

Alliance for Sustainable Energy, LLC  
operator of the  
National Renewable Energy Laboratory

Strategic Partnership Projects  
**Funds-In Agreement—Nonfederal Sponsor**

**Standard Agreement Face Page**

|   |   |            |                           |      |                                     |            |  |
|---|---|------------|---------------------------|------|-------------------------------------|------------|--|
| <p>1. Sponsor Name &amp; Address<br/>Port of Seattle<br/>2711 Alaskan Way<br/>Seattle, WA 98121</p>   | <p>4. Funds-In Agreement Number<br/>FIA-21-17442-0</p>  |            |                           |      |                                     |            |  |
| <p>2. Estimated Performance Period (in months) 15</p>   | <p>5. Project Title<br/>Central Mechanical Plant and Waterfront Clean Energy Strategic Plan</p> |            |                           |      |                                     |            |  |
| <p>3. Financial</p> <table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 80%;">Contractor Cost</td> <td style="text-align: right;">\$ 150,000</td> </tr> <tr> <td>DOE Administrative Charge</td> <td style="text-align: right;">\$ 0</td> </tr> <tr> <td>Total Not-to-Exceed Cost to Sponsor</td> <td style="text-align: right;">\$ 150,000</td> </tr> </table> <p>Amount of first 90-day advance \$ 0<br/>See attached invoice for advance payment instructions.</p> | Contractor Cost   | \$ 150,000 | DOE Administrative Charge | \$ 0 | Total Not-to-Exceed Cost to Sponsor | \$ 150,000 | <p>6. Agreement Terms and Conditions<br/>This agreement consists of (1) this Standard Agreement, (2) Terms and Conditions, and (3) the following:</p> <ul style="list-style-type: none"> <li>a. Appendix A—Statement of Work</li> <li>b. Appendix B—Patent Rights</li> <li>c. Appendix C—Rights in Technical Data</li> </ul> |
| Contractor Cost   | \$ 150,000  |            |                           |      |                                     |            |  |
| DOE Administrative Charge   | \$ 0  |            |                           |      |                                     |            |  |
| Total Not-to-Exceed Cost to Sponsor   | \$ 150,000  |            |                           |      |                                     |            |  |

|  |  |
|--|--|
| <p>7. Sponsor—Representatives</p> <p>Technical representative<br/>Stephanie Meyn<br/>Port of Seattle<br/>2711 Alaskan Way<br/>Seattle, WA 98121<br/>206.787.3678</p> | <p>9. Contractor—Representatives</p> <p>Technical representative<br/>Scott Cary<br/>National Renewable Energy Laboratory<br/>15013 Denver West Parkway, MS RSF 401<br/>Golden, CO 80401<br/>303.384.7169</p> |
| <p>8. Contract representative<br/>Stephanie Meyn<br/>Port of Seattle<br/>2711 Alaskan Way<br/>Seattle, WA 98121<br/>206.787.3678</p>                                 | <p>10. Contract representative<br/>Katheryn Lennon<br/>National Renewable Energy Laboratory<br/>15013 Denver West Parkway, MS RSF 450-6<br/>Golden, CO 80401<br/>303.384.7378</p>                            |

|  |   |                   |              |
|--|---|-------------------|--------------|
| <p>11. Sponsor Acceptance<br/>Stephen P. Metruck<br/>Executive Director<br/>Port of Seattle<br/>2711 Alaskan Way<br/>Seattle, WA 98121</p> | <p>12. Contractor Acceptance<br/>Anne Miller, Director Technology Transfer<br/>Alliance for Sustainable Energy, LLC<br/>Operator of the National Renewable Energy Laboratory<br/>15013 Denver West Parkway<br/>Golden, CO 80401</p> |                   |              |
| <p>Signature:</p>  | <p>Date:</p>  | <p>Signature:</p> | <p>Date:</p> |

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Strategic Partnership Projects  
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**General Terms and Conditions**

(together with the face page and appendices, hereinafter referred to as “Agreement”)

**Article I. Parties to the Agreement.** The U.S. Department of Energy facility contractor, Alliance for Sustainable Energy, LLC, manager of the National Renewable Energy Laboratory under Contract No. DE-AC36-08GO28308 (“Prime Contract”) and hereinafter referred to as the “Contractor” or “NREL,” has been requested by the “Sponsor,” as identified in Block 1 on page 1 of this Agreement, to use best efforts to perform the work set forth in the Statement of Work, attached hereto as Appendix A. Sponsor is a municipal corporation under Title 53 of the Revised Code of Washington (“RCW”), with authority to enter into this agreement pursuant to RCW 39.34. The Contractor and Sponsor are hereinafter collectively referred to as the “Parties” or individually as a “Party.” It is understood by the Parties that the Contractor is obligated to comply with the terms and conditions of its facility Prime Contract with the United States Government (hereinafter called the “Government”) represented by the United States Department of Energy (hereinafter called the “Department” or “DOE”) when providing goods, services, products, materials, or information to the nonfederal Sponsor under this Agreement.

