HESSEQUA MUNICIPALITY

HES-TECH 20/2526

SUPPLY, DELIVERY AND INSTALLATION OF AN INVERTER AND BATTERY PACK TO INTEGRATE WITH EXISTING SOLAR PANELS – CIVIC CENTRE IN RIVERSDALE

PART C3: SCOPE OF WORKS

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PART C3.1: DESCRIPTION OF WORKS

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C3.1.1 Overview of the Works

C3.1.1.1 **SCOPE OF WORKS:**

1. Project Overview

Hessequa Municipality seeks a turnkey solution for the supply, delivery, installation, and commissioning of a 50kW 3-phase hybrid inverter and a suitable lithium battery system. The system will replace the existing off-grid inverter at the Civic Centre and integrate with the existing 36kW solar PV array.

The solution must enable:

- Grid-tied operation with export of excess solar energy to the municipal grid.
- Reliable battery backup functionality during grid outages.
- Maximised self-consumption of generated solar energy.
- Compliance with all relevant municipal registration and NRS 097-2-1 requirements for embedded generation.

2. Scope of Contract

PHASE	DELIVERABLES
Engineering	- Design integration with existing PV strings (no reconfiguration) - Single Line Diagram (SLD), layout drawings, and earthing scheme - Grid connection and export interface design
Procurement	- 50kW 3-phase hybrid inverter (certified for grid feed-in) - Lithium battery system - AC/DC cabling, protection devices, racking, monitoring platform
Construction	- Removal of old inverter - Installation of the new hybrid system - Minimal power disruption during changeover

Compliance & registration	- Complete and submit all documentation required for municipal registration of the solar PV system as a Small-Scale Embedded Generator (SSEG) - Ensure full grid export capability in line with local utility rules
Commissioning	- System testing and validation - Prove ≤20ms switchover to battery on grid failure - Provide full performance report - Train municipal staff on system use and maintenance

3. Existing PV System Configuration

The site currently has an operational photovoltaic (PV) array installed at the Riversdale Civic Centre in Riversdale, Western Cape, South Africa.

The existing PV system configuration is provided for bidder reference to ensure compatibility with the proposed inverter and battery system.

PV ARRAY CONFIGURATION

The photovoltaic (PV) system layout is confirmed as follows:

- Panel Type: Canadian Solar 460 W modules.
- Panel Model: CS3W-460MS
- Total number of panels: 96 (44 kW).
- Maximum Open-Circuit Voltage (Voc), including cold-temperature correction, remains below **650V.**
- String configuration:
    - 12 panels connected in series form one string.
    - Two such strings are paralleled on the roof to form a set.
    - There are 4 sets in total.
    - Thus, 8 strings of 12 panels each, paralleled in pairs, resulting in 4 combined cable runs descending from the roof.

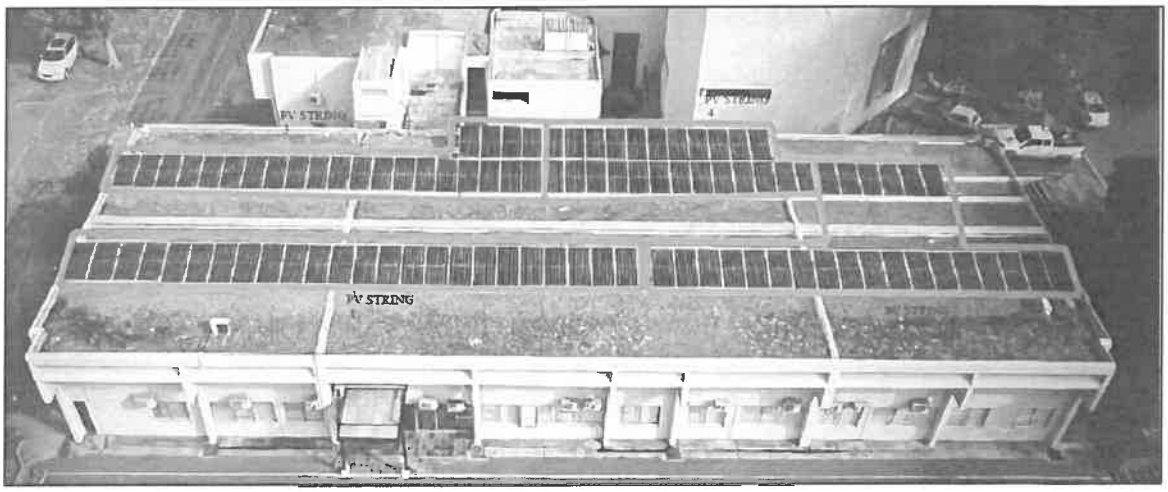

Figure 1: PV Panel Layout

Canadian Solar CS3W-460MS – Key Electrical Specifications

- **Maximum Power (Pmax):** 460 W
- **Maximum Power Voltage (Vmp):** 41.5 V
- **Maximum Power Current (Imp):** 11.09 A
- **Open Circuit Voltage (Voc):** 49.5 V
- **Short Circuit Current (Isc):** 11.72 A

Figure 2: Nameplate Solar Panel

BIDDERS MUST ENSURE THAT THE PROPOSED HYBRID INVERTER AND BATTERY SYSTEM ARE FULLY COMPATIBLE WITH THE EXISTING PV ARRAY CONFIGURATION WITHOUT REQUIRING MODIFICATION OF THE EXISTING STRING LAYOUT.

