

POST GRADUATE GOVERNMENT COLLEGE FOR GIRLS, SECTOR-11, CHANDIGARH



COURAGE TO KNOW



Energy Audit Report 2023

1. Background

The Post Graduate Government College for Girls, Sector-11, Chandigarh has campus area sprawling in 34.93 acre. .

- (i) The campus has one main line of 11 KV is source of electricity in the building.
- (ii) The management has planned for the improvement in power efficiency and has shown improvement in the electricity bill.
- (iii) The building has installed 495 KWPSolar Photovoltaic grid System for in-house green energy generation which is catering the lighting conventional electricity load. The system is maintained properly and cell cleaning is also done to maintain the higher generation.
- (v) Under the process of retro-fitting, LED lights are installed in the building to reduce the energy consumption and it is observed that the energy consumption has reduced compared to the relevant years.
- (v) For future management is purchasing the LED lights, Energy Efficient AC units etc. as replacement of the existing low efficient installations.
- (vi) The log books of all blocks are maintained regarding the conservation protocols..
- (vii) The awareness of all staff about the installed equipment and detailing is good.

2. Objective

Audit is mainly an examination of the present state of environment footprint and impact of the College. Green auditing is a process whereby an organization's environmental performance is tested against its environmental policies. Since the institute does not have a documented environment policy or environment management system in place and green audit is being conducted for the first time, so accordingly we have defined the scope and objective of the current green audit as below:

1. To review on a basic level, the activities and operations of the College and identify main sources of resource utilization, and their environmental impacts.
2. Understand the sustainability related initiatives undertaken.
3. Identify the gaps, best practices or initiatives undertaken by the college to maximize energy saving.
4. As part of the audit report-share audit observations and findings along with suggestions and recommendations for the future

3. Electricity Bill Analysis

Table 1: Monthly Electricity Bill –During first Phase of Installation

Expenditure on Electricity Charges for last 5 bills before installation of Solar Panel		Expenditure on Electricity Charges for last 5 bills before installation of Solar Panel	
Date	Amount	Date	Amount
21.06.2013-21.08.2013	5,58,295.00	21.06.2014-21.08.2014	5,40,260.00
22.08.2013-21.10.2013	14,47,178.00	22.08.2014-21.10.2014	5,96,518.00
22.10.2013-21.12.2013	10,35,992.00	22.10.2014-21.12.2014	5,03,531.00
22.12.2013-21.02.2014	3,39,429.00	22.12.2014-21.02.2015	4,17,135.00
22.02.2014 -21.04.2014	6,36,189.00	22.02.2015 -21.04.2015	4,48,532.00
TOTAL	4,017,083.00		2,505,976.00

