



# Technical Evaluation Report

## FOR THE PROJECT

**"SUPPLY AND INSTALLATION OF SINGLE ARM SOLAR STREET LIGHTS AND  
SOLARIZATION OF DWSS AT MERGED DISTRICTS OF KHYBER PAKHTUNKHWA ADP  
NO: 935 (2019-20)"**

PACKAGE 02	<ol style="list-style-type: none"><li>1. Installation of 180 Solar street lights in various regions of (Razmak, Mir Ali, Ladah, South Waziristan, Sub Division Tank, Darazinda Bazar)</li><li>2. Two (02) No. Solarization DWSS At South Waziristan</li></ol>
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**Prepared By: Ultimate Engineering Consultants Peshawar**

**Submitted To: Director, Directorate of Local Govt. & Rural Development  
Department, Merged Areas, Phase 05, Peshawar**

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**ANNEXURE-I  
TECHNICAL EVALUATION OF FIRMS  
SUMMARY**

**TECHNICAL EVALUATION OF FIRMS FOR THE PROJECT FOR "SUPPLY AND INSTALLATION OF SINGLE ARM SOLAR STREET LIGHTS AND SOLARIZATION OF  
DWSS AT MERGED DISTRICTS OF KHYBER PAKHTUNKHWA ADP NO: 935 (2019-20)"**

S · N O	Firm/ Company Name	Eligibility Criteria					Technical Compliance		Remarks/ Recommendation's
		PEC Registration	Solar Code E11	Affidavit of (Non- Black Listing) Attached	Registration with KPRA	IEC CERTIFICATION	Solar Street Lights Compliance Sheet according to approved specification	Solar Pump Design according to approved specification	
1	M/S TSK INTERNATIONAL (PVT) LTD	YES	YES	YES	YES	YES	YES	YES	Technical Compliance sheet for Solar Street Lights and Technical Design for DWSS are found in accordance with the specifications. Financial bid of the firm is recommended for opening.
2	CITITEK (PVT) LTD	YES	YES	YES	YES	YES	YES	YES	Technical Compliance sheet for Solar Street Lights and Technical Design for DWSS are found in accordance with the specifications. Financial bid of the firm is recommended for opening.
3	SKY GREEN ENGINEERING (PVT) LTD	YES	YES	YES	YES	YES	YES	NO	Technical Compliance sheet for Solar Street Lights is found in accordance with the specifications but <b>the Technical Design for DWSS is defective due to discharge taken in US-GPH instead of IGPH. Financial bid of the firm is not recommended for opening.</b>

