CITY OF UNALASKA
UNALASKA, ALASKA

RESOLUTION 2025-07

A RESOLUTION OF THE UNALASKA CITY COUNCIL AUTHORIZING THE CITY MANAGER AND DEPARTMENT OF PUBLIC UTILITIES TO APPLY FOR U.S. DEPARTMENT OF ENERGY OFFICE OF CLEAN ENERGY DEMONSTRATIONS GRANT, NOT TO EXCEED AN AWARD OF $50M WITH A 20% MATCH FROM THE CITY

WHEREAS, the City of Unalaska is committed to exploring and implementing sustainable energy alternatives to meet the energy demands of our community while minimizing environmental impact; and

WHEREAS, a wind study conducted by V3 Energy, LLC on the feasibility of wind energy in Pyramid Valley has shown favorable results, indicating the installation of wind infrastructure can significantly contribute to the community's energy portfolio; and

WHEREAS, the city has identified a need to reduce its carbon footprint as a part of its broader environmental and energy sustainability goals; and

WHEREAS, maximizing community-wide diesel generation efficiency and increasing renewable energy solutions is essential for reducing greenhouse gas emissions and promoting better air quality within the community; and

WHEREAS, preliminary estimates indicate that construction of five wind turbines equipped with a Battery Energy Storage System (BESS) in Pyramid Valley would require an investment of approximately $31.6M; and

WHEREAS, grant funding opportunities available through various federal and state programs aimed at supporting renewable energy projects could provide 80% of the cost for the project and require a 20% match (about $6.3M); and

WHEREAS, by authorizing the City Manager to apply for these grants, the City can take proactive steps to acquire the necessary funding and facilitate the development of renewable energy infrastructure that benefits its current and future customers.

NOW THEREFORE BE IT RESOLVED that the Unalaska City Council hereby authorizes the City Manager and Public Utilities to apply for U.S. Department of Energy, Office of Clean Energy Demonstrations grant, funding not to exceed $50M to support the construction of five wind turbines and a Battery Energy Storage System in Pyramid Valley.

PASSED AND ADOPTED by a duly constituted quorum of the Unalaska City Council on January 28, 2025.

Vincent M. Tutiakoff, Sr.
Mayor

ATTEST:

Estkarlen P. Magdaong, CMC
City Clerk

CITY OF UNALASKA CORPORATE SEAL STATE OF ALASKA

MEMORANDUM TO COUNCIL

To: Mayor and City Council Members
From: Erik Hernandez, Acting Utilities Director
Through: William Homka, City Manager
Date: January 28, 2024
Re: Resolution 2025-07: Authorizing the City Manager and Department of Public Utilities to apply for a U.S. Department of Energy Office of Clean Energy Demonstrations grant not to exceed an award of $50M with a 20% match from City.

SUMMARY: The U.S. Department of Energy (DOE), Office of Clean Energy Demonstrations (OCED) has announced an initial funding opportunity, Energy Improvements in Rural or Remote Areas – FY2025. The total amount of funding available is projected to be $400M, with individual awards potentially reaching up to $50M, contingent upon the specific category applicable. The City of Unalaska is eligible to apply for the "Open Category", which could provide financial support for the project aimed at five wind turbines along with a Battery Energy Storage System (BESS) in Pyramid Valley.

PREVIOUS COUNCIL ACTION: Previous Council actions related to Wind Power Integration are outlined below.

- Ordinance 2003-11 approved the Wind Integration Assessment Project (FY2003).
- Ordinance 2017-07 funded the Wind Power Development and Integration Assessment Project (EL18C) through Capital Budget (FY2018).
- Resolution 2017-63 Council entered into an agreement with V3 Energy, LLC to perform the Wind Power Development & Integration Assessment Phase II – IV Project in the amount of $48,481 via, moving forward with Phase II work (FY2018).
- Ordinance 2018-12 Budget Amendment adding $220,000 to the Engineering Services line item of the Project budget to begin Phase III work. (October 23, 2018)
- Ordinance 2019-17 Budget Amendment, adding $75,000 for Phase III. (January 14, 2020)
- Ordinance 2021-16 Budget Amendment, accepting $139,000 from Alaska Energy Authority and appropriating $139,000 to the Wind Power Development Project (December 14, 2021).

BACKGROUND: In 2017, the Department of Public utilities issued a Request for Proposals (RFP) to complete the final phases of the *Wind Power Development and Integration Assessment Project*, which was awarded to V3 Energy, LLC. Measurement, meteorological or "MET" towers were installed at four locations in Unalaska to collect data which was analyzed by engineer Doug Vaught from V3 Energy. A summary of this study, along with an assessment of the potential energy and economic benefits of wind development in Unalaska, was presented to the City Council in November 2022.

DISCUSSION: There is sufficient data indicating favorable results to installing wind generation in Pyramid Valley. Given the current programs offered by the Department of Energy, it would be beneficial for the city to pursue this opportunity and develop a resource that has been successfully implemented in similar communities. This option should be evaluated alongside the potential for geothermal and other renewable resources. The primary goal of this project is to reduce a reliance on diesel generation and stabilize the City's costs to produce electricity. By incorporating low-cost renewable energy resources and incorporating a Battery Energy Storage System (BESS), the City can decrease its diesel consumption and enhance efficiency of its existing diesel power generation.

Staff seeks approval to apply for grant funding from DOE to install five wind turbines in Pyramid Valley. Recent estimates indicate that the total cost for this project, which includes a BESS, is approximately $31.6M. Of this amount, approximately $6.3M would be contributed by the City. The deadline for submitting concept papers is February 27, 2025, and final applications are due on August 28, 2025.

The City can provide a grant match utilizing funds from the Electric Utility Proprietary Fund, General Fund or a combination of both. The current estimated balance of the Electric Proprietary Fund is: $11,746,371.57.

ALTERNATIVES: Council may recommend modifying the project's scope or not approve the resolution. Currently, there are no alternative funding opportunities available that match this award.

FINANCIAL IMPLICATIONS: A 20% match (approx. $6.3M) is required to secure funding, if awarded. Financial modeling indicates a profitable operation, with a short payback within 1-2 years, especially on a larger scale.

LEGAL: None

STAFF RECOMMENDATION: Staff recommends adoption of Resolution 2025-07.

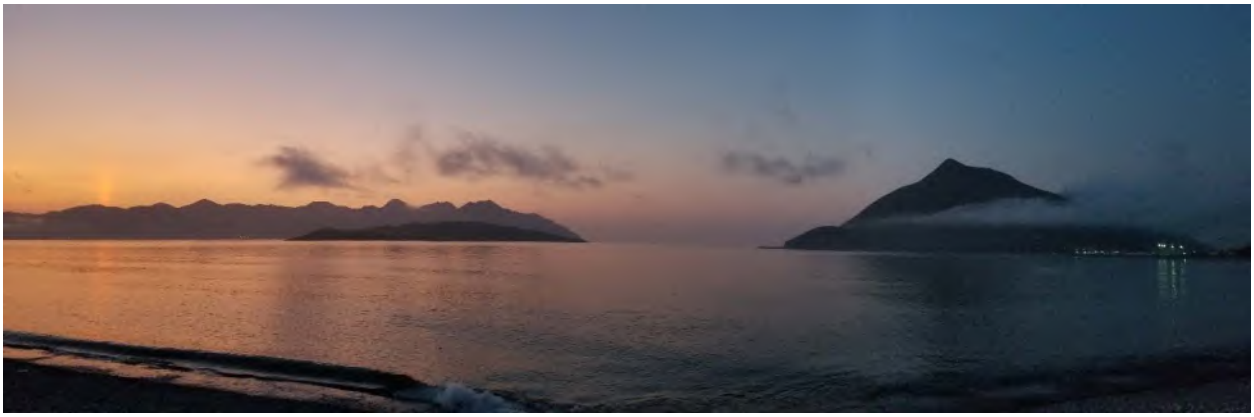
PROPOSED MOTION: I move to adopt Resolution 2025-07.

CITY MANAGER COMMENTS: I support the staff recommendation.

ATTACHMENTS:

- Wind Resource Assessment Report
- DOE OCED Notice of Funding

City of Unalaska Wind Power Development and Integration Assessment Project, Wind Resource Assessment Report



Douglas Vaught photo

February 18, 2022

Douglas Vaught, P.E.
V3 Energy LLC
Anchorage, Alaska

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Introduction

With frequent high winds, Unalaska Island, home of City of Unalaska and Dutch Harbor, has long been considered an optimal location for wind energy. The August 2017 *Request for Proposals, Analysis of the City of Unalaska Wind Power Development and Integration Assessment Project* was broken into three phases, starting with Phase II (Phase I, a survey-level assessment of wind power potential for Unalaska, was completed in draft form in 2005). Phase II of the project, "Develop a Data Collection Plan," was completed by V3 Energy LLC with a Phase II report dated August 6, 2018.

Phase III of the project, "Implement Data Collection Plan," was initiated shortly following completion of Phase II with obtaining landowner permission, permits, ordering equipment, etc. over the following year. As described herein, three met towers were installed in October 2018 and the fourth in August 2019. In August 2021 the last of the four met towers was decommissioned, signifying the end of the data collection aspect of Phase III. This report presents and discusses the data collected through that nearly three-year period.

In a slight change to the 2017 plan as described in the *Requests for Proposals*, the Phase IV ("Pre-development Plan") effort will be accomplished via a State of Alaska Renewable Energy Fund Round 13 grant award with a project entitled *City of Unalaska Wind Power Feasibility.*

Site Selection

There were several criteria to consider for wind prospecting in Unalaska (completed under Phase II of the wind project), that commenced with an assessment of the regional wind climate (refer to pages 13 through 20 of the Phase II report). In short, developable locations for wind power in rural Alaska, including Unalaska, are those with the following criteria:

- Wind resource: high (but not too high) mean wind speed, normal or near normal Weibull distribution, low-to-moderate turbulence (steady wind flow), acceptable extreme winds, and unimodal or bimodal wind direction distribution.
- Power distribution infrastructure: proximity to existing (or near-term planned) distribution lines with sufficient amperage capacity to accept input from planned wind farm capacity, including expansion potential.
- Roads/access: proximity to existing roads, or reasonable cost to develop or improve access.
- Site area: large enough to host a wind turbine array that meets project wind power capacity goals.
- Land use: available for development (ownership, easement restrictions, lease rates, etc.).
- Airspace: no insurmountable FAA restrictions for airport flight operations.
- Terrestrial wildlife and avian species: no or minimal impacts to critical habitat, flyways, etc.
- Wetlands, parks, and other high-value environments: no insurmountable restrictions and/or acceptable mitigation requirements are possible.
- Noise, shadow flicker, and aesthetics: no or minimal impact to residents.
- Rime icing environment and/or ice throw risk: no or minimal risk and/or acceptable mitigating measures possible.

With these considerations, four locations were chosen for installation of meteorological (met) towers for wind resource evaluation (see Figure 1):

1. Pyramid (Lower Pyramid Valley)
2. Hog Island
3. Icy Creek Reservoir
4. Bunker Hill (referenced in the Phase II report as Little South America)

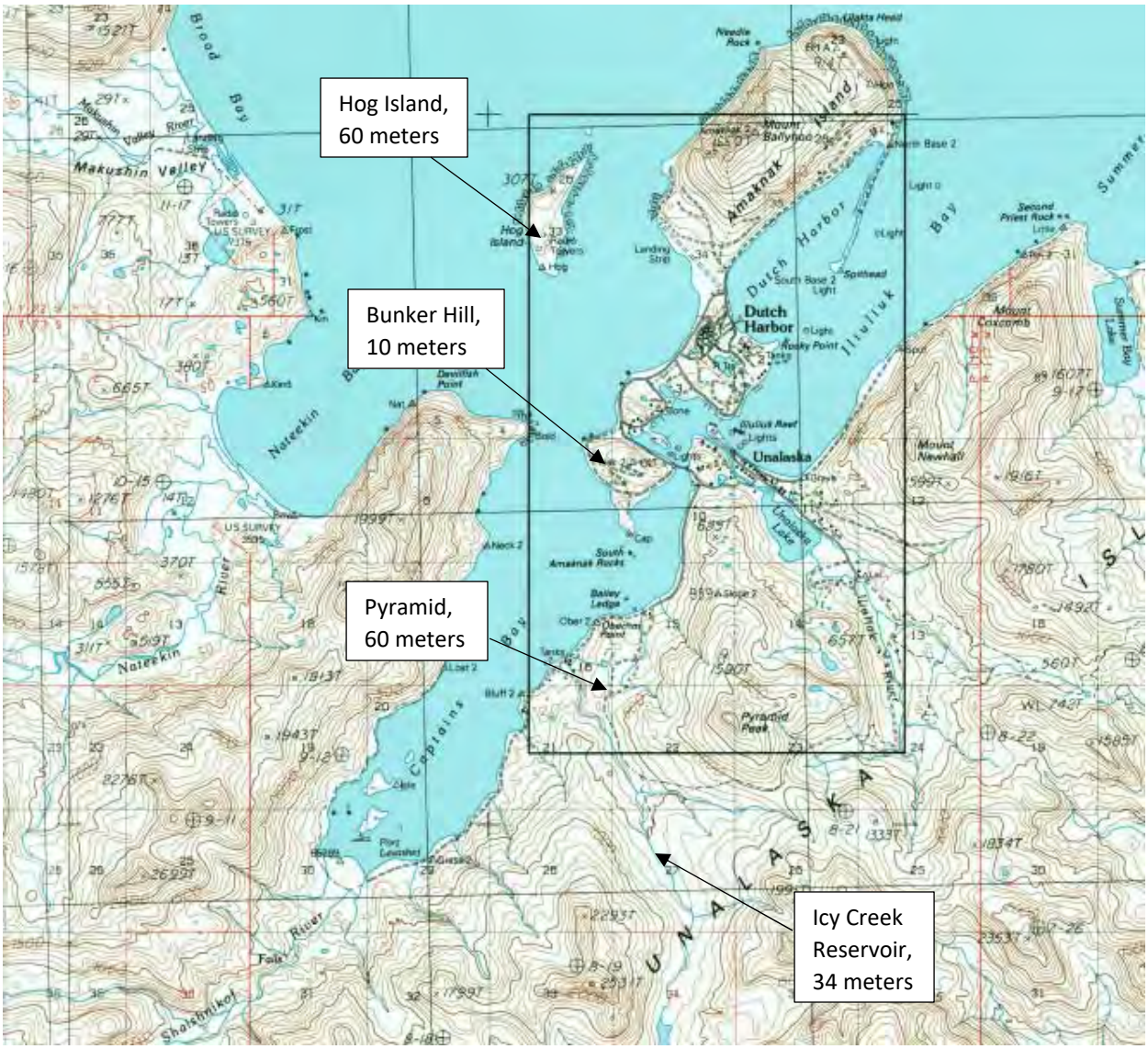


Figure 1: Met tower locations and heights (map from Topozone.com)

There are two primary uses of wind data for wind power development. First is classification of site(s) to determine suitable turbine models. Wind turbine manufacturers require International Electrotechnical Commission (IEC)[1] classification of a site to ensure that the proposed turbine model is appropriate and

[1] See IEC Classification discussion in Appendix A

warranty coverage valid. Financial institutions and/or partners require proper classification to ensure the wind turbine investment will perform as predicted throughout planned service life and that a warranty can be offered.

The second use of wind data is calculation of annual energy production (AEP) for wind turbines of interest with reasonable deductions for wake, electrical, O&M, soiling, and other losses. Net AEP data is used to model economic benefit of a wind power project.

Pyramid (lower Pyramid Valley)

Pyramid Valley, source of Unalaska's water supply, was considered at project outset to be the most promising location in Unalaska for a wind power project. The plateau area that comprises the lower valley is large enough to host several megawatts of wind power capacity; a wide, well-maintained gravel road provides access; the area is devoid of housing and other community-use development other than the water plant; and of considerable importance, the valley is served by an underground high capacity, three-phase power distribution line (3 phase power routes to the water plant with single phase continuing to Icy Creek Reservoir) that is minimally loaded at present. Additionally, Pyramid Valley is relatively distant from Dutch Harbor Airport and displaced from established landing patterns and normal air traffic routing.

Figure 2: Pyramid 60-meter met tower (Andy Dietrich aerial photo)

Pyramid Site and Met Tower Information

A 60-meter height (197 ft.) NRG Systems, Inc. tubular, guyed met tower was installed[2] in mid-October 2018 on City of Unalaska land just south of Veronica Lake (see Figure 2 and Figure 3) and was decommissioned by Department of Public Works personnel in August 2021. Refer to Table 1 for summary information of the met tower and data collected from it.

[2] Met tower installation accomplished by V3 Energy LLC with contracted assistance from Bering Straits Development Company and Solstice Alaska Consulting. The considerable support provided by City of Unalaska Dept. of Public Works personnel is much appreciated.

Table 1: Pyramid met tower summary information

Data dates	10/16/2018 to 8/12/2021 (34 months)
Datalogger information	NRG Symphonie PRO, 26 channel, site no. 3550
Site coordinates	53.8496 North, 166.5625 West (WGS 84 datum)
Site elevation	103 meters (334 ft.)
Wind speed, mean annual, 60 m level	6.84 m/s corrected to Dutch Harbor Airport long-term weather station data; 6.39 m/s as measured
Wind power density, mean annual, 60 m	548 W/m^2 when corrected to Dutch Harbor Airport long-term weather station data; 446 W/m^2 as measured
Wind power class	5 (excellent), when corrected to Dutch Harbor Airport long-term weather station data) of 7 defined classifications; 4 (good) as measured
Maximum 10-min. avg wind speed	37.5 m/s (83.9 mph)
Maximum 3-sec. gust wind speed	51.4 m/s (115.0 mph)
Wind shear power law exponent	0.100 (low; 0.140 considered nominal)
Calm wind frequency (winds < 4 m/s)	Approx. 33%
Extreme wind probability (50-year period)	41.3 to 47.6 m/s
Turbulence intensity, 60 m level	0.120
IEC 61400-1 3rd ed. classification	Class IIB

Figure 3: Pyramid met tower location (orange line shows underground power distribution routing, 3 phase to the water house/tank, continuing at single phase to Icy Creek Reservoir), view north; Google Earth image

Before installing the met tower, a Federal Aviation Administration (FAA) obstruction evaluation was requested. FAA issued Aeronautical Study No. (ASN) 2018-WTW-5350-OE in July 2018 with a determination of no hazard to air navigation. Obstruction lighting was not required although FAA requested alternating bands of aviation orange and white paint on the met tower and that orange high-visibility marker balls be attached near the top of the outer guy wires to improve tower visibility to aviators. Both requirements were accomplished.

The Pyramid met tower was equipped with two anemometers each at 60 meters, 50 meters and 40 meters; one wind vane each at 60 meters and 50 meters; a vertical wind propeller anemometer at 55 meters; and temperature and relative humidity sensors at the tower base (refer to Table 2). Refer to Appendix B for detailed sensor technical information and to Appendix F for documentation photographs.

Table 2: Pyramid met tower sensors

Ch	Sensor Type	Model	Name	Height (m)	Dir. (°T)
1	Anemometer	40C	60m E	59.7	094
2	Anemometer	40C	60m W	59.3	269
3	Anemometer	40C	50m E	50.2	094
4	Anemometer	40C	50m W	49.7	269
5	Anemometer	40C	40m E	38.9	094
6	Anemometer	40C	40m W	38.4	269
13	Vane	200M	60m	57.4	027
14	Vane	200M	50m	48.0	038
16	Temp	T60	Temp	3.0	000
19	Rel. Humidity	RH5X	RH	2.0	000
20	RM Young	27106T	Vert Spd	55.3	311

Pyramid Data Quality Control

The met tower sensor data was manually filtered to remove compromised records. This included startup sequencing, isolated periods of power supply problems, icing events, tower shading[3], and poorly functioning sensors. As indicated in Figure 4, anemometer data recovery from the Pyramid met tower was outstanding initially but as the sensors aged, they began to fail. In 2020 the channel 1, channel 4, and channel 6 anemometers began "dragging", or behaving abnormally compared to their companion anemometers. From the ground, a damaged anemometer appears to function normally, but close observation – both visual and via the data record – indicates that it spins more slowly than its companion and stops rotating at slightly higher wind speeds. On a positive note, infrequent icing events[4] have been detected, indicating minimal concern for atmospheric icing that can negatively impact wind turbine operations.

Note in Figure 4 periods of loss of function of the wind vanes and temperature sensor early in the project. This was due to a power supply problem that was corrected in February 2019. At that time, a relative humidity (RH) sensor was installed to aid in the detection and inference of wintertime icing events. Table 3 presents *data recovery rate* for each Pyramid sensor.

[3] Tower shading results from airflow distortion by the met tower. Air decelerates slightly upwind of the tower, accelerates as it goes around the tower (Bernoulli principle), and decelerates markedly in the lee of the tower where a flow separation bubble may occur, resulting in disturbed airflow downwind (source: Windographer help menu). Because of that, anemometers in a 30-degree arc downwind are filtered from the dataset. Anemometers are paired opposite each other and perpendicular to the prevailing winds to minimize the tower shading effects.
[4] Icing is inferred in the dataset by observing stationary anemometers and/or wind vanes combined with temperature near freezing or below and relative humidity at or near 100%, indicating the likelihood of snow or freezing rain.

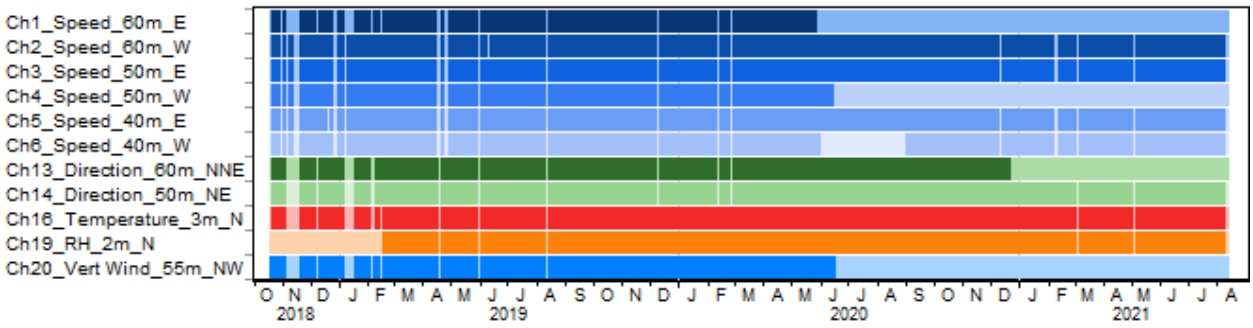


Figure 4: Pyramid met tower data recovery rate graphic (tower shading filtering excluded)

Table 3: Pyramid met tower data recovery rate table (tower shading filtering excluded)

Data Channel	Height	DRR (%)
Ch1_Speed_60m_E	59.7 m	54.9
Ch2_Speed_60m_W	59.3 m	98.9
Ch3_Speed_50m_E	50.2 m	98.9
Ch4_Speed_50m_W	49.7 m	58.3
Ch5_Speed_40m_E	38.9 m	98.8
Ch6_Speed_40m_W	38.4 m	90.3
Ch13_Direction_60m_NNE	57.3 m	75.3
Ch14_Direction_50m_NE	48.0 m	97.6
Ch16_Temperature_3m_N	3 m	97.8
Ch19_RH_2m_N	2 m	88.0
Ch20_Vert Wind_55m_NW	55.2 m	57.3

Pyramid Environmental Measurements

Unalaska experiences a cool, damp maritime climate, with a relatively narrow range of temperatures and typically high relative humidity, especially compared to northern and interior Alaska. From the perspective of wind turbine operations, cool damp air is beneficial as it yields higher air density than equivalent elevation in warmer climates. Figure 5 shows boxplot summaries of measured temperature, relative humidity, and calculated air density at Pyramid for the data collection period but presented as *mean of monthly means* where repeating months are averaged.

Note that although standard air density[5] at 103 meters (334 ft.) elevation is 1.213 kg/m^3, the measured air density at Pyramid was 1.248 kg/m^3, 2.9% higher than standard density at 103 meters elevation and 1.9% higher than standard sea level conditions. This is important as higher density proportionally increases the lift force imparted to the rotor blade, increasing turbine power output.

[5] Standard air density at sea level is 1.225 kg/m^3 (at 15° C)

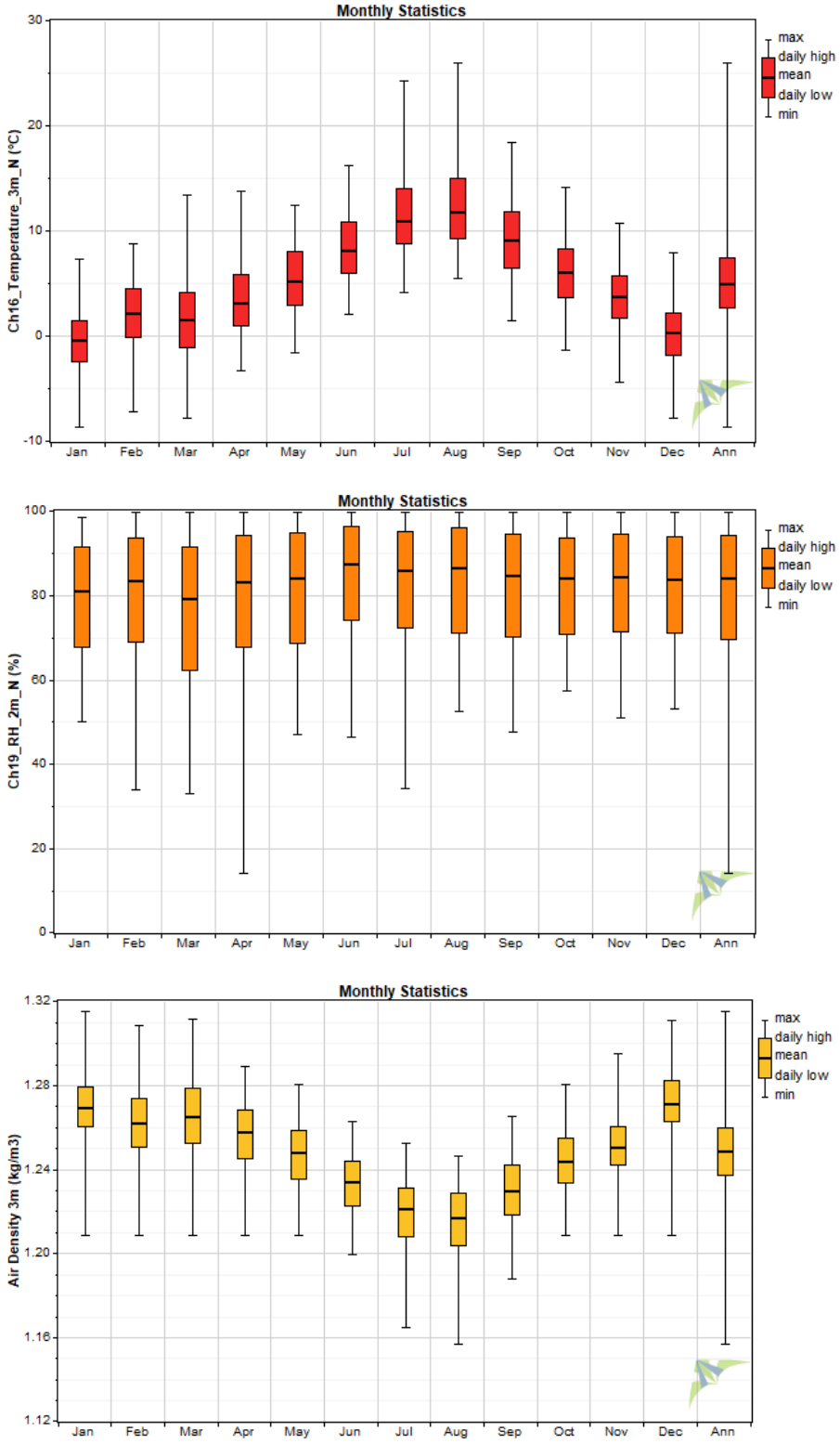


Figure 5: Pyramid met tower temperature, relative humidity, and air density boxplots

Pyramid Wind Speed and Anemometer Combination

Filtered wind speed data, as described in Data Quality Control, yields more representative information than raw data. But the NRG 40C anemometer, as used on the Pyramid met tower, responds more quickly to gusts than falling wind speeds. In moderate-to-higher turbulence conditions, as was measured at Pyramid, this can yield high-bias wind speed data compared to that obtained from high precision anemometers.[6] A net correction of approximately -1% was applied to the anemometer data set using Equation 1. Note that this correction is applied to each 10-minute time step.

Equation 1: NRG 40C anemometer wind speed measurement adjustment for turbulence

$$Uadjusted = \frac{Uobserved}{(0.095 \times TI) + 0.992}$$

With filtering and adjusting anemometer response for turbulence with Equation 1, an anemometer data summary is presented in Table 4.

Table 4: Pyramid wind speeds, filtered and adjusted by Equation 1

Variable	Ch1_Speed _60m_E	Ch2_Speed _60m_W	Ch3_Speed _50m_E	Ch4_Speed _50m_W	Ch5_Speed _40m_E	Ch6_Speed _40m_W
Mean wind speed (m/s)	6.32	6.39	6.25	6.21	6.15	6.23
Mean wind speed (mph)	14.1	14.3	14.0	13.9	13.8	13.9
Max 10-min wind speed (m/s)	29.9	37.5	37.0	28.6	36.5	35.8
Max 10-min wind speed (mph)	66.8	83.9	82.8	63.9	81.6	80.1
Max gust wind speed (m/s)	41.0	51.4	51.4	49.7	49.7	41.3
Max gust wind speed (mph)	91.8	115.0	115.0	111.2	111.2	92.4
Mean power density (W/m²)	439	446	416	405	403	405
Frequency of calms (%)	33.3	33.9	34.8	34.2	35.5	33.6

Combined Anemometers

Although Table 4 represents wind speed data with necessary filtering, long periods of met tower operation with asymmetric data collection, especially from the 60-meter and 50-meter level anemometers, yields divergent wind speed data for paired anemometers. Two primary options can be used to correct this: synthesize missing data or mathematically combine the anemometers (or both). Both methods typically yield similar results, but anemometer combination is more conservative in that less change is introduced to the data set. Hence, only anemometer combination was used to create a more representative data set than that presented in Table 4.

Table 5: Pyramid combined anemometer data (DRR: data recovery rate)

Combined	Height	First Anemometer		Second Anemometer		Combined Sensor	
Sensor	(m)	DRR (%)	Mean (m/s)	DRR (%)	Mean (m/s)	DRR (%)	Mean (m/s)
Speed 60m cmb	59.5	54.9	6.32	98.9	6.39	98.3	6.39
Speed 50m cmb	50.0	98.9	6.25	58.3	6.21	97.6	6.28
Speed 40m cmb	40.7	98.8	6.15	90.3	6.23	98.7	6.16

[6] Explanation and equation from Windographer software help menu

Seasonal and Diurnal Variation

Pyramid's monthly wind speed profile (see Figure 6) demonstrates a pronounced seasonal variation of wind speeds with higher winter winds and lower summer winds. This is a normal pattern and matches well with typical seasonal power demands in a community. Figure 7 indicates a normal, though somewhat muted, diurnal (daily) wind speed profile of higher afternoon winds compared to night and morning. This is also typical.

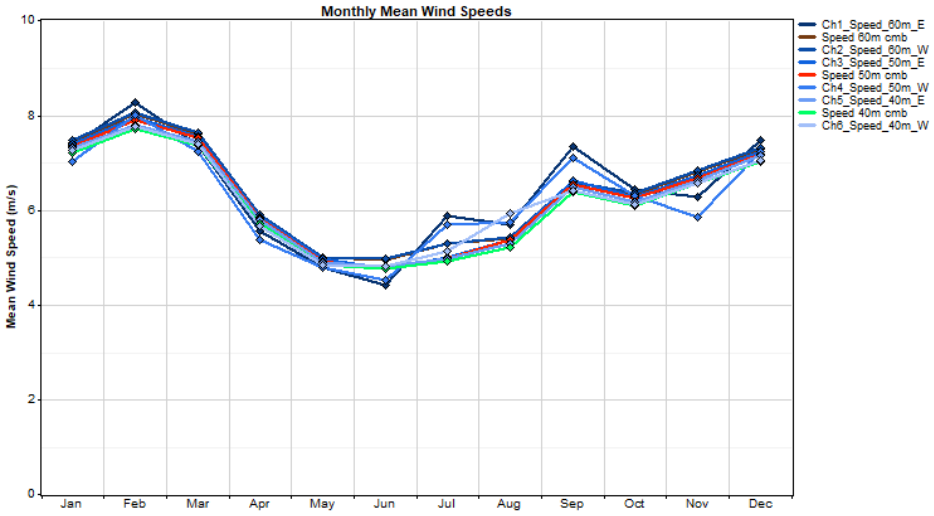


Figure 6: Pyramid mean (mean of monthly means) wind speeds, all anemometers

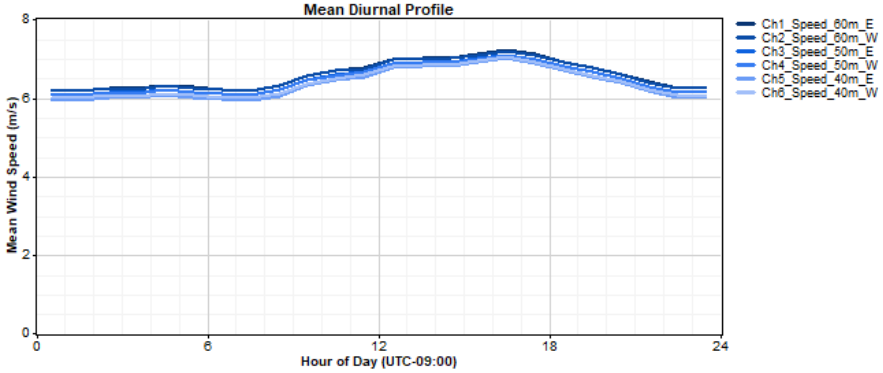


Figure 7: Pyramid diurnal wind speed profile

Pyramid Wind Speed Adjustment Against Airport Reference Data

The Pyramid met tower was operational for 34 months, which is relatively long for a wind resource assessment project but brief when considering long-term climatology. This presents a risk of site mischaracterization, which can be high or low as three years of met tower data may capture unusually windy or unusually calm winter season(s), skewing or biasing the results. At Pyramid, the measured and adjusted mean annual wind speed of 6.39 m/s at the 60-meter level (refer to Table 5) is 8% lower than the 6.95 m/s mean wind speed at Pyramid at the 60-meter level predicted by AWS Truepower Windnavigator wind modeling software, which raises a question of possible data skew or bias.[7]

[7] See Table 4 on page 30 of the Unalaska Wind Assessment Phase II project report

To assess data skew, Pyramid met tower data was adjusted by comparison to nearby Dutch Harbor Airport, located 5.6 km (3.5 miles) north-northeast of the met tower. Automated airport weather station data from January 1988 to July 2021 was obtained to provide 33.5 years of comparative wind speed data. With reference to Figure 8, the 33 complete months of Pyramid overlap – November 2018 to July 2021 – demonstrates that Dutch Harbor Airport had lower than average wind speeds from start of the Pyramid met tower project through October 2020. Beginning in November 2020, airport wind speeds were generally higher than their long term (33.5-year) average.

