REQUEST FOR PROPOSAL NUMBER: AF/NTW/RFP26013/2026

Date: October 14, 2026

RFP Deadline: November 5, 2026

REQUEST FOR PROPOSAL

NAME: RFP for SUPPLY, INSTALLATION, TESTING, COMMISSIONING AND WARRANTY OF SOLAR HYBRID POWER SYSTEMS FOR ATOMA TELECOM SITES

*CONFIDENTIALITY*

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**Background ATOMA:**

A telecommunication company incorporated and existing under the Laws of Islamic Emirate of Afghanistan and having its office at Park Plaza opposed of Shar-e Naw Park Kabul Afghanistan PO Box # 100208-07-054, Kabul. ATOMA is a leading telecom company is Afghanistan, having the highest customer base and operates a large network of sites across Afghanistan. ATOMA played a significant role in the development and expansion of telecommunications services in Afghanistan, particularly in the areas of mobile voice and data services. Offering a wide range of mobile communication services, including voice calls, SMS, mobile internet, and value-added services. We introduced various innovative products and packages tailored to the needs of Afghan consumers. Also serves the business sector, offering solutions such as mobile banking, enterprise connectivity, and other services to support businesses' communication needs.

TENDERER'S ACKNOWLEDGEMENT/ PRELIMINARY NON-DISCLOSURE AGREEMENT.

**Tender's Acknowledgment: Please mark as appropriate:**

We acknowledge receipt and acceptance of the RFP and intend to submit a tender as required ☐

We acknowledge receipt of the RFP but decline to tender for the following reasons: ☐

Please write your reason here:

- We undertake to return to ATOMA within the below-mentioned deadline from receipt of the complete RFP package with all attachments, information and documents related thereto as provided by ATOMA and any copies made thereof.
- The complete tender documents along with the Proposal to be submitted in a SEALED envelope addressed to the Supply Chain Department of ATOMA and to be physically submitted in the tender box located in ATOMA Head Office, Reception, located in Shar-E-Naw Kabul not later than Date November 5, 2026
- Bidders are requested to do the registration at ATOMA at the time of obtaining the RFP from ATOMA reception.
- Bidders should ensure that they provide accurate email addresses and contact numbers at the time of registration.
- Bids are invited from reputable companies for **"Request for Proposal for supply, installation, testing, commissioning and warranty of solar hybrid power systems for ATOMA telecom sites,** according to ATOMA requirements and Technical Specifications as per RFP.
- Bid received after the mentioned deadline shall not be accepted.
- ATOMA reserves the right to accept or reject any or all bids and to annul the bidding at any time, without thereby incurring any liability to the affected supplier(s) or any obligations to inform the affected supplier(s) on the grounds of ATOMA's action.

**12: Preliminary Non-Disclosure Agreement:**

We agree that all information and documents contained in or related to this RFP as provided by ATOMA is proprietary information and shall be treated as confidential. We undertake that all such information and documents, as described above, shall not be divulged to any other party (such prohibition applies to any further release of information regarding this RFP by ATOMA) without the prior written permission from ATOMA to do so. We agree that this RFP and all information and documents relating to it and provided hereunder by ATOMA are not to be used for any purpose other than for the preparation of our tender submission. This undertaking will also apply to any subsequent contract resulting from this RFP.

Name: _____

Designation: _____

Signed / Date / Stamped: _____

## 1. Introduction:

ATOMA invites qualified and experienced solar energy system integrators and renewable-energy solution providers to submit proposals for the **design, engineering, supply, transportation, installation, integration, testing, commissioning, documentation, and warranty support of hybrid solar power systems for 100 telecom sites in Afghanistan.**

The project is intended to reduce generator fuel consumption and operating expenditure while maintaining continuous and reliable operation of telecom equipment.

The proposed solution shall integrate:

- Solar PV generation
- Battery Energy Storage System (BESS)
- Existing/new generator
- Existing utility/grid supply, where available
- Telecom DC loads
- Telecom/technical AC loads
- Three-phase Rectifier, inverter & MPPT/power conversion system
- Automatic energy management and source prioritization
- Remote monitoring and alarms
- Complete protection, distribution, and balance-of-system equipment

The bidder shall provide a complete **turnkey solution**, including all equipment, materials, engineering, installation, testing, commissioning, and training required for a fully operational system.

## 2. PROJECT OBJECTIVES:

The principal objectives of this RFP are:

1. Reduce diesel generator operating hours and fuel consumption.
2. Utilize solar energy as the primary renewable energy source.
3. Achieve a minimum monthly energy contribution of **90% from Solar PV and Battery Energy Storage System (BESS)**, with the Diesel Generator (DG) energy contribution limited to a maximum of **10% of the monthly site energy demand.**

4. The DG should be retained strictly as a backup power source and should not be used as a routine or primary source of energy for the site load.
5. **DG-to-BESS charging should be strictly prohibited.** Battery charging should be performed primarily and preferentially through Solar PV, and the system should be designed to prevent intentional charging of the BESS from the DG.
6. Provide reliable battery backup for telecom loads.
7. Maintain continuous operation of critical telecom equipment.
8. Reduce generator dependence while retaining the generator as a backup source.
9. Provide intelligent automatic switching and energy management.
10. Improve overall site power reliability.
11. Provide centralized and remote monitoring of the solar systems.
12. Standardize solar systems across different site load categories.
13. Provide a scalable solution capable of future expansion.

## 3. SITE POPULATION AND STANDARDIZED LOAD CATEGORIES:

ATOMA's current site schedule contains 100 solar-selected sites. Individual site names, coordinates and site-specific information are intentionally excluded from this RFP.

