

# Annexure - A

# Sarhad University

OF SCIENCE & INFORMATION TECHNOLOGY, PESHAWAR

Ref. No. SUIT/BOG/2023/

Dated: 28-08-2023

## NOTIFICATION

The Board of Governors in its 25<sup>th</sup> meeting held on 5<sup>th</sup> August, 2023, has approved the attached Policy on Energy Efficiency, Renewable Energy and Sustainable Energy, with immediate effect.

CC:

- 1) All concerned.
- 2) The PS to Vice Chancellor.

REGISTRAR  
28/8/23

**SARHAD UNIVERSITY OF SCIENCE & INFORMATION TECHNOLOGY,**  
**PESHAWAR**

**POLICY REGARDING ENERGY EFFICIENCY, RENEWABLE ENERGY AND**  
**SUSTAINABLE ENERGY**

**1. Purpose**

Sarhad University of Science & Information Technology (SUIT) is committed to the efficient, responsible and sustainable use of energy. The University shall promote energy conservation, energy efficiency, renewable energy, reduction of unnecessary fuel consumption and sustainable energy management across its facilities and operations.

**2. Scope**

This policy applies to all University campuses, buildings, departments, laboratories, offices, infrastructure projects, electrical systems, renewable-energy installations and generators.

**3. Policy Statement**

The University shall integrate energy-efficiency and renewable-energy considerations into its planning, construction, renovation, operation and maintenance activities. The University shall seek to reduce energy consumption, increase the use of clean energy and continuously improve its overall energy performance.

**4. Energy Efficiency and Sustainable Infrastructure**

The University shall:

- Incorporate energy-efficiency and renewable-energy considerations into new construction, renovation and major infrastructure projects.
- Consider energy performance during the planning and design stage of major projects.
- Promote energy-efficient lighting, electrical equipment, building services, controls and other technologies where technically and financially feasible.
- Encourage building designs that make appropriate use of natural lighting and ventilation.
- Consider future energy requirements and sustainable-energy opportunities in infrastructure planning.

**5. Renewable Energy and Solar PV**

The University shall promote renewable-energy development, particularly solar photovoltaic (PV) systems, where technically and financially feasible.

The University shall:

- Prioritize solar PV at suitable University facilities based on site, structural, electrical, load and grid conditions.

- Gradually increase renewable-energy capacity in accordance with institutional requirements and available resources.
- Ensure proper design, installation, operation and maintenance of renewable-energy systems.
- Monitor renewable-energy systems to support efficient operation and performance improvement.
- Consider future solar expansion when planning new buildings and infrastructure.

#### **6. Energy Monitoring and Management**

The University shall maintain a systematic approach to energy monitoring and management by:

- Monitoring electricity consumption and, where applicable, meter readings and energy-use patterns.
- Monitoring generator fuel consumption and operational requirements.
- Monitoring renewable-energy generation from installed systems.
- Reviewing energy-consumption trends to identify conservation and efficiency opportunities.
- Taking appropriate corrective measures where significant or unusual energy consumption is identified.
- Promoting energy conservation awareness among faculty, staff, students and other University users.

#### **7. Generator and Fuel Management**

Generators shall primarily be used for emergency, backup and operational requirements when grid or renewable electricity is unavailable or insufficient.

The University shall:

- Optimize generator operation to minimize unnecessary fuel consumption.
- Prefer grid or renewable electricity over diesel generation where operationally appropriate.
- Monitor generator operation and fuel consumption.
- Investigate significant or unusual fuel consumption and implement corrective measures.
- Maintain generators in safe and operational condition for emergency readiness.

#### **8. Future Energy Expansion and Carbon Reduction**

The University shall consider future renewable-energy expansion and carbon reduction in its long-term planning.

Where technically feasible, the University shall:

- Preserve suitable structural and spatial provisions for future solar PV expansion.
- Consider future electrical capacity, protection and interconnection requirements.
- Assess structural and electrical suitability before expanding renewable-energy installations.
- Promote measures that reduce electricity and fuel consumption and associated greenhouse-gas emissions.

#### **9. Energy Conservation Practices**

All University users shall contribute to responsible energy use. The University shall encourage:

- Switching off unnecessary lights, air-conditioning, computers, laboratory equipment and other electrical appliances.
- Efficient operation of air-conditioning, heating and lighting systems.
- Use of energy-efficient equipment and technologies.
- Regular maintenance of energy-consuming equipment and systems.
- Responsible energy-use practices in classrooms, offices, laboratories and common areas.

#### **10. Roles and Responsibilities**

The University administration shall provide overall direction and support for implementation of this policy. Relevant departments, offices, committees and facility-management personnel shall implement energy-efficiency measures, support energy monitoring, coordinate renewable-energy initiatives and ensure appropriate operation and maintenance of energy systems.

All faculty, staff, students and other University users shall support energy conservation and responsible energy use.

