

M/s _____



PAKISTAN RAILWAYS

Karachi Division.

TENDER DOCUMENTS

For

**DESIGN, SUPPLY, INSTALLATION, TESTING AND COMMISSIONING
FOR CONVERSION OF EXISTING GRID-TIED SOLAR SYSTEMS INTO
HYBRID SOLAR SYSTEMS AT 21 NOS RAILWAY STATIONS ACROSS
KARACHI DIVISION ON A TURNKEY BASIS.**

On

Single Stage-Two Envelope Basis

TECHNICAL PROPOSAL

Volume 1 of 2

Tender No. 258-W/Genl/Solar/RS-4

**DIVISIONAL SUPERINTENDENT OFFICE
PAKISTAN RAILWAYS
KARACHI**

WARRANTY CERTIFICATE

Tender Name: **DESIGN, SUPPLY, INSTALLATION, TESTING AND COMMISSIONING FOR
CONVERSION OF EXISTING GRID-TIED SOLAR SYSTEMS INTO HYBRID
SOLAR SYSTEMS AT 21 NOS RAILWAY STATIONS ACROSS KARACHI
DIVISION ON A TURNKEY BASIS.**

Tender No: **258-W/Genl/Solar/RS-4**

I/We, the undersigned, hereby certify, declare, and undertake that, if awarded the Contract, I/We shall comply with the following warranty obligations:

1. I/We warrant that all equipment, materials, and accessories supplied under the Contract shall strictly conform to the technical specifications, drawings, and other requirements stipulated in the Bidding Documents.
2. I/We further warrant that all equipment and materials supplied shall be brand new, unused, of the latest design and manufacture, and free from defects in design, material, workmanship, and manufacturing.
3. I/We undertake that, during the warranty period, any equipment, component, or material found to be defective due to faulty design, material, workmanship, manufacturing defects, or failure to meet the specified performance requirements under normal operating and maintenance conditions shall be repaired or replaced at my/our own cost, without any additional cost to the Procuring Agency.
4. I/We undertake to furnish a Warranty/Guarantee for the Inverter for a period of Ten (10) years and for the Lithium Ion Battery for a period of Five (05) years from the date of successful Installation, Testing and Commissioning (ITC).
5. I/We acknowledge that my/our liability under this warranty shall be limited to the repair or replacement of defective equipment, components, or materials supplied under the Contract and shall not exceed the value of the defective item(s). However, I/We shall remain liable for any direct damages sustained by the Procuring Agency due to failure of the supplied equipment to comply with the warranties provided herein, excluding consequential or indirect damages.
6. I/We further certify that the above warranty obligations shall remain valid notwithstanding the completion of supply or acceptance of the equipment and shall be fulfilled in accordance with the terms and conditions of the Contract.

I/We hereby certify that the above declarations are true and correct and shall form an integral part of my/our Bid and, upon acceptance, shall become binding obligations under the Contract.

Authorized Signatory: _____

Name: _____

Designation: _____

Name of Bidder/Firm: _____

Company Seal: _____

Date: _____

**ADDITIONAL
PARTICULAR CONDITIONS
OF
CONTRACT**

ADDITIONAL

PARTICULAR CONDITIONS OF

CONTRACT

The following SCCs/PCCs are addition to those in Standard Bidding Documents generated by EPADS 2.0 and shall supplement the General Conditions of Contract (GCC). Whenever there is a conflict, the provisions herein shall prevail over those in the GCC.

Number of GC Clause

The Purchaser is: Divisional Superintendent, Pakistan Railways, Karachi.

Number of GC Clause

The Site is: **21 Nos. Railway Stations, List attached as Annexure – A.**

Number of GC Clause

For notices, the Purchaser's address shall be:

Attention: Divisional Superintendent, Pakistan Railways, Karachi

Address: Divisional Superintendent Office, Pakistan Railways, Karachi.

City: *Karachi*

Country: *Pakistan*

Telephone: + 921-99213516

[Addresses of the Supplier shall be entered before signing the Contract]

Number of GC Clause

The formal mechanism for the resolution of disputes shall be as follows:

- a. The rights and obligations of the Parties under or pursuant to these Conditions shall be governed and construed according to the Law of Islamic Republic of Pakistan.
- b. The dispute shall be referred to CEO / Sr. GM, Pakistan Railways being sole arbitrator for arbitration and finally settled in Lahore, Pakistan in accordance with the Arbitration Act, 1940, and any amendment or substitution thereof. The decision of the arbitrator (s) shall be final and shall not be challenged or assailed in any court on any ground whatsoever except under Arbitration Act 1940.

Number of GC Clause

1. The Contractor shall design/supply/install/test/commission the equipment/system at each station as specified in Annexure-A. The contractor will ensure that he/she will supply the original, newly manufactured product as per approved specifications. No refurbished/reconditioned or used product will be accepted.

Number of GC Clause

1. Details of shipping and other documents to be furnished by the Supplier. *The bidder will also provide Operation and Maintenance manuals and drawings/diagrams for the system.* The contractor shall provide detailed technical specifications which should be self-explanatory of the equipment to

be supplied with the offering bid to establish the compliance of the supplied equipment with approved specifications.

Number of GC Clause

Payments shall be released as per submitted collective Invoice of not less than PKR 5.000 million each. Once the items are delivered and its Station wise ITC has been carried out successfully, the payment shall be made after submission of an invoice or request for payment by the Supplier, subject to verification and acceptance by the purchaser.

Number of GC Clause

The transportation of the equipment safely up to the site is responsibility of the bidder. All the transportation charges of the goods upto the sites shall be borne by the Supplier

Number of GC Clause

Tests and Inspections: The Purchaser/Employer reserves the right to have the testing and verification of any equipment, material, or installation carried out (at the time of delivery, during or at the end of ITC with access to drawing and production data) by a third-party inspection agency at any stage of the project. Such testing, if conducted, shall be at the expense of the Contractor/Successful Bidder.

Number of GC Clause

The period of validity of the warranty of equipment shall be as specified in BOQ or Warranty Certificate Specimen attached with these bidding documents.

i.e. (Warranty for the Inverter for a period of Ten (10) years and for the Lithium Ion Battery for a period of Five (05) years from the date of successful Installation, Testing and Commissioning (ITC).)

Number of GC Clause

The Supplier shall correct any defects covered under the Warranty within 10 Working Days on the occurrence of such defects.

Number of GC Clause

Pakistan Railways will be entitled to carry out random testing of supplied material from any agency on expense of supplier.

Number of GC Clause

The Contractor shall be responsible for replacing parts or equipment or any component of Supplied System that becomes defective during DLP (_____ no of days (As specified in SBD generated by EPADS 2.0) from date of completion of the project).

Number of GC Clause

As specified in SBD generated by EPADS 2.0

GENERAL INFORMATION OF BIDDER

Advertised Tender No.

1	Name of Firm					
2	Office Address					
3	Mobile No.					
4	Telephone No.					
5	E. Mail					
6	Web Site					
7	Sale Tax Registration No.					
8	National Tax No.					
9	Past Experience of relevant field if any	<table border="1"><tr><td>1.</td></tr><tr><td>2.</td></tr><tr><td>3.</td></tr><tr><td>4.</td></tr></table>	1.	2.	3.	4.
1.						
2.						
3.						
4.						
10	Past Experience of Supply to Railways if Any	<table border="1"><tr><td>1.</td></tr><tr><td>2.</td></tr><tr><td>3.</td></tr><tr><td>4.</td></tr></table>	1.	2.	3.	4.
1.						
2.						
3.						
4.						

Name of Firm: _____

Authorized Signature of Bidder: _____

Stamp & Date: _____

LIST OF STATIONS/SITES

The stations listed below are equipped with existing On-Grid Solar PV Systems of the respective capacities indicated against each station. The scope of this tender includes the design, supply, installation, testing, commissioning, and conversion of these existing On-Grid Solar Systems into Hybrid Solar Systems in accordance with the technical specifications and Bill of Quantities (BOQ).

S.No.	Station Name	Capacity (kW)	S.No.	Station Name	Capacity (kW)
1	Drigh Road	25	12	Aladino Sand	10
2	Malir City	15	13	Pali Jani	10
3	Jumma Goth	15	14	Odero Lal	10
4	Bin Qasim	35	15	Wahab Shah	10
5	Dhabeji	15	16	Tando Adam	20
6	Ranpathani	10	17	Sindh University	10
7	Jungshahi	8	18	Buddhapur	10
8	Jhampir	7	19	Khannote	10
9	Bolari	10	20	Gopang	10
10	Kotri	30	21	SAN	10
11	Detha	10	-----	-----	-----
Total Capacity (kW)			290		

TECHNICAL PROPOSAL

TECHNICAL PROPOSAL - Part-1

Name of Bidder_____

DESIGN, SUPPLY, INSTALLATION, TESTING AND COMMISSIONING FOR CONVERSION OF EXISTING 07-KW GRID-TIED SOLAR SYSTEM INTO HYBRID SOLAR SYSTEM AT JHAMPIR RAILWAY STATION OVER KARACHI DIVISION.