The Bidder shall price the systems against the following standardized load classes.

| # | Solar Load Class | Number of Sites |
|---|---|---|
| 1 | 8 kW | 43 |
| 2 | 10 kW | 45 |
| 3 | 12 kW | 12 |
| | **Total** | **100** |

The quantities above shall be used as the **baseline for commercial pricing**. ATOMA reserves the right to redistribute the quantities between load classes based on final site surveys without changing the unit rates.

The Bidder shall submit separate unit prices for each load category.

## 4. DESIGN AND ENERGY MANAGEMENT PHILOSOPHY:

The system shall be designed around a 24-hour daily operating cycle with the following sequential priorities:

**Priority 1 – Solar PV:**

Solar PV shall be the preferred and primary energy source whenever sufficient solar energy is available.

PV power shall:

- Supply the connected loads
- Charge the batteries using available excess energy
- Reduce generator operation
- Export power to the designated load buses where permitted by the system architecture.

**Priority 2 – Batteries:**

The batteries shall supply the designated loads during non-solar periods or whenever Solar PV is insufficient or unavailable and shall provide the backup under the agreed design load, based on a maximum 80% DOD.

**Priority 3 – Generator:**

The DG shall operate strictly as a backup source and shall automatically start and supply the site only when the combined Solar PV and BESS sources are unable to maintain the required telecom load or when the configured minimum BESS SOC threshold is reached.

**DG-to-BESS charging is not permitted.** The DG shall supply the telecom load only and shall not be intentionally used to charge the BESS under normal or backup operation.

**Energy Management System (EMS):**

The Energy Management System (EMS) shall be configured to maximize Solar PV/BESS utilization, minimize DG runtime and diesel fuel consumption, and achieve a minimum monthly and annual energy contribution of **90% from Solar PV and BESS combined**, with DG energy contribution not exceeding **10% of monthly and annual site energy demand**.

The EMS shall automatically optimize:

**Solar → Load + Battery Charging → Battery → Generator**

**Solar PV** → Load + Battery Charging

**Battery** → Load when solar is insufficient/unavailable

**Generator** → Load only when solar PV and BESS sources are insufficient/unavailable

**DG → Battery charging:** PROHIBITED

The EMS shall automatically optimize these energy sources with the objective of maintaining continuous telecom operation while **maximizing solar utilization and minimizing generator runtime and diesel consumption**.

## 5. PV SYSTEM DESIGN:

### 5.1 Solar PV Modules:

The bidder shall supply high-quality PV modules with the following minimum requirements:

- Module rated power: **610 Wp to 750 Wp**
- New, unused and genuine modules
- Manufacturer included in the applicable **BloombergNEF (BNEF) Tier 1 PV Module Manufacturer** listing
- Monocrystalline technology
- IEC 61215 and IEC 61730 compliance
- Positive power tolerance
- Proven module efficiency: **>22%**
- PID resistance, the manufacturer shall provide a valid test report from an accredited laboratory demonstrating ≤ **5% degradation after PID testing**. Modules with ≤ **2% degradation** are preferred.
- Suitable for high-temperature and outdoor operation
- UV-resistant materials
- Junction box with appropriate IP rating
- PV modules shall be supplied with **factory-fitted, UV-resistant, IP68-rated DC connectors** that are compatible with the proposed PV cables and equipment.
- Bidder to submit datasheets, IEC certificates and supporting manufacturer documentations for each technical requirement listed above or elsewhere in this document.

6. PV SIZING FORMULA:

The bidder shall clearly show all calculations.

For the RFP baseline, the PV plant shall be calculated as:

**Recommended PV Capacity (kWp) = Load (kW) × (Solar Hours + Battery Hours) / (Peak Sun Hours × PV/System Efficiency)**

The bidder should not reduce the PV capacity without submitting engineering calculations demonstrating compliance with the required energy balance.

7. 610 Wp to 750 Wp PANEL QUANTITY:

The number of PV modules shall be calculated as:

**Number of Panels = Ceiling (Required PV total Capacity / Individual PV panel capacity)**

Actual installed PV capacity shall be:

**Actual PV Capacity = Number of Panels × Individual PV panel capacity**

The bidder shall provide the final module layout, single line diagram of the proposed design, string configuration, MPPT allocation and DC voltage calculations.

8. Purpose-Built Outdoor Telecom Power Cabinets:

The system shall be based on **purpose-built outdoor telecom/industrial hybrid power cabinets manufactured by specialized power-system companies.**

The architecture shall incorporate, as applicable:

- Power core / controller / EMS
- Modular rectifiers
- Modular solar MPPTs
- Modular inverter modules
- AC and DC protection/distribution
- Battery/BMS interface
- Generator/grid interface
- Communication and remote monitoring

The cabinets shall be **air-cooled with proper cooling fans suitable for continuous outdoor telecom operation** under Afghanistan environmental conditions.

The system shall provide:

- **Native -48 VDC output for telecom loads**
- **380/400 VAC three-phase output for AC loads**

Conventional residential or light-commercial Rectifier, inverter & MPPT architectures are not **accepted as the principal power-conversion system.**

**9. Parallel Operation and Scalability:**

The proposed power cabinets shall support **OEM-approved parallel operation.**

Parallel operation shall allow additional cabinets/modules to be added for capacity expansion and/or redundancy while maintaining coordinated control, communications, load sharing, protection, -48 VDC output, three-phase AC output, PV, BESS, generator integration and monitoring.

The bidder shall provide manufacturer documentation confirming parallel capability and shall state the maximum supported parallel configuration.

