

7.1.2 - Facilities for Alternate Sources of Energy and Energy Conservation Measures

S.No.	Details of Alternate Sources of Energy and Energy	Page No.
	Conservation Measures	
1.	Individual Solar Roof Type Power Plant 1 kW PV system	2
2.	IoT based Room Automation System	5
3.	LED Lighting - Energy Conservation	6
4.	Mini Bio Gas Plant	8

1. INDIVIDUAL SOLAR ROOF TYPE POWER PLANT - 1 kW PV system

Modern day educational institutions with contemporary infrastructure requires significant amount of electricity to manage its facilities. With increasing electricity costs, rooftop solar power plants have emerged as an ideal solution to save on these costs. Moreover, educational institutions can play a vital role in creating awareness about solar energy by installing rooftop solar power at its campuses. The installed PV system consists of multi crystalline solar modules with fixed angle mounting systems and the solar inverters with battery backup.



Installed Solar PV Module in Main Building Roof Top



SYSTEM DESCRIPTIONS

Block Diagram of Installed PV System





Photographs of Installed PV System

Data sheet of PV Solar module

S.No.	Particulars	Rating
1.	Rated Power	260W
2.	Open circuit voltage	38.12V
3.	Short circuit current	8.9A
4.	Voltage at maximum power	30.40V
5.	Current at maximum power	8.57A
6.	Maximum system voltage	1000V
7.	Module weight	18.3Kg