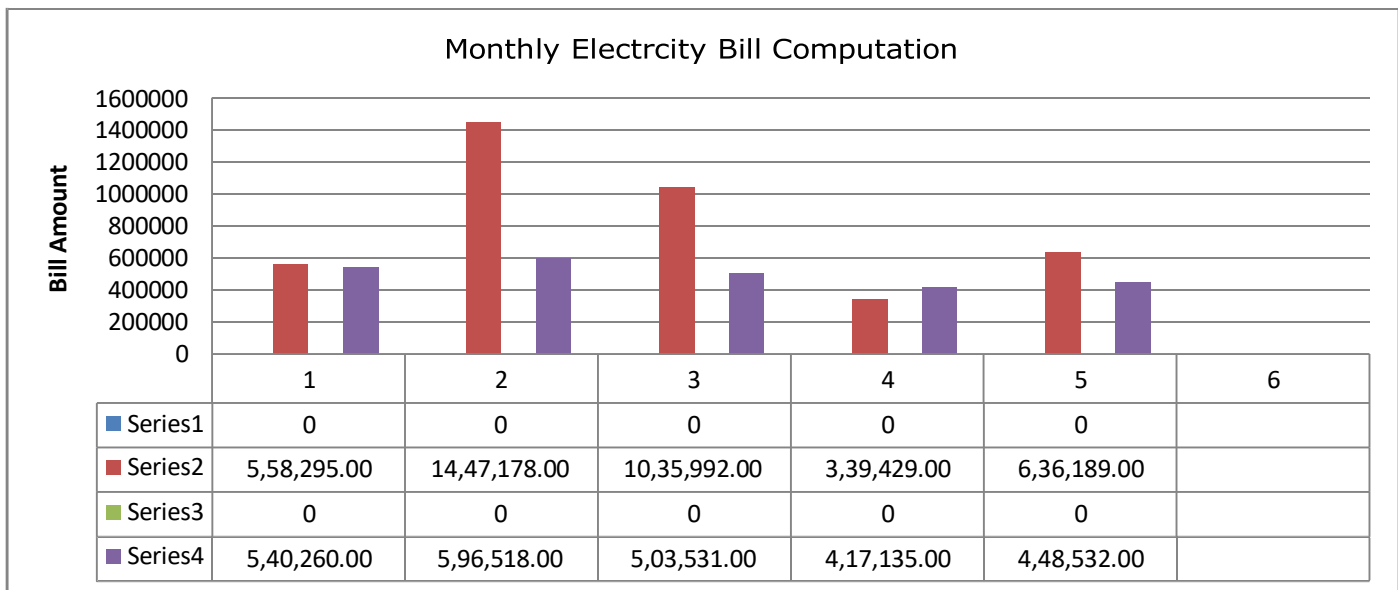


Fig.2: Compilation and Computation of Bill of 2013-2014(in Red) and 2014-2015(in Blue)

Table 2: Monthly Electricity Bill –Before and After Solar Panel Installation

Expenditure on Electricity Charges for last 5 bills before installation of Solar Panel		Expenditure on Electricity Charges for last 5 bills before installation of Solar Panel	
Date	Amount	Date	Amount
21.06.2013-21.08.2013	5,58,295.00	21.06.2021-21.08.2021	189,262.00
22.08.2013-21.10.2013	14,47,178.00	22.08.2021-21.10.2021	744,116.00
22.10.2013-21.12.2013	10,35,992.00	22.10.2021-21.12.2021	539,586.00
22.12.2013-21.02.2014	3,39,429.00	22.12.2021-21.02.2022	361,516.00
22.02.2014 -21.04.2014	6,36,189.00	22.02.2022-21.04.2022	531,826.00
TOTAL	4,017,083.00		2,366,306.00

The major outcome of the bill analysis are as below:

A solar roof top system is the investment that appreciate with time as there is constant increase in savings and every unit of solar energy helps prevent 0.7 kg of carbon dioxide emission. Installing 1 KWp solar roof top plant is thus equivalent to planting two trees in terms of carbon Sequestration .A solar energy plant installed in April, 2014 with capacity 495 KWp in Post Graduate Government College for Girls, Sector-11, Chandigarh, providing the benefit of 60 thousand units and the comparative electricity bills for 10months before and after the installation of solar panel(June 2013 to April 2014 and June 2021-April 2022;Table1) reduce the electricity usage by 41.09 % , saving42 metric ton carbon dioxide, generating 42 carbon credits

4. Energy Efficiency measures:

(i) Data Collection

All the data of active instruments and their year of manufacture in tabulated form, so assessment will be done about their efficiency.

Table 1. Compilation of Energy Data for Energy Auditing

Type	Wattage	Hourly Electricity Consumption	Daily Electricity consumption	Yearly Consumption	Amount in Rupee (Approx.Rs6/unit)	Carbon Footprint (kg of CO ₂) Annually
Regular	75 watt	7.5 hrs.	0.075x7.5=0.563	205 units	1231.87	143.5

Fan						
Tube Light	40 watt	6hrs	0.24 unit/day	87.6 units	525.60	61.32

Total Number of Fans in Class Rooms in Campus: 250; Total units Generated: 205x 250=51,250 units worth approximately 3 lakhs and Total Number of Tubes in Class Rooms in Campus: 220; Total units Generated: 205x 220=45,100 units worth approximately 2.70 lakhs annually

Table 2. ENERGY AUDITING (SESSION:2020-21)