**10. BATTERY ENERGY STORAGE SYSTEM (BESS):**

Battery chemistry shall be **$LiFePO_4$ (LFP)** and suitable for stationary telecom/industrial energy-storage applications.

Minimum requirements shall include:

- **≥6,000 cycles at 80% DoD**
- Cycle-life claim supported by official manufacturer documentation
- Minimum operating ambient temperature range of **-10°C to +45°C**, or wider
- Any capacity or charge/discharge derating within this range to be declared
- Integrated BMS
- Cell-level voltage and temperature monitoring
- SOC (State of Charge) and SOH (State of Health) monitoring
- Cycle counting
- Cell balancing

- Over/under-voltage protection
- Over-current and short-circuit protection
- Over/under-temperature protection
- Communication with the inverter/power controller/EMS
- Remote alarm capability
- Cell balancing
- Nominal and usable energy clearly declared
- Maximum continuous charge/discharge capability declared
- Automatic isolation in abnormal conditions
- Battery warranty conditions and retained-capacity criteria clearly stated

**Battery Sizing Formula:**

The baseline nominal battery capacity shall be calculated as:

**Battery Nominal Energy (kWh) = Load (kW) × Backup Hours / (Maximum DoD × Battery Efficiency)**

**11. RECTIFIER, INVERTER & MPPT REQUIREMENTS:**

The Rectifier, inverter & MPPT shall be **three-phase** and shall be specifically designed for telecom hybrid power applications.

The inverter shall have:

**11.1 AC Output:**

The AC output shall supply the designated AC telecom/site loads.

**11.2 DC Output:**

The system shall provide dedicated/controlled DC output for telecom DC loads.

The proposed architecture shall therefore support:

**PV + Battery + Generator → Hybrid Power Conversion → AC Output + DC Output**

The Bidder shall clearly demonstrate in the technical proposal how the AC and DC outputs are implemented.

The inverter shall preferably provide:

- Three-phase AC output
- Independent AC and DC load management
- MPPT solar inputs
- Battery interface
- Generator interface
- Automatic source selection
- Programmable charging
- Generators start/stop control
- Load priority management
- Battery SOC-based generator control
- Remote monitoring
- Modbus/SNMP or equivalent communications
- Event logging
- Alarm management
- Surge protection
- Anti-islanding protection where applicable
- Overload protection
- Short-circuit protection
- Over-temperature protection
- Outdoor application IP55
- Inverter shall be air-cooled via an integrated cooling fan.

The inverter shall be sized with adequate margin above the continuous design load.

**12. INVERTER SIZING FORMULA:**

The bidder shall use the following baseline methodology:

**Minimum Inverter Rating = Maximum Continuous Load × 1.25**

The Bidder shall select the next available standard inverter size.

However, the final inverter rating shall also consider:

- AC load
- DC load
- Startup/inrush current
- PV input capacity
- Battery charging power
- Generator capacity
- Future expansion
- Manufacturer's continuous operating limits
- Ambient temperature derating

**12.1. Rectifier Capacity**

Total installed rectifier capacity shall be at least:

**2 × the approved continuous design load.**

To ensure that when the generator or grid is operating, sufficient rectifier capacity is available to:

**Supply the full telecom load + simultaneously recharge the battery.**

Battery charging power shall remain subject to the battery/BMS manufacturer's permissible charging limits.

BESS charging shall be performed using Solar PV as the primary charging source. **The DG shall not be used for intentional BESS charging.** The hybrid power system, EMS, rectifier, inverter and associated controls shall be configured to prevent intentional DG-to-BESS charging.

The EMS shall control generator operation and battery charging with the objective of minimizing generator operating hours and fuel consumption.

**13. AC AND DC LOAD MANAGEMENT:**

The system shall clearly distinguish between AC and DC loads.

The bidder shall provide:

**DC System:**

- DC distribution
- DC protection
- DC breakers/fuses
- DC bus
- Surge protection
- Proper DC cabling
- Battery connection
- Telecom rectifier/interface where required

**AC System:**

- AC distribution board
- Three-phase protection
- MCCB/MCB
- RCCB/RCBO where applicable
- Surge protection
- Metering
- Generator input
- AC output
- Earthing and bonding

The Bidder shall submit complete single-line diagrams for each site.

## 14. GENERATOR INTEGRATION:

The existing generator shall remain available as a backup power source only and shall automatically start when the Solar PV and BESS are unable to maintain the required telecom load or when the configured minimum BESS SOC threshold is reached.

The solar hybrid system shall support automatic generator integration.

Minimum functions:

1. Automatic generator start
2. Automatic generator stop
3. Generator low-fuel alarm interface where available
4. Generator running-status monitoring
5. Generator fault monitoring
6. Battery SOC-based generator start
7. Load-based generator start
8. Generator warm-up/cool-down timing
9. Generator protection
10. Configurable generator operating thresholds

## 15. SOLAR, BATTERY, AND GENERATOR PRIORITY:

The Energy Management System (EMS) shall support programmable priorities.

The system shall follow the following operating sequence:

1. **Solar PV available:** Solar PV supplies the telecom load.
2. **Excess Solar PV available:** Excess Solar PV energy charges the BESS.
3. **Solar PV insufficient:** Solar PV and BESS operate together to supply the telecom load.
4. **BESS reaches minimum configured SOC:** The DG starts automatically.
5. **DG running:** The DG supplies the telecom load only.
6. **DG-to-BESS charging:** The DG shall **not charge the BESS** under any operating conditions.

7. **Solar PV becomes sufficient:** The system shall automatically transfer the load back to Solar PV/BESS operation and stop the DG when the configured stop conditions are satisfied.

DG operation, with a target of achieving a minimum annual **90% Solar PV/BESS energy contribution** and a maximum **10% DG energy contribution**.

