WIND ENERGY INTEGRATION

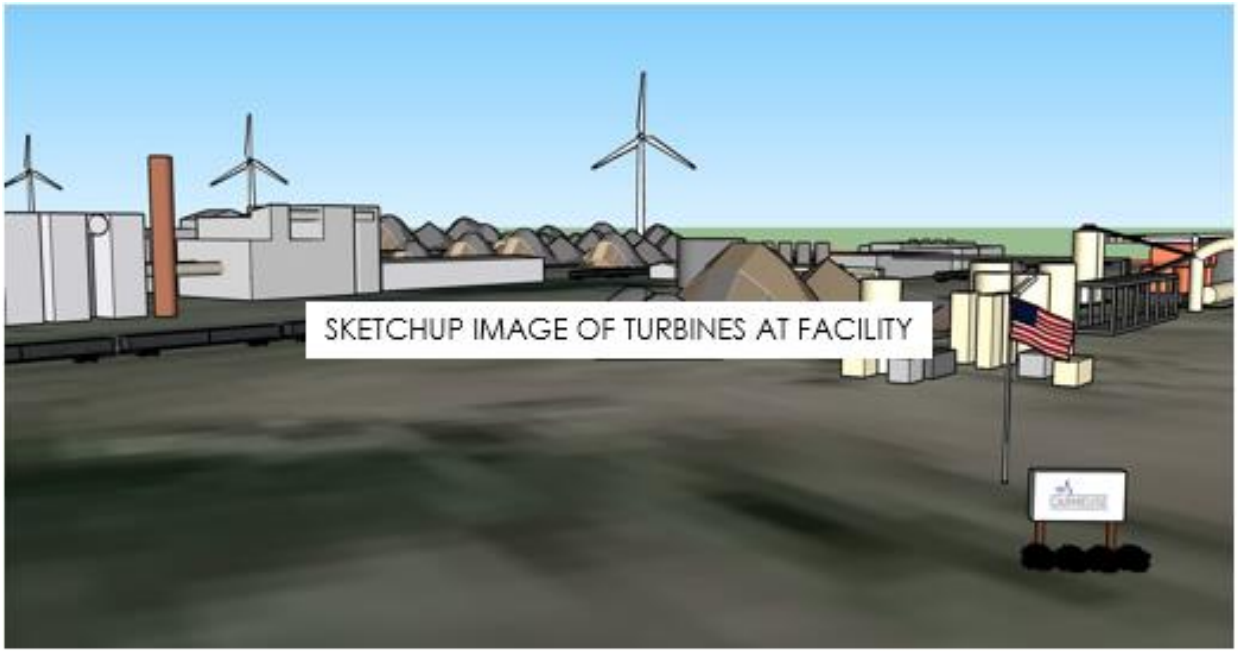
# DETAILED EVALUATION PACKAGE

## EXECUTIVE SUMMARY

# CUSTOMER NAME

CITY, STATE

MONTH 2019




ONE POWER COMPANY

AN INDUSTRIAL POWER COMPANY

Methodology v20##.#

# YOUR ONE POWER TEAM MEMBERS

The primary team members associated with this evaluation are listed below. Please do not hesitate to contact any of us with additional questions, concerns, or for clarification.

**Report preparation:**
Name
Position
###.###.####
email@onepower.com

VCARD
REPLACE IMAGE BY RIGHT-CLICKING & SELECTING "CHANGE PICTURE"

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vCARD
JESSICA GROSSO

## OUR PROMISE TO OUR CUSTOMERS

- Safety and quality are always first
- Be professors, not salesmen
- Make our customers smarter than the competition's experts
- Work with manufacturers to give our customers the best products possible
- Make wind hassle-free
- Be available and be honest
- Charge a fair price and get paid for our work
- Make decisions for the long term
- Never settle for the industry standard
- Challenge everything

# CONTENTS



# LIST OF APPENDICES



[DOESN'T AUTO UPDATE; MAINTAIN CENT. GOTHIC, SIZE 9, CAPS]

## OVERVIEW

One Power Company completed a comprehensive Detailed Evaluation for the Customer Name facility located in City, State. The project consists of number 1.5-MW wind turbines, for a total of #.# MW. This Executive Summary reviews the findings of those preconstruction tasks performed, which collectively, create a shovel-ready *Wind for Industry* project. Complete details of every section can be found in the attached Appendices.