Data of Electrical and Electronic Equipment

Department	AC	Refrigerator	Computer and its peripherals/ Laptop	Heater	Micro wave	Water Dispenser	Water Purifier /Water Cooler	Laboratory Equipment's(Chimney/Electric Iron//Fashion maker/Electric Toaster/food processor/Electric Tandoor/OTG/Mixer /Rice cooker/Music System/Electric Oven)	Electric Kettle	Printer
Botany	01 2017-2018	03 2019	Computer(01;) Scanner(01; 2011)	01 2008	01 2010-2011	01	-	Electric Oven(02;200;2019)	-	01
Geography	01 2016	01 2019	Desk Top(02;2013-14)	01	01 2010	01	-	-	-	01
Hindi	01	- NF	01	01	01	-	-	-	-	-
Home Science	01 2007	01 2012	01 2006	-	01 2003	01 2020	01 2012	Chimney(01;2011) Electric Iron(01;2012) Fashion maker(02;2003,2017) Electric Toaster (01;2007) Food Processor(01;2011) Electric Tandoor(01;2007) OTG(01;2007) Mixer(01;2007) Rice cooker(01;2007)	01 2012	01 2019
Political Science	01	01	01	01	01	-	-	-	01	01
Physica	03		19	01	01					01

Psychology	02 (i)Hitachi(2011) (ii)Mitsubishi (2017)	01 2008	01 2007		01 2010	-	-	-	-	-
Punjabi	01	01	- NF	01	01	01		-	01	01
Sanskrit,Philosophy and French	01	01	03	03	01	-	-	-	02	03
Sociology	04 01(Staff Room) 03(Room No.210)	01	01 (2013-2014)	01	-	01	-	-	01	-
Department of Computer Application	Window AC-14 (i)1.5 ton(5;2007) (ii)2 ton(9;2007) Split AC-2 (i)1.5 ton(2;2012-13)		101 ((i)Wipro(30;2008) (ii)HP(30;2012) (III)Desktop(21;2015) (iv)Lenovo(20;2018) Laptop(01;2010-11)			03 2007	Water Cooler (02;2011)	-		01(H P Laser jet2019) 01(H P Laser jet2006)
Department of Public Administration	01 2018-19	01	01 Monitor:2013-14 CPU:2019	01 2007	01	-	-	-	01 2019	01 2020-21
Music (Instrumental)	-	01 Yes	01 Yes		01 Yes	01 Yes	-	Music System(Yes)		

