

**TECHNICAL REPORTS FOR PROJECTS WITH  
TOTAL ELIGIBLE PROJECT COSTS GREATER THAN \$200,000**

The Technical Report for projects with total eligible project costs greater than \$200,000 (and for any other project that must submit a Technical Report under this appendix) must demonstrate that the project design, procurement, installation, startup, operation, and maintenance of the renewable energy system or energy efficiency improvement will operate or perform as specified over its design life in a reliable and a cost-effective manner. The Technical Report must also identify all necessary project agreements, demonstrate that those agreements will be in place, and that necessary project equipment and services are available over the design life. All technical information provided must follow the format specified in Sections 1 through 10 of this appendix. Supporting information may be submitted in other formats. Design drawings and process flowcharts are encouraged as exhibits. A discussion of each topic is not necessary if the topic is not applicable to the specific project. Questions identified in the Agency's technical review of the project must be answered to the Agency's satisfaction before the application will be approved. The applicant must submit the original technical report plus one copy to the Rural Development State Office. Renewable energy projects with total eligible project costs greater than \$400,000 and for energy efficiency improvement projects with total eligible project costs greater than \$200,000 require the services of a licensed professional engineer (PE) or team of PEs. Depending on the level of engineering required for the specific project or if necessary to ensure public safety, the services of a licensed PE or a team of licensed PEs may be required for smaller projects.

**SECTION 7 - SOLAR, LARGE PROJECTS**

Section 7. Solar, Large

The technical requirements specified in this section apply to large solar electric projects and large solar thermal projects, as defined in § 4280.103. Large solar electric systems are those for which the rated power of the system is larger than 10kW. Large solar electric systems are either standalone (off grid) or interconnected to the grid (on grid). Large solar thermal systems are those for which the rated storage volume of the system is greater than 240 gallons or that have a collector area of more than 1,000 square feet.

- (a) Qualifications of project team. The large solar project team should consist of an equipment supplier of major components, a project manager, general contractor, system engineer, system installer, and system maintainer. One individual or entity may serve more than one role. Authoritative evidence that project team service providers have the necessary professional credentials or relevant experience to perform the required services must be provided. Authoritative evidence that vendors of proprietary components can provide necessary equipment and spare parts for the system to operate over its design life must also be provided. The application must:
  - (1) Discuss the proposed project delivery method. Such methods include a design, bid, build where a separate engineering firm may design the project and prepare a request for bids and the successful bidder constructs the project at the applicant's risk, and a design/build method, often referred to as turnkey, where the applicant establishes the specifications for the project and secures the services of a developer who will design and build the project at the developer's risk;
  - (2) Discuss the qualifications of the suppliers of major components being considered;
  - (3) Discuss the project manager, general contractor, system engineer, and system installer qualifications for engineering, designing, and installing large solar systems, including any relevant certifications by recognized organizations. Provide a list of the

- same or similar systems designed or installed by the design, engineering, and installation team and currently operating with references, if available; and
- (4) Describe the system operator's qualifications and experience for servicing, operating, and maintaining the system for the proposed application. Provide a list of the same or similar systems designed or installed by the design, engineering, and installation team and currently operating with references, if available.
- (b) Agreements, permits, and certifications. Identify all necessary agreements and permits required for the project and the status and schedule for securing those agreements and permits, including the items specified in paragraphs (b)(1) through (5).
- (1) Identify zoning, building, and electrical code issues, and required permits and the anticipated schedule for meeting those requirements and securing those permits.
  - (2) Identify available component warranties for the specific project location and size.
  - (3) For systems planning to interconnect with a utility, describe the utility's system interconnection requirements, power purchase arrangements, or licenses where required and the anticipated schedule for meeting those requirements and obtaining those agreements. This is required even if the system is installed on the customer side of the utility meter. For systems planning to utilize a local net metering program as their interconnection agreement, describe the applicable local net metering program.
  - (4) Identify all environmental issues, including environmental compliance issues, associated with the project on Form RD 1940-20, "Request for Environmental Information," and in compliance with 7 CFR part 1940, subpart G, of this title.
  - (5) Submit a statement certifying that the project will be installed in accordance with applicable local, State, and national codes and regulations.
- (c) Resource assessment. Provide adequate and appropriate data to demonstrate the amount of renewable resource available. Indicate the source of the solar data and assumptions.
- (d) Design and engineering. Provide authoritative evidence that the system will be designed and engineered so as to meet its intended purpose, will ensure public safety, and will comply with applicable laws, regulations, agreements, permits, codes, and standards.
- (1) For large solar electric systems, the engineering must be comprehensive, including solar collector design and selection, support structure design and selection, power conditioning design and selection, surface or submersible water pumps and energy storage requirements as applicable, and selection of cabling, disconnects, and interconnection equipment. A complete set of engineering drawings, stamped by a professional engineer, must be provided.
  - (2) For large solar thermal systems, the engineering must be comprehensive, including solar collector design and selection, support structure design and selection, pump and piping design and selection, and energy storage design and selection. Provide a complete set of engineering drawings stamped by a professional engineer.
  - (3) For either type of system, provide a concise but complete description of the large solar system, including location of the project and proposed equipment and system specifications. Identify possible vendors and models of major system components. Provide the expected system energy production based on available solar resource data on a monthly (when possible) and annual basis and how the energy produced by the system will be used.
  - (4) For either type of system, provide a description of the project site and address issues such as solar access, orientation, proximity to the load or the electrical grid, environmental concerns such as land use, water quality, habitat fragmentation, and aesthetics,