#### **11. Compliance and Review**

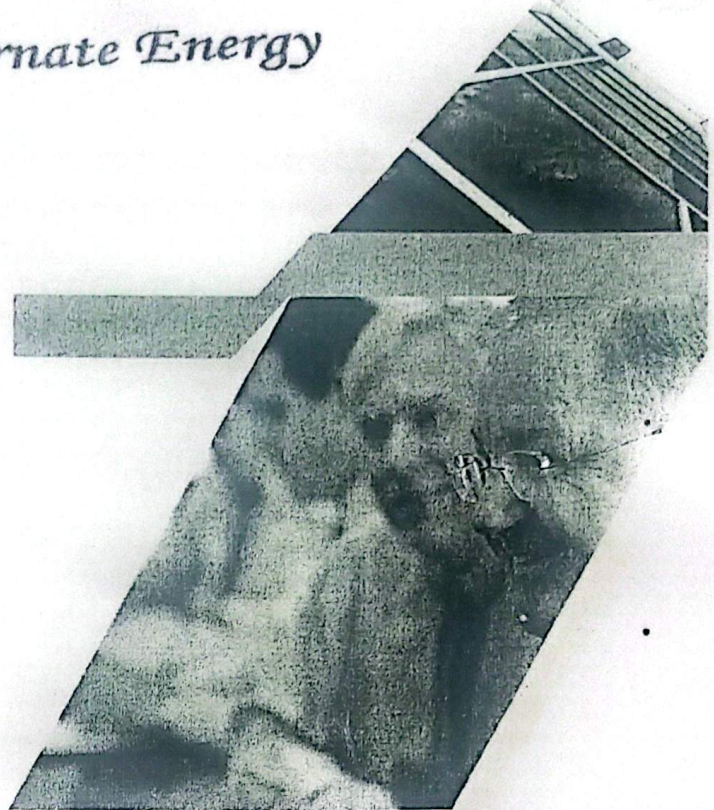
All University departments and faculties shall comply with this policy and applicable technical, safety, environmental and regulatory requirements. The policy shall be reviewed periodically to ensure continued relevance and alignment with the University's strategic objectives, sustainability priorities and applicable requirements.

#### **12. Effective Date**

This policy shall become effective upon approval by the competent authority of Sarhad University of Science & Information Technology and shall remain in force until amended or superseded.

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## Next Gen Alternate Energy



DATE :: 18<sup>TH</sup> Apr 2024  
REF # SL-02-744

**Engineering Design Proposal - EDC**  
**800.40 KW PV GRID CONNECTED**  
**PROJECT AT SARHAD UNIVERSITY,**  
**PESHAWAR CAMPUS**

**200.10 KW PV GRID CONNECTED**  
**PROJECT AT SARHAD UNIVERSITY,**  
**ISLAMABAD CAMPUS**

**200.10 KW PV GRID CONNECTED**  
**PROJECT AT UNIVERSITY OF BOLTON,**  
**ISLAMABAD CAMPUS.**

*This Document gives performance review of Grid Tied PV Plant having total capacity of 1.2MWp at SARHAD UNIVERSITY, PESHAWAR and ISLAMABAD CAMPUSES and UNIVERISTY OF BOLTON, ISLAMABAD.*

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**1200.60 KW PV GRID CONNECTED PROJECT AT SARHAD  
UNIVERSITY PESHAWAR AND ISLAMABAD CAMPUSES AND  
UNIVERSITY OF BOLTON, ISLAMABAD.**

The Solar PV System design included in this document has been prepared considering your location's meteorological conditions and terrain. Our design team makes use of latest design techniques, standards and Solar Energy databases to give you accurate yield estimations so you can know how much you will save during your plant's design life i.e. 25 years.

Our product selection has been done considering a combination of Tier-1 Solar Modules and Balance of System which will enable a system configuration having minimum losses and optimum performance and that fully complies with the AEDB requirements.

**Next Gen Alternate Energy** Ltd. does not just supply & install Solar PV Systems, the company believes in educating its clients so that they themselves can know what's best for them and what they are investing in.

**Director: Akhunzada Sadiq Saeed (+92-346-9080511)**

**Next Gen Alternate Energy**

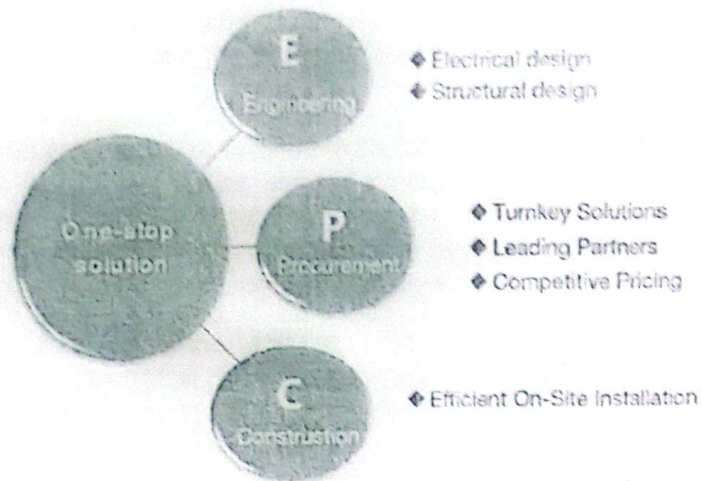
**Email: [akhunzada.sadiq@nextgenalternateenergy.com](mailto:akhunzada.sadiq@nextgenalternateenergy.com)**

