**Technical Report and Technical Merit Summary**

**Renewable Energy Systems (RES)**

*Per 7 C.F.R. 5001: 5001.3, 5001.106 (e ), and 5001.307 (e )*

*Per 7 C.F.R. 4280-B: 4280.103, 4280.110 (g), 4280.113 (c), and 4280.117-.120*

**Technical Merit Process (5001.106 (e) and 4280.117):**

1. The RES project must have technical merit based on information provided with the complete application.
2. The Agency will assign each area of the technical report a “pass,” “pass with conditions,” or “fail.” An area will receive a “pass” if the information provided for the area has no weaknesses and meets or exceeds any requirements specified for the area. An area will receive a “pass with conditions” if the information provided for the area has minor weaknesses which could be conditioned and reasonably resolved by the borrower. Otherwise, if the information provided for the area is conclusively deemed to be a major weakness, the area will receive a fail.
3. The Agency will compile the results for each area of the technical report to determine if the Project has technical merit. A project whose technical report receives a “pass” in each of the applicable areas will be considered to have “technical merit. A project whose technical report receives a “pass with conditions” in one or more the applicable areas will be considered to have “conditional technical merit.” A project whose technical report receives a “fail” in any one area will be considered to be “without technical merit.”
4. A project that is determined to have “technical merit” or “conditional technical merit” is eligible for further consideration for funding. Projects with “conditional technical merit” would be subject to funding conditions that would need to be met to ensure full technical merit prior to completion of the project. A project that is determined to be “without technical merit” is not eligible to compete for funding.

 d. ) For RES Projects with total project costs of $80,000 or less, the Agency will evaluate the following areas in making the technical merit determination: (A) Project description; (B) Resource assessment; (C) Project economic assessment; and (D) Qualifications of key service providers.

 e.) For RES Projects with total project costs of less than $200,000, but more than $80,000 the Agency will evaluate the following areas in making the technical merit determination: (A) Project description; (B) Resource assessment; (C) Project economic assessment; (D) Project construction and equipment; and (E) Qualifications of key service providers.

 f.) For RES Projects with total project costs of $200,000 and greater, the Agency will evaluate the following areas in making the technical merit determination: (A) Qualifications of the project team; (B) Agreements and permits; (C) Resource assessment; (D) Design and engineering; (E) Project development; (F) Equipment procurement and installation; and (G) Operations and maintenance.

**Technical Merit Documentation (5001.307 (e) and 4280.118-.120):**

 (2.) Information provided must be in sufficient detail to enable the Agency to determine the technical merit of the project. Design drawings and process flowcharts are encouraged as exhibits. Each application must:

 a.) Provide sufficient information to enable the calculation of simple payback, defined as, total project costs ÷ dollar value of energy units replaced, credited, sold, or used and fair market value of byproducts as applicable in a typical year. Renewable energy systems project’s simple payback does not include any one-time benefits such as but not limited to construction and investment-related benefits, nor credits which do not provide annual income to the project, such as tax credits.

 (i) **Value of energy replaced** will be calculated based on the borrower entity’s historical energy consumption with actual average price paid for the energy replaced, calculated by:

 **subtracting the projected energy to be consumed**, (projected energy use if the proposed RES project had been in place for the original building and/or equipment, as applicable, for the same period used to determine that actual energy use,

 **from the historical energy consumed**, (actual energy used in the original building and/or equipment, as applicable, prior to the RES project, must be based on the actual average annual total energy used in british thermal units (BTU) over the most recent 12, 24, 36, 48 or 60 consecutive months of operation),

 **and converting the result to a monetary value using a constant value or price of energy,**  (value or price of energy must be the actual average price paid over the same time period used to calculate the actual energy used. When calculating the actual average price of energy, only include energy charges directly reduce by the unit of energy being replaced or saved. Do not include monthly service, demand, or other similar charges that will not be replaced or saved.)

 (ii) **Value of energy credited or sold** will be calculated based on the amount of energy units to be sold at the proposed rate per unit, as documented in utility net metering or crediting policies and/or a purchase agreement.

 (iii) If proposed energy will be **used in a new facility, value of energy used** will be calculated based on the amount of energy units to be used at the documented price per unit of conventional fuel alternative.

 (iv) **Value of byproducts** produced by and used in the project or related enterprises should be documented at the fair market value to be received for the byproducts in a typical year.

b.) Provide sufficient information to enable the calculation of the percentage of historical use of energy compared to the amount of renewable energy that will be generated once the project is operating at its steady state operating level.