All studies and analyses use the Goldwind 87-1500 (1.5 megawatts, MW, 87-meter rotor diameter, and 80-meter hub height) wind turbine.

## 1. WIND RESOURCE ASSESSMENT

The Wind Resource Assessment (WRA) was completed using Method #: Name of Method. Information on the datasets used is detailed in the table(s) below. [Copy tables directly from completed WRA report.]

IF METHOD 1 OR 2 (one table only):

| | TALL TOWER | REFERENCE DATA | WEATHER STATION |
|---|---|---|---|
| Data Type | Data Source | MERRA-2 Re-Analysis | Data Source |
| Collection Location | Location | MERRA-2 Data | Location |
| Distance from Project Site (miles) | # | # | # |
| Latitude (NAD 83) | ##.####° N | ##.####° N | ##.####° N |
| Longitude (NAD 83) | ##.####° W | ##.####° W | ##.####° W |
| Elevation (m) | ### | ### | ### |
| Data Collection Length | # month(s) | 30 years | # year(s) |
| Data Collection Start | #/#/#### | #/#/#### | #/#/#### |
| Data Collection End | #/#/#### | #/#/#### | #/#/#### |
| Data Availability | ##.##% | ##.##% | ##.##% |
| Data Collection Heights (m) | ## | ## | ## |
| Extrapolated Wind Data Heights (m) | ## | ## | ## |

IF METHOD 3 (all three of the following tables):

| TALL TOWER DATASETS | | | | |
|---|---|---|---|---|
| Data Type | Data Source | Data Source | Data Source | Data Source |
| Collection Location | Location | Location | Location | Location |
| Distance from Project Site (miles) | # | # | # | # |
| Latitude (NAD 83) | ##.####° N | ##.####° N | ##.####° N | ##.####° N |
| Longitude (NAD 83) | ##.####° W | ##.####° W | ##.####° W | ##.####° W |
| Elevation (m) | ### | ### | ### | ### |
| Data Collection Length | # month(s) | # month(s) | # month(s) | # month(s) |
| Data Collection Start | #/#/#### | #/#/#### | #/#/#### | #/#/#### |
| Data Collection End | #/#/#### | #/#/#### | #/#/#### | #/#/#### |
| Data Availability | ##.##% | ##.##% | ##.##% | ##.##% |
| Data Collection Heights (m) | ## | ## | ## | ## |
| Extrapolated Wind Data Heights (m) | ## | ## | ## | ## |

| REFERENCE DATASETS | | | | |
|---|---|---|---|---|
| Data Type | MERRA-2 Re-Analysis | MERRA-2 Re-Analysis | MERRA-2 Re-Analysis | MERRA-2 Re-Analysis |
| Collection Location | MERRA-2 Data | MERRA-2 Data | MERRA-2 Data | MERRA-2 Data |
| Distance from Project Site (miles) | # | # | # | # |
| Latitude (NAD 83) | ##.####° N | ##.####° N | ##.####° N | ##.####° N |
| Longitude (NAD 83) | ##.####° W | ##.####° W | ##.####° W | ##.####° W |
| Elevation (m) | ### | ### | ### | ### |
| Data Collection Length | 30 years | 30 years | 30 years | 30 years |
| Data Collection Start | #/#/#### | #/#/#### | #/#/#### | #/#/#### |

| | | | | |
|---|---|---|---|---|
| Data Collection End | #/#/#### | #/#/#### | #/#/#### | #/#/#### |
| Data Availability | ##.##% | ##.##% | ##.##% | ##.##% |
| Data Collection Heights (m) | ## | ## | ## | ## |
| Extrapolated Wind Data Heights (m) | ## | ## | ## | ## |

The results of the WRA, including the Gross and Net Annual Energy Production (AEP) and the Gross and Net Capacity Factor can be found in the table below.

| | Gross AEP (kWh) | Gross Capacity Factor | Net AEP (kWh) | Net Capacity Factor |
|---|---|---|---|---|
| TURBINE CODE 1 | #,###,000 | ##.#% | #,###,000 | ##.#% |
| TURBINE CODE 2 | #,###,000 | ##.#% | #,###,000 | ##.#% |
| TURBINE CODE 3 | #,###,000 | ##.#% | #,###,000 | ##.#% |
| Plant Total | ##,###,000 | ##.#% | ##,###,000 | ##.#% |