Invoice of PV Solar module

INVOICE Date: 12-03-2019 Customer's Detx Customer's Detx Pinneipal, Kings College Of Engineering, Punalkulam, Gandarvakottai Tahuk, Pudukottai District, Tamil Nadu - 613 303. STEPUP Crystalline Solar Panel (260W, Open Circuit Voltage: 32VDC, Shot Circuit Current 14.4A) Model: GOLDI 60 Series -260Wp(GOLDI/260PM(260WP)) GST 5% Ist of Warranty, if Improper Installation of equipment by third party will make this warranty null and wid and The warranty specifically exclude consequential damages) MCCOUNT DETAILS STEPUP CONTROLS, Bank: AXIS BANK, Acc. No: 518020084006598, JISC Code: UTIB0001767, KORATTUR Branch, Chennal, AUTHORIZED Thanking You FOR STEE UP AUTHORIZED ANK, Acc. No: 518020084006598, JISC Code: UTIB0001767, KORATTUR Branch, Chennal, AUTHORIZED ANK, Acc. No: 518020084006598, JISC Code: UTIB0001767, KORATTUR Branch, Chennal, AUTHORIZED ANK, Acc. No: 518020084006598, JISC Code: UTIB0001767, KORATTUR Branch, Chennal, AUTHORIZED ANK, Acc. No: 518020084006598, JISC Code: UTIB0001767, KORATTUR Branch, Chennal, AUTHORIZED ANK, Acc. No: 518020084006598, JISC Code: UTIB0001767, KORATTUR Branch, Chennal, AUTHORIZED AND ANT AUTHORIZED AND AND AND AND AND AND AND AND AND AN	1000	salesstepupcontrols@gmail.com.GST.No: 33,	act: 99 AWYP	768202 G8803F	33, 9 1ZA	944081	
Imme & Address Date: 12-03-2019 The Principal, Kings College Of Engineering, Punalkulam, Gandarvakottai Taluk, Pudukottai District, Tamil Nadu - 613 303. P.O. ref. no. Stop P.O. date 06/03 Stop GST NO. User Stop Cy UntPrice 011 0001000000000000000000000000000000	Invoir	INVOICE	in spectra	calette agental	and the state	6.000	
The Principal, Kings College Of Engineering, Punalkulam, Gandarvakottai Taluk, Pudukottai District, Tamil Nadu - 613 303. P.O. ref. no. 91 Steve 06/03 You Poly Crystalline Solar Panel (260W, Open Circuit Voltage: 32VDC, Full Load Voltage: 24VDC, Full Load Current: 8.1A, Short Circuit Current 14.4A) Model: GOLDI 60 Series - 260Wp(GOLDI260PM(260WP)) 01 Voltage: 01 Voltage	ame &	Address	Date: 12-03-2019				
Kings College Of Engineering, Pundukottai District, Tamil Nadu - 613 303. P.O. date 08/03 St No GST NO. UK St No Uken Description Or Or 1 Poly Crystalline Solar Panel (260W, Open Circuit Voltage: 32VDC, Full Load Voltage: 24VOC, Full Load Current: 8.1A, Short Circuit Current 14.4A) OH Nor 11,160.00 Model: GOLDI 60 Series - 260Wp(GOLDI260PM(260WP)) GST 5% 04 Nor 11,160.00 [25 Years of Warranty, If Improper Installation of equipment by third party will make this warranty null and woid and The warranty specifically exclude consequential damages) NET AMOUNT 4 ACCOUNT DETAILS STEPUP CONTROLS, Bank: AXIS BANK, Acc. No: 938020084008598, JESC Code: UTIB0001767, KORATTUR Branch, Chennal, Mob: 994408113		The Principal,	P.O. ref. no.		ner's D	962	
Pudukottai District, Tamil Nadu - 613 303. Intervention Intervention Intervention 1 Poly Crystalline Solar Panel (260W, Open Circuit Voltage: 32VDC, Full Load Voltage: 24VDC, Full Load Current: 8.1A, Short Circuit Current 14.4A) Of Nos 11,150.00 1 Poly Crystalline Solar Panel (260W)(GOLDI260PM(260WP)) Of Nos 11,150.00 25 Years of Warranty, If Improper Installation of eculpment by third party will make this warranty null and wold and The warranty specifically exclude consequential damages } Intervention		Kings College Of Engineering, Punalkulam, Gandarvakottai Taluk			00		
Si No Tem Description Ory Unit Price 1 Poly Crystalline Solar Panel (260W, Open Circuit Voltage: 32VDC, Full Load Voltage: 24VDC, Full Load Current: 8.1A, Short Circuit Current 13.4A) 04 Nos 11,160.00 Short Circuit Current 13.4A) Model: GOLDI 60 Series -260Wp(GOLDI260PM(260WP)) 04 Nos 11,160.00 I Full Load Marranty, If Improper Installation of equipment by third party will make this warranty null and void and The warranty specifically exclude consequential damages) GST 5% NET AMOUNT		Pudukottai District, Tamil Nadu - 613 303.	F.O. date		08/	08/03/2019	
SI NO Item Description Ory Unit Price 1 Poly Crystalline Solar Panel (260W, Open Circuit Voltage: 32VDC, Full Load Voltage: 24VDC, Full Load Current: 8.1A, Short Circuit Current 14.4A) Of Nor 11,160.00 Short Circuit Current 14.4A) Model: GOLDI 60 Series -260Wp(GOLDI260PM(260WP)) Of Nor 11,160.00 C25 Years of Warranty, If Improper Installation of equipment by third party will make this warranty pull and void and the warranty specifically exclude consequential damages) NET AMOUNT 4				NU.	URP		
Image:	No		All shares	A Property of the second			
Full Load Voltage: 24VDC, Full Load Current: 8.1A, Short Circuit Current 14.4A) Model: GOLDI 60 Series -260Wp(GOLDI260PM(260WP)) GST 5% [25 Years of Warranty, If Improper Installation of equipment by third party will make this warranty pull and wold and The warranty specifically exclude consequential damages) NET AMOUNT 4 Model: GOLDI 60 Series -260Wp(GOLDI260PM(260WP)) GST 5% [25 Years of Warranty, If Improper Installation of equipment by third party will make this warranty pull and wold and The warranty specifically exclude consequential damages) NET AMOUNT 4 MOLENDETAILS STEPUP CONTROLS, Bank: AXIS BANK, Acc. No: 938020084006598, IFSC Code: UTIB0001767, KORATTUR Branch, Chennal. Thanking You FOR STEPUP CONTROLS, Bank: AXIS BANK, Acc. No: 938020084006598, IFSC Code: UTIB0001767, KORATTUR Branch, Chennal. Thanking You FOR STEPUP CONTROLS, Bank: AXIS BANK, Acc. No: 938020084006598, IFSC Code: UTIB0001767, KORATTUR Branch, Chennal. Thanking You FOR STEPUP CONTROLS, Bank: AXIS BANK, Acc. No: 918020084006598, IFSC Code: UTIB0001767, KORATTUR Branch, Chennal.	1	Poly Crystalline Solar Panel (26bW, Open Clevel)	Qty	Unit Price		Total Pr	
GST 5% equipment by third party will make this warranty null and void and The warranty specifically exclude consequential damages) NET AMOUNT 4 ACCOUNT DETAILS STEPUP CONTROLS, Bank: AXIS BANK, Acc. No: 918020084006558, IFSC Code: UTIB0001767, KORATTUR Branch, Chennal, Thanking You FOR STEP UP AUTHORIZED AUTHORIA		Full Load Voltage: 24VDC, Full Load Current: 8.1A, short Circuit Current 14.4A) Model: GOLDI 60 Series -260Wp(GOLDI260PM(260WP))	04 Nos	11,160	0.00	44,640.0	
Thanking You FOR STEE UP ANTHONICAL AUTHORIZED ANTHONICAL Mob: 994408112		(25 Years of Warranty, if Improper Installation of guipment by third party will make this warranty null and oid and The warranty specifically exclude consequential amages)				2232.00	
ACCOUNT DETAILS STEPUP CONTROLS, Bank: AXIS BANK, Acc. No: 918020084006598, JFSC Code: UTIB0001767, KORATTUR Branch, Chennal. Thanking You FOR STEP OP AUTHORIZED AUTHORIZED KU TAMIL SELVA Mob: 994408113			2	NET AMO	UNT	46,872.0	
Thanking You FOR STEE OP ANTHONY OF STABULURADORSSB, JFSC Code: UTIBOO01767, KORATTUR Branch, Chennal AUTHORIZED ANTHONY OF THE TOPHTHICSI) Mob: 994408112	STEP	ACCOUNT DETAILS	1				
AUTHORIZED STORY KJ TAORE SLVA Mob: 9944081129			7, KORAT	TUR Branch,	Chenn	ai,	
	TÌ	anking You IR STEE UP					
- ⁻	Th FC AU KJ	THORIZED SHATCORY thorized Shatcory tamil scluy (Cory b) 994408112					