**16. MOUNTING STRUCTURES:**

The Bidder shall supply complete PV mounting structures.

Structures shall be:

- Hot-dip galvanized steel or anodized aluminum
- Corrosion resistant
- Wind-load compliant
- Suitable for the site roof/ground/tower environment
- Properly anchored
- Designed for local environmental conditions
- Supplied with all fasteners
- Properly bonded and earthed
- Solar structure shall be nut-and-bolt assembled.
- Side and middle clamps should be made of stainless steel material

The Bidder shall conduct a structural assessment before installation.

No drilling, cutting or modification of existing structures shall be undertaken without ATOMA approval.

**17. CABLES AND CABLING:**

All cables shall be appropriately rated for the application.

PV DC cables shall be:

- UV resistant
- Outdoor rated
- Double insulated

- Solar PV approved
- Correctly sized for voltage drop and current

AC cables shall be sized according to:

- Continuous current
- Ambient temperature
- Installation method
- Voltage drops
- Short-circuit rating
- Applicable standards
- Installation in good quality electrical conduits

DC telecom cables shall be sized according to:

- Maximum current
- Voltage drops
- Temperature
- Installation method
- Protection coordination
- Installation in good quality electrical conduits

The Bidder shall submit cable sizing calculations.

**18. PROTECTION SYSTEM:**

The system shall include all necessary protection devices, including:

**DC Protection:**

- DC isolators
- String protection where required
- DC surge protection

- Over-current protection
- Reverse-current protection
- Proper grounding

**AC Protection:**

- MCCB/MCB
- AC surge protection
- Over/under-voltage protection
- Over/under-frequency protection
- Phase-loss protection
- Phase-sequence protection
- Earth leakage protection where applicable

**Battery Protection:**

- Battery fuse/breaker
- DC isolator
- BMS protection
- Short-circuit protection
- Over-temperature protection.

All protection devices shall be coordinated and appropriately rated.

**19. EARTHING AND LIGHTNING PROTECTION:**

The Bidder shall provide complete earthing and bonding.

This shall include:

- Connecting all solar relevant equipment (Solar & Power Cabinet) to the existing earthing system in the site
- PV structure earthing
- Equipment earthing

- Inverter earthing
- Battery cabinet earthing
- AC distribution earthing
- DC system bonding as applicable
- Lightning protection interface
- Surge protection

Earth resistance shall meet applicable standards and site requirements.

The Bidder shall conduct and document earth resistance measurements.

**2O. REMOTE MONITORING:**

The solar system shall provide centralized remote monitoring system. The Remote Monitoring System shall separately measure, record and report the energy contribution of each power source, including:

- Solar PV energy supplied directly to the load
- Solar PV energy used for BESS charging
- BESS energy supplied to the load
- DG energy supplied to the load
- Total site/load energy consumption
- DG runtime and number of DG starts
- DG fuel consumption, where supported by the generator/controller
- Solar PV, BESS and DG energy contribution as a percentage of total site energy demand

The system shall provide daily, monthly and annual energy contribution reports and shall allow verification of the required minimum Solar PV/BESS contribution and maximum DG contribution.

At minimum, the following parameters shall be available:

**PV:**

- PV voltage
- PV current

- PV power
- Daily generation
- Monthly generation
- Lifetime generation
- MPPT status

**Battery:**

- SOC
- SOH
- Voltage
- Current
- Temperature
- Charging/discharging power
- Alarms
- Cycle count

**Inverter:**

- AC voltage
- AC current
- Frequency
- AC power
- DC output
- Efficiency
- Operating mode
- Alarms
- Fault history

Generator:

- Running status
- Start/stop status
- Runtime
- Fault status
- Generator power where available

Energy:

- Solar energy
- Battery energy
- Generator energy
- Load energy
- Fuel-saving estimate

The system should support remote access through a secure monitoring platform.

21. COMMUNICATION AND CYBERSECURITY:

All communication equipment shall use secure communication protocols.

The system shall support, where applicable:

- Ethernet
- RS485
- Modbus TCP
- Modbus RTU
- SNMP
- HTTPS
- VPN
- Secure API/interface

Default passwords shall be changed before commissioning.

The Bidder shall provide:

- User management
- Role-based access
- Audit logs
- Secure password policy
- Firmware management
- Remote alarm notification

No equipment shall be connected to the ATOMA network without prior authorization.

**22. SITE SURVEY:**

Before final equipment procurement, the Bidder shall conduct detailed site surveys.

The survey shall verify:

1. Actual AC load
2. Actual DC load
3. Load profile
4. Existing rectifier capacity
5. Battery configuration
6. Generator rating
7. Generator condition
8. Existing ACDB/DCDB
9. Available PV space
10. Roof/ground condition
11. Structural condition
12. Cable routes

13. Earthing system
14. Lightning protection
15. Accessibility
16. Security
17. Environmental conditions
18. Solar irradiation/shading
19. Existing power architecture
20. Future load requirements

The Bidder shall submit a Site Survey Report for ATOMA approval.

**23. SITE-SPECIFIC ENGINEERING:**

The standardized load categories are intended for RFP pricing and procurement.

Following site survey, the Bidder shall confirm:

- Final PV capacity
- Number of panels
- Battery capacity
- Inverter rating
- AC/DC distribution
- Cable sizes
- Protection ratings
- Mounting arrangement
- Generator integration
- Energy management configuration

No reduction from the baseline design shall be accepted without written ATOMA approval.

