



										FOR REVIEW	
										SOLAR ROOFTOP 341.55 kWp PROJECT	
										DRAWING NAME: PV MODULE LAYOUT	
										DRAWING NO. -	
										SHEET: 1 Of 1	
										SCALE: N/A	
										DESIGNED BY วันชัยการไฟฟ้า	
										REV. A	

CLIENT:		CONTRACTOR:								CIVIL ENGINEER		
 มหาวิทยาลัยเทคโนโลยีราชมงคลล้านนา ภาคพายัพ (ดอยสะเก็ด) 98 หมู่ 8 ตำบลป่าป้อง อำเภอดอยสะเก็ด จังหวัดเชียงใหม่ 50220		 วันชัยการไฟฟ้า								ELECTRICAL ENGINEER		
										MECHANICAL ENGINEER	-	
				A	4/02/2024	For-Review	Ms. Wanmai K.	Ms. Wanmai K.	Ms. Wanmai K.	PROJECT MANAGER		
				REV.	DATE	DISCRIPTION	DRAWN	CHECKED	APPROVED	DATE	4 Feb 2024	

1 2 3 4 5 6 7 8

BOQ มหาวิทยาลัยเทคโนโลยีราชมงคลล้านนา ภาคพายัพ ดอยสะเก็ด 341.55 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	Skylink/ PV Syst	1	Set		50,000.00	50,000.00	
3	Procurement / Installation	Skylink	1	Set			-	
							-	
3.1	PV Module 690 W	AKCOM	495	Panel	3,073,950.00	123,750.00	3,197,700.00	
3.2	String Inverter SUN2000-100KTL-M2	Huawei	3	ea	580,470.00	18,000.00	598,470.00	
3.3	String Inverter SUN2000-50KTL-M3	Huawei	0	ea	-	-	-	
3.3	Rapid shutdown for comply with EIT standard with Emergency Botton	Projoy	247.5	ea	2,475,000.00	24,750.00	2,499,750.00	ตามมาตรฐาน วศท.กำหนดให้ต้องติดตั้ง Rapid shutdown ตั้งแต่วันที่ 1 ก.ค. 2566
3.3	Controller Box for DC24V กล่องควบคุมไฟฟ้า (Rapid Shutdown Device)	Projoy	6	ea	60,000.00	1,200.00	61,200.00	
3.3	สายไฟเลี้ยง Rapit shutdown	Thai Yazaki	3000	m	165,000.00	75,000.00	240,000.00	
3.3	DC Fuse(Inline Fuse)	Uriarte	0	set	-	-	-	
3.4	DC Connector	Multi Contact	100	ea	20,000.00	5,000.00	25,000.00	
3.5	DC Extension Cable (Solar Cable) FD depends on calculation	Helukabel/JJ Lap/Prysmian/Link	19,000.00	m	684,000.00	114,000.00	798,000.00	
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	199,000.00	45,000.00	244,000.00	
3.6.2	AC Cable CV Cable size ...150.. Sq.mm. (MDB Solar to MAIN MDB)	Thai Yazaki	100	m	95,000.00	10,000.00	105,000.00	
3.6.4	AC Cable THW Cable size ...35.. Sq.mm. (AC Collection Ground)	Thai Yazaki	50	m	11,900.00	4,000.00	15,900.00	
3.6.5	AC Cable THW Cable size ...16.. Sq.mm. (AC Collection Ground)	Thai Yazaki	300	m	18,900.00	7,500.00	26,400.00	
3.6.5	AC Cable THW Cable size ...6.. Sq.mm. (DC Ground)	Thai Yazaki	400	m	25,200.00	10,000.00	35,200.00	
3.6.6	Acc . AC Cable (cable lag,Terminat lag,support cable grend)	Thai Yazaki	1	Set	20,000.00	7,500.00	27,500.00	
3.7	Main Distribution Board	Precise					-	
3.7.1	Main Distribution Board (MDB)	Precise	2	ea	60,000.00	10,000.00	70,000.00	
3.8	Grounding System	Kumwell	1	Set	20,000.00	6,000.00	26,000.00	
							-	
3.9	Mounting Structure (341.55 kWp)	Skylink Solar	1	Set	341,550.00	102,465.00	444,015.00	
3.10	Cable Tray	Perforated Tray					-	
3.10.1	Cable Tray 100x100x2400	Perforated Tray	150	ea	231,000.00	22,500.00	253,500.00	
3.10.3	Cable Tray 200x100x2400	Perforated Tray	30	ea	40,500.00	6,000.00	46,500.00	
3.10.4	Cable Tray 300x100x2400	Perforated Tray	0	ea	-	-	-	
3.10.5	Cable ladder 400x100x2400	Perforated Tray	0	ea	-	-	-	
3.10.6	Conduit and Flexable, Support Cable Tray		1	Lot	80,000.00	30,000.00	110,000.00	
							-	
3.11	Metering System						-	
3.11.1	PQM Meter (UMG 96RM)	Janitza	1	ea	70,000.00	20,000.00	90,000.00	
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 400 kVA Std.Loss	Ekarat	0	ea	-	-	-	
3.13.2	22kV For Transformer	STC,Precise	0	Set	-	-	-	
3.13.3	22 kV Sac Cable		50	m	11,250.00	2,500.00	13,750.00	
3.13.4	Current Transformer MV	Precise	3	ea	96,000.00	15,000.00	111,000.00	
3.13.5	Potential Transformer MV	Precise	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	30,000.00	5,000.00	35,000.00	
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	10,000.00	1,500.00	11,500.00	
4	Safety System						-	
4.1	Warning Sign,Fire Extinguisher 1 Sets ,Equipment Name Plate (Acrylic)	Skylink	1	Set	10,000.00	3,000.00	13,000.00	
4.2	Ladder For Service	Skylink	0	Set	-	-	-	
4.3	Inverter Support Structure and Fence	Skylink	2	Set	70,000.00	30,000.00	100,000.00	
5	Test and Comissioning System						-	
5.1	Commissioning Work	Skylink	1	Set		35,000.00	35,000.00	
6	Others						-	
6.1	Hand rail Lifegrad	Skylink		Set	-	-	-	
6.2	Walkway	Skylink		Set	-	-	-	
6.3	Water Cleaning system	Skylink	1	Set	40,000.00	15,000.00	55,000.00	
6.4	Mobilization	Skylink	1	Set	-	50,000.00	50,000.00	
6.5	Unload and Transportation	Skylink	1	Set	150,000.00	50,000.00	200,000.00	
6.6	Insurance	Skylink		Set	-		-	
6.7	Management and Overhead	Skylink	1	Set		100,000.00	100,000.00	
	Total				8,854,420.00	1,184,165.00	10,038,585.00	
					Total		10,038,585.00	
	System Size (KWdc) = Q'ty Panel x PV Module Rate							
	THB/W				25.92	3.47	29.39	