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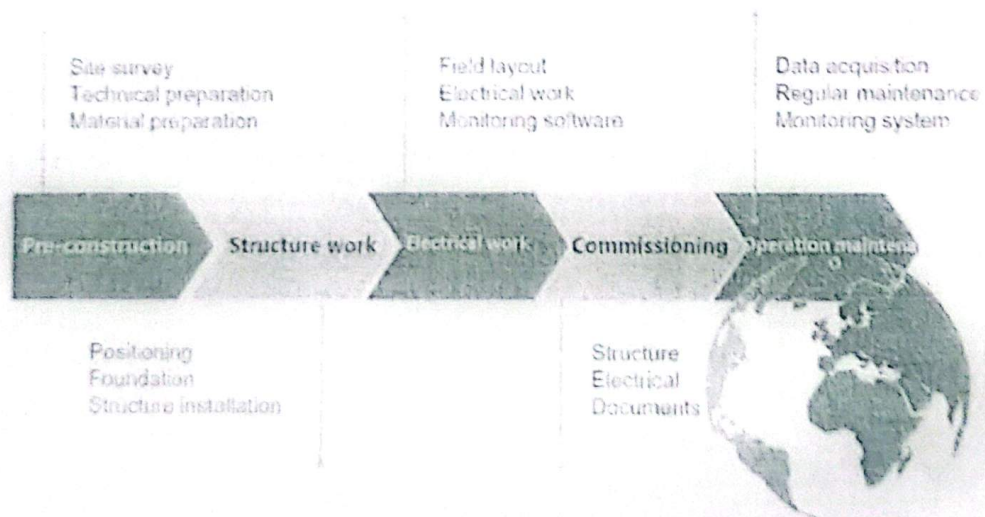
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## TURNKEY EPC

Turnkey solutions provider for PV solar projects across Pakistan.



## PROJECT MANAGEMENT



## PRELIMINARIES

The type of technology used here is Grid Tied PV system with mono-perc/ N-Type technology solar photovoltaic panels. This type of system works in synchronization with an external source. The external source in this case will be Grid.

The mounting structures to be used are design to withstand the effects of high wind pressures and physical load. The mounting structure to be used is Roof Mounted Customized structure.

The grounding and earthing of the system require the knowledge of current earthing setup at the site. This is to incorporate new and existing earthing system together. The PV system is protected by surge arrestors installed in inverters. Other than these, the inverters are fully protected against surges and faults. The modules, inverters, combiners, AC LV panels are all appropriately grounded.

This document elaborates the 1200.60 KWp Grid-tied PV Plant design, meteorological data, technical justifications, Yield Calculations, and technical documents of inverters.

## SYSTEM SUMMARY AND DESIGN CONSIDERATIONS:

|                                  |   |                         |
|----------------------------------|---|-------------------------|
| Hookup Voltage                   | : | 380V (Single Injection) |
| System Type                      | : | On Grid System          |
| Generator Synchronization        | : | Considered              |
| Proposed System Size             | : | 1200.60 KWp             |
| Roof Mount/Ground Mount          | : | Roof Mounted            |
| Tilt & Azimuth Orientation       | : | 10 Degree True South    |
| PV Modules to Inverter Distance  | : | 150 Meters Max          |
| Inverter to Termination Distance | : | 10 Meters               |

## TECHNICAL & COMMERCIAL PROPOSAL

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| SARHAD UNIVERSITY PESHAWAR 800-KW |                                 |                                                                                                                                                                                                                                                                                                                                             |        |         |
|-----------------------------------|---------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------|
| S.No.                             | Equipment                       | Description                                                                                                                                                                                                                                                                                                                                 | UoM    | Qty     |
| 1                                 | Solar Panels                    | Solar Panel - 580 Wp<br>Total = 1380 Modules x 580W = KWp<br>(Tier 1 Manufactured, as per Bloomberg list)<br>Brands: Longi, JA Solar, Risen, Trina, jinko or equivalent.                                                                                                                                                                    | Watts  | 800,400 |
| 2                                 | Inverter                        | GrowWatt 125KW                                                                                                                                                                                                                                                                                                                              | Nos    | 6       |
| 3                                 | Remote Monitoring Device        | Smart Data Logger                                                                                                                                                                                                                                                                                                                           | Nos    | 1       |
| 4                                 | DC Cables (Imported)            | DC Cables: IEC-50618 TUV Certified1. 1C x 6mmsq, 1000DC; Cu/XLPE, Red & Black                                                                                                                                                                                                                                                               | Meters | 26000   |
| 5                                 | Connectors                      | MC4 connector / QC4 connector                                                                                                                                                                                                                                                                                                               | Nos    | 500     |
| 6                                 | Mounting Structure (Roof Mount) | Orientation: Portrait<br>Tilt Angle: 10-Degrees                                                                                                                                                                                                                                                                                             | Watts  | 800,400 |
| 7                                 | AC Combiner Box-01              | DB Local Fabricated in 16 Gauge, Color Code: RAL7035, Wall Mounted/Gound Mount, MS Powder Coated, Glands, Lugs, Indication Lights, Control Breaker, AC SPD Type II etc. Complete in all respect.<br>4No. MCCB, TP, 250A<br>1No. ACB, TP, 1200A<br>Type 1 & 2 AC SPD<br>Ground Fault Protection Device (Built in Within Inverter) & with ACB | Qty    | 1       |
| 8                                 | DC Combiner Box                 | DB Local Fabricated in 16 Gauge, Color Code: RAL7035, Wall Mounted, MS Powder Coated, Glands, Lugs, Indication Lights, Control Breaker etc. Complete in all respect.<br>2X13No. DC Circuit Breaker 20A 1000V<br>MCB/Fuse Make: Suntime / Chint /ZI Beny                                                                                     | Qty    | 7       |

