GOVERNMENT OF KHYBER PAKHTUNKHWA

DIRECTORATE OF LOCAL & RURAL DEVELOPMENT DEPARTMENT MERGED AREA, PESHAWAR

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	 Installation of 180 Solar street lights in various regions of (Razmak, Mir Ali, Ladah, South Waziristan, Sub Division Tank, Darazinda Bazar) Two (02) No. Solarization DWSS At South Waziristan
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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

JULY 2020

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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)"

a				Eligibilit	y Criteria		Technical (Compliance	
S N O	Firm/ Company Name	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	Remarks/ Recommendation's
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 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.

ANNEXURE – II TSK ENGINEERING INTERNATIONAL (PVT) LTD TECHNICAL COMPLIANCE SHEET FOR SOLAR STREET LIGHTS, PACKAGE 02

S#	Item	Required Data	Quoted Data	Remarks				
	P/I of Road light pole hot dipped	Material Type	Hot Dipped Galvanized					
	galvanized 8 meters long round conical	Minimum Thickness (4 mm)	4 mm					
	overall thickness 4mm, single arms	Thickness of Galvanization (80	80 Microns					
1	(Length 1m, thickness 4mm), base dia 150	Micron)	oo wicions	OV				
1	mm and top dia 75 mm with base plate size (400mm x400mm x20mm) along with	Towns of Material for male		OK				
	stiffeners (4 x 200mm x100mm x20mm).	Type of Material for pole	GI / Stainless Steel					
	Complete in all respect as per Instruction	Fasteners Nut/bolts/ washers b/w	GI / Stainless Steel					
	of Engineer In charge.	pole & foundation						
	Solar panel mount (Top-of-Pole) made of		Hot Dipped Galvanized					
	Hot dipped galvanized angle Iron to	Material Type	Angle Iron					
	sustain 200 km/h wind pressure suitable	Minimum Thickness (4 mm)	4 mm					
2	for mounting 300 watts 01 No panels, As	Thickness of Galvanization (80	> 90 Mignons	OK				
2	per provided specification at Annex-A.	Micron)	> 80 Microns	OK				
		Type of Material for array						
		Fasteners Nut/bolts/ washers b/w	Stainless Steel					
		structure & PV						
	Construction of foundation for pole							
	including cost of pit excavation, 1:2:4							
	RCC 450mm x 450mm x 1830mm along							
2	with (4 No Electro plated galvanized J-		***	OW				
3	bolts dia=25mm, length=1m with L-	Compliance (yes/No)	Yes	OK				
	Bend=150mm) having at least 150mm threads with double Nuts/double							
	Washers), Complete in all respect as per							
	Instruction of Engineer In charge.							
	P/I Solar panel mono-crystalline,	Make	JA Solar					
	Hydrophobic, A Grade 300 Watts or	Model	JAM60 Series					
4	above, 17.5% Module efficiency min and		JAMOO Selles	OK				
	25 years power output warranty, As per	PV Module Size (300 Watt or	300 Watt or Above					
	provided specification at Annex-A.	Above)						
	P/I Road light fixture SMD type, (each	Make	Unlumin					
	LED not more than 2 watts) white LED 60	Model	Beluga					
5	watts, 12/24 V DC, IP 66, LED Efficiency	Rated Power (60 Watts)	60W	OK				
	min 130 Lumens/Watt complete in all respect. As per provided specification at	Lumen Per Watt (> 130 lm/W)	140 lm/W					
	Annex-A	IP Class (IP 66)	IP 66					
	Lithium Ferrous Phosphate (LiFePO4)	Make	Sunnew					
	Batteries, 1.68 kWHr (24 Volt), As per	Model	SN-2470					
	provided specification at Annex-A.	iviouei	Lithium Ferrous Phosphate					
		Battery Type (LiFePO4)	(LiFePO4)					
		Battery Size (70 Ah)	70 Ah					
			25.6V					
6		Battery Terminal Voltage (24V)	23.6 V	OK				
		Cycle life of battery before 80 %						
		capacity of initial capacity @ 50	6000 Cycles					
		% DOD at discharge rate of 10 Hours (5750 Cycles)	-					
		Design charge and discharge rate of battery @0.2C and 0.5C)	Compatible					
	P/I Battery & Controller box under solar	of battery @0.2C and 0.3C)						
	panel made of 16 SWG Hot dipped	Motorial Type	Hot Dipped Galvanized					
	Galvanized (80 Microns), IP 65 having	Material Type	Sheet					
7	inverted louvers for ventilation and proper			OK				
	locking arrangement suitable for housing							
	Lithium (LiFePO4) Battery, As per	Minimum Thickness (16 SWG)	16 SWG					
	provided specification at Annex-A.							
	P/I Solar charge controller MPPT 24 V, 15	Make	Lumiax					
	amps, multiple protections, with timer and	MANAGER						
		l	MPPT-1575-DCLi					
	dusk to dawn, remote programming and	Model	1,111111070 2021					
8	dusk to dawn, remote programming and monitoring with all sort of protections, As		MPPT	OK				
8	dusk to dawn, remote programming and	Working Technology	MPPT	OK				
8	dusk to dawn, remote programming and monitoring with all sort of protections, As			OK				