## 2. PROJECT PERFORMANCE REPORT

One Power completed a Project Performance Report (PPR) to determine the P50 energy production values and exceedance table for the project. 19 Performance Factors were used. The following tables detail the results of the PPR, including Annual Energy Production and Capacity Factor Exceedance, and Monthly P50 Energy Production Values.

| ANNUAL ENERGY PRODUCTION AND CAPACITY FACTOR EXCEEDANCE TABLE | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | BY TURBINE | | | | | | Plant Total (kWh) | |
| | T-CODE 1 | | T-CODE 2 | | T-CODE 3 | | | |
| P1 | #,###,000 kWh | ##.#% | #,###,000 kWh | ##.#% | #,###,000 | ##.#% | ##,###,000 | ##.#% |
| P10 | #,###,000 kWh | ##.#% | #,###,000 kWh | ##.#% | #,###,000 | ##.#% | ##,###,000 | ##.#% |
| P50 | #,###,000 kWh | ##.#% | #,###,000 kWh | ##.#% | #,###,000 | ##.#% | ##,###,000 | ##.#% |
| P75 | #,###,000 kWh | ##.#% | #,###,000 kWh | ##.#% | #,###,000 | ##.#% | ##,###,000 | ##.#% |
| P90 | #,###,000 kWh | ##.#% | #,###,000 kWh | ##.#% | #,###,000 | ##.#% | ##,###,000 | ##.#% |
| P95 | #,###,000 kWh | ##.#% | #,###,000 kWh | ##.#% | #,###,000 | ##.#% | ##,###,000 | ##.#% |
| P99 | #,###,000 kWh | ##.#% | #,###,000 kWh | ##.#% | #,###,000 | ##.#% | ##,###,000 | ##.#% |

| MONTHLY P50 ENERGY PRODUCTION VALUES | | | | | |
|---|---|---|---|---|---|
| Month | Monthly Ratios | BY TURBINE (KWH) | | | Plant Total (kWh) |
| | | T-CODE 1 | T-CODE 2 | T-CODE 3 | |
| January | ##.#% | #,###,000 | #,###,000 | #,###,000 | ##,###,000 |
| February | ##.#% | #,###,000 | #,###,000 | #,###,000 | ##,###,000 |
| March | ##.#% | #,###,000 | #,###,000 | #,###,000 | ##,###,000 |
| April | ##.#% | #,###,000 | #,###,000 | #,###,000 | ##,###,000 |
| May | ##.#% | #,###,000 | #,###,000 | #,###,000 | ##,###,000 |
| June | ##.#% | #,###,000 | #,###,000 | #,###,000 | ##,###,000 |
| July | ##.#% | #,###,000 | #,###,000 | #,###,000 | ##,###,000 |
| August | ##.#% | #,###,000 | #,###,000 | #,###,000 | ##,###,000 |
| September | ##.#% | #,###,000 | #,###,000 | #,###,000 | ##,###,000 |
| October | ##.#% | #,###,000 | #,###,000 | #,###,000 | ##,###,000 |
| November | ##.#% | #,###,000 | #,###,000 | #,###,000 | ##,###,000 |
| December | ##.#% | #,###,000 | #,###,000 | #,###,000 | ##,###,000 |
| Annual | ##.#% | #,###,000 | #,###,000 | #,###,000 | ##,###,000 |

## 3. SITING

The turbine(s) was/were sited with consideration to existing infrastructure, such as residences, businesses, pipelines, powerlines, and microwave paths and environmental factors, such as the local flood plain and potential wetlands. Local zoning, discussed in detail in Appendix 5, was also considered. The following is the information about the site layout and turbine location(s).


| Turbine | LOCATION (NAD 83) | | Elevation (m) | Distance to Nearest Zone (m) |
|---|---|---|---|---|
| | Latitude | Longitude | | |
| TURBINE CODE 1 | ##.######° N | ##.######° W | ### | ### |
| TURBINE CODE 2 | ##.######° N | ##.######° W | ### | ### |
| TURBINE CODE 3 | ##.######° N | ##.######° W | ### | ### |

One Power identified ## Zones of Interest around the project area. These Zones were used throughout the feasibility studies to determine the project's potential impact on the surrounding community. The closest residence to the project is ### feet from turbine WTG##. If the results of any feasibility study are abnormal, discuss.