1	Design, Supply, installation, testing and commissioning work for conversion of existing Grid-Tied solar systems into Hybrid solar system at Railway Stations with all allied accessories i.e., Hybrid inverter, additional protective equipment, including all civil and electrical works, wiring, cabling. (Complete in all respects). <u>NOTE:</u> The bidder will fill out each BOQ separately as per mentioned System Capacity.			
	Description	Unit	Qty	Brand Name /Country of Origin & Technical Data
1.1	Inverter Type: Three Phase HYBRID Inverter equipped with a built-in online monitoring system and Wi-Fi-enabled monitoring device (dongle), IP-65 with built in DC and AC Surge Protection Devices. 10 years warranty. Manufacturing Brand: Inverex, GoodWe, Huawei Solis, Sungow or Equivalent Tier-1	Each	As per System Capacity requirement	
1.2	Batteries: Lithium-ion Battery, Nominal voltage: 48 V. Rated capacity: 100-AH. This includes battery cables and allied accessories. s: 05 Years. Brands: Narada, Inverex, or equivalent reputed manufacturers.	Each	02	
1.3	Dust Proof Powder Coated Metallic Distribution Box, indoor/outdoor, appropriate housing space, as per site requirements complete in all respects, IP 54 or higher.	Each	01	
1.4	Additional Protective Devices Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems.: • Three Phase Four Pole 200-A MCCB for Mains Supply from Utility • Three phase Three/Four Pole MCBs for input side and output side of the inverter separately. • Three Phase Over/Under Voltage and Phase Sequence Protection Device on inverter input side and load side separately. • DC Two Pole Circuit breakers and Fuses for DC input to inverter and also between Battery/Batteries and Inverter • SPDs, Three Phase Four Pole 150A Manual Change over Switch. Brand for Circuit Breakers: Schneider, Terasaki or Equivalent.	Job	01	
1.5	Additional DC & AC Cables Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems. (Note: lengths & size may vary on each site;) Brands Newage, Allied, Fast, Pakistan Cables or equivalent	Job	As per site requirement	
1.6	Installation and Transportation Charges as per site requirement to complete the project in all respect.	Job	01	

Bidder Signature

TECHNICAL PROPOSAL - Part-2

Name of Bidder _____

DESIGN, SUPPLY, INSTALLATION, TESTING AND COMMISSIONING FOR CONVERSION OF EXISTING 08-KW GRID-TIED SOLAR SYSTEM INTO HYBRID SOLAR SYSTEM AT JUNGSHAHI RAILWAY STATION OVER KARACHI DIVISION.

1	Design, Supply, installation, testing and commissioning work for conversion of existing Grid-Tied solar systems into Hybrid solar system at Railway Stations with all allied accessories i.e., Hybrid inverter, additional protective equipment, including all civil and electrical works, wiring, cabling. (Complete in all respects). NOTE: The bidder will fill out each BOQ separately as per mentioned System Capacity.			
	Description	Unit	Qty	Brand Name /Country of Origin & Technical Data
1.1	Inverter Type: Three Phase HYBRID Inverter equipped with a built-in online monitoring system and Wi-Fi-enabled monitoring device (dongle), IP-65 with built in DC and AC Surge Protection Devices. 10 years warranty. Manufacturing Brand: Inverex, GoodWe, Huawei Solis, Sungow or Equivalent Tier-1.	Each	As per System Capacity requirement	
1.2	Batteries: Lithium-ion Battery, Nominal voltage: 48 V. Rated capacity: 100-AH. This includes battery cables and allied accessories. Warranty: 05 Years. Brands: Narada, Inverex, or equivalent reputed manufacturers.	Each	02	
1.3	Dust Proof Powder Coated Metallic Distribution Box, indoor/outdoor, appropriate housing space, as per site requirements complete in all respects, IP 54 or higher.	Each	01	
1.4	Additional Protective Devices Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems.: • Three Phase Four Pole 200-A MCCB for Mains Supply from Utility • Three phase Three/Four Pole MCBs for input side and output side of the inverter separately. • Three Phase Over/Under Voltage and Phase Sequence Protection Device on inverter input side and load side separately. • DC Two Pole Circuit breakers and Fuses for DC input to inverter and also between Battery/Batteries and Inverter • SPDTs, Three Phase Four Pole 150A Manual Change over Switch Brand for Circuit Breakers: Schneider, Terasaki or Equivalent.	Job	01	
1.5	Additional DC & AC Cables Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems. (Note: lengths & size may vary on each site;) Brands Newage, Allied, Fast, Pakistan Cables or equivalent	Job	As per site requirement	
1.6	Installation and Transportation Charges as per site requirement to complete the project in all respect.	Job	01	

Bidder Signature

TECHNICAL PROPOSAL - Part-3

Name of Bidder _____

DESIGN, SUPPLY, INSTALLATION, TESTING AND COMMISSIONING FOR CONVERSION OF EXISTING 10-KW GRID-TIED SOLAR SYSTEM INTO HYBRID SOLAR SYSTEM AT ALADINO SAND RAILWAY STATION OVER KARACHI DIVISION.

1	Design, Supply, installation, testing and commissioning work for conversion of existing Grid-Tied solar systems into Hybrid solar system at Railway Stations with all allied accessories i.e., Hybrid inverter, additional protective equipment, including all civil and electrical works, wiring, cabling. (Complete in all respects). <u>NOTE:</u> The bidder will fill out each BOQ separately as per mentioned System Capacity.			
	Description	Unit	Qty	Brand Name /Country of Origin & Technical Data
1.1	Inverter Type: Three Phase HYBRID Inverter equipped with a built-in online monitoring system and Wi-Fi-enabled monitoring device (dongle), IP-65 with built in DC and AC Surge Protection Devices. 10 years warranty. Manufacturing Brand: Inverex, GoodWe, Huawei Solis, Sungow or Equivalent Tier-1	Each	As per System Capacity requirement	
1.2	Batteries: Lithium-ion Battery, Nominal voltage: 48 V. Rated capacity: 100-AH. This includes battery cables and allied accessories. Warranty: 05 Years. Brands: Narada, Inverex, or equivalent reputed manufacturers.	Each	01	
1.3	Dust Proof Powder Coated Metallic Distribution Box, indoor/outdoor, appropriate housing space, as per site requirements complete in all respects, IP 54 or higher.	Each	01	
1.4	Additional Protective Devices Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems.: • Three Phase Four Pole 200-A MCCB for Mains Supply from Utility • Three phase Three/Four Pole MCBs for input side and output side of the inverter separately. • Three Phase Over/Under Voltage and Phase Sequence Protection Device on inverter input side and load side separately. • DC Two Pole Circuit breakers and Fuses for DC input to inverter and also between Battery/Batteries and Inverter • SPDs, Three Phase Four Pole 150A Manual Change over Switch Brand for Circuit Breakers: Schneider, Terasaki or Equivalent.	Job	01	
1.5	Additional DC & AC Cables Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems. (Note: lengths & size may vary on each site;) Brands Newage, Allied, Fast, Pakistan Cables or equivalent	Job	As per site requirement	
1.6	Installation and Transportation Charges as per site requirement to complete the project in all respect.	Job	01	

Bidder Signature

TECHNICAL PROPOSAL - Part-4

Name of Bidder _____

DESIGN, SUPPLY, INSTALLATION, TESTING AND COMMISSIONING FOR CONVERSION OF EXISTING 10-KW GRID-TIED SOLAR SYSTEM INTO HYBRID SOLAR SYSTEM AT DETHA RAILWAY STATION OVER KARACHI DIVISION.

1	Design, Supply, installation, testing and commissioning work for conversion of existing Grid-Tied solar systems into Hybrid solar system at Railway Stations with all allied accessories i.e., Hybrid inverter, additional protective equipment, including all civil and electrical works, wiring, cabling. (Complete in all respects). NOTE: The bidder will fill out each BOQ separately as per mentioned System Capacity.			
	Description	Unit	Qty	Brand Name /Country of Origin & Technical Data
1.1	Inverter Type: Three Phase HYBRID Inverter equipped with a built-in online monitoring system and Wi-Fi-enabled monitoring device (dongle), IP-65 with built in DC and AC Surge Protection Devices. 10 years warranty. Manufacturing Brand: Inverex, GoodWe, Huawei Solis, Sungow or Equivalent Tier-1	Each	As per System Capacity requirement	
1.2	Batteries: Lithium-ion Battery, Nominal voltage: 48 V. Rated capacity: 100-AH. This includes battery cables and allied accessories. Warranty: 05 Years. Brands: Narada, Inverex, or equivalent reputed manufacturers.	Each	01	
1.3	Dust Proof Powder Coated Metallic Distribution Box, indoor/outdoor, appropriate housing space, as per site requirements complete in all respects, IP 54 or higher.	Each	01	
1.4	Additional Protective Devices Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems.: - Three Phase Four Pole 200-A MCCB for Mains Supply from Utility - Three phase Three/Four Pole MCBs for input side and output side of the inverter separately. - Three Phase Over/Under Voltage and Phase Sequence Protection Device on inverter input side and load side separately. - DC Two Pole Circuit breakers and Fuses for DC input to inverter and also between Battery/Batteries and Inverter - SPDTs, Three Phase Four Pole 150A Manual Change over Switch Brand for Circuit Breakers: Schneider, Terasaki or Equivalent.	Job	01	
1.5	Additional DC & AC Cables Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems. (Note: lengths & size may vary on each site;) Brands Newage, Allied, Fast, Pakistan Cables or equivalent	Job	As per site requirement	
1.6	Installation and Transportation Charges as per site requirement to complete the project in all respect.	Job	01	

Bidder Signature

TECHNICAL PROPOSAL - Part-5

Name of Bidder _____

DESIGN, SUPPLY, INSTALLATION, TESTING AND COMMISSIONING FOR CONVERSION OF EXISTING 10-KW GRID-TIED SOLAR SYSTEM INTO HYBRID SOLAR SYSTEM AT GOPANG RAILWAY STATION OVER KARACHI DIVISION.

