

**TRR GOVERNMENT DEGREE COLLEGE
KANDUKUR, PRAKASAM DIST.**



ENERGY AUDIT

2019

**TRR GOVERNMENT DEGREE COLLEGE, KANDUKUR, PRAKASAM DT.
DEPARTMENT OF BOTANY**

















Date: 28.01.2020

STAFF COUNCIL RESOLUTION

Staff council met today in the principal chamber and resolved following things. As a part of implementing the energy policy of our college, the college wishes to conduct Energy audit for the year 2019. For making this a reality and success the following staff members and students are involved in the energy audit committee.

1. Sri. D. Vijayasri (FAC PRINCIPAL.) Lecturer in Physics, Energy Audit Coordinator
2. Sri D. Krishna Kumar. Lecturer in Physics
3. Ch. Suresh Kumar. Lecturer in Mathematics, Energy Audit member
4. Dr. M. Srinivas Reddy. Lecturer in Chemistry, Energy Audit Member
5. Dr. K.R. Shanmugam, Lecturer in Zoology
6. Dr. Shaik Mastan Vali. Lecturer in Botany
7. Sri Madhu Babu, Assistant Engineer, Dept of Electricity, Kandukur
8. M. Sunil, III BSc (BZC)
9. Shaik Hazeer Baba, II BSc (BZC)
10. Kum.J.Neelima, I BSc (BZC)

The Energy audit members should coordinate with each other and form committees to speed up the energy audit process. The committee members should update the latest developments in their audit process to the Principal.

Botany		 Principal 28/1/20 TRR GOVT. DEGREE COLLEGE NAAC Accredited B KANDUKUR-523 100 Prakasam Dt
Political Science		Physical Education 
Zoology		Mathematics 
History		Computer Science 
Chemistry		English 
Economics		Telugu 
Physics		Hindi 
Commerce		NSS & NCC 

CERTIFICATE

This is to certify that I have gone through the Green & Energy Policy of the college along with the Energy Audit report-2019-20 submitted by the Internal Energy Audit team of T.R.R.Government College, Kandukur, Prakasam District. The observations of the team and their appropriate recommendations made by the team are true and correct to the best of my knowledge. I sincerely appreciate the efforts made by the internal audit team in conducting the energy audit in their campus.

Kandukur,

20-03-2020


[T.MADHU BABU]
ASST EXECUTIVE ENGINEER
OPERATION SECTION
KANDUKUR: APCPDCL

Foreword:

The Internal Audit Team has prepared this report for the **Tikkavarapu Rami Reddy Government Degree College** located at Kovur Road, Kandukur, Prakasam District, Andhra Pradesh - 523105, India based on input data submitted by the College. The inputs of the college are derived by inspection and investigation. The details have been consolidated and thoroughly studied and analyzed to generate the report based on a comparative analysis of the existing facilities. The Green audit is a study based on the inspection and investigation of data collected over a period of time

Recommendations are made to convert the institution into an eco-friendly campus. The College Management can implement these recommendations based on the availability of funds in phased manner to move towards eco-friendly campus.

AKNOWLEDGEMENTS

The Internal Energy Audit Team thanks the Tikkavarapu Rami Reddy Government Degree College, Kandukur Prakasam District for assigning this valuable important work of Internal Energy Audit. We appreciate the cooperation extended to our team during the entire process.

Our special heartfelt thanks to the Chairperson of the entire process **Smt. D. Vijaya Sri** , Principal for her constant support and encouragement during the entire period of audit.

We thank all the teaching and non-teaching staff for their cooperation and support in successfully completing the Audit process. We also thank all the students of TRR Government Degree College for their help in enumerating the flora and fauna of the college.

We also thank all the persons who are directly and indirectly involved in the audit process for extending their full support in successful completion of this process.

-Internal Energy Audit Team

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INTRODUCTION:

TRR Government Degree College, since its inception in 1966, is catering the needs of rural poor students. Sri Thikkavarapu Rami Reddy garu, Sri. Chenchu Rama Naidu garu came forward to take up the noble task of establishing a college to cater to the needs of the rural students of Kandukur and surrounding mandals in the district. The college has celebrated its Golden Jubilee Celebrations in January 2017. Till to date, the college has been successful in shaping the student's character and their career. The college has illustrious Alumni in the form of Sri. I Y R. Krishna Rao, Former Chief Secretary, Govt. of Andhra Pradesh, Sri. Ganta Srinivasa Rao, Former Minister for Human Resource Development, Govt. of Andhra Pradesh , Professor. K. Veeraiah, Former Vice Chancellor, Vikrama Simhapuri University, Nellore along with many Teachers, Govt. Employees, Businessmen and Politicians.

OVERVIEW OF THE INSTITUTION

VISION

To develop the college into a Best Educational Center with adequate physical-digital infrastructure, effective governance, efficient teaching-learning process and student support services thereby transforming the students into Knowledgeable, Skilful, Employable, Responsible, Socially Committed, Environmentally Conscious, Gender Sensitive, Patriotic citizens with special emphasis on socially marginalized and economically poor students

MISSION

- ❖ To develop the college into a Best Higher Education Centre with diverse programs
- ❖ To provide adequate physical and digital infrastructure facilities
- ❖ To provide efficient governance through democratic, transparent, accountable, value based and eco-friendly approaches
- ❖ To create enabling academic environment for effective teaching-learning and assessment process and student support services with student centric approach
- ❖ To impart various soft skills, life skills and employability skills to the students
- ❖ To nurture the students, develop critical-creative thinking, scientific temper, problem solving approach, innovativeness, inclusiveness, patriotism, gender sensitivity, environmental consciousness and social service orientation.
- ❖ To support the faculty to enrich the knowledge and skills which shall be beneficial for their academic progress and the students

INTERNAL ENERGY AUDIT TEAM (2019-20)

1	Sri. D. Vijayasri (FAC PRINCIPAL) Lecturer in Physics Energy Audit Coordinator
2	Sri D. Krishna Kumar Lecturer in Physics
3	Ch. Suresh Kumar Energy Audit member Lecturer in Mathematics
4	Dr. M. Srinivas Reddy Lecturer in Chemistry
5	Dr. K.R. Shanmugam Lecturer in Zoology
6	Dr. Shaik Mastan Vali Lecturer in Botany
7	Sri Madhu Babu Assistant Engineer, Electricity Dept, Kandukur
8.	M. Sunil, N. III BSc (BZC)
9.	Shaik Hazeer Baba, II BSc (BZC)
10.	Kum.J.Neelima, I BSc (BZC)

Internal Energy Audit Committees:

The Energy Audit members will work under the guidance of the Principal and the IQAC Coordinator. The Energy Audit members are assigned different works. They form committees to make the work easy. The committees formed are as follows

(i) Committee on Energy Conservation & Energy Utilization

(ii) Committee on Clean and Alternative Renewable Energy

(iii) Drafting Committee

D. Vijayasri, Lecturer in Physics and Ch. Suresh Kumar, Lecturer in Mathematics will lead the Committee on Energy Conservation & Energy Utilization.

Sri D.Krishna Kumar, Lecturer in Physics and Dr. M. Srinivasa Reddy , Lecturer in Chemistry will lead the Committee on Clean and Alternative Renewable Energy.

Dr Shaik Mastan Vali, Lecturer in Botany and Dr. KR Shanmugam, Lecturer in Zoology will take part in drafting the energy audit report.

Report of the Committee on Energy Efficient Practices

The Committee on Energy Efficient Practices have observed the following energy efficient practices in the college. They are as follows :

- ❖ As planned earlier by the Committee, the awareness programs on energy conservation were conducted to sensitize the students.
- ❖ The sensitization of students and staff has yielded better results on energy conservation. The lights and fans in class rooms, laboratories, staff rooms and office are periodically checked daily when not in use and immediately taken care of.
- ❖ The committee has found that no class rooms/ office/ labs are found with tube lights fans ACs on without the persons in the room. Hence wastage of energy is nil.

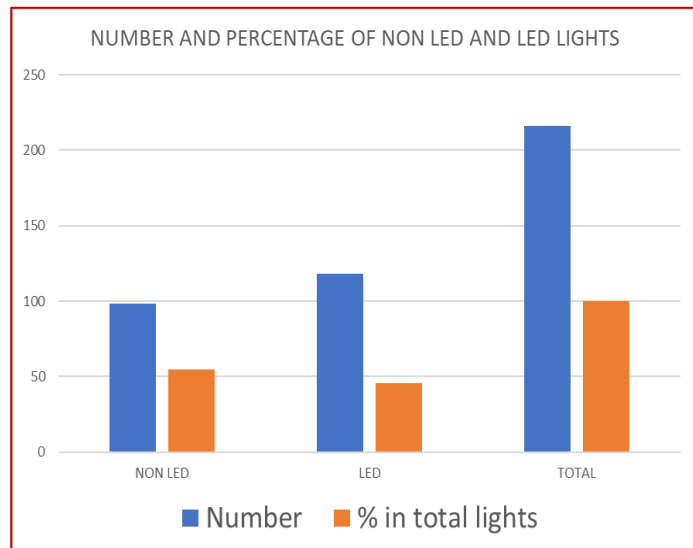
Report of the Committee on Energy Conservation and Energy utilization

The following are the observations made by the Committee on Energy Conservation and Energy Utilization in the college.

Lamps :

Types of lamps in the premises:

Lamp Type	Qty.
Non LED	98
LED	118
TOTAL	216



The committee observed that out of total 216 tube lights in the college, 118 were LEDs which occupy 54.63% of the total lights. The remaining 84 were Non LED tube lights which occupy 45.37% of the total lights. So more usage of LED tube lights means more energy conservation.

Alternative Energy Initiatives:

The College uses solar panels as an alternative source of energy at present.