## 24. SYSTEM PERFORMANCE REQUIREMENTS:

The Bidder shall guarantee:

- Continuous telecom load support
- Required 8-hour battery backup under the agreed design load
- Correct automatic transition between power sources
- Safe generator integration
- Solar energy harvesting
- Correct AC/DC load distribution
- System availability
- Monitoring availability
- Protection functionality

The bidder shall clearly state all performance guarantees.

## 25. ENERGY YIELD AND FUEL SAVING:

The bidder shall provide an energy model for each load category.

The model shall include:

- Load
- Solar generation
- Battery charging
- Battery discharge
- Generator operation
- System losses
- Estimated annual solar generation
- Estimated generator runtime reduction
- Estimated diesel fuel saving

The Bidder shall demonstrate that the proposed system is capable of achieving a minimum annual energy contribution of:

**Solar PV + BESS ≥ 90% of total annual site energy demand**

and:

**DG ≤ 10% of total annual site energy demand**

The bidder shall provide calculations for:

**Annual Solar Energy = Estimated Daily Solar Energy × 365**

**Estimated Fuel Saving = Reduced Generator Runtime × Generator Fuel Consumption Rate**

The Bidder shall also demonstrate that the proposed system does not rely on DG energy for routine BESS charging. Any energy supplied by the DG shall be treated as DG contribution and shall not be counted as Solar PV/BESS energy contribution.

**26. DESIGN LIFE:**

The complete system shall be designed for a minimum operational life of:

- PV modules: 25 years or more;
- Mounting structures: 25 years or more;
- Inverters: minimum 10 years expected service life;
- Battery: minimum 10 years design life or manufacturer's stated life;
- Cables/protection equipment: appropriate long-term telecom/industrial service life.

**27. WARRANTY:**

Minimum warranty requirements:

| Equipment | Minimum Warranty |
|---|---|
| PV Modules | 25-year product warranty |
| PV Performance (The power performance) | More than 90% after 20 years |
| Rectifier Inverter & MPPT | 5 years minimum |
| Battery | 10 years minimum |
| BMS | 5 years minimum |
| Mounting Structure | 10 years minimum |
| Monitoring System | 3 years minimum |
| Installation Workmanship | 2 years minimum |

Bidders are encouraged to offer longer warranties.

**28. SPARE PARTS:**

The Bidder shall provide recommended spare parts for:

- Rectifiers, Inverters & MPPTs
- Fans
- Communication modules
- Fuses
- Breakers
- SPD devices
- BMS components
- Connectors
- Monitoring equipment

The bidder shall submit a recommended spare-parts list with prices.

**29. INSTALLATION REQUIREMENTS:**

The Bidder shall provide all labor, tools, lifting equipment, transportation and consumables required for installation.

Installation shall include:

- PV installation
- Mounting structures
- Battery installation
- Rectifier, inverter and MPPT
- AC distribution
- DC distribution
- Cabling

- Protection
- Earthing
- Construction of concrete bases for floor-mounted equipment, as required.
- Generator integration
- Monitoring
- Labeling
- Testing
- Commissioning

All equipment should be securely installed and appropriately labeled.

**3O. TESTING AND COMMISSIONING:**

The Bidder shall conduct complete testing before handover.

Testing shall include:

**PV:**

- Open-circuit voltage
- Short-circuit/current verification
- String polarity
- Insulation resistance
- MPPT operation
- PV generation

**Battery:**

- Voltage
- SOC
- Charging
- Discharging

- Backup test
- BMS communication
- Protection test

**Inverter:**

- AC output
- Three-phase balance
- Frequency
- Protection
- Overload
- Alarm
- Automatic transfer

**Rectifier:**

- DC output
- Protection
- Frequency
- Overload
- Alarm
- Automatic transfer

**Generator:**

- Start command
- Stop command
- Automatic operation
- Battery SOC start
- Fault response

System:

- Solar-to-load operation
- Solar-to-battery operation
- Battery-to-load operation
- Generator-to-load operation
- Automatic source transfer
- Recovery after grid/generator restoration.

31. ACCEPTANCE TEST:

Final acceptance shall be based on a Site Acceptance Test (SAT).

The Bidder shall submit an SAT procedure before testing.

A site shall not be considered accepted until:

1. All equipment is operational
2. All alarms are functional
3. Monitoring is operational
4. Battery backup is demonstrated
5. Generator integration is demonstrated
6. PV generation is verified
7. AC/DC outputs are verified
8. Safety/protection tests are completed
9. Documentation is submitted
10. ATOMA signs the SAT certificate

32. DOCUMENTATION:

The Bidder shall submit:

- Detailed engineering design

- Single-line diagrams (SLDs)
- Layout drawings
- PV string diagrams
- Cable schedules
- Cable calculations
- Protection calculations
- Battery calculations
- PV sizing calculations
- Inverter sizing calculations
- Structural calculations
- Earthing calculations
- Equipment datasheets
- IEC certificates
- Factory test certificates
- Installation manuals
- Operation manuals
- Maintenance manuals
- Warranty certificates
- As-built drawings
- Test reports
- Commissioning reports
- Site Acceptance Certificates

All documents shall be provided in editable and PDF formats.

33. TRAINING:

The Bidder shall provide training to the ATOMA's technical/O&M personnel.

Training shall cover:

- System operation
- Monitoring
- Alarm handling
- Battery management
- Rectifier, Inverter and MPPT operation
- Generator integration
- Preventive maintenance
- Fault diagnosis
- Emergency procedures
- Safety
- Basic troubleshooting

Training shall be provided at no additional cost.

**34. ENVIRONMENTAL REQUIREMENTS:**

Equipment shall be suitable for Afghanistan's environmental conditions, including:

- High ambient temperature
- Low temperatures
- Dust
- Snow where applicable
- Wind
- UV exposure
- Humidity
- Variable solar irradiation

The Bidder shall provide temperature derating calculations.