1	Design, Supply, installation, testing and commissioning work for conversion of existing Grid-Tied solar systems into Hybrid solar system at Railway Stations with all allied accessories i.e., Hybrid inverter, additional protective equipment, including all civil and electrical works, wiring, cabling. (Complete in all respects). NOTE: The bidder will fill out each BOQ separately as per mentioned System Capacity.			
	Description	Unit	Qty	Brand Name /Country of Origin & Technical Data
1.1	Inverter Type: Three Phase HYBRID Inverter equipped with a built-in online monitoring system and Wi-Fi-enabled monitoring device (dongle), IP-65 with built in DC and AC Surge Protection Devices. 10 years warranty. Manufacturing Brand: Inverex, GoodWe, Huawei Solis, Sungow or Equivalent Tier-1	Each	As per System Capacity requirement	
1.2	Batteries: Lithium-ion Battery, Nominal voltage: 48 V. Rated capacity: 100-AH. This includes battery cables and allied accessories. Warranty: 05 Years. Brands: Narada, Inverex, or equivalent reputed manufacturers.	Each	01	
1.3	Dust Proof Powder Coated Metallic Distribution Box, indoor/outdoor, appropriate housing space, as per site requirements complete in all respects, IP 54 or higher.	Each	01	
1.4	Additional Protective Devices Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems.: - Three Phase Four Pole 200-A MCCB for Mains Supply from Utility - Three phase Three/Four Pole MCBs for input side and output side of the inverter separately. - Three Phase Over/Under Voltage and Phase Sequence Protection Device on inverter input side and load side separately. - DC Two Pole Circuit breakers and Fuses for DC input to inverter and also between Battery/Batteries and Inverter - SPDTs, Three Phase Four Pole 150A Manual Change over Switch Brand for Circuit Breakers: Schneider, Terasaki or Equivalent.	Job	01	
1.5	Additional DC & AC Cables Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems. (Note: lengths & size may vary on each site;) Brands Newage, Allied, Fast, Pakistan Cables or equivalent	Job	As per site requirement	
1.6	Installation and Transportation Charges as per site requirement to complete the project in all respect.	Job	01	

Bidder Signature

TECHNICAL PROPOSAL - Part-6

Name of Bidder _____

DESIGN, SUPPLY, INSTALLATION, TESTING AND COMMISSIONING FOR CONVERSION OF EXISTING 10-KW GRID-TIED SOLAR SYSTEM INTO HYBRID SOLAR SYSTEM AT KHANNOTE RAILWAY STATION OVER KARACHI DIVISION.

1	Design, Supply, installation, testing and commissioning work for conversion of existing Grid-Tied solar systems into Hybrid solar system at Railway Stations with all allied accessories i.e., Hybrid inverter, additional protective equipment, including all civil and electrical works, wiring, cabling. (Complete in all respects). NOTE: The bidder will fill out each BOQ separately as per mentioned System Capacity.			
	Description	Unit	Qty	Brand Name /Country of Origin & Technical Data
1.1	Inverter Type: Three Phase HYBRID Inverter equipped with a built-in online monitoring system and Wi-Fi-enabled monitoring device (dongle), IP-65 with built in DC and AC Surge Protection Devices. 10 years warranty. Manufacturing Brand: Inverex, GoodWe, Huawei Solis, Sungow or Equivalent Tier-1	Each	As per System Capacity requirement	
1.2	Batteries: Lithium-ion Battery, Nominal voltage: 48 V. Rated capacity: 100-AH. This includes battery cables and allied accessories. Warranty: 05 Years. Brands: Narada, Inverex, or equivalent reputed manufacturers.	Each	01	
1.3	Dust Proof Powder Coated Metallic Distribution Box, indoor/outdoor, appropriate housing space, as per site requirements complete in all respects, IP 54 or higher.	Each	01	
1.4	Additional Protective Devices Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems.: • Three Phase Four Pole 200-A MCCB for Mains Supply from Utility • Three phase Three/Four Pole MCBs for input side and output side of the inverter separately. • Three Phase Over/Under Voltage and Phase Sequence Protection Device on inverter input side and load side separately. • DC Two Pole Circuit breakers and Fuses for DC input to inverter and also between Battery/Batteries and Inverter • SPDs, Three Phase Four Pole 150A Manual Change over Switch Brand for Circuit Breakers: Schneider, Terasaki or Equivalent.	Job	01	
1.5	Additional DC & AC Cables Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems. (Note: lengths & size may vary on each site;) Brands Newage, Allied, Fast, Pakistan Cables or equivalent	Job	As per site requirement	
1.6	Installation and Transportation Charges as per site requirement to complete the project in all respect.	Job	01	

Bidder Signature

TECHNICAL PROPOSAL - Part-7

Name of Bidder _____

DESIGN, SUPPLY, INSTALLATION, TESTING AND COMMISSIONING FOR CONVERSION OF EXISTING 10-KW GRID-TIED SOLAR SYSTEM INTO HYBRID SOLAR SYSTEM AT ODERO LAL STATION OVER KARACHI DIVISION.

1	Design, Supply, installation, testing and commissioning work for conversion of existing Grid-Tied solar systems into Hybrid solar system at Railway Stations with all allied accessories i.e., Hybrid inverter, additional protective equipment, including all civil and electrical works, wiring, cabling. (Complete in all respects). <u>NOTE:</u> The bidder will fill out each BOQ separately as per mentioned System Capacity.			
	Description	Unit	Qty	Brand Name /Country of Origin & Technical Data
1.1	Inverter Type: Three Phase HYBRID Inverter equipped with a built-in online monitoring system and Wi-Fi-enabled monitoring device (dongle), IP-65 with built in DC and AC Surge Protection Devices. 10 years warranty. Manufacturing Brand: Inverex, GoodWe, Huawei Solis, Sungow or Equivalent Tier-1	Each	As per System Capacity requirement	
1.2	Batteries: Lithium-ion Battery, Nominal voltage: 48 V. Rated capacity: 100-AH. This includes battery cables and allied accessories. Warranty: 05 Years. Brands: Narada, Inverex, or equivalent reputed manufacturers.	Each	01	
1.3	Dust Proof Powder Coated Metallic Distribution Box, indoor/outdoor, appropriate housing space, as per site requirements complete in all respects, IP 54 or higher.	Each	01	
1.4	Additional Protective Devices Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems.: - Three Phase Four Pole 200-A MCCB for Mains Supply from Utility - Three phase Three/Four Pole MCBs for input side and output side of the inverter separately. - Three Phase Over/Under Voltage and Phase Sequence Protection Device on inverter input side and load side separately. - DC Two Pole Circuit breakers and Fuses for DC input to inverter and also between Battery/Batteries and Inverter - SPDTs, Three Phase Four Pole 150A Manual Change over Switch Brand for Circuit Breakers: Schneider, Terasaki or Equivalent.	Job	01	
1.5	Additional DC & AC Cables Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems. (Note: lengths & size may vary on each site;) Brands Newage, Allied, Fast, Pakistan Cables or equivalent	Job	As per site requirement	
1.6	Installation and Transportation Charges as per site requirement to complete the project in all respect.	Job	01	

Bidder Signature

TECHNICAL PROPOSAL - Part-8

Name of Bidder _____

DESIGN, SUPPLY, INSTALLATION, TESTING AND COMMISSIONING FOR CONVERSION OF EXISTING 10-KW GRID-TIED SOLAR SYSTEM INTO HYBRID SOLAR SYSTEM AT PALI JANI RAILWAY STATION OVER KARACHI DIVISION.

