

CITY OF UNALASKA
UNALASKA, ALASKA

RESOLUTION 2022-47

A RESOLUTION OF THE UNALASKA CITY COUNCIL SUPPORTING AN ALASKA ENERGY AUTHORITY RENEWABLE ENERGY FUND ROUND 15 GRANT APPLICATION IN THE AMOUNT OF \$4,000,000 FOR THE FINAL DESIGN AND CONSTRUCTION OF THE WIND ENERGY PROJECT

WHEREAS, the City of Unalaska has determined that it is in the best interests of the residents of the City of Unalaska to investigate alternative power sources; and

WHEREAS, the Wind Energy Project was funded as part of the approved FY2018 CMMP; and

WHEREAS, three Budget Amendment Ordinances have increased funding for the Project since its inception; and

WHEREAS, the December 14, 2021, Budget Amendment accepted an award of \$139,000 in Alaska Energy Authority Grant Funds from a previous round of funding; and

WHEREAS, the City of Unalaska has the opportunity to apply for Round 15 of the Alaska Energy Authority's Renewable Energy Fund Grant Program to continue the development of this project to Final Design and Construction; and

WHEREAS, City Council will be requested to accept grant funds and provide City funds to complete the project if the grant application is successful.

NOW THEREFORE BE IT RESOLVED that the Unalaska City Council supports the submission of an Alaska Energy Authority Renewable Energy Fund Round 15 Grant Application in the Amount of \$4,000,000 for the Final Design and Construction of the Wind Energy Project.

PASSED AND ADOPTED by a duly constituted quorum of the Unalaska City Council on November 22, 2022

Vincent M. Tutiakoff, Sr.
Mayor

ATTEST:

Marjie Veeder, CMC
City Clerk

MEMORANDUM TO COUNCIL

To: Mayor and City Council Members
From: Steve Tompkins, Director of Public Utilities
Bob Cummings, City Engineer
Through: Chris Hladick, Interim City Manager
Date: November 16, 2022
Re: Resolution 2022-47: Supporting an Alaska Energy Authority Renewable Energy Fund Round 15 Grant Application in the Amount of \$4,000,000 for the Final Design and Construction of the Wind Energy Project

SUMMARY: Resolution 2022-47 will approve the City submitting an application for an Alaska Energy Authority (AEA) Renewable Energy Fund (REF) Round 15 Grant Application for the Final Design and Construction of the Wind Energy Project. The amount of grant funding requested is \$4,000,000. The Grant Application will be prepared by the City Engineer, Bob Cummings, and the engineer of record for the City for this Project, Douglas Vaught of V3 Energy, LLC. The application deadline is December 5, 2022.

PREVIOUS COUNCIL ACTION: In 2003, Unalaska City Council approved the Wind Integration Assessment Project through Ordinance 2003-11. In FY2018, Council funded the Wind Energy Project through Capital Budget Ordinance 2017-07. In 2017, Council entered into an Agreement with V3 Energy, LLC to begin to perform Phase II – IV of the Project for \$48,481 via Resolution 2017-63, moving forward with Phase II work. Budget Amendment Ordinance 2018-12, approved and adopted October 23, 2018, added \$220,000 to the Engineering Services line item of the Project's budget to begin the Phase III work. Budget Amendment Ordinance 2019-17, approved and adopted on January 14, 2020, provided an additional \$75,000 for Phase III. Budget Amendment Ordinance 2021-16, approved December 14, 2021, accepted \$139,000 in Grant Funding from the Alaska Energy Authority Renewable Energy Fund, the same program Staff proposes to apply to for additional funding via Resolution 2022-47.

BACKGROUND: The Wind Energy Project will be comprised of 5 phases should this application be supported by Council and funded by AEA REF:

- Phase I: Past Assessments. Complete.
- Phase II: Pre-Design and Site Selection. Complete
- Phase III: Data Collection and Analysis. 90% complete
- Phase IV: Feasibility and Design. The feasibility study is currently in progress and is funded through the prior AEA Grant.
- Phase V: Construction (should funds be made available to proceed).