Some of the Technical details of the solar energy are as follows:

- ❖ Company name : M/s: Wind Stream Technologies Pvt.Ltd., Hyderabad
- ❖ All the solar panels are in the premises only. Solar Grid Tied Power Plant is installed on the college roof top with a Capacity of 20 kilo watts.
- ❖ Number of solar photo voltaic modules - (315 Wp) & A total of 64 modules.
- ❖ Date of Installation: 28-09-2017
- ❖ Date of completion of work: 08-01-2018
- ❖ Cost of project: **Rs. 16,85,000**



Photograph of solar power panels on the roof top

Details of ID -Solar Energy production and supply to the Grid:

USCNO : 4511101001920
 ADDRESS : KANDUKUR
 SECTION : KDK TOWN
 NAME : TRR GOVT COLLEGE

MONTH (1)	TYP E (2)	OPRDG-IMP (3)	CLRDG- IMP (4)	IMP UNITS (5)	OPRDG- EXP (6)	CLRDG- EXP (7)	EXP UNITS (8)	NET UNITS (9)
Jan-20	KVH	10726	11686	960	5198	5697	499	0
Feb-20	KVH	11686	12634	948	5697	6104	407	0
Mar-20	KVH	12634	13514	880	6104	6658	554	0
Apr-20	KVH	13514	14620	1106	6658	7037	379	0
May-20	KVH	14620	15668	1048	7037	7999	962	0
Jun-20	KVH	15668	17087	1419	7999	8145	146	0
Jul-20	KVH	17087	17863	776	8145	9858	1713	-937
JuL-20	KVH	17863	19168	1305	9858	10744	886	0
Aug-20	KVH	19168	21608	2440	10744	10909	165	0
Sep-20	KVH	21608	23795	2187	10909	11240	331	0
Oct-20	KVH	23795	26065	2270	11240	11652	412	0
Nov-20	KVH	26065	27542	1477	11652	12957	1305	0
Dec-20	KVH	27542	28726	1184	12957	14281	1324	-140
TOTAL				18000			9083	1077

[Source: Admn.Officer, Electricity Department, Kandukur, Prakasam Dist.]

*In the above data furnished in the Table, which is supplied by the Asst Accounts Officer, ERO, Kandukur town, the fifth column indicates the **import units** which indicates the monthly consumption of electricity in a year. The eighth column indicates the **export units** which indicates the number of units of solar energy produced by the roof top solar panels. The last column indicates the **net units**, which indicates the supply of excess solar power transferred to the grid.*

Table showing the percentage of solar power transferred to the grid after meeting our college needs :

Month	Total power consumed	Solar power generated	Excess no. of Units of solar energy sent to the grid	% of Solar power transferred to the grid after our energy needs
January,2019	960	499	0	0
February,2019	948	407	0	0
March,2019	880	554	0	0
April,2019	1106	379	0	0
May,2019	1048	962	0	0
June,2019	1419	146	0	0
July,2019	776	1713	-937	54.69
July,2019	1305	886	0	0
August,2019	2440	165	0	0
September,2019	2187	331	0	0
October,2019	2270	412	0	0
November,2019	1477	1305	0	0
December,2019	1184	1324	-140	10.57
TOTAL	18000	9083	937	10.31

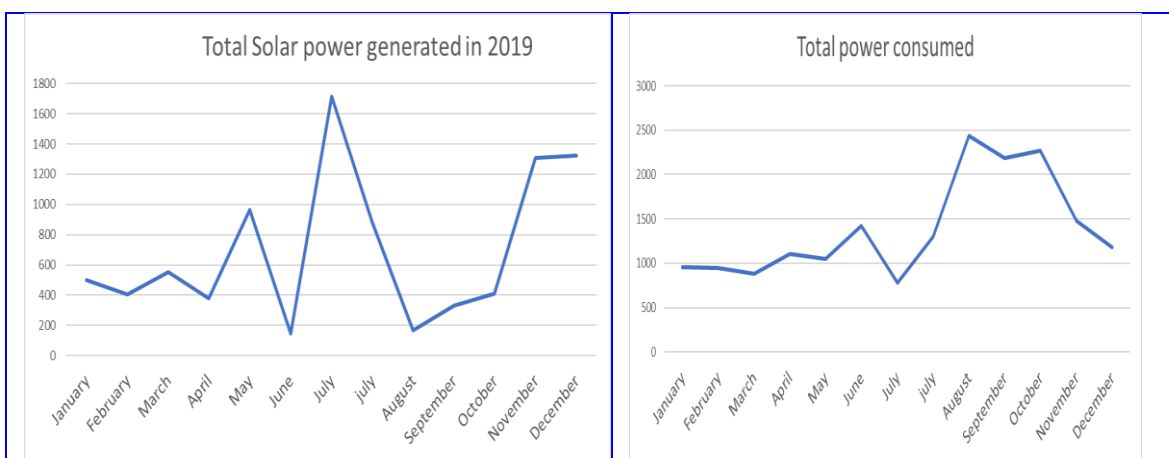
[Source: AO, Electricity Department, Kandukur, Prakasam Dist.]

From the above table it is observed that

- (i) The total quantity of solar power generated during Jan, 2019 to Dec, 2019 is **9083 Units**
- (ii) The total excess quantity of solar power transferred to the grid during July, 2019 and Dec, 2019 is **937 Units.**

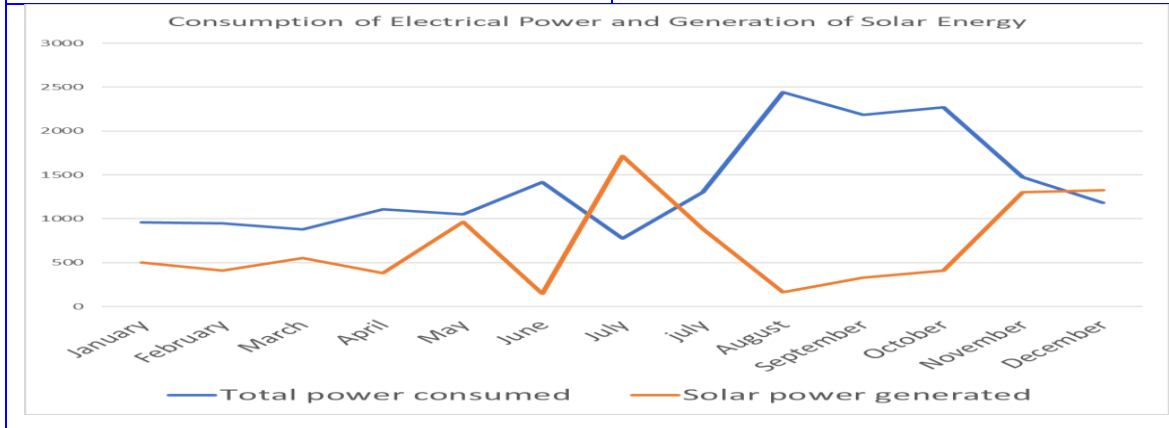
- (iii) Except for the months of July and December, during the other remaining ten months, the solar power generation is lower than the total electricity consumption in the college.
- (iv) The total percentage of solar power transferred to the grid is 10.31% of the total solar power generated in the college after our self consumption.
- (v) Due to monsoon effect, the production of solar power is low.
- (vi) The solar power production is found to be more in the months of July , and December 2019.

Graphical analysis of Solar power generation and total power consumption



Solar Power Generation during 2019

Power Consumption during 2019



Consumption of Electrical Power Vs. Solar Power generation

- (i) It is observed that the peak consumption of electrical power is seen in August and September months.
- (ii) The peak production of solar power generation is observed in the months of July, December and November.

Total Electricity Power consumption by the college during 2019 :

- ❖ From the above graph, it is very clear that the maximum electricity is consumed in the months of July August , September, October and November due to the more number of academic activities during these months.
- ❖ From the above graph, it is also clear that minimum consumption occurs in the months of June due to the summer vacation for the college

Solar Power Generation during 2019 :

From the graph it is clear that the solar energy production is more in the months of July November and December. Except these months the solar energy production doesn't match the energy consumption for the 2019 year.

Recommendations by the Internal Energy Audit Committee:

- More awareness programs should be planned to sensitize the students and staff so that the energy conservation should be done both with in and out side the campus.
- More Energy efficient electrical appliances should be procured.
- As Kandukur mandal receives plenty of sun light, the Solar Energy should be tapped in such a way that it meets the energy needs of the college but also it generates income to the college by selling the excess energy to the grid.
- Energy saved is energy produced. Energy wastage in the college should be arrested. Staff should monitor the wastage of power in the college.
- All the staff and students are sensitized in the energy conservation methods to be adopted in the college by creating awareness on the conservation of energy.
- The reasons for the low production of solar power even during hot summer months is to be traced out and effective measures should be taken to improve the out put of solar energy.

Power consumption and Solar Power production particulars from Electricity Dept

CONSUMPTION OF POWER AND SOLAR ENERGY GENERATION PARTICULARS FOR 2019

USCNO	:	4511101001920
ADDRESS	:	KANDUKURU
SECTION	:	KDK TOWN
NAME	:	TRR GOVT DEGREE COLLEGE

MONTH	TYPE	OPRDG-IMP	CLRDG-IMP	IMP UNITS	OPRDG-EXP	CLRDG-EXP	EXP UNITS	NET UNITS
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 ASST EXECUTIVE ENGINEER,
 OPERATION SECTION
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**T.R.R.GOVERNMENT DEGREE COLLEGE
KANDUKUR, PRAKASAM DIST.**



ENERGY AUDIT - 2020

**TRR GOVERNMENT DEGREE COLLEGE, KANDUKUR, PRAKASAM DT.
DEPARTMENT OF BOTANY**

Date: 21.10.2021

STAFF COUNCIL RESOLUTION

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2	Dr. P. Raj Gopal Babu, IQAC Co-ordinator, Lecturer in English
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4	N. Srinivasulu Energy Audit Member, Lecturer in Mathematics
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Principal
21/10/21
TRR GOVT. DEGREE COLLEGE
NAAC Accredited B
KANDUKUR-523 105. Prakasam Dt

CERTIFICATE

This is to certify that I have gone through the Energy Audit report-2020-21 submitted by the Internal Energy Audit team of T.R.R.Government College, Kandukur, Prakasam District. The report shows the detailed observations of team with appropriate recommendations and supporting calculations. The internal audit team has made a commendable job in conducting the energy audit in their campus. The data furnished in the report is correct to the best of my knowledge.