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

ANNEXURE-II TSK ENGINEERING INTERNATIONAL (PVT) LTD

SUMMARY OF SYSTEM DESIGN FOR FIX STRUCTURE SYSTEM BASED SOLAR POWER PUMPING SETS, PACKAGE 02

	SUMMARY OF SYSTEM DESIGN FOR FIX STRUCTURE SYSTEM BASED SOLAR POWER PUMPING SETS, PACKAGE 02 PV Generator Peak Power (Watts) PV Generator Peak Power (Watts)																				
			et)						:t)		PV Ger	nerato:	r Peal	k Powei	r (Watts)	gu	gu	ing		ness	tting age
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)	Solar Module Brand	Module Size	No of Strings in Parallel	No of Module/String in Series	Total PV Generation	Pump Model, Make, Rating	Motor Model, Make, Rating	Inverter Make, Model, Rat	dv/dt Filter, Make/Model	Column Pipe Size & Thickness	Motor Flat Cable Size (Core*Area) as per pump se with Maximum 2.5% volt drop losses
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

	TECHNICAL COMPLIANC	ANNEXURE – III CITITEK (PVT) LTD E SHEET FOR SOLAR STREET L	IGHTS, PACKAGE 02	
S#	Item	Required Data	Quoted Data	Remarks
	P/I of Road light pole hot dipped galvanized 8 meters long round conical	Material Type Minimum Thickness (4 mm)	Hot Dipped Galvanized 4 mm	
1	overall thickness 4mm, single arms (Length 1m, thickness 4mm), base dia 150 mm and top dia 75 mm with base plate	Thickness of Galvanization (80 Micron)	80 Microns	OK
1	size (400mm x400mm x20mm) along with stiffeners (4 x 200mm x100mm x20mm). Complete in all respect as per Instruction of Engineer In charge.	Type of Material for pole Fasteners Nut/bolts/ washers b/w pole & foundation	Stainless Steel / Hot Dipped Galvanized	OK
	Solar panel mount (Top-of-Pole) made of Hot dipped galvanized angle Iron to	Material Type	Hot Dipped Galvanized Angle Iron	
	sustain 200 km/h wind pressure suitable for mounting 300 watts 01 No panels, As	Minimum Thickness (4 mm)	4.06 mm	
2	per provided specification at Annex-A.	Thickness of Galvanization (80 Micron)	80 Microns	OK
		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
	P/I Solar panel mono-crystalline,	Make	JA Solar / Astronergy	
4	Hydrophobic, A Grade 300 Watts or above, 17.5% Module efficiency min and 25 years power output warranty, As per	Model	JAM60D09-310/BP, CHSM60M-HC	OK
	provided specification at Annex-A.	PV Module Size (300 Watt or Above)	310 Watt or Above	
	P/I Road light fixture SMD type, (each LED not more than 2 watts) white LED 60	Make	SunMaster	
_	watts, 12/24 V DC, IP 66, LED Efficiency	Model	SLD29-60w	0.17
5	min 130 Lumens/Watt complete in all	Rated Power (60 Watts)	60W	OK
	respect. As per provided specification at Annex-A	Lumen Per Watt (> 130 lm/W) IP Class (IP 66)	140 lm/W IP 66	
	Lithium Ferrous Phosphate (LiFePO4)	, ,		
	Batteries, 1.68 kWHr (24 Volt), As per	Make	Vision / WRL	
	provided specification at Annex-A.	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	
6		Battery Terminal Voltage (24V)	25.6V / 24V	OK
		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	Material Type	Hot Dipped Galvanized Sheet	OK
	locking arrangement suitable for housing Lithium (LiFePO4) Battery, As per provided specification at Annex-A.	Minimum Thickness (16 SWG)	16 SWG	

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

ANNEXURE-III CITITEK (PVT) LTD

SUMMARY OF SYSTEM DESIGN FOR FIX STRUCTURE SYSTEM BASED SOLAR POWER PUMPING SETS, PACKAGE 02

	T	,	SUMI	VIAKI (JI SIS	ע זאנעדד	LOIGIN	TOKI	IXSIKU	JIUKE SI	SIENID	ASED	SOL	AKIU	WEKTUW	PING SETS	, I ACK	AGE UZ			_
			et)						£		PV Ge	nerato	r Peal	k Powei	r (Watts)	Bu	gu	Rating	le	ness	ize setting oltage
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)	Solar Module Brand	Module Size	No of Strings in Parallel	No of Module/String in Series	Total PV Generation	Pump Model, Make, Rating	Motor Model, Make, Rating	Inverter Make, Model, Ra	dv/dt Filter, Make/Model	Column Pipe Size & Thickn	Motor Flat Cable Size (Core*Area) as per pump se with Maximum 2.5% volt drop losses
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