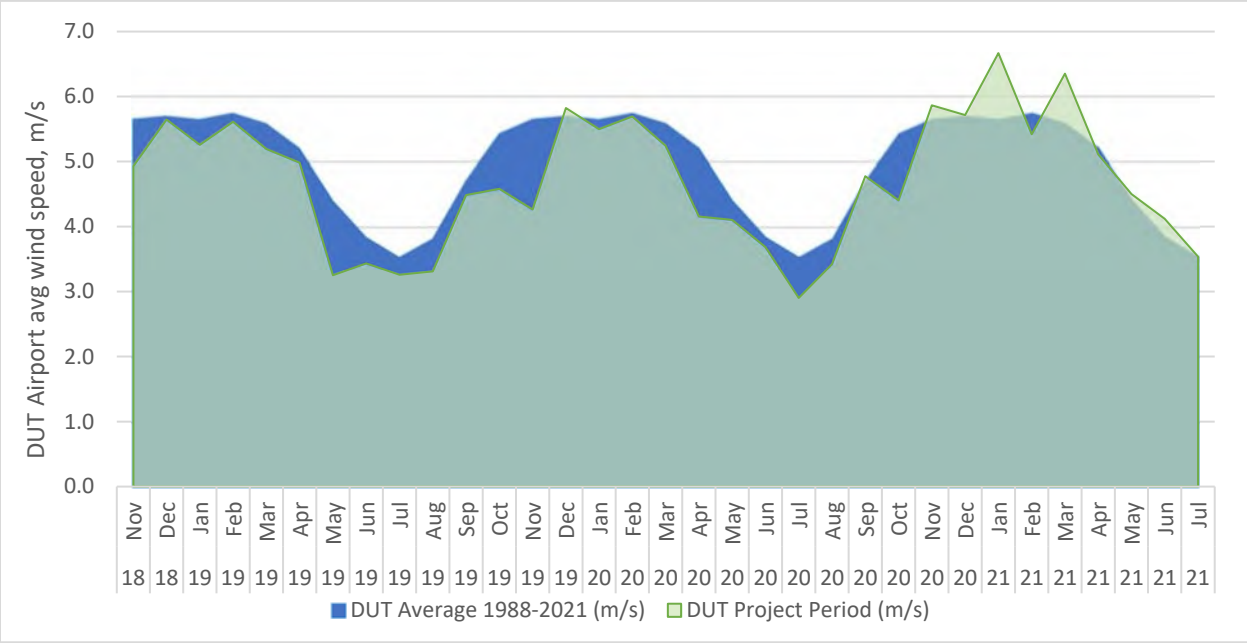


Figure 8: Dutch Harbor Airport wind speed comparison, Pyramid test period vs. 33.5-year average

The implication of lower-than-average wind speeds at the airport during the Pyramid study period is that mean wind speeds calculated from the Pyramid data set are likely biased low. An adjustment was made to the Pyramid data to correct that bias. Table 6 combines data from Table 5 and Figure 8 to adjust the 60-meter level combined anemometer against the long-term average. This yields an 8% increase in mean wind speed, from 6.39 m/s to 6.84 m/s, which is 98.4% of the 6.95 m/s AWS Truepower Windnavigator-predicted wind speed at the site.

Table 6: Pyramid 60 m level wind speed adjustment to Dutch Harbor Airport

Month	Pyramid 60 m cmb Speed (m/s)	Wind Speed Correction (%)	60 m Adjusted Wind Speed (m/s)
Jan	7.45	98%	7.32
Feb	8.05	103%	8.30
Mar	7.63	101%	7.68
Apr	5.92	111%	6.55
May	5.01	114%	5.69

Month	Pyramid 60 m cmb Speed (m/s)	Wind Speed Correction (%)	60 m Adjusted Wind Speed (m/s)
Jun	4.96	103%	5.13
Jul	5.31	110%	5.85
Aug	5.41	114%	6.14
Sep	6.61	102%	6.73
Oct	6.35	121%	7.68
Nov	6.83	114%	7.82
Dec	7.29	99%	7.25
Annual	6.39	108%	6.84

Adjusting met tower data to a long-term average has important implications for wind turbine energy production potential as the power of the wind is a function of the velocity cubed, as noted in Equation 2.

Equation 2: Wind power density equation (P=power, A= rotor swept area, ρ=air density, V=wind speed; units Watts/m^2)

$$\frac{P}{A} = \frac{1}{2} * \rho * V^3$$

So, although the long-term average predicted wind speed of 6.84 m/s is 7% higher than the 6.39 m/s measured win speed at Pyramid during the study period, the cubic relationship of wind speed vs. power (or energy) yields a 23% higher power density (6.84^3 divided by 6.39^3). This adjustment boosts the wind power class of the Pyramid site from Class 4 (good) to low Class 5 (excellent).

Pyramid Wind Direction

The prevailing wind directions at Pyramid are broadly northerly, southeasterly, and southwesterly, with southeasterly and southwesterly winds strongest (see Figure 9). The represents winds flowing across Unalaska Bay from the north, Pyramind Valley from the southeast, and Shaishnikof Creek and Captains Bay from the southwest. The practical interpretation of Figure 9 is that power-generating winds are generally southerly and northerly. Hence, for the most part, Pyramid's winds are bimodal, which is advantageous in that a multi-turbine array layout can be relatively easily designed to minimize rotor wake interference.

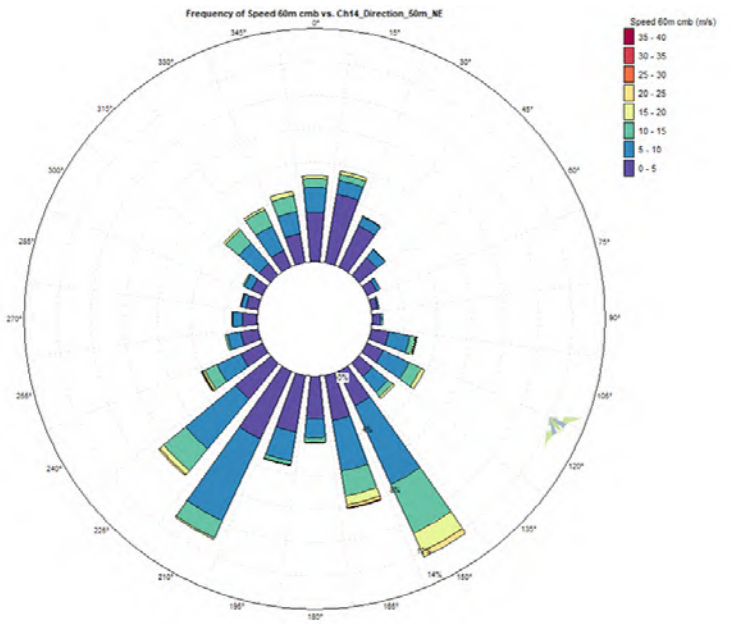


Figure 9: Pyramid wind energy rose, 50-meter level combined anemometers and 50-meter wind vane

Pyramid Vertical Wind Flow

A RM Young propeller vane anemometer was installed at the 55-meter (180 ft.) level to enable calculation of wind flow angle, an important engineering consideration with wind turbines that affects main rotor shaft bearing loading. Relatively high wind up-flow angle from westerly winds (see Figure 10) may pose some concern and should be discussed in detail with wind turbine manufacturers.

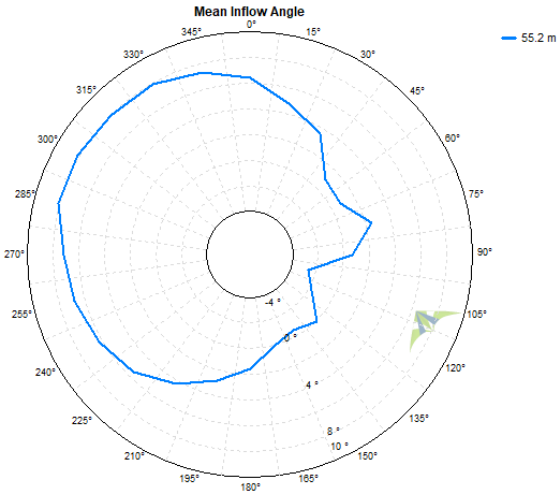


Figure 10: Pyramid vertical wind flow rose, combined 60-meter anemometers

Pyramid Wind Distribution, Weibull

The probability distribution function, or histogram, of the Pyramid met tower 60-meter combined anemometer wind speed data indicates a shape curve dominated by low-to-moderate wind speeds with a somewhat high percentage of calm winds (see Figure 11).

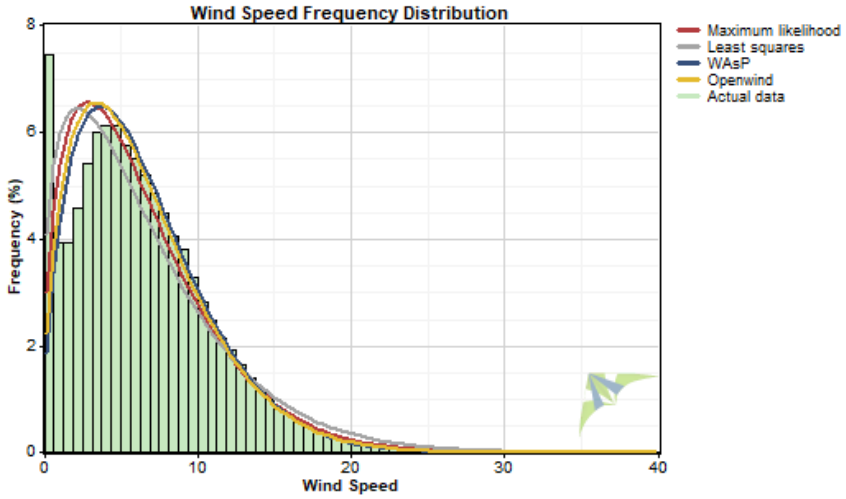


Figure 11: Pyramid wind speed probability distribution histogram

With reference to Figure 11, Table 7 includes the statistical information of the fitted shape curves for the measured wind speed distribution. Note that a Weibull k for all four estimation models is lower than 2.0; the latter which represents a "normal" shape curve in the wind power industry known as the Rayleigh curve. This demonstrates a predominance of lower wind speeds in the data set.

Table 7: Pyramid wind speed distribution table

	Weibull	Weibull	Mean	Proportion	Power	R
	k	A		Above	Density	Squared
Algorithm	(-)	(m/s)	(m/s)	6.421 m/s	(W/m2)	(-)
Maximum likelihood	1.40	7.00	6.38	0.413	481	0.902
Least squares	1.28	7.14	6.62	0.419	627	0.906
WAsP	1.55	7.24	6.52	0.438	440	0.893
Openwind	1.49	7.09	6.41	0.424	440	0.897
Actual data			6.41	0.438	440	

Pyramid Wind Shear and Roughness

Wind shear is defined as the change in wind velocity (wind and direction vector) with height above ground level. Low wind shear is desirable as the marginal increase in power output at higher heights is minimal, leading to the possibility of lower height wind turbine towers to significantly reduce project costs.

Pyramid wind shear is low by wind industry standards with a mean calculated power law exponent of 0.100 from the combined anemometers and all wind direction sectors (see Figure 12). A view by wind direction though (see Figure 13) shows higher wind shear with prevailing southeasterly and southwesterly winds. The calculated surface roughness of 0.00022 meters is equivlant to that of a very smooth surface, such as a calm sea.

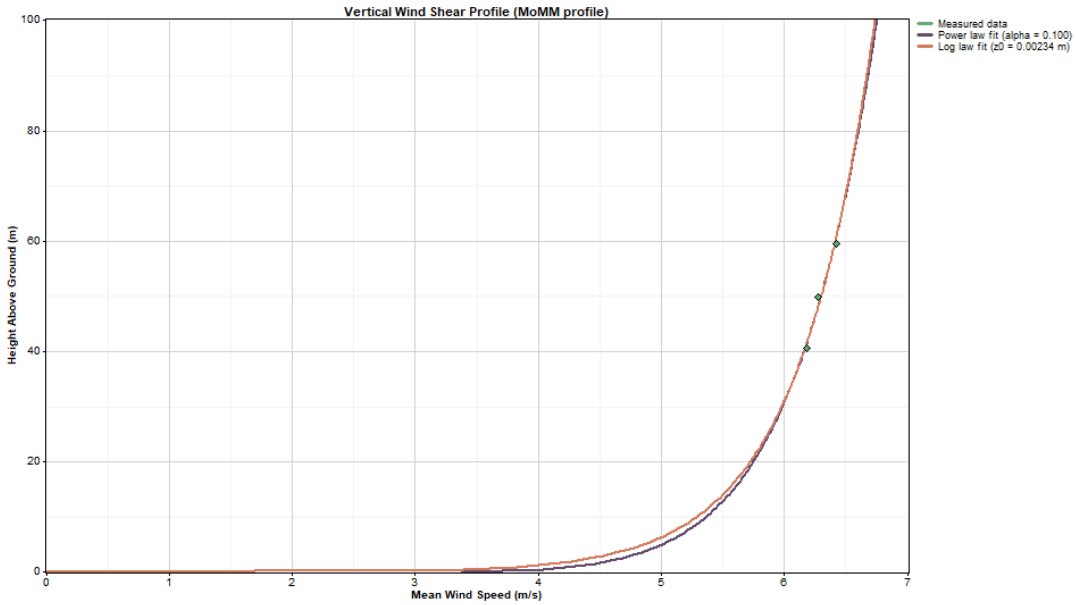


Figure 12: Pyramid vertical wind shear profile (calculated 0.100 power law exponent)

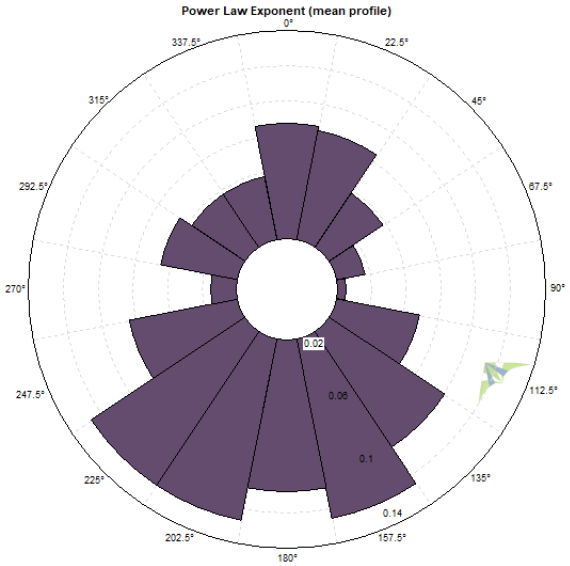


Figure 13: Pyramid vertical wind shear rose (0.14 power law exponent, outer ring)

Pyramid Extreme Wind Behavior

Extreme wind is described by Vref, or reference velocity, in a 50-year return period (see Table 21 in Appendix A) as defined by IEC 61400-1, 3rd edition (2005) standards. Reference velocity is the highest 10-minute average wind speed predicted to occur once every 50 years. Because very few wind studies for wind power development approach 50 years duration, a Gumbel distribution analysis estimates the 50-year extreme wind probability using collected met tower data.[8] Three estimation methods for wind

[8] In probability theory and statistics, the Gumbel distribution models the distribution of the maximum or minimum of several samples of various distributions; see https://en.wikipedia.org/wiki/Gumbel_distribution for further explanation.

power are commonly used: periodic maxima, method of independent storms, and European Wind Turbine Standards II, with results shown in Table 8. Note that one very strong wind event, which suprisingly occurred during the summer, on August 31, 2020, significantly influenced Pyramid's 50-year extreme wind probability.

Periodic Maxima

The first method to estimate Vref is a Gumbel distribution analysis modified for monthly maximum winds versus annual maximum winds, which are typically used for this type calculation. Thirty-four months of wind data are acceptable for this analysis, using the 60-meter combined anemometer. With filtered and preconditioned (by Weibull k) data, the predicted Vref by this method is 42.6 m/s. With reference to Appendix A, this result just exceeds IEC Class II criteria, the middle-defined category of extreme wind probability.

Method of Independent Storms

A second extreme wind estimation method, method of independent storms, yields a Vref estimate of 47.6 m/s, which is significantly higher than that predicted by the periodic maxima method and would classify the site as IEC 61400-1 Class I.

European Wind Turbine Standards II (EWTS II)

The third estimation technique, EWTS II, ignores measured peak wind speeds and calculates Vref from the Weibull k factor. There are three variants of this method – Exact, Gumbel, and Davenport – which yield a Vref between 41.3 and 44.6 m/s at Pyramid. These results are like that of the periodic maxima method and classify the site as IEC Class I or II.

Table 8: Extreme Wind Vref (50-year return period), Pyramid 60m combined anemometer

Method	Vref (50 yr) (m/s)
Periodic Maxima	42.6
Method of Independent Storms	47.6
EWTS II (Exact)	41.3
EWTS II (Gumbel)	41.8
EWTS II (Davenport)	44.6

Turbulence

Turbulence at the Pyramid met tower site is moderate with a mean turbulence intensity of 0.12 at 15 m/s (refer to Appendix A for further explanation). Considering the reputation of the Aleutian Islands for extremely rough and turbulent wind conditions, this is a desirable outcome. Note in Figure 14 moderate turbulence for wind speeds up to approximately 24 m/s, at which point turbulence increases, though curiously, decreases at about 27 m/s. This is somewhat a moot point however as most wind turbines are designed to secure operating at 25 m/s sustained wind speed.

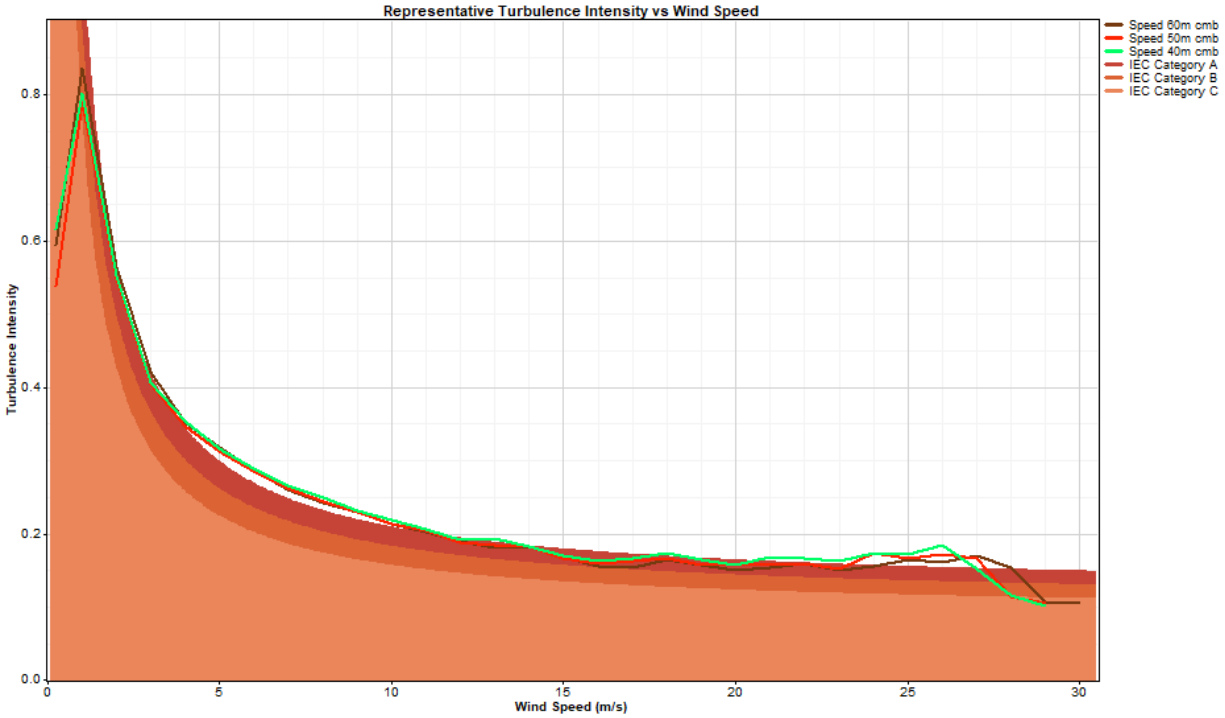


Figure 14: Pyramid turbulence intensity vs. wind speed

There is, however, a caveat as turbulence with easterly winds (coming from Pyramid Mtn) and westerly winds (coming from the ridgeline north of Captains Bay) is very high (see Figure 15), possibly presenting an operational limitation. Note however in Figure 9 that easterly and westerly winds at the Pyramid site are uncommon and hence the operational limitation would be minimal.

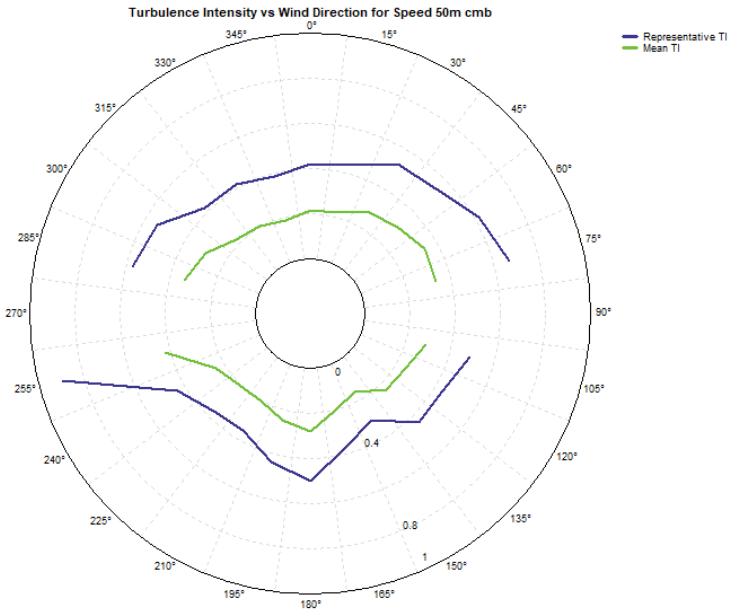


Figure 15: Pyramid turbulence intensity by wind direction

For IEC classification, a category is assigned for turbulence intensity at 15 m/s. With winds from all sectors, Table 9 indicates moderate turbulence at the three wind speed measurement heights. Note again however with reference to Figure 15 that turbulence from easterly and westerly winds is high.

Table 9: Pyramid turbulence intensity table and IEC categories

		15 m/s Speed Bin				
				Standard	Represen-	IEC 3 ed.
	Height	Data	Mean	Deviation	tative	Turbulence
Wind Speed Sensor	(m)	Points	TI	of TI	TI	Category
Speed 60m cmb	59.5	73,431	0.120	0.038	0.168	C
Speed 50m cmb	50.0	73,431	0.122	0.036	0.168	B
Speed 40m cmb	40.7	73,431	0.126	0.034	0.170	B

Pyramid IEC Classification

As noted in previous sections and discussed in greater detail in Appendix A, for the purposes of wind turbine design and selection, IEC 61400-1, 3rd edition (2005) standards classify a site by its extreme wind and turbulence behavior. The Pyramid extreme wind probability indicates a high Class II environment and calculated TI demonstrates Category B turbulence, hence a Class IIB site classification.

Hog Island

The August 2017 *Request for Proposals, Analysis of the City of Unalaska Wind Power Development and Integration Assessment Project Phases II to IV* that initiated the wind resource study envisioned up to five primary sites to be instrumented with met towers. Unalaska's topography is complex and wind power site options are limited, however, as discussed in the Phase II report. Initially, only lower Pyramid Valley was considered a primary site and recommended for a large, 60-meter met tower. The 34-meter Icy Creek Reservoir met tower was intended as an auxiliary to the larger Pyramid met tower to both assess upper valley winds and to serve as a reference point for wind flow modeling. The 10-meter Bunker Hill met tower was installed as a higher elevation reference to validate climatology data derived from Cold Bay upper air monitoring data.

With that, a second primary site was desired as an alternative should the Lower Pyramid Valley wind resource prove insufficient or unsuitable. With due consideration of the options, it was felt that only Hog Island readily possessed the development characteristics necessary to host several wind turbines and hence was added to the project. Unfortunately, meso-scale wind resource models such as UL's AWS Truepower Windnavigator (discussed in the Phase II report) do not include Hog Island and hence its anticipated wind resource was uncertain. It was hoped that Hog Island's relative distance from high elevation, shadowing terrain would prove beneficial, but there was concern that its low elevation may prove disadvantageous with respect to wind speeds.

Figure 16: Hog Island met tower (D. Vaught photo)

Hog Island is only accessible by boat or helicopter and has no existing power distribution. Steep topography on the northern half of Hog Island and instrument approach area boundaries for Dutch Harbor Airport Runzway 13 likely restrict future wind power development to only the southern half of the island. But according to City of Unalaska Public Works personnel, Hog Island may be less expensive to develop than the Ptarmigan Road site area in Iliuliuk Valley (refer to the Phase II report for site information and discussion). This reflects the nature of power distribution supplying Iliuliuk Valley compared to a relatively straight-forward requirement to route approximately 1.25 miles of power distribution across Unalaska Bay from an electrical substation near the airport.

Hog Island Site and Met Tower Information

A 60-meter (197 ft.) NRG Systems, Inc. tubular, guyed met tower was installed in mid-August 2019 on Ounalashka Corporation land on Hog Island and was decommissioned in April 2021 (see Figure 16).[9] Refer to Table 10 for summary information of the met tower and data collected from it.

Table 10: Hog Island met tower summary information

Data dates	8/17/2019 to 4/22/2021 (20 months)
Datalogger information	NRG Symphonie PRO, 26 channel, site no. 3550
Site coordinates	53.9029 North, 166.5755 West (WGS 84 datum)
Site elevation	30 meters (98 ft.)
Wind speed, mean annual, 60 m level	6.0 m/s
Wind power density, mean annual, 60 m	293 W/m^2
Wind power class	3 (fair) of 7 defined classifications
Maximum 10-min. avg wind speed	32.8 m/s
Maximum 3-sec. gust wind speed	40.7 m/s (91 mph)
Wind shear power law exponent	0.225

[9] Met tower installation accomplished by V3 Energy LLC with contracted assistance from Bering Straits Development Company and Solstice Alaska Consulting, and with the generous material and personnel support of City of Unalaska Department of Public Works.

Calm wind frequency (winds < 4 m/s)	34%
Extreme wind probability (50-year period)	Not calculated
Turbulence intensity, 60 m level	0.131
IEC 61400-1 3rd ed. classification	Not determined

Figure 17: Hog Island met tower location, view north; Google Earth image

Prior to installation of the met tower, a Federal Aviation Administration (FAA) obstruction evaluation was requested. FAA issued Aeronautical Study No. (ASN) 2018-WTW-5353-OE in September 2018 with a determination of no hazard to air navigation. Obstruction lighting was required in addition to alternating bands of aviation orange and white paint on the met tower and orange high-visibility marker balls near the top of the outer guy wires to improve visibility. Obstruction lighting was accomplished with a strobe light kit from NRG Systems, Inc. and a 24 Volt custom designed and constructed battery power system with a 3 kW wind turbine and 1,000 kW solar power capacity supplied by APRS World of Minnesota.

The Hog Island met tower was equipped with two anemometers each at 60 meters, 50 meters and 40 meters; wind vanes at 60 meters and 50 meters; and temperature, relative humidity, and barometric pressure sensors at the tower base (see Table 11). Refer to Appendix C for detailed sensor technical information and to Appendix F for documentation photographs of the met tower installation.

Table 11: Hog Island met tower sensors

Ch	Sensor Type	Model	Name	Height (m)	Dir. (°T)
1	Anemometer	40C	60m E	59.7	098
2	Anemometer	40C	60m W	59.3	269
3	Anemometer	40C	50m E	50.3	098
4	Anemometer	40C	50m W	49.8	269
5	Anemometer	40C	40m E	40.9	098
6	Anemometer	40C	40m W	40.4	269
13	Vane	200M	60m	57.4	148
14	Vane	200M	50m	47.7	220
16	Temp	T60	Temp	3.0	000
17	Barom. Press.	BP20	BP	2.0	270
18	Rel. Humidity	RH5X	RH	2.0	270

Hog Island Data Quality Control

As with data collected from the Pyramid met tower, Hog Island met tower data was manually filtered to remove compromised records. This included startup sequencing, isolated periods of power supply problems, icing events, tower shading, and poorly functioning sensors. Unlike the Pyramid met tower though where all sensors performed very well until later in the project, several Hog Island anemometers experienced "dragging" problems (see Pyramid data quality control discussion) and by May 2020 both wind vanes failed (see Figure 18). NRG Systems anemometers and wind vanes are exceptionally reliable, and this rate of failure is unprecedented. A possible explanation is the exceptionally high population of bald eagles in Unalaska, which is a distinguishing aspect of the community compared to scores of locations throughout Alaska with met towers over the past 20 years. During met tower installation and subsequent site visits, bald eagles were often observed perched on the sensor boom arms. It is probable that eagles occasionally attempted to land on the sensors themselves, damaging them.

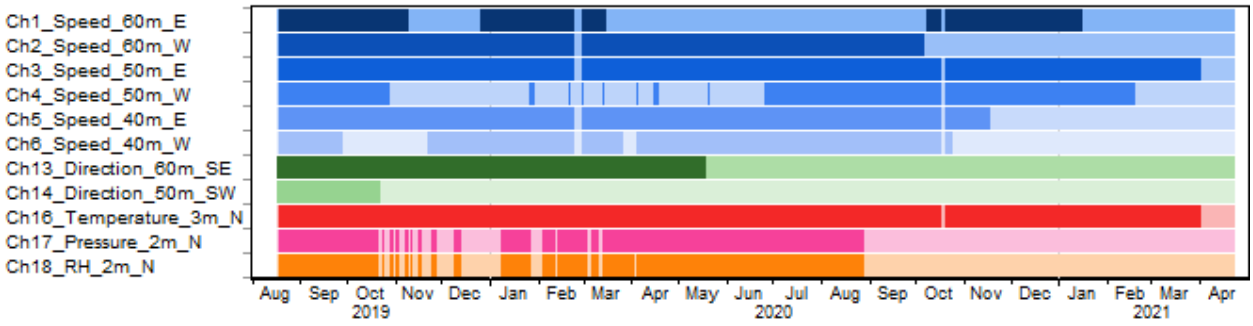


Figure 18: Hog Island met tower data recovery graphic (tower shading filtering excluded)

Hog Island Environmental Measurements

Environmental conditions at Hog Island do not differ substantially from those at Pyramid Valley, hence, one may reference the previous section for temperature, humidity, and density information. Unlike Pyramid though, Hog Island was equipped with a barometric pressure sensor (see Figure 19). The intent of this sensor was to record an extreme low-pressure event (960 mb or lower) to document possible accompanying extreme winds. Data recovery problems with the barometric pressure sensor

compromised this analysis, but a trendline demonstrated decreasing wind gust speeds with higher atmospheric pressure (see Figure 20). Notably, highest wind gusts occurred with southwesterly to westerly winds during low pressure weather events.

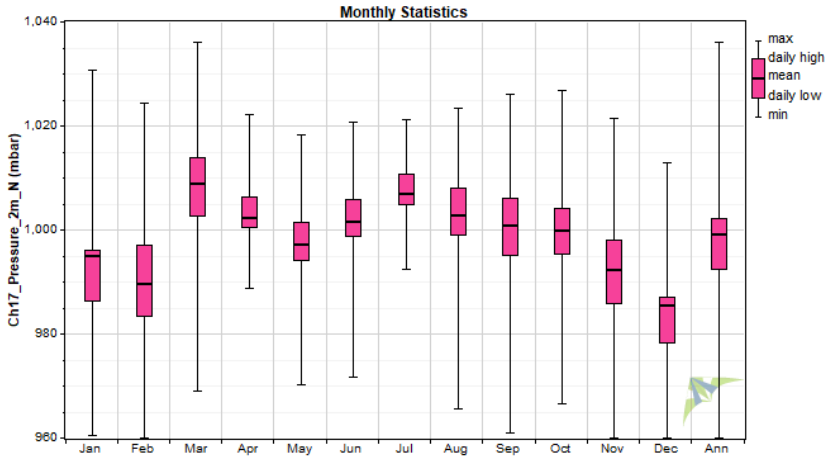


Figure 19: Hog Island barometric pressure boxplot

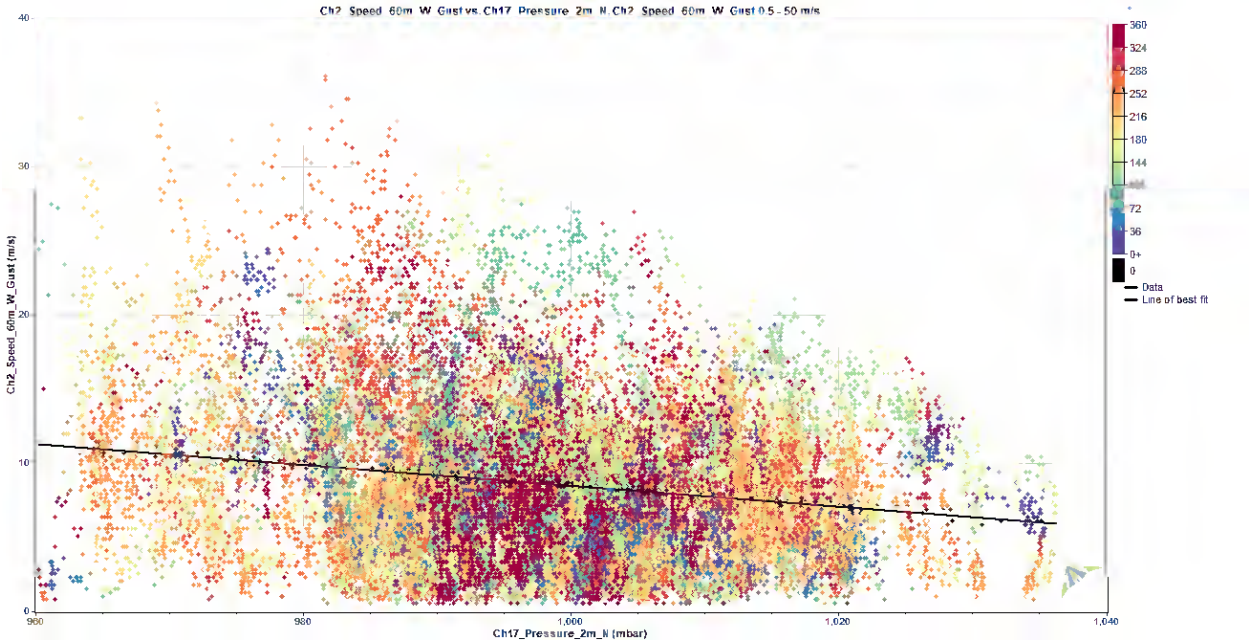


Figure 20: Scatterplot of Hog Island barometric pressure vs. 60 m level wind gust (color code indicates wind direction)

Hog Island Wind Speed and Anemometer Combination

For the three anemometers with higher data recovery rates (60m W, 50m E, and 40m E), mean wind speeds were low (see Table 12) at between approximately 5.1 and 5.9 m/s. Because comparison with Pyramid met tower (see succeeding discussion) demonstrates that Pyramid is the preferred wind power site of the two locations, wind speed adjustment for turbulence as employed with Pyramid data was not accomplished.