Kandukur,

26-03-2021


T.MADHU BABU
ASST EXECUTIVE ENGINEER
OPERATION SECTION
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INTRODUCTION:

TRR Government Degree College, since its inception in 1966, is catering the needs of rural poor students. Sri Thikkavarapu Rami Reddy garu, Sri. Chenchu Rama Naidu garu came forward to take up the noble task of establishing a college to cater to the needs of the rural students of Kandukur and surrounding mandals in the district. The college has celebrated its Golden Jubilee Celebrations in January 2017. Till to date, the college has been successful in shaping the student's character and their career. Caste, creed, and sex has never stood as barriers here. The college has illustrious Alumni in the form of Sri. I Y R. Krishna Rao, Former Chief Secretary, Govt. of Andhra Pradesh, Sri. Ganta Srinivasa Rao, Former Minister for Human Resource Development, Govt. of Andhra Pradesh , Professor. K. Veeraiah, Former Vice Chancellor, Vikrama Simhapuri University, Nellore along with many Teachers, Govt. Employees, Businessmen and Politicians.

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- ❖ To support the faculty to enrich the knowledge and skills which shall be beneficial for their academic progress and the students

- ❖ To collaborate with the stakeholders - Alumni, Industry, Community and Parents for holistic development of the college

ENERGY AUDIT TEAM (2020)

1	Dr. M. Ravi Kumar, Principal & Energy Audit Coordinator
2	Dr. P. Raj Gopal Babu, IQAC Co-ordinator, Lecturer in English
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Internal Energy Audit Committees:

The Energy Audit members will work under the guidance of the Principal and the IQAC Coordinator. The Energy Audit members are assigned different works. They form committees to make the work easy. The committees formed are as follows

- (i) *Committee on Energy Efficient Practices*
- (ii) *Committee on Energy Conservation and Energy Utilization*
- (iii) *Committee on Clean and Alternative Renewable Energy*
- (iv) *Internal Energy Audit Report Drafting Committee*

Dr. M. Ravi Kumar and N. Srinivasulu, Lecturer in Mathematics will lead the committee on energy efficient practices

Dir. M. Ravi Kumar, Principal TRR GDC, Kandukur, and Dr. N. Sri Hari, Lecturer in Physics will lead the committee on Energy Conservation and Energy Utilization

Dr. N.V.Srihari, Lecturer in Physics, Dr.Shaik Mastan Vali, Lecturer in Botany, and Dr. K. Jonah Phillip, Lecturer in Mathematics will lead the Committee on Clean and Alternative energy.

Dr. Ch. Shankar Rao, Lecturer in Economics and Dr P. Raj Gopal Babu will take part in drafting the energy audit report.

Report of the Committee on Energy Efficient Practices

The Committee on Energy Efficient Practices have observed the following energy efficient practices in the college. They are as follows :

- ❖ As planned earlier by the Committee, the awareness programs on energy conservation were conducted to sensitize the students.
- ❖ The sensitization of students and staff has yielded better results on energy conservation. The lights and fans in class rooms, laboratories, staff rooms and office are periodically checked daily when not in use and immediately taken care of.

- ❖ The committee has found that no class rooms/ office/ labs are found with tube lights fans ACs on without the persons in the room. Hence wastage of energy is nil.
- ❖ The over-flown water from the overhead tanks is monitored effectively with energy conserving sensor based gadgets like water overflow detecting sensor.
- ❖ Digital socket sensor used in hydroponic unit in Botany Dept, is found to be controlling the water flow periodically as per the requirement of the growth of the plants.

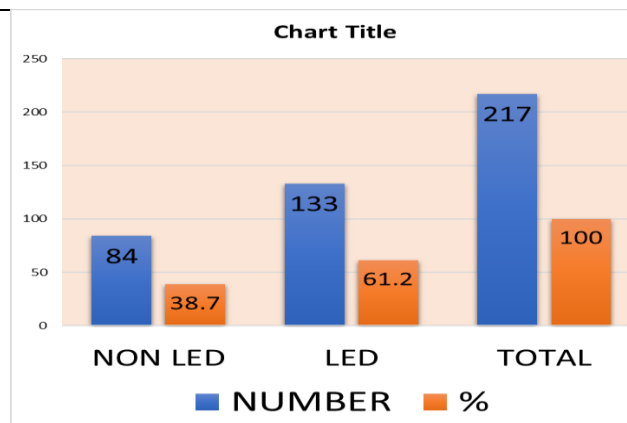
Report of the Committee on Energy Conservation and Energy utilization

The following are the observations made by the Committee on Energy Conservation and Energy Utilization in the college.

Power consumption by LED & Non-LED tubelights/ Ceiling Fans/ Computer systems/Other appliances etc.

LED & Non-LED Lamps :

Lamp Type	Qty.
Non LED	84
LED	133
TOTAL	217



The committee observed that out of a total 217 tube lights in the college, 133 were LEDs which occupy 61.3% of the total lamps. The remaining 84 were Non LED tube lights which occupy 38.7% of the total lamps. So more utilization of LEDs means more energy conservation.

CONSUMPTION OF POWER BY LED LAMPS

S. No.	No. of hours of consumption	No. of lamps consuming power during Jan 2020 to Dec 2020 (Expected)							Total no. of LED lamps
		365 days	280 days	220 days	180 days	160 days	90 days	60 days	
1	8hrs	4	0	0	0	0	0	0	4
2	6hrs	4	41	13	0	0	0	1	59
3	4hrs	0	0	8	0	0	0	0	8
4	3hrs	0	0	6	0	0	0	0	6
5	2hrs	0	0	0	1	4	0	0	5
6	1hr	0	1	1	0	0	0	0	2
Total :		8	42	28	1	4	0	1	84

Power Consumption by LED lamps (133 lamps) : 3580.16 units

(Calculation chart is given at the end of the Report)

CONSUMPTION OF POWER BY NON-LED LAMPS

S. No.	No. of hours of consumption	No. of lamps consuming power during Jan 2020 to Dec 2020 (Expected)							Total no. of Non-LED lamps
		365 days	280 days	220 days	180 days	160 days	90 days	60 days	
1	8hrs	18	0	0	0	0	0	0	18
2	6hrs	12	43	19	0	0	0	0	74
3	4hrs	0	01	09	0	0	17	0	27
4	3hrs	0	0	10	0	0	0	0	10
5	2hrs	0	0	0	01	0	0	01	02
6	1hr	0	01	01	0	0	0	0	02
Total :		30	45	39	01	00	17	01	133

Power Consumption by Non-LED lamps (84 lamps) : 4799 units

(Calculation chart is given at the end of the Report)

CONSUMPTION OF POWER BY CEILING FANS

S. No.	No. of hours of consumption	No. of Ceiling Fans consuming power during Jan 2020 to Dec 2020 (Expected)							Total No. of ceiling fans
		365 days	280 days	220 days	180 days	160 days	90 days	60 days	
1	8hrs	7	0	0	0	0	0	0	7
2	6hrs	2	58	26	0	0	0	0	86
3	4hrs	0	0	11	0	0	0	0	11
4	3hrs	0	0	9	0	0	12	0	21
5	2hrs	0	0	0	1	2	0	0	03
6	1hr	0	0	0	0	0	0	0	00
Total :		9	58	46	1	2	12	0	128

Power Consumption by Ceiling Fans (128 fans) : 8822 units

(Calculation chart is given at the end of the Report)

CONSUMPTION OF POWER BY COMPUTER SYSTEMS/LAPTOPS

S. No.	No. of hours of consumption	No. of Computer Systems/Laptops consuming power during Jan 2020 to Dec 2020 (Expected)							Total No. of ceiling fans
		365 days	280 days	220 days	180 days	160 days	90 days	60 days	
1	8hrs	3	0	35	0	0	0	0	43
2	6hrs	0	17	28	2	0	0	0	52
3	4hrs	0	1	20	7	0	0	0	27
Total :		3	20	90	9	0	0	0	122

Power Consumption by 122 Computer systems/laptops : 5798.5 units

(Calculation chart is given at the end of the Report)

ABSTRACT SHOWING THE POWER CONSUMPTION DURING 2020

S.No.	Electrical Appliance	Quantity	Power consumption (No.of Units)
1	Non LED Tube Lights	84	4799
2	LED Tube lights	133	3580
3	Ceiling Fans	128	8822
4	Computer systems/Laptops	122	5798
5	Other Appliances	NA	5749
Total Power consumption during 2020 (in Units) :			28747

Conservation of Electrical Energy during 2020 :

The expected total power consumption during 2020 (in Units)	28748
The actual total power consumption during 2020 (in Units) (Source: Electricity Dept, Kandukur)	12882
Difference in Units	15867

Result : College has conserved 15867 units of electrical energy

Report of the Committee on Clean and Alternative Renewable Energy

Alternative Energy Initiatives:

The College uses solar panels as an alternative source of energy at present.

Some of the Technical details of the solar energy are as follows:

- ❖ Company name : M/s: Wind Stream Technologies Pvt.Ltd., Hyderabad
- ❖ All the solar panels are in the premises only. Solar Grid Tied Power Plant is installed on the college roof top with a Capacity of 20 kilo watts.
- ❖ Number of solar photo voltaic modules - (315 Wp) & A total of 64 modules.
- ❖ Date of Installation: 28-09-2017
- ❖ Date of completion of work: 08-01-2018
- ❖ Cost of project: **Rs. 16,85,000**



Photograph of solar power panels on the roof top

Details of ID of Solar Plant and Solar Energy production and supply to the Grid:

USCNO : 4511101001920
 ADDRESS : KANDUKUR
 SECTION : KDK TOWN
 NAME : TRR GOVT COLLEGE

MONTH (1)	TYPE (2)	OPRDG-IMP (3)	CLRDG-IMP (4)	IMP UNITS (5)	OPRDG-EXP (6)	CLRDG-EXP (7)	EXP UNITS (8)	NET UNITS (9)
Jan-20	KVH	28726	29763	1037	14281	15559	1278	-241
Feb-20	KVH	29763	30488	725	15559	16843	1284	-559
Mar-20	KVH	30488	31483	995	16843	18331	1488	-493
Apr-20	KVH	31483	32435	952	18331	20434	2103	-1151
May-20	KVH	32435	33927	1492	20434	21143	709	0
Jun-20	KVH	33927	35409	1482	21143	21972	829	0
Jul-20	KVH	35409	37162	1753	21972	22651	679	0
Aug-20	KVH	37162	38277	1115	22651	24351	1700	-585
Sep-20	KVH	38277	38945	668	24351	26014	1663	-995
Oct-20	KVH	38945	39623	678	26014	27425	1411	-733
Nov-20	KVH	39623	40644	1021	27425	28187	762	0
Dec-20	KVH	40644	41608	964	28187	29273	1086	-122
TOTAL				12882			14992	4879

[Source: AO, Electricity Department, Kandukur, Prakasam Dt.]

