
Tender documents

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1 Request for quote

RFQ	BFZ-181016
CLIENT	Zahle Waste Water Treatment Plant
LOCATION	Bekaa-Zahle
PROJECT	PV-Diesel Hybrid System
SUBMISSION DATE	28 March 2019, 12:00:00 UTC+2

1.1 Request

Implement Turnkey Diesel-Hybrid On-ground PV System using Fixed Axis ground mounted south oriented structure, to synchronize with the Utility and Gensets.

1.2 Project overview

Implement at the Waste Water Treatment Plant-Zahle a Turnkey PV-Diesel Hybrid System, Ground Mounted, to synchronize with the Utility and Generators at site. Project aims to reduce energy bills and operating overheads for the Bekaa Water Authority, Lebanon (BWE).

System Size \cong 202kWp

1.3 PV system requirements

The allocated system integrator shall design and install a PV-Diesel Hybrid photovoltaic system that can meet the below list of required system topology and capabilities:

- All system components and accessories shall be high quality according to international recognized norms and adequate test certificates
- Panels shall be Tier 1, 5 Bus Bars, with 10 years product warranty and 25 years performance warranty
- All DC cables and balance of system accessories shall be TÜV certified or with adequate test certificate
- Ground mounted system shall be a professional structure from a professional supplier with all needed certifications and static calculation notes proving its adequacy for the project
- PV-Diesel Hybrid Controller shall be able to connect up to three generators and shall allow upgrade in case of future expansion
- Diesel Hybrid Controller and Inverters shall be perfectly compatible
- AC cable losses shall be less than 3 %, professional calculation note shall be submitted

1.4 Submittal

It is the sole responsibility of the bidder to verify the site location and the proposed system before submission of an offer. Submittal shall include the following:

1. Company portfolio
2. Reference list for PV projects with a comparable size installed as well as reference list for PV project on a wastewater treatment plant installed
3. Company certifications and any other supporting documents that can be of added value reflecting the company's professionalism and strength in the sector
4. Team certifications and competency as well as CVs of the team
5. Confirmation letter proving company can support the offered system along its lifetime
6. Professional software simulation for the entire system showing string-to-inverter allocation, production, cable losses, etc.
7. Datasheets, brands, certifications and warranties of each item quoted
8. Statement of work, methodology including all project phases from procuring to commissioning and handover, detailed action, delivery time, and complete time plan
9. Details of mounting system to be proposed, with calculation note based on the shared preliminary pullout tests. (Noting that further pullout and chemical tests shall be achieved and detailed calculation note submitted after tender award)
10. Official statement revealing and committing to the parties that will do the structural tests in the field, the chemical tests, and the final calculation note
11. Detailed annual maintenance plan describing all activities and procedures incurred
12. Priced offer as per specifications and prices for PV plant (3, pages 12-18)

1.5 Submission deadline

28 March 2019, 12:00:00 UTC+2

1.6 Post-contract submittals

1. Following the contract award, contractor shall visit the site within 3-days time to assess the overall site and set a detailed action plan.
2. Test report including mechanical tests and chemical tests for the field as requested in chapter 2.2.
3. Professional calculation note from reliable third party for the ground mounting system proposed with detailed sketching
4. Detailed Single Line Diagram (SLD) showing connectivity details and safety points
5. Detailed cable trenching sketch and optimized passage route

Above submittals to be handed within one week from date of site visit to bfz.

1.7 Submission procedure

- Complete offers shall be submitted as one hard copy in sealed envelopes to Lancaster Tamar Main Reception, Boulevard General Emile Lahoud, Hadath, Beirut Lebanon.
- Envelopes shall be clearly marked as RFQ181016, followed by name of company
- Questions can be directed electronically to bfz via email to julia.frank@bfz.de
- Latest questions shall be sent at least three days before submission deadline else will not be answered.

1.8 Payment terms

- * 60 % upon contract award (against bank guarantee as requested)
- 30 % upon product delivery (against bank guarantee as requested)
- 10 % Upon successful commissioning & handover

* Performed only after submitting the post contract submittals and attaining approval from bfz technical team.

1.9 Price validity

Price validity shall be 60 days from deadline date. Any rate fluctuations shall be beared by the contractor.