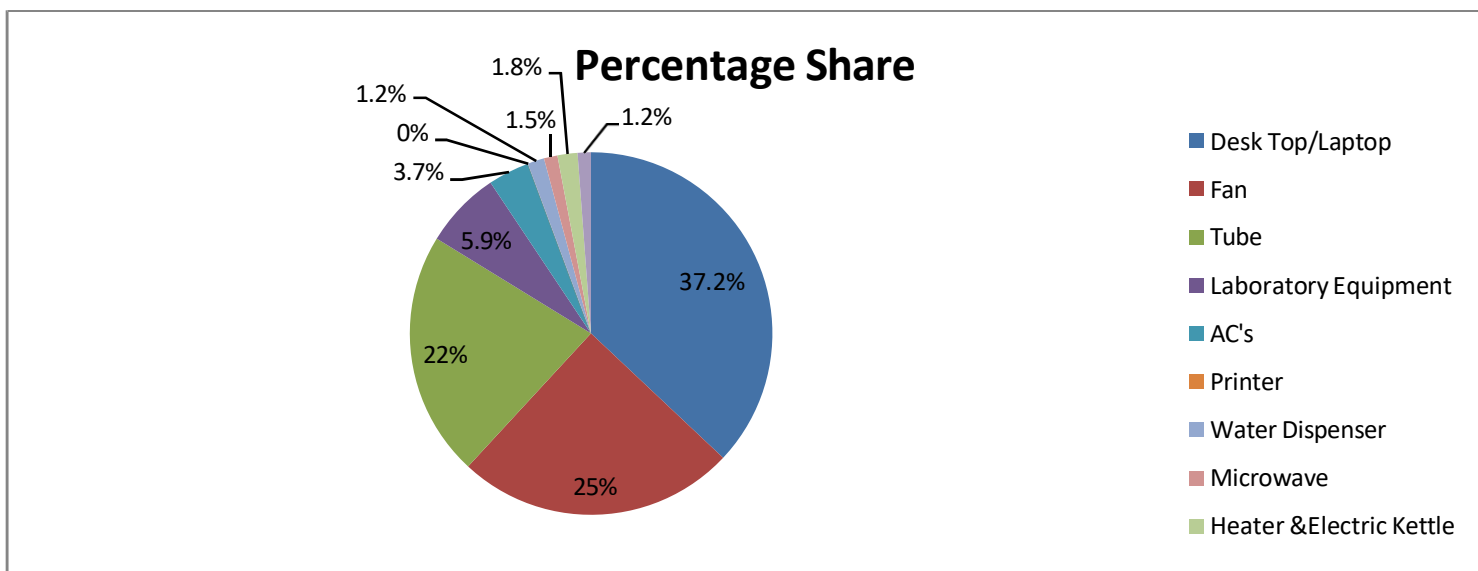


Fig1.Energy Data compilation

The pie chart helps in compilation and computation of data in survey analysis to get retrofitting in order to have building resilience in energy conservation (Fig.1).The trend to modify the existing structure of buildings with retrofitting in terms of energy efficiency and load equipment has shifted to a new paradigm of energy conservation.It was proved that significant energy cost savings can be achieved through integrated energy auditing in the building energy supply sources with emphasis on the full utilization of solar energy and optimization of the operation of electrical storage. In this direction, the college electrical auditing protocol have integrated students in regularly monitoring the lights,fans,computers,ACs are switched off when not in use as a “Students Light Patrol” in every department to check empty classrooms,laboratories and other spaces to make sure the lights have been turned off when they’re not in use.A student energy patrol is to streamline the input process. The inputs done by student light patrol to conserve the energy are;

- Turn off and unplug all appliances(cell phone,Laptop/DeskTop) while not in use and fully charged.
- Keep your electronics on a low brightness setting to save energy
- Turn off lights and AC when you leave a classroom/office room/staff room
- During the day, maximize natural daylight by using natural light instead of overhead or fluorescent lights. Turning off one fluorescent light for an hour a day can save 30 kg of carbon dioxide emissions per year
- Shut down computers or use the “sleep” setting when not in use.
- Turning off screens and monitors when you’re done using them.
- Making sure that computers shut down completely at the end of the day
- Check the thermostats for potential energy saving adjustments. Setting the heat for 68 °F (20 °C) degrees in the colder months and 78 °F (26°C) degrees for cooling in the warmer months can significantly reduce energy costs. Check the thermostat in your office/Department/staff room to see if these settings have already been applied.





(ii) In order to create awareness in the students, the college has conducted survey “ENERGY SAVING AWARENESS QUESTIONNAIRE” on APRIL 09-30,2022, which comprises of 14 questions on energy sustainability and the mitigation of carbon footprints. The students both day scholars and hostellers participated in the survey and total of 436 students participated (link enclosed).

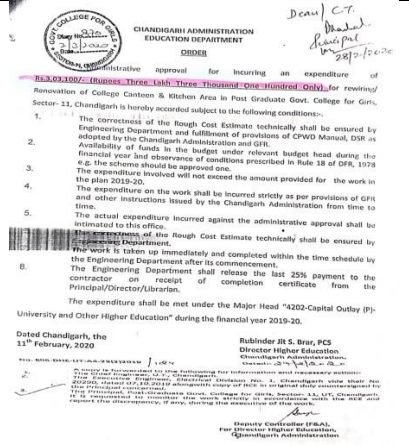
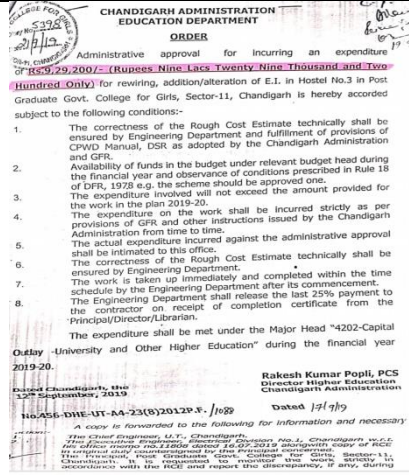
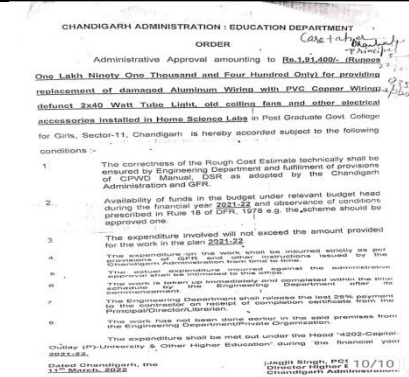
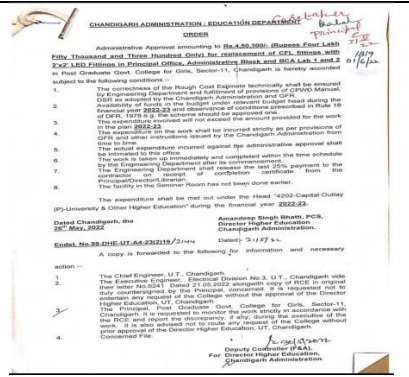
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5. Recommendation of Energy Retrofitting

