TECHNICAL SPECIFICATIONS

Procurement of a 50 kW Rooftop Solar Photovoltaic Station

This document sets out the technical specifications and minimum requirements for the procurement and turnkey installation of a 50 kW (peak) rooftop photovoltaic (PV) power station and an associated electricity production display screen.

Tenderers are required to demonstrate full compliance with all specifications herein. Any proposed deviation must be explicitly declared and technically justified in writing. Non-compliant submissions may be disqualified from evaluation.

Scope of Work

The contractor shall carry out the complete, turnkey implementation of a 50 kW rooftop PV station. The scope of work shall encompass, but is not limited to, all items described in the subsections below.

2.1 Site Survey and Structural Assessment

Prior to any design or procurement activity, the contractor shall conduct a comprehensive site survey and structural assessment of the roof, including:

- Detailed shading analysis covering the full annual solar cycle, using recognised simulation software (e.g. PVsyst, Helioscope, or equivalent).
- Assessment of roof orientation, tilt potential, and any obstructions that may affect system performance.

2.2 System Design

The contractor shall prepare a detailed system design package for client approval before procurement commences. The design submission shall include:

- Panel layout drawing showing module positioning, row spacing, and walkway access provisions.
- String configuration diagram, specifying the number of strings, modules per string, and connection topology.
- Shading loss analysis and estimated system performance (annual energy yield in kWh/year and specific yield in kWh/kWp/year).

2.3 PV Modules

The supply and installation of PV modules shall meet the following minimum requirements:

- Combined rated capacity of not less than 50 kW peak (kWp) under Standard Test Conditions (STC: 1,000 W/m², AM 1.5, 25 °C cell temperature).
- Module technology: monocrystalline or polycrystalline silicon, or equivalent high-efficiency technology, as appropriate for the site.
- Minimum product warranty: 10 years from the date of commissioning.
- Minimum linear performance warranty: 25 years, guaranteeing not less than 80% of rated power output at end of warranty period.
- All modules shall be from the same manufacturer, model, and production batch.

2.4 Grid-Tied Inverter(s)

The contractor shall supply and install inverter(s) meeting the following requirements:

- Type: grid-tied, with integrated anti-islanding protection in compliance with applicable Georgian national grid codes and IEC/EN standards.
- Inverter efficiency: minimum European Weighted Efficiency (Euro η) of 97% or equivalent.
- Protection class: minimum IP65 for outdoor installation, or IP54 for indoor installation in a ventilated enclosure.
- Communication interfaces: RS-485, Ethernet, or wireless (Wi-Fi/GSM), capable of
- The contractor shall provide evidence of type approval for grid connection by the relevant Georgian distribution system operator (DSO) or equivalent authority, where applicable.

2.5 Mounting Structure

The mounting structure shall satisfy all of the following:

- Material: galvanised steel (minimum 85 µm coating) or anodised aluminium (minimum 20 µm anodising), providing corrosion resistance suitable for an outdoor rooftop environment.
- The design shall be compatible with the existing roof type (flat, pitched, or membrane) and shall not compromise the roof's waterproofing integrity.
- All penetrations and anchor points shall be sealed using manufacturer-approved weatherproofing methods.
- Module tilt angle shall be optimised for maximum annual energy yield based on the site latitude and shading analysis.

2.6 Cabling

All DC and AC cabling shall comply with the following requirements:

- DC cables: double-insulated, UV-resistant, rated for outdoor photovoltaic use (e.g. EN 50618 / IEC 62930 or equivalent). Minimum voltage rating: 1,000 V DC (or 1,500 V DC if the inverter so requires).
- AC cables: appropriate cross-section to minimise ohmic losses; rated for the full prospective fault current at the point of connection.
- All cables exposed to UV radiation, weather, or mechanical damage shall be installed in protective conduits or cable trays with UV-resistant properties.
- Cable management shall be neat, labelled at both ends, and installed in compliance with IEC 60364 (low-voltage electrical installations).

2.7 Earthing and Surge Protection

The following protective measures shall be implemented:

- All metallic components of the PV system (modules, mounting structure, inverter enclosures, conduits) shall be connected to a dedicated earthing system
- Surge protection devices (SPDs) shall be installed on both the DC side and on the AC side.
- Earth continuity of the entire metallic structure shall be verified and documented during commissioning.

Electricity Production Display Screen

The contractor shall supply and install a dedicated display screen presenting live electricity production data from the PV station. The display shall serve as a public information tool, promoting awareness of the renewable energy system among building users and visitors. Screen diagonal: not less than 55 cm (approximately 22 inches), measured corner to corner.