**Article II. Term of the Agreement.** The Contractor’s estimated period of performance for completion of the Statement of Work is included in Block 2 on page 1 of this Agreement. The term of this Agreement shall be effective as of the later date of (1) the date on which it is signed by the last of the Parties thereto or (2) the date on which funds are received and allocated to this Agreement. Unless terminated earlier, this Agreement shall terminate on December 31, 2022.

**Article III. Costs.**

1. The Contractor estimated cost for the work to be performed under this Agreement is stated in Block 3 on page 1 of this Agreement.
2. The Contractor has no obligation to continue or complete performance of the work at a cost in excess of the original estimated cost or any subsequent amendment.
3. The Contractor agrees to provide at least thirty (30) days’ notice to the Sponsor if the actual cost to complete performance will exceed its estimated cost.

**Article IV. Funding and Payment.** The Parties acknowledge that in its capacity as the Port of Seattle Washington, the Sponsor is prohibited by the Revised Code of Washington 42.24.080, Article VIII sections 5 and 7 of the Washington State Constitution and/or other laws, constitutional prohibitions or regulations from advancing funds for this reimbursable Funds-In-Agreement. In lieu of advance funding, Contractor intends to use the DOE Cost of Strategic Partnership Projects Program under the Departmental Administration appropriation. The Sponsor shall pay to the Contractor the actual costs incurred in performance of the work described in this Agreement and the Contractor shall have no obligation to perform in the absence of payment of such actual costs. At the end of the first month the Contractor will invoice the Sponsor in an amount sufficient to pay the first month’s actual incurred costs and thereafter invoice the Sponsor monthly for actual incurred costs until termination or completion of the performance of work under this Agreement.

The Contractor will invoice the Sponsor each billing cycle. Sponsor’s payment shall be due no later than thirty (30) days after receipt of Contractor’s invoice. Payment shall be made directly to the Contractor who will then notify the DOE as appropriate. Upon termination or completion, any excess funds shall be refunded by the Contractor to the Sponsor.

**Article V. Source of Funds.** The Sponsor hereby represents that, if the funding it brings to this Agreement has been secured through other agreements, such other agreements do not have any terms and conditions (including

intellectual property terms and conditions) that conflict with the terms and conditions of this Agreement.

**Article VI. Tangible Personal Property.** Upon termination of this Agreement, tangible personal property or equipment produced or acquired in conducting work under this Agreement shall be owned by the Sponsor. Tangible personal property or equipment produced or acquired as part of this Agreement will be accounted for and maintained during the term of the Agreement in the same manner as DOE property or equipment. Costs incurred for disposition of property shall be the responsibility of the Sponsor and included in costs allocated in Article III or paid separately by the Sponsor.

**Article VII. Publication Matters.** The publishing Party shall provide the other Party a 60-day period in which to review and comment on proposed publications that disclose any of the following: technical developments and/or research findings generated in the course of the Agreement or identify Proprietary Information (as defined in Appendix C). The publishing Party shall not publish or otherwise disclose Proprietary Information identified by the other Party, except as mandated by law.

The Sponsor will not use the name of Contractor, the Government, or their employees in any promotional activity, such as advertisements, with reference to any product or service resulting from this Agreement, without prior written approval of the Government and Contractor.

**Article VIII. Legal Notice.** The Parties agree that the following legal notice shall be affixed to each report furnished to the Sponsor under this Agreement and to any report resulting from this Agreement which may be distributed by the Sponsor:

#### DISCLAIMER

This report may contain research results which are experimental in nature. Neither the United States Government, nor any agency thereof, nor Facility Contractor, nor any of their employees, makes any warranty, express or implied, or assumes any legal responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference to any specific commercial product, process, or service by its trade name, trademark, manufacturer, or otherwise, does not constitute or imply an endorsement or recommendation by the United States Government or any agency thereof, or by the Facility Contractor. The United States Government reserves for itself a royalty-free, worldwide, irrevocable, non-exclusive license for Governmental purposes to publish, disclose, distribute, translate, duplicate, exhibit, prepare derivative works, and perform any such data included herein. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof, or by the Facility Contractor and shall not be used for advertising or product endorsement purposes.