ANNEXURE – II TSK ENGINEERING INTERNATIONAL (PVT) LTD TECHNICAL COMPLIANCE SHEET FOR SOLAR STREET LIGHTS, PACKAGE 02				
S #	Item	Required Data	Quoted Data	Remarks
1	P/I of Road light pole hot dipped galvanized 8 meters long round conical overall thickness 4mm, single arms (Length 1m, thickness 4mm), base dia 150 mm and top dia 75 mm with base plate size (400mm x400mm x20mm) along with stiffeners (4 x 200mm x100mm x20mm). Complete in all respect as per Instruction of Engineer In charge.	Material Type	Hot Dipped Galvanized	OK
		Minimum Thickness (4 mm)	4 mm	
		Thickness of Galvanization (80 Micron)	80 Microns	
		Type of Material for pole Fasteners Nut/bolts/ washers b/w pole & foundation	GI / Stainless Steel	
2	Solar panel mount (Top-of-Pole) made of Hot dipped galvanized angle Iron to sustain 200 km/h wind pressure suitable for mounting 300 watts 01 No panels, As per provided specification at Annex-A.	Material Type	Hot Dipped Galvanized Angle Iron	OK
		Minimum Thickness (4 mm)	4 mm	
		Thickness of Galvanization (80 Micron)	> 80 Microns	
		Type of Material for array Fasteners Nut/bolts/ washers b/w structure & PV	Stainless Steel	
3	Construction of foundation for pole including cost of pit excavation, 1:2:4 RCC 450mm x 450mm x 1830mm along with (4 No Electro plated galvanized J-bolts dia=25mm, length=1m with L-Bend=150mm) having at least 150mm threads with double Nuts/double Washers), Complete in all respect as per Instruction of Engineer In charge.	Compliance (yes/No)	Yes	OK
4	P/I Solar panel mono-crystalline, Hydrophobic, A Grade 300 Watts or above, 17.5% Module efficiency min and 25 years power output warranty, As per provided specification at Annex-A.	Make	JA Solar	OK
		Model	JAM60 Series	
		PV Module Size (300 Watt or Above)	300 Watt or Above	
5	P/I Road light fixture SMD type, (each LED not more than 2 watts) white LED 60 watts, 12/24 V DC, IP 66, LED Efficiency min 130 Lumens/Watt complete in all respect. As per provided specification at Annex-A..	Make	Unlumin	OK
		Model	Beluga	
		Rated Power (60 Watts)	60W	
		Lumen Per Watt (> 130 lm/W)	140 lm/W	
		IP Class (IP 66)	IP 66	
6	Lithium Ferrous Phosphate (LiFePO4) Batteries, 1.68 kWhr (24 Volt), As per provided specification at Annex-A.	Make	Sunnew	OK
		Model	SN-2470	
		Battery Type (LiFePO4)	Lithium Ferrous Phosphate (LiFePO4)	
		Battery Size (70 Ah)	70 Ah	
		Battery Terminal Voltage (24V)	25.6V	
		Cycle life of battery before 80 % capacity of initial capacity @ 50 % DOD at discharge rate of 10 Hours (5750 Cycles)	6000 Cycles	
7	P/I Battery & Controller box under solar panel made of 16 SWG Hot dipped Galvanized (80 Microns), IP 65 having inverted louvers for ventilation and proper locking arrangement suitable for housing Lithium (LiFePO4) Battery, As per provided specification at Annex-A.	Material Type	Hot Dipped Galvanized Sheet	OK
		Minimum Thickness (16 SWG)	16 SWG	
8	P/I Solar charge controller MPPT 24 V, 15 amps, multiple protections, with timer and dusk to dawn, remote programming and monitoring with all sort of protections, As per provided specification at Annex-A.	Make	Lumiax	OK
		Model	MPPT-1575-DCLi	
		Working Technology	MPPT	
		Size	24V/15Amps	
		Maximum conversion efficiency (97%)	97.50%	

ANNEXURE – II TSK ENGINEERING INTERNATIONAL (PVT) LTD TECHNICAL COMPLIANCE SHEET FOR SOLAR STREET LIGHTS, PACKAGE 02				
S #	Item	Required Data	Quoted Data	Remarks
9	Flexible 1.5" dia PVC pipe for 4.0 mm2 copper cable through the pole for providing extra insulation to avoid power losses.	Compliance (yes/No)	Yes	OK
10	P/I 2x4.0 mm2 flexible copper cable along with proper connectors MC-4 (TUV Approved) from solar Panel to Charge controller, Charge controller to battery as well as to light fixtures	Compliance (yes/No)	Yes	OK

<p style="text-align: center;"><b>ANNEXURE-II</b>  <b>TSK ENGINEERING INTERNATIONAL (PVT) LTD</b>  <b>SUMMARY OF SYSTEM DESIGN FOR FIX STRUCTURE SYSTEM BASED SOLAR POWER PUMPING SETS, PACKAGE 02</b></p>																					
Sr. #	Name of Work	Discharge (l GPH)	Total Dynamic Head (Feet)	Pump Setting (Feet)	WHP (HP/watts)	Pump Efficiency (%)	Motor Efficiency (%)	Pump Shaft Power (HP)	Motor Input Power (Watt)	Total PV Power (Wp)	PV Generator Peak Power (Watts)					Pump Model, Make, Rating	Motor Model, Make, Rating	Inverter Make, Model, Rating	dv/dt Filter, Make/Model	Column Pipe Size & Thickness	Motor Flat Cable Size (Core*Area) as per pump setting with Maximum 2.5% voltage drop losses
											Solar Module Brand	Module Size	No of Strings in Parallel	No of Module/String in Series	Total PV Generation						
1	DWSS MAKIN BAZAAR	1200	320	280	1.94	55.5	72.0	3.49	3620.59	6336.03	JA/Yingy/Topray	320	1	20	6400.0	Impo S4SP4/33	Impo 4 Hp	JFY Spring 4000	LTOCL 38005-3	2 Inches, 3.6 mm	4 x 2.5 Sq. mm
2	DWSS AT NEW RAGHZAI MARKET BARWAND SARWAKAI	1200	300	260	1.82	55.5	72.0	3.28	3394.30	5940.03	JA/Yingy/Topray	315	1	19	5985.0	Impo S4SP4/33	Impo 4 Hp	JFY Spring 4000	LTOCL 38005-3	2 Inches, 3.6 mm	4 x 2.5 Sq. mm