From 2003 to 2005, a Phase 1 analysis of the feasibility for wind energy in Unalaska was conducted by Northern Power Systems, however, Phase II of that project was not realized at that time. Local interest in renewable energy and the availability of new technology led the City of Unalaska Department of Public Utilities to issue a Request for Qualifications for Phase II – IV of the Wind Energy Project. V3 Energy, LLC was awarded the work.

MET towers were set up at four locations around Unalaska and Doug Vaught of V3 Energy analyzed the data collected from the towers and generated the *City of Unalaska Wind Power Development and Integration Assessment Project, Wind Resource Assessment Report* dated February 18, 2022, and presented to Council on November 10, 2022.

Resolution 2022-47 before the Council tonight will support the City's Grant Application for an additional round of AEA REF monies to fund the balance of Phase IV Final Design as well as Phase V Construction.

DISCUSSION: Staff believes requesting additional funding via this AEA REF Round 15 Grant Application to continue moving this project forward is in the best interests of the City and its residents and businesses. Preliminary analysis shows that grant monies along with production tax credits available through the Inflation Reduction Act of 2022 make a significant contribution to making wind power economically feasible in Unalaska. Staff feels this is an opportune time to attempt to obtain grant funds. When the grant awardees are announced (approximately in June, 2023), the feasibility study will be complete, and these results can inform future council action. At this time there is no financial commitment for the City by applying. If this grant effort is successful, City Council would be requested to approve the acceptance of grant funds and approve the City's contribution to the project.

ALTERNATIVES: Council could elect to not pursue this grant opportunity and wait until the feasibility study is complete before deciding to attempt to obtain grant funding. The risk with this approach is there may not be grant funding available at this time.

FINANCIAL IMPLICATIONS: At this time the only financial implication to the City related to the grant application is the fee from V3 Energy to assist staff to prepare the AEA REF15 grant application. This fee will be less than \$3,120. This project has \$67,119 of city appropriated funds (non-grant) available from which this grant preparation assistance fee could be paid from. If the grant is successful, City Council would then be requested to approve any City funds required for the project construction and to accept grant funds. Grants are awarded by the legislature in the State budget which is expected to be finalized in June of 2023.

LEGAL: Not applicable to this Resolution.

STAFF RECOMMENDATION: Staff recommends approval of Resolution 2022-47. A successful application would provide funds towards wind development in Unalaska with the potential to make wind development economically advantageous to the City and its residents.

PROPOSED MOTION: I move to approve Resolution 2022-47.

CITY MANAGER COMMENTS: I concur with the Staff Recommendation.

ATTACHMENTS:

V3 Energy PowerPoint presentation to City Council on November 10, 2022

Status of City of Unalaska Wind Power Development and Integration Assessment Project

Presentation to City Council

Douglas Vaught, P.E.

V3 Energy, LLC

November 10, 2022

History of project

- Wind energy feasibility study of Naknek and Unalaska
 - Dames and Moore, 1999, for Alaska Division of Energy
 - No data collected
- **Phase I**, wind integration assessment
 - Northern Power Systems, 2005, draft report
 - No data collected
- RFP for **Phase II to IV**
 - Awarded to V3 Energy, LLC, Aug. 2017
- **Phase II**, develop data collection plan
 - Site options, integration, historical, environmental, and permitting reviews, and data collection plan
 - Report Aug. 2018

History, continued

- **Phase III**, implement data collection plan
 - Install meteorological (met) towers
 - Collect wind data
 - Wind Resource Assessment report, Feb. 2022
- **Phase IV**, pre-development plan
 - Analyze effects on powerhouse
 - Assess development paths
 - Economic analyses
 - In progress

Phase II Site Options

- Unalaska terrain complex and constrained
- Airspace restrictions
- Limited electrical distribution network
- Lower Pyramid Valley obvious candidate
- Hog Island alternate relatively large area
- Ballyhoo has higher elevation access, but very high modeled wind speeds, icing, steep switchback road, WWII National Historic Area