**Article IX. Disclaimer.** THE GOVERNMENT AND THE CONTRACTOR MAKE NO EXPRESS OR IMPLIED WARRANTY AS TO THE CONDITIONS OF THE RESEARCH OR ANY INTELLECTUAL PROPERTY, GENERATED INFORMATION, OR PRODUCT MADE OR DEVELOPED UNDER THIS AGREEMENT, OR THE OWNERSHIP, MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE OF THE RESEARCH OR RESULTING PRODUCT; THAT THE GOODS, SERVICES, MATERIALS, PRODUCTS, PROCESSES, INFORMATION, OR DATA TO BE FURNISHED HEREUNDER WILL ACCOMPLISH INTENDED RESULTS OR ARE SAFE FOR ANY PURPOSE INCLUDING THE INTENDED PURPOSE; OR THAT ANY OF THE ABOVE WILL NOT INTERFERE WITH PRIVATELY OWNED RIGHTS OF OTHERS. NEITHER THE GOVERNMENT NOR THE CONTRACTOR SHALL BE LIABLE FOR SPECIAL, CONSEQUENTIAL, OR INCIDENTAL DAMAGES ATTRIBUTED TO SUCH RESEARCH OR RESULTING PRODUCT, INTELLECTUAL PROPERTY, GENERATED INFORMATION, OR PRODUCT MADE OR DELIVERED UNDER THIS AGREEMENT.

**Article X. General Indemnity.** [Reserved]

**Article XI. Product Liability Indemnity.** To the extent permitted by Washington State law and except for any loss, liability, or claim resulting from any willful misconduct or negligent acts or omissions of the Government, the Contractor, or persons acting on their behalf (“Indemnified Parties”), the Sponsor agrees to hold harmless and

indemnify the Indemnified Parties against any losses, liabilities, and claims, including all damages, costs, and expenses, including attorney's fees, arising from personal injury or property damage occurring as a result of the making, using, or selling of a product, process, or service by or on behalf of the Sponsor, its assignees, or licensees, which was derived from the work performed under this Agreement.

For the purposes of this Article, neither the Government nor the Contractor shall be considered assignees or licensees of the Sponsor, as a result of reserved Government and Contractor rights. This Article shall apply only if the Sponsor was:

1. informed as soon and as completely as practical by the appropriate Indemnified Party of the allegation or claim;
2. afforded, to the maximum extent by applicable laws, rules, or regulations, an opportunity to participate in and control its defense; and
3. given all reasonably available information and reasonable assistance requested by the Sponsor.

No settlement for which the Sponsor would be responsible shall be made without the Sponsor's consent unless required by final decree of a court of competent jurisdiction.

**Article XII. Intellectual Property Indemnity—Limited.** [Reserved]

**Article XIII. Notice and Assistance Regarding Patent and Copyright Infringement.** Each Party shall report to the other Party, promptly and in reasonable written detail, each claim or allegation of infringement of any patent, copyright, trade secret or other intellectual property right based on the performance of this Agreement of which a Party has knowledge. In the event of any claim or suit against a Party based on such alleged infringement, the other Party shall furnish to the Party, when requested by the Party, all evidence and information in the possession of the other Party pertaining to such suit or claim.

**Article XIV. Patent Rights.** Terms and conditions regarding patent rights are set forth in Appendix B attached hereto and incorporated herein.

**Article XV. Rights in Technical Data.** Terms and conditions regarding rights in technical data are set forth in Appendix C attached hereto and incorporated herein.

**Article XVI. Background Intellectual Property.** Each Party may use the other Party's Background Intellectual Property identified in an appendix of this Agreement solely in performance of the Statement of Work. This Agreement does not grant to either Party any option, grant, or license to commercialize, or otherwise use the other Party's Background Intellectual Property. Licensing of Background Intellectual Property, if agreed to by the Parties, shall be the subject of separate licensing agreements between the Parties.

Each Party shall use reasonable efforts to list all relevant Background Intellectual Property in the appendix titled "Background Intellectual Property;" however, neither Party shall be liable to the other Party because of failure to list its Background Intellectual Property.

**Article XVII. Assignment and Notification.** Neither this Agreement nor any interest therein or claim thereunder shall be assigned or transferred by either Party, except as authorized in writing by the other Party to this Agreement, provided, however, the Contractor may transfer it to the Department, or its designee, with notice of such transfer to the Sponsor, and the Contractor shall have no further responsibilities except for the confidentiality, use, and/or non-disclosure obligations of this Agreement. The obligations of the Contractor set forth in this Agreement shall apply to any successor in interest continuing the operation of the National Renewable Energy Laboratory.

If the Sponsor intends to assign or transfer any interest in this Agreement to a third party or the Sponsor is merging or being acquired by a third party, the Sponsor shall notify the Contractor with details of the pending action for a determination. The Contractor shall reply in writing whether such transfer is acceptable or invoke the termination

clause.