In the above data in the Table, which is supplied by the Asst Accounts Officer, ERO, Kandukur town, the fifth column indicates the **import units** which indicates the monthly consumption of electricity in a year. The eighth column indicates the **export units** which indicates the number of units of solar energy produced by the roof top solar panels. The last column indicates the **net units**, which indicates the supply of excess solar power transferred to the grid.

**Table showing the percentage of solar power transferred to the Power grid
after meeting our college needs :**

Month	Total power consumed	Solar Power generated	Excess no. of Units of solar energy sent to the grid	% of Solar power transferred to the grid after meeting our energy needs
January,2020	1037	1278	241	18.87
February,2020	725	1284	559	43.51
March,2020	995	1488	493	33.13
April,2020	952	2103	1151	68.99
May,2020	1482	709	0	0
June,2020	1482	829	0	0
July,2020	1753	679	0	0
August,2020	1115	1700	585	34.41
September,2020	668	1663	995	59.83
October,2020	673	1411	733	51.94
November,2020	1021	762	0	0
December,2020	964	1086	122	11.23
TOTAL :	12882	14992	4879	32.5

[Source: AO, Electricity Department, Kandukur, Prakasam Dt.]

Observations from the above data:

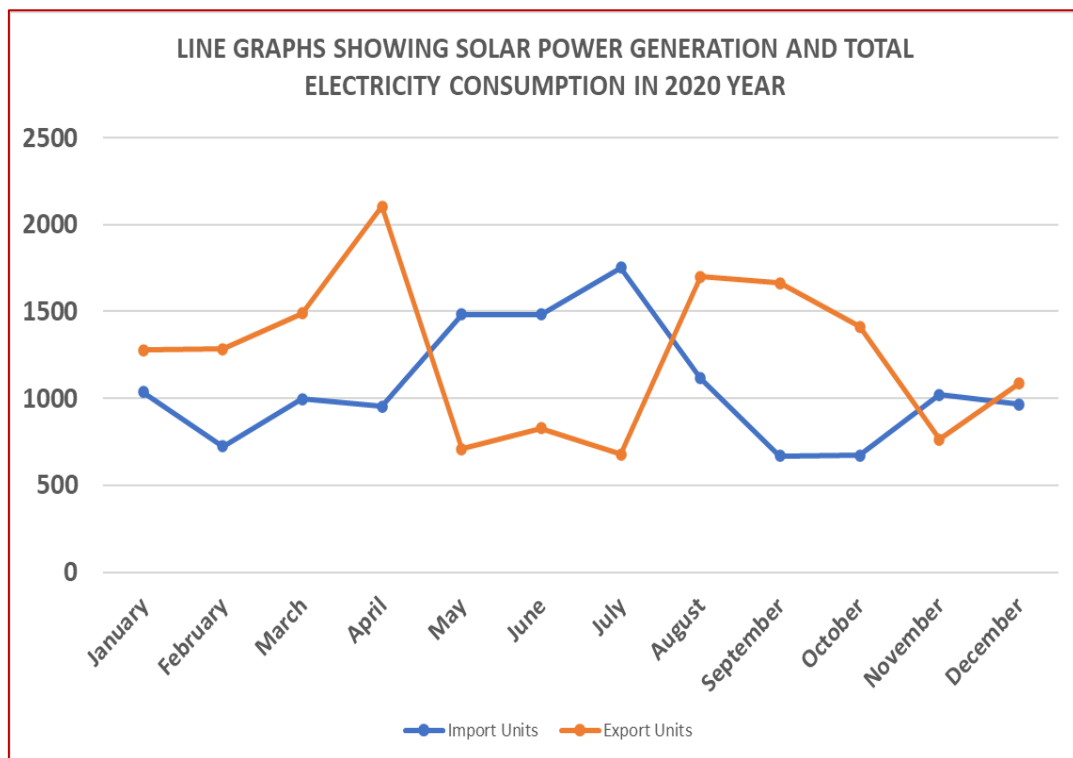
From the above table it is observed that

- (i) The total quantity of solar power generated during Jan, 2020 to Dec, 2020 is **14,992** Units
- (ii) The total excess quantity of solar power transferred to the grid during Jan, 2020 to Dec, 2020 is **4879** Units
- (iii) Except for the months of May, June, July and November in all the other remaining eight months, the solar power generation has exceeded the total

electricity consumption in the college.

- (iv) The total percentage of solar power transferred to the grid is **32.5%** of the total solar power generated in the college after our self consumption.
- (v) Due to monsoon effect, the production of solar power is low.
- (vi) The solar power plant has encountered some technical problem during the months of May, 2020 and November, 2020, which was later rectified.
- (vii) The solar power production is found to be more in the months of April, September and March 2020.

Graphical Analysis of Solar Power generation Vs. Total Power consumption in 2020



- ❖ From the above graph it is very clear that the maximum power consumption has occurred in the month of July followed by the June and May. During summer season, maximum power consumption is taking place.
- ❖ From the above graph it is also clear that minimum consumption occurs in the months of September and October. Power consumption during these months is less during Dasara vacation and semester exams.

- ❖ The maximum solar power generation is seen in the month of April. As sunlight is more abundant during this month, more solar energy is generated. Due to technical failure, enough solar power is not generated in the month of May.
- ❖ Solar energy generation is very low in the monsoon months of June and July.

Recommendations by the Internal Energy Audit committee:

1. More awareness programs should be planned to sensitize the students and staff such that the energy conservation should be done both within the campus and outside the campus
2. Solar flood lights should be used in the college premises and near the women's Hostel
3. More Energy efficient electrical appliances should be procured.
4. As Kandukur Mandal receives abundant sun light, Solar Energy utilisation should be extended in such a way that it not only meets the energy needs of the college but also generate income to the college
5. All the staff should follow *No-Vehicle Day* in the college at least once in a month.
6. Any technical issues in solar energy panels should be immediately attended to minimise the production loss.
7. Energy wastage in no case be tolerated. All the staff and students are sensitized on this issue.

Calculation charts:

Total Wattage = No of days X hours X Wattage X Number of appliances will give the total wattage of the electrical appliance used.

Power Consumption by Non LED Tube lights in Units-Calculations:

1. $365 \times 8 \times 40 \times 4 = 467200 = 467200/1000 = 467.2$ units
2. $365 \times 6 \times 40 \times 4 = 350400 = 350400/1000 = 350.4$ units
3. $280 \times 6 \times 40 \times 41 = 2755200 = 2755200/1000 = 2755$ units
4. $280 \times 1 \times 40 \times 1 = 11200 = 11200/1000 = 11.2$ units
5. $220 \times 6 \times 40 \times 13 = 686400 = 686400/1000 = 686.4$ units
6. $220 \times 4 \times 40 \times 8 = 281600 = 281600/1000 = 281.6$ units
7. $220 \times 3 \times 40 \times 6 = 158400 = 158400/1000 = 158.4$ units
8. $220 \times 1 \times 40 \times 1 = 8800 = 8800/1000 = 8.8$ units
9. $180 \times 2 \times 40 \times 1 = 14400 = 14400/1000 = 14.4$ units
10. $160 \times 2 \times 40 \times 4 = 51200 = 51200/1000 = 51.2$ units
11. $60 \times 6 \times 40 \times 1 = 14400 = 14400/1000 = 14.4$ units

Total No. of Units : = 4799 UNITS

Power Consumption by LED Tube lights in Units-Calculations:

1. $365 \times 8 \times 18 \times 18 = 946080 = 946080/1000 = 946.08$ units
2. $365 \times 6 \times 18 \times 12 = 473040 = 473040/1000 = 473$ units
3. $280 \times 6 \times 18 \times 43 = 1300320 = 1300320/1000 = 1300.32$ units
4. $280 \times 4 \times 18 \times 1 = 20160 = 20160/1000 = 20.16$ units
5. $280 \times 1 \times 18 \times 1 = 5040 = 5040/1000 = 5.04$ units
6. $220 \times 6 \times 18 \times 19 = 451440 = 451440/1000 = 451.44$ units
7. $220 \times 4 \times 18 \times 9 = 142560 = 142560/1000 = 142.56$ units
8. $220 \times 3 \times 18 \times 10 = 118800 = 118800/1000 = 118.80$ units
9. $220 \times 1 \times 18 \times 1 = 3960 = 3960/1000 = 3.96$ units
10. $180 \times 2 \times 18 \times 1 = 6480 = 6480/1000 = 6.48$ units
11. $90 \times 4 \times 18 \times 17 = 110160 = 110160/1000 = 110.160$ units
12. $60 \times 2 \times 18 \times 1 = 2160 = 2160/1000 = 2.16$ units

Total No. of Units : = 3580.16 units

Power Consumption by fans in Units-Calculations:

1. $365 \times 8 \times 50 \times 7 = 1022000 = 1022000/1000 = 1022$ units
2. $365 \times 6 \times 50 \times 2 = 219000 = 219000/1000 = 219$ units
3. $280 \times 6 \times 50 \times 58 = 4872000 = 4872000/1000 = 4872$ units
4. $220 \times 6 \times 50 \times 26 = 1716000 = 1716000/1000 = 1716$ units
5. $220 \times 4 \times 50 \times 11 = 484000 = 484000/1000 = 484$ units
6. $220 \times 3 \times 50 \times 9 = 297000 = 297000/1000 = 297$ units
7. $180 \times 2 \times 50 \times 1 = 18000 = 18000/1000 = 18$ units
8. $160 \times 2 \times 50 \times 2 = 32000 = 32000/1000 = 32$ units
9. $90 \times 3 \times 50 \times 12 = 162000 = 162000/1000 = 162$ units

Total No. of Units : = 8822.00 UNITS

Power Consumption by Computers/laptops in Units-Calculations:

1. $365 \times 6 \times 50 \times 3 = 328500 = 328500/1000 = 328.5$ units
2. $280 \times 4 \times 50 \times 4 = 224000 = 224000/1000 = 224.00$ units
3. $220 \times 6 \times 50 \times 40 = 2640000 = 2640000/1000 = 2640$ units
4. $220 \times 4 \times 50 \times 30 = 1320000 = 1320000/1000 = 1320$ units
5. $220 \times 2 \times 50 \times 20 = 440000 = 440000/1000 = 440$ units
6. $180 \times 4 \times 50 \times 2 = 72000 = 72000/1000 = 720$ units
7. $180 \times 2 \times 50 \times 7 = 12600 = 12600/1000 = 126$ units