|                                            |                                                                                                                                 |                                                                           |              |     |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|--------------|-----|
| 9                                          | AC Cable 4C x 240sqmm<br>(Per Phase 2 cable)                                                                                    | Pakistan Cable/Fast Cable/Newage<br>Cable/Equivalent<br>Cu/PVC/PVC        | Meters       | 300 |
| 10                                         | AC Cable 4C x 120sqmm                                                                                                           | Pakistan Cable/Fast Cable/Newage<br>Cable/Equivalent<br>Cu/PVC/PVC        | Meters       | 100 |
| 11                                         | Earthing Cable 1C x<br>120sqmm                                                                                                  | Pakistan Cable/Fast Cable/Newage<br>Cable/Equivalent Cu/PVC               | Meters       | 20  |
| 12                                         | Earthing Cable 1C x<br>50sqmm                                                                                                   | Pakistan Cable/Fast Cable/Newage<br>Cable/Equivalent Cu/PVC               | Meters       | 100 |
| 13                                         | Earthing Cable 1C x 16sqmm<br>bare conductor                                                                                    | Pakistan Cable/Fast Cable/Newage<br>Cable/Equivalent<br>Cu Bare conductor | Meters       | 400 |
| 14                                         | Earthing Cable 1C x<br>2.5sqmm                                                                                                  | Pakistan Cable/Fast Cable/Newage<br>Cable/Equivalent Cu/PVC               | Meters       | 400 |
| 15                                         | Main Earthing (3 Pits<br>including for arrestor)                                                                                | Local - One Earthing pit (Resistance <<br>5 ohms)                         | Job          | 1   |
| 16                                         | Miscellaneous Items,<br>including inverter stand<br>EPOXY, UPVC, Nut Bolt,<br>cable trays, cable ties,<br>Termination Kits etc. | Local                                                                     | Job          | 1   |
| 17                                         | Electrical & Mechanical<br>Installation &<br>Commissioning &<br>Transportation                                                  | Local                                                                     | Job          | 1   |
| 18                                         | Lightning Arrestor                                                                                                              | Local                                                                     | Job          | 1   |
| 19                                         | Communication Cable                                                                                                             | Local                                                                     | Meters       | 50  |
| 20                                         | Net-Metering                                                                                                                    | Grid-Interconnection Study                                                | Job          | 1   |
| TOTAL PROJECT PRICE PKR (EXCLUSIVE OF TAX) |                                                                                                                                 |                                                                           | 80,040,000/- |     |
| PRICE PER WATT PKR/Wp (EXCLUSIVE OF TAX)   |                                                                                                                                 |                                                                           | 100.00/-     |     |

## Warranties

| Product            | Warranty                                  |
|--------------------|-------------------------------------------|
| Solar Modules      | 12 Years Product and 25 Years Performance |
| Inverter           | 5 Years                                   |
| Mounting Structure | 2 Years                                   |

| SARHAD UNIVERSITY ISLAMABAD 200-KW |                                 |                                                                                                                                                                                                                                                                                                                                              |        |         |
|------------------------------------|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------|
| S.No.                              | Equipment                       | Description                                                                                                                                                                                                                                                                                                                                  | UoM    | Qty     |
| 1                                  | Solar Panels                    | Solar Panel - 580 Wp<br>Total = 345 Modules x 580W = KWp<br>(Tier 1 Manufactured, as per Bloomberg list)<br>Brands: Longi, JA Solar, Risen, Trina, jinko or equivalent.                                                                                                                                                                      | Watts  | 200,100 |
| 2                                  | Inverter                        | GrowWatt 100KW                                                                                                                                                                                                                                                                                                                               | Nos    | 2       |
| 3                                  | Remote Monitoring Device        | Smart Data Logger                                                                                                                                                                                                                                                                                                                            | Nos    | 1       |
| 4                                  | DC Cables (Imported)            | DC Cables: IEC-50618 TUV Certified1. 1C x 6mmsq,1000DC; Cu/XLPE, Red & Black                                                                                                                                                                                                                                                                 | Meters | 6500    |
| 5                                  | Connectors                      | MC4 connector / QC4 connector                                                                                                                                                                                                                                                                                                                | Nos    | 150     |
| 6                                  | Mounting Structure (Roof Mount) | Orientation: Portrait<br>Tilt Angle: 10-Degrees                                                                                                                                                                                                                                                                                              | Watts  | 200,100 |
| 7                                  | AC Combiner Box-01              | DB Local Fabricated in 16 Gauge, Color Code: RAL7035, Wall Mounted/Ground Mount, MS Powder Coated, Glands, Lugs, Indication Lights, Control Breaker, AC SPD Type II etc. Complete in all respect.<br>4No. MCCB, TP, 250A<br>1No. ACB, TP, 1200A<br>Type 1 & 2 AC SPD<br>Ground Fault Protection Device (Built in Within Inverter) & with ACB | Qty    | 1       |
| 8                                  | DC Combiner Box                 | DB Local Fabricated in 16 Gauge, Color Code: RAL7035, Wall Mounted, MS Powder Coated, Glands, Lugs, Indication Lights, Control Breaker etc. Complete in all respect.<br>2X13No. DC Circuit Breaker 20A 1000V<br>MCB/Fuse Make: Suntime / Chint /ZJ Beny                                                                                      | Qty    | 4       |