**Article XVIII. Similar or Identical Services.** The Government and/or Contractor shall have the right to perform similar or identical services in the Statement of Work for other sponsors as long as the Sponsor's Proprietary Information is not utilized.

**Article XIX. Export Control.** Each Party is responsible for its own compliance with laws and regulations governing export control.

**Article XX. Disputes.** The Parties shall attempt to jointly resolve all disputes arising from this Agreement. In the event a dispute arises under this Agreement, the Sponsor is encouraged to contact Contractor's Technology Partnerships Ombudsman in order to resolve such dispute before pursuing third-party mediation or other remedies. If the Parties are unable to jointly resolve a dispute within 60 days, the Parties agree to submit the dispute to a third-party mediation process that is mutually agreed upon by the Parties.

**Article XXI. Entire Agreement and Modifications.**

1. This Agreement with its appendices contains the entire agreement between the Parties with respect to the subject matter hereof, and all prior representations or agreements relating hereto have been merged into this document and are thus superseded in totality by this Agreement.
2. Any agreement to materially change any terms or conditions of this Agreement or the appendices shall be valid only if the change is made in writing, executed by the Parties hereto, and approved by DOE.

**Article XXII. Termination.** This Agreement may be terminated by either Party, following thirty (30) days written notice to the other Party. If Article IV provides for advance funding, this Agreement may also be terminated by the Contractor in the event of failure by the Sponsor to provide the necessary advance funding. In the event of termination, either by the Sponsor or the Contractor (e.g. for lack of advance funding), the Sponsor shall be responsible for the Contractor's costs (including closeout costs), but in no event shall the Sponsor's cost responsibility exceed the total cost to the Sponsor as described in Article III, above.

It is agreed that any obligations of the Parties regarding Proprietary Information or other intellectual property will remain in effect, despite early termination of the Agreement.

**Article XXIII. Public Records Act.** Sponsor is a public agency subject to the Washington State Public Records Act, Chap. 42.56 RCW. Sponsor and Contractor shall each be responsible for fulfilling public records requests received by it under RCW 42.56 or the Freedom of Information Act (5 USC § 552), respectively, provided that the Parties shall cooperate and assist one another if needed. For clarity, such cooperation and assistance does not obligate either Party to provide records to the other Party. In the course of this Agreement, the Parties may exchange or share records that are confidential, sensitive, or otherwise exempt from public disclosure. The Parties shall treat confidential and security-sensitive records with the utmost care, and shall provide notice to one another of records requests to which confidential or security-sensitive records may be responsive. Each Party shall independently assert legally-applicable exemptions in response to records requests, provided that if the Parties disagree about whether exemptions are applicable to particular records, each Party shall have the option to provide the other Party notice and an opportunity to seek an injunction. Because the Parties are engaged in a joint undertaking, the common interest privilege shall apply to records that are exempt as attorney/client privileged or prepared in anticipation of litigation.

**Article XXIV. Records Maintenance.** The Parties to this Agreement shall each maintain books, records, documents and other evidence which sufficiently and properly reflect all direct and indirect costs expended by either party in the performance of the services. These records shall be subject to inspection, review or audit by personnel of both Parties, other personnel duly authorized by either party, the Office of the State Auditor, and federal officials so authorized by law. All books, records, documents, and other material relevant to this Agreement will be retained for six years after expiration and the Office of the State Auditor, federal auditors, and any persons duly authorized by the Parties shall have full access and the right to examine any of these materials during this period.

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**Funds-In Agreement—FIA-21-17442-0**

**Appendix A – Statement of Work**

**Notice:** By signing this Agreement, the Sponsor acknowledges in advance that its entity name and the title and non-proprietary description of the project are available for public release by the Contractor without further notice.

**I. Project Title:**

Central Utility Plant Redesign Optimization & Waterfront Clean Energy Electrification Study

**II. Non-Proprietary Description of Project:**

Provide technical assistance to assist in the Port of Seattle's net zero/carbon neutral/carbon negative 2050 goals.

**III. Background:**

Parties to this agreement are:

Contractor: Alliance for Sustainable Energy, operator of the National Renewable Energy Laboratory under Prime Contract No. DE-AC36-08GO28308 for the U.S. Department of Energy (DOE). Contractor has a facility at 15013 Denver West Parkway, Golden, CO 80401.