ANNEXURE – III CITITEK (PVT) LTD TECHNICAL COMPLIANCE SHEET FOR SOLAR STREET LIGHTS, PACKAGE 02				
S #	Item	Required Data	Quoted Data	Remarks
1	P/I of Road light pole hot dipped galvanized 8 meters long round conical overall thickness 4mm, single arms (Length 1m, thickness 4mm), base dia 150 mm and top dia 75 mm with base plate size (400mm x400mm x20mm) along with stiffeners (4 x 200mm x100mm x20mm). Complete in all respect as per Instruction of Engineer In charge.	Material Type	Hot Dipped Galvanized	OK
		Minimum Thickness (4 mm)	4 mm	
		Thickness of Galvanization (80 Micron)	80 Microns	
		Type of Material for pole Fasteners Nut/bolts/ washers b/w pole & foundation	Stainless Steel / Hot Dipped Galvanized	
2	Solar panel mount (Top-of-Pole) made of Hot dipped galvanized angle Iron to sustain 200 km/h wind pressure suitable for mounting 300 watts 01 No panels, As per provided specification at Annex-A.	Material Type	Hot Dipped Galvanized Angle Iron	OK
		Minimum Thickness (4 mm)	4.06 mm	
		Thickness of Galvanization (80 Micron)	80 Microns	
		Type of Material for array Fasteners Nut/bolts/ washers b/w structure & PV	Stainless Steel	
3	Construction of foundation for pole including cost of pit excavation, 1:2:4 RCC 450mm x 450mm x 1830mm along with (4 No Electro plated galvanized J-bolts dia=25mm, length=1m with L-Bend=150mm) having at least 150mm threads with double Nuts/double Washers), Complete in all respect as per Instruction of Engineer In charge.	Compliance (yes/No)	Yes	OK
4	P/I Solar panel mono-crystalline, Hydrophobic, A Grade 300 Watts or above, 17.5% Module efficiency min and 25 years power output warranty, As per provided specification at Annex-A.	Make	JA Solar / Astronergy	OK
		Model	JAM60D09-310/BP, CHSM60M-HC	
		PV Module Size (300 Watt or Above)	310 Watt or Above	
5	P/I Road light fixture SMD type, (each LED not more than 2 watts) white LED 60 watts, 12/24 V DC, IP 66, LED Efficiency min 130 Lumens/Watt complete in all respect. As per provided specification at Annex-A..	Make	SunMaster	OK
		Model	SLD29-60w	
		Rated Power (60 Watts)	60W	
		Lumen Per Watt (> 130 lm/W)	140 lm/W	
		IP Class (IP 66)	IP 66	
6	Lithium Ferrous Phosphate (LiFePO4) Batteries, 1.68 kWhr (24 Volt), As per provided specification at Annex-A.	Make	Vision / WRL	OK
		Model	V-LFP-25.6V70Ah, WRL-1440-24-B-0.5c	
		Battery Type (LiFePO4)	Lithium Ferrous Phosphate (LiFePO4), Super Capacitor	
		Battery Size (70 Ah)	70 Ah / 60 Ah	
		Battery Terminal Voltage (24V)	25.6V / 24V	
		Cycle life of battery before 80 % capacity of initial capacity @ 50 % DOD at discharge rate of 10 Hours (5750 Cycles)	6000 / 1 Million	
		Design charge and discharge rate of battery @0.2C and 0.5C)	Compatible / Compatible	
7	P/I Battery & Controller box under solar panel made of 16 SWG Hot dipped Galvanized (80 Microns), IP 65 having inverted louvers for ventilation and proper locking arrangement suitable for housing Lithium (LiFePO4) Battery, As per provided specification at Annex-A.	Material Type	Hot Dipped Galvanized Sheet	OK
		Minimum Thickness (16 SWG)	16 SWG	