 If the project is closely associated with a residence, satisfactory demonstration must be made that 50 percent or more of the projected renewable energy will benefit the agricultural operation or rural small business; and

c.) Demonstrate that the RES project will operate or perform over the project’s useful life in a reliable, safe, and a cost-effective manner, which may include but is not limited to addressing project design, installation, operation, maintenance, and warranties.

3.) In addition, the following technologies, must provide a technical report in accordance with the paragraphs below, as applicable. If the application is for a hybrid project, technical reports must be prepared for each technology that comprises the hybrid project:

 (A) Hydrogen;

 (B) Ocean energy;

 (C) Geothermal electric generation;

 (D) Anaerobic digesters and biogas;

 (E) Biomass;

 (F) Hybrid applications; and

 (G) Renewable energy systems with storage components.

1. **For total project costs in the amount of $80,000 or less,** each RES technical report must provide:

 (a) A description of the proposed RES project, including its intended purpose;

 (b) Vendor/Installer certified projections on energy to be replaced and/or generated, including the quality and availability of the renewable resource to the project;

 If there is a residence closely associated with the RES project, includes projects which will virtually net meter or credit energy to be generated by the RES project to a residence off-site from the project yet owned by the applicant, the historical amount of energy used by the residence and the historical amount of energy used by the agricultural operation or rural small business, as applicable, to satisfactorily demonstrate 51 percent or more of proposed generation will benefit the agricultural operation or rural small business;

 (c) Vendor/Installer certification that the RES project uses commercially available technology;

 (d) Certification that the Vendor/Installer is qualified to complete the project as intended;

 (e) Certification that the project will perform over its useful life in a reliable and cost-effective manner; and

 (f) The projected financial performance of the project. The description must address total project costs, revenues accrued from the sale or crediting of energy, quantity and value of energy offset, and revenue from byproducts. Include applicable investment and other production incentives and indicate if they are one time or reoccurring incentives. Provide an estimate of simple payback, including all calculations, documentation, and any assumptions.

**ii.) For RES guaranteed loan projects with total project costs greater than $80,000 and up to but not including $200,000,** the technical report identified in paragraph (i) of this section applies, except that Appendix D *(guaranteed loans)* or Appendix B *(grants and combinations)* of this part is to be followed to prepare the report.

**iii.) For RES guaranteed loan projects with estimated total project costs of $200,000 or greater**, the technical report identified in paragraph (i) of this section applies, except that Appendix E *(guaranteed loans)* or Appendix C *(grants and combinations)*of this title is to be followed to prepare the report.

(4.) Modifications. If the technical report is prepared prior to the borrower’s selection of a final design, equipment vendor, or contractor, or other significant decision, the borrower may modify the report and resubmit it to the Agency, provided that the overall scope of the project is not materially changed as determined by the Agency. Changes in the technical report may require additional environmental documentation in accordance with 7 CFR part 1970.

**Vendor/Installer Certification**

**Renewable Energy Systems (RES)**

*Per 7 C.F.R. 5001: 5001.3, 5001.106 (e ), and 5001.307 (e )*

*Per 7 C.F.R. 4280-B: 4280.103, 4280.110 (g), 4280.113 (c), and 4280.117-.120*

I hereby certify that I have the necessary qualifications to complete the proposed renewable energy systems project as intended and certify that the proposed renewable energy system for \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (applicant name),

1. uses commercially available technology;
2. will replace \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(amount and unit of measurement) of energy, at

 $\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (price per unit of renewable energy being replaced);

1. will generate \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_(amount and unit of measurement) of energy, at

 $\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (price per unit of renewable energy to be generated);

 d.) will operate and perform over the project’s useful life in a reliable and cost-effective manner.

 Warranties include: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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 I further certify that there is an adequate quantity and quality of renewable energy resource available to the project to ensure its successful operation, including production capacity of the renewable energy system as noted above.

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 (Name of Vendor/Installer)

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 (Representatives Signature)

 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

 (Date)

**Appendix D** **to Subpart D of 7 C.F.R. 5001 or Appendix B to Subpart B of 7 C.F.R. 4280.**

**Technical Reports for Renewable Energy System (RES) Projects with Total Project Costs of Less Than $200,000 but More Than $80,000**

Provide the information specified in Sections A through D for each technical report prepared under this appendix. A Renewable Energy Site Assessment may be used in lieu of Sections A through C if the Renewable Energy Site Assessment contains the information requested in Sections A through C. In such instances, the technical report would consist of Section D and the Renewable Energy Site Assessment.

