

BOQ มหาวิทยาลัยเทคโนโลยีราชมงคลล้านนา ลำปาง 536.06 kW Rev.1 (2024)

Item	Description							Remark
		Model / Brand	Quantity	Unit	Price / Unit		Total Price	
					Material	Installation		
1	Permit Coordination	Government	1	Set		120,000.00	120,000.00	
2	Engineering / Design Work	PV Syst	1	Set		50,000.00	50,000.00	
3	Procurement / Installation	-	1	Set			-	
							-	
3.1	PV Module 690 W	AKCOM	774	Panel	4,806,540.00	193,500.00	5,000,040.00	
3.2	String Inverter SUN2000-100KTL-M2	Huawei	4	ea	773,960.00	8,000.00	781,960.00	
3.3	String Inverter SUN2000-50KTL-M3	Huawei	2	ea	192,060.00	12,000.00	204,060.00	
3.3	Rapid shutdown for comply with EIT standard with Emergency Botton	Projoy	0	ea	-	-	-	ตามมาตรฐาน วศท.กำหนดให้ต้องติดตั้ง Rapid shutdown ตั้งแต่วันที่ 1 ก.ค. 2566
3.3	Controller Box for DC24V กล่องควบคุมไฟฟ้า (Rapid Shutdown Device)	Projoy	0	ea	-	-	-	
3.3	สายไฟเลี้ยง Rapit shutdown	Thai Yazaki	0	m	-	-	-	
3.3	DC Fuse(Inline Fuse)	Uriarte	0	set	-	-	-	
3.4	DC Connector	Multi Contact	130	ea	26,000.00	9,100.00	35,100.00	
3.5	DC Extension Cable (Solar Cable) FD depends on calculation	Helukabel/JJ Lap/Prysmian/Link	20,000.00	m	720,000.00	120,000.00	840,000.00	
3.6	AC Cable						-	
3.6.1	AC Cable CV Cable size ...1C x 70.. Sq.mm.(Inverter to MDB Solar)	Thai Yazaki	250	m	112,500.00	45,000.00	157,500.00	
3.6.2	AC Cable CV Cable size ...240.. Sq.mm. (MDB Solar to TR)	Thai Yazaki	600	m	570,000.00	120,000.00	690,000.00	
3.6.4	AC Cable THW Cable size ...120.. Sq.mm. (AC Collection Ground)	Thai Yazaki	50	m	27,500.00	4,000.00	31,500.00	
3.6.5	AC Cable THW Cable size ...16.. Sq.mm. (Ground)	Thai Yazaki	400	m	25,200.00	10,000.00	35,200.00	
3.6.5	AC Cable THW Cable size ...6.. Sq.mm. (DC Ground)	Thai Yazaki	1000	m	45,000.00	15,000.00	60,000.00	
3.6.6	Acc . AC Cable (cable lag,Terminat lag,support cable grend)	Thai Yazaki	1	Set	50,000.00	20,000.00	70,000.00	
3.7	Main Distribution Board	Precise					-	
3.7.1	Main Distribution Board (MDB)	Precise	2	ea	500,000.00	10,000.00	510,000.00	
3.8	Grounding System	Kumwell	1	Set	25,000.00	7,500.00	32,500.00	
							-	
3.9	Mounting Structure (536.06 kWp)	-	1	Set	1,876,210.00	964,908.00	2,841,118.00	
3.10	Cable Tray	Perforated Tray					-	
3.10.1	Cable Tray 100x100x2400	Perforated Tray	200	ea	308,000.00	30,000.00	338,000.00	
3.10.3	Cable Tray 200x100x2400	Perforated Tray	100	ea	135,000.00	20,000.00	155,000.00	
3.10.4	Cable Tray 300x100x2400	Perforated Tray	30	ea	59,250.00	9,000.00	68,250.00	
3.10.5	Cable ladder 400x100x2400	Perforated Tray	0	ea	-	-	-	
3.10.6	Conduit and Flaxible, Support Cable Tray		1	Lot	50,000.00	25,000.00	75,000.00	
							-	
3.11	Metering System						-	
3.11.1	PQM Meter (UMG 512 Pro)	Janitza	1	ea	120,000.00	15,000.00	135,000.00	
3.11.2	Revenue Meter	EDMI ATLAS ,MK10E	0	ea	-	-	-	
3.12	Protection System						-	
3.12.1	Relay Protection System (SEL-751)	SEL-751	0	lot	-	-	-	
3.13	Other Accessories						-	
3.13.1	Transformer 800 kVA	-	1	ea	450,000.00	30,000.00	480,000.00	
3.13.2	22kV For Transformer	STC,Precise	1	Set	120,000.00	50,000.00	170,000.00	
3.13.3	22 kV Sac Cable		70	m	15,750.00	3,500.00	19,250.00	
3.13.4	Current Transformer MV	-	3	ea	96,000.00	15,000.00	111,000.00	
3.13.5	Potential Transformer MV	-	1	ea	51,700.00	10,000.00	61,700.00	
3.13.6	Concret Pole and Support CT,VT and Acc.	STC	1	ea	35,000.00	25,000.00	60,000.00	
3.13.7	Concret Pole For Riser Pole Incomming + Outgoing	STC	0	ea	-	-	-	
3.13.8	Drop Out Fuse	Precise	3	ea	9,000.00	3,000.00	12,000.00	
3.13.9	Lightning Arrester 21 kV 10 kA	Precise	3	ea	12,000.00	3,000.00	15,000.00	
3.13.10	Electrical Distribution Box	Schneider	1	ea	15,000.00	8,000.00	23,000.00	
3.13.11	Electrical System (Lighting Fixture, Receptacle)	Philips	1	Set	8,000.00	2,000.00	10,000.00	
3.14	Monitoring System						-	
3.14.1	Smart Logger 3000A	Huawei	1	ea	30,000.00	10,000.00	40,000.00	
3.14.2	RS485 for Zero Export	lapp	1	Set	20,000.00	5,000.00	25,000.00	
3.14.3	LAN Wiring System	TP Link	1	Set	5,000.00	3,500.00	8,500.00	
3.14.4	UPS	Leonic	1	ea	5,000.00	1,000.00	6,000.00	
4	Safety System						-	
4.1	Warning Sign,Fire Extinguisher 1 Sets ,Equipment Name Plate (Acrylic)		1	Set	10,000.00	3,000.00	13,000.00	
4.2	Ladder For Service		0	Set	-	-	-	
4.3	Inverter Support Structure and Fence		1	Set	150,000.00	40,000.00	190,000.00	
5	Test and Comissioning System						-	
5.1	Commissioning Work		1	Set		35,000.00	35,000.00	
6	Others						-	
6.1	Hand rail Lifegrad			Set	-	-	-	
6.2	Walkway			Set	-	-	-	
6.3	Water Cleaning system			Set	-	-	-	
6.4	Mobilization		1	Set	-	100,000.00	100,000.00	
6.5	Unload and Transportation		1	Set	250,000.00	100,000.00	350,000.00	
6.6	Insurance			Set	-		-	
6.7	Management and Overhead		1	Set		300,000.00	300,000.00	
	Total				11,704,670.00	2,555,008.00	14,259,678.00	
					Total		14,259,678.00	
	System Size (KWdc) = Q'ty Panel x PV Module Rate							
	THB/W				21.83	4.77	26.60	