ANNEXURE – III CITITEK (PVT) LTD TECHNICAL COMPLIANCE SHEET FOR SOLAR STREET LIGHTS, PACKAGE 02				
S #	Item	Required Data	Quoted Data	Remarks
8	P/I Solar charge controller MPPT 24 V, 15 amps, multiple protections, with timer and dusk to dawn, remote programming and monitoring with all sort of protections, As per provided specification at Annex-A.	Make	EPSolar	OK
		Model	Tracer3906LPLI	
		Working Technology	MPPT	
		Size	24V/15Amps	
		Maximum conversion efficiency (97%)	98%	
9	Flexible 1.5" dia PVC pipe for 4.0 mm2 copper cable through the pole for providing extra insulation to avoid power losses.	Compliance (yes/No)	Yes	OK
10	P/I 2x4.0 mm2 flexible copper cable along with proper connectors MC-4 (TUV Approved) from solar Panel to Charge controller, Charge controller to battery as well as to light fixtures	Compliance (yes/No)	Yes	OK



ANNEXURE-III CITITEK (PVT) LTD SUMMARY OF SYSTEM DESIGN FOR FIX STRUCTURE SYSTEM BASED SOLAR POWER PUMPING SETS, PACKAGE 02																					
Sr. #	Name of Work	Discharge (I GPH)	Total Dynamic Head (Feet)	Pump Setting (Feet)	WHP (HP/watts)	Pump Efficiency (%)	Motor Efficiency (%)	Pump Shaft Power (HP)	Motor Input Power (Watt)	Total PV Power (Wp)	PV Generator Peak Power (Watts)					Pump Model, Make, Rating	Motor Model, Make, Rating	Inverter Make, Model, Rating	dv/dt Filter, Make/Model	Column Pipe Size & Thickness	Motor Flat Cable Size (Core*Area) as per pump setting with Maximum 2.5% voltage drop losses
											Solar Module Brand	Module Size	No of Strings in Parallel	No of Module/String in Series	Total PV Generation						
1	DWSS MAKIN BAZAAR	1200	380	260	2.30	55.0	77.0	4.15	4020.0	7035.0	Astro/JA/Yingli	320	1	22	7040.0	Impo S4SP8/25	Impo 5.5 Hp	Jntech JNP5K 5H	JNH1A F	1.5 Inches, 50 mm	4 x 4 sq. mm
2	DWSS AT NEW RAGHZAI MARKET BARWAND SARWAKAI	1200	300	260	1.82	55.0	75.0	3.31	3288.2	5754.0	Astro/JA/Yingli	320	1	18	5460.0	Impo S4SP8/21	Impo 4 Hp	Jntech JNP4K H	JNH1A F	1.5 Inches, 50 mm	4 x 4 sq. mm