Outdoor equipment should have an appropriate minimum IP rating, with **IP65 or better preferred** for exposed equipment.

**35. QUALITY REQUIREMENTS:**

All equipment should be new and unused.

The Bidder shall provide:

- Manufacturer certificates
- Factory test reports
- Quality certificates
- Product serial numbers
- Warranty certificates
- Authenticity documentation

ATOMA reserves the right to reject counterfeit, refurbished or previously installed equipment.

**369. FACTORY ACCEPTANCE TEST:**

ATOMA reserves the right to witness Factory Acceptance Tests (FAT) for major equipment.

FAT may include:

- PV module inspection
- Rectifier, Inverter & MPPT functional test
- Battery/BMS test
- Communication test
- Protection test
- AC/DC output test
- Monitoring test

FAT requirements shall be agreed before shipment.

**37. BOQ REQUIREMENTS:**

The bidder shall provide separate unit prices for each standardized load category.

The commercial BOQ shall include, at minimum:

1. 610Wp - 730 Wp PV modules
2. PV mounting structure
3. Rectifier, inverter & MPPT
4. Battery system
5. BMS
6. Battery cabinet/rack
7. ACDB
8. DCDB
9. DC distribution
10. AC distribution
11. DC cables
12. AC cables
13. PV cables
14. MC4/connectors
15. DC isolators
16. AC breakers
17. DC breakers
18. SPDs
19. Earthing materials
20. Lightning protection interface
21. Generator integration
22. Energy management system

23. Monitoring system
24. Communication equipment
25. Sensors
26. Installation
27. Transportation
28. Civil works
29. Structural works
30. Testing and commissioning
31. Training
32. Documentation
33. Warranty
34. Spare parts

**38. COMMERCIAL PRICING TABLE:**

The bidder shall submit the following format, and prices shall be provided in **USD**:

| Load Class | Sites | PV (W) | Number of Panels | Battery (kWh) | Inverter (kW) | Rectifier (kW) | Transportation Cost | Installation, Testing & Commissioning Cost | Total/Site |
|---|---|---|---|---|---|---|---|---|---|
| 8 kW | 43 | | | | | | | | |
| 10 kW | 45 | | | | | | | | |
| 12kW | 12 | | | | | | | | |

**39. ITEMIZED BOQ:**

In addition to the package price, Bidder shall submit detailed unit prices for all major equipment and services.

| Item# | Description | Make/Model | Specification | Unit | Qty | Unit Price | Total |
|---|---|---|---|---|---|---|---|
| 1 | PV Module | | 610-730 Wp | Nos. | | | |
| 2 | Rectifier | | DC | kW | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 3 | Inverter | | 3-Phase AC | kW | | | |
| 4 | MPPT | | kW | kW | | | |
| 5 | Battery | | LFP | kWh | | | |
| 6 | BMS | | Compatible | Set | | | |
| 7 | Mounting Structure | | Complete | Set | | | |
| 8 | ACDB | | Complete | Set | | | |
| 9 | DCDB | | Complete | Set | | | |
| 10 | PV Cable | | Solar Rated | m | | | |
| 11 | AC Cable | | LV Rated | m | | | |
| 12 | DC Cable | | Telecom Rated | m | | | |
| 13 | Cabinet | | Air-cool IP65 | Nos. | | | |
| 14 | SPD | | AC/DC | Set | | | |
| 15 | Earthing | | Complete | Set | | | |
| 16 | Monitoring | | Remote | Set | | | |
| 17 | Installation | | Complete | Site | | | |
| 18 | Testing/Commissioning | | Complete | Site | | | |

## 40. BIDDER TECHNICAL SUBMISSION:

Each bidder shall submit:

1. Company profile
2. Relevant solar telecom experience
3. Similar project references
4. Proposed system architecture
5. Detailed technical proposal
6. PV module datasheets
7. Inverter datasheets
8. Battery datasheets
9. BMS details

10. Monitoring platform details
11. Energy calculations
12. PV sizing calculations
13. Battery sizing calculations
14. Inverter sizing calculations
15. Single-line diagram
16. Installation methodology
17. Testing methodology
18. Warranty proposal
19. Project implementation schedule
20. Organization structure
21. Key personnel CVs
22. HSE plan
23. Quality plan
24. Cybersecurity plan
25. Spare-parts proposal
26. Deviations/exceptions list

**41. BIDDER EXPERIENCE:**

The bidder should demonstrate successful implementation of comparable projects involving:

- Telecom sites
- Solar hybrid systems
- Lithium battery systems
- Generator integration
- Three-phase Rectifier, inverter & MPPTs

- Remote monitoring
- Large-scale multi-site deployments

Preference may be given to bidders with demonstrated experience in Afghanistan or similar environmental conditions.

**42. IMPLEMENTATION SCHEDULE:**

The bidder shall provide a detailed project schedule covering:

1. Contract award
2. Site survey
3. Detailed engineering
4. Engineering approval
5. Equipment procurement
6. Factory testing
7. Transportation
8. Site preparation
9. Installation
10. Integration
11. Testing
12. Commissioning
13. SAT
14. Handover

The bidder shall propose the maximum number of sites that can be deployed simultaneously.

**43. HEALTH, SAFETY AND ENVIRONMENT (HSE):**

The Bidder shall comply with applicable HSE requirements.

Minimum requirements include:

- PPE

- Electrical safety
- Working-at-height safety
- Lifting safety
- Battery safety
- Fire safety
- Lock-out/tag-out
- Site access controls
- Safe handling of PV modules
- Safe handling of batteries
- Waste management

No installation activity shall compromise the live telecom network.