4. Technical Specifications

4.1 Hybrid Inverter (50kW, 3-Phase)				
No.	**Technical Specification**	**Requirement**	**COMPLY**	
			YES	**NO**
1.	Nominal AC Output Power	50 kW (Three-phase)		
2.	Maximum DC Input Power	≥ 65 kW		
3.	Number of MPPT Trackers	Minimum 3, preferred 4		
4.	MPPT Voltage Range	150 V to ≥ 850 V DC		

5.	Max DC Input Voltage	≥ 1,000 V DC		
6.	Max AC Output Current	≥ 80 A		
7.	Grid Support Features	Export limitation, phase balancing, grid-tie, off-grid & backup mode		
8.	System Efficiency (Euro)	≥ 97 %		
9.	Battery Compatibility	Compatible with high-voltage $LiFePO_4$/ Lithium-Ion battery banks (≥ 48 V nominal modules)		
10.	Communication Protocols	RS485, CAN, and Modbus; remote monitoring via Wi-Fi/Ethernet/LAN		
11.	Protection Features	Anti-islanding, overload, short-circuit, surge, over/under voltage, reverse polarity		
12.	Enclosure Protection Rating	≥ IP65		
13	Operating Temperature Range	−20 °C to +60 °C (with derating if applicable)		
14.	Certifications	CE, IEC/EN 62109-1/2, NRS097 or equivalent		
15.	Warranty	Minimum 5 years, extendable to 10 years		

4.2 Lithium Battery (50kWh Usable)

No.	Technical Specification	Requirement	COMPLY	
			YES	NO
1.	Battery Chemistry	Lithium Iron Phosphate ($LiFePO_4$)		
2.	Total Nominal Energy	> 50 kWh		
3.	Usable Energy (DoD ≥ 90 %)	≥ 45 kWh		
4.	Nominal Voltage	≥ 48 V per module; compatible with inverter's DC voltage range		
5.	Scalability	Stackable or parallel modules, min. 10 units if <6 kWh each		
6.	Depth of Discharge	≥ 90 %		
7.	Round-Trip Efficiency	≥ 95 %		
8.	Battery Management System (BMS)	Integrated BMS with protections; compatible with inverter CAN/RS485 protocols		
9.	Communication Interfaces	CAN and RS485 (Modbus optional)		

10.	Enclosure Protection	≥ IP55		
11.	Operating Temperature Range	0 °C to +55 °C (charge); −10 °C to +55 °C (discharge)		
12.	Certifications	UN38.3, IEC 62619, CE or equivalent		
13.	C-rating	0,5C (For Batteries)		
14.	Warranty	Minimum 10 years or ≥ 6,000 cycles at 90 % DoD		

5. System Integration Requirements

System Integration Requirements				
No.	**Technical Specification**	**Requirement**	**COMPLY**	
			YES	**NO**
1.	PV Compatibility	Seamless integration with existing 36kW array, no alteration of existing string configuration		
2.	Grid Interaction	Bidirectional power flow (import/export) supported		
		Compliant with NRS 097-2-1 and SSEG feed-in requirements		
		Anti-islanding protection included		
3.	Municipal Registration	Bidder must handle full SSEG registration process with Hessequa Municipality		
		Include all necessary documentation, diagrams, and compliance reports		
4	Monitoring	Cloud-based dashboard		
		Real-time monitoring of solar production, energy import/export, battery SOC, and system status		

6. Project Timeline

Milestone	Timeline
• Equipment Delivery	≤ 3 weeks after purchase order
• Installation & Commissioning	≤ 1 week
• **Total Duration**	**≤ 4 weeks**

7. Conditions of Tender

1. Technical Submission:
   - Bidders must, in their response to this request for quotation, include the technical specifications of the products (details of the hybrid inverter, batteries, etc).

2. Compliance with Technical Specifications:
   - Bidders must comply fully with all requirements listed under the Technical Specifications and System Integration Requirements section. Failure to comply will render the bid non-responsive.

3. Project Completion Period:
   - The project must be completed within 8 weeks from the date of official order placement.

4. Installation address:

   Civic Centre
   Van den Berg Street
   Riversdale
   6670

5. COIDA Certificate
   - A valid COIDA certificate must be provided.

Failure to adhere to the beforementioned will result in your tender being declared non-responsive.

DECLARATION,

I, THE UNDERSIGNED (NAME) .....

CERTIFY THAT THE INFORMATION FURNISHED ABOVE IS CORRECT. I ACCEPT THAT THE MUNICIPALITY MAY ACT AGAINST ME SHOULD THIS DECLARATION PROVE TO BE FALSE.

AUTHORISED SIGNATURE: .....

NAME: .....

CAPACITY: ..... DATE: .....