Table 12: Hog Island wind speeds, filtered

Variable	Ch1_Speed _60m_E	Ch2_Speed _60m_W	Ch3_Speed _50m_E	Ch4_Speed _50m_W	Ch5_Speed _40m_E	Ch6_Speed _40m_W
Mean wind speed (m/s)	6.87	5.80	5.91	6.19	5.12	4.96
Mean wind speed (mph)	15.4	13.0	13.2	13.8	11.5	11.1
Max 10-min wind speed (m/s)	26.3	32.2	31.7	30.8	31.7	30.2
Max wind speed (mph)	58.8	72.0	70.9	69.0	70.8	67.6
Max gust wind speed (m/s)	43.8	44.0	43.5	43.5	43.4	43.6
Max gust wind speed (mph)	98.0	98.4	97.3	97.3	97.1	97.5
Wind power density (W/m²)	495	319	336	410	264	247
Frequency of calms (%)	28.9	36.7	33.5	36.2	44.2	45.9

Combined Anemometers

Table 12 shows wind speed data with necessary filtering, but like Pyramid, long periods of met tower operation with asymmetric data collection yielded divergent wind speed data for paired anemometers. The two primary options can be used to correct this: synthesize missing data or mathematically combine the anemometers. Like with Pyramid, only anemometer combination was used to create a more representative data set (see Table 13).

Table 13: Hog Island combined anemometer data

Combined	Height	First Anemometer		Second Anemometer		Combined Sensor	
Sensor	(m)	DRR (%)	Mean (m/s	DRR (%)	Mean (m/s)	DRR (%)	Mean (m/s)
Speed 60m cmb	59.5	40.7	6.85	65.6	5.81	83.2	6.11
Speed 50m cmb	50.1	94.4	6.19	50.5	6.11	95.9	6.15
Speed 40m cmb	40.7	72.5	5.14	57.9	4.96	73.1	5.11

Seasonal and Diurnal Variation

Hog Island's monthly wind speed profile (see Figure 21), like at Pyramid, demonstrates a pronounced seasonal variation of wind speeds with higher winter winds and lower summer winds. Figure 22 demonstrates a diurnal wind speed variation on Hog Island like that at Pyramid, but more pronounced with a greater difference between daytime and nighttime winds.

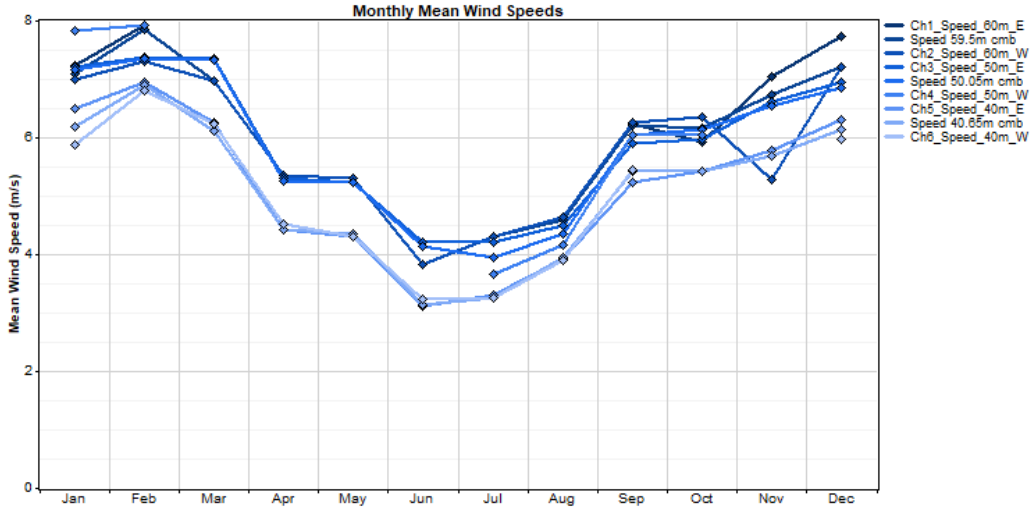


Figure 21: Hog Island monthly wind speeds, combined anemometers only

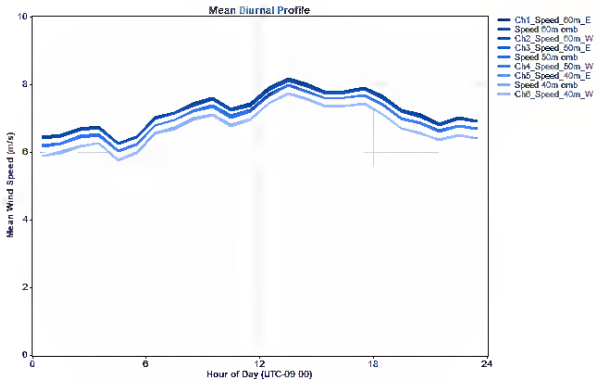


Figure 22: Hog Island diurnal wind speed profile

Hog Island Wind Distribution

The probability distribution function of the Hog Island met tower 60 meter combined anemometer wind speed data indicates a shape curve dominated by lower-to-moderate wind speeds (see Figure 23), but interestingly, with a lower percentage of calm winds (0 to 0.5 m/s) than measured at Pyramid (refer to Figure 11).

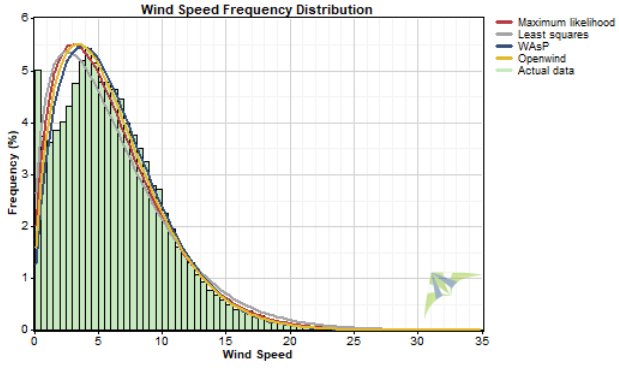


Figure 23: Hog Island wind speed probability distribution histogram

Hog Island Wind Shear and Roughness

Hog Island met tower site wind shear is moderate by wind industry standards with a mean power law exponent of 0.225 from all wind direction sectors (combined anemometers, 2019 only, see Figure 24). But, with reference to Figure 25, wind shear is extremely high with northwesterly to northerly winds. This reflects the topography of the met tower site area where a high hill lies to the north. This is an unavoidable constraint of Hog Island. The high terrain cannot be developed due to conflict with the Unalaska Airport Runway 13 instrument approach area, and the developable southwestern portion of the island is lower elevation and partially shadowed by higher terrain to the north.

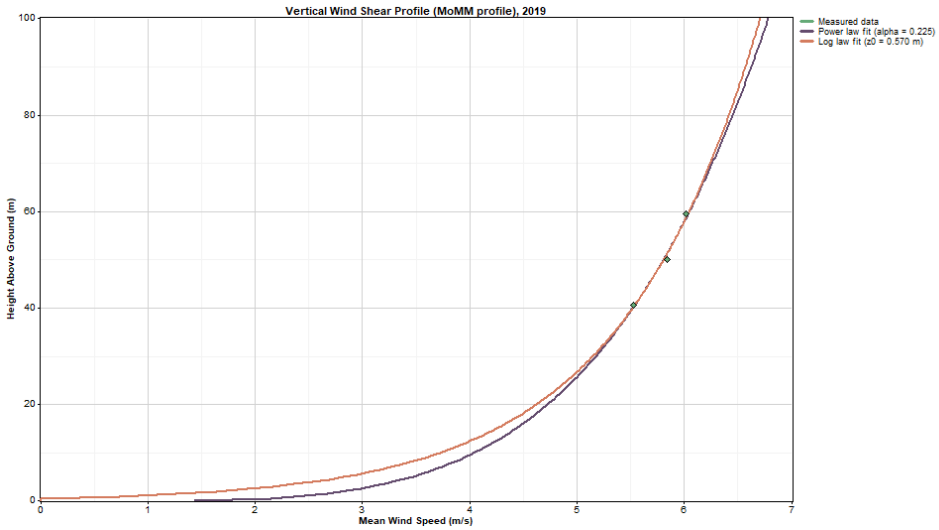


Figure 24: Hog Island vertical wind shear profile (calculated 0.225 power law exponent)

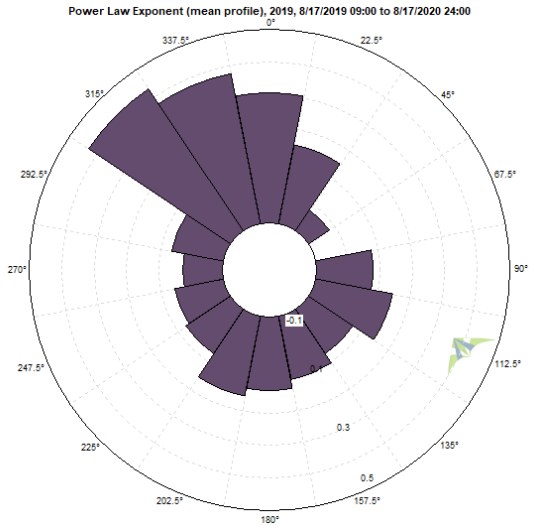


Figure 25: Hog Island vertical wind shear rose (0.50 power law exponent, outer ring)

Hog Island Turbulence

Turbulence at the Hog Island met tower site is moderate with a mean turbulence intensity (TI) of 0.13 at 15 m/s (refer to Appendix A for an explanation of turbulence calculation).

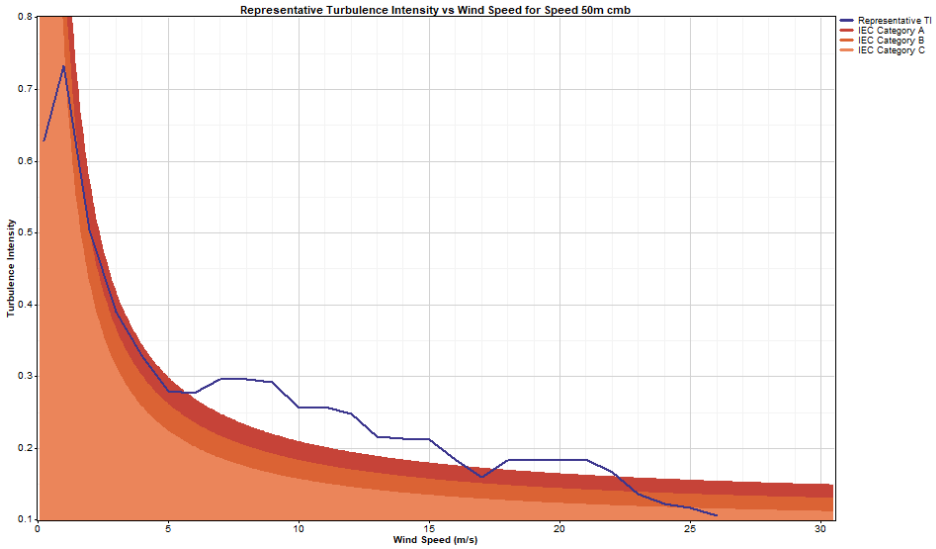


Figure 26: Hog Island turbulence intensity vs. wind speed

Hog Island Wind Direction

The prevailing wind directions at Hog Island are northeasterly and southeasterly to southwesterly, with the latter winds strongest (refer to Figure 27). This is largely consistent with wind directions measured at Pyramid.

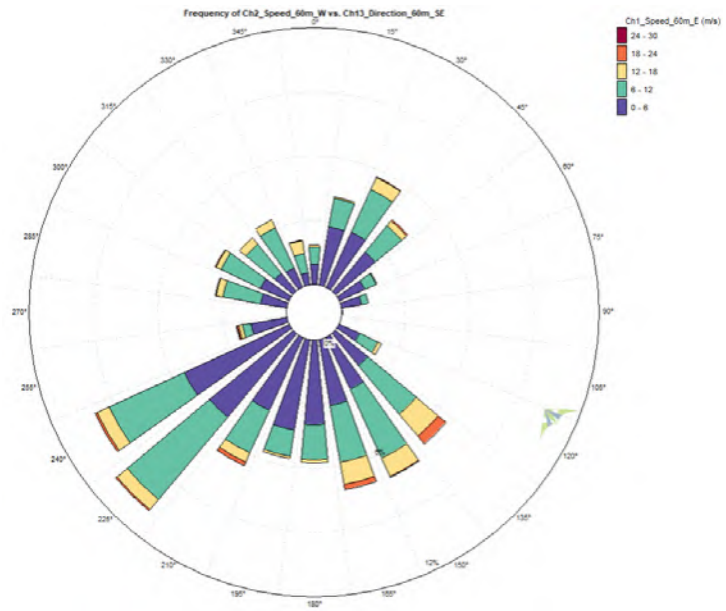


Figure 27: Hog Island wind energy rose, 60-meter west anemometer and 60-meter wind vane

Hog Island and Pyramid Comparison

A seminal objective of Unalaska's wind study was simultaneous collection of wind data from two or more primary sites. Primary sites were only lower Pyramid Valley and Hog Island, both equipped with 60-meter met towers. The 20 months of Hog Island met tower data overlapped completely with Pyramid data, which preceded and succeeded it.

With reference to Figure 28, for comparable anemometers (50-meter east-facing) the monthly mean wind speeds measured at Pyramid were consistently higher, or at least equivalent to, those measured at Hog Island. All other considerations aside, this is the definitive comparative assessment of the two site locations. For Hog Island to be the preferred location for City of Unalaska wind power development, it must be considerably windier than Pyramid, but clearly that was not observed.

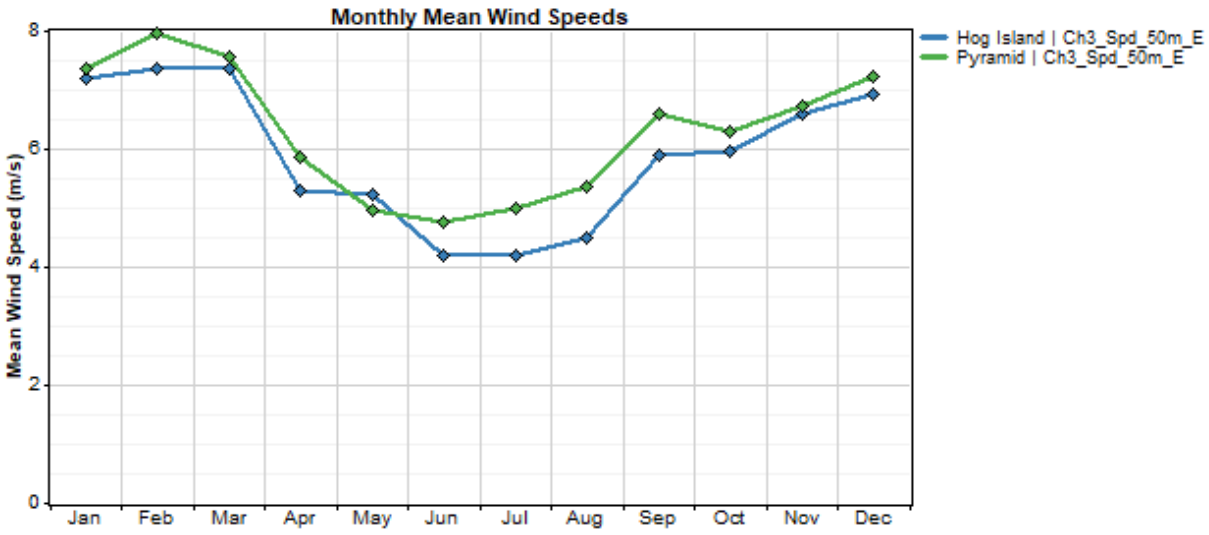


Figure 28: Hog Island vs. Pyramid wind speed comparison, 50 m anemometers

Icy Creek Reservoir (upper Pyramid Valley)

Upper Pyramid Valley, for the purposes of this analysis, comprises the area between Icy Creek Reservoir and Icy Lake at the top of the valley. Although of secondary interest given the wind power development advantages of the lower valley, upper valley was thought potentially promising should the lower valley wind resource prove less robust than desired and/or wind power development in the lower valley not be feasible for other reasons.

Figure 29: Icy Creek Reservoir 34-meter met tower (D. Vaught photo)

Given the lower likelihood of wind power development in the upper valley compared to lower valley, a 34-meter met tower was installed at a well-exposed location immediately west of Icy Creek Reservoir (see Figure 29). Besides providing wind data to lend insight into the upper valley wind resource, data from the Icy Creek Reservoir met tower was desired to serve as a reference point for a wind flow model using Pyramid met tower as the model's data set (see Figure 30).

Icy Creek Reservoir Site and Met Tower Information

The Icy Creek Reservoir met tower was installed in mid-October 2018 at the same time as the 60-meter Pyramid and 10-meter Bunker Hill met towers.[10] The tower was decommissioned and removed from the site by Department of Public Works personnel in October 2019 following failure of an outer guy wire that resulted in an unrepairable "crack-over" of the tower's top sections. Refer to Table 14 for summary information of the met tower and data collected from it.

Table 14: Icy Creek Reservoir met tower summary information

Data dates	10/16/2018 to 10/28/2019 (12 months)
Datalogger information	NRG Symphonie PRO, 16 channel, site no. 3551
Site coordinates	53.82946 North, 166.55130 West (WGS 84 datum)
Site elevation	168 meters (551 ft.)
Wind speed, mean annual, 34 m	5.46 m/s (12.2 mph)
Wind power density, mean annual, 34 m	318 W/m^2
Wind power class	3 (fair), of 7 defined classifications (possibly Class 4 with long-term climatology adjustment; see Pyramid met tower discussion)
Maximum 10-min. avg wind speed	28.9 m/s
Maximum 2-sec. gust wind speed	40.7 m/s (91.0 mph)
Wind shear power law exponent	0.0717 (very low; 0.14 considered nominal)
Calm wind frequency (winds < 4 m/s)	Approx. 44%
Extreme wind probability (50-year period)	Not calculated
Turbulence intensity, 34 m	0.122 (moderately high)
IEC 61400-1 3rd ed. classification	Not determined

[10] Met tower installation accomplished by V3 Energy LLC with contracted assistance from Bering Straits Development Company and Solstice Alaska Consulting.

Figure 30: Icy Creek Reservoir met tower location, view north, Google Earth image

Prior to installation of the met tower, a Federal Aviation Administration (FAA) obstruction evaluation was requested. FAA issued Aeronautical Study No. (ASN) 2018-WTW-5349-OE in July 2018 with a determination of no hazard to air navigation. Obstruction lighting was not required although FAA requested alternating bands of aviation orange and white paint on the met tower and orange high-visibility marker balls be attached near the top of the outer guy wires to improve visibility of the tower for aviators. Both requirements were accomplished.

The Icy Creek Reservoir met tower was equipped with two anemometers at 34 meters and one anemometer at 20 meters; one wind vane each 33 meters; and temperature and relative humidity sensors at the tower base (refer to Table 15). Refer to Appendix D for detailed sensor technical information and to Appendix F for documentation photographs of the met tower installation.

Table 15: Icy Creek Reservoir met tower sensors

Ch	Sensor Type	Model	Name	Height (m)	Dir. (°T)
1	Anemometer	40C	34m ESE	34.0	121
2	Anemometer	40C	34m WSW	34.0	262
3	Anemometer	40C	20m ESE	20.5	124
13	Vane	200M	Direction	33.0	281
16	Temp	T60	Temp	2.5	000
17	Rel. Humidity	RH5X	RH	2.0	000

Icy Creek Reservoir Data Quality Control

As with data collected from the Pyramid and Hog Island met towers, Icy Creek Reservoir met tower data was manually filtered to remove compromised records. This included startup sequencing, isolated periods of power supply problems, icing events, tower shading, and poorly functioning sensors. Figure 31 demonstrates mixed results regarding data recovery at Icy Creek. There was some minor data loss due to icing in but also periods of significant anemometer failure, possibly due to damage caused by eagles as discussed with Hog Island.

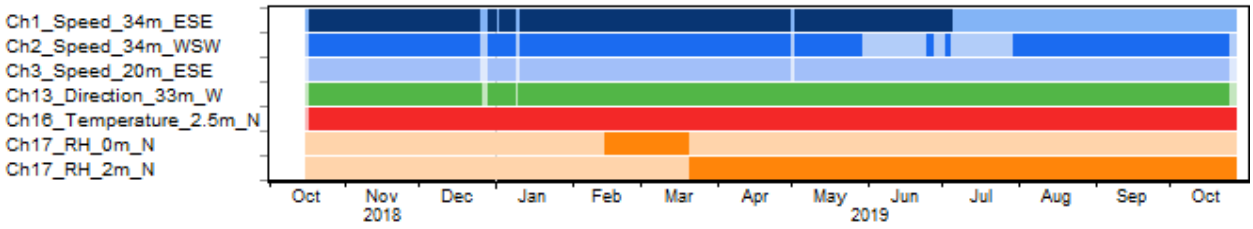


Figure 31: Icy Creek Reservoir met tower data recovery graphic (tower shading filtering not employed)

Icing Data

Considering the cool, wet climate of the Aleutian Islands, significant data loss due to icing was expected, especially at the higher elevation of Icy Creek Reservoir compared to lower Pyramid Valley. This concern proved unfounded however as icing loss was a very minimal 0.9 percent over the one-year data measurement period.

Icy Creek Reservoir Wind Speed and Data Synthesis

Given the data recovery problems with both 34-meter level anemometers, data reconstruction or gap-filling was employed to yield a more accurate dataset for analysis than raw or filtered data alone would provide.

With reference to reconstructed data, mean wind speeds at the 34-meter level were measured at approximately 5.44 m/s with a mean wind power density of 318 Watts/m^2 (see Table 16). This classifies lower Pyramid Valley as a Class 3 (description: fair) wind resource.

Table 16: Icy Creek Reservoir wind speeds with reconstructed (gap-filled) data

Variable	Ch1_Speed_ 34m_ESE	Ch2_Speed_ 34m_WSW	Ch3_Speed_ 20m_ESE
Mean wind speed (m/s)	5.37	5.44	5.18
Mean wind speed (mph)	12.0	12.2	11.6
Max 10-min wind speed (m/s)	28.7	28.9	27.7
Max 10-min wind speed (mph)	64.2	64.6	61.9
Max gust wind speed (m/s)	40.0	40.7	40.6
Max gust wind speed (mph)	89.5	91.0	90.8
Mean power density (W/m^2)	313	318	276
Frequency of calms (%)	44.9	43.9	46.7

Icy Creek Reservoir Wind Direction

The prevailing winds at the Icy Creek Reservoir site were measured as strongly northwesterly and southeasterly, which reflects the confining nature – due to enclosure by high mountains to the east and west – of upper Pyramid valley (see Figure 32).

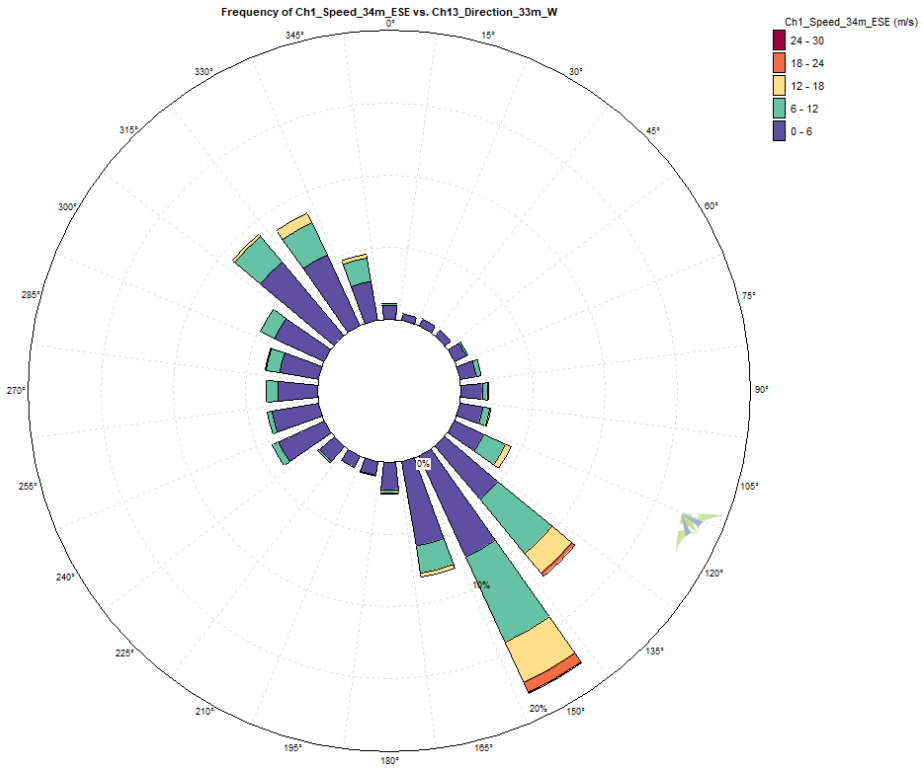


Figure 32: Icy Creek Reservoir wind energy rose

Icy Creek Reservoir and Pyramid Comparison

As noted earlier, one purpose of the Icy Creek Reservoir was to explore the wind potential of upper Pyramid Valley to determine possible suitability as a wind turbine location compared to lower valley. It was recognized during planning that the upper valley is geographically constrained compared to lower valley, which could prove disadvantageous.

With reference to measured wind shear at the Pyramid met tower (see Figure 12), a virtual 34-meter anemometer on the Pyramid tower was synthesized to enable direct comparison with the Icy Creek Reservoir wind speed data. Figure 33 shows the comparative monthly mean wind speeds, with Icy Creek clearly lower for all months except June 2018 and January 2019 when they were equal. As a result, the wind power class of Icy Creek Reservoir is less than at Pyramid (referring to lower Pyramid valley).

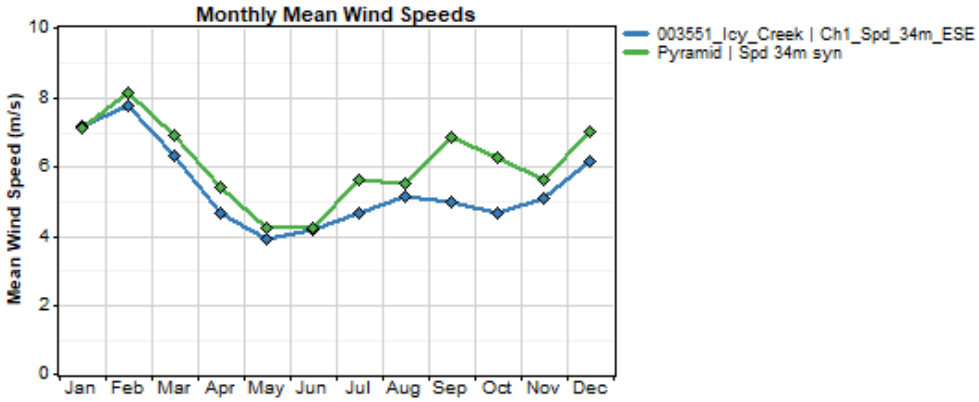


Figure 33: Icy Creek Reservoir vs. Pyramid wind speed comparison, overlap period

Although detailed month-by-month wind speed and wind direction data could provide additional insight, comparing the wind roses (overlap period, Figure 34) of the two sites clearly indicates Pyramid benefits from southwesterly winds along the reach of Captain's Bay while Icy Creek Reservoir does not due to high blocking terrain that comprises the eastern boundary of the upper valley.

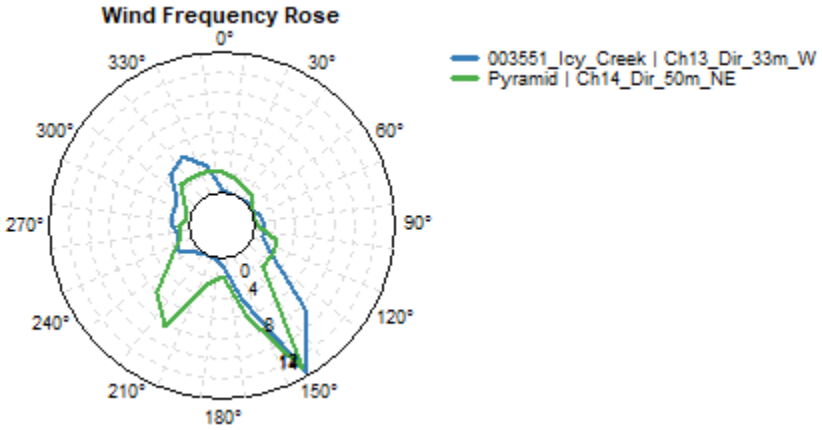


Figure 34: Icy Creek Reservoir vs. Pyramid wind direction comparison

Bunker Hill (aka Little South America)

Bunker Hill (also known locally as Little South America) was identified in the Phase II report as a suitable location to measure the wind resource – primarily wind directions – to validate meso-scale wind modeling of Cold Bay upper air data. There were two candidate sites – Bunker Hill and Ballyhoo (Amaknak Island) – for this purpose. In some respects, Ballyhoo may have been preferable to Bunker Hill as it is twice the elevation and hence better exposed, but the location of Bunker Hill between the main prospective met tower sites – Lower Pyramid Valley and Hog Island – made it the more suitable choice.

A short, 10-meter met tower was chosen for Bunker Hill as the location, though presumably with a comparable wind resource as lower Pyramid Valley, was not considered suitable for wind turbines. The summit area of Bunker Hill is small, and the existing road access would be expensive to improve. More importantly, with many WWII historical features, nearly the entire island and especially the Bunker Hill

summit area is administered by the National Park Service as part of the Aleutian World War II National Historic Area.

Figure 35: Bunker Hill 10-meter met tower (K. Arduser photo)

Bunker Hill Site and Met Tower Information

The Bunker Hill met tower was installed in mid-October 2018 at the same time as the 60-meter Pyramid and 34-meter Icy Creek Reservoir met towers (see Figure 35).[11] Refer to Table 17 for summary information of the met tower and data collected from it.

Table 17: Bunker Hill met tower summary information

Data dates	10/18/2018 to 6/16/2020
Datalogger information	NRG Symphonie PRO, 16 channel, site no. 3547
Site coordinates	53.87568 North, 166.55820 West (WGS 84 datum)
Site elevation	110 meters (361 ft.)
Wind speed, mean annual, 10 m	6.14 m/s (13.7 mph)
Wind power density, mean annual, 10 m	400 W/m^2
Wind power class	4 (good) to 5 (excellent), of 7 defined classifications
Maximum 10-min. avg wind speed	30.9 m/s
Maximum 2-sec. gust wind speed	43.6 m/s (97.5 mph)
Wind shear power law exponent	Not calculated
Calm wind frequency (winds < 4 m/s)	Approx. 35%
Extreme wind probability (50-year period)	Not calculated
Turbulence intensity, 34 m	0.147 (high)
IEC 61400-1 3rd ed. classification	Not determined

[11] Met tower installation accomplished by V3 Energy LLC with contracted assistance from Bering Straits Development Company and Solstice Alaska Consulting.

Figure 36: Bunker Hill met tower location, view north, Google Earth image

Prior to installation of the met tower, a Federal Aviation Administration (FAA) obstruction evaluation was requested. FAA issued Aeronautical Study No. (ASN) 2018-WTW-5351-OE in September 2018 with a determination of no hazard to air navigation. Obstruction lighting was required in addition to alternating bands of aviation orange and white paint on the met tower and orange high-visibility marker balls near the top of the outer guy wires to improve visibility. Obstruction lighting was accomplished with an LED light from Unimar, Inc. and a 24 Volt battery power system with a 1 kW wind turbine supplied by Renewable Energy Systems of Alaska.

The met tower was purchased as a NOW configuration from NRG Systems, Inc. As such, it had a standard suite of instrumentation for a 10-meter met tower, including two anemometers, one wind vane, and one temperature sensor, plus a pyranometer (solar irradiance sensor) that was included as an additional sensor. In February 2019, a relative humidity sensor was added (refer to Table 18).

Table 18: Bunker Hill met tower sensors

Ch	Sensor Type	Model	Name	Height (m)	Dir. (°T)
1	Anemometer	40C	10m NE	10.0	054
2	Anemometer	40C	10m W	10.0	256
13	Vane	200M	10m	9.0	144
16	Temp	T60	Temp	3.0	000
17	Rel. Humidity	RH5X	RH	1.0	090
22	Pyranometer	Li-Cor	Pyra	2.0	180

Bunker Hill Data Quality Control

As with data collected from the other met towers, Bunker Hill met tower data was manually and automatically filtered to remove compromised records. This included startup sequencing, isolated periods of power supply problems, icing events, and poorly functioning sensors. Figure 37 demonstrates several problems including a faulty boom arm on the channel 1 anemometer in June 2019 that was not corrected until August 2019. Following, the direction sensor failed in October 2019 and was replaced in November 2019. The datalogger itself experienced unexplained and strange data loss from mid-March to mid-April 2020, which resolved on its own. A review of datalogger events was not revealing. On a positive note, data loss due to icing was extremely minimal.