1.10 Scope & requirements from contractor

- Simulation on professional software showing the exact string combinations, orientation, azimuth, production, losses, etc.
- Detailed calculation note from professional 3rd party based on pullout tests in the field and chemical tests
- System detailed design based on the initial requirements and design provided in chapter 2
- Procuring of all PV system including all shipping, customs (Delivery Duty Paid, DDP), and logistics to site in Bekaa
- Land evaluation, conditioning, preparing for ground-mount installation
- Structural safety tests by civil entity to ensure correct ground-mount piling (inclined pull tests, horizontal pressure tests, creation of soil profiles, chemical analysis in a laboratory)
- All civil works such as ground mounted system piling and cable trenching and installations in field as shown in chapter 2
- All electrical works required to connect the system to the existing facility with all required electric safety and search protecting devices (SPDs).
- Installation & Commissioning as per DIN VDE 100-172/IEC 60364-7-712 and best practices
- Comprehensive training, documentation with data sheets, as built drawings, handover documentation and maintenance manual for client, presenting the system in place, technology, operation procedure, basic maintenance tips, etc.
- 1-year system warranty and defect liability

1.11 Selection criteria

BFZ will evaluate all offers based on 70 % weight for technical evaluation & 30 % weight for financial offer.

2 System design and site details

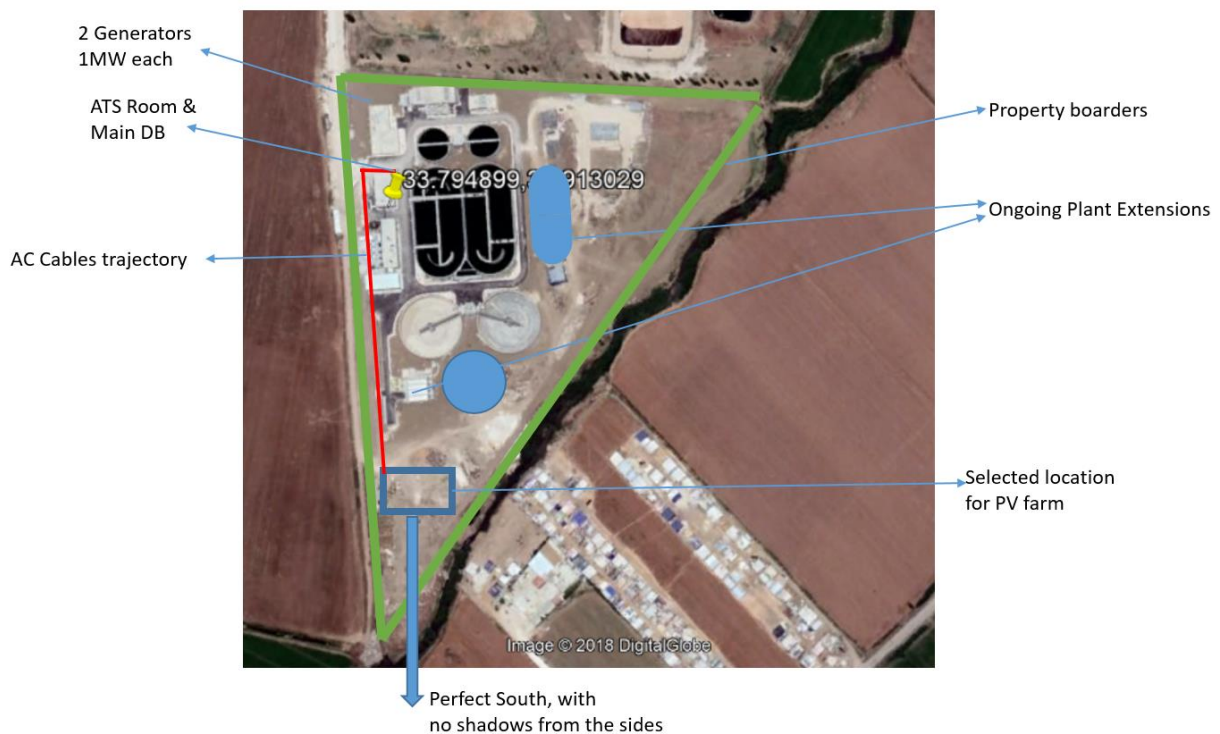
RFQ	BFZ181016
CLIENT	Waste Water Treatment Plant – Zahle
LOCATION	Zahle
PROJECT	PV-Diesel Hybrid Solar System
SUBMISSION DATE	28 March 2019, 12:00:00 UTC+2