NOTE: If the Total Project Cost for the RES project is $80,000 or less, this appendix does not apply. Instead, for such projects, please provide the information specified in § 5001.307 (e) *(guaranteed loans)* or §4280.120 (b)(4) *(grants and combinations)*.

*Section A. Project Description*

Provide a description of the project, including its intended purpose and a summary of how the project will be constructed and installed. Describe how the system meets the definition of Commercially Available. Identify the project’s location and describe the project site.

*Section B. Resource Assessment*

Describe the quality and availability of the renewable resource to the project. Identify the amount of Renewable Energy generated that will be generated once the proposed project is operating at its steady state operating level. If applicable, also identify the percentage of energy being replaced by the system.

If the application is for a Bioenergy Project, provide documentation that demonstrates that any and all woody biomass feedstock from National Forest System land or public lands cannot be used as a higher value wood-based product.

*Section C. Project Economic Assessment*

Describe the projected financial performance of the proposed project. The description must address Total Project Costs, energy savings, and revenues, including applicable investment and other production incentives accruing from Government entities. Revenues to be considered shall accrue from the sale of energy, offset or savings in energy costs, byproducts, and green tags. Provide an estimate of Simple Payback, including all calculations, documentation, and any assumptions.

*Section D. Project Construction and Equipment Information*

Describe how the design, engineering, testing, and monitoring are sufficient to demonstrate that the proposed project will meet its intended purpose, ensure public safety, and comply with applicable laws, regulations, agreements, permits, codes, and standards. Describe how all equipment required for the RES is available and able to be procured and delivered within the proposed project development schedule. In addition, present information regarding component warranties and the availability of spare parts.

*Section E. Qualifications of Key Service Providers*

Describe the key service providers, including the number of similar systems installed and/or manufactured, professional credentials, licenses, and relevant experience. When specific numbers are not available for similar systems, estimations will be acceptable.

**Appendix E to Subpart D of 7 C.F.R. 5001 or Appendix C to Subpart B of 7 C.F.R. 4280.**

 **Technical Reports for Renewable Energy System (RES) Projects with Total Project Costs of $200,000 and Greater**

Provide the information specified in Sections A through G for each technical report prepared under this appendix. Provide the resource assessment under Section C that is applicable to the project. For hybrid projects, technical reports must be prepared for each technology that comprises the hybrid project.

*Section A. Qualifications of the Project Team*

Describe the project team, their professional credentials, and relevant experience. The description shall support that the project team key service providers have the necessary professional credentials, licenses, certifications, and relevant experience to develop the proposed project.

*Section B. Agreements and Permits*

Describe the necessary agreements and permits (including any for local zoning requirements) required for the project and the anticipated schedule for securing those agreements and permits. For example, Interconnection Agreements and Power Purchase Agreements are necessary for all Renewable Energy projects electrically interconnected to the utility grid.

*Section C. Resource Assessment*

Describe the quality and availability of the renewable resource and the amount of Renewable Energy generated through the deployment of the proposed system. For all Bioenergy Projects, except Anaerobic Digesters Projects, complete Section C.3 of this appendix. For Anaerobic Digester Projects, complete Section C.6 of this appendix.

(1) Wind. Provide adequate and appropriate data to demonstrate the amount of renewable resource available. Indicate the source of the wind data and the conditions of the wind monitoring when collected at the site or assumptions made when applying nearby wind data to the site.

(2) Solar. Provide adequate and appropriate data to demonstrate the amount of renewable resource available. Indicate the source of the solar data and assumptions.

 (3) Bioenergy/Biomass Project. Provide adequate and appropriate data to demonstrate the amount of renewable resource available. Indicate the type, quantity, quality, and seasonality of the Renewable Biomass resource, including harvest and storage, where applicable. Where applicable, also indicate shipping or receiving method and required infrastructure for shipping. For proposed projects with an established resource, provide a summary of the resource. Document that any and all woody biomass feedstock from National Forest System land or public lands cannot be used as a higher value wood-based product.

(4) Geothermal Electric Generation. Provide adequate and appropriate data to demonstrate the amount of renewable resource available. Indicate the quality of the geothermal resource, including temperature, flow, and sustainability and what conversion system is to be installed. Describe any special handling of cooled geothermal waters that may be necessary. Describe the process for determining the geothermal resource, including measurement setup for the collection of the geothermal resource data. For proposed projects with an established resource, provide a summary of the resource and the specifications of the measurement setup.