Met towers (guyed, tubular)

- Lower Pyramid Valley (near Veronica Lake), 60 meter (197 ft.), 10/2018 to 8/2021
- Hog Island, 60 meter (197 ft.), 8/2019 to 4/2021
- Icy Creek Reservoir, 34 meter (112 ft.), 10/2018 to 10/2019
- Bunker Hill summit, 10 meter (33 ft.), 10/2018 to 6/2020

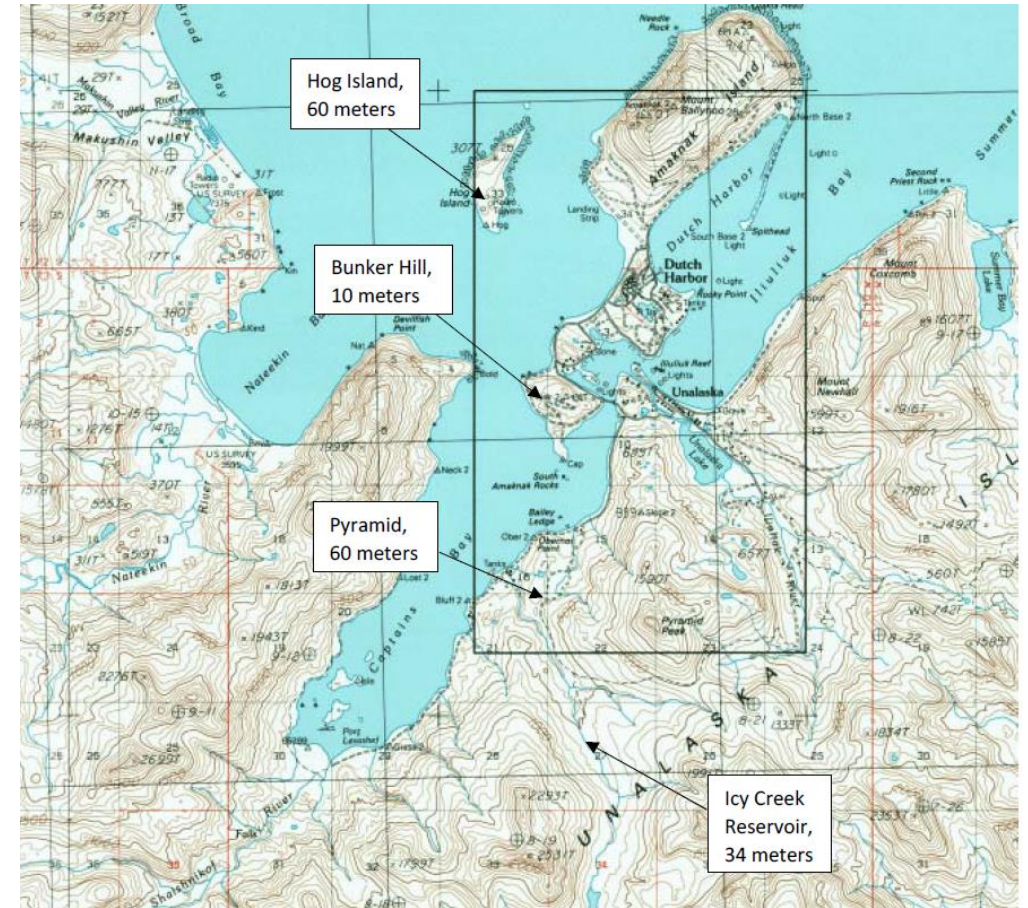
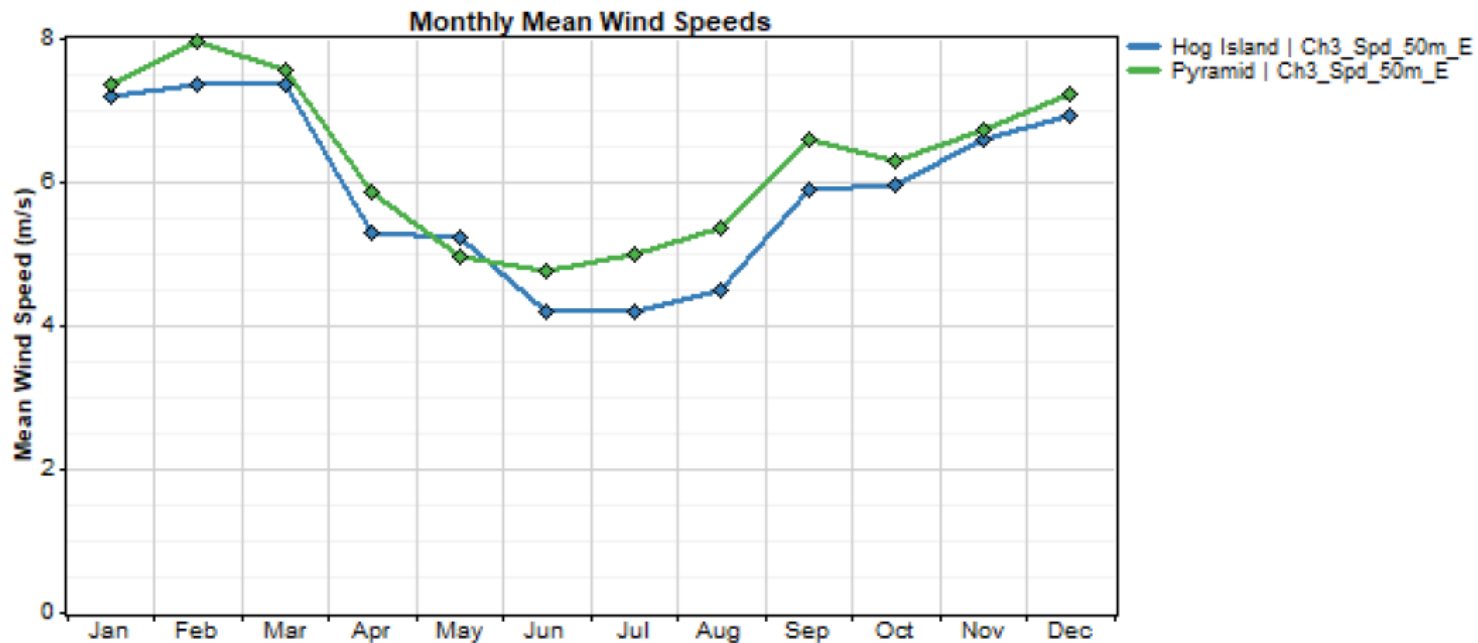