2.1 Site overview, PV plant location and cabling path

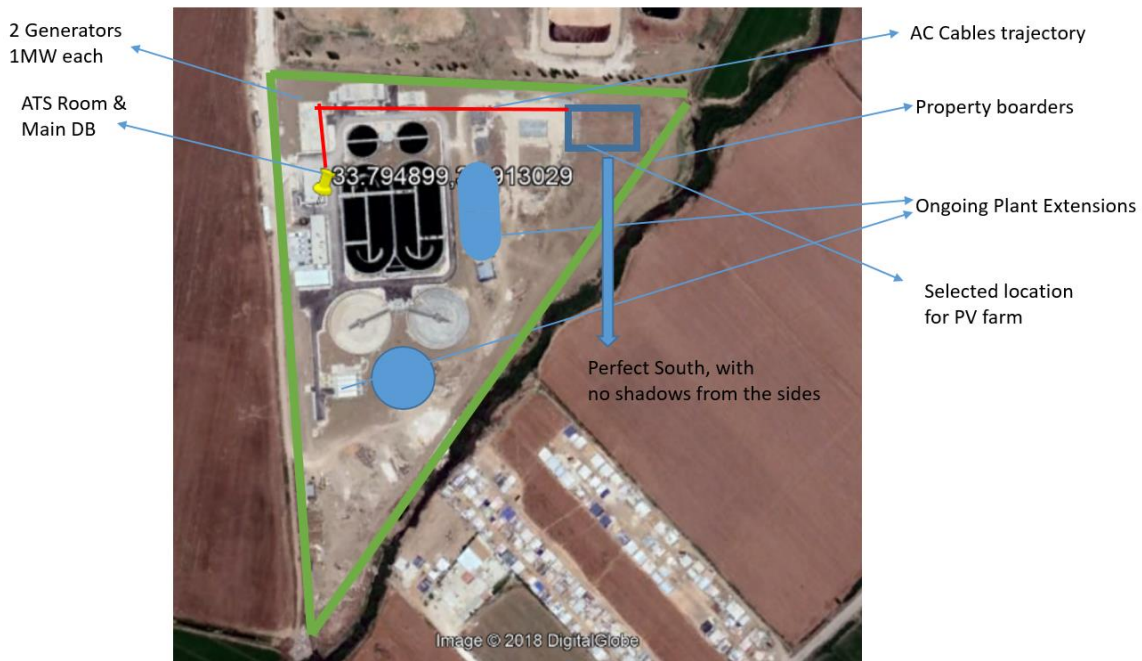
Coordinates: 33.794899,35.913029

The site has been checked for best location of PV farm. The PV plant shall be installed in either one of the two options below. This shall depend on the final decision of the concerned parties in case of additional building activities for the WWTP Zahle. The final decision shall be resolved in due course and before products arrive to site. However from the technical aspect, both options shall preserve the same design and bill of quantities (BOQ), as the distances in both options are almost the same.

Option I:



Option II:



- Site has 2 Generators, 1 MW each, synchronized. Contractor shall connect the diesel hybrid control to the generators, PV, EDL and load.
- ATS and DB are in same room as shown in pic
- PV is placed in south side of the site with perfect orientation, 15 degrees angle
- The trenching to be done is 300 m in soil and 20 meters in asphalt.

2.2 Soil Quality & Required Tests

The site under study consists of an area of low to no vegetation, with no high obstacles in proximity. The terrain is flat (has no slope), with local ground elevation differences not exceeding +/- 10 cm. A preliminary soil test was conducted at the candidate site and the results show that the soil type is soft clay to a depth of 6 meters.

Contractor shall perform another test once awarded the contract and issue a reliable calculation note from third party.

Detailed test shall include:

- Inclined pull tests
- Horizontal pressure tests
- Chemical analysis in a laboratory (Sulfate constituent, PH Level, Water Content, Conductibility, Chloride, Sulfides)

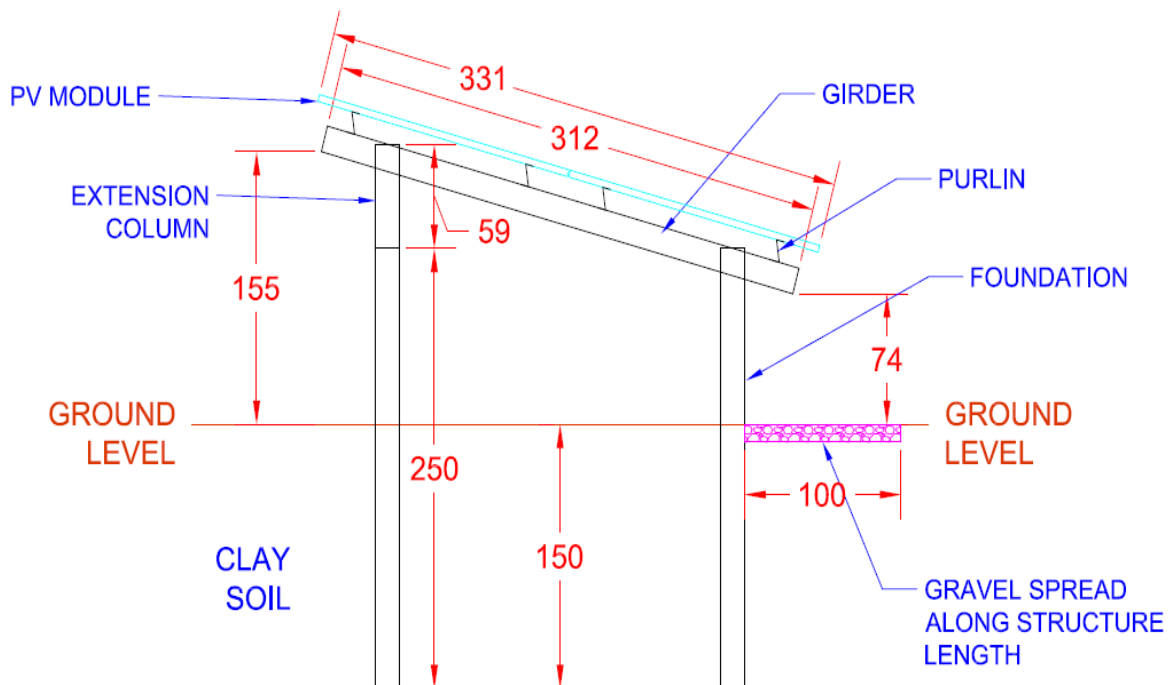
Calculation note shall rely on the above results.

2.3 Mounting System Detail

The modules will be mounted on a steel structure as shown in Figure below. The structure consists of foundation columns, connected vertically by girders, which in turn are connected horizontally by purlins. Each of these components in addition to module placement and DC cabling are detailed separately below.



Taking into consideration the nature of the terrain and the type of soil encountered, a hammered foundation system is selected for the module structure. The depth of the steel foundation implanted in ground is calculated to ensure that the soil friction suffices uplift and load bearing design requirements as shown in Figure below.



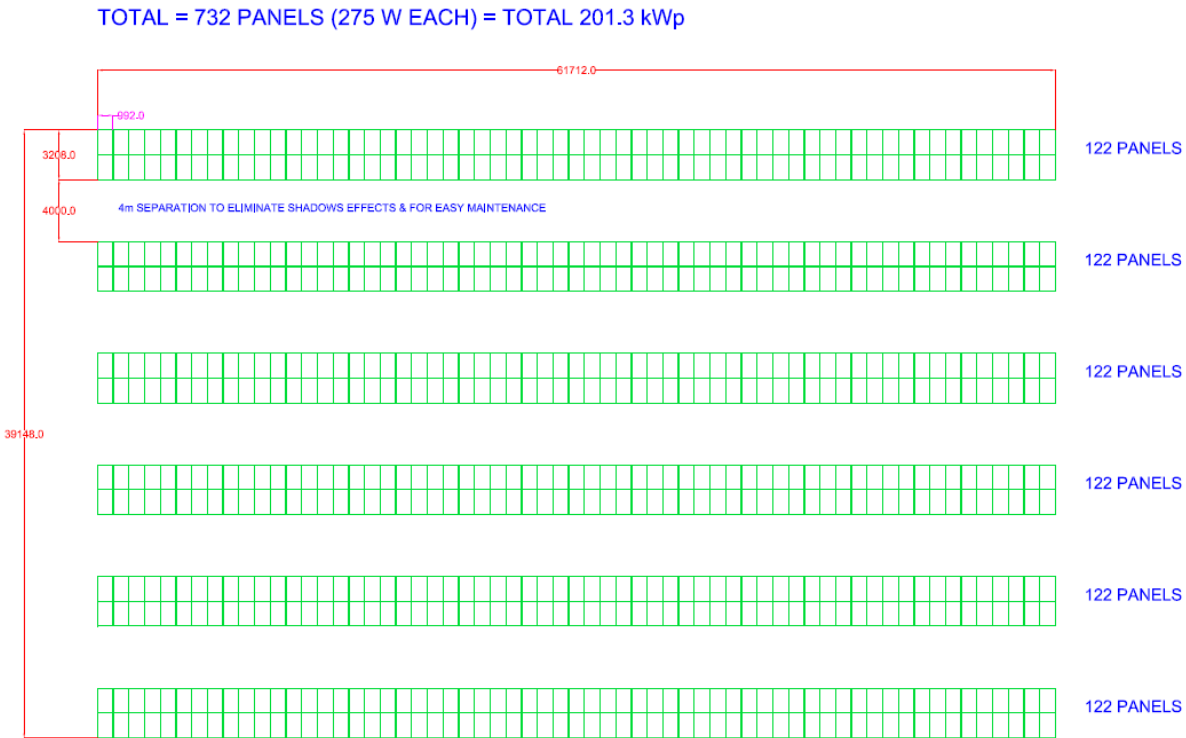
The site shall be first surveyed and the exact location of each foundation marked on ground as per the structural design drawings. The piles shall be hammered using special piling machine.

A layer of gravel shall be spread all along the front dripping side of the structure with a width of 50 cm. Falling water off the modules will strike the gravel first, dispersing its energy through the gravel instead of piercing into the soil.

2.4 Panels Layout

Each of the PV structures will hold 2 rows of modules installed vertically, and will extend in length as per the drawing below.

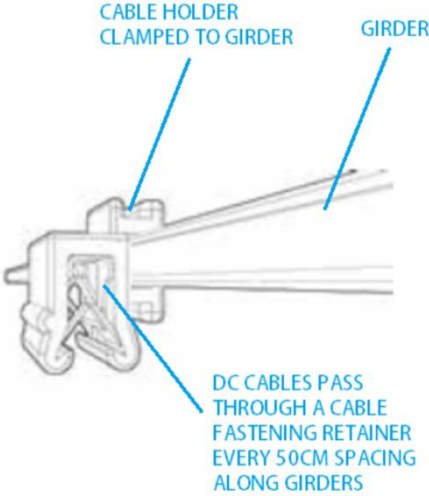
We will keep it to the supplier to decide on what module size to choose, as this depends on the specifications of the structure they will propose. However the total PV system size shall be respected. Below we show the drawing using the 1 x 1.65 m Panels size. We request as minimum the Polycrystalline 275W panel.



Modules shall be fixed to the purlins along their vertical side using special clamps as shown below.



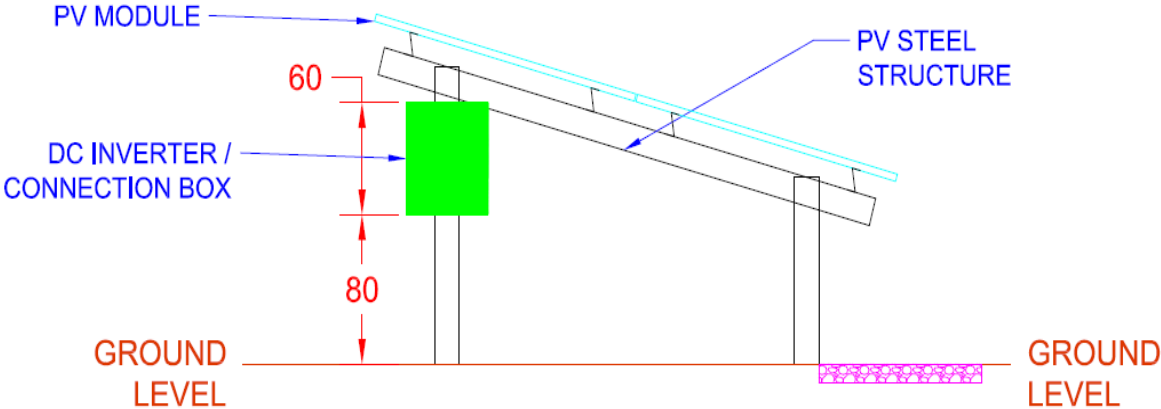
Special cable clips will also be used to fix the cable to the ground mounted steel structure as shown in figure below. These cable clips will allow the cables to remain vented through open air, yet ensure that the cables are elevated from ground level and fixed along its desired path.



To preserve aesthetics, all DC cables interconnecting the modules shall be tied to the nearest purlin via copper wires or metal zipper cables. Those wires will be loosely tied as not to damage the DC cables, however, they show prolonged lifecycle when exposed to harsh weather conditions. The DC cables from each string of modules shall be combined in a connection box located midway between the extremities of the PV farm as to average out cable losses. The connection box shall in turn be connected to the DC inverters via DC cables of the required cross sections. Details of the electric connectivity is included in the electric design section of this report.

2.5 DC Inverters

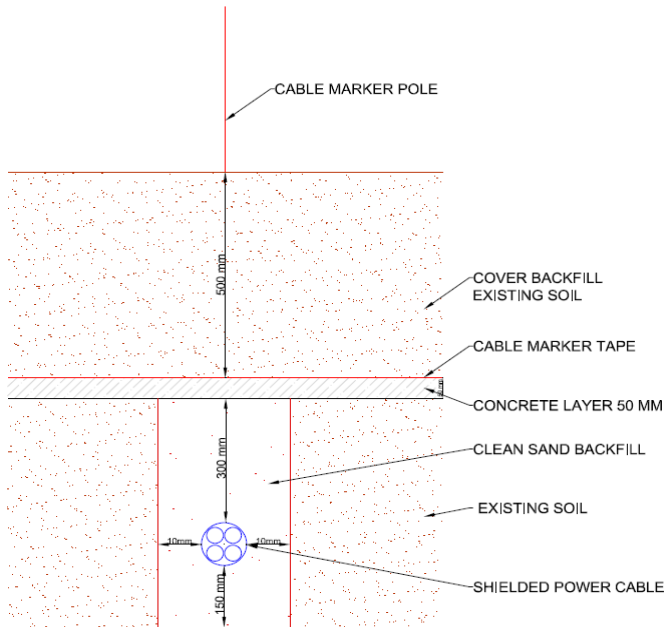
DC inverters shall be mounted on the side galvanized ground mounting system, directly underneath the panels. This shall give some protection for the inverters from direct sunlight and rain (although the inverters shall be IP 67 rated hence can be placed totally outdoors). A typical detail of the mounting structure of the DC inverters and the connection box is shown in Figure below.



2.6 Cable selection and erection

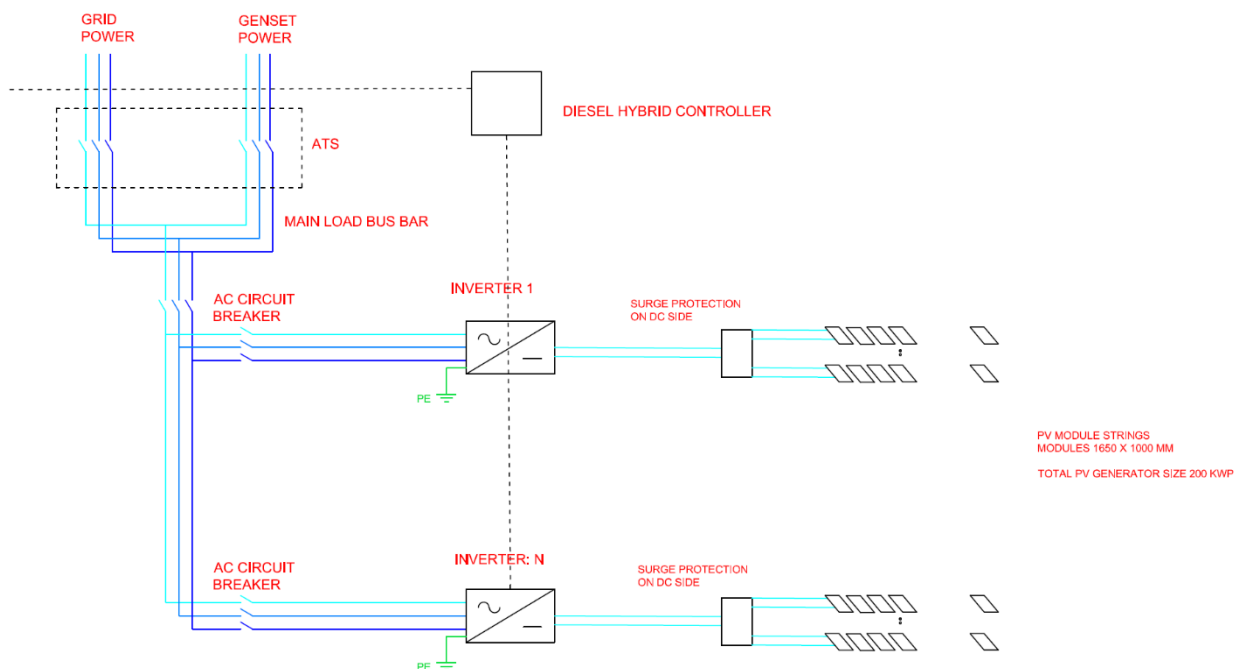
Given the distances revealed above from the PV side to the main ATS & DB room, contractor shall select the right AC cables to achieve a total loss of less than 3%. A detailed calculation note that be submitted to support the selection.

The AC electric cables shall be trenched in the field and erected as per best standards to reduce the losses from one side, and to protect the cable as well. Below are the details of cable erections.



2.7 Single Line Diagram

We demonstrate below a preliminary single line diagram as an initial guide. Contractor shall issue final detailed SLD once awarded the contract, following a site visit.



3 Specifications and prices for PV plant

All companies taking part in the tender should answer in their offer the following:

3.1 Class A Polycrystalline solar modules for system size of 202 kWp

Electrical specifications of the modules

- product brand and type:
- nominal capacity 265 - 285 [Wp]:
- MPP voltage [V]:
- MPP power [A]:
- short circuit current [A]:
- open-circuit voltage [V]:
- performance tolerance [%]: +.... / - 0
- maximal system voltage < 1000 [V]:
- 60 cells
- module efficiency ≥ 17 [%]:

Dimensions and weight of modules

- dimensions [length * width in mm]:
- frame height [mm]:
- weight [kg]:

Temperature coefficients of cells

- regarding the nominal power [%/K]:
- regarding the open-circuit voltage [%/K]:
- regarding the short circuit current [%/K]:

Limits

- permitted voltage [V]:
- permitted module temperature [from...to in °C]:

Wind resistance classification

- certification:

Product Certification:

Protection Class:

Product guarantee: min. 10 years

Performance guarantee: linear min. 25 years

Comments:

Number of units

Unit Price € 0,00 Total price € 0,00

Cables

The run and connection of the UV shielded cables are included in the offer as well as all necessary material for their standardized installation. Moreover, all connecting pieces (plug connectors, clamps and collecting boxes) are included in the offered amount. All testing certificates shall be submitted.

- cable dimensions ≥ 6 [mm²]:
- cable type:
- product brand:

Comments:

m	€ 0,00	0,00
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3.2 Mounting system

The system is mounted according to the layout plan. Cable entries are installed accordingly. All pieces are resistant against corrosion and ultraviolet radiation.

Type ground mounted:

Piece	mounting structure type: made from:	€ 0,00	0,00
Piece	module end clamp:	€ 0,00	0,00
Piece	module middle clamp:	€ 0,00	0,00
Piece	profile of cross girder:	€ 0,00	0,00
Piece	set of connectors for cross girder:	€ 0,00	0,00
Piece	screw set for roof hook:	€ 0,00	0,00
Piece	screw set for module clamps:	€ 0,00	0,00

Comments:

Sum	€ 0,00	0,00
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3.3 Power inverter

The power inverter is offered fully installed and connected including communication and hybrid controller. The installation also includes string inverter fuses for feeding the grid with low voltage (230 V/400 V). The offer includes all certificates for standardization proofs and declaration of conformity.

- product brand and type:
- product warranty ≥ 5 years:
- recommended maximal PV generator power [W]:
- nominal input power [W]:
- stand-by power consumption $< 0,005$ [Pstandby/Pnominal]:
- Umpp range[V DC]:
- maximum open-circuit voltage [V DC]:
- maximum string current [A]:
- Max. Efficiency [%]:
- Euro. Efficiency $\geq 98,3$ [%]:
- nominal output power under permanent operation [W]:
- peak power [W]:
- THD [%]:

- reactive power factor -0,8 - +0,8 [cos phi]:
- system voltage monitoring:
- ground fault monitoring:
- protection class:
- relative humidity ≥ 95 [%] (non-condensating):
- cooling system:
- noise emission <60 dB [A]:

Dimensions and weight

- height [mm]:
- width [mm]:
- depth [mm]:
- weight [kg]:

Comments:

Piece	€ 0,00	0,00
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Product warranty

€ 0,00 0,00

Cost of warranty extension for min. 5 years (optional):

Data transfer monitoring

€ 0,00 0,00

Specification:

The data transfer monitoring includes cable routing and connection, complete documentation, data transfer monitoring and all necessary articles (cables, mounting, interface device on all sensors and active components, electricity meter, router/modem, installation of telephone and AC power supply) is included in the offer.

Comments:

	€ 0,00	0,00
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3.4 DC disconnecter and overvoltage protection

The offer includes an DC disconnecter with load switching capacity of max. PV generator power. It is completely installed and connected with all mounting parts. The overvoltage protection device must include an overvoltage protection for both poles.

- switching voltage [V DC]:
- switching current [A DC]:
- operating temperature [from to in °C]:

Comments:

Piece	€ 0,00	0,00
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3.5 Circuit breakers

The offer includes circuit breakers between inverter and grid connecting point including distribution fuse board. Circuit breakers are fully installed and connected.

- trigger characteristic:
- tripping current [A]:
- brand and type:

Comments:

Piece	€ 0,00	0,00
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3.6 AC - installation

The offer includes all necessary cables installed and connected as well as all material necessary for a standardized installation. Moreover, all connecting pieces (plug connectors, clamps and collecting boxes) are included in the offered amount. UV-Shielded Copper or equivalent AC Cables. Losses less than 3 %.

Piece	cable dimension ≥ 6 [mm ²): cable type: product brand:	€ 0,00	0,00
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Piece	sheathed cable: cable dimension ≥ 6 [mm ²): cable type: product brand:	€ 0,00	0,00
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Comments:

€ 0,00	0,00
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3.7 Lightning protection, grounding and potential equalization

Piece	sheathed cable: cable dimension [mm ²): cable type: product brand:	€ 0,00	0,00
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Piece	grounding made of..... Diameter [mm]:	€ 0,00	0,00
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Piece	terminal clamps (different types and sizes)	€ 0,00	0,00
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Comments:

€ 0,00	0,00
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3.8 Transport, packaging and disposal

In this position all costs for transport, packaging and waste disposal of necessary material are included.

Comments:

	€ 0,00	0,00
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3.9 Maintenance (optional)

The yearly system inspection includes:

- data reading with an interface
- visual inspection
- control of yield
- maintenance reports (according to maintenance manual) to be submitted to bfz and the Bekaa Water Establishment (BWE)

Comments:

	€ 0,00	0,00
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3.10 Others

Documentation

- overview of circuit diagram (allocation of modules, inverter and meter)
- circuit diagram (information on type, product brand, circuit and function)
- documentation of inverter management
- technical data sheet of all components
- plan of module arrangement
- as built drawings in soft and hardcopy
- maintenance manual
- acceptance report and commissioning report

Introduction and Training for operation and maintenance of PV plant

Comments:

	€ 0,00	0,00
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3.11 Complete mounting and installation

Mounting, installation and connection of all PV modules (see 3.2 - Mounting system)

Comments:

	€ 0,00	0,00
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Acceptance and commissioning of plant

The acceptance and commissioning of the plant by an electrical engineer includes:

- registration of plant with the grid operator
- proof of functioning and installation
- measurement of grounding resistance, loop and grid impedance, irradiation and comparison with feed-in power

Comments:

	€ 0,00	0,00
Technicians and assistance	€ 0,00	0,00
Working hours		
Incidentals	€ 0,00	0,00

Comments:

	€ 0,00	0,00
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Summary of all positions:

ITEM	DESCRIPTION	QTY	UNIT PRICE EUR	TOTAL PRICE EUR
1	Class A Polycrystalline solar modules for system size of 202 kWp including cables			
2	Mounting System			
3	Power Inverter			
4	DC disconnecter and overvoltage protection			
5	Circuit Breakers			
6	AC Installation			
7	Lightning protection, grounding and potential equalization			
8	Transport, packaging and disposal			
9	Maintenance (optional)			
10	Others			
11	Complete mounting and installation			
	NET TOTAL Delivery Duty Paid in EUR excluding VAT			
	GROSS TOTAL including 11% VAT in EUR			

Terms

- Price validity 60 days from contract award
- Any fluctuation in EUR/USD shall be beared by the contractor
- Prices are considered LOCO/DDP receiving area in WWPT in Zahle
- Contractor shall be responsible to supply a complete system with all required accessories to ensure successful system functionality
- Delivery time of all products from the date of award till product delivery and installation: ____ calender days

Payments

- * 60 % upon contract award (against bank guarantee as requested)
- 30 % upon product delivery (against bank guarantee as requested)
- 10 % upon successful commissioning & handover

* Performed only after submitting the post award submittals and attaining approval from BFZ technical team

Place, Date, Signature and Stamp of bidder