1	Design, Supply, installation, testing and commissioning work for conversion of existing Grid-Tied solar systems into Hybrid solar system at Railway Stations with all allied accessories i.e., Hybrid inverter, additional protective equipment, including all civil and electrical works, wiring, cabling. (Complete in all respects). NOTE: The bidder will fill out each BOQ separately as per mentioned System Capacity.			
	Description	Unit	Qty	Brand Name /Country of Origin & Technical Data
1.1	Inverter Type: Three Phase HYBRID Inverter equipped with a built-in online monitoring system and Wi-Fi-enabled monitoring device (dongle), IP-65 with built in DC and AC Surge Protection Devices. 10 years warranty. Manufacturing Brand: Inverex, GoodWe, Huawei Solis, Sungow or Equivalent Tier-1	Each	As per System Capacity requirement	
1.2	Batteries: Lithium-ion Battery, Nominal voltage: 48 V. Rated capacity: 100-AH. This includes battery cables and allied accessories. Warranty: 05 Years. Brands: Narada, Inverex, or equivalent reputed manufacturers.	Each	01	
1.3	Dust Proof Powder Coated Metallic Distribution Box, indoor/outdoor, appropriate housing space, as per site requirements complete in all respects, IP 54 or higher.	Each	01	
1.4	Additional Protective Devices Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems.: • Three Phase Four Pole 200-A MCCB for Mains Supply from Utility • Three phase Three/Four Pole MCBs for input side and output side of the inverter separately. • Three Phase Over/Under Voltage and Phase Sequence Protection Device on inverter input side and load side separately. • DC Two Pole Circuit breakers and Fuses for DC input to inverter and also between Battery/Batteries and Inverter • SPDs, Three Phase Four Pole 150A Manual Change over Switch Brand for Circuit Breakers: Schneider, Terasaki or Equivalent.	Job	01	
1.5	Additional DC & AC Cables Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems. (Note: lengths & size may vary on each site;) Brands Newage, Allied, Fast, Pakistan Cables or equivalent	Job	As per site requirement	
1.6	Installation and Transportation Charges as per site requirement to complete the project in all respect.	Job	01	

Bidder Signature

TECHNICAL PROPOSAL - Part-9

Name of Bidder _____

DESIGN, SUPPLY, INSTALLATION, TESTING AND COMMISSIONING FOR CONVERSION OF EXISTING 10-KW GRID-TIED SOLAR SYSTEM INTO HYBRID SOLAR SYSTEM AT SINDH UNIVERSITY RAILWAY STATION OVER KARACHI DIVISION.

1	Design, Supply, installation, testing and commissioning work for conversion of existing Grid-Tied solar systems into Hybrid solar system at Railway Stations with all allied accessories i.e., Hybrid inverter, additional protective equipment, including all civil and electrical works, wiring, cabling. (Complete in all respects). NOTE: The bidder will fill out each BOQ separately as per mentioned System Capacity.			
	Description	Unit	Qty	Brand Name /Country of Origin & Technical Data
1.1	Inverter Type: Three Phase HYBRID Inverter equipped with a built-in online monitoring system and Wi-Fi-enabled monitoring device (dongle), IP-65 with built in DC and AC Surge Protection Devices. 10 years warranty. Manufacturing Brand: Inverex, GoodWe, Huawei Solis, Sungow or Equivalent Tier-1	Each	As per System Capacity requirement	
1.2	Batteries: Lithium-ion Battery, Nominal voltage: 48 V. Rated capacity: 100-AH. This includes battery cables and allied accessories. Warranty: 05 Years. Brands: Narada, Inverex, or equivalent reputed manufacturers.	Each	01	
1.3	Dust Proof Powder Coated Metallic Distribution Box, indoor/outdoor, appropriate housing space, as per site requirements complete in all respects, IP 54 or higher.	Each	01	
1.4	Additional Protective Devices Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems.: • Three Phase Four Pole 200-A MCCB for Mains Supply from Utility • Three phase Three/Four Pole MCBs for input side and output side of the inverter separately. • Three Phase Over/Under Voltage and Phase Sequence Protection Device on inverter input side and load side separately. • DC Two Pole Circuit breakers and Fuses for DC input to inverter and also between Battery/Batteries and Inverter • SPDs, Three Phase Four Pole 150A Manual Change over Switch Brand for Circuit Breakers: Schneider, Terasaki or Equivalent.	Job	01	
1.5	Additional DC & AC Cables Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems. (Note: lengths & size may vary on each site;) Brands Newage, Allied, Fast, Pakistan Cables or equivalent	Job	As per site requirement	
1.6	Installation and Transportation Charges as per site requirement to complete the project in all respect.	Job	01	

Bidder Signature

TECHNICAL PROPOSAL - Part-10

Name of Bidder _____

DESIGN, SUPPLY, INSTALLATION, TESTING AND COMMISSIONING FOR CONVERSION OF EXISTING 10-KW GRID-TIED SOLAR SYSTEM INTO HYBRID SOLAR SYSTEM AT WAHAB SHAH RAILWAY STATION OVER KARACHI DIVISION.

1	Design, Supply, installation, testing and commissioning work for conversion of existing Grid-Tied solar systems into Hybrid solar system at Railway Stations with all allied accessories i.e., Hybrid inverter, additional protective equipment, including all civil and electrical works, wiring, cabling. (Complete in all respects). <u>NOTE:</u> The bidder will fill out each BOQ separately as per mentioned System Capacity.			
	Description	Unit	Qty	Brand Name /Country of Origin & Technical Data
1.1	Inverter Type: Three Phase HYBRID Inverter equipped with a built-in online monitoring system and Wi-Fi-enabled monitoring device (dongle), IP-65 with built in DC and AC Surge Protection Devices. 10 years warranty. Manufacturing Brand: Inverex, GoodWe, Huawei Solis, Sungow or Equivalent Tier-1	Each	As per System Capacity requirement	
1.2	Batteries: Lithium-ion Battery, Nominal voltage: 48 V. Rated capacity: 100-AH. This includes battery cables and allied accessories. Warranty: 05 Years. Brands: Narada, Inverex, or equivalent reputed manufacturers.	Each	01	
1.3	Dust Proof Powder Coated Metallic Distribution Box, indoor/outdoor, appropriate housing space, as per site requirements complete in all respects, IP 54 or higher.	Each	01	
1.4	Additional Protective Devices Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems.: - Three Phase Four Pole 200-A MCCB for Mains Supply from Utility - Three phase Three/Four Pole MCBs for input side and output side of the inverter separately. - Three Phase Over/Under Voltage and Phase Sequence Protection Device on inverter input side and load side separately. - DC Two Pole Circuit breakers and Fuses for DC input to inverter and also between Battery/Batteries and Inverter - SPDTs, Three Phase Four Pole 150A Manual Change over Switch Brand for Circuit Breakers: Schneider, Terasaki or Equivalent.	Job	01	
1.5	Additional DC & AC Cables Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems. (Note: lengths & size may vary on each site;) Brands Newage, Allied, Fast, Pakistan Cables or equivalent	Job	As per site requirement	
1.6	Installation and Transportation Charges as per site requirement to complete the project in all respect.	Job	01	

Bidder Signature

TECHNICAL PROPOSAL - Part-11

Name of Bidder _____

DESIGN, SUPPLY, INSTALLATION, TESTING AND COMMISSIONING FOR CONVERSION OF EXISTING 10-KW GRID-TIED SOLAR SYSTEM INTO HYBRID SOLAR SYSTEM AT RANPATHANI RAILWAY STATION OVER KARACHI DIVISION.

1	Design, Supply, installation, testing and commissioning work for conversion of existing Grid-Tied solar systems into Hybrid solar system at Railway Stations with all allied accessories i.e., Hybrid inverter, additional protective equipment, including all civil and electrical works, wiring, cabling. (Complete in all respects). NOTE: The bidder will fill out each BOQ separately as per mentioned System Capacity.			
	Description	Unit	Qty	Brand Name /Country of Origin & Technical Data
1.1	Inverter Type: Three Phase HYBRID Inverter equipped with a built-in online monitoring system and Wi-Fi-enabled monitoring device (dongle), IP-65 with built in DC and AC Surge Protection Devices. 10 years warranty. Manufacturing Brand: Inverex, GoodWe, Huawei Solis, Sungow or Equivalent Tier-1	Each	As per System Capacity requirement	
1.2	Batteries: Lithium-ion Battery, Nominal voltage: 48 V. Rated capacity: 100-AH. This includes battery cables and allied accessories. Warranty: 05 Years. Brands: Narada, Inverex, or equivalent reputed manufacturers.	Each	02	
1.3	Dust Proof Powder Coated Metallic Distribution Box, indoor/outdoor, appropriate housing space, as per site requirements complete in all respects, IP 54 or higher.	Each	01	
1.4	Additional Protective Devices Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems.: - Three Phase Four Pole 200-A MCCB for Mains Supply from Utility - Three phase Three/Four Pole MCBs for input side and output side of the inverter separately. - Three Phase Over/Under Voltage and Phase Sequence Protection Device on inverter input side and load side separately. - DC Two Pole Circuit breakers and Fuses for DC input to inverter and also between Battery/Batteries and Inverter - SPDTs, Three Phase Four Pole 150A Manual Change over Switch Brand for Circuit Breakers: Schneider, Terasaki or Equivalent.	Job	01	
1.5	Additional DC & AC Cables Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems. (Note: lengths & size may vary on each site;) Brands Newage, Allied, Fast, Pakistan Cables or equivalent	Job	As per site requirement	
1.6	Installation and Transportation Charges as per site requirement to complete the project in all respect.	Job	01	

Bidder Signature

TECHNICAL PROPOSAL - Part-12

Name of Bidder _____

DESIGN, SUPPLY, INSTALLATION, TESTING AND COMMISSIONING FOR CONVERSION OF EXISTING 10-KW GRID-TIED SOLAR SYSTEM INTO HYBRID SOLAR SYSTEM AT BOLARI RAILWAY STATION OVER KARACHI DIVISION.