Total No. of Units : = 5798.5 UNITS

Power Consumption by other electrical appliances in Units-Calculations:

Appliance	Calculation
Refrigerators – 2 Nos	1X365X200X24 = 73000 = 1752000/1000 = 1752 Units 1X 200X200X24 = 40000 = 960000/1000 = 960 Units
AC – 3Nos	3X 200 X 1500x2 = 1800000= 1800000/1000 = 1800 Units
LCD Projectors: 6 Nos	6X200X300X2 = 720000 = 720000/1000 = 720 Units
Printers 14 Nos	14X 200X50X0.5 = 70000 = 70000/1000 = 70 Units
Xerox Machines- 3 Nos	3X 30X200X0.5 = 9000 = 9000/1000 = 9 Units
CC Cameras- 13 Nos	13X5X365X24 = 438000 = 438000/1000 = 438 Units
Speakers 15 Nos	15X20X120X0.083 = 3000 = 3000/1000 = 3 Units
Total Consumption by the above electrical appliances = 5749 Units	

Photographs of solar power panels on the roof top



Particulars of Power consumption and solar power generation particulars for 2020 given by Electricity Department, Kandukur

CONSUMPTION OF POWER AND SOLAR ENERGY GENERATION PARTICULARS FOR 2020

USCNO	:	4511101001920
ADDRESS	:	KANDUKURU
SECTION	:	KDK TOWN
NAME	:	TRR GOVT DEGREE COLLEGE

MONTH	TYPE	OPRDG-IMP	CLRDG-IMP	IMP UNITS	OPRDG-EXP	CLRDG-EXP	EXP UNITS	NET UNITS
Jan-20	KVH	28726	29763	1037	14281	15559	1278	-241
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May-20	KVH	32435	33927	1492	20434	21143	709	0
Jun-20	KVH	33927	35409	1482	21143	21972	829	0
Jul-20	KVH	35409	37162	1753	21972	22651	679	0
Aug-20	KVH	37162	38277	1115	22651	24351	1700	-585
Sep-20	KVH	38277	38945	668	24351	26014	1663	-995
Oct-20	KVH	38945	39623	678	26014	27425	1411	-733
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			TOTAL :	12882			14992	4879


 ASST EXECUTIVE ENGINEER
 OPERATION SECTION
 (KANDUKUR: APCDCL)

**TRR GOVERNMENT DEGREE COLLEGE
KANDUKUR PRAKASAM DIST.**



**ENERGY AUDIT
2021**

**TRR GOVERNMENT DEGREE COLLEGE, KANDUKUR, PRAKASAM DT.
DEPARTMENT OF BOTANY**

Date: 21.01.2022

STAFF COUNCIL RESOLUTION

Staff council met today in the principal chamber and resolved following things. As a part of implementing the energy policy of our college, the college wishes to conduct Energy audit for the year 2021. For making this a reality and success the following staff members and students are selected for the energy audit committee

1	Dr. M. Ravi Kumar, Principal & Energy Audit Coordinator
2	Dr. P. Raj Gopal Babu, IQAC Co-ordinator, Lecturer in English
3	Dr. N.V.Srihari, Energy Audit member Lecturer in Physics
4	N. Srinivasulu Energy Audit Member, Lecturer in Mathematics
5	Dr. K. Jona Philip, Energy Audit Member, Lecturer in Mathematics
6	Dr. Shaik Mastan Vali Lecturer in Botany
7	Sri Madhu Babu Assistant Engineer, Dept of Electricity, Kandukur
8.	Sri.Vajreswara Rao, Technical Asst, Dept of Physics
9.	Kum. Lavanya III BSc (BZC)
10.	Kalyan III BSc (BZC)
11.	Kum. Kusuma II MPCS

The Energy audit members should coordinate with each other and form committees to speed up the energy audit process. The committee members should update the latest developments in their audit process to the Principal.


Principal
PRINCIPAL
T.R.R. GOVT. DEGREE COLLEGE
NAAC Accredited B
KANDUKUR-523 105, Prakasam Dt

CERTIFICATE

This is to certify that I have gone through the Energy Audit report- 2021-22 submitted by the Internal Energy Audit team of T.R.R.Government College, Kandukur, Prakasam District. The report shows the detailed observations of team with appropriate recommendations and supporting calculations. The internal audit team has made a commendable job in conducting the energy audit in their campus. The data furnished in the report is correct to the best of my knowledge.

Kandukur,

25-02-2022


T.MADHU BABU
ASST EXECUTIVE ENGINEER
OPERATION SECTION
KANDUKUR: APCDCL

Foreword:

The Internal Audit Team has prepared this report for the **Tikkavarapu Rami Reddy Government Degree College** located at Kovur Road, Kandukur, Prakasam District, Andhra Pradesh - 523105, India based on input data submitted by the College. The inputs of the college are derived by inspection and investigation. The details have been consolidated and thoroughly studied and analyzed to generate the report based on a comparative analysis of the existing facilities. The Green audit is a study based on the inspection and investigation of data collected over a period of time

Recommendations are made to convert the institution into an eco-friendly campus. The College Management can implement these recommendations based on the availability of funds in phased manner to move towards eco-friendly campus.

AKNOWLEDGEMENTS

The Internal Energy Audit Team thanks the Tikkavarapu Rami Reddy Government Degree College, Kandukur Prakasam District for assigning this valuable important work of Internal Energy Audit. We appreciate the cooperation extended to our team during the entire process.

Our special heartfelt thanks to the Chairperson of the entire process **Dr.M.Ravi Kumar**, Principal for his constant support and encouragement during the entire period of audit.

We thank all the teaching and non-teaching staff for their cooperation and support in successfully completing the Audit process. We also thank all the students of TRR Government Degree College for their help in enumerating the flora and fauna of the college.

We also thank all the persons who are directly and indirectly involved in the audit process for extending their full support in successful completion of this process.

-Internal Energy Audit Team

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2	Internal Energy Audit Team	47
3	Internal Energy Audit Committees	48
4	Reports of Energy Audit Committees	48-57
5	Recommendations of the Internal Audit Team	58
6	Appendix-1 (Calculation charts)	59-62
7	Digital Electrical appliances	63-64

INTRODUCTION:

TRR Government Degree College, since its inception in 1966, is catering the needs of rural poor students. Sri Thikkavarapu Rami Reddy garu, Sri. Chenchu Rama Naidu garu came forward to take up the noble task of establishing a college to cater to the needs of the rural students of Kandukur and surrounding mandals in the district. The college has celebrated its Golden Jubilee Celebrations in January 2017. Till to date, the college has been successful in shaping the student's character and their career. Caste, creed, and sex has never stood as barriers here. The college has illustrious Alumni in the form of Sri. I Y R. Krishna Rao, Former Chief Secretary, Govt. of Andhra Pradesh, Sri. Ganta Srinivasa Rao, Former Minister for Human Resource Development, Govt. of Andhra Pradesh , Professor. K. Veeraiah, Former Vice Chancellor, Vikrama Simhapuri University, Nellore along with many Teachers, Govt. Employees, Businessmen and Politicians.

OVERVIEW OF THE INSTITUTION

VISION

To develop the college into a Best Educational Center with adequate physical-digital infrastructure, effective governance, efficient teaching-learning process and student support services thereby transforming the students into Knowledgeable, Skilful, Employable, Responsible, Socially Committed, Environmentally Conscious, Gender Sensitive, Patriotic citizens with special emphasis on socially marginalized and economically poor students

MISSION

- ❖ To develop the college into a Best Higher Education Centre with diverse programs
- ❖ To provide adequate physical and digital infrastructure facilities
- ❖ To provide efficient governance through democratic, transparent, accountable, value based and eco-friendly approaches
- ❖ To create enabling academic environment for effective teaching-learning and assessment process and student support services with student centric approach
- ❖ To impart various soft skills, life skills and employability skills to the students
- ❖ To nurture the students, develop critical-creative thinking, scientific temper, problem solving approach, innovativeness, inclusiveness, patriotism, gender sensitivity, environmental consciousness and social service orientation.
- ❖ To support the faculty to enrich the knowledge and skills which shall be beneficial for their academic progress and the students
- ❖ To collaborate with the stakeholders - Alumni, Industry, Community and Parents for holistic development of the college

ENERGY AUDIT TEAM (2021)

1	Dr. M. Ravi Kumar, Principal & Energy Audit Coordinator
2	Dr. P. Raj Gopal Babu, IQAC Co-ordinator, Lecturer in English
3	Dr. N.V.Srihari, Energy Audit member Lecturer in Physics
4	Sri N. Srinivasulu Energy Audit Member, Lecturer in Mathematics
5	Dr. K. Jona Philip, Energy Audit Member, Lecturer in Mathematics
6	Dr. Shaik Mastan Vali Lecturer in Botany
7	Sri Madhu Babu Assistant Engineer, Dept of Electricity, Kandukur
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9.	Kum. Lavanya III BSc (BZC)
10.	Kalyan III BSc (BZC)
11.	Kum Kusuma II BSc MPCS

Internal Energy Audit Committees-2022:

The Energy Audit members will work under the guidance of the Principal and the IQAC Coordinator. The Energy Audit members are assigned different works. They form committees to make the work easy. The committees formed are as follows

- (i) Committee on Energy Efficient Practices*
- (ii) Committee on Energy Conservation and Energy Utilization*
- (iii) Committee on Clean and Alternative Renewable Energy*
- (iv) Internal Energy Audit Report Drafting Committee*

Dr. M. Ravi Kumar and N. Srinivasulu, Lecturer in Mathematics will lead the committee on energy efficient practices

Dir. M. Ravi Kumar, Principal, TRR GDC, Kandukur, and Dr. N. Sri Hari, Lecturer in Physics will lead the committee on Energy Conservation and Energy Utilization

Dr. N.V.Srihari, Lecturer in Physics, Dr.Shaik Mastan Vali, Lecturer in Botany, and Dr. K. Jonah Phillip, Lecturer in Mathematics will lead the Committee on Clean and Alternative energy.

Dr. Ch. Shankar Rao, Lecturer in Economics and Dr P. Raj Gopal Babu will take part in drafting the energy audit report.