Retrofitting is the addition of new technology to already existing system in order to improve the energy efficiency and to achieve the de-carbonization target in line with the United Nations Framework Convention on Climate change.

S. No	Energy Retrofitting	Year	Vide Letter No.	Budget (Rs)	Status	Proof
1	Replacement of old flood light & street light fitting in the campus	2017 - 2018	69-DHE-UT-A4-23(4)2012/137;dated:5.3.18	11,24,400 /-	Completed	<p>The document is an official order from the Chandigarh Administration, dated 23rd February 2017. It authorizes the expenditure for the replacement of old flood lights and street light fittings with LED fittings in PGDC, Chandigarh. The order specifies the budget of Rs. 11,24,400 and lists several conditions for the expenditure, including the need for administrative approval and technical clearance from the Engineering Department. It is signed by the Director, Higher Education, Chandigarh Administration.</p>

2.	Replacement of old light fittings with LED fittings in class rooms, Toilets	2017 - 2018	102-DHE-UT--A4-23(12)2010-III/201;dated:16.3.18	11,24,400 /-	Completed	 <p>CHANDIGARH ADMINISTRATION EDUCATION DEPARTMENT</p> <p>ORDER</p> <p>Administrative approval for incurring an expenditure of RS.27,400/- (Rupees Two Lacs Seventy Three Thousand and Four Hundred only) for providing Additional Lighting and LED Fittings in Class Rooms and Toilet of Post Graduate Govt. College for Girls, Sector-11, Chandigarh is hereby accorded subject to the following conditions:-</p> <ol style="list-style-type: none"> The expenditure involved shall not exceed the amount provided for the work in the plan 2017-18. The expenditure on the work shall be incurred strictly as per provisions of GFR and other instructions issued by the Chandigarh Administration from time to time. The actual expenditure incurred against the administrative approval shall be intimated to this office. The correctness of the Rough Cost Estimate technically shall be ensured by Engineering Department. The work is taken up immediately and completed within the time schedule by the Engineering Department after its commencement. The Engineering Department shall release the last 25% payment to the contractor on receipt of completion certificate from the Principal. <p>The expenditure shall be met under the Major Head "4202-Capital Outlay -University and Other Higher Education" during the financial year 2017-18.</p> <p>Dated Chandigarh, the 15th March, 2018</p> <p>No.102-DHE-UT-A4-23(12)2010-III/201</p> <p>A copy is forwarded to the following for information and necessary action:-</p> <ol style="list-style-type: none"> The Chief Engineer, U.T., Chandigarh. The Executive Engineer, Electrical Division No. 1, Chandigarh w.r.t. his office memo no. 2302 dated 15.02.2018 alongwith copy of RCE in original duly countersigned by the Principal concerned. The Principal, Post Graduate Govt. College for Girls, Sector-11, Chandigarh. It is requested to monitor the work strictly in accordance with the RCE and report the discrepancy, if any, during the execution of the work. <p>Rakesh Kumar Pophi, PCS Director Higher Education Chandigarh Administration</p> <p>Dated: 16/3/2018</p> <p>Asstt. Controller (F&A) For Director Higher Education, Chandigarh Administration</p>
3.	Replacement of Floodlights, 1x40w Tube lights with LED lights and Exhaust fans in Hostel 2	2018 - 2019	360-DHE-A4-23(8)2012/137;dated:30.8.18	1,47,200/-	Completed	 <p>CHANDIGARH ADMINISTRATION EDUCATION DEPARTMENT</p> <p>ORDER</p> <p>Administrative approval for incurring an expenditure of RS.1,47,200/- (Rupees One Lacs Forty Seven Thousand and Two Hundred only) for replacement of Flood Lights, 1x40 WATT, Tube Lights and Exhaust Fans in Hostel No.2 of Post Graduate Govt. College for Girls, Sector-11, Chandigarh is hereby accorded subject to the following conditions:-</p> <ol style="list-style-type: none"> The expenditure involved shall not exceed the amount provided for the work in the plan 2018-19. The expenditure on the work shall be incurred strictly as per provisions of GFR and other instructions issued by the Chandigarh Administration from time to time against the administrative approval shall be intimated to this office. The correctness of the Rough Cost Estimate technically shall be ensured by Engineering Department. The work is taken up immediately and completed within the time schedule by the Engineering Department after its commencement. The Engineering Department shall release the last 25% payment to the contractor on receipt of completion certificate from the Principal. The expenditure shall be met under the Major Head "4202-Capital Outlay -University and Other Higher Education" during the financial year 2018-19. <p>Dated Chandigarh, the 14th August, 2018</p> <p>No.360-DHE-UT-A4-23(8)2012/499</p> <p>A copy is forwarded to the following for information and necessary action:-</p> <ol style="list-style-type: none"> The Chief Engineer, U.T., Chandigarh. The Executive Engineer, Electrical Division No.1, Chandigarh w.r.t. his office memo no. 1717 dated 05.07.2018 alongwith copy of RCE in original duly countersigned by the Principal concerned. The Principal, Post Graduate Govt. College for Girls, Sector-11, Chandigarh. It is requested to monitor the work strictly in accordance with the RCE and report the discrepancy, if any, during the execution of the work. <p>Rubinderjit S. Brar, PCS Director Higher Education Chandigarh Administration</p> <p>Dated: 30/8/18</p> <p>Asstt. Controller (F&A) For Director Higher Education, Chandigarh Administration</p>