Sponsor: Port of Seattle (Port). Sponsor has a facility at 2711 Alaskan Way, Seattle, WA 98121

**IV. Statement of Work - Task Descriptions, Deliverables, and Estimated Completion Dates:**

a. Task Descriptions

**Task 1-Central Utility Plant (CUP)**

Seattle-Tacoma International Airport (SEA) is a top-ten U.S. airport, serving 51.8 million passengers and 453,549 metric tons of air cargo in 2019. The facility, part of the Port of Seattle is in one of the fastest growing metropolitan areas in the nation. The airport was one of the first airports in the nation to develop a comprehensive greenhouse gas inventory (2006) and begin setting goals to become carbon neutral by 2050.

The Port of Seattle has a net zero emission target for 2050 and has already been able to reach its 2030 emission reduction goal of 50% through the use of zero carbon electricity, low carbon fuels, and primarily due to renewable natural gas. With work progressing on these goals, legacy systems operating on fossil fuels are significant barriers to the Port meeting its emissions reduction targets. SEA Airport's aggressive emissions reduction goals require actions to be addressed years in advance to most cost effectively align with scheduled maintenance and facility upgrades.

The Port of Seattle has committed to addressing all new energy demand through conservation and renewable energy sources and the airport's Central Mechanical Plant natural gas usage is a

significant load that is being considered for optimization along with other emission sources at the Port.

### **Project Description**

The primary goals of this project are to identify opportunities for reducing emissions for the airport while expanding the thermal generation capacities for the primary central mechanical plant supporting the majority of terminal loads.

An existing central plant has four natural gas boilers that produces steam from natural gas for heating and eight electric chillers plus three water side economizing plate frame heat exchangers that produce chilled water for cooling. The plant has been in its current location approximately 50 years, with maintained, rebuilt, upgraded and replaced equipment over its lifetime. Three of the boilers are approximately 50 years old, 1 boiler 13 years old, 1 chiller 30 years old, 3 chillers 20 years and 4 chillers 15 years. As part of the Sustainable Airport Master Plan (SAMP), the airport is evaluating the ability to expand by approximately 24 gates to the north and expects to build a utilidor to the new facility. The existing system distributes steam to multiple terminal concourses via steam piping utilidors to hot water heat exchangers. Additional load on the facility is generated via the pre-conditioned air (PCA) heating system which is part of the highly efficient PCA cooling/heating system plant. Projected heating demand, with the addition of the 24 gates appears to exceed available capacity, based on peak demand. Concepts under consideration include expanding the existing central plant for heat generation, installing a new facility to service additional square footage or some other combination of solutions.

To this end, NREL will:

1. Provide feedback on any existing studies and guidance for future utility planning, including the Utility Master Plan (Mechanical Books from SD-4, SD-3, and SD-11)
2. Review existing plant operations, performance, loads and level of utilization.
3. After review of available data, review assumptions with SEA that will influence potential alternatives. Initial assumptions include low cost of electrical energy, aspirational goals for carbon reduction, limited space, and meeting future energy needs through conservation. Energy resiliency, the ability to recover from disruptive but infrequent events, will be evaluated as a potential assumption.
4. Develop conceptual-level concepts for the future state of the CMP. Technologies that may be considered include but are not limited to conversion of heating system from steam to hot water, geothermal ground source heat pumps, heat pump based central plant using heat recovery chillers, thermal storage, battery storage, combined heat and power, wastewater heat recovery, and other potential solutions regarding long term energy needs as requested.
5. Review potential concepts for the future state of the CMP with SEA key staff for refinement. This will include obtaining additional feedback on facility space limitations.
6. Assess proposed alternatives in relation to any existing overall energy strategy and potential reductions in emissions.
7. For the preferred solution, utilize the NREL REopt tool to provide a techno-economic analysis for the proposed mix of power and/or heat generation, existing and potential energy sources, thermal and electric storage, and demand optimization for primary loads of the central mechanical plant. Effort will include a preliminary review of assumptions with SEA, review of draft results of analysis and final results of efforts.

### **Data Requirements**

- Recent and 2021 Utility Master Plan documents
- Copies of relevant previous studies, including long range energy needs at the facility

- CMP process schematic with system specifications, operation requirements, constraints, and costs at a fidelity sufficient to perform the technoeconomic assessment
- CMP loads (hourly for year) and energy and water use and associated costs
- Projected future CMP loads under 3 different growth scenarios provided by SEA (no new terminals, SAMP near-term and long-term projects)
- Facility space limitations and analysis for future space use conducted as part of the SAMP