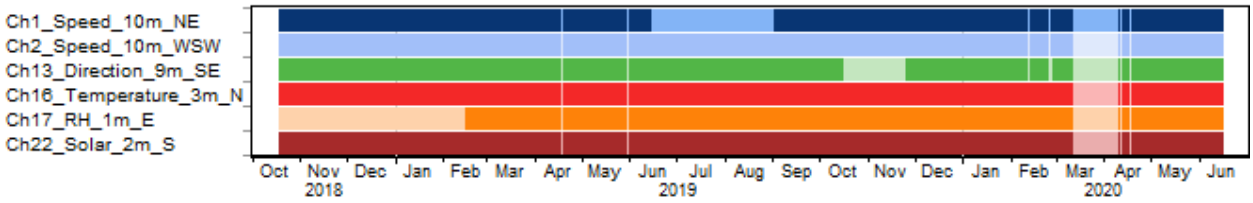


Figure 37: Bunker Hill met tower data recovery graphic

Bunker Hill Wind Speed and Data Synthesis

The Bunker Hill met tower was not installed with the intention of evaluating the wind resource at this location for wind power, but rather to lend insight into wind pattern differences between Pyramid Valley and Hog Island. As such, gap-filling reconstruction of filtered anemometer data was not employed, which explains the high measured wind speed variation between the two anemometers (see Table 19). Although a mean wind speed of 6.14 m/s at only 10 meters above ground level may seem extraordinary compared to the same mean wind speed measured at 40 meters on the Pyramid met tower, this is misleading. Although wind shear on Bunker Hill was not measured (a minimum of two levels of anemometers would be required), wind shear on exposed high hills is very nearly zero to even negative. With this, the measured wind speed at 10 meters on Bunker Hill is almost certainly representative of the wind speed much higher above ground level.

Table 19: Bunker Hill wind speeds with filtered data

Variable	Ch1_Speed_10m_NE	Ch2_Speed_10m_WSW
Mean wind speed (m/s)	6.14	5.85
Mean wind speed (mph)	13.7	13.1
Max 10-min wind speed (m/s)	30.9	29.8
Max 10-min wind speed (mph)	69.0	66.6
Max gust wind speed (m/s)	43.6	43.1
Max gust wind speed (mph)	97.5	96.4
Mean power density (W/m²)	400	353
Frequency of calms (%)	35.1	37.0

Bunker Hill Wind Direction

The primary purpose of the Bunker Hill met tower was to compare the site to mesoscale[12] winds from the Cold Bay upper air data to validate the selection of sites for installation of met towers (refer to pages 13 through 20 in the Phase II report). Figure 38 presents the measured wind rose on Bunker Hill and Figure 39 the Cold Bay upper air data wind rose. As one can see, they do not match well, possibly due to channeling of low elevation winds through the complex topography near Unalaska. Interestingly though, the Cold Bay wind rose better matches the Icy Creek Reservoir wind rose (see Figure 32) and to a lesser extent the Pyramid wind rose (see Figure 9).

In hindsight, installation of the Bunker Hill met tower was perhaps not strictly necessary as the options for readily developable wind power sites in Unalaska were few, limited to lower Pyramid Valley and Hog Island, and to a lesser extent upper Pyramid Valley, the Ptarmigan Road area of Iliuliak Valley, and on the periphery of possibility, Ballyhoo. Further, the measured wind roses of lower Pyramid valley (see Figure 9), Hog Island (see Figure 27) and Icy Creek Reservoir/Upper Pyramid Valley (see Figure 32) are explainable with their respective terrain exposures, without need to reference the upper air wind resource at Cold Bay, which lies far to the east.

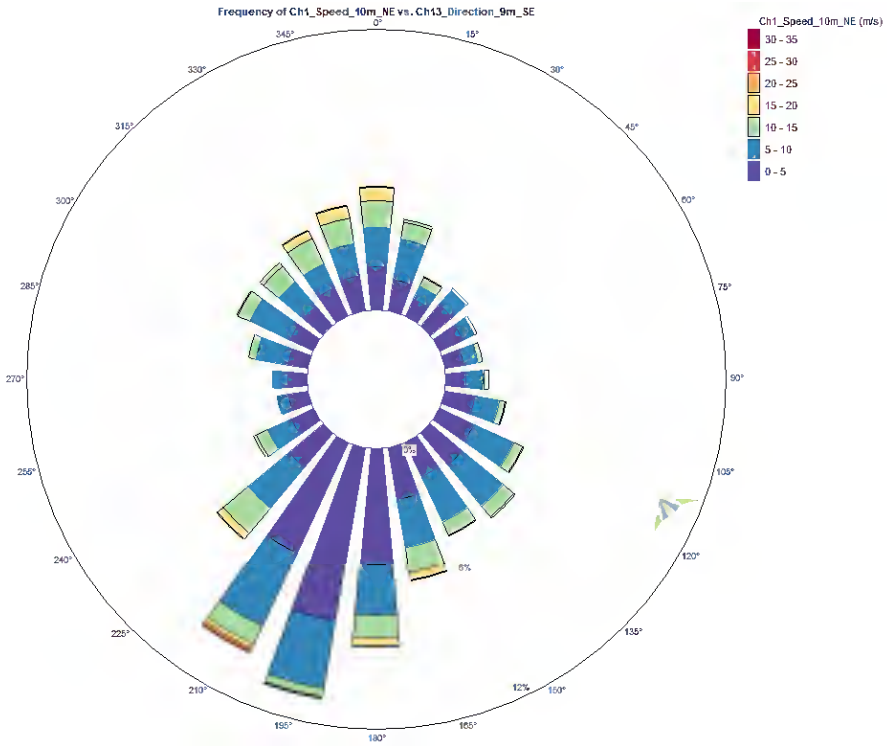


Figure 38: Bunker Hill wind energy rose, 10-meter NE anemometer

[12] Pertaining to meteorological phenomena, such as wind circulation and cloud patterns, that are about 1-to-100 km in horizontal extent (www.dictionary.com).

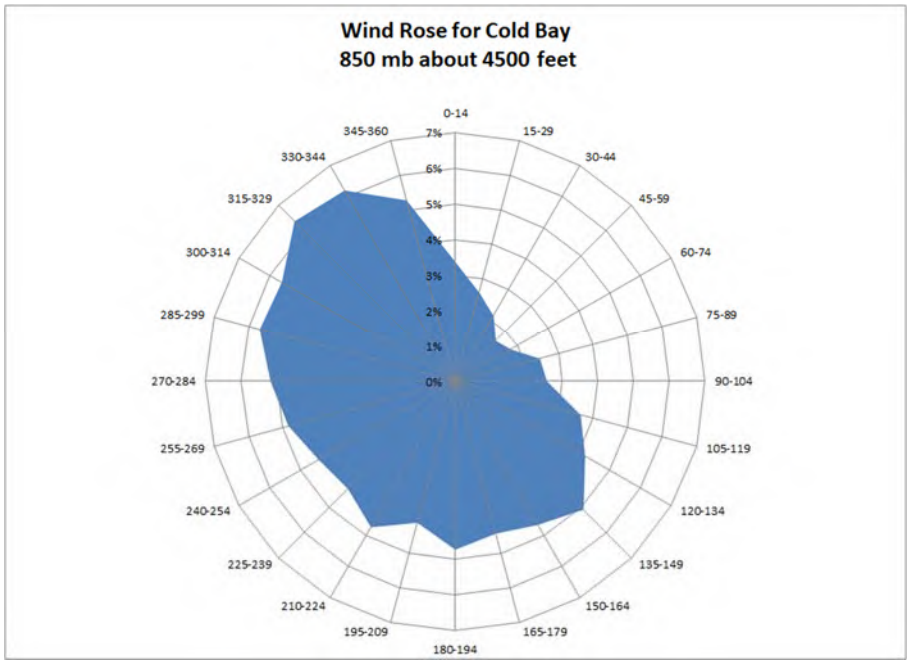


Figure 39: Cold Bay upper air (4500 ft. level) wind rose (from Phase II report)

Solar Irradiance

Bunker Hill was equipped with a pyranometer (solar irradiance sensor) to better understand Unalaska's solar power resource. Although not the focus of this report, solar power may be of interest to City of Unalaska and community residents. Figure 40 and Figure 41 lend insight into the potential, which will be explored further in a follow-on renewable energy feasibility study.

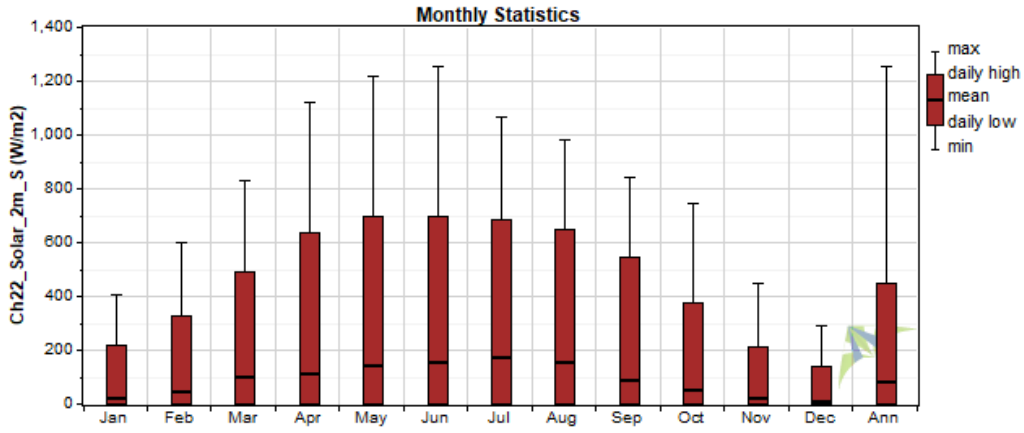


Figure 40: Bunker Hill solar irradiance boxplot, units of Watts/meter^2

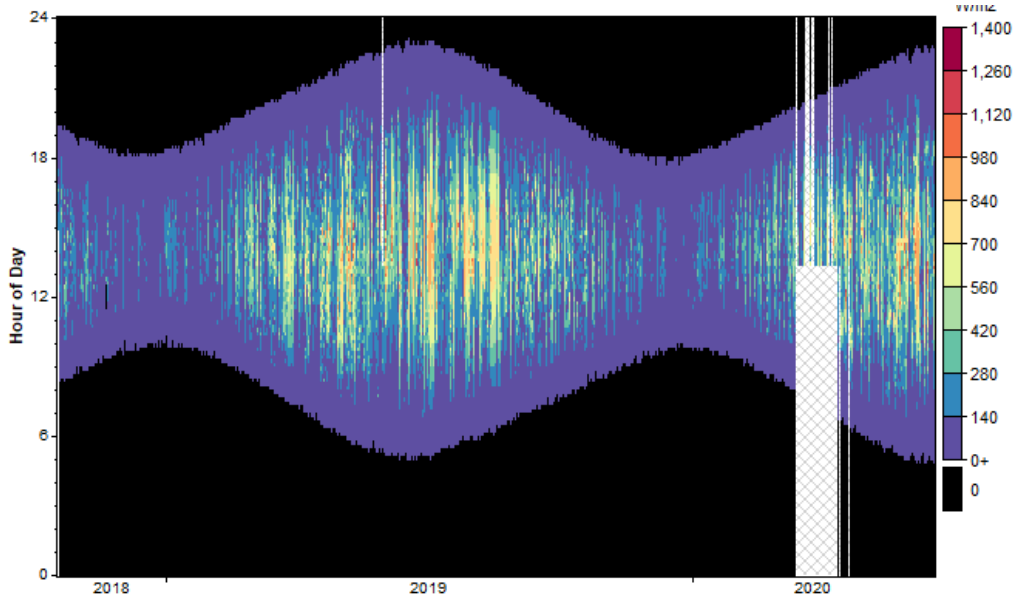


Figure 41: Bunker Hill solar irradiance Dmap, units of Watts/meter^2 on right-hand scale

Other Wind Power Site Options

During the Wind Power Development and Integration Assessment Project, Phase II site selection process, several site options other than upper and lower Pyramid Valley and Hog Island were considered (refer to pages 22 through 31 of the Phase II report). Most were rejected due to proximity to the airport, distance from existing power infrastructure, and other reasons. Two sites though – Ballyhoo (east summer area of Amaknak Island) and Ptarmigan Road (mid-elevation eastern flanks of Iliuliak Valley) – stand out as possible alternatives to lower Pyramid Valley and have high modeled wind speeds. Ballyhoo and Ptarmigan Road were considered for monitoring with met towers and ultimately rejected during the Phase II planning process in favor of focusing on Pyramid Valley and Hog Island.

Ballyhoo (east summit area of Amaknak Island)

AWS Windnavigator software predicts exceptionally strong winds on Ballyhoo (referring here to the formerly developed portion of Amaknak Island). At first glance this appears desirable, but Windnavigator modeling (discussed in the Phase II report) predicted winds that are too high for wind power development. Also, Ballyhoo is within the Aleutian World War II National Historic Area administered by the U.S. National Park Service, there is no existing power distribution serving the area, and perhaps most significantly, the access road is very steep with exceptionally tight switchback turns. These challenges aside, Ballyhoo presents significant wind power potential that may warrant wind resource measurement with a 10-meter met tower.

Ptarmigan Road (eastern flank of Iliuliak Valley)

This site area is past the turnout of Upper Ptarmigan Road after it turns north and away from Ski Bowl Road. AWS Windnavigator software predicts an excellent wind resource in this area, mostly due to its higher elevation than lower Pyramid Valley. Ptarmigan Road consists of two possible sites, one near the end of the access road and the other downhill and beyond it.

Access to the site area is reasonably easy on a well-maintained road. Drawbacks however include lack of high voltage service in Iliuliuk Valley that would be expensive to upgrade per Department of Public Utilities personnel, location within the instrument approach area to Runway 31 (although this approach is not used and the restriction perhaps could be successfully challenged), and nearness to housing development with the potential for noise and shadow flicker complaints.

Comparison to Kodiak's Pillar Mountain

Comparison of Pyramid to Kodiak Island's Pillar Mountain wind power site was requested to better understand how the wind resource in Unalaska compares. With completion of data collection activities, Pyramid classifies as low wind power class 5 (description: excellent), of seven defined wind classes. With data collection from 2005 to 2007, Kodiak's Pillar Mountain was assessed as wind power class 7 (superb). Note however that comparatively few wind turbines worldwide operate in Class 7 winds.

Table 20: Pyramid-Kodiak Pillar Mountain comparison

Wind characteristic (60-meter level)	Unalaska Pyramid Valley	Kodiak Pillar Mountain
Site elevation	103 m (334 ft.)	390 m (1,280 ft.)
Mean wind speed	6.84 m/s (15.3 mph)	8.35 m/s (18.6 mph)
Wind power density	548 W/m^2 (class 5 of 7)	956 W/m^2 (class 7 of 7)
Max. 10-min. avg wind speed	37.5 m/s (83.9 mph)	39.9 m/s (89.2 mph)
Max. 2-second gust	51.4 m/s (115.0 mph)	49.7 m/s (111.2 mph)
Calm wind probability (winds <4 m/s)	~33%	~21%
Wind shear power law exponent	0.100 (low)	0.023 (extremely low)
Extreme wind probability (50-year period, 10-min avg. wind speed)	41.3 to 47.6 m/s, IEC Class II	46.0 m/s, IEC Class II
Turbulence intensity and category	0.120, Cat. B (moderate)	0.106, Cat. C (low)
IEC 61400-1, 3rd ed. classification[13]	Class II-B	Class II-C

As demonstrated in Table 20, Pillar Mountain's mean wind speed and associated wind power density are higher than at Pyramid, but gust winds and extreme wind probability are similar. From an IEC classification perspective, the wind turbines installed on Pillar Mountain are also suitable for Pyramid, but given Pyramid's lower mean wind speed, wind turbines there would have lower annual energy production than on Pillar Mountain.

[13] International Electrotechnical Commission design standard for Wind Energy Generation Systems

Appendix A – IEC Wind Classification

Six parameters comprise IEC 61400-1, 3rd edition, wind classification:

1. Extreme wind
2. Wind shear
3. Wake turbulence
4. Flow inclination
5. Wind distribution
6. Turbulence intensity

IEC's simplified wind classification is intended to apply to most sites and relies on two of the six parameters: extreme wind probability (Class I, II, III, or S) and turbulence intensity (Category A, B, or C).

Extreme Wind

The classification of extreme wind is by V_{ref}, the reference wind speed, which is the highest measured or probable 10-minute average wind speed in a 50-year return period. This is accomplished with a Gumbel distribution analysis[14] which can be used to model the probability of extreme wind events. It is categorized in Table 21. Note also in **Error! Reference source not found.**Table 21 reference to maximum (3-sec. duration) gust wind in a one-year return period for each IEC extreme wind classification.

Table 21: IEC 61400-1, 3rd edition, extreme wind classes

Wind Class	I	II	III	S
V_{ref} (m/s)	50.0	42.5	37.5	Designer spec.
V_{gust} (m/s)	70.0	59.5	52.5	

Wind Shear

A wind shear, or power law, exponent, α, calculated by Equation 3 where *V* = wind speed and *Z* = height above ground level, between 0 and 0.2. α=0 would indicate no wind shear and α=0.2 would indicate very high wind shear.

Equation 3: Wind shear and power law exponent

$$V(z) = V(hub) \times \left({}^{Z}/_{Zhub}\right)^{\alpha}$$

Wake Turbulence

For comparison with the normal turbulence model, the IEC suggests an effective turbulence intensity, which is an ideal turbulence independent on wind direction and expected to cause the same fatigue damage as variable turbulence in winds from all directions. The effective turbulence intensity includes added turbulence from wakes of neighbor turbines.[15]

Flow Inclination

A wind flow vector not exceeding 8 degrees from horizontal (plus or minus).

[14] Gumbel distribution - Wikipedia

[15] The IEC 61400-1 turbine safety standard - WAsP

Wind Distribution

A wind speed, or histogram, where a Weibull function[16] yields a unitless shape factor (*k*) of 2.0 (known as a Rayleigh distribution) or less (see Figure 42).

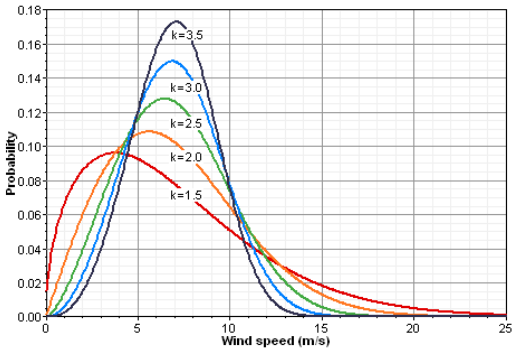


Figure 42: Weibull k shape curves

Turbulence Intensity

The turbulence intensity (*TI*) is a dimensionless number defined by the standard deviation (σ) of the wind speed within each time step (10 minutes for wind power analysis) divided by the mean wind speed (*V*) over that time step (see Equation 4).

Equation 4: Turbulence intensity

$$TI = {}^{\sigma i}/_{Vi}$$

IEC 61400-1, 3rd ed., defined turbulence categories based on mean turbulence intensity at a wind speed of 15 m/s (see Table 22).

Table 22: IEC 61400-1, 3rd edition, turbulence categories

Turb. Category	S	A	B	C
TI at 15 m/s	>0.16	0.14-0.16	0.12-0.14	<0.12

Simplified Wind Classification

Although there are six criteria to consider in IEC 61400-1 for wind turbine siting, the simplified evaluation considers just two of them: extreme wind probability and turbulence intensity. This yields the familiar wind turbine design classifications of, for example, Class IIA or Class IIIC (see Table 23).

Table 23: IEC 61400-1, 3rd edition, simplified wind classification

Wind Class	I	II	III	S
V_{ref} (m/s)	50.0	42.5	37.5	Values specified by the designer
A (TI_{ref})	0.16			
B (TI_{ref})	0.14			
C (TI_{ref})	0.12			

[16] Weibull distribution - Wikipedia

Appendix B – Pyramid Valley detailed met tower information

Table 24: Pyramid met tower complete sensor installation information

Sensor Type	Model	Name	Height (m)	Dir. (°T)	Serial No.	Scale	Offset	Boom (m)	Mt Angle	Terminal	Logging mode
Anemometer	40C	60m E	59.7	094	311709	0.76770	0.3349	2.4		1	Stats and samples
Anemometer	40C	60m W	59.3	269	311713	0.76214	0.3485	2.4		2	Stats
Anemometer	40C	50m E	50.2	094	311722	0.75942	0.3471	2.4		3	Stats and samples
Anemometer	40C	50m W	49.7	269	311723	0.75805	0.3841	2.4		4	Stats
Anemometer	40C	40m E	38.9	094	311724	0.76344	0.3218	2.4		5	Stats
Anemometer	40C	40m W	38.4	269	311873	0.75806	0.3600	2.4		6	Stats
Vane	200M	60m	57.4	027	742	147.911	-1.4602	2.4	180	13	Stats and samples
Vane	200M	50m	48.0	038	807	147.911	-1.4602	2.4	180	14	Stats
Temp	T60	Temp	3.0	000	n/a	44.7436	-40.8555	none		16	Stats
Rel. Humidity	RH5X	RH	2.0	000	n/a	20	0	none		19	Stats
RM Young	27106T	Vert Spd	55.3	311	n/a	18	0	1.9		20	Stats and samples

Table 25: Pyramid met tower monthly combined anemometer data

		60m cmb				50m cmb			40m cmb		
		DRR	Mean	Max	Gust	Mean	Max	Gust	Mean	Max	Gust
Year	Month	(%)	(m/s)	(m/s)	(m/s)	(m/s)	(m/s)	(m/s)	(m/s)	(m/s)	(m/s)
2018	Oct	90.2	6.31	15.2	25.5	6.20	14.9	23.4	6.10	14.7	24.0
2018	Nov	95.3	5.85	17.1	31.1	5.73	17.0	34.0	5.66	17.0	34.2
2018	Dec	96.3	7.32	25.4	33.1	7.20	24.7	33.0	7.07	24.2	33.2
2019	Jan	100.0	7.50	29.8	36.9	7.36	28.8	36.5	7.24	28.5	36.2
2019	Feb	100.0	8.69	26.3	34.4	8.47	25.6	34.8	8.27	25.3	33.7
2019	Mar	100.0	7.21	25.8	31.3	7.11	25.1	30.7	6.97	24.7	29.8
2019	Apr	96.5	5.59	22.1	26.5	5.52	21.9	26.9	5.43	21.9	26.5
2019	May	99.3	4.37	12.8	21.4	4.34	12.3	20.1	4.28	12.0	19.7
2019	Jun	100.0	4.39	18.5	23.0	4.34	18.1	23.1	4.28	17.8	22.5
2019	Jul	100.0	5.77	17.4	21.2	5.70	17.1	21.4	5.66	16.8	20.7
2019	Aug	99.5	5.63	21.9	28.3	5.64	21.3	27.2	5.57	20.8	27.3
2019	Sep	100.0	7.22	22.2	27.5	7.12	21.6	28.4	6.96	21.2	27.6
2019	Oct	100.0	6.40	28.5	39.7	6.30	27.6	38.8	6.16	27.0	38.5
2019	Nov	100.0	6.11	18.1	27.3	5.97	17.6	26.2	5.86	17.4	26.5
2019	Dec	97.6	7.36	28.6	39.7	7.19	27.6	40.3	7.11	27.8	40.0
2020	Jan	100.0	6.69	23.8	29.6	6.56	23.2	29.2	6.52	22.9	29.6
2020	Feb	96.9	7.71	27.9	37.9	7.58	27.0	39.8	7.46	26.9	38.2
2020	Mar	100.0	7.39	26.3	34.6	7.29	25.5	36.0	7.19	25.0	35.4
2020	Apr	100.0	5.45	19.6	25.2	5.35	19.0	23.4	5.28	18.6	23.2
2020	May	99.4	5.33	26.0	33.1	5.21	25.4	32.8	5.17	25.0	31.6
2020	Jun	97.0	4.84	18.3	24.5	4.39	17.9	23.6	4.69	17.9	23.0
2020	Jul	96.2	4.38	15.6	18.6	3.57	15.3	17.8	4.45	15.8	18.6
2020	Aug	97.9	4.72	37.5	51.2	4.65	37.0	49.5	4.70	36.1	49.7
2020	Sep	97.9	5.99	19.1	25.2	5.99	19.5	24.9	5.83	19.4	25.5
2020	Oct	97.0	6.31	22.9	30.6	6.23	22.3	31.2	6.07	21.9	32.1
2020	Nov	98.8	8.49	25.4	38.2	8.40	25.5	39.6	8.16	25.2	41.5
2020	Dec	96.5	7.19	24.1	34.6	7.21	23.5	34.5	6.96	23.1	34.4
2021	Jan	100.0	8.15	25.4	36.2	8.15	25.0	34.3	7.92	24.8	37.2
2021	Feb	95.2	7.75	21.6	31.1	7.68	21.0	32.2	7.45	20.7	33.4
2021	Mar	97.3	8.30	23.7	37.9	8.25	23.1	38.3	7.99	22.8	38.5
2021	Apr	100.0	6.72	20.8	27.3	6.62	20.3	26.4	6.49	19.9	26.5
2021	May	100.0	5.31	17.8	23.2	5.27	17.2	23.4	5.10	16.7	22.2
2021	Jun	100.0	5.66	23.9	33.1	5.64	23.3	32.2	5.37	22.9	29.8
2021	Jul	100.0	5.74	15.6	20.4	5.67	15.4	19.8	4.69	14.8	19.9
2021	Aug	82.5	6.92	19.5	22.2	6.81	18.8	21.9	5.82	18.2	21.7
All Data		98.3	6.40	37.5	51.2	6.28	37.0	49.5	6.17	36.1	49.7
Mean of monthly means			6.39			6.28			6.16		

Appendix C – Hog Island detailed met tower information

Table 26: Hog Island met tower complete sensor installation information

Sensor Type	Model	Name	Height (m)	Dir. (°T)	Serial No.	Scale	Offset	Boom (m)	Mt Angle	Terminal	Logging mode
Anemometer	40C	60m E	59.7	098	315386	0.76311	0.318	2.4		1	Stats
Anemometer	40C	60m W	59.3	269	315376	0.76207	0.3316	2.4		2	Stats
Anemometer	40C	50m E	50.3	098	315397	0.76227	0.3393	2.4		3	Stats
Anemometer	40C	50m W	49.8	269	315394	0.76234	0.3279	2.4		4	Stats
Anemometer	40C	40m E	40.9	098	315393	0.76008	0.3338	2.4		5	Stats
Anemometer	40C	40m W	40.4	269	315375	0.76293	0.3252	2.4		6	Stats
Vane	200M	60m	57.4	148	1354	147.911	-1.4602	2.4	180	13	Stats
Vane	200M	50m	47.7	220	1346	147.911	-1.4602	2.4	180	14	Stats
Temp	T60	Temp	3.0	000	183	44.7436	-40.8555	none		16	Stats
Barom. Press.	BP20	BP	2.0	270	536670	217.9	106.3	none		17	Stats
Rel. Humidity	RH5X	RH	2.0	270	n/a	20	0	none		19	Stats
RM Young	27106T	Vert Spd	55.56	223	n/a	18	0	1.9		20	Stats

Appendix D – Icy Creek Reservoir detailed met tower information

Table 27: ICR met tower complete sensor installation information

Sensor Type	Model	Name	Height (m)	Dir. (°T)	Serial No.	Scale	Offset	Boom (m)	Mt Angle	Terminal	Logging mode
Anemometer	40C	34m ESE	34.0	121	311702	0.76336	0.3121	1.53		1	Stats
Anemometer	40C	34m WSW	34.0	262	311703	0.76077	0.3391	1.53		2	Stats
Anemometer	40C	20m ESE	20.5	124	311704	0.75933	0.3793	1.53		3	Stats
Vane	200M	Direction	33.0	281	794	147.911	-1.4602	1.53	180	13	Stats
Temp	T60	Temp	2.5	000	n/a	44.7436	-40.8555	none		16	Stats
Rel. Humidity	RH5X	RH	2.0	000	n/a	20	0.0000	none		17	Stats

Appendix E – Bunker Hill detailed met tower information

Table 28: Bunker Hill met tower complete sensor installation information

Sensor Type	Model	Name	Height (m)	Dir. (°T)	Serial No.	Scale	Offset	Boom (m)	Mt Angle	Terminal	Logging mode
Anemometer	40C	10m NE	10.0	054	311706	0.76026	0.338	1.53		1	Stats
Anemometer	40C	10m W	10.0	256	311707	0.76465	0.3163	1.53		2	Stats
Vane	200M	10m	9.0	144	804	147.911	-1.4602	1.53	180	13	Stats
Temp	T60	Temp	3.0	000	106	44.7436	-40.8555	none		16	Stats
Rel. Humidity	RH5X	RH	1.0	090	n/a	20	0	none		17	Stats
Pyranometer	Li-Cor	Pyra	2.0	180	105963	15.99	0.0000	none		22	Stats

Appendix F – Met tower documentation photographs

Pyramid 60 m met tower, view to north

Pyramid 60 m, water treatment plant and Icy Creek access road, south view from site area

Pyramid 60 m, north view

Pyramid 60 m, northeast view

Pyramid 60 m, east view

Pyramid 60 m, southeast view

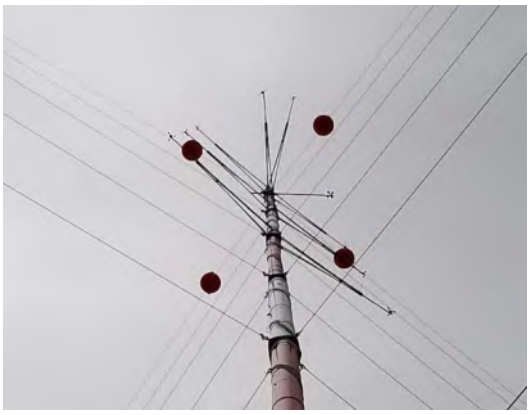
Pyramid 60 m, south view

Pyramid 60 m, southwest view

Pyramid 60 m, west view

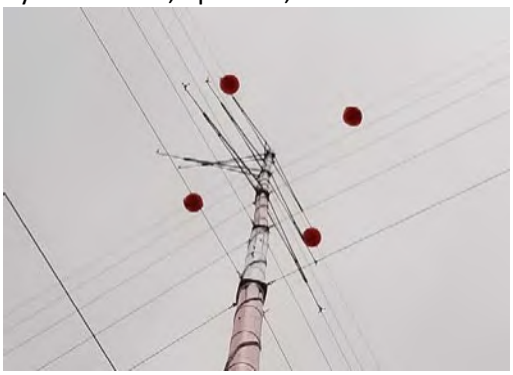
Pyramid 60 m, northwest view

Pyramid 60 m, uptower, north face



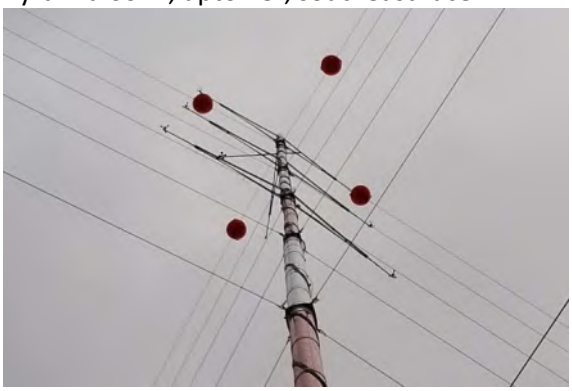
Pyramid 60 m, uptower, northeast face

Pyramid 60 m, uptower, east face

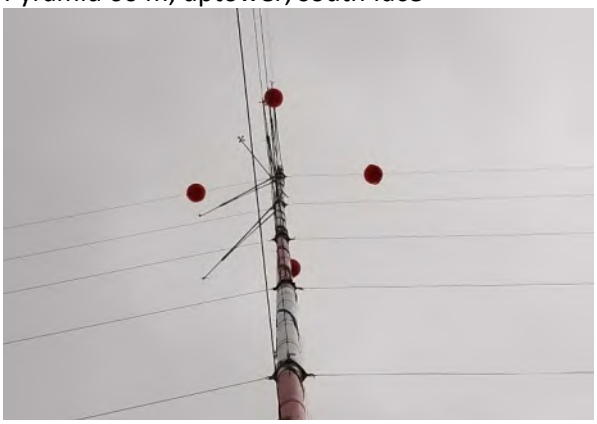


Pyramid 60 m, uptower, southeast face

Pyramid 60 m, uptower, south face



Pyramid 60 m, uptower, southwest face



Pyramid 60 m, uptower, west face

Pyramid 60 m, uptower, northwest face

Pyramid 60 m, north side (view to south)

Pyramid 60 m, east side (view to west)

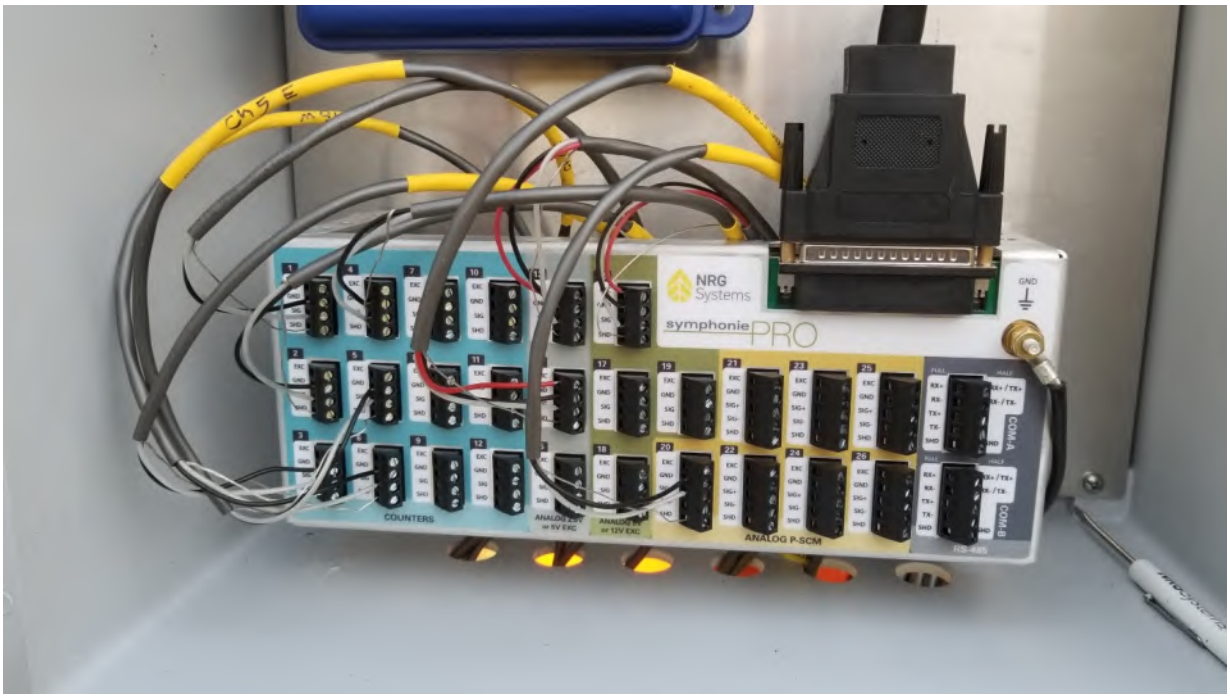
Pyramid 60 m, south side (view to north)