|                                                   |                                                                                                                                 |                                                                           |                     |     |
|---------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|---------------------|-----|
| 9                                                 | AC Cable 4C x 240sqmm<br>(Per Phase 2 cable)                                                                                    | Pakistan Cable/Fast Cable/Newage<br>Cable/Equivalent<br>Cu/PVC/PVC        | Meters              | 220 |
| 10                                                | AC Cable 4C x 120sqmm                                                                                                           | Pakistan Cable/Fast Cable/Newage<br>Cable/Equivalent<br>Cu/PVC/PVC        | Meters              | 50  |
| 11                                                | Earthing Cable 1C x<br>120sqmm                                                                                                  | Pakistan Cable/Fast Cable/Newage<br>Cable/Equivalent Cu/PVC               | Meters              | 50  |
| 12                                                | Earthing Cable 1C x<br>50sqmm                                                                                                   | Pakistan Cable/Fast Cable/Newage<br>Cable/Equivalent Cu/PVC               | Meters              | 30  |
| 13                                                | Earthing Cable 1C x 16sqmm<br>bare conductor                                                                                    | Pakistan Cable/Fast Cable/Newage<br>Cable/Equivalent<br>Cu Bare conductor | Meters              | 300 |
| 14                                                | Earthing Cable 1C x<br>2.5sqmm                                                                                                  | Pakistan Cable/Fast Cable/Newage<br>Cable/Equivalent Cu/PVC               | Meters              | 300 |
| 15                                                | Main Earthing (1 or 2<br>Pits including for<br>arrestor)                                                                        | Local - One Earthing pit (Resistance <<br>5 ohms)                         | Job                 | 1   |
| 16                                                | Miscellaneous Items,<br>including inverter stand<br>EPOXY, UPVC, Nut Bolt,<br>cable trays, cable ties,<br>Termination Kits etc. | Local                                                                     | Job                 | 1   |
| 17                                                | Electrical & Mechanical<br>Installation &<br>Commissioning &<br>Transportation                                                  | Local                                                                     | Job                 | 1   |
| 18                                                | Lightning Arrestor                                                                                                              | Local                                                                     | Job                 | 1   |
| 19                                                | Communication Cable                                                                                                             | Local                                                                     | Meters              | 50  |
| 20                                                | Net-Metering                                                                                                                    | Grid-Interconnection Study                                                | Job                 | 1   |
| <b>TOTAL PROJECT PRICE PKR (EXCLUSIVE OF TAX)</b> |                                                                                                                                 |                                                                           | <b>20,010,000/-</b> |     |
| <b>PRICE PER WATT PKR/Wp (EXCLUSIVE OF TAX)</b>   |                                                                                                                                 |                                                                           | <b>100.00/-</b>     |     |

## Warranties

| Product            | Warranty                                  |
|--------------------|-------------------------------------------|
| Solar Modules      | 12 Years Product and 25 Years Performance |
| Inverter           | 5 Years                                   |
| Mounting Structure | 2 Years                                   |

| UNIVERSITY OF BOLTON ISLAMABAD 200-KW |                                 |                                                                                                                                                                                                                                                                                                                                              |        |         |
|---------------------------------------|---------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---------|
| S.No.                                 | Equipment                       | Description                                                                                                                                                                                                                                                                                                                                  | UoM    | Qty     |
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| 2                                     | Inverter                        | GrowWatt 100KW                                                                                                                                                                                                                                                                                                                               | Nos    | 2       |
| 3                                     | Remote Monitoring Device        | Smart Data Logger                                                                                                                                                                                                                                                                                                                            | Nos    | 1       |
| 4                                     | DC Cables (Imported)            | DC Cables: IEC-50618 TUV Certified 1. 1C x 6mmsq, 1000DC; Cu/XLPE, Red & Black                                                                                                                                                                                                                                                               | Meters | 6500    |
| 5                                     | Connectors                      | MC4 connector / QC4 connector                                                                                                                                                                                                                                                                                                                | Nos    | 150     |
| 6                                     | Mounting Structure (Roof Mount) | Orientation: Portrait<br>Tilt Angle: 10-Degrees                                                                                                                                                                                                                                                                                              | Watts  | 200,100 |
| 7                                     | AC Combiner Box-01              | DB Local Fabricated in 16 Gauge, Color Code: RAL7035, Wall Mounted/Ground Mount, MS Powder Coated, Glands, Lugs, Indication Lights, Control Breaker, AC SPD Type II etc. Complete in all respect.<br>4No. MCCB, TP, 250A<br>1No. ACB, TP, 1200A<br>Type 1 & 2 AC SPD<br>Ground Fault Protection Device (Built in Within Inverter) & with ACB | Qty    | 1       |
| 8                                     | DC Combiner Box                 | DB Local Fabricated in 16 Gauge, Color Code: RAL7035, Wall Mounted, MS Powder Coated, Glands, Lugs, Indication Lights, Control Breaker etc. Complete in all respect.<br>2X13No. DC Circuit Breaker 20A 1000V<br>MCB/Fuse Make: Suntime / Chint / ZI Beny                                                                                     | Qty    | 4       |