### **Task 1 Deliverables Table**

| <b>Task</b>             | <b>Deliverable</b>   | <b>Schedule</b>   |
|-------------------------|--|---|
| 1. Data Review          | a) Kick-off meeting  | Upon agreement effective date                               |
|                         | b) Data Collection   | 2 months  |
|                         | c) Review Available Data Related to CMP  | 1 month after receipt of all necessary data                 |
|                         | d) Review Assumptions related to CMP with SEA  | 1 month after data review                                   |
| 2. Develop Alternatives | a) Develop Alternatives  | 1 month following receipt of comments regarding assumptions |
|                         | b) Review Alternatives with SEA, refine alternatives                                       | 2 months following receipt of comments                      |
| 3. Run Re-Opt Tool      | Techno-economic analysis – Draft results   | 4 months after receipt of all necessary data                |
| 4. Final Report         | a) A draft report as described above   | Within 1 month of receipt of Port comments on draft results |
|                         | b) A final report as described above   | Within 1 month of receipt of Port comments on draft report  |
| 5. General              | General Advisory Services and Technical Assistance related to the airport’s CMP evaluation | As needed.  |

### **Task 2-Waterfront Clean Energy Electrification Study**

In the Strategic Objectives section of the Century Agenda, the Port of Seattle has committed to addressing all new energy demand through conservation and renewable energy. In addition, the Port of Seattle has committed to reducing air pollutants and GHG in a stepwise function to eventually meet the goal of carbon neutral or carbon negative by 2050 for all ground and maritime transportation needs.

Under this mandate, the Port of Seattle has undertaken the Seattle Waterfront Clean Energy Strategic Plan (SWCESP) initiative. The Port of Seattle has retained a consultant to develop various components of this strategic plan (e.g., project planning, vision/goals, current/forecasted energy needs, planning scenarios, and implementation strategy). To complement this analysis, the Port of Seattle would like to utilize NREL’s unique modeling, analysis, and facilities in certain areas to provide a greater understanding and knowledge of potential scenarios to achieve these ambitious



goals. NREL recommends a phased approach for their assistance based on current financial limitations and study needs of the Port.

Phase I would focus on providing an optimal set of energy asset combinations for the Port of Seattle to make preliminary pathway decisions for Pier 46 and 91. Future phases of collaboration could utilize the various models and tools at NREL to provide a holistic operational optimization if needed in the future by the Port of Seattle.

### **Project Description**

The goal of this project is to identify energy asset combinations (e.g., on-site renewable generation, energy storage, and other considerations such as transportation vehicle loads or on-site generation of renewable fuels) to address energy costs, network constraints (as determined by others), and sustainability initiatives. In coordination with the Port of Seattle, NREL can technically validate and financially evaluate options for the SWCESP.

To this end, NREL will provide:

- 1. Coordination and Management.** NREL will engage as a stakeholder and advisor to the Port in 1) evaluating current energy demand, load and capacity profiles, 2) forecasting demands and planning scenarios, and 3) analysis of alternatives. It is expected that NREL will collaborate with the Port and their designated representatives for approximately 100 hours in support of the evaluation of current and forecasted energy demands and clean energy planning scenarios, participating in working groups, advising on data collection efforts to increase efficiency for all parties, reviewing documents and providing industry insights into emerging technologies.
- 2. Techno-economic assessment.** Upon completion of the current inventories and forecasted scenarios, NREL will assess the technical and economic viability of several renewable energy and energy storage technologies with a focus on Terminal 91 using NREL's Renewable Energy Optimization (REopt) tool. NREL will consider current and proposed future energy consumption, energy cost, renewable energy resource, technology cost, space available, and distribution system constraints as defined in the Port's planning efforts. This analysis will be informed by any existing studies such as conceptual site planning, microgrid evaluations, and future load profile development. NREL will work with Port of Seattle, its consultant, and other key stakeholders in the development of several load profiles that bracket Pier redevelopment and offer operational flexibility. The analysis will be performed for up to three different existing facility meters and/or aggregation of similar meters, up to 3 load scenarios, and up to 3 RE targets. The recommended system sizes and economics (initial cost, O&M cost, lifecycle cost, and net present value) for each meter will be provided. While Pier 46 will not be evaluated in the REopt model, the results from Pier 91 analysis will be summarized and can be used to inform Pier 46 decisions.

### **Data Requirements:**

Inclusion in Port data collection and planning processes; coordination and access to relevant data and deliverables including:

- Detailed inventory of Port energy uses and demand profiles by location.
- Criteria for and prioritized list of locations, study areas and/or uses for continued analysis.
- Detailed raw data collected necessary for techno-economic analysis.

- Access to any other relevant deliverables from related studies.
- Future energy forecast, evaluation of energy supply constraints, and identification and analysis of clean energy planning scenarios and impacts.

A full list of data requirements for the techno-economic assessment (e.g., current energy bills for past year, tariffs, natural gas usage, cost of capital, etc.) will be provided for the Port of Seattle to start the data gathering process.