Pyramid 60 m, west side (view to east)

Pyramid 60 m, tower base


Pyramid 60 m, inside weather box

Pyramid 60 m, datalogger



Pyramid 60 m, datalogger wiring panel


Pyramid 60 m, north anchors


Pyramid 60 m, east anchors

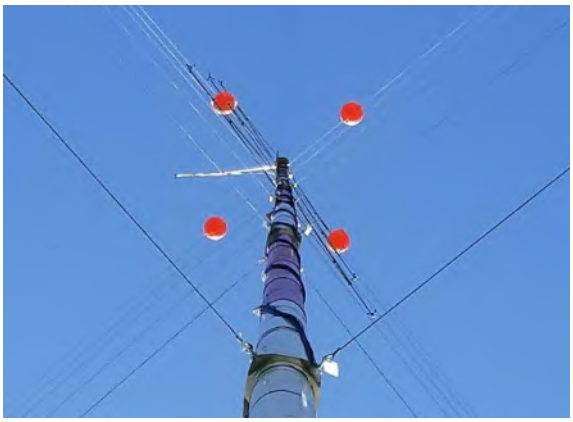

Pyramid 60 m, south anchors


Pyramid 60 m, west anchors

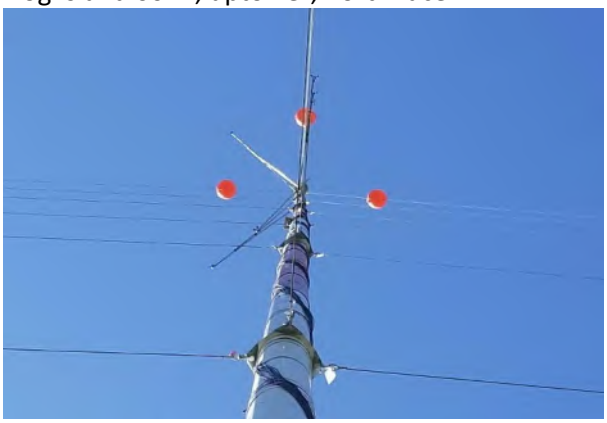
Hog Island 60 m met tower, view to north, Bob Cummings photo

Hog Island tower during assembly, view south

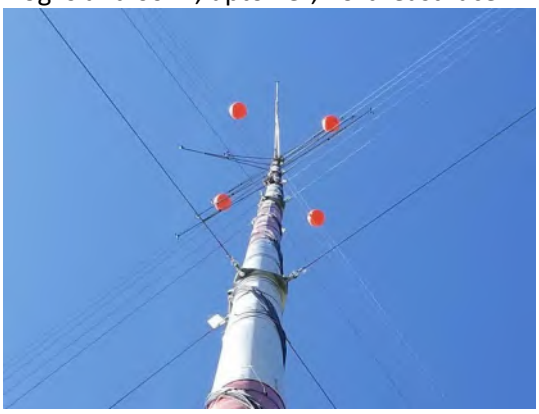
Hog Island 60 m, uptower, north face



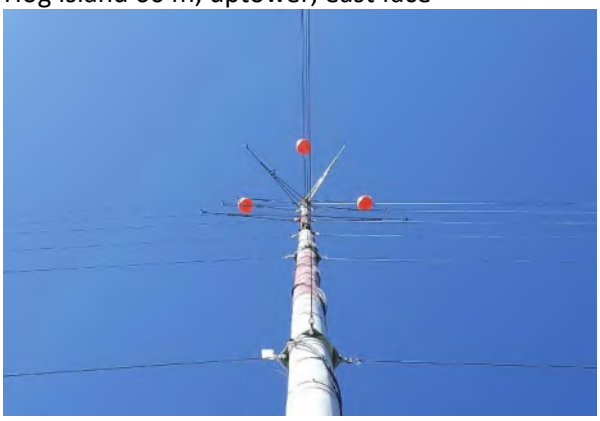
Hog Island 60 m, uptower, northeast face



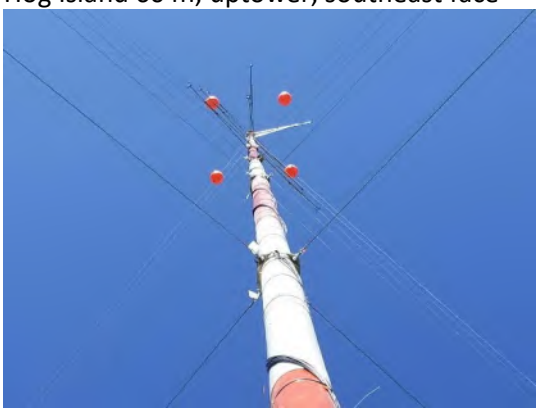
Hog Island 60 m, uptower, east face



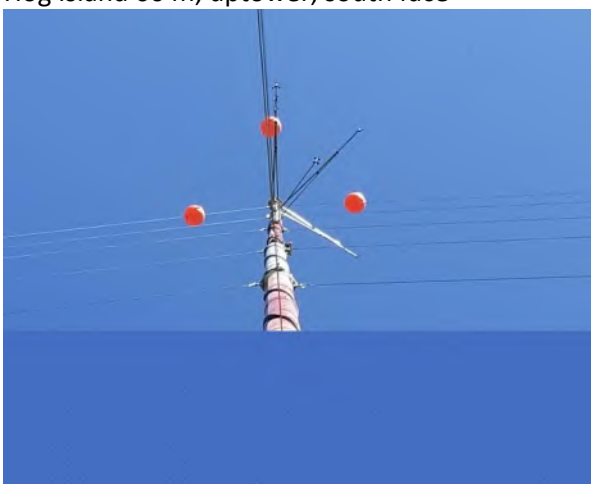
Hog Island 60 m, uptower, southeast face



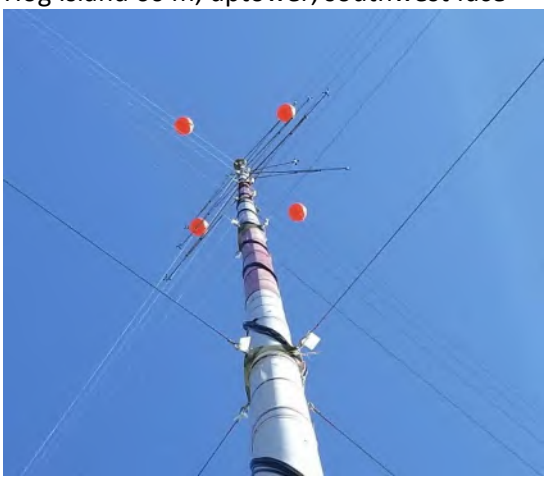
Hog Island 60 m, uptower, south face



Hog Island 60 m, uptower, southwest face



Hog Island 60 m, uptower, west face



Hog Island 60 m, uptower, northwest face

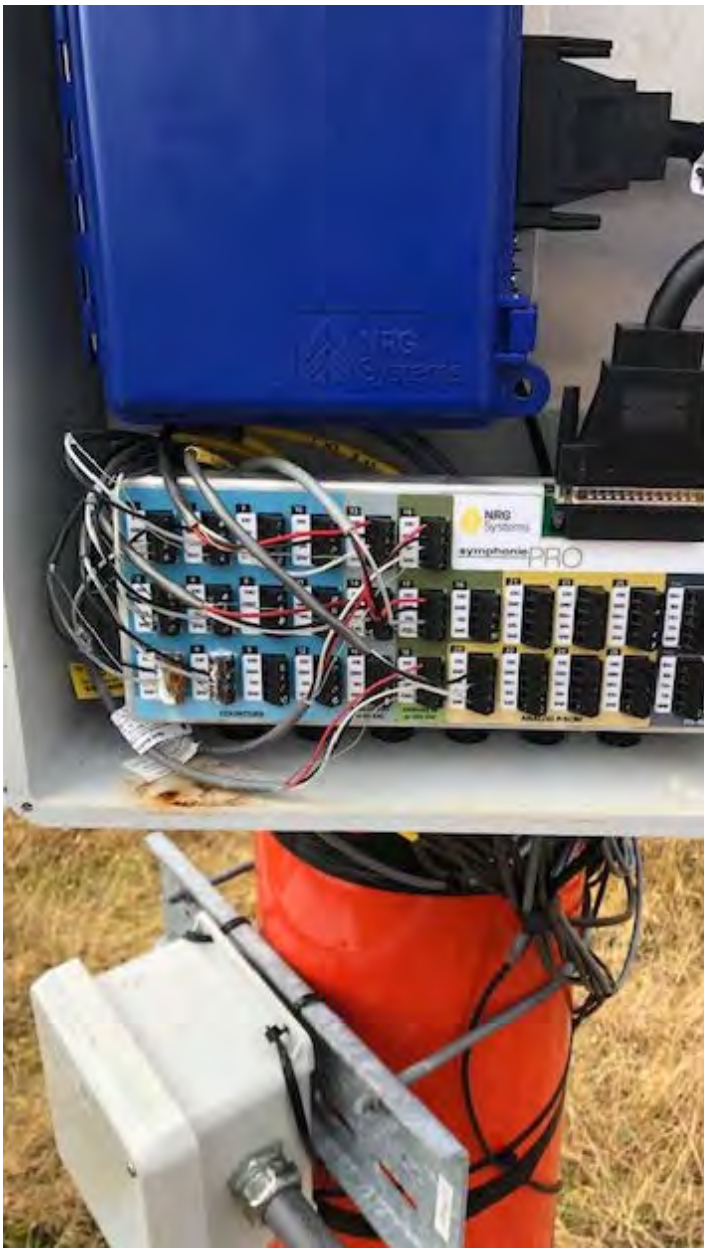
Hog Island 60 m, north side (view to south)

Hog Island 60 m, east side (view to west)

Hog Island 60 m, south side (view to north)

Hog island 60 m, west side (view to east)

Hog Island 60 m, tower base



Hog Island 60 m, inside weather box

Hog Island 60 m, power system for lights

Hog Island 60 m, inside lighting control weather box

ICR 34 m met tower, view to northwest

ICR 34 m met tower winter view, view to northwest (K. Arduser photo)

ICR 34 m site, north view

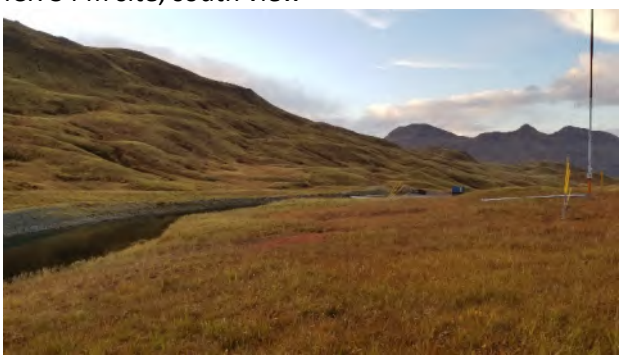
ICR 34 m site, northeast view

ICR 34 m site, east view

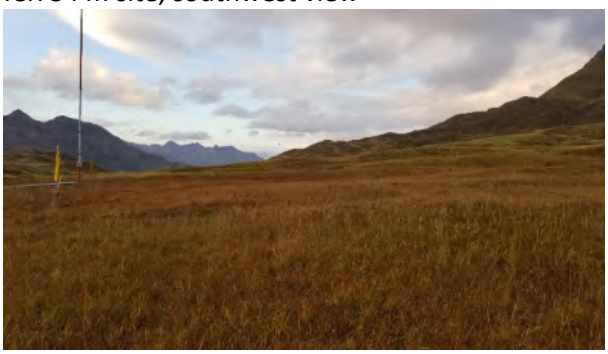
ICR 34 m site, southeast view (with K. Arduser)

ICR 34 m site, south view

ICR 34 m site, southwest view



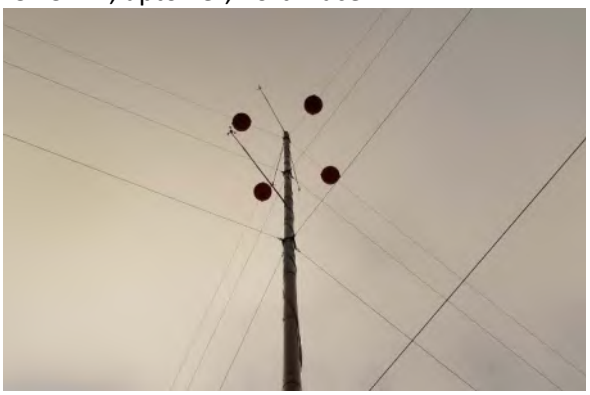
ICR 34 m site, west view



ICR 34 m site, northwest view

ICR 34 m, uptower, north face

ICR 34 m, uptower, northeast face

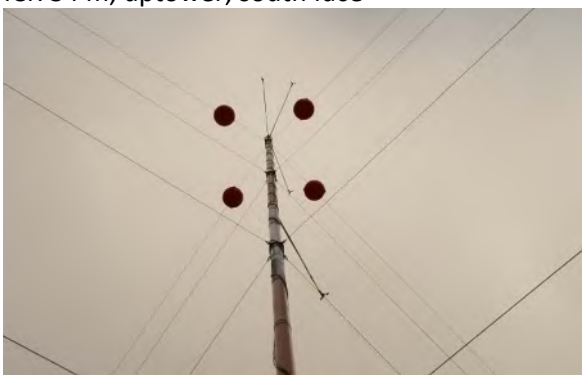


ICR 34 m, uptower, east face

ICR 34 m, uptower, southeast face

ICR 34 m, uptower, south face

ICR 34 m, uptower, southwest face



ICR 34 m, uptower, west face

ICR 34 m, uptower, northwest face

ICR 34 m, northeast side (view to southwest)

ICR 34 m, southeast side (view to northwest)

ICR 34 m, southwest side (view to northeast)

ICR 34 m, northwest side (view to southeast)

ICR 34 m, tower base

ICR 34 m, datalogger wiring panel

ICR 34 m, datalogger

ICR 34 m, northeast anchors

ICR 34 m, southeast anchors

ICR 34 m, southwest anchors

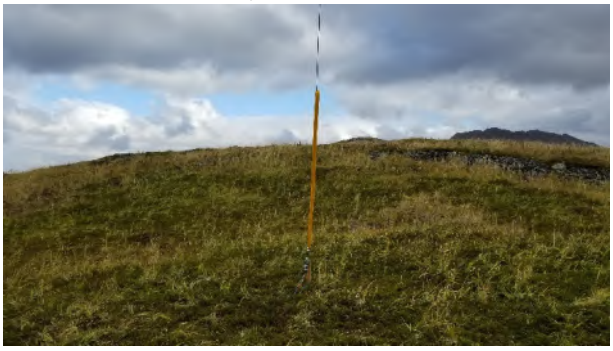
ICR 34 m, northwest anchors

Bunker Hill 10 m met tower, view to north

Bunker Hill 10 m met tower during installation

Bunker Hill 10 m site, north view

Bunker Hill 10 m site, northeast view



Bunker Hill 10 m site, east view

Bunker Hill 10 m site, southeast view

Bunker Hill 10 m site, south view

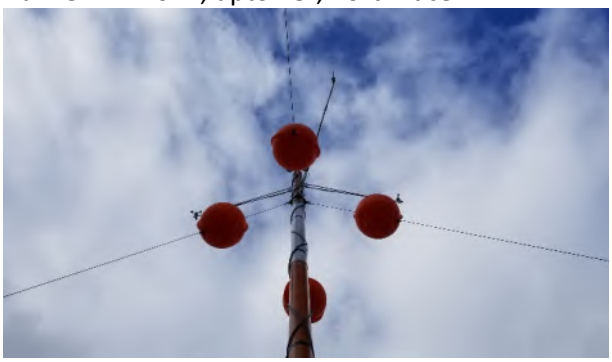
Bunker Hill 10 m site, southwest view

Bunker Hill 10 m site, west view

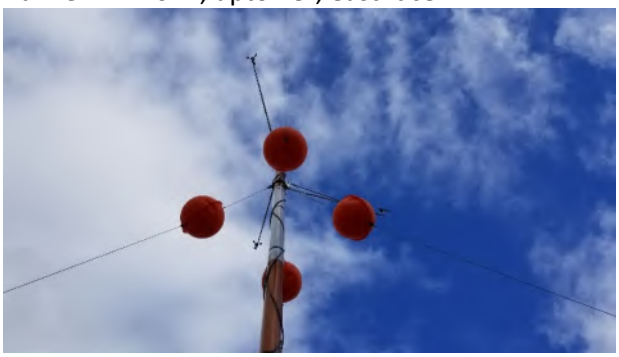
Bunker Hill 10 m site, northwest view

Bunker Hill 10 m, uptower, north face

Bunker Hill 10 m, uptower, east face



Bunker Hill 10 m, uptower, south face



Bunker Hill 10 m, uptower, west face

Bunker Hill 10 m, north side (view to south)

Bunker Hill 10 m, east side (view to west)

Bunker Hill 10 m, south side (view to north)

Bunker Hill 10 m, west side (view to east)

Bunker Hill 10 m, weather box

Bunker Hill 10 m, datalogger wiring panel

Bunker Hill 10 m, datalogger

Obstruction light batteries and turbine controller

U.S. Department of Energy
Office of Clean Energy Demonstrations

Bipartisan Infrastructure Law

ENERGY IMPROVEMENTS IN RURAL OR REMOTE AREAS – FISCAL YEAR 2025 RELEASE

Funding Opportunity Number: DE-FOA-0003428
Concept papers due: February 27, 2025, 5:00pm ET
Applications due: August 28, 2025, 5:00pm ET

Questions about this funding opportunity? Email ERA2024@hq.doe.gov
Problems with OCED eXCHANGE? Email OCED-ExchangeSupport@hq.doe.gov and include the funding opportunity title and number in subject line.

Step 1: Review the Funding Opportunity

Basic Information

Eligibility

Program Description

Step 2: Get Ready to Apply

Application Contents and Format

Step 3: Submit Your Application

Submission Requirements and Deadlines

Step 4: Learn About Review and Selection

Application Review Information

Risk Review

Award Notices

Step 5: Learn about Post-Selection and Post-Award Requirements

Post-Selection Information Requests and Submissions

Post-Award Requirements and Administration

Terms and Conditions

Reporting

Step 6: Contacts and Support

Agency Contacts

Helpful Websites

Before you begin

If you believe you are a good candidate for this funding opportunity, secure your SAM.gov and other registrations now. If you are already registered, make sure your registration is active and up to date. All registrations are free.

See Step 3: Submit Your Application

SAM.gov registration (this can take several weeks)

You must have an active account with SAM.gov. This includes having a Unique Entity Identifier (UEI).

OCED eXCHANGE (this can take 48-72 hours)

You must register with OCED eXCHANGE. A Login.gov or ID.me account is necessary to register.

FedConnect (this can take 48-72 hours)

You must register with FedConnect. Registering with FedConnect® is fast and easy. Only individuals who are designated as Points of Contact in SAM.gov can create a new company account.

Grants.gov registration (this can take several days)

You must have an active Grants.gov registration. Doing so requires a Login.gov registration as well.

Apply by

Concept papers are due on February 27, 2025, at 5:00 p.m. Eastern Time.

Applications are due on August 28, 2025, at 5:00 p.m. Eastern Time.

STEP 1:
REVIEW THE FUNDING OPPORTUNITY

IN THIS STEP

Basic Information

Funding detail

Announcement Type: Initial

Expected total available funding: $400 million[1]

Expected number and type of awards: 20–50 awards as Cooperative Agreements

Expected dollar amount of individual awards: $2 million–$50 million Federal share

Expected award project period: Project periods depend on the scope of the projects and will not exceed 7 years

Statutory Authority

The Infrastructure Investment and Jobs Act (IIJA, Public Law 117-58), also known as the Bipartisan Infrastructure Law, authorized the Office of Clean Energy Demonstrations.[2] This Notice of Funding Opportunity (NOFO) is supported under the Energy Improvements in Rural or Remote Areas program.[3]

Agency contact information

Office of Clean Energy Demonstrations
U.S. Department of Energy
1000 Independence Ave SW
Washington, D.C. 20585
Email: OCED@hq.doe.gov
Phone: 202-586-OCED
For questions relating to this specific solicitation, please use ERA2024@hq.doe.gov.

KEY FACTS

Funding Opportunity Title:
Energy Improvements in Rural or Remote Areas – Fiscal Year 2025 Release

Funding Opportunity Number:
DE-FOA-0003428

Assistance Listing:
81.255

KEY DATES

Concept Paper Deadline:
February 27, 2025

Application Deadline:
August 28, 2025

Anticipated Selection Announcement:
Spring 2026

NOTE: The 2024 Revisions to 2 CFR 200 will be in effect for awards issued under this NOFO.

[1] Depending on the number and quality of applications, DOE may choose to not award the full NOFO funding amount.
[2] IIJA Section 41201 (42 U.S.C. § 18861).
[3] IIJA Section 40103 (42 U.S.C. § 18712(c)).

Executive summary

Rural and remote areas often have higher energy costs and burden,[4] less resilient energy systems, and fewer alternatives for accessing clean energy compared with their urban counterparts. Furthermore, small communities do not always have the available time, money, or other resources to pursue clean energy options.

This Energy Improvements in Rural or Remote Areas (ERA) funding opportunity provides support for rural and remote communities to build clean energy projects that benefit their communities.

The goals of the program are to:

1. **Deliver measurable and sustained benefits to people who live in rural or remote areas** by funding replicable clean energy projects that lower energy costs, improve energy access and resilience, increase economic opportunity, and/or reduce environmental harm.
2. **Demonstrate effective rural or remote energy system approaches** using climate-resilient technologies, business structures that promote economic resilience, accessible and appropriate financing mechanisms, and/or best practices in community leadership and engagement, and workforce development.
3. **Build clean energy knowledge, experience, capacity, and self-reliance in rural and remote parts of America.**

This program serves communities of 10,000 people or fewer.[5] Applicants must propose projects that support at least one of these eligible activities:

A. Improving overall cost-effectiveness of energy generation, transmission, or distribution systems;
B. Siting or upgrading transmission and distribution lines;
C. Reducing greenhouse gas emissions from energy generation in rural or remote areas;
D. Providing or modernizing electric generation facilities;
E. Developing microgrids; and
F. Increasing energy efficiency.

Applications may include any technology that meets these eligible activities, as long as those technologies are commercially available (see Technology and System Requirements for details on "commercially available").

The following entities are eligible to apply: (1) Indian Tribes; (2) state and local governmental entities; (3) nonprofit organizations; and (4) for-profit organizations. See the Applicant Eligibility Guidance on the Apply for Funding Opportunities page for details.

Applicants must choose one of the four topic areas for their project's application. See Table 1 and pgs. 15-19 for more details on the topic areas.

[4] Based on data from the Low-Income Energy Affordability Data tool, https://www.energy.gov/scep/slsc/lead-tool. In 2023, counties with <20,000 people had an energy burden of 4%, vs. 3.12% for counties with ≥20,000 people.
[5] See the Eligibility section for further details on what this program considers to be a "rural or remote community."

Table 1. Program overview. Details to be determined through merit reviews and project negotiations.	
Expected Total Available Funding	$400M (million)
Project Funding	$2M–$50M contribution from DOE; 5–50% minimum required non-Federal cost share (i.e., from applicant). Amount depends on applicant type and topic area. See Cost Sharing and Table 2 for details on cost share.
Expected Project Count	20–50 projects
Requirements	This program serves rural and remote communities with 10,000 people or fewer. See the Eligibility section for details.
Topic Areas	**1. Open category** Expected award size per project: $10M–$50M Total expected award amount for topic area: $150M Cost share from applicant: 50%, or 20% for Indian Tribes, state and local governments, nonprofit organizations, and institutions of higher education **2. Dual use and co-location** Expected award size per project: $10M–$50M Total expected award amount for topic area: $175M Cost share from applicant: 50%, or 20% for Indian Tribes, state and local governments, nonprofit organizations, and institutions of higher education **3. Smaller-scale community-centered** Expected award size per project: $2M–$10M Total expected award amount for topic area: $50M Cost share from applicant: 20%, or 5% for Indian Tribes, state and local governments, nonprofit organizations, and institutions of higher education **4. Isolated microgrids & unelectrified buildings** Expected award size per project: $2M–$10M Total expected award amount for topic area: $25M Cost share from applicant: 20%, or 5% for Indian Tribes, state and local governments, nonprofit organizations, and institutions of higher education
Priorities	This funding opportunity prioritizes (see Funding Priorities for details): • Various types of communities that may experience additional historical and current burdens; and • Teams that credibly represent the needs and priorities of project communities.

Eligibility

Section 40103(c) of the Bipartisan Infrastructure Law defines rural or remote areas as a "city, town, or unincorporated area that has a population of not more than 10,000 inhabitants." Applicants must identify at least one area in the United States (including U.S. territories) with a population of not more than 10,000 (using the 2020 Census Bureau figures) that will benefit from the proposal. The identified area must be either: (a) a city, town, or other incorporated municipality, or (b) a Census Designated Place (CDP), Census County Division (CCD), or similarly discrete and identifiable community that is not located within an incorporated municipality.

For purposes of this funding opportunity, zip code tabulation areas (five digit) (ZCTA5), census tracts, and other similar census geographic entities are not discrete and identifiable communities. Applications that do not satisfy this requirement will be considered ineligible and removed from further evaluation. See the *Applicant Eligibility Guidance* linked under the Eligibility section for information on how to use the U.S. Census Bureau Data to determine a community's population.

Projects ideally should be sited within the rural or remote area they are designed to benefit. Projects proposed to be built outside of a rural or remote area may be considered for funding but must clearly define the rural or remote area(s) of not more than 10,000 inhabitants receiving the benefits. All areas identified as directly benefitting from the proposed project must meet the definition of rural or remote area.

All projects must be built within the United States.

DOE will not make eligibility determinations for potential applicants until after the application deadline.

Eligible applicants

The following types of entities[6] are eligible to apply for this funding—either as a recipient or subrecipient:

1. Indian Tribes[7]
2. State and local governmental entities[8]
3. Nonprofit organizations
4. For-profit organizations
5. Tribal organizations
6. Rural electric cooperatives
7. Farming associations and cooperatives
8. Labor unions
9. Institutions of higher education
10. Incorporated consortia
11. Unincorporated consortia

[6] See the Applicant Eligibility Guidance on the Apply for Funding Opportunities page for definitions and descriptions of entities.
[7] For purposes of this funding opportunity, "Indian Tribe" (per section 4 of the Indian Self Determination and Education Assistance Act (25 U.S.C. § 5304)), means any Indian tribe, band, nation, or other organized group or community, including any Alaska Native village or regional or village corporation as defined in or established pursuant to the Alaska Native Claims Settlement Act (85 Stat. 688) [43 U.S.C. § 1601, et seq.], which is recognized as eligible for the special programs and services provided by the United States to Indians because of their status as Indians. Federally Recognized Tribes and Tribal entities, whether or not they have land, are also considered disadvantaged (or Justice40) communities for the purposes of the Justice40 Initiative as discussed in this NOFO per the Addendum to the Interim Implementation Guidance for the Justice40 Initiative, M-21-28, on using the Climate and Economic Justice Screening Tool (M-23-09).
[8] State includes the Commonwealth of Puerto Rico, U.S. Virgin Islands, Guam, American Samoa, and the Commonwealth of the Northern Mariana Islands.

Applicants and any subrecipient(s) must be domestic entities. (See the next section on Foreign Entities for details on limited exceptions.) To qualify as a domestic entity, the entity must be organized, chartered, or incorporated (or otherwise formed) under the laws of a particular state or territory of the United States or under the laws of the United States; have majority domestic ownership and control; and have a physical place of business in the United States, or otherwise qualify as an Indian Tribe or tribal organization.

In addition, Department of Energy (DOE) Federally Funded Research and Development Centers (FFRDCs) are eligible to apply for funding as a subrecipient but are not eligible to apply as a recipient. The funding for the FFRDC will flow through the recipient. Non-DOE FFRDCs are eligible to participate as a subrecipient, subject to approval of their sponsor agency, but are not eligible to apply as a recipient. Notwithstanding the above, Federal agencies, instrumentalities, and corporations (other than DOE) are eligible to participate as a subrecipient but are not eligible to apply as a recipient.

Entities banned from doing business with the U.S. government such as entities debarred, suspended, or otherwise excluded from or ineligible from participating in Federal programs are not eligible.

Entities identified on a Department of Homeland Security, Binding Operational Directives as an entity publicly banned from doing business with the Unites States government are not eligible. See Cybersecurity Directives for more information.

Nonprofit organizations described in Section 501(c)(4) of the Internal Revenue Code of 1986 that engaged in lobbying activities after December 31, 1995, are not eligible to apply for funding. Nonprofit organizations described in Section 501(c)5 of the Internal Revenue Code are eligible to apply for funding. See the *Applicant Eligibility Guidance* located on the Apply for Funding Opportunities page for more information.

Other Eligibility Criteria

Foreign Entities

In general, foreign entities are not eligible to apply as either a recipient or subrecipient. In limited circumstances, DOE may allow a foreign entity to participate as a recipient or subrecipient. A foreign entity may apply to this funding opportunity, but the application must be accompanied by a disclosure of the foreign entity's participation. Likewise, if the applicant seeks to include a foreign entity as a subrecipient, the applicant must submit a separate disclosure in the application for each proposed foreign subrecipient.

Foreign entity disclosure information can be found in the Foreign Entity Participation and Performance of Foreign Work in the United States Guidance which is located on the What Other Information May be Requested? page. DOE's decision concerning foreign entity participation or foreign entity work is not appealable.

Cost sharing

Applicants must provide a certain percentage of the total project costs to meet the cost share requirement. The amount varies by topic area and type of applicant. See the Topic Areas section for details on the cost share amount. Applicants who believe their project qualifies for the reduced cost share must be able to provide verification that they are an entity identified as eligible for the reduced cost share.

Cost share may be provided in the form of cash or cash equivalents, or in-kind contributions.[9] The cost share must come from non-Federal sources unless otherwise allowed by law. Cost share may come from project recipients, subrecipients, state or local governments, or other third-party financing. Generally, realized tax credits may be used as cost share.[10] In general, deferred or avoided costs may not be used as cost share.

Applicants may not leverage Federal financing, such as DOE Loan Guarantees, to provide the required cost share or to otherwise support the same scope that is proposed under the Energy Improvements in Rural or Remote Areas program.

Program income (see details in Program Income section) should not be included as cost share in the applicant's budget. Non-Federal cost share can include Tennessee Valley Authority power sales revenue, which is specifically allowed under the Energy Policy Act of 2005. See 42 U.S.C § 16352(c) (Section 988 of Energy Policy Act of 2005) and 2 CFR 910.130(d)(2)(v).

To assist applicants in calculating proper cost share amounts, DOE has an information sheet and sample cost share calculation in the Cost Sharing Guidance located on the Preparing Your Budget page.

[9] Applicants may meet the cost share requirement through staff time, municipal or tribal budgets, philanthropic funds, or other contributions from a third-party entity to support project implementation or increase impact. See here for an explanation of cost share: https://www.energy.gov/oced/apply-funding-opportunities#budget

[10] Tax credits authorized by the Inflation Reduction Act of 2022 (P.L. 117-169) are considered a non-Federal source and are not a Federal award for purposes of cost sharing.

Program Description

Purpose

The Bipartisan Infrastructure Law authorizes DOE to invest $1 billion in energy improvements in rural or remote areas. Rural and remote areas often have higher energy costs and burden,[11] less resilient energy systems, and fewer alternatives for accessing clean energy compared with their urban counterparts. Furthermore, small communities do not always have the available time, money, or other resources to pursue clean energy options.

This funding opportunity provides support for rural and remote communities to build clean energy projects that benefit their communities. Benefits could include cleaner, more resilient, more reliable, and/or more affordable local energy sources for rural and remote communities. These projects could also increase local energy independence, tax revenue, economic development and diversification, and local jobs, and reduce environmental and health burdens.

This program aims to increase communities' capacity to plan, build, and operate clean energy systems, e.g., by developing available technical expertise locally and with partners, and/or increasing community engagement with those projects. We (i.e., the Office of Clean Energy Demonstrations, unless noted otherwise), also expect that this opportunity will enable projects and people to demonstrate inspiring and practical paths to clean energy so an even broader range and number of rural and remote communities can benefit from clean energy.

Funding will support materials, equipment, time, labor, and other resources to build clean energy projects in rural or remote communities and other allowable costs arising from activities as proposed (e.g., collaboration, outreach, and engagement with stakeholders and tribes, or workforce development programs).

This program serves communities of 10,000 people or fewer.[12]

This funding opportunity builds on previous rounds of this Energy Improvements in Rural or Remote Areas program, which include:

- The Energizing Rural Communities Prize (67 winners for phase 1 across 32 states and territories, announced July 2023; 33 of those teams won phase 2, announced in September 2024)[13]
- A funding opportunity announcement (17 selected projects across 20 states, for $366M total, announced February 2024)[14]
- A grant opportunity (19 selected projects across 12 states, for $78M total, announced April 2024)[15]

[11] Based on data from the Low-Income Energy Affordability Data tool, https://www.energy.gov/scep/slsc/lead-tool. In 2023, counties with <20,000 people had an energy burden of 4%, vs. 3.12% for counties with ≥20,000 people.
[12] See the Eligibility section for details of this program's definition of rural or remote communities.
[13] See prize winners here: https://americanmadechallenges.org/challenges/rural-energy/results and https://americanmadechallenges.org/challenges/rural-energy/results.
[14] See selection announcement here: https://www.energy.gov/oced/energy-improvements-rural-or-remote-areas-selections-award-negotiations.
[15] See selection announcement here: https://www.energy.gov/oced/energy-improvements-rural-or-remote-areas-grant-selections-award-negotiations.

Barriers to adoption highlighted in this funding opportunity

This funding opportunity focuses on a few of the barriers to adoption, many of which are non-technical, that rural and remote communities face when building clean energy projects. Tending to these barriers can improve overall project success and will be an important part of any project we fund through this opportunity.

We also aim to support projects and teams that will partner with DOE, the National Laboratories, other rural and remote communities, and other parties to develop, share, and help apply the lessons learned from the funded project to other communities working to deploy clean energy infrastructure in rural and remote communities across the country.

The Department of Energy uses the "Adoption Readiness Level" framework[16] to describe these non-technical barriers. Specifically, we seek projects that demonstrate how to address at least one of these items:

- ***Community perception***: Members of communities where clean energy projects are proposed frequently raise concerns about conflict with other forms of land and water use, economic development opportunities, and changes to community character. Proponents of clean energy projects can work with community members to choose appropriate technologies, locations, and ownership structures that help build community support for the project and ultimately generate more positive perceptions of and experience with clean energy infrastructure. Including community members and local labor in decision-making; using community ownership or equity models; building effective partnerships; and working with local, trusted messengers for communication are a few potential approaches for addressing community perception.
- ***Permitting & siting***: Rural and remote communities interested in deploying clean energy infrastructure are grappling with new permitting challenges. These challenges can include zoning ordinances that ban or restrict project development, and policies that limit where clean energy can go. Applicants can work with communities and government agencies, build local experience on these topics, coordinate projects with plans that consider ecosystem-wide impacts, or other approaches to overcome these siting challenges.[17]
- ***Downstream value chain***: Ensuring that a clean energy project provides direct benefits such as reduced energy costs, increased clean energy reliability and access, improved environmental quality, or increased economic opportunities to the people who pay the financial, environmental, and social costs of that project can help make it more successful.

Applicants may describe other adoption barriers in their community and how their project plans to address those barriers.

[16] https://www.energy.gov/technologytransitions/adoption-readiness-levels-arl-complement-trl
[17] See here for more information on renewable energy siting: https://www.energy.gov/eere/siting-large-scale-renewable-energy-projects

Program goals and objectives

The overall goals of this program are to:

1. **Deliver measurable and sustained benefits to people who live in rural or remote areas** by funding replicable clean energy projects that lower energy costs, improve energy access and resilience, increase economic opportunity, and/or reduce environmental harm.
2. **Demonstrate effective rural or remote energy system approaches** using climate-resilient technologies, business structures that promote economic resilience, accessible and appropriate financing mechanisms, and/or best practices in community leadership and engagement, and workforce development.
3. **Build clean energy knowledge, experience, capacity, and self-reliance in rural and remote parts of America.**

Award contribution to goals and objectives

In order to achieve the program's goals and objectives, we seek to support projects and teams that will:

- Build projects that will lower local energy costs; reduce outages for part or all of the community; and reduce greenhouse gases and other pollution.
- Provide data, experiences, and lessons learned about financial costs and impacts; system performance; overall process; and other aspects of planning and developing clean energy systems that can be analyzed by and shared with DOE, the National Laboratories, peer communities, and various interested stakeholders to inform clean energy adoption in rural and remote communities across the country.

Funding priorities

This funding opportunity prioritizes the following (definitions are described in the footnotes below):

- Communities and populations with at least one of these characteristics (referred to as "priority communities and populations" in this funding opportunity):
    - Disadvantaged communities as defined by the Justice40 Initiative[18] and identified in the Climate and Economic Justice Screening Tool;[19]
    - Energy communities as defined by the Inflation Reduction Act[20] or communities that are likely to become energy communities in the near future;

[18] The Justice40 Initiative, established by Executive Order 14008, sets a goal that 40% of the overall benefits of certain Federal investments flow to disadvantaged communities. Consistent with Justice40 guidance, DOE recognizes disadvantaged communities as the census tracts defined and identified as disadvantaged by the White House Council on Environmental Quality's Climate and Economic Justice Screening Tool (CEJST), located at https://screeningtool.geoplatform.gov/, as well as all Federally Recognized Tribes (whether or not they have land). See https://www.whitehouse.gov/wp-content/uploads/2023/01/M-23-09_Signed_CEQ_CPO.pdf.

[19] The Climate and Economic Justice Screening Tool is located here: https://screeningtool.geoplatform.gov/en/#3/33.47/-97.5

[20] Energy communities are defined here: https://energycommunities.gov/energy-community-tax-credit-bonus/

  - Low-income communities and populations;[21]
  - Communities or populations, including workers, that have been underrepresented (e.g., have faced barriers, underinvestment, lack of opportunity);
  - High energy burden communities and populations;[22] and
  - Frontline communities and populations, i.e., those hit first and worst by climate change.[23]
- Teams that include members who are:
  - Highly familiar with local community priorities and dynamics;
  - Members of (or who represent) priority communities or populations (as referenced above);
  - Part of labor unions or other local workforce development organizations;
  - Credible with and trusted by community members;
  - Residents of proposed host community(ies);
  - Experienced in project development with proposed technologies in similar geographic and cultural contexts; and
  - Capable of efficiently and effectively administering government funding.
- Projects that demonstrate learnings which are applicable to other rural or remote communities across the United States and territories.

Technology and System Requirements:

Applicants must propose projects that support at least one of these eligible activities:

A. Improving overall cost-effectiveness of energy generation, transmission, or distribution systems;
B. Siting or upgrading transmission and distribution lines;
C. Reducing greenhouse gas emissions from energy generation in rural or remote areas;
D. Providing or modernizing electric generation facilities;
E. Developing microgrids; and
F. Increasing energy efficiency.

Applications may include any technology that meets these eligible activities, as long as those technologies are commercially available (see next paragraph).

[21] Low income as defined in the Climate and Economic Justice Screening Tool: https://screeningtool.geoplatform.gov/en/methodology#low-income
[22] High energy burden as defined in the Climate and Economic Justice Screening Tool: https://screeningtool.geoplatform.gov/en/methodology#energy-burden
[23] Frontline communities are defined here as those communities who are the most vulnerable to and will be the most adversely affected by climate change and inequitable actions because of systemic and historical socioeconomic disparities, environmental injustice, or other forms of injustice. See: https://cpo.noaa.gov/climate-program-office-cpo-climate-adaptation-partnerships-program-fy2024/

For the purposes of this funding opportunity, commercially available technology is defined as a product that has been offered for sale, lease, or license to the public. Applicants can establish that the technology is commercially available by showing the product can be warrantied, can be purchased from a commercial vendor for the intended purpose, or some other justification the applicant chooses. The technology must be considered Technology Readiness Level (TRL)[24] 8–9 (the highest two levels) as defined by DOE before construction begins.

Topic Areas:

This funding opportunity includes the following topic areas. Each application you submit must be for a unique project, and each application must be for a specific topic area. The amount we expect to award per topic area is approximate.

For all topic areas, we welcome project aggregators, i.e., entities that identify and propose several projects together in one application. The project aggregator approach could be used to reduce overall project costs and/or to include communities that may not have capacity to apply for this funding on their own.

Table 2. Topic area summary.

Topic Area	Award Size per Project	Total Expected Award Amount for Topic Area	Cost Share from Applicant	Cost Share from Applicant: Eligible for Lower Amount[25]
1 Open category	$10M–$50M	$150M	50%	20%
2 Dual use and co-location	$10M–$50M	$175M	50%	20%
3 Smaller-scale community-centered	$2M–$10M	$50M	20%	5%
4 Isolated microgrids & unelectrified buildings	$2M–$10M	$25M	20%	5%

[24] https://www.directives.doe.gov/directives-documents/400-series/0413.3-EGuide-04/@@images/file

[25] For all topic areas, Indian Tribe, state and local government, institution of higher education, and nonprofit primary applicants are eligible for the lower cost share amount.

Topic Area 1: Open Category

Purpose

Offer a path to funding rural or remote clean energy infrastructure for many different project types, demonstrating approaches to addressing one or more relevant adoption barriers. (See "Barriers to adoption highlighted in this funding opportunity" for details.)

Eligible technologies and activities

Applicants may propose any project type that best serves the community's need and that reduces environmental impacts, within the program's six eligible activities. (See "Technology and System Requirements.")

Priority technologies and project types

This topic area prioritizes the following technologies or project types:

Solar, battery energy storage systems, wind, water power (marine energy and hydropower), geothermal (heating and cooling or power generation), biomass/biofuels, microgrids,[26] distribution, converting fossil fuel–powered equipment to electric, and repowering existing renewable energy systems.

Example projects

These examples of projects or components of projects offer some ideas for potential applications. Keep in mind that this list is not exhaustive, and that some examples could be relevant for more than one topic area. Also consider that projects should align with community priorities.

- Installation of microgrids to provide power regulation or backup electricity to the grid.
- Siting or upgrading less than 30 miles of subtransmission or distribution lines (≤69kV), grid stability and resilience with substation improvements, or other electrical infrastructure improvements (hardware or software).
- Use of biogas from agricultural waste, either from biogas capturing or biogas generation through anaerobic digestion, to fuel onsite equipment and/or for pipeline injection.
- Replacement of a non-clean backup energy generation system, such as a diesel generator, with a clean energy generation backup system and/or energy storage system, at a water treatment plant or pump station, or other critical facility.
- Replacement of fossil fuel–powered heating with heat pumps in community buildings or in a residential neighborhood.
- Upgrades to distribution systems to reduce outages and improve resilience.
- Installation of a geothermal heating and cooling system, including geothermal heat pumps, as part of a networked, community-scale geothermal system.

[26] A microgrid is a group of interconnected loads and distributed energy resources within clearly defined electrical boundaries that acts as a single controllable entity with respect to the grid. A microgrid can operate in either grid-connected or in island mode, including entirely off-grid applications. See https://www.energy.gov/sites/default/files/2024-02/46060_DOE_GDO_Microgrid_Overview_Fact_Sheet_RELEASE_508.pdf.

Topic Area 2: Dual use and co-location

Purpose

Provide funding for clean energy demonstration projects in rural and remote communities that either:

- Allow for using land or water for both energy supply and other activities; or
- Are co-located with other activities and result in additional benefits beyond energy supply and reduced pollution.

Demonstrations could help to:

- Address potential conflicts between clean energy and other land and water uses in rural or remote areas;
- Maximize tangible, measurable co-benefits of clean energy projects beyond supplying energy and reducing pollution—including but not limited to economic, workforce, health, social, cultural, and environmental benefits; and/or
- Increase equitable access to clean energy through new business models and financing structures.

Eligible project types

Applicants may propose projects that provide co-benefits to communities beyond supplying energy and reducing pollution, e.g., reducing land use conflicts, conserving water, diversifying incomes, and/or enhancing partnerships.

For agrivoltaics projects, dual use is defined as agricultural production, such as crop or livestock production, underneath or adjacent to solar panels (i.e., not solar on barn rooftops).

Example projects

These examples of projects or components of projects offer some ideas for potential applications. Keep in mind that this list is not exhaustive, and that some examples could be relevant for more than one topic area. Also consider that projects should align with community priorities.

- Deployment of small hydropower in existing conduits to generate recurring revenue that enables reinvestment in other community infrastructure.
- Innovative siting of solar panels, such as on agricultural land (agrivoltaics) or over canals, to reduce local siting constraints, preserve undisturbed land where possible, and enable new ownership structures.
- Distributed wind for farmers or farm groups.
- Conduit hydro in irrigation systems.
- Community geothermal heating and cooling systems.
- Use of business structures that promote economic and electric system resilience, accessible and appropriate financing mechanisms, and/or best practices in community leadership, community ownership, capacity building, and engagement with rural and remote farmers, small businesses, communities, and electric utilities.

Topic Area 3: Smaller-scale community-centered

Purpose

Fund smaller-scale clean energy projects that are initiated, driven, and/or broadly supported by residents of the host community(ies).

- Projects should increase long-term local capacity for future clean energy projects in the applying community and/or in nearby or peer communities. This could include increasing the availability of technical expertise to plan and develop projects or improving community perception.
- We encourage applicants to collaborate with relevant partners, particularly tribal governments and community-based organizations that are familiar with the local community, and/or entities (e.g., nonprofits or extension schools) that have experience with developing renewable energy projects in similar areas.

Eligible technologies and activities

Applicants may propose any project type that best serves the community's needs and that reduces environmental impacts, within the program's six eligible activities. (See "Technology and System Requirements.")

Priority technologies and project types

This topic area prioritizes the following technologies or project types (the same as for topic area 1):

Solar, battery energy storage systems, wind, water power (marine energy and hydropower), geothermal (heating and cooling or power generation), biomass/biofuels, microgrids,[27] distribution, converting fossil fuel–powered equipment to electric, and repowering existing renewable energy infrastructure.

Example projects

These examples of projects or components of projects offer some ideas for potential applications. Keep in mind that this list is not exhaustive, and that some examples could be relevant for more than one topic area. Also consider that projects should align with community priorities.

- Installation of a community-owned solar and battery project to reduce electricity cost and increase energy resilience.
- Installation of a distributed wind, solar, and battery storage microgrid system to reduce electricity costs and increase energy resilience.
- Installation of standalone microgrids in community-serving locations to ensure continuation of services during natural disasters.

[27] See footnote 26 for a description of microgrids.

Topic Area 4: Isolated microgrids and unelectrified buildings

Purpose

Build clean energy projects for either:

- Isolated microgrids[28] (often located in ultra-remote areas and served primarily by diesel generators); or
- Unelectrified homes or community buildings not currently served by an electrical grid.

Projects should demonstrate approaches to addressing one or more relevant adoption barriers. (See "Barriers to adoption highlighted in this funding opportunity" for details.)

Eligible technologies and activities

Applicants may propose any project type that best serves the community's needs and that reduces environmental impacts, within the program's six eligible activities. (See "Technology and System Requirements.")

Example projects

These examples of projects or components of projects offer some ideas for potential applications. Keep in mind that this list is not exhaustive, and that some examples could be relevant for more than one topic area. Also consider that projects should align with community priorities.

- Installation of a distributed wind plus battery storage and/or solar plus battery storage microgrid to reduce electricity cost and increase energy resilience through reducing demand on diesel in a remote community.
- Connecting homes to the grid previously not served by local power lines.

Applications Specifically NOT of Interest

We do not expect to fund the following project types through this opportunity:

1. Large transmission projects (i.e., projects >69kV, or proposals of lines ≥30 miles). If you believe that using higher voltage and/or longer lines is crucial to the success of the project, you may justify why you are including those components in the application.
2. Single-campus projects that serve only the regular operation of that facility (e.g., solar on individual hospitals or schools). For topic areas 3 and 4, applicants may propose single-campus projects that include backup power from emission-free sources for critical community-serving buildings (e.g., solar plus battery storage for a cultural center that serves as a command center and warming shelter during power outages).
3. Electric vehicles (EVs). See bullet below about EV charging.
4. Projects solely focused on EV charging. EV charging infrastructure may be a component of a broader, otherwise eligible project.
5. Projects including only weatherization.

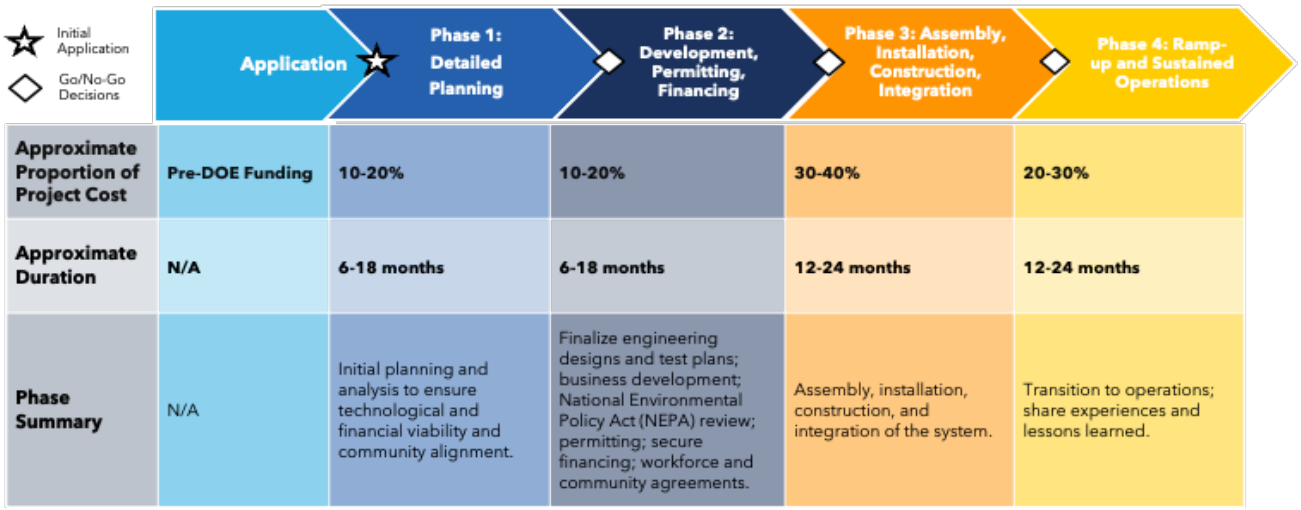
[28] See footnote 26 for a description of microgrids.

Expected award and project management structure

Awards selected under this funding opportunity will likely follow a four-phased project management structure for managing scope, schedule, deliverables, and budget. Projects typically have one "Budget Period"[29] per phase but may have more. DOE may adjust the phases or approaches for smaller, less complex projects. DOE will determine those options on a case-by-case basis, after we select projects and as we negotiate terms and conditions.

Figure 1 shows an example of the phase progression, major work activities, funding proportion, and timeline. This includes involvement from local communities and workers, relevant stakeholders, and tribes, as described within each of the phases below. All of the project's activities will also be further defined during award negotiations and subsequent negotiations between Budget Periods. DOE anticipates that we will fund all awarded projects through all phases, pending successful Go/No-Go reviews between and within phases (see section on Transitions Between Budget Periods).

While Figure 1 and the narrative text below provide approximate timetables for each phase, these timetables are representative only. While phases are used to conceptually describe the progression of project development, awards will be managed in Budget Periods as defined in 2 CFR 200.1 "Budget Period."



	Application	Phase 1: Detailed Planning	Phase 2: Development, Permitting, Financing	Phase 3: Assembly, Installation, Construction, Integration	Phase 4: Ramp-up and Sustained Operations
Approximate Proportion of Project Cost	**Pre-DOE Funding**	**10-20%**	**10-20%**	**30-40%**	**20-30%**
Approximate Duration	**N/A**	**6-18 months**	**6-18 months**	**12-24 months**	**12-24 months**
Phase Summary	N/A	Initial planning and analysis to ensure technological and financial viability and community alignment.	Finalize engineering designs and test plans; business development; National Environmental Policy Act (NEPA) review; permitting; secure financing; workforce and community agreements.	Assembly, installation, construction, and integration of the system.	Transition to operations; share experiences and lessons learned.

Figure 1. High-level summary of the expected phase structure for projects funded through this opportunity

Phase 1 – Detailed Planning

Phase 1 activities will focus on developing specific aspects of the overall project plan and completing analysis to refine projections submitted as part of the proposal. These activities must provide assurance to DOE that the overall project plan is technologically, financially, and legally viable, with buy-in from relevant local and community stakeholders and tribes. This could include any plans to develop a skilled local labor pool, retain workers through quality jobs, establish partnerships with minority serving institutions and community based-organizations, and provide community benefits through Workforce and Community Agreements.

[29] Budget Period means the time interval from the start date of a funded portion of an award to the end date of that funded portion during which recipients are authorized to expend the funds awarded, including any funds carried forward or other revisions pursuant to § 200.308. See https://www.ecfr.gov/current/title-2/part-200#p-200.1(Budget%20period).

Community and labor engagement should continue throughout Phase 1 to align project characteristics and decisions with community priorities and to publicly share project developments and community impacts as they become clearer.

Recipients will complete preliminary engineering and construction designs. This will include finalization of a Project Management Plan, a Risk Management Plan, the initial Safety Plan, an initial Financial Plan for all phases, and final site selection and procurement plan for the various components to be included in the award.

As specified by DOE, recipients will prepare an environmental information volume (EIV)[30] or an environmental considerations summary (ECS) to support DOE's National Environmental Policy Act (NEPA) evaluation of construction and operating impacts. Recipients should fully engage with the DOE's NEPA team as they develop environmental and regulatory plans to prepare for permitting and approval processes in Phase 2. See the *NOFO Supplemental Requirements* document located on the Funding Opportunities page for more information about NEPA, EIVs, and ECSs.

Phase 2 – Project Development, Permitting, and Financing

Phase 2 is for advanced planning activities. Recipients will finalize their project development plans, workforce and staffing plans, commercial agreements, workforce and community agreements, financial structure, and fabrication plans, and complete the necessary permitting and approval activities required to begin construction. By the end of Phase 2, engineering and operational designs should be sufficiently mature to support completion and execution of relevant fabrication, procurement, or construction contracts and starting major project execution tasks.

In Phase 2, recipients may start procurement of items with long lead times, with prior DOE approval. Third-party financing agreements should be completed and any relevant offtake agreements in place. Risk management plans should be revised and updated to reflect progress made and risks mitigated as well as new or emerging risks and corresponding management plans.

By the completion of Phase 2, safety and security plans should be finalized and execution ready. All necessary permits and regulatory approvals should be in place to prepare for construction, including completion of DOE's NEPA review. All procurement plans should be finalized. Community and labor engagement should have progressed, and updated comprehensive community benefits commitments should reflect community and labor input and collaboration to date and set the stage for ongoing engagement. Community impact targets should be finalized, and tracking plans should be in place to monitor economic, environmental, and social impacts of the projects.

Phase 3 – Assembly, Installation, Construction, and Integration

Phase 3 activities will focus on implementation. Recipients will employ industry standard project management tools and will be required to provide regular status updates and reports. Plans recipients develop in the preceding phases will be revised and updated as appropriate to reflect actual performance. Engineering drawings may be further developed within this phase. Operational protocols and controls will be finalized within this phase.

[30] For more information about the environmental information volume, see here: https://www.energy.gov/sites/default/files/2024-03/GUIDANCE%20ON%20PREPARATION%20OF%20THE%20ENVIRONMENTAL%20INFORMATION%20VOLUME%2003333024.pdf.

Previously and newly developed risks will be tracked, actively managed, and regularly reported to DOE. Reporting frequencies and content requirements will be unique to each award and negotiated prior to Phase 3 commencement.

While recipients will manage implementation, DOE will closely monitor progress and evaluate it against the plans developed through Phase 2. DOE and/or its third-party representatives will visit the site(s) regularly to verify progress and collect data, including data related to community benefits, consistent with the established reporting requirements.

During Phase 3, recipients will continue to advance their community benefits commitments, including commitments to quality jobs, and provide ongoing mechanisms for community and labor input that will support meaningful benefits and minimize any project negative impacts. Outcomes and impacts related to community benefits efforts will be tracked to assess progress.

Phase 3 may look significantly different for each award as there will be varying amounts of construction and retrofitting. Specific details will be addressed for selected projects during the negotiation phase.

Phase 4 – Ramp-Up and Sustained Operations

In Phase 4, recipients will transition to operations. By the end of Phase 4, each award will have operated over an extended period with a plan for workforce continuity. For this program, it is expected that Phase 4 will have a minimum duration of one year and may extend as long as three years.

A key objective this program is to demonstrate successful approaches, visions, and paths to share with and support similar communities pursuing clean energy planning and projects. To meet this key objective, Phase 4 is likely to include financial, socio-economic, environmental, and operational data collection and reporting to DOE. In addition, we expect all projects to generate high-fidelity operational data sets that enable detailed technical and financial modeling, and assessments such as environmental impacts and the social cost of greenhouse gas avoided[31] from the project.

Transitions Between Budget Periods

All projects will be required to complete regular Go/No-Go reviews prior to the end of a Budget Period to determine if the project will continue to receive Federal funding. For each selected project, we will negotiate specific Go/No-Go criteria for transitions from one Budget Period to the next.

The Go/No-Go criteria may include a requirement to submit a standardized set of data to provide quantitative and qualitative insight on metrics spanning the technological, environmental, economic, market, workforce, community benefits, and other components of the project's analysis activities. DOE may also require the negotiation of additional Go/No-Go decision points within phases (i.e., phases may include one or more Budget Periods with Go/No-Go points at the end of each Budget Period). Applicants must propose quantitative Go/No-Go criteria for Budget Periods as part of the workplan.

If DOE determines that an award is making insufficient progress, DOE or its representatives may add additional scrutiny and oversight and negotiate corrective measures.

[31] Recipients may use the social cost of greenhouse gases calculation such as that developed by the Environmental Protection Agency, found at https://www.epa.gov/environmental-economics/scghg.

DOE may discontinue awards at any of the Go/No-Go decision points if the recipient does not meet the Go/No-Go criteria, project, and/or program requirements. If awards are proceeding on an accelerated schedule, it may be possible to move to a Go/No-Go review earlier than originally planned and advance to the next Budget Period if the review is successfully completed.

DOE will negotiate specific project structure details with each recipient on a project-by-project basis to produce the best possible balance between project outcomes and DOE risk exposure. Examples of factors that may be considered as part of such negotiations include project and risk management processes, team capabilities, cost share amounts, financial contingencies, and engagement of independent monitors such as independent engineers and/or community benefits consultants. DOE will require access to project performance and financial data necessary to track progress against a project baseline (or similar).

We expect these projects to continue as self-sustaining entities operating fully independent of Federal funds. DOE may also request financial sustainability plans or long-term disposition and/or decommissioning plans as part of future decision points. This may include proposed sources of funding/revenue and the business model which will support the projects beyond the DOE award.

Cooperative Agreement Substantial Involvement

A Cooperative Agreement is an award funding type where there will be substantial Federal scientific or programmatic involvement. Substantial involvement includes but is not limited to the following:

1. DOE shares responsibility with the recipient for the management, control, direction, and performance of the project.
2. DOE may intervene in the conduct or performance of work under this award for programmatic reasons. Intervention includes the interruption or modification of the conduct or performance of project activities.
3. DOE may redirect or discontinue funding the project based on the outcome of DOE's evaluation of the project at the Go/No-Go decision point(s).
4. DOE participates in major project decision-making processes.

Unallowable Costs

All expenditures must be allowable, allocable, and reasonable in accordance with the applicable Federal cost principles. Pursuant to 2 CFR 910.352, the cost principles in the Federal Acquisition Regulations (48 CFR 31.2) apply to for-profit entities. The cost principles contained in 2 CFR Part 200 Subpart E apply to all entities other than for-profits.

Pre-Award Costs

Applicants selected for award negotiations (selectees) must request prior written approval to charge pre-award costs. Pre-award costs cannot be incurred prior to applicants receiving notification of selection for award negotiations.

Pre-award expenditures are made at the applicant's risk. DOE is not obligated to reimburse costs as outlined in the *Applicant Supplemental Budget and Cost Information* document located on the Preparing Your Budget page.

Program Income

Program income is gross income earned by the recipient or subrecipient that is directly generated by a supported activity or earned as a result of the Federal award during the period of performance (except as provided in the Federal award or regulations).

Recipients are encouraged to review 2 CFR 200.307 regarding program income. For this funding opportunity, the default use of program income is "Addition," where program income may be added to the award with prior approval and must be used for the purposes of the award. Any other treatment of program income must be negotiated and approved by DOE.

STEP 2:
GET READY TO APPLY

IN THIS STEP

Application Contents and Format

Component and Subcomponent	File Naming Convention	Page Limit	Format
Concept Paper	ControlNumber_LeadOrganization_ConceptPaper.pdf	7	PDF
Application			
Application For Federal Assistance	Standard Form SF-424 ControlNumber_LeadOrganization_App424.pdf	N/A	PDF
Technical Volume	ControlNumber_LeadOrganization_TechVol.pdf	20	PDF
Community Benefits Plan	ControlNumber_LeadOrganization_CBP.pdf	5	PDF
Community Partnership Documentation	ControlNumber_LeadOrganization_Partner_Doc.pdf	2	PDF
Impacting Indian Tribe Documentation	ControlNumber_LeadOrganization_IMT_Doc.pdf	N/A	PDF
Resumes or Equivalent	ControlNumber_LeadOrganization_Resumes.pdf	2	PDF
Letters of Commitment	ControlNumber_LeadOrganization_LOCs.pdf	2 per letter	PDF
Budget	Standard Form SF-424-A ControlNumber_LeadOrganization_App424A.pdf	N/A	PDF
Budget Justification Workbook	ControlNumber_LeadOrganization_Budget_Justification.xlsx	N/A	Excel
Subrecipient Justification Workbook	ControlNumber_LeadOrganization_Subrecipient_Budget_Justification.xlsx	N/A	Excel
Transparency of Foreign Connections	ControlNumber_LeadOrganization_TransparencyFC.pdf	N/A	PDF
Potentially Duplicative Funding	ControlNumber_LeadOrganization_DupFund.pdf	N/A	PDF
Verification of Cost Share Eligibility	ControlNumber_Cost_Share_Eligibility.pdf	N/A	PDF

Application Process

This application process includes 2 stages:

1. Concept paper, and
2. Application.

The application and supplemental information you submit through electronic systems used by the DOE, including OCED eXCHANGE and FedConnect.net, constitutes the authorized representative's approval and electronic signature.

Applicants for this funding opportunity may also be required to submit the following:

- Third-party information such as references, letters of support, or letters of commitment to the project or to contribute to cost sharing.
- A reference to any requirements to provide documentation to support an eligibility determination, such as proof of 501(c)(3) status or an authorizing tribal resolution.
- If applicable, the need to identify proprietary information.

Document Format Requirements

Your submission must conform to the form and content requirements described in this section, including maximum page lengths. We will issue you a control number when you begin the OCED eXCHANGE application process. The control number must be included with all application documents. The control number must be prominently displayed on the upper right corner of the header of every page and included in the file name (i.e., Control Number_Applicant Name_Application).

Format Requirements

- Each document must be submitted in **Adobe PDF** format unless otherwise stated (e.g., Budget in Excel)
- Include assigned **Control Number** in upper right corner of the header of every page along with the file name.
- Page numbers must be included in the footer of every page.
- You must not exceed the specified page limit for each section. DOE will only review the authorized number of pages.
- All documents must be written in **English**.
- All pages must format to fit 8.5x11-inch paper with margins no less than one inch on all sides.
- Use **Calibri** typeface, **black** font color, font size of **12-point** or larger. Figures and tables may use 10-point font.

- References must be included as footnotes or endnotes in a **font size of 10-point** or larger. Footnotes and endnotes are counted toward the maximum page requirement.
- The maximum file size that can be uploaded to the OCED eXCHANGE website is 50 megabytes (MB). OCED eXCHANGE will not allow you to upload files more than 50 MB, and hence you cannot submit them for review.
- If you would like to submit a file that exceeds 50 MB but is still within the maximum page limit specified, you must break the file into parts and mark it to that effect.

Concept Paper

Content

- Cover Page
- Responses to Concept Paper Questions:
  - Technical Solution
  - Business Case
  - Team
  - Project Plan
  - Community and Workers

Total Concept Paper Maximum Page Limit: 7 pages

Applicants must submit a concept paper by the specified due date and time to be eligible to submit an application. Applicants who do not submit a concept paper cannot apply. An applicant may submit more than one concept paper. Each concept paper must be limited to a single concept and topic area. The concept paper must conform to the requirements listed below, including the stated page limits. Applicants must submit each concept paper as a single file in OCED eXCHANGE.

The concept paper must address all the requirements described in this subsection. DOE will review only the authorized number of pages. Please note that applicants will need to substantiate all statements of expertise in the application.

DOE makes an independent assessment of each concept paper based on the criterion in Step 4: Application Review Information. DOE will encourage a subset of applicants to submit applications and will discourage the other applicants from submitting an application. See Step 4: Award Notices.

The following are the concept paper components and their requirements. Each potential applicant must provide the following information as part of the concept paper.

Concept Paper Cover Page(s):

We encourage applicants to use the cover page format shown at the end of the Step 2 section. The cover page must include all of the following:

- The project title.
- Topic area team is applying for.
- A short sentence describing the key attributes of the project (technology type, size, and location). DOE and reviewers may use this as a standalone summary of the application.
- The project team, including:
  - Name of the recipient (i.e., applicant),
  - Entity type and an explanation of eligibility as described in Step 1,
  - Technical and business points of contact, and
  - Names of all team members and their organizations.
- Clearly identify the location and population of the communities identified for energy improvements (as defined by the Census Bureau or other legal boundary). Provide a link(s) to Census Bureau figures confirming the populations of the community(ies) where the project is located and that will directly benefit from the project and state the type of area benefitted (e.g., city, town, borough, parish, census county division, or census-designated place). The Applicant Eligibility Guidance located on the Apply for Funding Opportunities page provides more information on how to use the census website.
- Provide up to 20 census tracts[32] and 9-digit zip codes (i.e., zip+4 code) of project location(s) and benefitting community(ies).
- The total project cost, proposed Federal funding amount, cost share from applicant, and period of performance.[33]
- Any statements regarding confidentiality as described in the Treatment of Application Information section.

In the remainder of the concept paper (seven pages total, including the cover page(s)), applicants must address the following questions in each section. You do not need to respond to each question separately, but you should address each of the prompts within each section.

[32] See here for additional guidance on finding your census tract: https://screeningtool.geoplatform.gov/en/ - 3/33.47/-97.5. We ask for census tracts primarily to understand whether the project is located in a Justice40 community. Census tracts are not sufficient to determine whether the project is located within a rural or remote community. See Eligibility section for details on the definition of rural or remote for this funding opportunity.

[33] The period of performance is the time period during which the recipient and subrecipient may incur new obligations to carry out all administrative actions and award activities and incur costs. See https://www.fema.gov/grants/mitigation/guide/part-8/g.

Technical Solution:

- What are your community's current energy challenges and priorities? Are there any particular challenges or barriers that are faced by members of priority communities and populations as described in the Funding priorities section?
- Tell us about your proposed project, including project and technology type, size, and location.
- Why is this technology or project type a good fit for your community?
- Which barriers to adoption will this project address, and how? (See "Barriers to adoption highlighted in this funding opportunity" for details.)

Business Case:

- How do you expect energy costs and energy burden to change for community members because of this project?
- What local economic impacts do you anticipate from this project, including e.g., local tax revenue, workforce development, and other economic development?
- Why is this project worth the cost for you?
- How do you plan to provide the cost share for this project?
- How do you plan to pay for the project's operations and maintenance?

Team:

- Tell us about your team and their experience, including partners involved in the project, their role(s) in the project, and how you have worked together and plan to work together for this project and in the future.
- How does your team represent the priority communities and populations as described in the Funding priorities section?

Project Plan:

- Tell us about your approach to plan and complete this project.
- How do you plan to check on progress and adjust your approach along the way?
- What are the top 1–5 risks for completing this project, and how do you plan to mitigate those risks?
- What is your plan to ensure you have enough qualified people to plan, develop, build, and operate the project?

Community and Workers:

- How will this project benefit your community and local workers, including any priority communities and populations as described in the Funding priorities section?[34]
- How have you worked with, and how will you continue to work with, community members and local workers on this project, and how have you included or will you include them as part of the decision-making process?
- What are the potential negative impacts of this project and how do you plan to mitigate them?

For additional information, see About Community Benefits Plans. Please note that the Office of Clean Energy does not use the DOE Community Benefits Plan template.

Application

Technical Volume Content

- Cover Page
- Project Overview
- Technical Approach
- Financial and Market Viability
- Management and Organization
- Workplan

Total Technical Volume Maximum Page Limit: 20 pages

Only applicants who have submitted an eligible concept paper will be eligible to submit an application. The application should reflect the project proposed in the concept paper.

Applicants will have approximately 100 days from DOE's posting of the concept paper Encourage/Discourage notification on OCED eXCHANGE to apply.

Regardless of the date the applicant receives the Encourage/Discourage notification (see Step 4: Award Notices), the submission deadline for the application remains the date and time stated on the first page of this funding opportunity.

Each application must be limited to a single concept. Applications must conform to the content and form requirements listed below and must not exceed the stated page limits. Applications must provide sufficient citations and references to justify the claims and approaches. However, DOE and reviewers are under no obligation to review cited sources.

[34] Benefits may include investments or positive outcomes that contribute to DOE Justice40 policy priorities in disadvantaged communities: decreased energy burden; decreased environmental exposure and burdens; increased access to low-cost capital; increased job creation and training; increased clean energy enterprise creation and contracting; increased energy democracy and community ownership; increased parity in clean energy access and adoption; and increased energy resilience.

Technical Volume

The Technical Volume is usually the longest part of the application and includes much of the key parts of the project information. The Technical Volume must include a table of contents, all items listed in the box above, and any associated figures, graphics and citations. Applicants should consider the review criteria and how DOE and reviewers will score the application, as well as how the review criteria are weighted (see Step 4: Application Review Information) when preparing the Technical Volume. Applicants must address all elements of the Technical Volume; however, we expect applicants to tailor the information based on the type, size, and complexity of your proposed project.

Application Cover Page:

We encourage applicants to use the cover page format shown at the end of the Step 2 section. The cover page must include all of the following:

- The project title.
- Topic area team is applying for.
- A short sentence describing the key attributes of the project (technology type, size, and location). DOE and reviewers may use this as a standalone summary of the application.
- The project team, including:
    - Name of the recipient (i.e., applicant),
    - Entity type and an explanation of eligibility as described in Step 1,
    - Technical and business points of contact, and
    - Names of all team members and their organizations.
- Clearly identify the location and population of the communities identified for energy improvements (as defined by the Census Bureau or other legal boundary). Provide a link(s) to Census Bureau figures confirming the populations of the community(ies) where the project is located and that will directly benefit from the project and state the type of area benefitted (e.g., city, town, borough, parish, census county division census-designated place). The *Applicant Eligibility Guidance*, located on the Apply for Funding Opportunities page, provides more information on how to use the census website.
- Provide up to 20 census tracts[35] and 9-digit zip codes (i.e., zip+4 code) of project location(s) and benefitting community(ies).
- The total project cost, proposed Federal funding amount, cost share from applicant, and period of performance.
- Any statements regarding confidentiality as described in the Treatment of Application Information section.

[35] See here for additional guidance on finding your census tract: https://screeningtool.geoplatform.gov/en/ - 3/33.47/-97.5. We ask for census tracts primarily to understand whether the project is located in a Justice40 community. Census tracts are not sufficient to determine whether the project is located within a rural or remote community. See Eligibility section for details on the definition of rural or remote for this funding opportunity.

Project Overview:

We encourage applicants to use the project overview format shown at the end of the Step 2 section. The project overview section must include all of the following in the list below.

- Technology(ies) used in the project:
  - Basic description (a few words or a short sentence).
  - Select up to 5 from this list: Solar, battery energy storage system, wind, water power, geothermal, biomass/biofuels, microgrids, transmission or distribution, energy efficiency, converting fossil fuel-powered equipment to electric, repowering existing renewable energy systems, dual-use, other.
- Provide the following information based on technology type(s) included in project:
  - Electricity generation:
    - Generation type (solar, wind, water power, geothermal, biomass/biofuels, diesel, other)
    - Nameplate capacity of generation (kW)
    - Behind the meter (Yes/No)
  - Microgrid:
    - Isolated grid/microgrid (Yes/No)
    - Can island from the broader grid (Yes/No)
  - Energy storage:
    - Storage type (lithium-ion battery, flow battery, other electrochemical battery, thermal, pumped hydropower, other)
    - Nameplate storage capacity (kWh)
    - Peak power (kW)
    - Behind the meter (Yes/No)
  - Transmission or distribution upgrades:
    - Voltage rating of line(s) (kV)
    - Line-miles upgraded
  - Energy efficiency or conversion to electric equipment:
    - Technology type (heat pump, lighting, etc.)
    - Number of installations
    - Expected energy savings (kWh/year)
  - Electrification:
    - Number of meter connections
    - Connection type (residential, commercial, or industrial)

- Primary benefits the project provides to the community(ies):
    - Select up to 5 from this list: Reduces cost of energy, reduces GHG emissions, addresses energy resilience needs, addresses energy demand growth, improves energy access, improves energy efficiency, promotes economic development, addresses energy workforce challenges, addresses energy independence (community microgrids, self-sufficient industrial facility, domestic supply, etc.), provides other environmental benefits, other
- Applicant entity type:
    - Select 1 from list: Indian Tribes, state and local governments, nonprofit organizations, for-profit organizations, institutions of higher education, incorporated consortia, and unincorporated consortia
- Narrative (a few brief sentences at most for each bullet below):
    - Energy challenges the community(ies) face
    - Why project team and community(ies) chose the technology(ies).
    - Why the project is important to the community(ies).

Technical Approach:

Applicants must address the prompts below, as relevant for the project.

- Current community energy challenges
    - What are your community's current energy challenges, priorities, and needs, including of underrepresented groups? Include any priorities related to energy resilience and reliability, energy cost, clean energy access, environmental protection, human health, economic development, quality jobs, workforce development, or environmental justice.
    - What burdens does the community face that could be impacted by the project, including environmental, socioeconomic, or health burdens?[36]
    - How did you determine community priorities and needs, e.g., what community engagement did you do, and who or what type of community members provided input?
- Appropriateness of technology choice and project type
    - Why is this technology or project type a good fit for your community?
    - How does this project address the community's priorities and needs, including priorities related to identified burdens?
    - You may include quantitative (e.g., dollars saved) and/or qualitative (e.g., improvements in quality of life due to fewer outages) impacts.

[36] Applicants may use EJSCREEN (https://ejscreen.epa.gov/mapper/), the Climate and Economic Justice Screening tool (https://screeningtool.geoplatform.gov/en/#3/33.47/-97.5), or other analytic tools to characterize community burdens.

- Technical feasibility of project and appropriate technology readiness
    - How well does this technology or project type work in similar contexts? (e.g., communities that have similar geographies, demographics, and/or cultures)
    - What is the technology readiness level of the technology(ies) used in this project? (See the Technology and System Requirements section.)
    - Project size, impact on emissions and pollution, and impact on grid resilience and reliability (a project may include one or more of these categories):

      Electricity generation
      - Planned usage of generation (e.g., primary power, backup power, meeting peak demand)
      - Where relevant: Proposed reduction (quantitative where possible) in greenhouse gas and other emissions and pollutants, and/or reduction in fuel use
      - Where relevant: How does this electricity generation match expected demand? (e.g., solar generation greater in the summer but demand is higher in the winter for heating with heat pumps)

      Energy storage systems
      - Planned usage of storage (e.g., used alongside generation, providing brief back-up power during outages, meeting peak demand)

      Energy efficiency
      - Expected reductions in electricity and/or fuel use

      Reliability and resilience
      - How will this project reduce the likelihood and impact of energy disruptions or outages? (e.g., baseline and expected changes in outage duration and frequency (e.g., SAIFI, CAIDI, and SAIDI[37]) on average or under certain conditions (e.g., Major Event Days) for customers impacted by project)
      - Who specifically will benefit most from this improved resilience?
      - Baseline and expected changes in climate resilience, e.g., reduced fire or flooding risk
      - Changes in water consumption and/or improved water quality
- Sharing results
    - How will you share your experience with the process and results of this project with neighboring or peer communities?
- Community capacity
    - How will this project increase community capacity to plan, build, and operate clean energy systems, e.g., by developing available technical expertise locally and with partners, and/or increasing community support for those projects?

[37] SAIFI = System Average Interruption Frequency Index. It is the number of non-momentary electric interruptions, per year, the average customer experienced. CAIFI = Customer Average Interruption Duration Index. It is average number of minutes it takes to restore non-momentary electric interruptions. SAIDI = System Average Interruption Duration Index. It is the minutes of non-momentary electric interruptions, per year, the average customer experienced.

- Offtakers
    - Who is buying and receiving the energy produced? (If applicable)

Financial and Market Viability:

Applicants must address the prompts below, as relevant for the project.

- Long-term financial viability
    - How do you expect to financially sustain this project over its lifetime? (This could include using funding and other support from government, philanthropy, and other sources.)
- Business plan
    - What are the key success metrics for this project?
    - What are the expected total project costs? Please include a discussion of the major equipment and the basis of the estimate (e.g., vendor quote, experience)
    - How will the project ownership model (e.g., community ownership or equity models) benefit community members?
- Financial model

    For applicants in topic areas 1 and 2, and for all for-profit applicants:

    - Project financial model in Excel:
        - Dynamic model with a base case indicating the most likely performance scenario as well as a scenario manager with sensitivities and input assumptions
        - Latest estimates of capital expenditures, revenues, and operating expenses over project's useful life
        - Timing and impact of operational, investing, and financing cash flows

    For all other applicants:

    - Narrative and estimated value of any non-financial benefits, and a brief explanation of how you estimated those benefits
    - Project financial model or equivalent, including latest estimates of capital expenditures, revenues, and operating expenses over entire project lifetime
- Budget
    - Provide project budget covering planning through operations
- Sources of funds for cost share
    - How will you provide the cost share for this project?
    - What risks are there with those sources of funding?

Management and Organization (Team):

Applicants must address the prompts below, as relevant for the project.

- Experience of applicant organization, team members and project partners
  - Who is on your team, and what is their experience relevant to the project and community?
  - How long has your organization been working on community clean energy projects?
  - What roles and responsibilities does each team member have in the project?
  - What time commitment will each team member have to the project (e.g., by hours per person or full-time equivalent workers)?
  - What is your team's previous experience working together and in the community?
- Team composition:
  - Describe how your team includes members who are:
    - Highly familiar with local community priorities and dynamics
    - Members of (or who represent) priority communities or populations (as referenced in the Funding priorities section.)
    - Part of labor unions or other local workforce development organizations
    - Credible with and trusted by community members
    - Residents of the local community
    - Experienced in project development with proposed technologies, in similar geographic and cultural contexts
    - Capable of efficiently and effectively administering government funding (e.g., by previously having managed Federal funds)
  - How to do you plan to work together during and after the project?
  - Resumes or other descriptions of how each team member's experience supports their role in the project (up to 2 pages each).
- Partners
  - Which partners are involved in this project, and what are their roles?
  - How do those partnerships improve your ability to implement the project successfully and/or serve the community?
  - Describe any partnership strengths, challenges, plans, and any formal or informal agreements together.

Workplan:

Applicants must address the prompts below, as relevant for the project.

- Plan for completing project on time and on budget.
- Provide a project management schedule with key milestones, including path to site control and permitting.
- Plan for anticipating, mitigating, and responding to risks of the project. Risks should include:
    - Identification of technical risks, including technology, systems integration, infrastructure, engineering, scale-up and similar elements.
    - Identification of security risks, including cybersecurity, physical security, internal and external threat identification and response, and similar elements.
    - Identification of financial risks including project finance, market and regulatory structures, commercial business models, and similar elements.
    - Identification of organizational risks, including project team, project management structure, and similar elements.
    - Identification of execution risks, including engineering, procurement, construction, permitting, safety, testing, and similar elements.
    - Assessment of the probability of occurrence of each risk and potential impacts.
    - Identification of proposed mitigations for identified risks.

Community Benefits Plan

The Community Benefits Plan must not exceed 5 pages total.

Projects funded under this funding opportunity must 1) support meaningful community and labor engagement; 2) invest in the American workforce; 3) advance diversity, equity, inclusion, and accessibility; and 4) contribute to the President's goal that 40% of overall benefits of certain Federal investments flow to disadvantaged communities (the Justice40 Initiative).

Applications must include a Community Benefits Plan (CBP) describing how the project will incorporate these four objectives. For projects impacting multiple communities, Community Benefits Plans should address all four objectives across all those communities. We encourage you to provide Community Partnership Documentation that reflects your engagement with community partners in developing your Community Benefits Plan, and/or approval of the Community Benefits Plan by community partners.

The Community Benefits Plan should provide the most detail for the project's phase 1. For subsequent phases, the plan can offer a high-level summary of proposed goals, deliverables, outcomes, and implementation strategies. If a project is selected for award negotiations, DOE will provide guidance to selectees on how to update Community Benefits Plans across project phases, and to incorporate outcomes and findings in final reports.

In your responses to the questions below, we encourage applicants to describe ongoing efforts related to two-way engagement with communities, labor, and tribes; workforce and community agreements; workforce development and quality jobs; and diversity, equity, inclusion, and accessibility that are directly related to the proposed project. This may include, e.g., descriptions of existing community advisory bodies that would be consulted on the proposed project; community or workforce agreements that would cover the proposed project; workforce training programs that would train workers for the project; or electric cooperative member-owner meetings for projects led by co-ops. You may include any discussion about philanthropic efforts unrelated to the project when you describe your team's relationship with and experience in the community (Management and Organization (Team) section), but do not include these efforts in the Community Benefits Plan.

You can find detailed guidance on creating your Community Benefits Plan under the application documents section on the OCED Exchange website at https://oced-Exchange.energy.gov. We encourage you to read this guidance and use information generated in other portions of this funding opportunity to support developing your Community Benefits Plan.

Below is more detail on what each of the four sections of the plan should include.

Community and Labor Engagement: This section should describe your plans to engage and collaborate with community and labor stakeholders in all impacted communities, especially members of priority communities and populations (as referenced in Program Description), and any impacted tribes. Engagement and collaboration should reflect the priorities of impacted groups, ensure community and labor input can affect project decisions, and support transparency and accountability.

If awarded, recipients will work with their communities and DOE to continue to identify Federally recognized Indian Tribes, including Alaska Native village or regional or village corporations (who are not project partners) who may have interests at the proposed project locations. The recipient will support DOE's tribal engagement, which acknowledges tribes' consultation policies, traditions, and expectations, and adheres to DOE Order 144.1[38] on tribal consultation.

- Provide any additional detail about the project team's prior and ongoing efforts to engage and collaborate with community stakeholders, tribes, workforce organizations, labor unions, and members of priority communities or populations not covered in the Technical Volume and Management and Organization (Team) section.
- Describe the project engagement strategy, including high-level objectives, approaches, and timelines for engaging and collaborating with workforce organizations, labor unions, community organizations, and community members, including members of priority communities or populations.
- How will engagement methods help meet project goals?
- How will input from community and labor stakeholders and tribes impacted by the project guide or inform project decisions, characteristics, or site selection?

[38] See DOE Order 144.1: Department of Energy American Indian Tribal Government Interactions and Policy (2009) for details: https://www.energy.gov/sites/default/files/DOE%20O%20144.1.pdf.

- Describe any plans to negotiate a Community Benefits Agreement, Project Labor Agreement, Community Workforce Agreement, and/or other collective bargaining agreements. Applicants should consider pursuing multiple agreements. Projects impacting multiple communities should strongly consider developing such agreements with each community. Describe any existing agreements that will cover the proposed project. If there are no plans to negotiate agreements, describe other strategies to ensure the benefits will flow to impacted communities and workers, and to integrate community and labor input into project decision-making.

Investing in the American Workforce: This section should describe plans to create and retain high-paying quality jobs and develop a skilled local workforce, which can support project stability, continuity, and success, and help meet program goals. Applicants who will not directly employ a workforce should demonstrate how they will select and work with anticipated employers to ensure project jobs are quality jobs, support workforce development, and uphold worker rights.

- Summarize the project team's previous or ongoing efforts to invest in the local workforce and create quality jobs, invest in workforce development, and protect worker rights.
- How will the project team attract and retain a skilled, local, and diverse workforce for construction and ongoing operations? This may include a description of how the project team will select contractors or vendors that will attract and retain a skilled, local, and diverse workforce.
- Describe the anticipated quality of jobs and anticipated number of jobs, including the number of construction, operations, and maintenance jobs. Describe the anticipated breakdown of hourly and salaried jobs, and benchmark wages and benefits against local prevailing wage or average wages for the industry and occupations.[39] Provide a timeline for job creation and duration.
- Describe any plans for investing in workforce development, which may include workforce education and training for local workers that leads to employment and support for opportunities for advancement. Provide a timeline for any workforce development activities.
- Describe any plans or commitments to support worker organizing and collective bargaining, so that workers can form and join unions of their choosing. Describe how workers will have the opportunity to organize with the purposes of exercising collective voice in the workplace in both construction and ongoing operations.

Diversity, Equity, Inclusion, and Accessibility (DEIA): This section should detail how DEIA objectives will be incorporated into the project and describe how you will partner with underrepresented businesses, educational institutions, and training or workforce development organizations that serve workers facing barriers to quality jobs, and/or other partners to help support DEIA.

- Describe your prior and ongoing DEIA efforts and specifically how they will be incorporated into the project.
- Describe DEIA goals and implementation strategies, aligned with project phases and workplans. This may include plans to provide comprehensive supportive services (to improve representation and access to jobs) and partner with underrepresented businesses, vendors, or suppliers and/or organizations serving underrepresented communities and those facing barriers to employment.

[39] About Community Benefits Plans | Department of Energy see heading "What is a good job?" for indicators of quality jobs.

Justice40 Initiative and Equitable Impacts: This section should include an assessment of project impacts and where they flow, and strategies to maximize benefits, minimize negative impacts, and track and report impacts. It should also describe how the project aligns with any community priorities not covered in the Technical Volume.

- To which communities or groups will the project benefits identified in the Technical Volume flow? Specifically, estimate the extent to which project benefits flow to Justice40 communities.
- What are the project's potential negative impacts?[40] Describe where/to whom impacts are expected to flow and the extent to which these impacts flow to Justice40 communities.
- How will you maximize benefits, minimize negative impacts, and track and report impacts? Indian Tribe, tribal organization, local government, or nonprofit primary applicants may describe plans to develop strategies to achieve these outcomes (e.g., contracting with organizations that can support this work as part of this funding opportunity).
- How will you ensure community and worker accountability and transparency and capture feedback (e.g., Workforce and Community Agreements and public access to project data)?

Community Partnership Documentation

Each supporting document must not exceed 2 pages total.

In support of the Community Benefits Plan, applicants may submit letters, Memoranda of Understanding, or other similar agreements from partnering tribes, labor unions, and/or community entities specifically describing the nature of existing or planned partnerships. Applicants may also submit letters of support from impacted tribes, labor unions, community entities, and local governments. If the applicant intends to enter into a Workforce and Community Agreement, please include letters from proposed partners.

Impacted Indian Tribe Documentation

For any project that potentially impacts Indian Tribes, including when the potentially impacted Indian Tribe is the applicant, applicants are required to submit additional documentation at the time of application, and possibly during negotiation and prior to award. Potential impacts to Indian Tribes determined after application will also require additional documentation (see Community Benefits discussion on consultation).

[40] Negative impacts may include ecological (e.g., effects on natural resources and on components, structures, and functioning of ecosystems), aesthetic, historic, cultural, economic, social, or health impacts.

Documentation from Potentially Impacted Indian Tribes

Applicants are required to submit documentation demonstrating that an authorized representative[41] of each potentially impacted Indian Tribe known to the applicant is, at a minimum, aware of the nature of the application and its potential impacts to the relevant Indian Tribes. The notified authorized representative must be holding their position while the award is open for applications, and documentation must demonstrate affirmative awareness of the application (e.g., a delivery record from certified mail, a reply by the authorized representative). Documentation demonstrating support (see Tribal Land or Tribal Subsurface Rights below) submitted at the time of application will be considered to also demonstrate awareness of an Indian Tribe.

An applicant's failure to submit documentation of an Indian Tribe's awareness, or a letter of support, when required as described in this section, may constitute grounds for determining an application ineligible, non-responsive to the NOFO, not subject to further review, and/or not otherwise subject to selection or award.

Tribal Land or Tribal Subsurface Rights

For any project intended to be sited on tribal land(s)[42] or known by the applicant to intersect with tribal subsurface rights, applicants are required to submit documentation demonstrating support from the relevant Indian Tribes at the time of application.

Documentation may include either:

- A letter of support from tribal leadership. The letter must be signed by an authorized representative of the Indian Tribe. The signer(s) must be holding their position while the award is open for applications.
- A Tribal Council Resolution, Board resolution (including the Board of Directors of an Alaska Native Corporation (ANC)), or similar act passed by the legislative body of the Tribal government or Board of Directors of an ANC, expressing support for the project.

Applicants are encouraged to reference any applicable community benefits agreements in the tribal support documentation, and to also reference any tribal support documentation in the Community Benefits Plan as appropriate.

[41] An authorized representative must be an elected official or designated leader according to the traditions, constitution, or charter of the Indian Tribe, or someone with relevant delegated authority within the Tribal government. Examples include: Chief, Chairman, Chairwoman, Governor, Nation Representative, President, Chief Executive Officer, Chief Financial Officer, Speaker of the Council, Speaker of the Congress, Tribal administrator.

[42] Tribal land means "Indian land" and "tribal land" as defined by 25 U.S.C. § 3501. https://www.govinfo.gov/content/pkg/USCODE-2023-title25/pdf/USCODE-2023-title25-chap37-sec3501.pdf.

Other Potential Impacts

For projects not intended to be sited on tribal land(s) or not known to intersect with tribal subsurface rights, but that are known by the applicant to have other potential impacts on tribal resources or reserved rights, letters of support or resolutions of support are strongly encouraged and, depending on the nature of the impact, may be required if selected for negotiation of an agreement. Applicants are encouraged to reach out to Indian Tribes as early as possible in the application process to give Indian Tribes ample time to evaluate and respond. Potential impacts include impacts to cultural sites, sacred sites, water rights, fishing rights, and hunting rights.

The following resources may be useful to help determine if a project may impact an Indian Tribe(s) resources or reserved rights and the appropriate contacts:

- Map of Indian Lands: https://bia-geospatial-internal.geoplatform.gov/indianlands/
- Directory of Federally recognized Tribes and Tribal Leaders: https://www.bia.gov/service/tribal-leaders-directory

These resources are not exhaustive, and many Indian Tribes have resources or reserved rights which extend beyond their tribal lands, or are covered within treaties, statutes, or case-law.

Identification of Potential Impacts

Applicants are required to document any efforts taken to identify any potential impacts to Indian Tribes, including any correspondence with Indian Tribes. These documents should be available on request to DOE.

If an applicant has reason to believe the proposed project has potential impacts to an Indian Tribe(s), the applicant must provide the project location and whether it is on tribal land or is known to intersect with subsurface rights, identify the potentially impacted Indian Tribe, and describe the potential impacts.[43]

The applicant must also describe how the applicant has engaged with potentially impacted Indian Tribe(s) before applying and plans to engage with potentially impacted Indian Tribe(s) during the period of performance of the agreement, and, if necessary, after the end of the period of performance.

If the applicant is an Indian Tribe, these elements should be addressed to ascertain potential impacts to Indian Tribes other than the applicant.

The Cooperative Agreement Standard Terms and Conditions, located on the Award Terms and Conditions page, require a recipient to obtain approval by DOE before any activities take place that could impact tribal resources or reserved rights, including but not limited to lands, cultural sites, sacred sites, water rights, mineral rights, fishing rights, and hunting rights. DOE will determine if formal government-to-government consultation is needed, and DOE will conduct that consultation accordingly.

[43] Applicants do not need to reveal specific details about sacred sites such as specific location or specific ceremonies.

Notice Concerning Application Information

Any application that may potentially impact Indian Tribe(s) may be shared with the potentially impacted Indian Tribe(s). Applicants should include a Notice of Restriction on Disclosure and Use of Data identifying any business sensitive, trade secrets, proprietary, or otherwise confidential information. Such information shall be used or disclosed only for evaluation of the application or to determine whether the proposed project affects an Indian Tribe(s).

Resumes

Each resume must not exceed 2 pages total.

You must provide a resume for all senior and key personnel, or similar document that describes their background and experience. A resume provides information that can be used by reviewers to evaluate the individual's relevant skills and experience of the personnel.

Letters of Commitment

Each letter must not exceed 2 pages total.

Submit letters of commitment from all subrecipient and third-party cost share providers. If applicable, the letter must state that the third-party cost share provider is committed to providing a specific minimum dollar amount or value of in-kind contributions allocated to cost sharing.

For third-party cost share providers, letters of commitment should include the following information: (1) the name of the organization; (2) the proposed dollar amount to be provided; and (3) the proposed cost sharing type (cash or in-kind contributions).

Application for Federal Assistance (SF-424)

The Standard Form SF-424 represents the government-wide standard form for application packages, and requires basic information about the applicant (name, address, telephone number, type of applicant, etc.), including a list of sources of proposed funding and a description of the proposed project. Complete all required fields in accordance with the instructions on the form. In Field 21 of the SF-424, the authorized representative must certify and agree with the Certification and Assurances found in SAM.gov | Home.

Note: The dates and dollar amount on the SF-424 are for the complete project.

Budget and Budget Justification Workbook

Applicants must provide a Budget, and a Budget Justification Workbook. For any subaward listed in the application, a separate Budget Justification Workbook must be provided for each subaward listed in the application. See the Required Applications Documents page and the *Applicant Supplemental Budget and Cost Information* document for guidance.

Budget

Applicants must use the Standard Form SF-424-A BUDGET INFORMATION - Non-Construction Programs to submit their budget.

Budget Justification Workbook

We encourage applicants to use the Budget Justification Workbook template available on OCED eXCHANGE at https://oced-exchange.energy.gov/ and on the Apply for Funding Opportunities page. The Budget Justification Workbook includes built-in calculations to support a detailed and robust budget and a narrative which supports the information you provide in the Standard Form SF-424A. Applicants must complete each tab within the "Budget Justification Workbook" for the project, including all work to be performed by the recipient and its subrecipients and contractors. If the applicant elects to not use the Budget Justification Workbook template, they must provide all data elements and justifications which follow the SF-424A and the Budget Justification Workbook template.

Applicants must include costs associated with implementing the various requirements specific to the Bipartisan Infrastructure Law and the Inflation Reduction Act (e.g., Buy America requirements for infrastructure projects, Davis-Bacon, Community Benefits Plan, reporting, oversight, construction signage)[44] and with required annual audits and incurred cost proposals in their proposed budget documents. Such costs may be reimbursed as a direct or indirect cost.

Transparency of Foreign Connections

Applicants must identify the following as they relate to the proposed recipient and subrecipients:

1. Entity name, website address, and physical address.
2. The identity of all owners, Principal Investigator/Lead Project Manager, and senior/key personnel, at the recipient and subrecipient level, who are a party to any *Foreign Government-Sponsored Talent Recruitment Program* of a foreign country of risk (i.e., China, Iran, North Korea, and Russia).
3. The existence of any joint venture or subsidiary that is based in, funded by, or has a foreign affiliation with any foreign country of risk.[45]
4. Any current or pending contractual or financial obligation or other agreement specific to a business arrangement, or joint venture–like arrangement with an enterprise owned by a foreign state or any foreign entity.
5. Percentage, if any, of foreign ownership (direct or indirect) in, or control of, the proposed recipient or subrecipient(s).
6. Percentage, if any, of foreign ownership (direct or indirect) in, or control of, the proposed recipient or subrecipient(s) by an entity of a foreign country of risk.

[44] After receiving a DOE award, recipients are encouraged to display DOE Investing in America signage during and after construction. Guidance can be found at: https://www.energy.gov/design. Proposed signage costs that meet these specifications are an allowable cost and should be included in the proposed project budget.
[45] Countries of risk may change but currently include the People's Republic of China, Iran, Russia, and North Korea.

7. Percentage, if any, of venture capital or institutional investment by an entity that has a general partner or individual holding a leadership role in such entity who has an affiliation with any foreign country of risk.
8. Any technology licensing or intellectual property sales to a foreign country of risk, during the 5-year period preceding submission of the proposal.
9. Any equipment that is identified at the time of application, that will be used on the project, and that is made, or uses code written in a foreign country of risk.
    a. Equipment originally made or manufactured in a foreign country of risk (including relabeled or rebranded equipment).
    b. Coded equipment where the source code is written in a foreign country of risk.
    c. Equipment from a foreign country of risk that will be connected to the internet or other remote communication system.
    d. Any companies from a foreign country of risk that will have physical or remote access to any part of the equipment used on the project after delivery.
10. Any foreign business entity, offshore entity, or entity outside the United States related to the proposed recipient or subrecipient.
11. An organization chart to illustrate the relationship between your entity and the immediate parent, ultimate parent, and any intermediate parent, as well as any subsidiary or affiliates. Identify where each entity is incorporated.

DOE reserves the right to request additional or clarifying information based on the information submitted.

Potentially Duplicative Federal Funding

If the applicant or project team member has other active awards of Federal funds, the applicant must determine whether the activities of those awards potentially overlap with the activities set forth in its application to this funding opportunity. If there is a potential overlap, the applicant must notify DOE in writing, within the part of the application that addresses potentially duplicative Federal funding, of the potential overlap and state how it will ensure any project funds (i.e., applicant cost share and Federal funds) will not be used for identical cost items under multiple awards.

Likewise, for projects that receive funding under this NOFO, if a recipient or project team member receives any other award of Federal funds for activities that potentially overlap with the activities funded under the DOE award, the recipient must promptly notify DOE in writing of the potential overlap and state whether project funds from any of those other Federal awards have been, are being, or are to be used (in whole or in part) for one or more of the identical cost items under the DOE award. If there are identical cost items, the recipient must promptly notify the DOE Grants and Agreements Officer in writing of the potential duplication and eliminate any inappropriate duplication of funding.

Verification of Cost Share Eligibility

If seeking reduced cost share (see Table 2 for cost share based on topic area and type of applicant), please include documentation verifying status of the prime recipient as an eligible entity type.

Other Required Application Forms

Disclosure of Lobbying Activities (SF-LLL)

Recipients and subrecipients may not use any Federal funds to influence or attempt to influence, directly or indirectly, any officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress, in connection with any Federal contract, grant, loan, or cooperative agreement. In addition, if any registrants under the Lobbying Disclosure Act of 1995 have made a lobbying contact on behalf of the applicant (including with non-Federal funds) with respect to this funding opportunity, the applicant must complete and submit SF-LLL, "Disclosure of Lobbying Activities" (SF-424 Individual Family | Grants.gov).

Other Submission Requirements

Applicant Disclosure of Existing Work or Relationship with National Laboratories

Applicants shall disclose any pre-existing work or relationship with National Laboratories that is prior to this funding opportunity's application and that is or may be relevant to the funding opportunity application.

Example Cover Page(s) for Concept Papers and Applications

Project Title:	**OCED eXCHANGE Control Number:**		
Applicant Name:			
Applicant Entity Type (see Eligible applicants):			
Topic Area of Application:			
Project Location(s) by City, State, and Zip Code+4: ***(Please separate locations by commas) Location, State, Zip***	City/Town/ Unincorpor-ated Area	State	Zip Code+4

Population and Census Verification of Project Location and/or Directly Benefitting Community or Communities:	Provide a link(s) to Census Bureau figures confirming the populations of the community(ies) that will benefit from the project, and state the entity type benefitting (e.g., city, town, borough, parish, census county division, or census-designated place (see data.census.gov).
Census Tract(s) Directly Impacted by Project: ***(Please separate tracts with commas)***	Census Tracts Identified as Disadvantaged in Justice40[46]: Remaining Census Tracts:
Project Technologies (*Select up to 5 from this list*: solar, battery energy storage system, wind, water power, geothermal, biomass/biofuels, microgrids, transmission or distribution, energy efficiency, converting fossil fuel–powered equipment to electric, repowering existing renewable energy systems, dual-use, other): ***(Please separate technologies by commas)***	
One-Sentence Project Description:	

Team Member Organizations (e.g., Sub-Recipients, Key Technology Providers, and Project Partners):	
Do the proposed recipient and <u>all</u> subrecipients qualify as domestic entities*? ☐ Yes ☐ No **If not, specify which entities do not qualify as domestic entities and will require a foreign entity disclosure here and include necessary foreign entity disclosures with the application:**	* To qualify as a domestic entity, the entity must be organized, chartered, or incorporated (or otherwise formed) under the laws of a particular state or territory of the United States; have majority domestic ownership and control; and have a physical place of business in the United States or otherwise qualify as an Indian Tribe or tribal organization.

Points of Contact	**Name**	**Email**	**Phone Number**
Demonstration Project Manager:			
Business Point of Contact:			

Confidentiality Statement (if applicable):	
Total DOE Funding Request ($M USD):	
Total Non-Federal Cost Share ($M USD):	
Total Project Costs ($M USD):	
Total Period of Performance (yrs):	

[46] For details on identifying Justice40 disadvantaged communities, see footnote 18.