**44. LIVE NETWORK PROTECTION:**

Because these are operational telecom sites, the Bidder shall ensure:

- No unplanned network outage
- No interruption to critical DC loads
- Controlled AC switching
- Approved Method of Procedure (MOP)
- Approved Risk Assessment
- Approved rollback plan
- Pre- and post-work verification
- Coordination with the ATOMA's O&M team

Any work affecting live equipment shall require prior ATOMA O&M team approval.

**45. CHANGE MANAGEMENT:**

Any deviation from approved design shall require written ATOMA approval.

The Bidder shall not:

- Change equipment model without approval
- Reduce PV capacity
- Reduce battery capacity
- Change inverter topology
- Change protection arrangement
- Modify load allocation
- Modify generator integration

without prior written ATOMA approval.

**46. WARRANTY AND DEFECT LIABILITY:**

The Bidder shall be responsible for correcting defects arising from:

- Manufacturing defects
- Installation defects
- Defects caused during transportation.
- Design errors
- Incorrect configuration
- Incorrect commissioning
- Material defects

Warranty claims shall not require ATOMA to pay additional labor or transportation charges for covered defects.

**47. PERFORMANCE LIQUIDATED DAMAGES:**

ATOMA may include liquidated damages for:

- Delay in delivery
- Delay in installation
- Failure to achieve agreed performance

- Failure to meet guaranteed backup duration
- Failure to meet agreed availability
- Repeated equipment failures

The final LD mechanism shall be defined in the Contract.

**48. BID EVALUATION:**

Bids may be evaluated based on:

| Evaluation Area | Indicative Weight |
|---|---|
| Technical Compliance | 30% |
| System Performance/Engineering | 15% |
| Commercial Price | 25% |
| Relevant Experience | 10% |
| Warranty | 10% |
| Delivery/Implementation Plan | 5% |
| Monitoring & EMS | 5% |
| **Total** | **100%** |

ATOMA reserves the right to modify the evaluation methodology.

**49. MANDATORY TECHNICAL COMPLIANCE:**

The bidder shall complete a compliance matrix:

Any deviation shall be clearly declared.

| Requirement | ATOMA Requirement | Bidder Compliance | Offered Specification | Deviation |
|---|---|---|---|---|
| PV Module | 610-730 Wp | | | |
| Inverter | 3-Phase | | | |
| Rectifier | DC O/P | | | |
| MPPT | Modular | | | |
| AC Output | Required | | | |
| DC Output | Required | | | |
| Battery | LFP | | | |
| BMS | Mandatory | | | |
| Remote Monitoring | Mandatory | | | |

| | | | | |
|---|---|---|---|---|
| Generator Integration | Mandatory | | | |
| AC/DC Protection | Mandatory | | | |
| Earthing | Mandatory | | | |
| Lightning/SPD | Mandatory | | | |
| Site Survey | Mandatory | | | |
| Testing & Commissioning | Mandatory | | | |
| Warranty | Mandatory | | | |

**50. KEY FORMULAS TO BE INCLUDED IN BIDDER'S DESIGN:**

The bidder shall include the following calculations.

**50.1 PV Plant**

PV kWp = Load × (6 + 8) / (6 × 0.80)

**50.2 Panel Quantity**

Panel Quantity = Ceiling (PV kWp / 0.730)

**50.3 Actual PV Capacity**

Actual PV kWp = Panel Quantity × 0.730

**50.4 Battery Nominal Energy**

Battery kWh = Load × 8 / (0.80 × 0.95)

**50.5 Inverter Rating**

Minimum Inverter kW = Maximum Load × 1.25

The bidder shall use manufacturer-specific derating factors and shall not rely solely on the simplified formulas above for final engineering.

**51. IMPORTANT DESIGN QUALIFICATION:**

The above sizing methodology is an **RFP baseline**.

The Bidder shall perform detailed engineering using:

- Actual site load
- Actual AC/DC load split

- Solar irradiation
- Temperature
- Shading
- PV orientation
- Tilt
- Cable losses
- Inverter efficiency
- Rectifier efficiency
- MTTP efficiency
- Battery efficiency
- Battery aging
- Battery temperature derating
- Generator characteristics
- Seasonal solar variation
- Required availability

If the detailed engineering indicates that a larger system is required to achieve the specified performance, the bidder shall clearly identify the additional requirements in its technical proposal.

The Bidder shall not claim under-sizing resulting from ATOMA's standardized load classification as an excuse for failure to meet the guaranteed performance after approved detailed engineering.

**52. GENERAL RESPONSIBILITY OF BIDDER:**

The Bidder shall be fully responsible for providing a complete and operational system.

The Bidder's scope shall be considered **"Supply, Install, Test, Commission and Make Operational"**, including all items necessary for successful operation whether or not each minor item is explicitly listed in the BOQ.

Any minor component, accessory, connector, protection device, cable, software license, mounting accessory, communication interface, or consumable required for complete operation shall be deemed included in the Bidder's price.

**53. ATOMA's RESPONSIBILITIES:**

Unless otherwise agreed, ATOMA shall:

- Provide site access;
- Provide available site information;
- Provide available load information;
- Coordinate access with relevant site owners;
- Provide existing generator information where available;
- Provide existing telecom power-system information;
- Review and approve submitted designs;
- Witness agreed testing;
- Provide necessary approvals for network-affecting activities.

**54. BID VALIDITY:**

The bid shall remain valid for a minimum of **7 days** from the submission deadline unless otherwise specified.