2. IoT BASED ROOM AUTOMATION SYSTEM

Internet of Things (or commonly referred to as IoT) based Room Automation system (RAS), as the name suggests aims to control all the devices of smart room through internet protocols or cloud based computing. The IoT based Room Automation system is of low cost and it functions with the help of wireless technology. The IoT based RAS is installed in Innovation Club laboratory to control two fans and two lights.



Photographs of Installed IoT based RAS in Innovation Club Laboratory

3. LED LIGHTING - ENERGY CONSERVATION

The light-emitting diode (LED) is today's most energy-efficient and rapidly- developing lighting technology. Quality LED light bulbs last longer, are more durable, and offer comparable or better light quality than other types of lighting. LED lights installed at various locations are shown below:



Photographs of Installed LED Lights

Locations of LED lights

Room / lab Detail	Specification	Maximum powerrating	No. of LED lights
Block I			
Principal room	LED light	40W	04
Secretary room	LED light	40W	06
Optical lab	LED tube light	40W	06
Block I building opposite	LED Street light	55W	10
Block II building opposite	LED Street light	250W	06
Block III			
Ground Floor (Girls)	LED tube light	40W	20
Ground floor (boys)	LED bulb	40W	02
Ground floor (boys)	LED tube light	40W	14
Kitchen	LED light	40W	14
Block IV			
Bath room 1 st floor	LED light	40W	04
Varanda 2 nd floor	LED light	40W	01
Bath room 2 nd floor	LED light	40W	02
Library Block			
Ground floor	LED light	25W	01
Street lights (LED)	Canteen	20W	02
	First year block	20W	01
	Physics lab	20W	01
	Ground side	20W	03
	Girls hostel	20W	03
	Library back	55W	05
	Gate compound	20W	03
	Outside	20W	02

4. MINI BIO GAS PLANT

The biogas plant is designed in such a way that it produces the biogas from vegetable and food waste from canteen. The bio degradable food waste was considered for bio gas production. One month survey was conducted to calculate the food waste generating from the canteen. The vegetables waste and food waste was weighted at end of every day and noted for one month food waste calculation. The required quantity of gas is 9 liters per day to cook the food for average of 500 students. The average generated food waste (22.8kgs/day) generates 5.4 m³ of biogas.



Photograph of Installed Mini Bio Gas Plant