1	Design, Supply, installation, testing and commissioning work for conversion of existing Grid-Tied solar systems into Hybrid solar system at Railway Stations with all allied accessories i.e., Hybrid inverter, additional protective equipment, including all civil and electrical works, wiring, cabling. (Complete in all respects). <u>NOTE:</u> The bidder will fill out each BOQ separately as per mentioned System Capacity.			
	Description	Unit	Qty	Brand Name /Country of Origin & Technical Data
1.1	Inverter Type: Three Phase HYBRID Inverter equipped with a built-in online monitoring system and Wi-Fi-enabled monitoring device (dongle), IP-65 with built in DC and AC Surge Protection Devices. 10 years warranty. Manufacturing Brand: Inverex, GoodWe, Huawei Solis, Sungow or Equivalent Tier-1	Each	As per System Capacity requirement	
1.2	Batteries: Lithium-ion Battery, Nominal voltage: 48 V. Rated capacity: 100-AH. This includes battery cables and allied accessories. Warranty: 05 Years. Brands: Narada, Inverex, or equivalent reputed manufacturers.	Each	02	
1.3	Dust Proof Powder Coated Metallic Distribution Box, indoor/outdoor, appropriate housing space, as per site requirements complete in all respects, IP 54 or higher.	Each	01	
1.4	Additional Protective Devices Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems.: - Three Phase Four Pole 200-A MCCB for Mains Supply from Utility - Three phase Three/Four Pole MCBs for input side and output side of the inverter separately. - Three Phase Over/Under Voltage and Phase Sequence Protection Device on inverter input side and load side separately. - DC Two Pole Circuit breakers and Fuses for DC input to inverter and also between Battery/Batteries and Inverter - SPDTs, Three Phase Four Pole 150A Manual Change over Switch Brand for Circuit Breakers: Schneider, Terasaki or Equivalent.	Job	01	
1.5	Additional DC & AC Cables Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems. (Note: lengths & size may vary on each site;) Brands Newage, Allied, Fast, Pakistan Cables or equivalent	Job	As per site requirement	
1.6	Installation and Transportation Charges as per site requirement to complete the project in all respect.	Job	01	

Bidder Signature

TECHNICAL PROPOSAL - Part-13

Name of Bidder _____

DESIGN, SUPPLY, INSTALLATION, TESTING AND COMMISSIONING FOR CONVERSION OF EXISTING 10-KW GRID-TIED SOLAR SYSTEM INTO HYBRID SOLAR SYSTEM AT BUDHAPUR RAILWAY STATION OVER KARACHI DIVISION.

1	Design, Supply, installation, testing and commissioning work for conversion of existing Grid-Tied solar systems into Hybrid solar system at Railway Stations with all allied accessories i.e., Hybrid inverter, additional protective equipment, including all civil and electrical works, wiring, cabling. (Complete in all respects). NOTE: The bidder will fill out each BOQ separately as per mentioned System Capacity.			
	Description	Unit	Qty	Brand Name /Country of Origin & Technical Data
1.1	Inverter Type: Three Phase HYBRID Inverter equipped with a built-in online monitoring system and Wi-Fi-enabled monitoring device (dongle), IP-65 with built in DC and AC Surge Protection Devices. 10 years warranty. Manufacturing Brand: Inverex, GoodWe, Huawei Solis, Sungow or Equivalent Tier-1	Each	As per System Capacity requirement	
1.2	Batteries: Lithium-ion Battery, Nominal voltage: 48 V. Rated capacity: 100-AH. This includes battery cables and allied accessories. Warranty: 05 Years. Brands: Narada, Inverex, or equivalent reputed manufacturers.	Each	02	
1.3	Dust Proof Powder Coated Metallic Distribution Box, indoor/outdoor, appropriate housing space, as per site requirements complete in all respects, IP 54 or higher.	Each	01	
1.4	Additional Protective Devices Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems.: • Three Phase Four Pole 200-A MCCB for Mains Supply from Utility • Three phase Three/Four Pole MCBs for input side and output side of the inverter separately. • Three Phase Over/Under Voltage and Phase Sequence Protection Device on inverter input side and load side separately. • DC Two Pole Circuit breakers and Fuses for DC input to inverter and also between Battery/Batteries and Inverter • SPDs, Three Phase Four Pole 150A Manual Change over Switch Brand for Circuit Breakers: Schneider, Terasaki or Equivalent.	Job	01	
1.5	Additional DC & AC Cables Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems. (Note: lengths & size may vary on each site;) Brands Newage, Allied, Fast, Pakistan Cables or equivalent	Job	As per site requirement	
1.6	Installation and Transportation Charges as per site requirement to complete the project in all respect.	Job	01	

Bidder Signature

TECHNICAL PROPOSAL - Part-14

Name of Bidder _____

DESIGN, SUPPLY, INSTALLATION, TESTING AND COMMISSIONING FOR CONVERSION OF EXISTING 10-KW GRID-TIED SOLAR SYSTEM INTO HYBRID SOLAR SYSTEM AT SAN RAILWAY STATION OVER KARACHI DIVISION.

1	Design, Supply, installation, testing and commissioning work for conversion of existing Grid-Tied solar systems into Hybrid solar system at Railway Stations with all allied accessories i.e., Hybrid inverter, additional protective equipment, including all civil and electrical works, wiring, cabling. (Complete in all respects). <u>NOTE:</u> The bidder will fill out each BOQ separately as per mentioned System Capacity.			
	Description	Unit	Qty	Brand Name /Country of Origin & Technical Data
1.1	Inverter Type: Three Phase HYBRID Inverter equipped with a built-in online monitoring system and Wi-Fi-enabled monitoring device (dongle), IP-65 with built in DC and AC Surge Protection Devices. 10 years warranty. Manufacturing Brand: Inverex, GoodWe, Huawei Solis, Sungow or Equivalent Tier-1	Each	As per System Capacity requirement	
1.2	Batteries: Lithium-ion Battery, Nominal voltage: 48 V. Rated capacity: 100-AH. This includes battery cables and allied accessories. Warranty: 05 Years. Brands: Narada, Inverex, or equivalent reputed manufacturers.	Each	02	
1.3	Dust Proof Powder Coated Metallic Distribution Box, indoor/outdoor, appropriate housing space, as per site requirements complete in all respects, IP 54 or higher.	Each	01	
1.4	Additional Protective Devices Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems.: • Three Phase Four Pole 200-A MCCB for Mains Supply from Utility • Three phase Three/Four Pole MCBs for input side and output side of the inverter separately. • Three Phase Over/Under Voltage and Phase Sequence Protection Device on inverter input side and load side separately. • DC Two Pole Circuit breakers and Fuses for DC input to inverter and also between Battery/Batteries and Inverter • SPDs, Three Phase Four Pole 150A Manual Change over Switch Brand for Circuit Breakers: Schneider, Terasaki or Equivalent.	Job	01	
1.5	Additional DC & AC Cables Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems. (Note: lengths & size may vary on each site;) Brands Newage, Allied, Fast, Pakistan Cables or equivalent	Job	As per site requirement	
1.6	Installation and Transportation Charges as per site requirement to complete the project in all respect.	Job	01	

Bidder Signature

TECHNICAL PROPOSAL - Part-15

Name of Bidder _____

DESIGN, SUPPLY, INSTALLATION, TESTING AND COMMISSIONING FOR CONVERSION OF EXISTING 15-KW GRID-TIED SOLAR SYSTEMS INTO HYBRID SOLAR SYSTEMS AT MALIR CITY RAILWAY STATION OVER KARACHI DIVISION.

