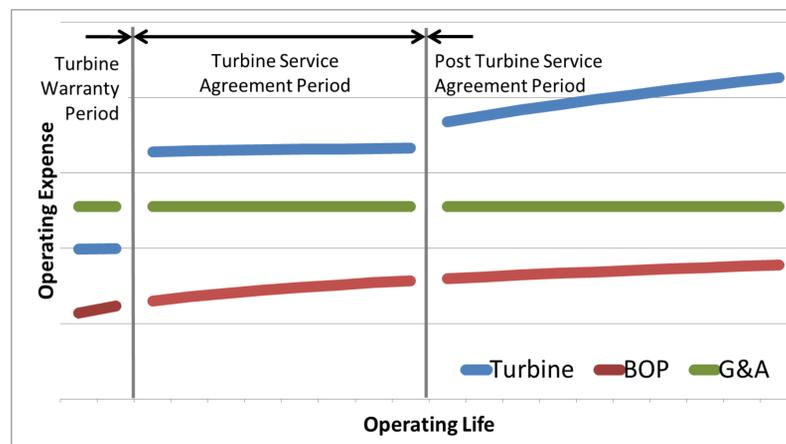
Reported Development Costs include Owner's costs through COD

- Interest during construction
- Securing land access
- Securing transmission access
- Permitting
- Contracts (TSA, PPA, etc.)

OPERATING EXPENDITURES

Maintenance Agreements reflect the project maintenance strategy (Owner, OEM, or third-party)

- Turbine scheduled and unscheduled maintenance
- Wind technicians and supplemental labor
- Balance of plant (BOP) and infrastructure maintenance



Management Agreements address operations monitoring and coordination of day-to-day project operations

General & Administrative (G&A) Fees reported by the Owner cover land lease and royalty expenses, taxes, and insurance premiums, among other misc. costs

CONCLUSIONS

Benchmarking provides a cost- and time-effective approach to forecasting wind project CAPEX and OPEX, the results of which are suitable for feasibility assessments and comparisons to expenses incurred within the wind industry. Estimates developed are consistent with AACE Cost Estimating Classes 4 and 5, which provides levels of accuracy up to -15%/+20%.

BIOGRAPHY

Mr. Sean Noonan is an Energy Consultant with Sargent & Lundy. He provides a variety of consulting engineering services, including renewable energy due diligence, electric plant economic and operational benchmarking, construction monitoring, financial reviews, and operation assessments. He has performed independent engineering evaluations of various wind energy portfolios, including reviews of project financial projections, budget reviews, contract reviews, wind turbine selection, independent design reviews, and construction plans and schedule reviews. Mr. Noonan has also prepared reviews of plant design, operating performance, O&M, contracts and agreements, and the financial overview of various power projects. He holds a B.S. in Mechanical Engineering and is a licensed Professional Engineer.

CONTACT INFORMATION

Sean P. Noonan, P.E.
55 East Monroe Street
Chicago, Illinois, 60603-5780
+1-312-269-6720
snoonan@sargentlundy.com

SARGENT & LUNDY

As part of our more than 125 years of electric power industry experience, Sargent & Lundy has significant wind energy experience. We provide a full range of services to the wind industry, including site screenings, project feasibility studies, wind resource assessments, independent engineering, interconnection planning, conceptual engineering, contract development, detailed engineering, design reviews, construction monitoring, commissioning services, and O&M support.