		CE SHEET FOR SOLAR STREET LI	,	1
S #	Item	Required Data	Quoted Data	Remarks
	P/I of Road light pole hot dipped galvanized 8 meters long round conical	Material Type	Hot Dipped Galvanized	
	overall thickness 4mm, single arms (Length 1m, thickness 4mm), base dia	Minimum Thickness (4 mm)	4 mm	-
1	150 mm and top dia 75 mm with base plate size (400mm x400mm x20mm)	Thickness of Galvanization (80 Micron)	90 Microns	OK
	along with stiffeners (4 x 200mm x100mm x20mm). Complete in all respect as per Instruction of Engineer In charge.	Type of Material for pole Fasteners Nut/bolts/ washers b/w pole & foundation	Stainless Steel	
	Solar panel mount (Top-of-Pole) made of Hot dipped galvanized angle Iron to	Material Type	Hot Dipped Galvanized Angle Iron	
	sustain 200 km/h wind pressure suitable for mounting 300 watts 01 No panels, As	Minimum Thickness (4 mm)	4.06 mm	
2	per provided specification at Annex-A.	Thickness of Galvanization (80 Micron)	90 Microns	OK
		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 Jbolts dia=25mm, length=1m with LBend=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
	P/I Solar panel mono-crystalline, Hydrophobic, A Grade 300 Watts or	Make	JA / Ulica	
4	above, 17.5% Module efficiency min and 25 years power output warranty, As	Model	JAM60D00/PR, UL- 310M-60	OK
	per provided specification at Annex-A.	PV Module Size (300 Watt or Above)	310 W	
	P/I Road light fixture SMD type, (each LED not more than 2 watts) white LED	Make	Sunmaster	
	60 watts, 12/24 V DC, IP 66, LED Efficiency min 130 Lumens/Watt	Model	ELS-ST11	
5	complete in all respect. As per provided specification at Annex-A	Rated Power (60 Watts)	60W	OK
		Lumen Per Watt (> 130 lm/W)	130 lm/W	
		IP Class (IP 66)	IP 66	
	Lithium Ferrous Phosphate (LiFePO4) Batteries, 1.68 kWHr (24 Volt), As per	Make	Ritar/Sacrad Sun/LinkData	
	provided specification at Annex-A.	Model	1.68KWHr/24V	
		Battery Type (LiFePO4)	Lithium Ferrous Phosphate (LiFePO4)	
		Battery Size (70 Ah)	70 Ah	
6		Battery Terminal Voltage (24V)	12/24V	OK
		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	Material Type	Hot Dipped Galvanized Sheet	OV.
7	inverted louvers for ventilation and proper locking arrangement suitable for housing Lithium (LiFePO4) Battery, As per provided specification at Annex-A.	Minimum Thickness (16 SWG)	16 SWG	OK

ANNEXURE – IV SKY GREEN ENGINEERING (PVT) LTD TECHNICAL COMPLIANCE SHEET FOR SOLAR STREET LIGHTS, PACKAGE 02

S #	Itom	Degwined Date	,	Domonica	
5#	Item	Required Data	Quoted Data	Remarks	
	P/I Solar charge controller MPPT 24 V, 15 amps, multiple protections, with timer	Make	EPEver		
	and dusk to dawn, remote programming	Model	Tracer3906BPL/LPLI		
8	and monitoring with all sort of	Working Technology	MPPT	OK	
	protections, As per provided	Size	24V/15Amps		
	specification at Annex-A.	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

			SUM	MARY (OF SYS	STEM D	ESIGN	FOR F		CTURE SY		,	_		WER PUM	PING SETS	, PACK	AGE 02			
			et)						t)		PV Generator Peak Power (Water			r (Watts)	ting	ting	Rating	-	ness	ze setting oltage	
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)	Solar Module Brand	Module Size	No of Strings in Parallel	No of Module/String in Series	Total PV Generation	Pump Model, Make, Rati	Motor Model, Make, Rati	Inverter Make, Model, Rai	dv/dt Filter, Make/Model	Column Pipe Size & Thickness	Motor Flat Cable Size (Core*Area) as per pump se with Maximum 2.5% volt drop losses
1	DWSS MAKIN BAZAAR	1200	380	260		I			DESIGN	N DEFECT	TIVE DU	ЕТО	DISC	HARGE	TAKEN I	N US-GPH	INSTEA	D OF IGI	PH.	1	1
2	DWSS AT NEW RAGHZAI MARKET BARWAND SARWAKAI	1200	300	260		DESIGN DEFECTIVE DUE TO DISCHARGE TAKEN IN US-GPH INSTEAD OF IGPH.															