ANNEXURE – IV SKY GREEN ENGINEERING (PVT) LTD TECHNICAL COMPLIANCE SHEET FOR SOLAR STREET LIGHTS, PACKAGE 02				
S #	Item	Required Data	Quoted Data	Remarks
1	P/I of Road light pole hot dipped galvanized 8 meters long round conical overall thickness 4mm, single arms (Length 1m, thickness 4mm), base dia 150 mm and top dia 75 mm with base plate size (400mm x400mm x20mm) along with stiffeners (4 x 200mm x100mm x20mm). Complete in all respect as per Instruction of Engineer In charge.	Material Type	Hot Dipped Galvanized	OK
		Minimum Thickness (4 mm)	4 mm	
		Thickness of Galvanization (80 Micron)	90 Microns	
		Type of Material for pole Fasteners Nut/bolts/ washers b/w pole & foundation	Stainless Steel	
2	Solar panel mount (Top-of-Pole) made of Hot dipped galvanized angle Iron to sustain 200 km/h wind pressure suitable for mounting 300 watts 01 No panels, As per provided specification at Annex-A.	Material Type	Hot Dipped Galvanized Angle Iron	OK
		Minimum Thickness (4 mm)	4.06 mm	
		Thickness of Galvanization (80 Micron)	90 Microns	
		Type of Material for array Fasteners Nut/bolts/ washers b/w structure & PV	Stainless Steel	
3	Construction of foundation for pole including cost of pit excavation, 1:2:4 RCC 450mm x 450mm x 1830mm along with (4 No Electro plated galvanized J-bolts dia=25mm, length=1m with L-Bend=150mm) having at least 150mm threads with double Nuts/double Washers), Complete in all respect as per Instruction of Engineer In charge.	Compliance (yes/No)	Yes	OK
4	P/I Solar panel mono-crystalline, Hydrophobic, A Grade 300 Watts or above, 17.5% Module efficiency min and 25 years power output warranty, As per provided specification at Annex-A.	Make	JA / Ulica	OK
		Model	JAM60D00/PR, UL-310M-60	
		PV Module Size (300 Watt or Above)	310 W	
5	P/I Road light fixture SMD type, (each LED not more than 2 watts) white LED 60 watts, 12/24 V DC, IP 66, LED Efficiency min 130 Lumens/Watt complete in all respect. As per provided specification at Annex-A..	Make	Sunmaster	OK
		Model	ELS-ST11	
		Rated Power (60 Watts)	60W	
		Lumen Per Watt (> 130 lm/W)	130 lm/W	
		IP Class (IP 66)	IP 66	
6	Lithium Ferrous Phosphate (LiFePO4) Batteries, 1.68 kWhr (24 Volt), As per provided specification at Annex-A.	Make	Ritar/Sacrad Sun/LinkData	OK
		Model	1.68KWhr/24V	
		Battery Type (LiFePO4)	Lithium Ferrous Phosphate (LiFePO4)	
		Battery Size (70 Ah)	70 Ah	
		Battery Terminal Voltage (24V)	12/24V	
		Cycle life of battery before 80 % capacity of initial capacity @ 50 % DOD at discharge rate of 10 Hours (5750 Cycles)	6000	
		Design charge and discharge rate of battery @0.2C and 0.5C)	Compatible	
7	P/I Battery & Controller box under solar panel made of 16 SWG Hot dipped Galvanized (80 Microns), IP 65 having inverted louvers for ventilation and proper locking arrangement suitable for housing Lithium (LiFePO4) Battery, As per provided specification at Annex-A.	Material Type	Hot Dipped Galvanized Sheet	OK
		Minimum Thickness (16 SWG)	16 SWG	

ANNEXURE – IV SKY GREEN ENGINEERING (PVT) LTD TECHNICAL COMPLIANCE SHEET FOR SOLAR STREET LIGHTS, PACKAGE 02				
S #	Item	Required Data	Quoted Data	Remarks
8	P/I Solar charge controller MPPT 24 V, 15 amps, multiple protections, with timer and dusk to dawn, remote programming and monitoring with all sort of protections, As per provided specification at Annex-A.	Make	EPEver	OK
		Model	Tracer3906BPL/LPLI	
		Working Technology	MPPT	
		Size	24V/15Amps	
		Maximum conversion efficiency (97%)	98%	
9	Flexible 1.5" dia PVC pipe for 4.0 mm2 copper cable through the pole for providing extra insulation to avoid power losses.	Compliance (yes/No)	OK	OK
10	P/I 2x4.0 mm2 flexible copper cable along with proper connectors MC-4 (TUV Approved) from solar Panel to Charge controller, Charge controller to battery as well as to light fixtures	Compliance (yes/No)	OK	OK

ANNEXURE-IV																				
SKY GREEN ENGINEERING (PVT) LTD																				
SUMMARY OF SYSTEM DESIGN FOR FIX STRUCTURE SYSTEM BASED SOLAR POWER PUMPING SETS, PACKAGE 02																				
Sr. #	Name of Work	Discharge (I GPH)	Total Dynamic Head (Feet)	Pump Setting (Feet)	WHP (HP/watts)	Pump Efficiency (%)	Motor Efficiency (%)	Pump Shaft Power (HP)	Motor Input Power (Watt)	Total PV Power (Wp)	PV Generator Peak Power (Watts)				Pump Model, Make, Rating	Motor Model, Make, Rating	Inverter Make, Model, Rating	dv/dt Filter, Make/Model	Column Pipe Size & Thickness	Motor Flat Cable Size (Core*Area) as per pump setting with Maximum 2.5% voltage drop losses
											Solar Module Brand	Module Size	No of Strings in Parallel	No of Module/String in Series						
1	DWSS MAKIN BAZAAR	1200	380	260	DESIGN DEFECTIVE DUE TO DISCHARGE TAKEN IN US-GPH INSTEAD OF IGPH.															
2	DWSS AT NEW RAGHZAI MARKET BARWAND SARWAKAI	1200	300	260	DESIGN DEFECTIVE DUE TO DISCHARGE TAKEN IN US-GPH INSTEAD OF IGPH.															