unique safety concerns, construction, and installation issues, and whether special circumstances exist.

- (e) Project development schedule. Identify each significant task, its beginning and end, and its relationship to the time needed to initiate and carry the project through startup and shakedown. Provide a detailed description of the project timeline, including system and site design, permits and agreements, equipment procurement, and system installation from excavation through startup and shakedown.
- (f) Project economic assessment. Provide a study that describes the costs and revenues of the proposed project to demonstrate the financial performance of the project, including the calculation of simple payback. Provide a detailed analysis and description of project costs, including design and engineering, permitting, equipment, site preparation, system installation, system startup and shakedown, warranties, insurance, financing, professional services, and operations and maintenance costs. Provide a detailed description of applicable investment incentives, productivity incentives, loans, and grants. Provide a detailed description of historic or expected energy use and expected energy offsets or sales on a monthly and annual basis. In addition, provide other information necessary to assess the project's cost effectiveness.
- (g) Equipment procurement. Demonstrate that equipment required by the system is available and can be procured and delivered within the proposed project development schedule. Large solar systems may be constructed of components manufactured in more than one location. Provide a description of any unique equipment procurement issues such as scheduling and timing of component manufacture and delivery, ordering, warranties, shipping, receiving, and on-site storage or inventory. Provide a detailed description of equipment certification. Identify all the major equipment that is proprietary and justify how this unique equipment is needed to meet the requirements of the proposed design. Include a statement from the applicant certifying that "open and free" competition will be used for the procurement of project components in a manner consistent with the requirements of 7 CFR part 3015 of this title.
- (h) Equipment installation. Describe fully the management of and plan for site development and system installation, provide details regarding the scheduling of major installation equipment, including cranes and other devices needed for project construction, and provide a description of the startup and shakedown specifications and process and the conditions required for startup and shakedown for each equipment item individually and for the system as a whole. Include a statement from the applicant certifying that equipment installation will be made in accordance with all applicable safety and work rules.
- (i) Operations and maintenance. Identify the operations and maintenance requirements of the system necessary for the system to operate as designed over the design life. The application must:
  - (1) Ensure that systems must have at least a 5-year warranty for equipment. Provide information regarding system warranty and availability of spare parts;
  - (2) Describe the routine operations and maintenance requirements of the proposed system, including maintenance schedules for the mechanical, electrical, and software systems;
  - (3) For owner maintained portions of the system, describe any unique knowledge, skills, or abilities needed for service operations or maintenance; and
  - (4) Provide information regarding expected system design life and timing of major component replacement or rebuilds. Include in the discussion, costs and labor associated with the operation and maintenance of the system, and plans for in-sourcing or out-sourcing.
- (j) Dismantling and disposal of project components. Describe a plan for dismantling and disposing of project components and associated wastes at the end of their useful lives. Describe the budget for and any unique concerns associated with the dismantling and disposal of project components and their wastes. Describe any environmental compliance

requirements such as proper disposal or recycling procedures to reduce any potential impact from hazardous chemicals.