(5) Geothermal Direct Generation. Provide adequate and appropriate data to demonstrate the amount of renewable resource available. Indicate the quality of the geothermal resource, including temperature, flow, and sustainability and what direct use system is to be installed. Describe any special handling of cooled geothermal waters that may be necessary. Describe the process for determining the geothermal resource, including measurement setup for the collection of the geothermal resource data. For proposed projects with an established resource, provide a summary of the resource and the specifications of the measurement setup.

(6) Anaerobic Digester Project/Biogas.  Provide adequate and appropriate data to demonstrate the amount of renewable resource available.  Indicate the substrates used as digester inputs, including animal wastes or other Renewable Biomass in terms of type, quantity, seasonality, and frequency of collection. Describe any special handling of feedstock that may be necessary.  Describe the process for determining the feedstock resource.  Provide either tabular values or laboratory analysis of representative samples that include biodegradability studies to produce gas production estimates for the project on daily, monthly, and seasonal basis. If an anerobic digester project, identify the type of operation (e.g. dairy, swine, layer, etc.), along with breed, herd population size and demographics, and the type of waste collection method and frequency information available. For the biogas produced, identify the type of digester (e.g. mixed, plug-flow, attached film, covered lagoon, etc.), if applicable, or the method of capture (landfill, sewage waste treatment, etc.) and treatment. Identify the system designer and determine the digester design assumptions such as the number and type of animals, the bedding type and estimated annual quantity used, the manure and wastewater volumes, and the treatment of digester effluent (e.g. none, solids separation by screening, etc. with details including use or method of disposal).

(7) Hydrogen Project. Provide adequate and appropriate data to demonstrate the amount of renewable resource available. Indicate the type, quantity, quality, and seasonality of the Renewable Biomass resource. For solar, wind, or geothermal sources of energy used to generate hydrogen, indicate the renewable resource where the hydrogen system is to be installed. Local resource maps may be used as an acceptable preliminary source of renewable resource data. For proposed projects with an established renewable resource, provide a summary of the resource.

(8) Hydroelectric/Ocean Energy Projects. Provide adequate and appropriate data to demonstrate the amount of renewable resource available. Indicate the quality of the resource, including temperature (if applicable), flow, and sustainability of the resource, including a summary of the resource evaluation process and the specifications of the measurement setup and the date and duration of the evaluation process and proximity to the proposed site. If less than 1 year of data is used, a Qualified Consultant must provide a detailed analysis of the correlation between the site data and a nearby, long-term measurement site.

(9) Renewable Energy Systems with Storage Components. Provide adequate and appropriate data to demonstrate the amount of renewable resource available. Indicate the type, quantity, quality, and seasonality of the Renewable Energy resource, where applicable. Indicate the storage system specifications and the integrity of the system in conjunction with the renewable energy system it is integrated with, including application, size, lifetime, response time, capital and maintenance costs associated with the operation as well as the distribution of the stored resource(s).

*Section D. Design and Engineering*

Describe the intended purpose of the project and the design, engineering, testing, and monitoring needed for the proposed project. The description shall support that the system will be designed, engineered, tested, and monitored so as to meet its intended purpose, ensure public safety, and comply with applicable laws, regulations, agreements, permits, codes, and standards. In addition, identify that all major equipment is Commercially Available, including proprietary equipment, and justify how this unique equipment is needed to meet the requirements of the proposed design. In addition, information regarding component warranties and the availability of spare parts must be presented.

*Section E. Project Development*

Describe the overall project development method, including the key project development activities and the proposed schedule, including proposed dates for each activity. The description shall identify each significant historical and projected activity, its beginning and end, and its relationship to the time needed to initiate and carry the activity through to successful project completion. The description shall address Applicant project development cash flow requirements. Details for equipment procurement and installation shall be addressed in Section F of this Appendix. Applications should include a concise development schedule with timelines for activities.

*Section F. Equipment Procurement and Installation*

Describe the availability of the equipment required by the system. The description shall support that the required equipment is available and can be procured and delivered within the proposed project development schedule. Describe the plan for site development and system installation, including any special equipment requirements. In all cases, the system or improvement shall be installed in conformance with manufacturer’s specifications and design requirements, and comply with applicable laws, regulations, agreements, permits, codes, and standards.

*Section G. Operations and Maintenance*

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. The warranty must cover and provide protection against both breakdown and a degradation of performance. The performance of the RES or EEI shall be monitored and recorded as appropriate to the specific technology.