Report of the Committee on Energy Efficient Practices

The Committee on Energy Efficient Practices have observed the following energy efficient practices in the college. They are as follows :

- ❖ As planned earlier by the Committee, the awareness programs on energy conservation were conducted to sensitize the students.
- ❖ The sensitization of students and staff has yielded better results on energy conservation. The lights and fans in class rooms, laboratories, staff rooms and office are periodically checked daily when not in use and immediately taken care of.

- ❖ The committee has found that no class rooms/ office/ labs are found with tube lights fans ACs on without the persons in the room. Hence wastage of energy is nil.
- ❖ The over-flown water from the overhead tanks is monitored effectively with energy conserving sensor based gadgets like water overflow detecting sensor.
- ❖ Digital socket sensor used in hydroponic unit in Botany Dept, is found to be controlling the water flow periodically as per the requirement of the growth of the plants.

Report of the Committee on Energy Conservation and Energy utilization

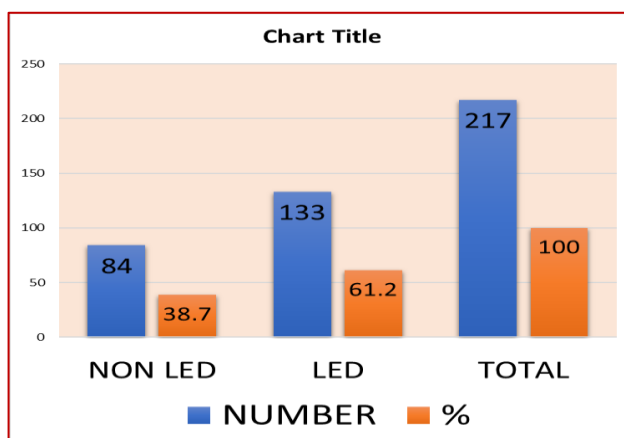
The following are the observations made by the Committee on Energy Conservation and Energy Utilization in the college.

Power consumption by LED & Non-LED tubelights/ Ceiling Fans/ Computer systems/Other appliances etc.

LED & Non-LED Lamps :

Types of lamps in the premises:

Lamp Type	Number
Non LED	84
LED	133
TOTAL	217



The committee observed that out of a total 217 tube lights in the college, 133 are LEDs, which occupy 61.3% of the total lamps. The remaining 84 were Non LED tube lights, which occupy 38.7% of the total lamps. So more usage of LEDs means more energy conservation.

CONSUMPTION OF POWER BY LED LAMPS

S. No.	No. of hours of consumption	No. of lamps consuming power during Jan 2020 to Dec 2021 (Expected)							Total no. of LED lamps
		365 days	280 days	220 days	180 days	160 days	90 days	60 days	
1	8hrs	4	0	0	0	0	0	0	4
2	6hrs	4	41	13	0	0	0	1	59
3	4hrs	0	0	8	0	0	0	0	8
4	3hrs	0	0	6	0	0	0	0	6
5	2hrs	0	0	0	1	4	0	0	5
6	1hr	0	1	1	0	0	0	0	2
Total :		8	42	28	1	4	0	1	84

Power Consumption by LED lamps (133 lamps) : 3580.16 units

(Calculation chart is given at the end of the Report)

CONSUMPTION OF POWER BY NON-LED LAMPS

S. No.	No. of hours of consumption	No. of lamps consuming power during Jan 2020 to Dec 2020 (Expected)							Total no. of Non-LED lamps
		365 days	280 days	220 days	180 days	160 days	90 days	60 days	
1	8hrs	18	0	0	0	0	0	0	18
2	6hrs	12	43	19	0	0	0	0	74
3	4hrs	0	01	09	0	0	17	0	27
4	3hrs	0	0	10	0	0	0	0	10
5	2hrs	0	0	0	01	0	0	01	02
6	1hr	0	01	01	0	0	0	0	02
Total :		30	45	39	01	00	17	01	133

Power Consumption by Non-LED lamps (84 lamps) : 4799 units

(Calculation chart is given at the end of the Report)

CONSUMPTION OF POWER BY CEILING FANS

S. No.	No. of hours of consumption	No. of Ceiling Fans consuming power during Jan 2020 to Dec 2020 (Expected)							Total No. of ceiling fans
		365 days	280 days	220 days	180 days	160 days	90 days	60 days	
1	8hrs	7	0	0	0	0	0	0	7
2	6hrs	2	58	26	0	0	0	0	86
3	4hrs	0	0	11	0	0	0	0	11
4	3hrs	0	0	9	0	0	12	0	21
5	2hrs	0	0	0	1	2	0	0	03
6	1hr	0	0	0	0	0	0	0	00
Total :		9	58	46	1	2	12	0	128

Power Consumption by Ceiling Fans (128 fans) : 8822 units

(Calculation chart is given at the end of the Report)

CONSUMPTION OF POWER BY COMPUTER SYSTEMS/LAPTOPS

S. No.	No. of hours of consumption	No. of Computer Systems/Laptops consuming power during Jan 2020 to Dec 2020 (Expected)							Total No. of ceiling fans
		365 days	280 days	220 days	180 days	160 days	90 days	60 days	
1	8hrs	3	0	35	0	0	0	0	43
2	6hrs	0	17	28	2	0	0	0	52
3	4hrs	0	1	20	7	0	0	0	27
Total :		3	20	90	9	0	0	0	122

Power Consumption by 122 Computer systems/laptops : 5798.5 units

(Calculation chart is given at the end of the Report)

ABSTRACT SHOWING THE POWER CONSUMPTION DURING 2020

S.No.	Electrical Appliance	Quantity	Power consumption (No.of Units)
1	Non LED Tube Lights	84	4799
2	LED Tube lights	133	3580
3	Ceiling Fans	128	8822
4	Computer systems/Laptops	122	5798
5	Other Appliances	NA	5749
Total Power consumption during 2020 (in Units) :			28747

Conservation of Electrical Energy during 2020 :

The expected total power consumption during 2020 (in Units)	28748
The actual total power consumption during 2020 (in Units) (Source: Electricity Dept, Kandukur)	25698
Difference in Units	5749

Result : College has conserved 15867 units of electrical energy

Report of the Committee on Clean and Alternative Renewable Energy

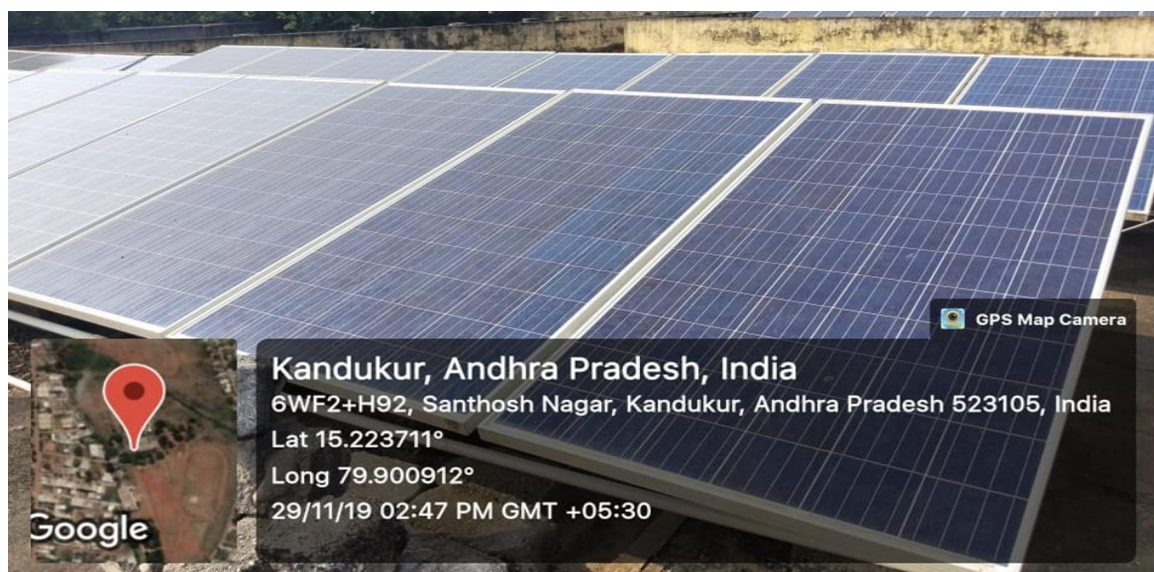
Alternative Energy Initiatives:

The College uses solar panels as an alternative source of energy at present.

Some of the Technical details of the solar energy are as follows:

- ❖ Company name : M/s: Wind Stream Technologies Pvt.Ltd., Hyderabad
- ❖ All the solar panels are in the premises only. Solar Grid Tied Power Plant is installed on the college roof top with a Capacity of 20 kilo watts.
- ❖ Number of solar photo voltaic modules - (315 Wp) & A total of 64 modules.
- ❖ Date of Installation: 28-09-2017
- ❖ Date of completion of work: 08-01-2018
- ❖ Cost of project: **Rs. 16,85,000**

Photograph of solar power panels on the roof top



Details of ID of Solar Plant and Solar Energy production and supply to the Grid:

USCNO : 4511101001920
 ADDRESS : KANDUKUR
 SECTION : KDK TOWN
 NAME : TRR GOVT COLLEGE

MONTH (1)	TYPE (2)	OPRDG-IMP (3)	CLRDG-IMP (4)	IMP UNITS (5)	OPRDG-EXP (6)	CLRDG-EXP (7)	EXP UNITS (8)	NET UNITS (9)
Jan-21	KVH	41608	42435	827	29273	30755	1482	-655
Feb-21	KVH	42435	43369	934	30755	32301	1546	-612
Mar-21	KVH	43369	44455	1086	32301	33396	1095	-9
Apr-21	KVH	44455	47512	3057	33396	33396	0	0
May-21	KVH	47512	50705	3193	33396	33396	0	0
Jun-21	KVH	50705	53385	2680	33396	33396	0	0
Jul-21	KVH	53385	55576	2191	33396	33758	362	0
Aug-21	KVH	55576	58188	2612	33758	34047	289	0
Sep-21	KVH	58188	60463	2275	34047	34859	812	0
Oct-21	KVH	60463	62687	2224	34859	35515	656	0
Nov-21	KVH	62687	65512	2825	35515	35515	0	0
Dec-21	KVH	65512	67306	1794	35515	36049	534	0

[Source: AO, Electricity Department, Kandukur, Prakasam Dt.]