4.	Replacement of old ceiling fans & fittings with New ceiling fans and LED fitting	2018 - 2019	563-DHE-A4-23(44)2013/347;dated:9.1.19	7,58,200/-	Completed	 <p>CHANDIGARH ADMINISTRATION EDUCATION DEPARTMENT</p> <p>ORDER</p> <p>Administrative approval for incurring an expenditure of RS.7,58,200/- (Rupees Seven Lacs Fifty Eight Thousand and Two Hundred only) for rewiring and replacement of Old Ceiling Fan and Fittings with New Ceiling Fans and LED fittings in Gymnasium and Badminton Hall at Post Graduate Govt. College for Girls, Sector-11, Chandigarh is hereby accorded subject to the following conditions:-</p> <ol style="list-style-type: none"> The expenditure involved shall not exceed the amount provided for the work in the plan 2018-19. The expenditure on the work shall be incurred strictly as per provisions of GFR and other instructions issued by the Chandigarh Administration from time to time against the administrative approval shall be intimated to this office. The correctness of the Rough Cost Estimate technically shall be ensured by Engineering Department. The work is taken up immediately and completed within the time schedule by the Engineering Department after its commencement. The Engineering Department shall release the last 25% payment to the contractor on receipt of completion certificate from the Principal. The expenditure shall be met under the Major Head "4202-Capital Outlay -University and Other Higher Education" during the financial year 2018-19. <p>Dated Chandigarh, the 31st December, 2018</p> <p>No.563-DHE-UT-A4-23(44)2013/347</p> <p>A copy is forwarded to the following for information and necessary action:-</p> <ol style="list-style-type: none"> The Chief Engineer, U.T., Chandigarh. The Executive Engineer, Electrical Division No.1, Chandigarh w.r.t. his office memo no.20835 dated 29.11.2018 alongwith copy of RCE in original duly countersigned by the Principal concerned. The Principal, Post Graduate Govt. College for Girls, Sector-11, Chandigarh. It is requested to monitor the work strictly in accordance with the RCE and report the discrepancy, if any, during the execution of the work. <p>Rubinderjit S. Brar, PCS Director Higher Education Chandigarh Administration</p> <p>Dated: 01/01/19</p> <p>Asstt. Controller (F&A) For Director Higher Education, Chandigarh Administration</p>
5.	Replacement of old flood lights with LED flood lights at Gate	2018 - 2019	59-DHE-A4-23(2)2019/ 172 ; dated:25.2.19	82,700/-	Completed	 <p>CHANDIGARH ADMINISTRATION EDUCATION DEPARTMENT</p> <p>ORDER</p> <p>Administrative approval for incurring an expenditure of RS.82,700/- (Rupees Eighty Two Thousand and Seven Hundred only) for providing LED Flood Lights at gate of Post Graduate Govt. College for Girls, Sector-11, Chandigarh is hereby accorded subject to the following conditions:-</p> <ol style="list-style-type: none"> The expenditure involved shall not exceed the amount provided for the work in the plan 2019-20. The expenditure on the work shall be incurred strictly as per provisions of GFR and other instructions issued by the Chandigarh Administration from time to time. The actual expenditure incurred against the administrative approval shall be intimated to this office. The correctness of the Rough Cost Estimate technically shall be ensured by Engineering Department. The work is taken up immediately and completed within the time schedule by the Engineering Department after its commencement. The Engineering Department shall release the last 25% payment to the contractor on receipt of completion certificate from the Principal. The expenditure shall be met under the Major Head "4202-Capital Outlay -University and Other Higher Education" during the financial year 2019-20. <p>Dated Chandigarh, the 10th February, 2019</p> <p>No.59-DHE-UT-A4-23(2)2019/172</p> <p>A copy is forwarded to the following for information and necessary action:-</p> <ol style="list-style-type: none"> The Chief Engineer, U.T., Chandigarh. The Executive Engineer, Electrical Division No.1, U.T., Chandigarh w.r.t. his office memo no.22195 dated 20.12.2018 alongwith copy of RCE in original duly countersigned by the Principal concerned. The Principal, Post Graduate Govt. College for Girls, Sector-11, Chandigarh. It is requested to monitor the work strictly in accordance with the RCE and report the discrepancy, if any, during the execution of the work. <p>Rubinderjit S. Brar, PCS Director Higher Education Chandigarh Administration</p> <p>Dated: 25/2/2019</p> <p>Deputy Controller (F&A) For Director Higher Education Chandigarh Administration</p>