## 4. CUSTOMER COST ANALYSIS

The Customer Name facility in City is serviced by Utility. The current Marginal Cost of Energy (MCOE) at this facility is $0.0###/kWh. Net metering is/is not available for this project. The project was sized to offset approximately ##% of the facility's current annual energy consumption.

Insert information on project sizing analysis that was performed including if the project will send back energy to the grid.

The REA rate offered for this project is $0.0###/kWh, flat for 20 years. [Or insert pricing structure.]

## 5. PERMITTING ANALYSIS

Consult Head of Regulatory for content

## 6. COMMERCIAL

The REA negotiated for this project follows the standard One Power REA, apart from list anything outside of the typical REA (e.g. facility closure clause, Customer will keep the RECs, etc.).

## 7. ENGINEERING AND CONSTRUCTION PLAN

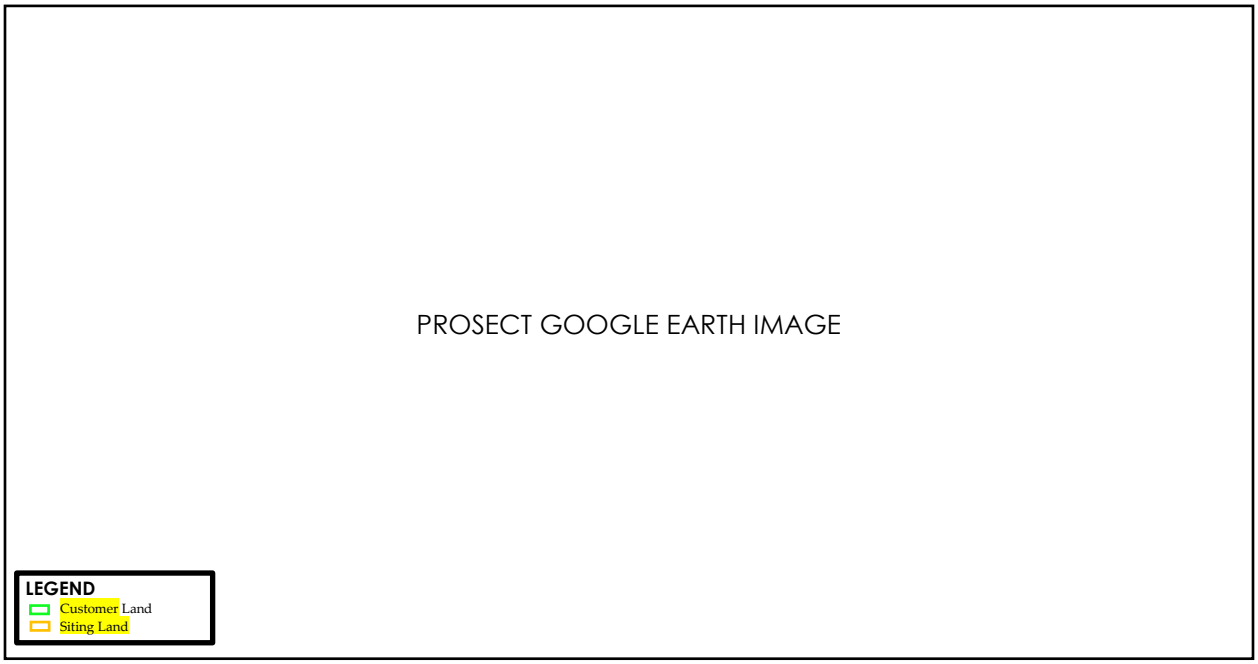
Consult Project Manager for content

## 8. PROJECT DRAWINGS

Project drawings including the 1-line diagram, site layout, and conceptual renderings can be found in Appendix 8.

## 9. LAND

The turbines are sited on Customer-owned land/an adjacent parcel. One Power will lease/purchase the land necessary for the project. The land owned by Customer Name is outlined in green in the figure below, while the project parcel is outlined in orange. The project parcel is approximately ### acres.




A Phase 1 Environmental Site Assessment (ESA) was completed at the parcel(s) where the turbines are sited. The third-party Phase 1 ESA concluded [insert relevant conclusions from the ESA]. If Phase 2 was performed: Following the results of the Phase 1 ESA, Phase 2 ESA was completed on Parcel #. Insert relevant conclusions of the Phase 2.

## 10. PROJECT FINANCIAL MODEL

See Appendix 10 for the Project Name financial model.