|                                            |                                                                                                                                 |                                                                           |        |              |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------|--------|--------------|
| 9                                          | AC Cable 4C x 240sqmm<br>(Per Phase 2 cable)                                                                                    | Pakistan Cable/Fast Cable/Newage<br>Cable/Equivalent<br>Cu/PVC/PVC        | Meters | 220          |
| 10                                         | AC Cable 4C x 120sqmm                                                                                                           | Pakistan Cable/Fast Cable/Newage<br>Cable/Equivalent<br>Cu/PVC/PVC        | Meters | 50           |
| 11                                         | Earthing Cable 1C x<br>120sqmm                                                                                                  | Pakistan Cable/Fast Cable/Newage<br>Cable/Equivalent Cu/PVC               | Meters | 50           |
| 12                                         | Earthing Cable 1C x<br>50sqmm                                                                                                   | Pakistan Cable/Fast Cable/Newage<br>Cable/Equivalent Cu/PVC               | Meters | 30           |
| 13                                         | Earthing Cable 1C x 16sqmm<br>bare conductor                                                                                    | Pakistan Cable/Fast Cable/Newage<br>Cable/Equivalent<br>Cu Bare conductor | Meters | 300          |
| 14                                         | Earthing Cable 1C x<br>2.5sqmm                                                                                                  | Pakistan Cable/Fast Cable/Newage<br>Cable/Equivalent Cu/PVC               | Meters | 300          |
| 15                                         | Main Earthing (1 or 2<br>Pits including for<br>arrestor)                                                                        | Local - One Earthing pit (Resistance <<br>5 ohms)                         | Job    | 1            |
| 16                                         | Miscellaneous Items,<br>including inverter stand<br>EPOXY, UPVC, Nut Bolt,<br>cable trays, cable ties,<br>Termination Kits etc. | Local                                                                     | Job    | 1            |
| 17                                         | Electrical & Mechanical<br>Installation &<br>Commissioning &<br>Transportation                                                  | Local                                                                     | Job    | 1            |
| 18                                         | Lightning Arrestor                                                                                                              | Local                                                                     | Job    | 1            |
| 19                                         | Communication Cable                                                                                                             | Local                                                                     | Meters | 50           |
| 20                                         | Net-Metering                                                                                                                    | Grid-Interconnection Study                                                | Job    | 1            |
| TOTAL PROJECT PRICE PKR (EXCLUSIVE OF TAX) |                                                                                                                                 |                                                                           |        | 20,010,000/- |
| PRICE PER WATT PKR/Wp (EXCLUSIVE OF TAX)   |                                                                                                                                 |                                                                           |        | 100.00/-     |

### Warranties

| Product            | Warranty                                  |
|--------------------|-------------------------------------------|
| Solar Modules      | 12 Years Product and 25 Years Performance |
| Inverter           | 5 Years                                   |
| Mounting Structure | 2 Years                                   |

| SUMMARY     |                                                        |                 |                   |                |
|-------------|--------------------------------------------------------|-----------------|-------------------|----------------|
| S.No        | INSTITUTE/CAMPUS                                       | REQUIRED SYSTEM | TOTAL PRICE       | PRICE PER WATT |
| 1           | SARHAD UNIVERSITY OF INFORMATION TECHNOLOGY, PESHAWAR  | 800.40 KW       | PKR 80,040,000/-  | PKR 100/-      |
| 2           | SARHAD UNIVERSITY OF INFORMATION TECHNOLOGY, ISLAMABAD | 200.10 KW       | PKR 20,010,000/-  | PKR 100/-      |
| 3           | UNIVERSITY OF BOLOTON, ISLAMABAD                       | 200.10 KW       | PKR 20,010,000/-  | PKR 100/-      |
| GRAND TOTAL |                                                        | 1200.60 KW      | PKR 120,060,000/- | PKR 100/-      |