**55. FINAL HANDOVER:**

Final handover shall occur only after:

- SAT completion
- Documentation approval
- As-built drawings
- Training completion
- Warranty certificates
- Monitoring access

- Spare parts delivery
- Punch-list closure
- Employer acceptance

**56. BIDDER'S DECLARATION:**

The bidder shall confirm:

We confirm that we have reviewed the requirements of this RFP and have included all equipment, materials, engineering, labor, transportation, installation, testing, commissioning, documentation, warranty and other requirements necessary to deliver a complete and fully operational solar hybrid power system.

**57. FINAL COMMERCIAL SUMMARY:**

The bidder shall provide a consolidated commercial summary:

| Load Class | No. of Sites | Price/Site | Total CAPEX | Warranty | Delivery |
|---|---|---|---|---|---|
| 8 kW | 43 | | | | |
| 10 kW | 45 | | | | |
| 12kW | 12 | | | | |
| **Total** | **100** | | | | |

**58. ANNEX A – STANDARD SYSTEM CONFIGURATION:**

The preferred system architecture shall be:

PV ARRAY
↓
DC COMBINER / PROTECTION
↓
3-PHASE RECTIFIER, INVERTER & MPPT / POWER CONVERSION SYSTEM
↙ ↘
DC OUTPUT AC OUTPUT
↓ ↓
TELECOM DC LOAD AC LOAD
↑
BATTERY BESS
↑
HYBRID ENERGY MANAGEMENT SYSTEM
↑
GENERATOR / GRID INPUT

The final architecture shall be proposed by the bidder and approved by ATOMA.

## 59. ANNEX B – REQUIRED BID SUBMISSION CHECKLIST:

The bidder shall submit the following:

- Technical proposal
- Commercial proposal
- Compliance matrix
- Company profile
- Similar project references
- PV datasheet
- Inverter datasheet
- Battery datasheet
- BMS datasheet
- Monitoring solution
- PV calculations
- Battery calculations
- Inverter calculations
- Energy model
- Single-line diagram (SLD)
- Installation methodology
- Testing procedure
- Warranty statement
- Spare-parts list
- Project schedule
- HSE plan
- Quality plan
- Cybersecurity plan
- List of deviations
- Signed commercial BOQ

## 60. Declaration:

ATOMA reserves the right to accept or reject any proposal, wholly or partially, and to negotiate technical, commercial, and contractual terms with one or more qualified bidders.

## 61. PROPOSAL REQUIRED DOCUMENTS

The following documents are required to be submitted along with Sealed Proposal to be submitted in Tender Box Located in reception of ATOMA-Head Office.

- **Technical Proposal** Detailed technical approach and demonstrating compliance with the RFP requirements.
- **Commercial Proposal** Detailed financial proposal and breakdown, which cover all associated costs to this project.
- **Company Profile (**Company Background, Staff Availability, Office location, Tangible Assets)
- **Valid License from Government** of Afghanistan (Relevant License duration should be not less than three years)
- **International Supplier Licensing Compliance:** The International Supplier shall comply with all applicable Afghan laws and regulatory requirements. Where the nature of the Services requires a local license, permit, registration, or authorization, the Supplier shall obtain the required authorization or, where permitted, engage an appropriately licensed local partner, subject to ATOMA's prior approval. All related compliance requirements and costs shall be the Supplier's responsibility.
- **At least 3 references** of reputable and well-known organizations along with their names and contact numbers where the company has provided or providing the same services to.
- **Experience in relevant** field minimum 3 years and (Relevant Experience, Client References, Projects Values and Tuners)
- **Financial Stability** (Bank Statement for last Six Months, (All bank accounts should be in the name of the company stamped by Authorized Bank.)
- **Audited Financial Statement:** Latest audited financial statement
- **Team Composition** Details of the proposed team, including key personnel, qualifications, roles, responsibilities, and relevant experience.

**Evaluation Criteria:**

- Technical capabilities and experience
- Project solution and implementation methodology
- Price and commercial terms for entire project implementation
- Financial stability and references
- Compliance with Documentation Requirements (Pass/Fail)

The Evaluation Committee shall assign the percentage weight for each evaluation criterion prior to the opening and evaluation of proposals. The weighting shall reflect the importance of each criterion in achieving the objectives of this procurement and shall remain unchanged throughout the evaluation process.

Only proposals that satisfy the mandatory compliance requirements shall be considered for detailed technical and commercial evaluation.

**Submission Instructions:**

- All proposals must be submitted electronically to: Temp_ismail.safi1@atoma.com.af, sadeequllah@atoma.com.af
- All commercial proposal which are submitted electronically must be **password protected**. Unprotected proposal will not be considered for further evaluation.
- The sealed envelope should be submitted at: ATOMA Head Office, Reception Shar-E Naw Kabul, Afghanistan.
- The sealed envelope must be placed in ATOMA tender box, located in ATOMA main office reception.
- All questions regarding this RFP must be submitted in writing.
- Responses will be provided to all potential bidders.
- Bids must remain valid for 120 days from the submission deadline.
- The bid must be submitted in English.
- ATOMA reserves the right to reject any or all proposals.

**General Requirements and Compliance**

- The supplier must have and always maintain and all the time, at its own cost and expense, all permits, licenses, authorization, and approval from relevant government entities necessary for the service provided under this RFP/Agreement.

- The top three suppliers shall present slide presentations to the cross-functional team comprised of technical IT and Network, Energy control team, legal and compliance and procurement).

**Queries and Submissions:**

All queries related to this document should be addressed to:
Procurement department of ATOMA
Email: Temp_ismail.safi1@atoma.com.af, sadeequllah@atoma.com.af.
Phone# 0772227050, 0772222021