**Task 2 Deliverables Table**

| <b>Task</b>                       | <b>Deliverable</b>  | <b>Schedule</b>   |
|-----------------------------------|---|---|
| Project Management & Coordination | Kick-off meeting, data requirements   | Upon agreement effective date                           |
| Technical Advisory Services       | Collaboration and technical assistance with Waterfront Clean Energy Strategic Plan planning process   | 6 months  |
| REopt Analysis                    | Techno-economic analysis – Draft results  | 4 months after receipt of all necessary data            |
|                                   | Techno-economic analysis – Final results  | 2 months following receipt of comments on Draft Results |
| Final Report                      | NREL will provide a written report (~5 pages) or slide deck (~20 slides) summarizing analysis assumptions and results. The report will provide a prioritized list of options to meet varying levels of renewable energy generation. | 1 month following tecno-economic analysis               |

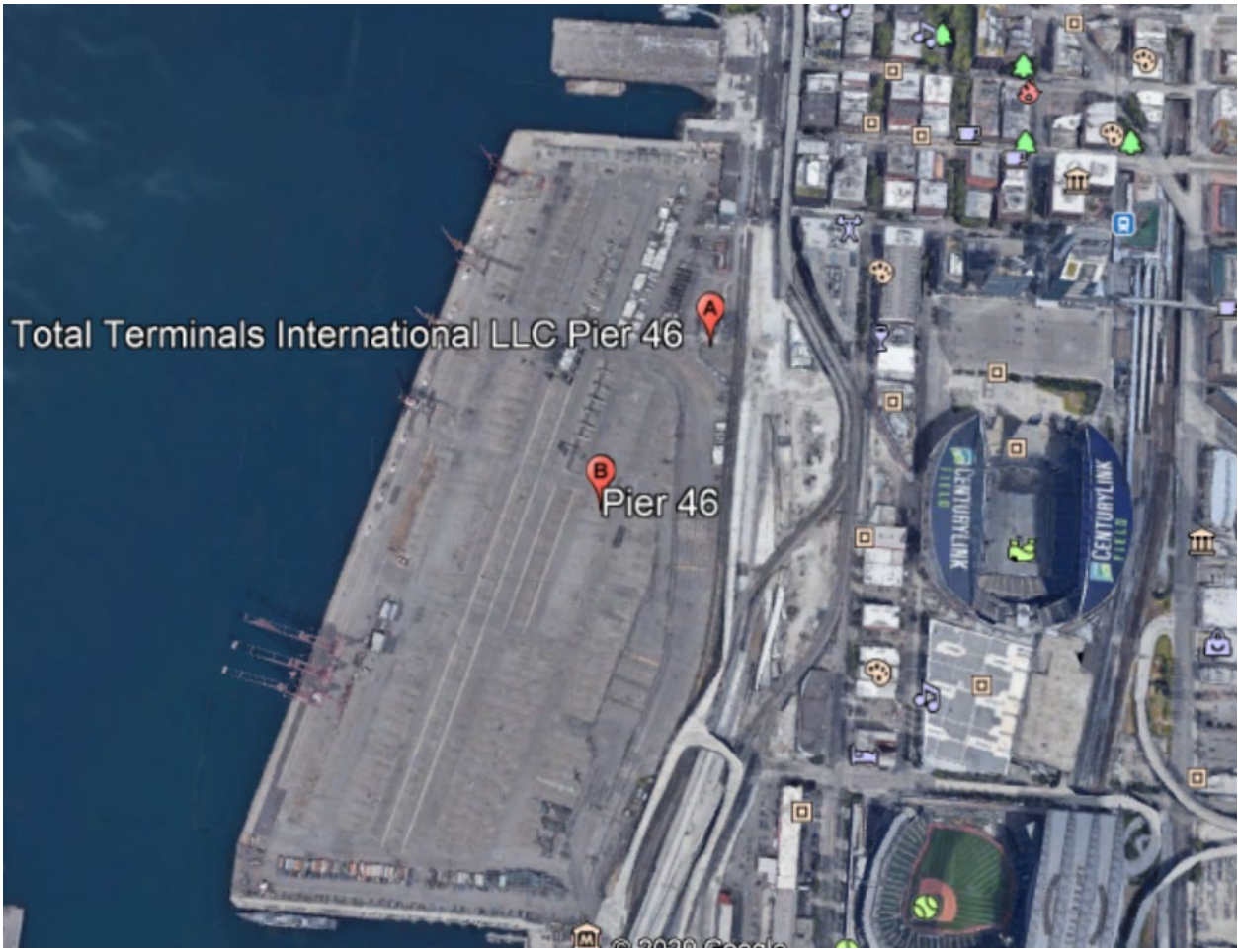


Figure 1 - Pier 46 Vicinity



Figure 2 - Pier 91 Vicinity - Google Earth

**V. Schedule:**

It is anticipated work will be complete 15 months from Agreement effective date.