6.	Rewiring & Renovation of college canteen and kitchen area	2018 - 2019	606-DHE-A4-23(2)2019/ 124 ; dated:25.2.19	3,03,100/-	Completed	 <p>Administrative approval for incurring an expenditure of Rs.3,03,100/- (Rupees Three Lacs Three Thousand and One Hundred Only) for rewiring/ Renovation of College Canteen & Kitchen Area in Post Graduate Govt. College for Girls, Sector-11, Chandigarh is hereby accorded subject to the following conditions:-</p> <ol style="list-style-type: none"> The correctness of the Rough Cost Estimate technically shall be ensured by Engineering Department and fulfillment of provisions of CPWD Manual, DSR as Availability of funds in the budget under relevant budget head during the financial year and observance of conditions prescribed in Rule 18 of DFR, 1978. The expenditure involved will not exceed the amount provided for the work in the plan 2019-20. The actual expenditure incurred against the administrative approval shall be intimated to this office. The correctness of the Rough Cost Estimate technically shall be ensured by Engineering Department. The work is taken up immediately and completed within the time schedule by the Engineering Department after its commencement. The Engineering Department shall release the last 25% payment to the contractor on receipt of completion certificate from the Principal/Director/Librarian. The expenditure shall be met under the Major Head "4202-Capital Outlay (P)- University and Other Higher Education" during the financial year 2019-20. <p>Dated Chandigarh, the 11th February, 2020</p> <p>Rubinder Jit S. Bray, PCS Director Higher Education, