

December 4, 2024

DISCLAIMER: The contents of this guidance document does not have the force and effect of law and is not meant to bind the public in any way. This document is intended only to clarify existing requirements under the law or agency policies, including criteria outlined in 7 C.F.R. 4280-B and its appendices. This document is merely advisory and is intended to provide transparency regarding considerations that may be evaluated to determine the technical merit of a proposed project.

Solar PV + Battery Energy Storage Systems (BESS) Technical Considerations for Rural Business Cooperative Service (RBCS) Projects

Qualifications of Key Service Providers or Project Team

- The application should identify members of the project team and provide bios and/or resumes.
- The developer's key team members should demonstrate an appropriate level/quantity (no less than three years) of domain-relevant experience.
- Provide a list of all relevant licenses/certifications held by team members and associated contractors.
- Disclose if developers have any outstanding legal or financial liabilities, labor violations, environmental violations and other ongoing actions against the company.
- Demonstrate developer's track record of installing projects of similar size and scope.
- Provide developer's experience in accessing and monetizing incentives such as renewable energy tax credits (federal and state), depreciation, solar renewable energy certificates (SRECs), etc.
- Provide up to three references from previous project customers.
- For projects with a total project cost (TPC) of \$200k and greater:
 - also include a high-level system description of previously installed projects.

Agreements and Permits

- The application should identify the authorities having jurisdiction for the project and list any permits that will be required for the project.
- Provide any supporting information/documentation that applies (e.g. reference to the ordinances, codes, statues, etc.).
- Describe the anticipated schedule for securing the agreements and permits.
- Provide information on interconnection, including the process as outlined by the utility and what stage the project is at in the process of applying for an interconnection agreement or study.
- Discuss any risks associated with interconnection (long lead times, upgrade costs) and clearly outline the mitigation strategies.

- For projects that will sell energy back to the utility, applicants should provide information on the applicable sale rate (\$/kWh), as well as net metering arrangement and other associated agreement required to secure this export arrangement.
- Describe the structure of the project in detail. In particular, please describe what entity will own the system, what entity will purchase what commodity (e.g., energy, capacity, a completed system) and how are these entities benefitting (e.g., savings, grid services, resilience, etc.).
- If a power purchase agreement (PPA), lease, energy services agreement, or other energy-sale contract will be employed for this project, please provide that agreement and specify the \$/kWh rate. The Agency reserves the right to reconsider the award if modifications to any project agreements or contracts negatively affect eligibility or economic feasibility.
- If there are any modifications that are negotiated between the applicant and the offtaker, then those changes must either be provided to USDA before the agreement is executed or an executed amended agreement must be provided. The Agency reserves the right to reconsider the award if modifications negatively affect eligibility or economic and/or technical feasibility.
- The agreement may not contain provisions for potential sale of the project assets prior to the end of the useful life of the system.
- The agreement should note performance guarantees as applicable.
- Applicant should attest that the proposed contract is legal/regulatorily authorized in the project's jurisdiction.
- If the behind the meter PV system is expected to meet the local onsite demand (i.e., the energy consumption of the facility where the system is installed), typically the system should generate *no more than* 1.2x of the host facility's annual energy consumption. The applicant should provide the previous year's (all 12 months) utility bills.
- If the PV system is exporting 100% of the energy to the utility, the power capacity could be constrained to existing distribution transformer rating.
- Applicant should attest and demonstrate that system size does not violate limitations placed on system by utility either by policy or physical limitations (e.g., interconnection caps, distribution transformer size)
- If a lease is required for site control, provide an executed copy of the lease. Site control is required at time of application and for the useful life of project.
- The lease footprint, term, and use provisions should match the project needs.
- For projects with a TPC of \$200k and greater:
 - also provide the existing distribution transformer rating where the potential PV and BESS will be connected. If the size of the system is above distribution transformer rating, applicants should seek a fast-track check with the utility.

Resource Assessment for Solar and RES with Storage Components

- Provide a production report for year 1 generation from the system that is consistent with the system specs. Assumptions used to generate the report should be provided. The Agency prefers production reports from reputable software such as PYSyst, HelioScope, and Aurora Solar.

- Resource assessment should describe the quality and the availability of the renewable energy resource.
- Provide battery dispatch analytics, including annual dispatch curves and how these are shaped according to the proposed use case of the battery.
- Clearly state the use cases for the battery (e.g., peak shaving, load shifting, resilience) and how this will benefit the applicant or off taker. This statement should be backed up by dispatch curves produced by a reputable battery analysis software such as Energy Toolbase, Aurora Solar, or REOPT, as well as savings estimates for the applicant/off taker. These curves should in turn be supported by the off-taker's consumption, utility rate, and the production from the proposed solar system.
- Provide warranty that this dispatch strategy will not void the battery warranty.
- If the battery will net the applicant/off taker negative savings, the applicant should describe the non-economic benefits of the battery (e.g. resilience, backup power) and provide analytics on how the applicant/off taker will benefit from this service (e.g. provide utility outage data (frequency and duration of the outages) for the service territory or quantify the critical loads and the value of lost load).

Project Economic Assessment

- Please state if the project is relying on net metering or another type of utility program that will guarantee crediting or purchase of the solar + BESS system's excess generation. Please also state the rates at which the excess generation will be valued and provide supporting documentation (e.g., policy or program documents, rate schedule, program website, etc.)
- If the project has low economic value, describe the project's non-monetary benefits and how these benefits support project viability. For projects with a TPC of \$200k and greater, financial statements are required for a complete application:
 - Provide a cash flow analysis (pro forma) that shows the net present value (NPV) of customer savings at the end of the system contract. Describe how the assumed rates (e.g., utility escalation, value of exported energy) for savings calculations are derived.
 - All value streams and debits should be identified as line items in the cash flow statement, including system generation, battery dispatch, incentives (e.g. investment tax credit, USDA REAP Grant), net metering or export rates, principal and interest payments (if the applicant is undertaking a loan), the avoided cost of utility purchases, operating expenses (e.g. system maintenance, inverter replacements), etc.
 - Tie all line items in the cash flow statement, back to application materials. E.g. if the project is relying on an export rate from the utility, then the rate and revenue should reference and be consistent with what was described on the 4280-3 application form.

Design and Engineering

- Clearly describe, providing as many supporting details as relevant, the intended purpose of the project.

- Provide the design, engineering, testing, and monitoring needed for the proposed project. Ensure these align with the stated purpose of the project, as well as ensure public safety, and comply with all applicable laws, regulations, agreements, permits, codes and standards.
- Identify how all major equipment is commercially available, including proprietary equipment. Provide justifications for any unique equipment needed to meet the requirements of the proposed design.
- Provide designed dispatch strategy for the BESS and explain how this will be accomplished using the proposed battery management system.
- Product specifications for the software and hardware associated with the battery storage system should highlight the assets' capabilities to perform the use cases specified in the application (e.g., peak shaving, load shifting, resilience, etc.).
- If the behind the meter PV system is expected to meet the local onsite demand (i.e., the energy consumption of the facility where the system is installed), typically the system should generate no more than 1.2x of the host facility's annual energy consumption. The applicant should provide the previous year's (all 12 months) utility bills.
- If the PV system is exporting 100% of the energy to the utility, the power capacity could be constrained to existing distribution transformer rating.
- Applicant should attest and demonstrate that system size does not violate limitations placed on system by utility either by policy or physical limitations (e.g., interconnection caps, distribution transformer size)
- Battery system power capacity (aggregated across all inverters) should not exceed peak PV production and/or facility peak demand (i.e., the highest kW usage over a 15-minute interval over the last 12 months).
 - For grid-connected systems, battery system energy capacity (aggregated across all inverters) should not exceed:
 - Daily average excess PV generation (this will not be applicable if net metering is considered for PV generation;
 - Average outage duration multiplied by average demand (if resilience is the battery use case); *or*
 - Average consumption during high time of use rates (if energy load shifting is the battery use case).
 - For off-grid systems, battery system energy capacity (aggregated across all inverters) should not exceed PV energy generation and daily average energy consumption
- For projects with a TPC of \$200k and greater:
 - Also provide a system spec sheet that identifies at a minimum: system's location, capacity, year 1 production, proposed panel manufacturer, proposed inverter manufacturer, proposed racking manufacturer, proposed battery manufacturer and battery chemistry, and battery management software.
 - Also provide an accompanying conceptual layout of the system which identifies point of interconnection, distribution transformer (with rating), wiring runs, and location of infrastructure (e.g. junction boxes, battery, etc.)

Project Construction and Equipment Information or Project Development

- Describe the applicant's overall project development and construction processes. Please break these into sequential steps (e.g., Permitting, Financing, Procurement, Pre-Construction, etc.) with descriptions at each stage.
- Provide a schedule for project development and installation. The timeline should identify at the least the key milestones with starting and ending dates for processes related to permitting, interconnection, equipment procurement, construction, commissioning, and commercial operation.
- Address the project's cash flow requirements and how they will be satisfied.

Equipment Procurement and Installation

- Discuss how all the required equipment necessary to build the project will be procured, the staging of that procurement (e.g. anticipated delivery for items), and disclose any risk associated with long-lead time items.
- Describe the availability of the equipment required by the system and how it can be procured and delivered within the proposed project development schedule.
- Describe if any special equipment is required.
- Describe how open and free competition will be used for the procurement of project components in a manner consistent with 2 CFR part 200.
- Describe how the system or improvements will be installed in full compliance with the National Electric Code, and all applicable local building codes and standards, with permits, and in conformance with the manufactures intended purpose for the specified products.

Operations and Maintenance

- Provide high level description of system function and capability for performing the highlighted use cases.
- Describe how the system will operate. If the system will be fully automatic, what software and hardware will be used, and how will the system be monitored? If the system requires manual operation, provide high level steps to operate the system for various use case.
- Describe the operations and maintenance requirements of the system, including major rebuilds and component replacements necessary for the system to operate as designed over its useful life.
- Describe who will be responsible for the operations and maintenance and their qualifications or training, citing any O&M contracts to be employed.
- Describe if the warranty covers and provide protection against both breakdown and degradation of performance.
- Describe how the performance of the renewable energy system and BESS together will be monitored and recorded.
- Provide information on the availability of spare parts.
- For projects with a TPC of \$200k and greater:
 - Also attach warranty information for all major system components.
 - Also provide workmanship warranty terms for all contracts.