Figure 2: Pyramid 60-meter met tower (Andy Dietrich aerial photo)

Pyramid vs. Hog Island

- Pyramid Valley: 6.84 m/s (15.3 mph) mean speed at 60 m, wind power class 5 (of 7), 51.4 m/s (115 mph) max. gust
- Hog Island: 6.00 m/s mean wind speed at 60 m level, wind power class 3, 40.7 m/s (91 mph) gust, instrumentation problems



Pyramid wind summary

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 3 rd ed. classification	Class IIB

Alaska Energy Authority's Renewable Energy Fund (REF)

- Round 13 (2020) grant award (\$139K) to COU for wind power feasibility (signed 1/2022 due to appropriation delay)
- Remaining Phase III and IV tasks transferred to REF13 project
- Accomplished to date:
 - Site wind flow and power system modeling
 - Hired HDL 5/2022 to review WTP geotech studies for foundation design
 - Scope mod 6/2022 for pre-design to enable application for construction
 - Hired EPS 7/2022 to assess interconnection and powerplant integration
 - Hired STG 10/2022 to assess construction requirements and costs
 - Requested EWT turbine cost quote 9/2022

EWT DW58-1000

- Emergya Wind Technologies, The Netherlands
 - 58 m (190 ft.) rotor diameter, 1,000 kW capacity
 - Gearless/direct drive, synchronous generator, tubular tower
 - Tip heights of 250 ft./325 ft. (46 m/69 m hub hts.)
 - Designed for isolated grids (like Unalaska)
 - Survivability wind speed 59.5 m/s (133 mph)
 - Nine in rural Alaska (2 in Kotzebue, 2 in Nome, 2 in Delta Junction, 1 in Bethel, 1 in St. Mary's, 1 soon in Stebbins)
 - All are previous generation DW52-900 and DW54-900 models, (survivability of 59.5 and 52.5 m/s respectively)



EWT DW54-900 HH75 in Kotzebue

Possible Project

- One or two EWT 58-1000 wind turbines
 - COU land between WTP and Veronica Lake
 - Generate ~ 2,260 MWh/yr/turbine (approx. 4.8% of 2019-2022 electric load demand)
- Cost estimate
 - \$8.6M, AEA estimated cost for 1 MW wind
 - \$13.35M AEA estimated cost for 2 MW wind
 - Costs based on Alaska reference projects
 - Most are summer-only barge access on permafrost soils
 - Note lower cost/kW for 2+ turbines
- Working on Unalaska-specific price estimates and quotes