## TERMS & CONDITIONS

|                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Validity                  | The validity of the quote is for 7 days.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Delivery and Installation | Delivery and Installation time would be between 1.5 to 2.5 months from the date of signing of the contract and receipt of advance payment.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Financials                | <p>Prices are hedged against dollar at 278 Rs/USD, any variation in the currency more than 1% price would reflect in the quote before issuance of PO.</p> <p>Payment terms are 30% advance with PO, 30% at the time of delivery and remaining 40% balance will be charged in 3 consecutive monthly instalments after completion of system and commissioning.</p>                                                                                                                                                                                                                                                                                                                                                                    |
| Technical                 | <p>The equipment/services other than those mentioned in BOQ will be charged as per actual.</p> <p>Quantity of PV Module may change/vary due to availability of ratings, but potential would be same.</p> <p>Cable lengths other than that mentioned in BOQ, will be charged as per actual.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Net Metering              | <p><b>Next Gen' Scope:</b><br/>Next Gen will prepare the document for Net Metering.</p> <p><b>Customer's Scope:</b><br/>Meter Name change (If required)<br/>Sanction load change (If required)</p> <p><b>NOTE:</b><br/>All expenses not mentioned above maybe charged separately. It will be applicable as per the laws of NEPRA and local disco. This is an additional service for customer support. Timeline for net metering to be operational depends on the Local disco/NEPRA approvals, it does not fall under Nextgens' scope of work. Client shall not withhold NextGen's quoted amount due to Net Metering and its delays.</p>                                                                                             |
| Relocation                | Client will be charged for relocation of system from one site to another, as per actual. Or any relocation of solar equipment.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| General                   | Next Gen shall not be deemed to be in default of any of its obligations under this Proposal for any delay or failure to fulfill its obligations hereunder, so long and to the extent to which any delay or failure in the fulfillment of such obligation is prevented, frustrated, hindered or delayed as a consequence of circumstances of Force Majeure (including but not limited to act of God, war, hostilities, riots, strikes, lock outs, acts of threat or terrorism or any unforeseeable circumstances beyond the control of Solis or related parties). In the event of any such excused delay, the time for performance of such obligations shall be extended for a period equal to the time lost by reason of the delay. |

## FINANCIAL ANALYSIS

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# Data

|                                   |             |
|-----------------------------------|-------------|
| Unit price Inclusive of GST (PKR) | 60          |
| Unit price Annual Increment (%)   | 2.00%       |
| Cost of project (PKR)             | 120,060,000 |
| First Year Energy Injected (kWh)  | 1,730,699   |

| Year | Units Produced | Unit Price (PKR) | Revenue (PKR) | Initial Project Cost (PKR) | Net Cash Flow (PKR) | Payback      |
|------|----------------|------------------|---------------|----------------------------|---------------------|--------------|
| 0    | 0              |                  | 0             | -120,060,000               | -120,060,000        | -120,060,000 |
| 1    | 1,730,699      | 50               | 86,534,950    | -                          | 86,534,950          | -33,525,050  |
| 2    | 1,726,199      | 51               | 88,036,149    | -                          | 20,449,973          | -13,075,077  |
| 3    | 1,721,427      | 52.02            | 89,548,633    | -                          | 20,741,246          | 7,666,169    |
| 4    | 1,716,655      | 53.06            | 91,086,401    | -                          | 21,035,990          | 28,702,159   |
| 5    | 1,711,883      | 54.122           | 92,649,861    | -                          | 21,334,227          | 50,036,386   |
| 6    | 1,707,111      | 55.204           | 94,239,424    | -                          | 21,635,980          | 71,672,366   |
| 7    | 1,702,339      | 56.308           | 95,855,510    | -                          | 21,941,268          | 93,613,634   |
| 8    | 1,697,567      | 57.434           | 97,498,544    | -                          | 22,250,114          | 115,863,748  |
| 9    | 1,692,795      | 58.583           | 99,168,957    | -                          | 22,562,538          | 138,426,286  |
| 10   | 1,688,023      | 59.755           | 100,867,187   | -                          | 22,878,558          | 161,304,844  |
| 11   | 1,683,251      | 60.95            | 102,593,679   | -                          | 23,198,194          | 184,503,038  |
| 12   | 1,678,479      | 62.169           | 104,348,883   | -                          | 23,521,464          | 208,024,502  |
| 13   | 1,673,707      | 63.412           | 106,133,258   | -                          | 23,848,385          | 231,872,887  |
| 14   | 1,668,935      | 64.68            | 107,947,269   | -                          | 24,178,975          | 256,051,862  |
| 15   | 1,664,163      | 65.974           | 109,791,387   | -                          | 24,513,249          | 280,565,111  |
| 16   | 1,659,391      | 67.293           | 111,666,090   | -                          | 24,851,222          | 305,416,333  |
| 17   | 1,654,619      | 68.639           | 113,571,866   | -                          | 25,192,909          | 330,609,242  |
| 18   | 1,649,847      | 70.012           | 115,509,205   | -                          | 25,538,323          | 356,147,565  |
| 19   | 1,645,075      | 71.412           | 117,478,610   | -                          | 25,887,477          | 382,035,042  |
| 20   | 1,640,303      | 72.841           | 119,480,587   | -                          | 26,240,381          | 408,275,423  |
| 21   | 1,635,531      | 74.297           | 121,515,652   | -                          | 26,597,046          | 434,872,469  |
| 22   | 1,630,759      | 75.783           | 123,584,327   | -                          | 26,957,482          | 461,829,951  |
| 23   | 1,625,987      | 77.299           | 125,687,142   | -                          | 27,321,696          | 489,151,647  |
| 24   | 1,621,215      | 78.845           | 127,824,637   | -                          | 27,689,696          | 516,841,343  |
| 25   | 1,616,443      | 80.422           | 129,997,357   | -                          | 28,061,488          | 544,902,831  |
| Sum  | 41,842,403     |                  | 2,672,615,564 | -                          | 664,962,831         |              |