Solar PV Rooftop 536.06 kWp. มหาวิทยาลัยเทคโนโลยีราชมงคลล้านนา ลำปาง

Total PV Plant Capacity (DC)	536.06 kWp
Daily Electricity Production	1,500.97 kWh/day
Monthly Electricity Production	45,029.04 kWh/month
Annual Electricity Production	540,348.48 kWh/year
Investment	14,259,678.0 Batt
Tariff	4.00 Bath/unit

Year	Degradation of PV Module		Annual Electricity Production (kWh/Year)	Estimated Yearly Saving (@ 4.00 Baht/kWh)	Accumulated Saving (Baht)	Payback Period (Baht)
0		100%		-14,259,678.00		-14,259,678.00
1	2.50%	97.50%	540,348	2,161,394	2,161,394	-12,098,284
2	0.60%	96.90%	526,840	2,107,359	4,268,753	-9,990,925
3	0.60%	96.30%	523,679	2,094,715	6,363,468	-7,896,210
4	0.60%	95.70%	520,537	2,082,147	8,445,615	-5,814,063
5	0.60%	95.10%	517,413	2,069,654	10,515,268	-3,744,410
6	0.60%	94.50%	514,309	2,057,236	12,572,504	-1,687,174
7	0.60%	93.90%	511,223	2,044,892	14,617,397	357,719
8	0.60%	93.30%	508,156	2,032,623	16,650,020	2,390,342
9	0.60%	92.70%	505,107	2,020,427	18,670,447	4,410,769
10	0.60%	92.10%	502,076	2,008,305	20,678,752	6,419,074
11	0.60%	91.50%	499,064	1,996,255	22,675,007	8,415,329
12	0.60%	90.90%	496,069	1,984,277	24,659,284	10,399,606
13	0.60%	90.30%	493,093	1,972,372	26,631,656	12,371,978
14	0.60%	89.70%	490,134	1,960,538	28,592,193	14,332,515
15	0.60%	89.10%	487,194	1,948,774	30,540,967	16,281,289
16	0.60%	88.50%	484,270	1,937,082	32,478,049	18,218,371
17	0.60%	87.90%	481,365	1,925,459	34,403,508	20,143,830
18	0.60%	87.30%	478,477	1,913,906	36,317,415	22,057,737
19	0.60%	86.70%	475,606	1,902,423	38,219,838	23,960,160
20	0.60%	86.10%	472,752	1,891,008	40,110,846	25,851,168
21	0.60%	85.50%	469,916	1,879,662	41,990,508	27,730,830
22	0.60%	84.90%	467,096	1,868,384	43,858,893	29,599,215
23	0.60%	84.30%	464,294	1,857,174	45,716,067	31,456,389
24	0.60%	83.70%	461,508	1,846,031	47,562,098	33,302,420
25	0.60%	83.10%	458,739	1,834,955	49,397,053	35,137,375
Total			12,349,263	49,397,053	49,397,053	