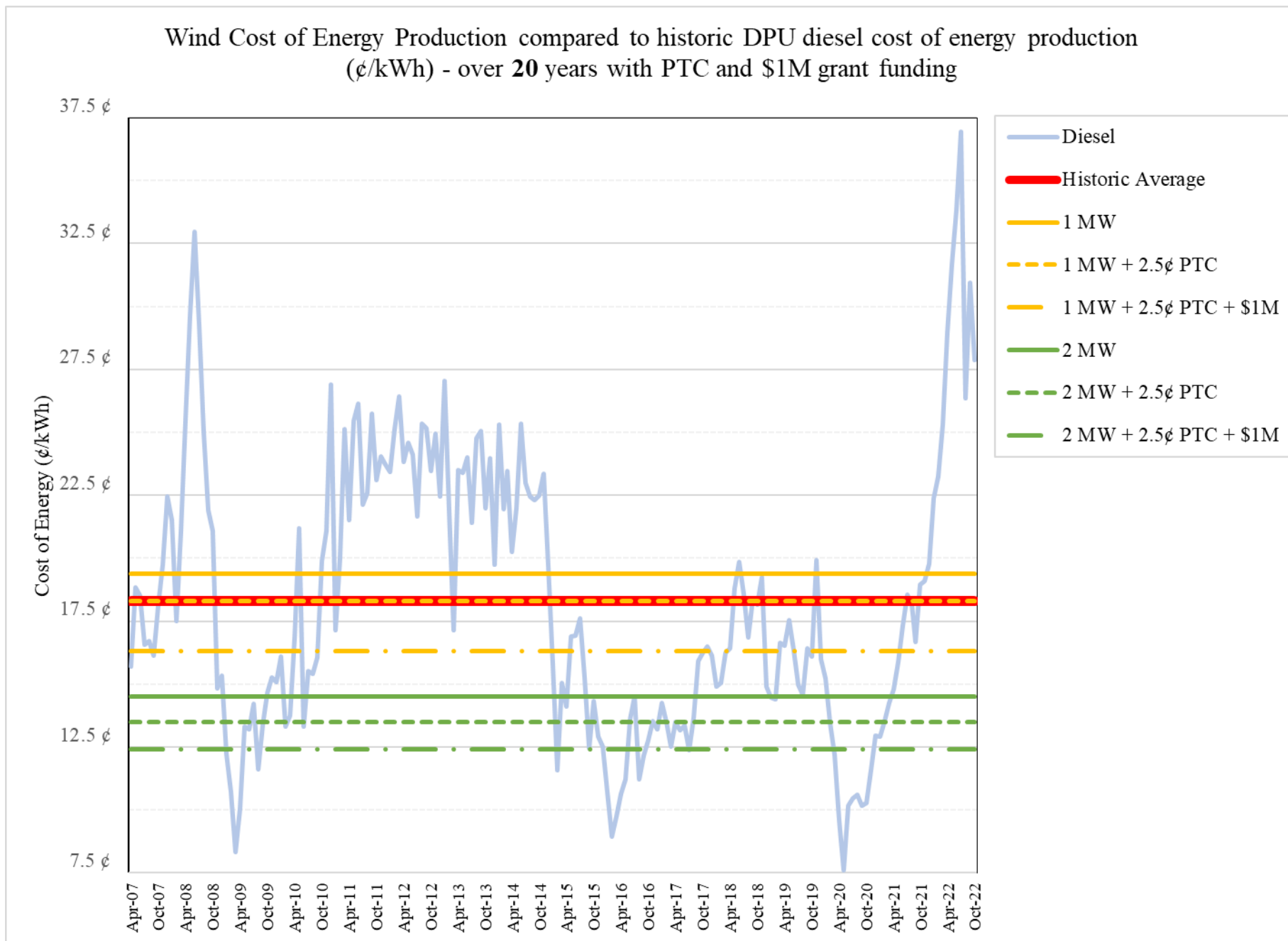
Funding Opportunities

- AEA Renewable Energy Fund Round 15
 - Applications due: 12/5/2022
 - AEA makes recommendations to legislature: 3/15/2023
 - Legislative approval and signed by governor: 6/30/2023