TECHNICAL DATASHEETS AND DOCUMENTS

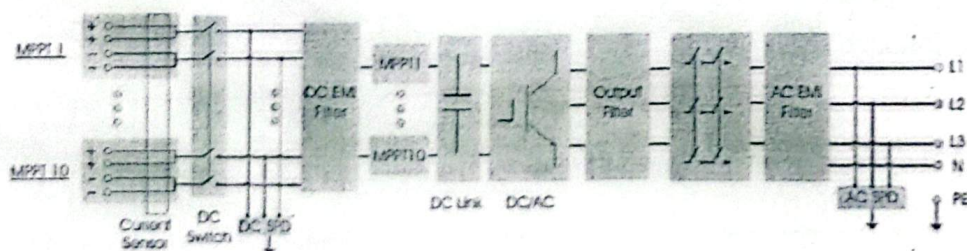
Inverter 125KW

# MAX 100~125KTL3-X LV

- 10 MPPTs fusefree design
- Smart IV scan and diagnosis
- Intelligent string monitoring
- AC&DC type II SPD
- IP66 protection



Topology Diagram



| Datasheet                                  | MAX 100KTL3-X LV           | MAX 110KTL3-X LV                      | MAX 120KTL3-X LV           | MAX 125KTL3-X LV           |
|--------------------------------------------|----------------------------|---------------------------------------|----------------------------|----------------------------|
| <b>Input/Output (DC)</b>                   |                            |                                       |                            |                            |
| Max. DC voltage                            |                            | 1100V                                 |                            |                            |
| Start voltage                              |                            | 100V                                  |                            |                            |
| Nominal voltage                            |                            | 600V                                  |                            |                            |
| MPP voltage range                          |                            | 180V-1000V                            |                            |                            |
| No. of MPP tracker                         |                            | 10                                    |                            |                            |
| No. of PV string per MPP tracker           |                            | 2                                     |                            |                            |
| Max. input current per MPP tracker         |                            | 32A                                   |                            |                            |
| Max. short-circuit current per MPP tracker |                            | 43A                                   |                            |                            |
| <b>Input/Output (AC)</b>                   |                            |                                       |                            |                            |
| AC nominal power                           | 100000W                    | 110000W                               | 120000W                    | 125000W                    |
| Max. AC apparent power                     | 110000VA                   | 121000VA                              | 132000VA                   | 137500VA                   |
| Nominal AC voltage (range*)                |                            | 220/230V, 230V/400V (150-480V)        |                            |                            |
| AC grid frequency (range*)                 |                            | 50/60 (60±5 ~ 59±0.5 Hz)              |                            |                            |
| Max. output current                        | 155.6A@400V<br>167.1A@380V | 174.6A@400V<br>183.6A@380V            | 190.5A@400V<br>200.5A@380V | 198.5A@400V<br>208.9A@380V |
| Adjustable power factor                    |                            | 0.8 leading ... 0.8 lagging           |                            |                            |
| THDi                                       |                            | < 3%                                  |                            |                            |
| AC grid connection type                    |                            | 3W+NPE                                |                            |                            |
| <b>Efficiency</b>                          |                            |                                       |                            |                            |
| Max. efficiency                            |                            | 98.8%                                 | 98.8%                      | 98.8%                      |
| European efficiency                        | 96.4%                      | 98.5%                                 | 98.5%                      | 98.5%                      |
| MPP efficiency                             |                            | 99.9%                                 |                            |                            |
| <b>Protection</b>                          |                            |                                       |                            |                            |
| DC reverse polarity protection             |                            | Yes                                   |                            |                            |
| DC switch                                  |                            | Yes                                   |                            |                            |
| AC/DC surge protection                     |                            | Type I / Type II                      |                            |                            |
| Isolation resistance monitoring            |                            | Yes                                   |                            |                            |
| AC short circuit protection                |                            | Yes                                   |                            |                            |
| Ground fault monitoring                    |                            | Yes                                   |                            |                            |
| String detection                           |                            | Yes                                   |                            |                            |
| Anti-IFT function                          |                            | Optional                              |                            |                            |
| Anti-island detection (AFCI)               |                            | Optional                              |                            |                            |
| <b>General</b>                             |                            |                                       |                            |                            |
| Dimensions (W/H/D)                         |                            | 976/400/345mm                         |                            |                            |
| Weight                                     |                            | 84kg                                  |                            |                            |
| Operating temperature range                |                            | -30 °C ... +60 °C                     |                            |                            |
| Nighttime power consumption                |                            | < 1W                                  |                            |                            |
| Topology                                   |                            | Transformerless                       |                            |                            |
| Cooling                                    |                            | Smart on cooling                      |                            |                            |
| Protection degree                          |                            | IP66                                  |                            |                            |
| Relative humidity                          |                            | 0 ~ 100%                              |                            |                            |
| Altitude                                   |                            | 4000m                                 |                            |                            |
| DC connection                              |                            | MC4 (Max. 6mm <sup>2</sup> )          |                            |                            |
| AC connection                              |                            | C terminal (Max. 240mm <sup>2</sup> ) |                            |                            |
| Display                                    |                            | LED/MPH+APP                           |                            |                            |
| Interfaces: RS485 / USB / CAN/RS485/RS485  |                            | Yes/Yes/Optional/Optional/Optional    |                            |                            |
| Warranty: 5 years / 10 years               |                            | Yes / Optional                        |                            |                            |

\* The AC voltage range and frequency range are only dependent on specific country grid standard.  
All specifications are subject to change without notice.

## Annexure - E