Solar PV Rooftop 341.55 kWp. มหาวิทยาลัยเทคโนโลยีราชมงคลล้านนา ภาคพายัพ (ดอยสะเก็ด)

Total PV Plant Capacity (DC)	341.55 kWp
Daily Electricity Production	956.34 kWh/day
Monthly Electricity Production	28,690.20 kWh/month
Annual Electricity Production	344,282.40 kWh/year
Investment	10,038,585.0 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%		-10,038,585.00		-10,038,585.00
1	2.50%	97.50%	344,282	1,377,130	1,377,130	-8,661,455
2	0.60%	96.90%	335,675	1,342,701	2,719,831	-7,318,754
3	0.60%	96.30%	333,661	1,334,645	4,054,476	-5,984,109
4	0.60%	95.70%	331,659	1,326,637	5,381,113	-4,657,472
5	0.60%	95.10%	329,669	1,318,677	6,699,791	-3,338,794
6	0.60%	94.50%	327,691	1,310,765	8,010,556	-2,028,029
7	0.60%	93.90%	325,725	1,302,901	9,313,457	-725,128
8	0.60%	93.30%	323,771	1,295,083	10,608,540	569,955
9	0.60%	92.70%	321,828	1,287,313	11,895,853	1,857,268
10	0.60%	92.10%	319,897	1,279,589	13,175,442	3,136,857
11	0.60%	91.50%	317,978	1,271,911	14,447,354	4,408,769
12	0.60%	90.90%	316,070	1,264,280	15,711,634	5,673,049
13	0.60%	90.30%	314,174	1,256,694	16,968,328	6,929,743
14	0.60%	89.70%	312,289	1,249,154	18,217,482	8,178,897
15	0.60%	89.10%	310,415	1,241,659	19,459,142	9,420,557
16	0.60%	88.50%	308,552	1,234,209	20,693,351	10,654,766
17	0.60%	87.90%	306,701	1,226,804	21,920,155	11,881,570
18	0.60%	87.30%	304,861	1,219,443	23,139,598	13,101,013
19	0.60%	86.70%	303,032	1,212,127	24,351,725	14,313,140
20	0.60%	86.10%	301,213	1,204,854	25,556,578	15,517,993
21	0.60%	85.50%	299,406	1,197,625	26,754,203	16,715,618
22	0.60%	84.90%	297,610	1,190,439	27,944,642	17,906,057
23	0.60%	84.30%	295,824	1,183,296	29,127,938	19,089,353
24	0.60%	83.70%	294,049	1,176,197	30,304,135	20,265,550
25	0.60%	83.10%	292,285	1,169,139	31,473,274	21,434,689
Total			7,868,319	31,473,274	31,473,274	