 - Award effective date: 7/1/2023
 - \$4M maximum award for design/construction project
- Inflation Reduction Act
 - 0.5¢-to-2.5¢/kWh production tax credit (PTC) for 10 years

Wind vs. Diesel Cost of Energy

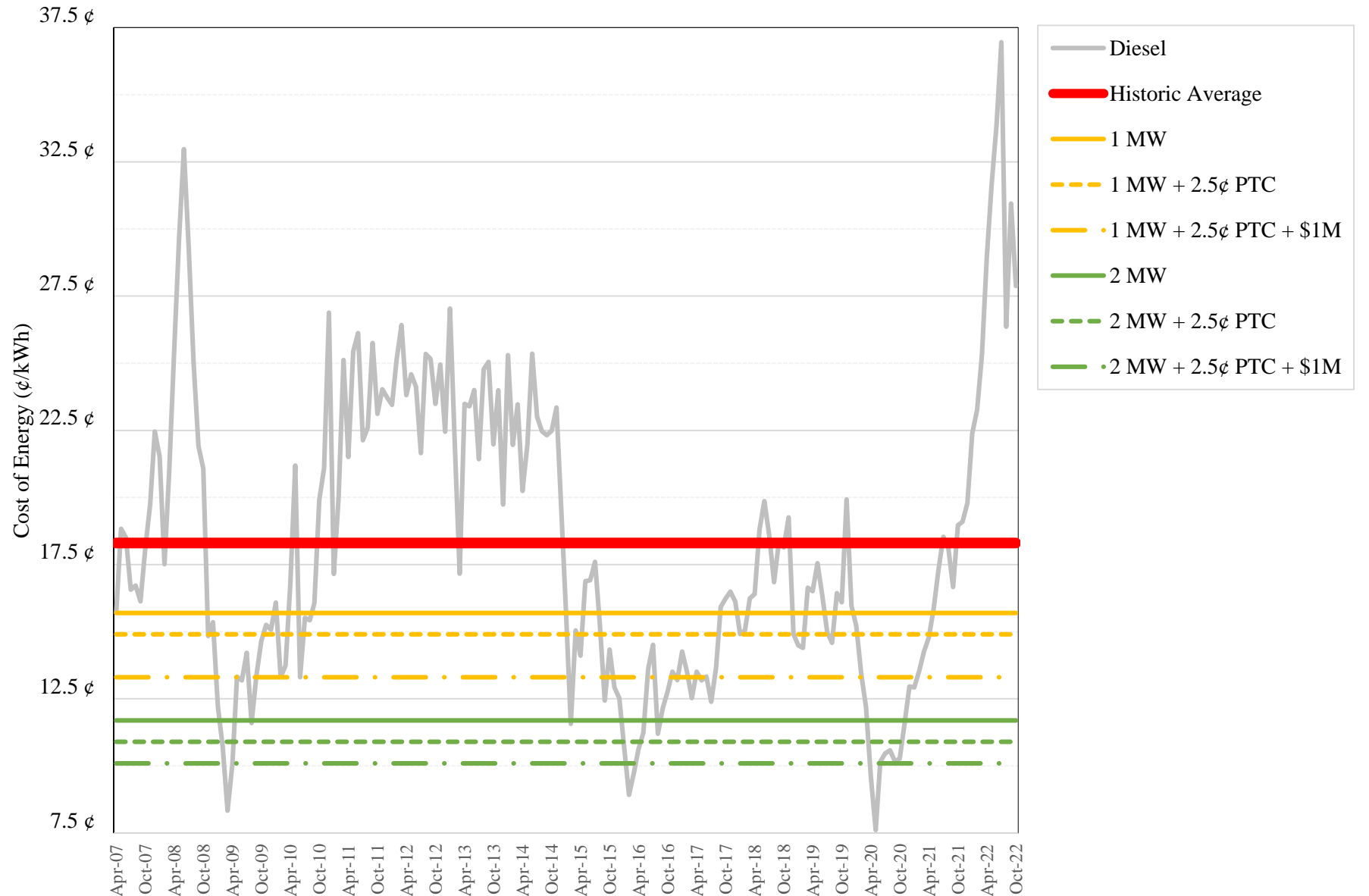
Assumptions:

- 20-yr project life
- 2.5¢ Production Tax Credit (PTC)
- \$1M grant



Wind vs. Diesel Cost of Energy

Wind Cost of Energy Production compared to historic DPU diesel cost of energy production (¢/kWh) - over 25 years with PTC and \$1M grant funding



Assumptions:

- 25-yr project life
- 2.5¢ Production Tax Credit (PTC)
- \$1M grant

Wind Project Cost Scenarios

Scenario	20 yr	Difference from Historic Average	25 yr	Difference from Historic Average	Captial Outlay (millions)
	¢/kWh		¢/kWh		
2007-2022 Avg DPU cost of energy production	18.3 ¢		18.3 ¢		
1 MW wind cost of energy	19.4 ¢	1.1 ¢	15.7 ¢	-2.6 ¢	\$ 8.6
1 MW + 2.5¢ PTC	18.3 ¢	0. ¢	14.9 ¢	-3.4 ¢	\$ 8.6
1 MW + 2.5¢ PTC + \$1M grant	16.3 ¢	-2. ¢	13.3 ¢	-5. ¢	\$ 7.6
1 MW + 2.5¢ PTC + \$2M grant	14.2 ¢	-4.1 ¢	11.6 ¢	-6.7 ¢	\$ 6.6
1 MW + 2.5¢ PTC + \$4M grant	10.1 ¢	-8.2 ¢	8.4 ¢	-9.9 ¢	\$ 4.6
2 MW wind cost of energy	14.5 ¢	-3.8 ¢	11.7 ¢	-6.6 ¢	\$ 13.3
2 MW + 2.5¢ PTC	13.5 ¢	-4.8 ¢	10.9 ¢	-7.4 ¢	\$ 13.3
2 MW + 2.5¢ PTC + \$1M grant	12.4 ¢	-5.9 ¢	10.1 ¢	-8.2 ¢	\$ 12.3
2 MW + 2.5¢ PTC + \$2M grant	11.4 ¢	-6.9 ¢	9.3 ¢	-9. ¢	\$ 11.3
2 MW + 2.5¢ PTC + \$4M grant	9.4 ¢	-8.9 ¢	7.6 ¢	-10.7 ¢	\$ 9.3