1	Design, Supply, installation, testing and commissioning work for conversion of existing Grid-Tied solar systems into Hybrid solar system at Railway Stations with all allied accessories i.e., Hybrid inverter, additional protective equipment, including all civil and electrical works, wiring, cabling. (Complete in all respects). <u>NOTE:</u> The bidder will fill out each BOQ separately as per mentioned System Capacity.]			
	Description	Unit	Qty	Brand Name /Country of Origin & Technical Data
1.1	Inverter Type: Three Phase HYBRID Inverter equipped with a built-in online monitoring system and Wi-Fi-enabled monitoring device (dongle), IP-65 with built in DC and AC Surge Protection Devices. 10 years warranty. Manufacturing Brand: Inverex, GoodWe, Huawei Solis, Sungow or Equivalent Tier-1	Each	As per System Capacity requirement	
1.2	Batteries: Lithium-ion Battery, Nominal voltage: 48 V. Rated capacity: 100-AH. This includes battery cables and allied accessories. Warranty: 05 Years. Brands: Narada, Inverex, or equivalent reputed manufacturers.	Each	01	
1.3	Dust Proof Powder Coated Metallic Distribution Box, indoor/outdoor, appropriate housing space, as per site requirements complete in all respects, IP 54 or higher.	Each	01	
1.4	Additional Protective Devices Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems.: • Three Phase Four Pole 200-A MCCB for Mains Supply from Utility • Three phase Three/Four Pole MCBs for input side and output side of the inverter separately. • Three Phase Over/Under Voltage and Phase Sequence Protection Device on inverter input side and load side separately. • DC Two Pole Circuit breakers and Fuses for DC input to inverter and also between Battery/Batteries and Inverter • SPDs, Three Phase Four Pole 150A Manual Change over Switch Brand for Circuit Breakers: Schneider, Terasaki or Equivalent.	Job	01	
1.5	Additional DC & AC Cables Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems. (Note: lengths & size may vary on each site;) Brands Newage, Allied, Fast, Pakistan Cables or equivalent	Job	As per site requirement	
1.6	Installation and Transportation Charges as per site requirement to complete the project in all respect.	Job	01	

Bidder Signature

TECHNICAL PROPOSAL - Part-16

Name of Bidder _____

DESIGN, SUPPLY, INSTALLATION, TESTING AND COMMISSIONING FOR CONVERSION OF EXISTING 15-KW GRID-TIED SOLAR SYSTEMS INTO HYBRID SOLAR SYSTEMS AT DHABEJI RAILWAY STATION OVER KARACHI DIVISION.

1	Design, Supply, installation, testing and commissioning work for conversion of existing Grid-Tied solar systems into Hybrid solar system at Railway Stations with all allied accessories i.e., Hybrid inverter, additional protective equipment, including all civil and electrical works, wiring, cabling. (Complete in all respects). NOTE: The bidder will fill out each BOQ separately as per mentioned System Capacity.			
	Description	Unit	Qty	Brand Name /Country of Origin & Technical Data
1.1	Inverter Type: Three Phase HYBRID Inverter equipped with a built-in online monitoring system and Wi-Fi-enabled monitoring device (dongle), IP-65 with built in DC and AC Surge Protection Devices. 10 years warranty. Manufacturing Brand: Inverex, GoodWe, Huawei Solis, Sungow or Equivalent Tier-1	Each	As per System Capacity requirement	
1.2	Batteries: Lithium-ion Battery, Nominal voltage: 48 V. Rated capacity: 100-AH. This includes battery cables and allied accessories. Warranty: 05 Years. Brands: Narada, Inverex, or equivalent reputed manufacturers.	Each	03	
1.3	Dust Proof Powder Coated Metallic Distribution Box, indoor/outdoor, appropriate housing space, as per site requirements complete in all respects, IP 54 or higher.	Each	01	
1.4	Additional Protective Devices Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems.: - Three Phase Four Pole 200-A MCCB for Mains Supply from Utility - Three phase Three/Four Pole MCBs for input side and output side of the inverter separately. - Three Phase Over/Under Voltage and Phase Sequence Protection Device on inverter input side and load side separately. - DC Two Pole Circuit breakers and Fuses for DC input to inverter and also between Battery/Batteries and Inverter - SPDTs, Three Phase Four Pole 150A Manual Change over Switch Brand for Circuit Breakers: Schneider, Terasaki or Equivalent.	Job	01	
1.5	Additional DC & AC Cables Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems. (Note: lengths & size may vary on each site;) Brands Newage, Allied, Fast, Pakistan Cables or equivalent	Job	As per site requirement	
1.6	Installation and Transportation Charges as per site requirement to complete the project in all respect.	Job	01	

Bidder Signature

TECHNICAL PROPOSAL - Part-17

Name of Bidder _____

DESIGN, SUPPLY, INSTALLATION, TESTING AND COMMISSIONING FOR CONVERSION OF EXISTING 15-KW GRID-TIED SOLAR SYSTEMS INTO HYBRID SOLAR SYSTEMS AT JUMMA-GOTH RAILWAY STATION OVER KARACHI DIVISION.

1	Design, Supply, installation, testing and commissioning work for conversion of existing Grid-Tied solar systems into Hybrid solar system at Railway Stations with all allied accessories i.e., Hybrid inverter, additional protective equipment, including all civil and electrical works, wiring, cabling. (Complete in all respects). NOTE: The bidder will fill out each BOQ separately as per mentioned System Capacity.			
	Description	Unit	Qty	Brand Name /Country of Origin & Technical Data
1.1	Inverter Type: Three Phase HYBRID Inverter equipped with a built-in online monitoring system and Wi-Fi-enabled monitoring device (dongle), IP-65 with built in DC and AC Surge Protection Devices. 10 years warranty. Manufacturing Brand: Inverex, GoodWe, Huawei Solis, Sungow or Equivalent Tier-1	Each	As per System Capacity requirement	
1.2	Batteries: Lithium-ion Battery, Nominal voltage: 48 V. Rated capacity: 100-AH. This includes battery cables and allied accessories. Warranty: 05 Years. Brands: Narada, Inverex, or equivalent reputed manufacturers.	Each	04	
1.3	Dust Proof Powder Coated Metallic Distribution Box, indoor/outdoor, appropriate housing space, as per site requirements complete in all respects, IP 54 or higher.	Each	01	
1.4	Additional Protective Devices Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems.: - Three Phase Four Pole 200-A MCCB for Mains Supply from Utility - Three phase Three/Four Pole MCBs for input side and output side of the inverter separately. - Three Phase Over/Under Voltage and Phase Sequence Protection Device on inverter input side and load side separately. - DC Two Pole Circuit breakers and Fuses for DC input to inverter and also between Battery/Batteries and Inverter - SPDTs, Three Phase Four Pole 150A Manual Change over Switch Brand for Circuit Breakers: Schneider, Terasaki or Equivalent.	Job	01	
1.5	Additional DC & AC Cables Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems. (Note: lengths & size may vary on each site;) Brands Newage, Allied, Fast, Pakistan Cables or equivalent	Job	As per site requirement	
1.6	Installation and Transportation Charges as per site requirement to complete the project in all respect.	Job	01	

Bidder Signature

TECHNICAL PROPOSAL - Part-18

Name of Bidder _____

DESIGN, SUPPLY, INSTALLATION, TESTING AND COMMISSIONING FOR CONVERSION OF EXISTING 20-KW GRID-TIED SOLAR SYSTEM INTO HYBRID SOLAR SYSTEM AT TANDO-ADAM RAILWAY STATION OVER KARACHI DIVISION.

1	Design, Supply, installation, testing and commissioning work for conversion of existing Grid-Tied solar systems into Hybrid solar system at Railway Stations with all allied accessories i.e., Hybrid inverter, additional protective equipment, including all civil and electrical works, wiring, cabling. (Complete in all respects). <u>NOTE:</u> The bidder will fill out each BOQ separately as per mentioned System Capacity.			
	Description	Unit	Qty	Brand Name /Country of Origin & Technical Data
1.1	Inverter Type: Three Phase HYBRID Inverter equipped with a built-in online monitoring system and Wi-Fi-enabled monitoring device (dongle), IP-65 with built in DC and AC Surge Protection Devices. 10 years warranty. Manufacturing Brand: Inverex, GoodWe, Huawei Solis, Sungow or Equivalent Tier-1	Each	As per System Capacity requirement	
1.2	Batteries: Lithium-ion Battery, Nominal voltage: 48 V. Rated capacity: 100-AH. This includes battery cables and allied accessories. Warranty: 05 Years. Brands: Narada, Inverex, or equivalent reputed manufacturers.	Each	06	
1.3	Dust Proof Powder Coated Metallic Distribution Box, indoor/outdoor, appropriate housing space, as per site requirements complete in all respects, IP 54 or higher.	Each	01	
1.4	Additional Protective Devices Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems.: - Three Phase Four Pole 200-A MCCB for Mains Supply from Utility - Three phase Three/Four Pole MCBs for input side and output side of the inverter separately. - Three Phase Over/Under Voltage and Phase Sequence Protection Device on inverter input side and load side separately. - DC Two Pole Circuit breakers and Fuses for DC input to inverter and also between Battery/Batteries and Inverter - SPDTs, Three Phase Four Pole 200A Manual Change over Switch Brand for Circuit Breakers: Schneider, Terasaki or Equivalent.	Job	01	
1.5	Additional DC & AC Cables Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems. (Note: lengths & size may vary on each site;) Brands Newage, Allied, Fast, Pakistan Cables or equivalent	Job	As per site requirement	
1.6	Installation and Transportation Charges as per site requirement to complete the project in all respect.	Job	01	

Bidder Signature

TECHNICAL PROPOSAL - Part-19

Name of Bidder _____

DESIGN, SUPPLY, INSTALLATION, TESTING AND COMMISSIONING FOR CONVERSION OF EXISTING 25-KW GRID-TIED SOLAR SYSTEM INTO HYBRID SOLAR SYSTEM AT DRIGH-ROAD RAILWAY STATION OVER KARACHI DIVISION.