Example Project Overview for Applications

Location Description:		
Project Technologies (*Select up to 5 from this list*: solar, battery energy storage system, wind, water power, geothermal, biomass/biofuels, microgrids, transmission or distribution, energy efficiency, converting fossil fuel–powered equipment to electric, repowering existing renewable energy systems, dual-use, other):		
Project technology description:		
Primary benefits the project (*Select up to 5 from this list*: Reduces cost of energy, reduces GHG emissions, addresses energy resilience needs, addresses energy demand growth, improves energy access, improves energy efficiency, promotes economic development, addresses energy workforce challenges, addresses energy independence (community microgrids, self-sufficient industrial facility, domestic supply, etc.), provides other environmental benefits, other):		
Applicant Entity Type (*Select 1 from list*: Indian Tribes, state and local governments, nonprofit organizations, for-profit organizations, institutions of higher education, incorporated consortia, and unincorporated consortia):		
Project Narrative:	Energy challenges the community(ies) face	
	Why project team and community(ies) chose the technology(ies)	
	Why the project is important to the community(ies)	
IF Project includes electricity generation:	Generation type (solar, wind, geothermal, biomass, water, diesel, other)	
	Nameplate capacity of generation (kW)	
	Behind the meter (Yes/No)?	
IF Project includes creating or upgrading existing microgrid:	Is already or planning to be a fully isolated grid/microgrid (Yes/No)?	
	Is already or planning to be capable of islanding independently from the broader grid (Yes/No)?	

IF Project includes Storage:	Storage type (lithium-ion battery, flow battery, other electrochemical battery, thermal, pumped hydropower, other)	
	Nameplate storage capacity (kWh or MWh)	
	Peak power (kW or MW)	
	Behind the meter (Yes/No)?	
IF Project includes Transmission or Distribution Upgrades:	Voltage rating of line(s) (kV)	
	Number of line-miles upgraded	
IF Project includes Energy Efficiency:	Technology type (heat pump, etc.)	
	Number of installations	
	Expected energy savings (kWh/year)	
IF Project includes Electrification:	Number of meter connections	
	Connection type (residential, commercial, or industrial)	

STEP 3:
SUBMIT YOUR APPLICATION

IN THIS STEP

Submission Requirements and Deadlines

Request application package

All application, concept paper, forms, and instructions are available on OCED eXCHANGE. To access these materials, go to https://OCED-exchange.energy.gov and select the Notice of Funding Opportunity Number DE-FOA-0003428.

Submission instructions

Actions to Take Prior to Applying

You must complete several one-time actions before applying to this funding opportunity. Some actions may take several weeks, and failure to complete them could interfere with your ability to apply to this funding opportunity, or to meet the negotiation deadlines and receive an award if the application is selected. These requirements are as follows:

SAM.gov

Effective January 1, 2020, the System for Award Management (SAM) is the central repository for common government-wide certifications and representations required of Federal grants recipients. Registration in SAM is required for eligibility for a Federal award and registration must be updated annually. Federal agencies use SAM information to comply with award requirements and avoid increased burden and costs of separate requests for such information, unless the recipient fails to meet a Federal award requirement, or there is a need to make updates to their SAM registration for other purposes.

You must have an active account with SAM.gov. This includes having a Unique Entity Identifier (UEI). SAM.gov registration can take several weeks. Begin that process today. To register, go to SAM.gov Entity Registration and click Get Started. From the same page, you can also click on the Entity Registration Checklist for the information you will need to register.

Each applicant must:

1. Be registered in SAM.gov before submitting an application;
2. Provide a valid Unique Entity Identifier in the application; and
3. Continue to maintain an active registration in SAM.gov with current information at all times during which you have an active Federal award or an application or plan under consideration by a Federal agency.

NOTE: Start the UEI and SAM registration process as soon as possible. If you have technical difficulties with the UEI validation or SAM registration process, use the Help feature on SAM.gov. Additional entity validation resources can be found here: GSAFSD Tier 0 Knowledge Base - Validating your Entity.

DOE may not make a Federal award to an applicant until the applicant has complied with all applicable UEI and SAM requirements. If an applicant has not fully complied with the requirements by the time DOE is ready to make a Federal award, the DOE will determine that the applicant is not qualified to receive a Federal award and use that determination as a basis for making a Federal award to another applicant.

OCED eXCHANGE

You must register with and submit application materials through OCED eXCHANGE at https://oced-exchange.energy.gov, OCED's online application portal. See detailed instructions at Financial Opportunities: Manuals (energy.gov). OCED eXCHANGE is designed to enforce the deadlines specified in this funding opportunity. The "Apply" and "Submit" buttons will automatically disable at the defined submission deadlines. If an applicant experiences technical difficulties with a submission, the applicant should contact the OCED eXCHANGE helpdesk for assistance (OCED-exchangeSupport@hq.doe.gov).

FedConnect

Register in FedConnect at https://www.fedconnect.net. To create an organization account, your organization's SAM.gov Marketing Partner Identification Number is required. For more information about registration requirements, review the FedConnect Ready, Set, Go! Guide at: https://www.fedconnect.net/FedConnect/Marketing/Documents/FedConnect_Ready_Set_Go.pdf.

Grants.gov

Register in Grants.gov (http://www.grants.gov) to receive automatic updates when modifications to this NOFO are posted. However, please note that we will not accept concept papers and applications through Grants.gov. As applicable, we will post modifications to this funding opportunity on the OCED eXCHANGE website and the Grants.gov system. However, you will only receive an email when a modification is posted if you register for email notifications for this NOFO in Grants.gov. OCED recommends that you register as soon after the release of the NOFO as possible to ensure you receive timely notice of any amendments or other NOFOs.

Submission dates and times

Concept Paper

You must submit your concept paper by February 27, 2025 at 5:00pm ET.

Application

You must submit your application by August 28, 2025 at 5:00pm ET.

Intergovernmental review

Applications under this program are not subject to Executive Order 12372, "Intergovernmental Review of Federal Programs."

Standards for Application Evaluation

Applications that are determined to be eligible will be evaluated in accordance with this NOFO, by the standards set forth in the Notice of Objective Merit Review Procedure (76 Fed. Reg. 17846, March 31, 2011) and the guidance provided in the "DOE Merit Review Guide for Financial Assistance," effective April 2024, which is available at: Department of Energy Guide to Financial Assistance.

Evaluation and Administration by Non-Federal Personnel

In conducting the merit review evaluation and the Go/No-Go Reviews, DOE may seek the advice of qualified non-Federal personnel as reviewers. DOE may also use non-Federal personnel to conduct routine, nondiscretionary administrative activities, including DOE contractors. The applicant, by submitting its application, consents to the use of non-Federal reviewers/administrators. Non-Federal reviewers must sign conflict of interest and non-disclosure acknowledgements (NDA) prior to reviewing an application. Non-Federal personnel conducting administrative activities must sign an NDA.

Treatment of Application Information

Applicants should not include business sensitive (e.g., commercial or financial information that is privileged or confidential), trade secrets, proprietary, or otherwise confidential information in their application unless such information is necessary to convey an understanding of the proposed project or to comply with a requirement in the NOFO. Applicants are advised to not include any critically sensitive proprietary detail.

If an application includes business sensitive, trade secrets, proprietary, or otherwise confidential information, it is furnished to the Federal government (government) in confidence with the understanding that the information shall be used or disclosed only for evaluation of the application.

Such information will be withheld from public disclosure to the extent permitted by law, including the Freedom of Information Act. Without assuming any liability for inadvertent disclosure, DOE will seek to limit disclosure of such information to its employees and to outside reviewers when necessary for merit review of the application or as otherwise authorized by law. This restriction does not limit the government's right to use the information if it is obtained from another source.

Applications, and other submissions containing confidential, proprietary, or privileged information must be marked as described below. Failure to comply with these marking requirements may result in the disclosure of the unmarked information under the Freedom of Information Act or otherwise. The U.S. Government is not liable for the disclosure or use of unmarked information and may use or disclose such information for any purpose as authorized by law.

The cover sheet of the application, and other submissions must be marked as follows and identify the specific pages containing business sensitive, trade secrets, proprietary, or otherwise confidential information:

Notice of Restriction on Disclosure and Use of Data:

> "Pages [list applicable pages] of this document may contain business sensitive, trade secrets, proprietary, or otherwise confidential information that is exempt from public disclosure. Such information shall be used or disclosed only for evaluation purposes or in accordance with a financial assistance or loan agreement between the submitter and the Government. The Government may use or disclose any information that is not appropriately marked or otherwise restricted, regardless of source."

In addition, (1) the header and footer of every page that contains business sensitive, trade secret, proprietary, or otherwise confidential information must be marked as follows: "Contains Business Sensitive, Trade Secrets, Proprietary, or otherwise Confidential Information Exempt from Public Disclosure," and (2) every line or paragraph containing such information must be clearly marked with double brackets or highlighting. DOE will make its own determination about the confidential status of the information and treat it according to its determination.

In furtherance of OCED's mission, and to support the further private investment in and deployment of clean energy technologies, as well as to support clean energy markets, OCED may publish aggregated and anonymized data derived from unmarked application information (information that is not marked as business sensitive, trade secret, proprietary, or otherwise confidential information with the Notice of Restriction). The goal is to appropriately share aggregated and anonymized applicant data for the benefit the nation's broader clean energy ecosystem while ensuring robust protection of the underlying information or data.

Applicants should be aware that DOE may share information about an applicant's submission, which is not properly marked business sensitive, trade secrets, proprietary or otherwise confidential, with other Federal agencies on a limited, confidential basis to be used to prevent two or more agencies funding the same activity twice. Consideration by another agency for funding will not negatively affect a DOE applicant.

Rights in Technical Data Under Award

The Treatment of Applicant Information section discusses data generated prior to the award that the applicant is submitting as part of the application. This section discussions data that will be part of or arises out of the award itself. The applicant should review this section in the *NOFO Supplemental Requirements* document, located on the Funding Opportunities page, before proceeding further.

Pursuant to special statutory authority, the funding program has determined for awards under this funding opportunity that Protected Data first produced in the performance of corresponding DOE awards may be protected from public disclosure for up to five years after the data is first produced. Protected Data is technical data or commercial or financial data first produced in the performance of the award which, if it had been obtained from and first produced by a non-federal party, would be a trade secret or commercial or financial information that is privileged or confidential under the meaning of 5 U.S.C. 552(b)(4) and which data is marked as being protected data by a party to the award. Such Protected Data must be marked as set forth in the award's intellectual property terms and conditions.

Intellectual Property Management Plan

Awardees may be required to prepare and submit an executed Intellectual Property Management Plan (IPMP) between the members of the team. While the award IP terms will set forth the treatment of and obligations related to intellectual property rights between DOE and the individual members, the IPMP should describe how the members will handle intellectual property rights and issues between themselves while ensuring compliance with federal intellectual property laws, regulations, and policies. Refer to the *NOFO Supplemental Requirements* document located on the Funding Opportunities page, for additional information on IPMPs. For this funding opportunity, IPMPs will only be required at the request of OCED.

Retention of Submissions

DOE expects to retain copies of all applications and other submissions. No submissions will be returned. By applying to DOE for funding, applicants consent to DOE's retention of their submissions.

Personally Identifiable Information

All information provided by the applicant must to the greatest extent possible exclude Personally Identifiable Information (PII), which is information which can be used to distinguish or trace an individual's identity, such as their name, Social Security number, biometric records, alone, or when combined with other personal or identifying information which is linked or linkable to a specific individual, such as date and place of birth, or mother's maiden name. See OMB Memorandum M-07-16 dated May 22, 2007, found at: https://www.whitehouse.gov/wp-content/uploads/legacy_drupal_files/omb/memoranda/2007/m07-16.pdf.

By way of example, applicants must screen resumes to ensure that they do not contain PII such as personal addresses, personal landline/cell phone numbers, and personal emails. **Under no circumstances should Social Security numbers (SSNs) be included in the application**. Federal agencies are prohibited from collecting, using, and displaying unnecessary SSNs. See the Federal Information Security Modernization Act of 2014 (Pub. L. No. 113-283, Dec 18, 2014; 44 U.S.C. § 3551).

Expectations for Data Collection and Use for Selected Projects

To evaluate the success of specific projects and this program overall, we will require projects we select to provide data related to finances, technology performance, and community benefits (see Community Benefits) throughout the development of the project. When we evaluate projects and the program overall, we will consider these metrics in the context of a baseline and relative to program goals. We may share data with the National Laboratories to conduct this analysis and program evaluation. Examples of data include, but are not limited to:

- Capital and operational expenditures over the lifetime of the project
- Number and demographics of end-users of the project
- Changes in energy usage and source (electricity and/or other fuel sources) relative to baseline
- Cost breakdown and Federal share by equipment, labor, supplies, direct and indirect costs
- Planned operational usage and uptime of energy equipment
- Historical outage data and other relevant resilience indicators
- Asset ownership and revenue/offtake plan
- Impact on energy burden of project end-users
- Impact on GHG emissions and other local criteria air pollution
- Other indicators of local environmental impacts such as water and land usage changes
- Identification of all sources of additional funds whether debt, equity or other Federal/state/tax incentives.
- Utility interconnection approval and power purchase agreements (or utility bill impact) for grid-connected projects

To the extent data is first produced in performance of the award and constitutes Protected Data, DOE may share this information and the results of any analysis publicly, but only if it is possible to aggregate and anonymize the data in accordance with OCED protocols into quantitative and qualitative data analyses for the purpose of informing future public and private sector investment decisions. If DOE sees potential value in sharing specific, individual pieces of data publicly, DOE may ask your permission to do so—but you are not required to grant that permission.

Project teams are also encouraged, though not required, to disseminate operational data, lessons learned, financial, planning, and operations & maintenance strategies to the broader community and the public. Specific details and requirements for dissemination will be finalized during negotiations.

STEP 4: LEARN ABOUT REVIEW AND SELECTION

IN THIS STEP

Application Review Information

Responsiveness review

We will deem the following concept papers and applications as nonresponsive, and will not review or consider them:

- Applications not based on established scientific principles.
- Applications proposing approaches identified specifically as not of interest.
- Applications that fall outside the technical parameters specified in the Technology and System Requirements.
- Applications that do not benefit at least one rural or remote area as described in the Eligibility section.
- Applications including research, development, and pilot-scale activities.

Review criteria

Compliance criteria

All submissions for concept papers and applications must:

- Comply with the applicable content and form requirements listed in Step 2 of the funding opportunity.
- Include all required documents.
- Upload successfully in OCED eXCHANGE including clicking the “Submit” button.
- Comply with the submission deadline stated in the funding opportunity.
- DOE will not review or consider submissions submitted through means other than OCED eXCHANGE, submissions submitted after the applicable deadline, or incomplete submissions.

Technical Review Criteria

Concept Papers

Concept papers are evaluated based on consideration of the following factors.

Concept Paper Criterion: Overall Funding Opportunity Responsiveness and Viability of the Project

This criterion involves consideration of the following factors. Note that percentages listed below are approximate weights for each bullet:

- (25%) Applicant clearly describes how the proposed project aligns with the goals of this funding opportunity; is suited to the needs of the community; and is likely to function as designed.

- (20%) Applicant proposes a budget which is reasonable for the project and community.
- (20%) Applicant and proposed team have the qualifications, experience, capabilities, and other resources necessary to design, develop, build, and operate the proposed project.
- (15%) Applicant proposes a preliminary project plan and timeline that is likely to result in successful operation of the project within five years.
- (20%) Applicant has and will meaningfully collaborate with the local community, labor organizations, tribal entities, and other stakeholders as relevant for the local context. The project will provide meaningful and relevant benefits to local residents.

Applications

Criterion 1: Technical Approach and Impact (25%)

This criterion considers the following factors:

- **Technology relevance:** Degree to which the proposed technology(ies) are suited to the needs of the community and are likely to function as designed. Proposed technologies and critical components are commercially available and will be TRL 8-9[47] by time of construction.
- **Energy improvements:** Degree to which the proposed project will effectively address community energy challenges and advance community priorities.
- **Demonstration for other communities:** Degree to which proposed project demonstrates compelling visions, pathways, and/or approaches that other communities or parties can follow to overcome barriers to adopting clean energy in rural or remote communities across the country.
- **Community capacity:** Degree to which proposed project is likely to increase community capacity to plan, build, and operate clean energy systems, e.g., by developing available technical expertise locally and with partners, and/or increasing community support for those projects.
- *For projects including generation or efficiency*
    - **Emissions reductions:** Degree to which the proposed project reduces or avoids new greenhouse gas emissions, appropriate for the size and type of the project and community.
- *For projects including resilience components*
    - **Resilience improvements:** Degree to which the proposed project improves resilience of energy systems for residents.
- *For topic area 1*
    - **Energy challenges:** Degree to which the community experiences significant energy challenges.

[47] https://www.directives.doe.gov/directives-documents/400-series/0413.3-EGuide-04/@@images/file

  - **Technical risks:** Degree to which the applicant demonstrates an understanding of the key technical, construction, regulatory, permitting, safety and occupational health, and infrastructure integration risks involved in the proposed work, and the quality of the mitigation strategies to address them.
  - **Priorities:** Degree to which the proposed project aligns with priority technologies or project types for this topic area.
- *For topic area 2:*
  - **Technical risks:** Degree to which the applicant demonstrates understanding of the key technical, construction, regulatory, permitting, safety and occupational health, and infrastructure integration risks involved in the proposed work, and the quality of the mitigation strategies to address them.
  - **Objectives:** Degree to which the proposed project effectively addresses potential land use conflicts; maximizes co-benefits; and increases equitable access of clean energy.
- *For topic area 3:*
  - **Energy challenges:** Degree to which the community experiences significant energy challenges.
  - **Project process:** Degree to which applicant demonstrates understanding of overall project process.
  - **Priorities:** Degree to which the proposed project aligns with priority technologies or project types for this topic area.
- *For topic area 4:*
  - **Energy challenges:** Degree to which the community experiences significant energy challenges.
  - **Project process:** Degree to which applicant demonstrates understanding of overall project process.

Criterion 2: Financial and Market Viability (20%)

This criterion considers the following factors:

- **Financial sustainability:** Degree to which owners and operators of the project will be able to financially sustain the project for the life of the project, including beyond the award.
- **Financial reasonableness:** Degree to which the budget is reasonable for the project and community.
- **Economic impact:** Degree to which the project is likely to generate positive economic impacts for communities, including through direct financial benefit, new jobs, tax revenue, clean energy enterprise creation, reduced energy cost or energy burden, and other economic development.
- **Cost share risk:** Degree to which sources of funds to be used for cost share are of reasonable risk for the project and community.

Criterion 3: Management and Organization (Team) (20%)

This criterion considers the following factors:

- **Team capability:** Capability of the prime recipient, the proposed team, and key personnel to manage and address all aspects of the proposed work—including project operation and maintenance and work related to community benefits—with a high probability of success and cost effectiveness.
- **Team composition:** Degree to which project team includes members who are:
    - Highly familiar with local community priorities and dynamics
    - Members of (or who represent) priority communities or populations (as referenced in the Funding priorities section).
    - Labor unions or other local workforce development organizations
    - Credible with and trusted by community members
    - Residents of the local community
    - Experienced in project development with proposed technologies, in similar geographic and cultural contexts
    - Capable of efficiently and effectively administering government funding
- **Partnerships:** Degree to which project partners strengthen project team's ability to execute project and/or benefit the community and workers.

Criterion 4: Workplan (15%)

This criterion considers the following factors:

- **Project timing:** Likelihood that construction of project will start within three years, and that operation will begin within five years.
- **Milestones:** Overall thoughtfulness and reasonableness of the proposed milestones.
- **Local labor:** Degree to which workplan includes reasonable path to hiring sufficient trained labor from local communities.
- **Site control:** Degree to which workplan includes current or clear and expected path to site control.

Criterion 5: Community Benefits Plan (20%)

This criterion considers the following factors:

- **Local engagement:** Degree to which project team has already demonstrated engagement and collaboration, and shows a clear plan to further meaningfully engage and collaborate with local stakeholders and impacted groups relevant for the local context, including labor unions, community-based organizations, and members of priority communities (as described in the Funding priorities section), as well as with tribes, in a manner that influences project decisions.

- **Alignment of community benefits:** Degree to which project benefits align with community priorities, and flow directly to members of priority communities (as described in the Funding priorities section).
- **Ownership approach:** Degree to which ownership models enable community decision-making, and maximize benefits to and minimize risks for the community.
- **Expanding job access, including for underrepresented groups:** Degree to which the project team will facilitate participation in planning, construction, operations, and other workforce opportunities from underrepresented groups, especially workers facing systematic barriers to employment.
- **Quality local jobs:** Degree to which construction and operation roles will be high-quality jobs drawing from local residents, particularly priority communities (as described in the Funding priorities section).
- **Resources:** Degree to which budget and time allocated for community benefits reflect what is needed for the proposed activities.

Other selection factors

In addition to the above criteria, the Selection Official—the Federal staff person in the Department of Energy who approves which projects DOE will select in this funding opportunity—may consider the following **program policy factors** in determining which applications to select:

1. The degree to which project supports **priority communities** (as described in the Funding priorities section), or communities with an urgent energy challenge.
2. The degree to which the project, applicant, and partners represent **tribes and tribal perspectives**, **community support**, involvement and **decision-making**.
3. The degree to which projects are located in and/or benefit communities that are **relatively rural or remote**, i.e., considering proximity to metro and/or well-resourced areas.
4. The degree to which project optimizes **use of DOE funds** for programmatic objectives.
5. The degree to which the proposed project incorporates team members or partners from **Minority Serving Institutions** (e.g., Historically Black Colleges and Universities (HBCUs)/Other Minority Serving Institutions), and partnerships with underrepresented businesses.
6. **Applicability** of project type or approaches to other rural or remote communities.
7. Diversity of **energy and other challenges communities face**, and types of solutions proposed compared with OCED and DOE portfolio.
8. Diversity of **geographic** distribution compared with OCED and DOE portfolio.
9. Diversity of **technology(ies)** compared with OCED and DOE portfolio.
10. Diversity of **applicant organizations** compared with OCED and DOE portfolio.
11. Number of selected **projects per topic area**.

Review and Selection Process

Overview

The evaluation process consists of multiple steps. Each step includes an initial eligibility review and a thorough technical review, based on the criteria described in the Technical Review Criteria section. Experts in the subject matter of the funding opportunity will conduct rigorous technical reviews of eligible submissions. Ultimately, the Selection Official considers the recommendations of the reviewers, along with other considerations such as the program policy factors and risk reviews, in determining which applications to select.

Pre-Selection Interviews

As part of the evaluation and selection process, DOE may invite one or more applicants to participate in pre-selection interviews or pre-selection site visits. Pre-selection interviews are distinct from and more formal than pre-selection clarifications. The invited applicant(s) will meet with DOE representatives to clarify the contents of the applications and to provide DOE an opportunity to ask questions regarding the proposed project. The information provided by applicants to DOE through pre-selection interviews contributes to DOE's selection decisions. DOE will not reimburse applicants for travel and other expenses relating to the pre-selection interviews or site visits, nor will these costs be eligible for reimbursement as pre-award costs.

Any pre-selection interviews and site visits may also include discussions with affected tribes, stakeholders, or communities potentially impacted to understand their views.

Pre-Selection Clarification

DOE may determine that pre-selection clarifications are necessary from one or more applicants. Pre-selection clarifications are distinct from and less formal than pre-selection interviews. These pre-selection clarifications will solely be for the purposes of clarifying the application. The pre-selection clarifications may occur before, during or after the merit review evaluation process. Information provided by an applicant that is not necessary to address the pre-selection clarification question will not be reviewed or considered. Typically, a pre-selection clarification will be carried out through either written response to DOE's written clarification questions or video or conference calls with DOE representatives.

The information provided by applicants to DOE through pre-selection clarifications is incorporated in their applications and contributes to the merit review evaluation and DOE's selection decisions. If DOE contacts an applicant for pre-selection clarification purposes, it does not signify that the applicant has been selected for negotiation of award or that the applicant is among the top-ranked applications.

DOE will not reimburse applicants for expenses relating to the pre-selection clarifications, nor will these costs be eligible for reimbursement as pre-award costs.

Recipient Integrity and Performance Matters

DOE, prior to making a Federal award with a total amount of Federal share greater than the simplified acquisition threshold ($250,000), is required to review and consider any information about the applicant that is in the designated integrity and performance system accessible through SAM (see 41 U.S.C. § 2313).

Review for Research, Technology, and Economic Security

As DOE invests in critical infrastructure and funds critical and emerging technology areas, DOE considers possible vectors of undue foreign influence in evaluating risk. If high risks are identified and cannot be sufficiently mitigated, DOE may elect to not fund the award. As part of the research, technology, and economic security risk review, DOE may contact the applicant and/or proposed project team members for additional information to inform the review.

Selection

The Selection Official may consider the technical merit, the Federal Merit Review's[48] recommendations, program policy factors, risk reviews, and the amount of funds available in arriving at selections for this funding opportunity.

Risk review

Pursuant to 2 CFR 200.206, DOE will conduct an additional review of the risk posed by applications submitted under this funding opportunity.

Such risk assessment will consider:

1. Financial stability,
2. Quality of management systems and ability to meet the management standards prescribed in 2 CFR Part 200 as adopted and supplemented by 2 CFR Part 910,
3. History of performance,
4. Audit reports and findings, and
5. The applicant's ability to effectively implement statutory, regulatory, or other requirements imposed on non-Federal entities.

DOE may make use of other publicly available information and the history of an applicant's performance under DOE or other Federal agency awards. Depending on the severity of the findings and whether the findings were resolved, DOE may elect not to fund the applicant.

In addition to this review, DOE must comply with the guidelines on government-wide suspension and debarment in 2 CFR Part 180 and must require non-Federal entities to comply with these provisions.

[48] The Federal Merit Review Panel is a small group of Federal staff who review applications, input from merit reviewers, and other sources, to choose which projects to recommend to the Selection Official to select.

These provisions restrict Federal awards, subawards and contracts with certain parties that are debarred, suspended or otherwise excluded from or ineligible for participation in Federal programs or activities.

Before making a Federal award, DOE will review and consider any information about the applicant that is in the responsibility/qualification records available in SAM.gov (see 41 U.S.C. 2313). The applicant can review and comment on any information in the responsibility/qualification records available in SAM.gov. Before making decisions in the risk review required by 2 CFR § 200.206, DOE will consider any comments by the applicant, along with information available in the responsibility/qualification records in SAM.gov.

Award Notices

Notice of Selection and Award Negotiation

DOE will notify applicants that are selected for award negotiation, and selected applicants will be notified of their award negotiation.

Concept Paper Notifications

DOE will notify applicants of its determination to encourage or discourage the submission of an application. DOE will post these notifications to OCED eXCHANGE. DOE may include general comments provided from reviewers on an applicant's concept paper in the encourage/discourage notifications.

Applicants may submit an application even if they receive a notification discouraging them from doing so. By discouraging the submission of an application, DOE intends to convey its lack of programmatic interest in the proposed project. Such assessments do not necessarily reflect judgments on the merits of the proposed project. The purpose of the concept paper phase is to save applicants the considerable time and expense of preparing an application that is unlikely to be selected for award negotiations.

Application Notifications

DOE may stagger its selection determinations. As a result, some applicants may receive their notification letter in advance of other applicants. DOE will notify applicants of its determination via a notification letter by email to the technical and administrative points of contact designated by the applicant in OCED eXCHANGE. The notification letter will inform the applicant whether or not its application was selected for award negotiations. Alternatively, DOE may notify one or more applicants that a final selection determination on particular applications will be made at a later date, subject to the availability of funds or other factors.

Successful Applicants

Receipt of a notification letter selecting an application for award negotiations does not authorize the applicant to commence performance of the project. If an application is selected for award negotiations, it is not a commitment by DOE to issue an award. Applicants do not receive an award until award negotiations are complete and the Grants and Agreements Officer executes the funding agreement, accessible by the recipient in FedConnect.

The award negotiation process may take several months. Applicants must designate a primary and a backup point-of-contact in OCED eXCHANGE with whom DOE will communicate to conduct award negotiations.

The applicant must be responsive during award negotiations by providing requested documentation, including documentation that DOE requests after selection, and must meet the negotiation deadlines. If the applicant fails to do so or if award negotiations are otherwise unsuccessful, DOE will cancel the award negotiations and rescind the selection. DOE reserves the right to terminate award negotiations at any time for any reason. See the *NOFO Supplemental Requirements* document located on the Funding Opportunities page for more information.

Alternate Selection Determinations

In some instances, an applicant may receive a notification that its application was not selected for award and DOE designated the application to be an alternate. As an alternate, DOE may consider the application for Federal funding in the future. A notification letter stating the application is designated as an alternate does not authorize the applicant to commence performance of the project. DOE may ultimately determine to select or not select the application for award negotiations.

Unsuccessful Applicants

DOE shall promptly notify in writing each applicant whose application has not been selected for award or whose application cannot be funded because of the unavailability of appropriated funds.

Award Conditions and Reporting

Recipients of an award made under this funding opportunity must comply with all applicable Federal, state, and local laws, regulations, DOE policy and guidance, instructions in this funding opportunity, and the award terms and conditions. Recipients must require subrecipients' compliance with all applicable requirements. Reporting requirements are identified on the Federal Assistance Reporting Checklist, attached to the award agreement. For more information, see Reporting and the *NOFO Supplemental Requirements* document located on the Funding Opportunities page.

STEP 5:
LEARN ABOUT POST-SELECTION AND POST-AWARD REQUIREMENTS

IN THIS STEP

Post-Selection Information Requests and Submissions

To reduce burden in the application process required under Memorandum M-24-11 Reducing Burden in the Administration of Federal Financial Assistance, DOE has instituted Post Selection Information Requests and Submissions procedures. These procedures allow certain elements of an application to be submitted later in the application process, either prior to merit review or after merit review when the application is under consideration for funding.

Applicants will be notified (primarily by e-mail) when Post Selection Information is needed. This notification is not a Notice of Award, nor should it be construed to be an indicator of possible funding. Applicants should only submit this information when requested. DOE will notify an applicant as to what documents and materials to submit, the format required and where and when to submit.

The Post-Selection Information Requests and Submissions are detailed in the *NOFO Supplemental Requirements* document located on the Funding Opportunities page. Please review this document prior to applying. NOTE: These requirements are not requested during the initial application process.

Post-Award Requirements and Administration

If applicants are selected for funding DOE will require all award recipients to follow and accept requirements governed by laws and policies—both Federal government–wide and DOE- or program-specific. These post-award requirements include all National and Administrative Policy Requirements; financial assistance general Certifications and Representations; Build America, Buy America requirements; Davis-Bacon Act requirements; Foreign National Participation; Foreign Entity Participation and Foreign Work Disclosures; Bipartisan Infrastructure Law-Specific Requirements; Fraud, Waste and Abuse requirements; Safety, Security, and Regulatory requirements; and Environmental Review in Accordance with National Environmental Policy Act requirements.

These post-award Requirements and Administration are detailed in the *NOFO Supplemental Requirements* document (located on the Funding Opportunities page) which provides the requirements that all DOE award recipients must follow. Please review this document prior to applying.

Terms and Conditions

The OCED award terms and conditions are determined by statutory, regulatory, and policy requirements, as well as the circumstances of each individual award. If selected for funding the applicant must apply the terms and conditions of the award to all subrecipients (and contractors, as appropriate). The award terms will consist of the three distinct documents, the Cooperative Agreement Standard Terms and Conditions, Cooperative Agreement Program and Award-Specific Terms and Conditions, and Cooperative Agreement Intellectual Property Terms and Conditions.

The Cooperative Agreement Standard Award Terms and Conditions, located on the Award Terms and Conditions page, apply to all OCED awards.

The Program and Award-Specific and the Intellectual Property Terms and Conditions will be negotiated for each award.

Reporting

DOE must measure project performance to show achievement of program goals and objectives, share lessons learned, improve program outcomes, and foster the adoption of promising practices. DOE and the selectee will establish project vision, goals and objectives during negotiations and incorporate them into the award terms. Projects awarded may be required to negotiate agreements with DOE National Laboratories to ensure quality data can be collected from demonstration projects and proprietary information is sufficiently protected.

To clearly communicate the specific reporting requirements to meet the program and project goals and objectives in the Federal award, DOE combined all reporting into one document, the Federal Assistance Reporting Checklist. This document provides any expected outcomes, indicators, targets, baseline data, or data collections that the applicant will be responsible for measuring and reporting. The Federal Assistance Reporting Checklist (FARC) is part of the award agreement.

DOE may require specific data collection to track progress toward key departmental goals: ensuring justice and equity, investing in quality jobs, boosting domestic manufacturing, reducing greenhouse gas emissions, and advancing a pathway to private sector deployment. Examples of data that may be collected include:

- New manufacturing production or recycling capacity
- Jobs data, including:
    - Number and types of jobs provided, wages and benefits paid
    - Workforce demographics, including local hires
- Efforts to minimize risks of labor disputes and disruptions
- Dollar value of contributions to worker training; number of new employee certificates and training credentials; ratio of apprentice- to journey-level workers employed
- Number of individuals trained, number of trainees placed in new full-time employment, number of trainings partnering with community-based organizations or labor unions
- Justice and equity data, including:
    - Underrepresented businesses acting as vendors and subcontractors for bids on supplies, services, and equipment
    - Value, number, and type of partnerships with Minority Serving Institutions (see Program Policy Factors for details)
    - Stakeholder engagement events, community engagement process
    - Other relevant indicators from the Community Benefits Plan
- Number, type and efficiency rating of energy efficient and clean energy equipment installed
- Number, type and capacity rating of generation and storage equipment installed

See the *NOFO Supplemental Requirements* document located on the Funding Opportunities page for more information.

STEP 6:
CONTACTS AND SUPPORT

IN THIS STEP

Agency Contacts

Program and solicitation questions

OCED Energy Improvements in Rural or Remote Areas

Project Management Division
U.S. Department of Energy, Office of Clean Energy Demonstrations
Email: ERA2024@hq.doe.gov

Note that DOE staff are only allowed to communicate with applicants about this funding opportunity by posting responses to questions received through this email address above.

You must submit questions to this email address (ERA2024@hq.doe.gov) at least three business days before the concept paper or application due date and time.

OCED eXCHANGE

If you need help with the eXCHANGE system, please contact OCED-ExchangeSupport@hq.doe.gov.

Grants.gov

Grants.gov provides 24/7 support. You can call 1-800-518-4726 or email support@grants.gov. Hold on to your ticket number.

SAM.gov

If you need help, you can call 866-606-8220 or live chat with the Federal Service Desk.

Helpful Websites

- Office of Clean Energy Demonstrations | Department of Energy
- OCED Application Process
- Applicant Eligibility Guidance