

**Department of Energy  
Build America, Buy America**

**Proposed Project-Specific Nonavailability Waiver for PV Inverter with Automatic Shutdown/Power Curtailment and Data Manager**

**Proposed Waiver Summary:**

Northwest Arctic Borough (NAB) requests a project-specific nonavailability waiver of the manufactured products domestic preference requirements of Section 70914 of the Build America, Buy America Act (BABA) included in the Infrastructure Investment and Jobs Act (Pub. L. No. 117-58, also known as the Bipartisan Infrastructure Law) to purchase a non-BABA compliant PV Inverter with Automatic Shutdown/Power Curtailment and Data Manager.

**Description of the recipient and the project.**

NAB is the second largest borough in Alaska, covering a 36,000 square mile region that includes 11 remote communities: Ambler, Buckland, Deering, Kiana, Kivalina, Kobuk, Kotzebue, Noatak, Noorvik, Selawik and Shungnak. In November 2024, NAB entered into a Cooperative Agreement for \$68.5 million dollars with the Office of Clean Energy Demonstrations (OCED) to install more than 3.8 MW of solar photovoltaic (PV) capacity, more than 8.5 MWh of battery energy storage systems (BESS), and 859 low temperature heat pumps across the eleven villages of the Northwest Arctic. The solar PV and BESS capacities currently planned for installation in each village are: Ambler (525 kW-DC, 1.0 MWh), Buckland (320 kW-DC, 0.512 MWh), Deering (140 kW-DC, 0.250 MWh), Kiana (507 kW-DC, 0.512 MWh), Kivalina (360 kW-DC, 0.512 MWh), Kotzebue (300kW-DC, 4 MWh), Noatak (220 kW-DC, no BESS), Noorvik (562 kW-DC, 0.768 MWh), Selawik (703 kW-DC, 1 MWh), and Shungnak-Kobuk (160 kW-DC, no BESS). This award also funds the replacement of a 10-mile overhead distribution tie-line between the villages of Kobuk and Shungnak with medium voltage direct current (MVDC) and power converters. OCED issued the Cooperative Agreement as part of the Energy Improvement in Rural or Remote Areas Program, which provides financial assistance to improve, in rural or remote areas of the United States, the resilience, safety, reliability, and availability of energy.

NAB's project is expected to displace over 350,000 gallons of diesel fuel annually, save over \$1.9 million each year in electricity and heating costs, save an additional \$12 million in avoided capital costs for a new diesel power plant and diesel fuel storage, and demonstrate a more effective hybrid renewable-diesel systems in remote isolated microgrids. The electricity generated by each solar PV array will be stored in a BESS, ensuring a reliable power supply even during periods of low solar energy production or high demand. Grid control and monitoring systems will also be employed to optimize the flow of electricity between the solar PV systems, batteries, and the power distribution network. All communities have electric utilities that are

owned and operated by the Alaska Village Electrical Cooperative (AVEC) aside from Kotzebue, Buckland and Deering which are owned and operated by Kotzebue Electric Association, City of Buckland and Ipnatchiaq Electric Company, respectively.

NAB seeks to purchase the inverter and data manager from SMA Solar Technology AG (SMA), a manufacturing company headquartered in Germany, because it is unable to identify a United States-based manufacturer of a PV Inverter with Automatic Shutdown/Power Curtailment and Data Manager for its project.

**Description of the products to be waived:**

NAB is requesting a BABA waiver for the following:

- Solar PV Inverter - SMA Highpower Peak 3
  - Total cost: \$10,000.59 per unit
  - Quantity: 38 (thirty-eight)
  - Country of origin: Germany
  - Product Service Codes (PSC): 6117
  - North American Industry Classification System (NAICS) codes: 335999 – All Other Miscellaneous Electrical Equipment and Component Manufacturing
  
- Solar PV Inverter - Data Manager
  - Total cost: \$877.85 per unit
  - Quantity: 11 (eleven) – 2 for Kotzebue, 1 for Shungnak/Kobuk, and 1 for each of the other villages
  - Country of origin: Germany
  - Product Service Codes (PSC): 6117
  - North American Industry Classification System (NAICS) codes: 335999 – All Other Miscellaneous Electrical Equipment and Component Manufacturing

**Description of the use of a PV Inverter with Automatic Shutdown/Power Curtailment and Data Manager for the Clean Energy in the Northwest Arctic Project:**

In solar PV systems, inverters convert the variable direct current electricity output of the solar PV array into the alternating current electricity used by the electricity distribution grid. The SMA Sunny Highpower Peak 3 inverter and required data manager are essential for the success of the solar PV projects in each of the Northwest Arctic communities due to its functionality, alignment with utility requirements, and proven performance in harsh, remote environments. Specifically, the SMA inverter's capabilities address key technical and operational challenges associated with integrating high-penetration renewable energy systems into small, isolated power grids found in each of the communities. Below are the core justifications for selecting the SMA inverter:

- Compliance with Alaska Village Electric Cooperative's Requirements:
  - Meets the utility's requirement for automatic shutdown or power curtailment during communication loss, preventing an imbalance of electricity supply and demand on the electrical distribution grid and thereby ensuring grid safety and operational compliance.
  - Supports seamless integration with grid management systems through advanced communication protocols (e.g., Modbus TCP).
- Enhanced Grid Stability:
  - Incorporates Dynamic Grid Support features, such as reactive power compensation and voltage control, crucial for maintaining stability in small, sensitive grids.
  - Provides rapid response to grid fluctuations, reducing the risk of overgeneration or instability in an isolated grid.
- Long-Term Safety and Operational Benefits:
  - Enhance grid safety with automatic shutdown and power curtailment, protecting infrastructure and avoiding overgeneration risks (e.g. safety hazards, damage to components of electrical distribution grid, etc.).
  - Remote monitoring and diagnostic capabilities reduce maintenance costs and downtime, ensuring long-term reliability in each community's isolated environment.

The high operating voltage of the SMA Sunny Highpower Peak 3 inverter reduces the current in each string of solar panels which will reduce wiring losses. Additionally, the large operating voltage range allows the inverter to produce power from a wider range of ambient light conditions, enabling the solar array to make power in lower light conditions. This solar inverter has been installed outside in Deering with no enclosure since 2019 and has shown to be highly tolerant to cold, wet weather. The solar inverters will be installed at the solar array field on a pole mounted strut.

Due to the remote location of where these PV arrays will be installed the data manager is critical for remote monitoring and troubleshooting of the PV system and is therefore a necessary component.

*Other Inverter Options that were Ruled Out:*

The only alternative BABA compliant inverter of similar capacity is the Yaskawa XGI 1500-250 series inverters; however, it lacks the essential power curtailment feature required to meet the utility's safety standards during a communication loss event. This limitation poses significant risks to grid stability, non-compliance with utility requirements, and potential project failure. No other utility scale string inverters that meet the technical requirements are BABA compliant.

Given these factors, the SMA Sunny Highpower Peak 3 inverter and associated data manager are the only viable solutions for ensuring the project's success, safety, and long-term operational integrity.

### **Description of the due diligence performed by the applicant and market research:**

Market and engineering research was conducted from November 19 to March 6, 2025. During this time, the project team engaged an external technical consulting firm to assess the feasibility of using the BABA-compliant Yaskawa XGI 1500-250 series inverter. The investigation concluded that the Yaskawa inverter could not meet the utility's critical requirement for automatic shutdown or energy curtailment during a loss of communication event, rendering it unsuitable for the project. , The project team also reached out to four renewable energy system vendors to explore alternative inverters that could satisfy the technical and utility requirements. Ultimately, the SMA Highpower Peak 3 inverter was selected for its ability to meet all necessary criteria. However, SMA confirmed that they have no plans to manufacture BABA-compliant inverters, highlighting a significant limitation in aligning with BABA requirements.

### **Description of how the non-domestic item is essential to the project and the anticipated impact if no waiver is issued:**

If a BABA waiver is not granted for the solar PV inverters and associated data manager required for this project, several impacts can be anticipated. These impacts will affect not only the technical feasibility of the project but also the funded award, project timeline, costs, and ultimately, the eleven communities that are set to benefit from these systems.

Anticipated Impacts of No Waiver Include:

1. Non-compliance with Utility Requirements:
  - a. The required feature for automatic shutdown or power curtailment during a communication loss, which is critical for each community's small, isolated grid, is unavailable in BABA-compliant inverters like the Yaskawa XGI 1500-250. Selecting a non-compliant inverter could lead to utility rejection of the project or unsafe operating conditions.
2. Adverse Impacts to Energy Affordability and Reliability:
  - a. The project is intended to improve energy affordability by reducing dependence on diesel fuel imports to a remote region of Alaska. Reducing reliance on diesel generation also reduces the cost of maintaining the existing diesel generators, which also improves energy affordability. A denied waiver could compromise these goals.
  - b. Grid instability caused by non-compliant inverters could lead to frequent outages or system failures, adversely affecting homes, schools, and businesses in each community.

Without a BABA waiver, the inability to use the SMA Sunny Highpower Peak 3 inverter and data manager would significantly compromise the project's feasibility, leading to non-compliance with utility requirements, delays, increased costs, and reduced system performance. The impacted communities would face continued reliance on diesel power, risking energy reliability and economic stability. A waiver is therefore critical to ensuring the project's success and delivering its intended benefits to the eleven communities.

## **Agency Summary and Waiver Determination:**

The Department of Energy (DOE) has reviewed the project-specific non-availability waiver submitted by NAB and supports the waiver. NAB has shown, via due diligence and market research, that it is unable to procure a technically suitable U.S. made PV Inverter with Automatic Shutdown/Power Curtailment and Data Manager for its Federally funded infrastructure project. NAB has also explained why the SMA Sunny Highpower Peak 3 inverter and associated data manager is the only PV inverter that will serve the needs of the project.

In reviewing the waiver, DOE also conducted due diligence to determine whether to support the waiver. DOE OCED contacted DOE Solar Energy Technologies Office (SETO) about the availability of domestically manufactured PV inverters. SETO indicated that the Enphase Energy, Inc. IQ8™ Microinverters were domestically manufactured. DOE OCED determined that the IQ8™ Microinverters do not meet the technical requirements for this project, particularly the requirement for automatic shutdown or power curtailment on loss of communications.

## **Justification:**

Due diligence and market research has revealed a deficit in the market for PV Inverter with Automatic Shutdown/Power Curtailment and Data Manager produced in the United States. NAB has identified an inverter produced by Germany-based company, SMA Solar Technology AG, that meets its specifications.

Without the waiver, the project's primary objectives and ultimate effectiveness will be compromised. The requested project-specific, non-availability waiver is therefore necessary to allow procurement of the essential non-domestic components, ensuring that the project can meet its performance objectives without compromising reliability or compliance.

## **Additional supporting information:**

- **Waiver type:** project-specific, nonavailability
- **Recipient name and Unique Entity Identifier (UEI):** Northwest Arctic Borough, X9BGKCFEV966
- **Recipient Address:** 163 Lagoon Street, Kotzebue, Alaska, 99752
- **Federal awarding agency organizational information:** U.S. Department of Energy, Office of Clean Energy Demonstrations, CGAC 089
- **Financial assistance program listing name and number:** 81.255
- **Federal financial assistance program name:** Bipartisan Infrastructure Law Energy Improvements in Rural or Remote Areas Program (DE-FOA-0002970)
- **Federal Award Identification Number (FAIN):** DE-CD-0000070
- **Federal financial assistance funding amount:** \$54,811,907
- **Total estimated infrastructure expenditures:** \$25,500,000

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