1	Design, Supply, installation, testing and commissioning work for conversion of existing Grid-Tied solar systems into Hybrid solar system at Railway Stations with all allied accessories i.e., Hybrid inverter, additional protective equipment, including all civil and electrical works, wiring, cabling. (Complete in all respects). NOTE: The bidder will fill out each BOQ separately as per mentioned System Capacity.			
	Description	Unit	Qty	Brand Name /Country of Origin & Technical Data
1.1	Inverter Type: Three Phase HYBRID Inverter equipped with a built-in online monitoring system and Wi-Fi-enabled monitoring device (dongle), IP-65 with built in DC and AC Surge Protection Devices. 10 years warranty. Manufacturing Brand: Inverex, GoodWe, Huawei Solis, Sungow or Equivalent Tier-1	Each	As per System Capacity requirement	
1.2	Batteries: Lithium-ion Battery, Nominal voltage: 48 V. Rated capacity: 100-AH. This includes battery cables and allied accessories. Warranty: 05 Years. Brands: Narada, Inverex, or equivalent reputed manufacturers.	Each	04	
1.3	Dust Proof Powder Coated Metallic Distribution Box, indoor/outdoor, appropriate housing space, as per site requirements complete in all respects, IP 54 or higher.	Each	01	
1.4	Additional Protective Devices Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems.: - Three Phase Four Pole 200-A MCCB for Mains Supply from Utility - Three phase Three/Four Pole MCBs for input side and output side of the inverter separately. - Three Phase Over/Under Voltage and Phase Sequence Protection Device on inverter input side and load side separately. - DC Two Pole Circuit breakers and Fuses for DC input to inverter and also between Battery/Batteries and Inverter - SPDTs, Three Phase Four Pole 200A Manual Change over Switch Brand for Circuit Breakers: Schneider, Terasaki or Equivalent.	Job	01	
1.5	Additional DC & AC Cables Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems. (Note: lengths & size may vary on each site;) Brands Newage, Allied, Fast, Pakistan Cables or equivalent	Job	As per site requirement	
1.6	Installation and Transportation Charges as per site requirement to complete the project in all respect.	Job	01	

Bidder Signature

TECHNICAL PROPOSAL - Part-20

Name of Bidder _____

DESIGN, SUPPLY, INSTALLATION, TESTING AND COMMISSIONING FOR CONVERSION OF EXISTING 30-KW GRID-TIED SOLAR SYSTEM INTO HYBRID SOLAR SYSTEM AT KOTRI RAILWAY STATION OVER KARACHI DIVISION.

1	Design, Supply, installation, testing and commissioning work for conversion of existing Grid-Tied solar systems into Hybrid solar system at Railway Stations with all allied accessories i.e., Hybrid inverter, additional protective equipment, including all civil and electrical works, wiring, cabling. (Complete in all respects). <u>NOTE:</u> The bidder will fill out each BOQ separately as per mentioned System Capacity.			
	Description	Unit	Qty	Brand Name /Country of Origin & Technical Data
1.1	Inverter Type: Three Phase HYBRID Inverter equipped with a built-in online monitoring system and Wi-Fi-enabled monitoring device (dongle), IP-65 with built in DC and AC Surge Protection Devices. 10 years warranty. Manufacturing Brand: Inverex, GoodWe, Huawei Solis, Sungow or Equivalent Tier-1	Each	As per System Capacity requirement	
1.2	Batteries: Lithium-ion Battery, Nominal voltage: 48 V. Rated capacity: 100-AH. This includes battery cables and allied accessories. Warranty: 05 Years. Brands: Narada, Inverex, or equivalent reputed manufacturers.	Each	04	
1.3	Dust Proof Powder Coated Metallic Distribution Box, indoor/outdoor, appropriate housing space, as per site requirements complete in all respects, IP 54 or higher.	Each	01	
1.4	Additional Protective Devices Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems.: • Three Phase Four Pole 200-A MCCB for Mains Supply from Utility • Three phase Three/Four Pole MCBs for input side and output side of the inverter separately. • Three Phase Over/Under Voltage and Phase Sequence Protection Device on inverter input side and load side separately. • DC Two Pole Circuit breakers and Fuses for DC input to inverter and also between Battery/Batteries and Inverter • SPDs, Three Phase Four Pole 200A Manual Change over Switch Brand for Circuit Breakers: Schneider, Terasaki or Equivalent.	Job	01	
1.5	Additional DC & AC Cables Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems. (Note: lengths & size may vary on each site;) Brands Newage, Allied, Fast, Pakistan Cables or equivalent	Job	As per site requirement	
1.6	Installation and Transportation Charges as per site requirement to complete the project in all respect.	Job	01	

Bidder Signature

TECHNICAL PROPOSAL - Part-21

Name of Bidder _____

DESIGN, SUPPLY, INSTALLATION, TESTING AND COMMISSIONING FOR CONVERSION OF EXISTING 35-KW GRID-TIED SOLAR SYSTEM INTO HYBRID SOLAR SYSTEM AT BIN-QASIM RAILWAY STATION OVER KARACHI DIVISION.

1	Design, Supply, installation, testing and commissioning work for conversion of existing Grid-Tied solar systems into Hybrid solar system at Railway Stations with all allied accessories i.e., Hybrid inverter, additional protective equipment, including all civil and electrical works, wiring, cabling. (Complete in all respects). NOTE: The bidder will fill out each BOQ separately as per mentioned System Capacity.			
	Description	Unit	Qty	Brand Name /Country of Origin & Technical Data
1.1	Batteries: Lithium-ion Battery, Nominal voltage: 48 V. Rated capacity: 100-AH. This includes battery cables and allied accessories. Warranty: 05 Years. Brands: Narada, Inverex, or equivalent reputed manufacturers.	Each	04	
1.2	Dust Proof Powder Coated Metallic Distribution Box, indoor/outdoor, appropriate housing space, as per site requirements complete in all respects, IP 54 or higher.	Each	01	
1.3	Additional Protective Devices Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems.: - Three Phase Four Pole 200-A MCCB for Mains Supply from Utility - Three phase Three/Four Pole MCBs for input side and output side of the inverter separately. - Three Phase Over/Under Voltage and Phase Sequence Protection Device on inverter input side and load side separately. - DC Two Pole Circuit breakers and Fuses for DC input to inverter and also between Battery/Batteries and Inverter - SPDTs, Three Phase Four Pole 200A Manual Change over Switch Brand for Circuit Breakers: Schneider, Terasaki or Equivalent.	Job	01	
1.4	Additional DC & AC Cables Required for Conversion of existing Grid-Tied Solar Systems into Hybrid Solar Systems. (Note: lengths & size may vary on each site;) Brands Newage, Allied, Fast, Pakistan Cables or equivalent	Job	As per site requirement	
1.5	Installation and Transportation Charges as per site requirement to complete the project in all respect.	Job	01	
Note: The Hybrid Inverter has already been installed at Bin Qasim Railway Station. Therefore, the scope under this BOQ (i.e TECHNICAL PROPOSAL - Part-21) is limited to the supply and installation of batteries and all associated equipment and works required to complete the conversion into a fully functional Hybrid Solar PV System.				

Bidder Signature

BID EVALUATION CHECKLIST

BID EVALUATION OF THE TENDER FOR THE PROVISION, INSTALLATION AND COMMISSIONING OF SOLAR SYSTEM

S#.	CRITERION	YES / NO	REMARKS
1	Has the bidder attached/enclosed original bid security in the favour of DAO/Karachi / PR in form of CDR/Pay Order/Bank Guarantee with the technical proposal?		
2	Has the bidder confirmed Railway Specifications/Requirements/Descriptions as stipulated in this tender?		
3	Is the bid validity according to the tender clause?		
4	Has the bidder confirmed completion schedule as per Schedule - B?		
5	Is the offer un-conditional?		
6	Has the bidder indicated its National Tax Number?		
7	Is the bidder certified with Alternative Energy Development Board (AEDB) / PPIB and Pakistan Engineering Council (PEC) in the category mentioned in eligibility criteria?		
8	Is the bidder's name included on ATL of FBR?		
9	Has the bidder provided undertaking that his firm / JV Partner is not involved in any kind of litigation with Pakistan Railways. Moreover, the bidder will not sublet / subcontract any firm on this project which is involved in litigation with Pakistan Railways. The undertaking is to be provided on judicial E-stamp paper.		

Evaluation Criteria

1. General

The Technical proposal of the Bidders shall be evaluated for the post-qualification of bidders based on the criteria given in succeeding paras regarding the Bidders Basic Eligibility, Work Experience, Personnel Capabilities, and Financial Soundness.

