



## **Attachment C**

# **Minimum Technical Requirements for Hydropower Projects**

## Minimum Technical Requirements for Hydropower Projects

All projects must demonstrate compliance with the Minimum Technical Requirements set forth in this attachment. These requirements are not intended to be all-encompassing, nor is this attachment intended to be a substitute for engineering specifications or for safety requirements. Site specific conditions and/or local requirements may require additional or specific technical requirements not contained in the following minimum requirements. MTC reserves the right to withhold payment to any projects that do not satisfy the Minimum Technical Requirements.

Minimum Technical Requirements	
<b>Installation General Requirements</b>	<p>Project electrical work must be performed by a licensed professional electrician.</p> <p>Project components must be installed according to the manufacturer's instructions and in compliance with all applicable codes and standards including:</p> <ul style="list-style-type: none"> <li>• The provisions of the National Electric Code (NEC) [most recent available at time of installation]</li> <li>• Local, state, and /or federal building laws, codes and practices</li> <li>• All systems must have an appropriate electric utility interconnection agreement in place at the time of interconnection to the utility grid.</li> <li>• All pertinent permits and inspections must be obtained and copies kept on file as may be required by local codes and/or state law.</li> </ul> <p>Additional general installation practices to be followed include that:</p> <ul style="list-style-type: none"> <li>• All interconnecting wires must be copper and all wiring connections must be properly made, insulated, and weather-protected.</li> <li>• Areas where wiring passes through ceilings, walls, or other areas of a building must be properly restored, booted, and sealed.</li> </ul> <p>Installed equipment may not be removed from the site for its useful design life as specified in the grant agreement or terms and conditions.</p>
<b>Mandatory Commissioning</b>	<p>The hydropower project must be fully commissioned and a commissioning report must be prepared. Commissioning is the process of ensuring that all systems are designed, installed, functionally tested, and capable of being maintained and operated according to the approved design and owner's operational needs. At a minimum, the commissioning report should include: inspection process and findings, system and component testing process and findings, and initial system performance findings.</p>
<b>All Equipment</b>	<p>The equipment and components that comprise the hydropower project must have the following characteristics:</p> <ul style="list-style-type: none"> <li>• All equipment funded in part or in whole by MTC must be new and of a design suitable for the proposed installation, with the exception that refurbished turbines and generators with warranties comparable to new equipment may be accepted with MTC approval.</li> <li>• UL listed and compliant with Institute of Electrical and Electronics Engineers (IEEE) standards</li> <li>• Minimum five-year full warranty or comparable service contract coverage to the purchaser against defects, failures, breakdowns, or excessive degradation of electrical output. The warranty shall cover the full cost, including labor, of repair or replacement of defective components or systems. The warranty shall also cover the automated reporting system discussed below, if included.</li> </ul>

**Reporting to  
MTC's  
Production  
Tracking  
System (PTS)**

Wherever feasible, projects supported by the Small Hydropower Initiative must include an automated reporting system that meets the requirements described below, and must report incremental power enabled by the project to the MTC Production Tracking System (PTS) for a minimum of five years. Where automated reporting for incremental power is not feasible, MTC may require awardees to develop and implement an alternative way to capture and report this information.

To facilitate automated reporting to the PTS, the facility must have a dedicated meter that:

- is readily accessible and easily understood by the system owner;
- measures the system's AC output;
- is separate from the utility billing meter and does not interfere with utility billing or net-metering;
- is a standard utility "revenue quality" meter that conforms to applicable American National Standards Institute (ANSI) C-12 standards and shall be installed on the output side of the renewable system's isolation transformer; and
- has a visible display of cumulative energy produced by the renewable energy system and be available for periodic testing and/or re-calibration, if necessary.

There are three options for establishing automated reporting to the PTS:

- 1) Vendor-Supplied System: A Data Acquisition System (DAS) that has local PTS-incorporated Automated Reporting features.
- 2) Vendor-Supplied Service: A DAS with a service that offers remote monitoring that has PTS-incorporated Automated Reporting features.
- 3) Sample Source Code Integration: A DAS vendor or service provider can customize the software of their system to incorporate this data transfer functionality.

Contact your vendor or contact MTC for a list of products that have incorporated automated reporting capabilities.

More information about Automated Reporting requirements can be found at: <http://ar.masstech-pts.org/downloads/>