In the above data in the Table, which is supplied by the Asst Accounts Officer, ERO, Kandukur town, the fifth column indicates the **import units** which indicates the monthly consumption of electricity in a year. The eighth column indicates the **export units** which indicates the number of units of solar energy produced by the roof top solar panels. The last column indicates the **net units**, which indicates the supply of excess solar power transferred to the grid.

Table showing the percentage of solar power transferred to the Power grid after meeting our college needs :

Month	Total power consumed	Solar Power generated	Excess no. of Units of solar energy sent to the grid	% of Solar power transferred to the grid after meeting our energy needs
January,2021	827	1482	-655	44.19
February,2021	934	1546	-612	39.58
March,2021	1086	1095	-9	0.821
April,2021	3057	0	0	0
May,2021	3193	0	0	0
June,2021	2680	0	0	0
July,2021	2191	362	0	0
August,2021	2612	289	0	0
September,2021	2275	812	0	0
October,2021	2224	656	0	0
November,2021	2825	0	0	0
December,2021	1794	534	0	0
TOTAL :	25698	6776	1268	18.71%

[Source: AO, Electricity Department, Kandukur, Prakasam Dist.]

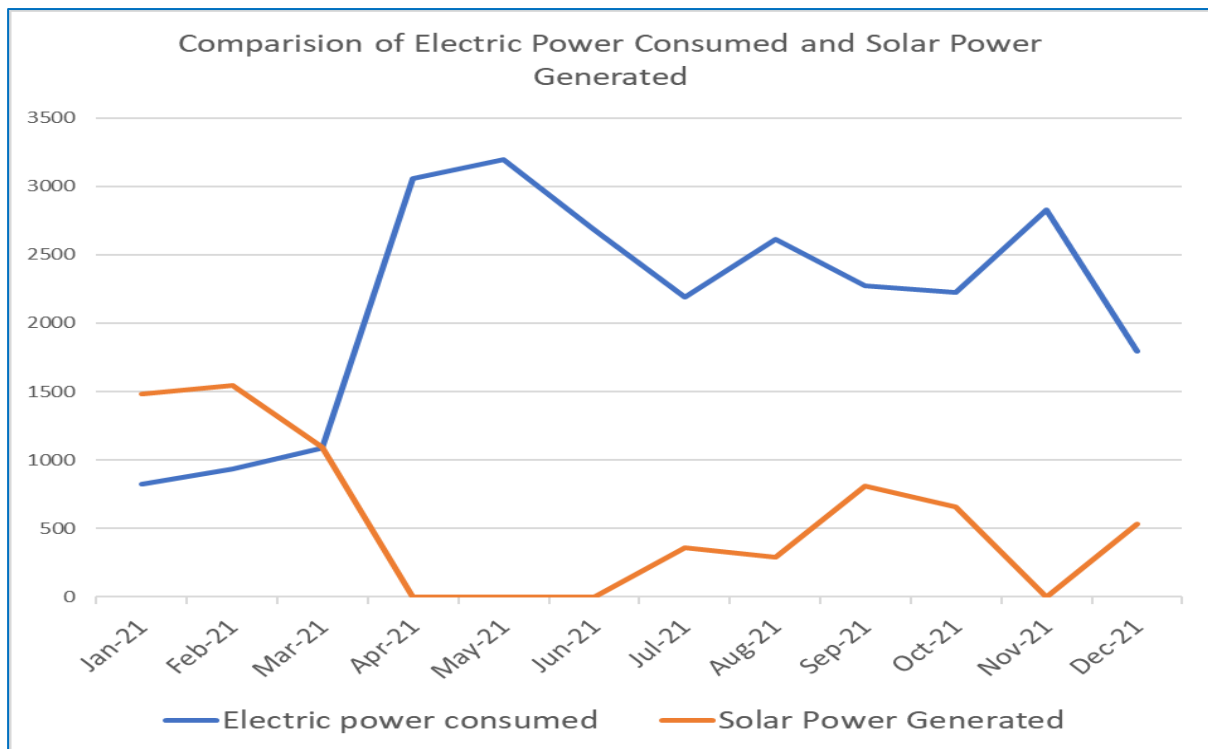
Observations from the above data:

From the above table it is observed that

- (i) It is noticed that Power consumption during the year 2021 (25698 units) has become doubled compared to the previous year 2020 (12882) units. This is attributed to the maximum utilization of the electrical and electronic items like Ceiling fans, ACs, computer systems, printers, Xerox machines and lab equipment.

- (ii) The total quantity of solar power generated during Jan, 2021 to Dec, 2021 is 6776 Units
- (iii) The total excess quantity of solar power transferred to the power grid during Jan. 2021 and Feb. 2021 is 1268 Units
- (iv) Except for the months of January and February in all the other remaining eight months, the solar power generation is lower than the total electricity consumption in the college. It is due to the technical failure occurred in functioning of solar panels.
- (v) The total percentage of solar power transferred to the grid is 18.71% of the total solar power generated.
- (vi) Due to monsoon effect, the production of solar power is low.
- (vii) The solar power production is found to be maximum during the months of January and February, 2021.

Graphical analysis of Solar power generation and total power consumption in 2021:



Total consumption of electric power and total solar power generated in the college during 2021 is shown in the above graph.

- (i) It is observed that, there is a steep increase in the consumption of electric power during the months of April, May, June and August and November. Usage of ceiling fans, ACs, Computer systems and Printers may be the main reason for this.
- (ii) The least energy consumption is noticed in the winter months of January ,February and March, where the Pongal holidays accompanied by the less usage of electrical appliances may be the reason for the less consumption of energy.
- (iii) From the above graph it is very clear that the higher consumption of electricity is observed in the months of May followed by April. It is justified that these months are the hottest in Kandukur Mandal. Maximum power utilization occurs in these months.
- (iv) From the above graph it is also clear that minimum consumption is noticed in the months of January and February. Winter accompanied by the Pongal vacation and semester exams may be the reason for less electricity consumption in these months.
- (v) The above graph gives the information regarding monthly generation of solar energy in the year 2021. The first two months of the year produced the excess solar power compared to the consumption of the same months(January and February).
- (vi) Except for January February and March during all the other months, solar power generation is nil. Some technical problem in the solar panels has occurred and this is the reason for the zero production of solar power during these months.

Recommendations by the Internal Energy Audit committee

1. More awareness programs should be planned to sensitize the students and staff such that the energy conservation should be done both with in the campus and out side the campus
2. Solar flood lights should be used in the college premises and near the women's Hostel
3. More Energy efficient electrical appliances should be procured.
4. As Kandukur Mandal receives abundant sun light , Solar Energy utilisation should be extended in such a way that it not only meets the energy needs of the college but also generate income to the college
5. The main reason for fall in solar power generation during 2021 when compared to the previous year, is due to the technical problem occurred in solar panels. Late notice of the problem in solar panels led to the poor generation of solar power. So the problem should be immediately attended to minimize the production loss.
6. All the staff should follow *No-Vehicle Day* in the college atleast once in a month.
7. Any technical issues in solar energy panels should be immediately attended to minimise the production loss.
8. Energy wastage in no case be tolerated. All the staff and students are sensitized on this issue.
9. To conserve energy all the staff should choose the public transport or Car Pooling or Bi-cycles.
10. All the staff should follow No Vehicle Day in the college atleast once in a month.
11. Energy saved is energy produced. Energy wastage in no case be tolerated. All the staff and students are sensitized on this issue.

Calculation charts:

Total Wattage = No of days X hours X Wattage X Number of appliances will give the total wattage of the electrical appliance used.

Power Consumption by Non LED Tube lights in Units-Calculations:

1. $365 \times 8 \times 40 \times 4 = 467200 = 467200/1000 = 467.2$ units
2. $365 \times 6 \times 40 \times 4 = 350400 = 350400/1000 = 350.4$ units
3. $280 \times 6 \times 40 \times 41 = 2755200 = 2755200/1000 = 2755$ units
4. $280 \times 1 \times 40 \times 1 = 11200 = 11200/1000 = 11.2$ units
5. $220 \times 6 \times 40 \times 13 = 686400 = 686400/1000 = 686.4$ units
6. $220 \times 4 \times 40 \times 8 = 281600 = 281600/1000 = 281.6$ units
7. $220 \times 3 \times 40 \times 6 = 158400 = 158400/1000 = 158.4$ units
8. $220 \times 1 \times 40 \times 1 = 8800 = 8800/1000 = 8.8$ units
9. $180 \times 2 \times 40 \times 1 = 14400 = 14400/1000 = 14.4$ units
10. $160 \times 2 \times 40 \times 4 = 51200 = 51200/1000 = 51.2$ units
11. $60 \times 6 \times 40 \times 1 = 14400 = 14400/1000 = 14.4$ units

Total No. of Units : = 4799 UNITS

Power Consumption by LED Tube lights in Units-Calculations:

1. $365 \times 8 \times 18 \times 18 = 946080 = 946080/1000 = 946.08$ units
2. $365 \times 6 \times 18 \times 12 = 473040 = 473040/1000 = 473$ units
3. $280 \times 6 \times 18 \times 43 = 1300320 = 1300320/1000 = 1300.32$ units
4. $280 \times 4 \times 18 \times 1 = 20160 = 20160/1000 = 20.16$ units
5. $280 \times 1 \times 18 \times 1 = 5040 = 5040/1000 = 5.04$ units
6. $220 \times 6 \times 18 \times 19 = 451440 = 451440/1000 = 451.44$ units
7. $220 \times 4 \times 18 \times 9 = 142560 = 142560/1000 = 142.56$ units
8. $220 \times 3 \times 18 \times 10 = 118800 = 118800/1000 = 118.80$ units
9. $220 \times 1 \times 18 \times 1 = 3960 = 3960/1000 = 3.96$ units
10. $180 \times 2 \times 18 \times 1 = 6480 = 6480/1000 = 6.48$ units
11. $90 \times 4 \times 18 \times 17 = 110160 = 110160/1000 = 110.160$ units
12. $60 \times 2 \times 18 \times 1 = 2160 = 2160/1000 = 2.16$ units

Total No. of Units : = 3580.16 UNITS

Power Consumption by ceiling fans in Units-Calculations:

1. $365 \times 8 \times 50 \times 7 = 1022000 = 1022000/1000 = 1022$ units
2. $365 \times 6 \times 50 \times 2 = 219000 = 219000/1000 = 219$ units
3. $280 \times 6 \times 50 \times 58 = 4872000 = 4872000/1000 = 4872$ units
4. $220 \times 6 \times 50 \times 26 = 1716000 = 1716000/1000 = 1716$ units
5. $220 \times 4 \times 50 \times 11 = 484000 = 484000/1000 = 484$ units
6. $220 \times 3 \times 50 \times 9 = 297000 = 297000/1000 = 297$ units
7. $180 \times 2 \times 50 \times 1 = 18000 = 18000/1000 = 18$ units
8. $160 \times 2 \times 50 \times 2 = 32000 = 32000/1000 = 32$ units
9. $90 \times 3 \times 50 \times 12 = 162000 = 162000/1000 = 162$ units

Total No. of Units : = 8822 UNITS

Power Consumption by Computers/laptops in Units-Calculations:

1. $365 \times 6 \times 50 \times 3 = 328500 = 328500/1000 = 328.5$ units
2. $280 \times 4 \times 50 \times 4 = 224000 = 224000/1000 = 224.0$ units
3. $220 \times 6 \times 50 \times 40 = 2640000 = 2640000/1000 = 2640$ units
4. $220 \times 4 \times 50 \times 30 = 1320000 = 1320000/1000 = 1320$ units
5. $220 \times 2 \times 50 \times 20 = 440000 = 440000/1000 = 440$ units
6. $180 \times 4 \times 50 \times 2 = 72000 = 72000/1000 = 720$ units
7. $180 \times 2 \times 50 \times 7 = 12600 = 12600/1000 = 126$ units

Total No. of Units : = 5798.5 UNITS

Power Consumption by other electrical appliances in Units-Calculations:

Electrical Appliance	Calculation
Refrigerators – 2 Nos	1X365X200X24 = 73000 = 1752000/1000 = 1752 Units 1X 200X200X24 = 40000 = 960000/1000 = 960 Units
AC – 3Nos	3X 200 X 1500x2 = 1800000= 1800000/1000 = 1800 Units
LCD Projectors: 6 Nos	6X200X300X2 = 720000 = 720000/1000 = 720 Units
Printers 14 Nos	14X 200X50X0.5 = 70000 = 70000/1000 = 70 Units
Xerox Machines- 3 Nos	3X 30X200X0.5 = 9000 = 9000/1000 = 9 Units
CC Cameras- 13 Nos	13X5X365X24 = 438000 = 438000/1000 = 438 Units
Speakers 15 Nos	15X20X120X0.083 = 3000 = 3000/1000 = 3 Units
Total Consumption by the above electrical appliances = 5749 Units	

Particulars of Power consumption and solar power generation particulars for 2020 given by Electricity Department, Kandukur

CONSUMPTION OF POWER AND SOLAR ENERGY GENERATION PARTICULARS FOR 2021

USCNO	:	4511101001920
ADDRESS	:	KANDUKURU
SECTION	:	KDK TOWN
NAME	:	TRR GOVT DEGREE COLLEGE

MONTH	TYPE	OPRDG-IMP	CLRDG-IMP	IMP UNITS	OPRDG-EXP	CLRDG-EXP	EXP UNITS	NET UNITS
Jan-21	KVH	41608	42435	827	29273	30755	1482	-655
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Apr-21	KVH	44455	47512	3057	33396	33396	0	0
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Nov-21	KVH	62687	65512	2825	35515	35515	0	0
Dec-21	KVH	65512	67306	1794	35515	36049	534	0
			TOTAL :	25698			6776	1276

M
ASST EXECUTIVE ENGINEER
OPERATION SECTION
KANDUKUR: APCPDCL

Water level controller



Water level controller, which is sensor based, is being used for one water tank, which is interconnected to three more tanks located on the roof top. This device arrests excess water flow. With this we are able to minimize the waste of water caused due to the over flowing of water.

Digital Socket Timer



Two digital socket timer are used for NFT model and Dutch Bucket Model of Hydroponics in Botany lab to conserve the electric power. Digital socket timers are used to control the flow of water periodically for hydroponics experiments. Circulation of nutrient solution is very important aspect of Hydroponic experiments. As the college working hours is 10.00 am to 5.00 pm, the question of circulating the nutrient solution through submersive motor pumps from 5.00 pm to 10.00 am arises. If we continuously switch on the motors, continuous circulation of nutritive solution may occurs at the cost of energy. So to solve this, the college has adopted the technology of digital socket timer, in which the time of water circulation to the plants of hydroponic units is controlled.

**Bills for the purchase of LED
lamps and other Digital
Electrical Appliances**

GSTIN : 37GVHPK1029K1ZC

Cell : 9640690583

9398143124

RAJASEKHAR KONAMKI

Opp: panchayathiraj Office, KANDUKUR, Prakasam Dt, A.P.

TAX INVOICE

Name: Principal
 Address: T.R.R. Govt. Degree College
Kovvur Road, Kandukur
 GSTIN:
 Cell:

Invoice No : **11**
 Invoice Date : **7.1.2019**
 State : **AP**
 State Code : **37**

SI No	Description of work	HSN Code	UOM	Qty	Rate	Amount
1.	LED Tubelights (Philko)			106	400/-	42400=00
2.	Ceiling Fans (Crompton)			10	1950/-	19500=00
3.	Fan Regulators			10	450/-	4500=00
4.	switch Boards			30	350/-	10500=00
5.	Switches			160	29/-	4640=00
6.	2.5 sqmm wire			1000	2500/-	25000=00
7.	1 sqmm wire			17	1100/-	18700=00
8.	1.5 sqmm wire			05	1500/-	7750=00

Total Invoice Amount In words :

(Rupees one lakh fifty six thousand nine hundred and twenty eight only)

Total Amount Before Tax	:	132990
Add: CGST 9%	:	11969
Add: SGST 9%	:	11969
Add: IGST	:	
Tax Amount : GST	:	23938
Total Amount After Tax	:	156928

Certified that the particular given above are true and correct

For Rajasekhar Konamki

R. Raja Sekhar
 Authorised Signatory

: Bank Details :
 Bank Name : Canara Bank
 Bank A/C No : 6162101003737
 Bank IFSC : CNRB0006162

: Terms & Conditions :

(Common Seal)

(E&OE)

GSTIN : 37GVHPK1029K1ZC

Cell : 9640690583

9398143124

RAJASEKHAR KONAMKI

Opp: panchayathiraj Office, KANDUKUR, Prakasam Dt, A.P.

TAX INVOICE

Name..... <i>J. D. Nayak</i>	Invoice No : 25
Address..... <i>T.R.K. Govt. Degree college</i>	Invoice Date : <i>12/01/2020</i>
<i>Howd Road</i>	State : <i>A-P</i>
GSTIN..... <i>Kandukur</i>	State Code : <i>37</i>
Cell.....	

SI No	Description of work	HSN Code	UOM	Qty	Rate	Amount
1	<i>LED Tube lights</i>			<i>21</i>	<i>400/-</i>	<i>8400 = 0</i>

Total Invoice Amount In words : *Nine thousand**Nine thousand and three hundred*

Total Amount Before Tax	:	<i>8400 = 0</i>
Add : CGST <i>9%</i>	:	<i>756 = 27</i>
Add : SGST <i>9%</i>	:	<i>756 = 27</i>
Add : IGST	:	
Tax Amount : GST	:	<i>1512 = 0</i>
Total Amount After Tax	:	<i>9912 = 0</i>

: Bank Details :

Bank Name : Canara Bank
 Bank A/C No : 6162101003737
 Bank IFSC : CNRB0006162

: Terms & Conditions :

(Common Seal)

Certified that the particulars given above are true and correct

For Rajasekhhar Konamki*K. Rajasekhhar*

Authorised Signatory

(E&OE)

RAJASEKHAR KONAMKI

Opp: panchayathiraj Office, KANDUKUR, Prakasam Dt, A.P.

TAX INVOICE

Name: *Primiya*
 Address: *J.R. Govt Degree College
 Kandanur.*
 GSTIN:
 Cell:

Invoice No **33**
 Invoice Date : *11.11.2020*
 State : *A.P*
 State Code : *37*

SI No	Description of work	HSN Code	UOM	Qty	Rate	Amount
1.	<i>Water Level Controller</i>			<i>01</i>	<i>450/-</i>	<i>450/-</i>

Total Invoice Amount In words :

(Five hundred and Thirty only)

Total Amount Before Tax	:	<i>450.00</i>
Add : CGST 9%	:	<i>40.50</i>
Add : SGST 9%	:	<i>40.50</i>
Add : IGST	:	
Tax Amount : GST	:	<i>81.00</i>
Total Amount After Tax	:	<i>531.00</i>

: Bank Details :

Bank Name : Canara Bank
 Bank A/C No : 6162101003737
 Bank IFSC : CNRB0006162

: Terms & Conditions :

(Common Seal)

Certified that the particular given above are true and correct

For Rajasekhar Konamki

R. Rajasekhar

Authorised Signatory

GSTIN : 37GVHPK1029K1ZC

Cell : 9640690583

9398143124

RAJASEKHAR KONAMKI

Opp: panchayathiraj Office, KANDUKUR, Prakasam Dt, A.P.

TAX INVOICE

Name: *Principal*
 Address: *Tad Govt Degree College*
Kandukur
 GSTIN:
 Cell:

Invoice No: **44**
 Invoice Date: *05-01-2021*
 State: *AP*
 State Code: *37*

SI No	Description of work	HSN Code	UOM	Qty	Rate	Amount
1.	<i>Digital socket - Timer</i>			<i>02</i>	<i>550/-</i>	<i>1100/-</i>

Total Invoice Amount In words : *One thousand*Total Amount Before Tax : *1100 = 00*Add : CGST 9% : *99 = 00*Add : SGST 9% : *99 = 00*Add : IGST : *00 = 00*Tax Amount : GST : *198 = 00*Total Amount After Tax : *1898 = 00*

Certified that the particular given above are true and correct

: Bank Details :

Bank Name : *Canara Bank*
 Bank A/C No : *6162101003737*
 Bank IFSC : *CNRB0006162*

: Terms & Conditions :

(Common Seal)

For Rajasekhar Konamki*Rajasekhar Konamki*

Authorised Signatory

(E&OE)