2. Weightage/Marks

The weightage/ distribution of the marks of following sections shall be as given below:-

- | | |
|----------------------------|----|
| i. Work Experience | 60 |
| ii. Personnel Capabilities | 15 |
| iii. Financial Soundness | 25 |

3. Mandatory Requirement

The Firms fulfilling the following Mandatory requirements shall only be considered for further evaluation (relevant documents to be attached).

- The bidder shall provide documentary evidence of Pakistan Engineering Council (PEC) registration in Financial Category C-5 or higher and PPIB Certification in Category C-2 or above.
- Firms must have Proof of Registration of Income Tax Department, and the Bidders must be on the Active Taxpayers list.
- Firms must provide an affidavit on legal stamp paper, declaring that the Firm has never been blacklisted by any Government/ Semi Government, Autonomous or State-Owned Organization and that their cases regarding blacklisting are not under trial in any Court of Law.
- Firms must attach Audit Report for Last 3 Financial Years i.e. FY 2023-23, 2023-24 & 2024-25.
- Firms must have proof of Completion of at least Two (02) Similar Projects during the last 05 years, Similar projects means Solar PV Projects (On Grid / Hybrid), each of minimum Rs. 5.00 million, in last five years.
- Original Bid Security amounting to **Rs. 889,300/- (Eight Lac Eighty-Nine Thousand Three Hundred Rupees Only.)** in the shape of Deposit at Call Receipt/ Bank Guarantee in favor of Divisional Accounts Officer Pakistan Railways Karachi., from any Scheduled Bank in Pakistan, to be attached with technical proposal.
- In case of Joint Venture, the JV Agreement between all the firms, showing the Lead Firm and Partner firm, must be attached.

4. Relevant Work Experience

Marking for work experience of the firms shall be evaluated as per following criteria.

Sr. No.	Description	Max. Marks
1	Experience of completion of Projects of Similar Nature (As defined in Para 3(e) of mandatory requirement) will be evaluated as follows:- a) For Two Projects = 30 Marks b) For Three Projects = 45 Marks c) Four and above = 60 Marks	60
Total Marks		60

Note:-Proof of projects completed shall be in the shape of completion certificate.

5. Professional Capabilities

Marking for personal capabilities of the firms shall be evaluated on the basis of following criteria.

S. no	Description	Max Marks
i.	BSc. Electrical Engineer, minimum experience of 2 Years or more	11
ii.	One DAE Electrical, with minimum experience of 2 Years	4
	Total Marks.	15

6. Financial Capabilities

Marking for financial position of the firm shall be evaluated on the basis of the following criteria.

S. no	Description	Max Marks
i.	Works Turnover (Attach three-year Audit Report) Less than Rs. 10.00 Million= 10 Marks Between Rs. 10.00 Million and Rs. 20.00 Million=15 Marks Between Rs. 20.00 Million and Rs. 30.00 Million=20 Marks Above Rs. 30.00 Million =25 Marks	25
	Total Marks.	25

7. Qualification Marks.

All the Bidding Firms / JV partners must secure at least 60% marks for Technical Qualification in the Tender.

Form Tech-1

List of completed Solar PV Project during last five years

S. No	Project Title	Value of Project (in Pak Rs)	Year of completion

Form Tech-2

Detail of completed Project

(Please fill the Form Tech-2 for each completed project separately)

Project Title:	Value of the Project (in Pak Rs):
Country: Location within country:	Completion Period (months):
Name of Client:	
Start date (month/year): Completion date (month/year):	Design Capacity (Kw): On Grid or Hybrid:
Mode of Project execution: <i>(EPC, PPP, BOT, BOOT, Lease or any other mode)</i>	
Narrative description of Project:	

Bidder Signature

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Bidder Signature

Form Tech-5

CV of graduate Engineer and Diploma / Associate Engineer

(Please fill the Form Tech-8 for each individual separately)

1. Name of Person: _____
2. Name of Employer Firm: _____
3. Date of Birth: _____
4. Nationality: _____
5. CNIC No: _____
6. Education:

<i>Degree</i>	<i>Major/Minor</i>	<i>Institution</i>	<i>Date (MM/YYYY)</i>

7. Membership of Professional Associations: _____

8. Employment Record

[Starting with present position, list in reverse order every employment held by staff member, giving for each employment (see format here below): dates of employment, name of employing organization, positions held.]:

<i>Employer</i>	<i>Position</i>	<i>From (MM/YYYY)</i>	<i>To (MM/YYYY)</i>

9. Certification:

I, the undersigned, certify that to the best of my knowledge and belief, this CV correctly describes myself, my qualifications, and my experience. I understand that any willful misstatement described herein may lead to my disqualification or dismissal, if engaged.

Date:

Day/Month/Year

[Signature of staff member or authorized representative]

Full name of authorized representative:

Note:

CVs must be signed by the Professional staff themselves or by the authorized official of the firm.

Bidder Signature

Form Tech-6

Financial Capabilities

Name of Firm: _____

Annual Turnover

For the year (amount in Million Pak. Rs)		
2022-23	2023-24	2024-25

Note:

1. For assessment purpose, average turnover of last three years shall be considered.
2. For Joint Venture, average turnover will be summed up for evaluation.
3. Audited Report of last three years must be attached.

(In case of Joint Venture, please provide above information for all partners)

Bidder Signature

TECHNICAL SPECIFICATIONS OF SOLAR ENERGY SYSTEM

The following are the minimum technical specifications of the equipment being parts of the solar PV System that shall be installed at the premises.

1. Inverters:

Performance and Rating Requirements:

The inverter shall be three phase Hybrid with minimum IP65 protection having CEC efficiency of not less than 94% and output frequency of 50Hz. The cumulative capacity of inverter shall be according to the total solar PV capacity to be installed and inverter's minimum input voltage shall be as per array specific design. Under all scenarios, the DC to AC ratio of the inverter shall not be more than 1.1.

The inverters shall have multiple MPPT inputs for 3-phase inverters. The Total Harmonic Distortion shall be less than 3%. The ambient operating temperature range of Inverter shall be between -25°C to 60°C. [Three phase inverters must have Diesel Generator Synchronization module for seamless integration with Generators].

Protection and Safety Requirements:

The inverter shall have AC overcurrent protection, residual current monitoring, DC reverse polarity protection, DC insulation resistance detection, PV array string fault monitoring, anti- islanding protection and Type-2 or better DC and AC SPDs. The inverter must have anti PID module to limit the harmful effects of Potential Induced Degradation of PV Modules. Inverters shall have a built-in data logger; communication interface protections and remote monitoring capability. It shall be compliant with UL 1741, IEC 62109-1/2 for safety design. AFCI compliance shall also be required.

Warranty Requirements :

As specified in warranty Certificates

2. DC cables, AC cables, Earthing wires, conduits, connectors, cable trays etc.

Copper cables with purity of 99.9 % or more with XLPO insulation and rated for 1500 V shall be used. Cables shall be low smoke Halogen free along with compliance with BS 6004, BS 7644 and UL 4703 standards. Minimum size for DC cables shall be of sizes as given in the Bills of Quantities. Under all conditions, for DC cables, voltage drop shall be less than 0.5% at STC Power and for AC cables voltage drop shall be less than 1% at STC power. 6 mm² earth wires for equipotential and lighting protection (where required) bonding shall be used. Separate DC and AC earthing each with 3 ohm or lesser resistance shall be achieved using the earthing arrangement (bore or rod type).

Perforated cable trays of 16 gauge or thicker and UPVC/corrugated PVC pipes shall be installed with seamless terminations. The cable tray shall not be physically accessible for routine works. Flexible pipes, glands, conduits, cables ducts shall be installed as per Employer Design. Conduits shall have 30% or higher spare capacity. Labeling of all cables shall be performed in compliance with IEC Standard 62491.

a) Breakers, Surge Arrester, LV Panel etc.

Circuit breaker, Protection devices and Non-Isolated Lightning Arrestors shall be installed as per Employer Design. MCB/MCCB Circuit breaker for each string shall be rated for more than 1.5 times the STC current rating of the string. Under all circumstances circuit breaker rating must be less than the fuse rating of PV Module.

In case of installation of LV panel, the panel shall be IP65 rated of galvanized material with at least 16 gauge. The panel shall have protection scheme compliant with IEC Standard 62548, input and output circuit breakers as per IEC Standards, bus bar current bearing capacity as per requirement, and isolators for bus bars and AC grounding bus bar. The panel shall have digital Ammeter and Voltmeter, RYB indicator with breather vents on both sides of cabinets with RAL Color: 6021. For cable trays 5WG gauge of 16 with at least 60 microns of zinc coating shall be ensured.

Operation Manual: An Operation, Instruction and Maintenance Manual along with diagrams of the equipment and system, in English shall be provided with the Solar PV System. The detailed diagram(s) of wiring and connection diagrams shall also be provided with the manual.

Note: Various components of solar PV system shall additionally be conformed to the relevant national / international electrical safety standards wherever applicable.