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**Appendix B-5 – Patent Rights**  
(Alternative III - no R&D performed)

[RESERVED] – No research, development, or demonstration is to be conducted in the performance of the Statement of Work.

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**Appendix C-3 – Rights in Technical Data**

(Alternative IV - facility services agreement or federal funds/nonproprietary)

**1. The following definitions shall be used.**

- A. "Generated Information" means information produced in the performance of this Agreement or any subcontract under this Agreement.
- B. "Proprietary Information" means information which is developed at private expense, is marked as Proprietary Information, and embodies (1) trade secrets or (2) commercial or financial information which is privileged or confidential under the Freedom of information Act (5 USC § 552 (b)(4)).
- C. "Unlimited Rights" means the right to use, disclose, reproduce, prepare derivative works, distribute copies to the public, and perform publicly and display publicly, in any manner and for any purpose, and to have or permit others to do so.

2. Generated Information shall not be marked as Proprietary Information. If the Sponsor provides Proprietary Information to the Contractor to perform the work, such Proprietary Information will be destroyed or returned to the Sponsor as directed by the Sponsor in writing. The Government and Contractor shall have Unlimited Rights in any information which is not removed from the facility by termination of this Agreement. Subject to the provisions of this Clause, Sponsor shall have the right to use, release to others, reproduce, distribute, or publish any data first produced under this Agreement. The DOE and the Contractor shall have the right to publish and use any data generated by Contractor and any data provided by the Sponsor to the Contractor (unless such provided data is marked as Proprietary Information by the Sponsor), and to permit others to do so, The Government and the Contractor agree not to disclose properly marked Proprietary Information to anyone other than the Sponsor without written approval of the Sponsor, except to Government employees who are subject to the statutory provisions against disclosure of confidential information set forth in the Trade Secrets Act (18 USC 1905). The Sponsor agrees that the Facility Contractor may provide to the DOE a non-proprietary description of the work to be performed under this Agreement.



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**Appendix D – Background Intellectual Property**  
Patents, Patent Applications, and Record of Inventions

**Project Title:** Central mechanical Plant and Waterfront Clean Energy Strategic Plan

The Contractor and the Sponsor have identified and agreed that the following Background Intellectual Property may be used in the performance of work under this Agreement and may be needed to practice the results of this Agreement.

**Contractor:**

NREL SWR-12-19: “REopt® (Renewable Energy Optimization)”

**Sponsor:**

None Expected

“Intellectual Property” means patents, trademarks, copyrights, mask works, and other forms of comparable property rights protected by Federal Law and foreign counterparts, except trade secrets.

“Background Intellectual Property” means the Intellectual Property identified by the Parties that was in existence prior to or is first produced outside of this Agreement, except that in the case of inventions in those identified items, the inventions must have been conceived outside of this Agreement and not first actually reduced to practice under this Agreement to qualify as Background Intellectual Property.

Each Party may use the other Party’s identified Background Intellectual Property solely in performance of research under the Statement of Work detailed in Appendix A of this Agreement. This Agreement does not grant to either Party any option, grant, or license to commercialize, or otherwise use the other Party’s Background Intellectual Property outside of this Agreement. Licensing of Background Intellectual Property, if agreed to by the Parties, shall be the subject of separate licensing agreements between the Parties.

The Parties understand that Background Intellectual Property may control or dominate a Subject Invention generated under this Agreement. For any such Subject Invention controlled by Contractor Background Intellectual Property, Contractor agrees to negotiate in good faith with the Sponsor to establish terms of the nonexclusive, commercial license. It is understood by the Sponsor that the Contractor shall have no obligation to grant such a license to the Sponsor and may grant exclusive or nonexclusive commercial licenses to others or sell or assign all or part of the rights in the Background Intellectual Property to any third party(ies), subject to any pre-existing rights held by the Government and obligations to others.

The Parties agree to maintain all unpublished Background Intellectual Property as confidential. Upon termination of this Agreement, each Party agrees to promptly discontinue its use of the other Party’s Background Intellectual Property and will, at the other Party’s request, return or destroy all remaining Background Intellectual Property. In the event the Contractor terminates this Agreement (1) for breach with respect to any material provision thereof; or (2) pursuant to the Termination Article of this Agreement, the Sponsor’s rights to all NREL Background Intellectual Property will automatically terminate.

Each Party has used reasonable efforts to list all relevant Background Intellectual Property, but Intellectual Property may exist that is not identified. Neither Party shall be liable to the other Party because of failure to list Background Intellectual Property.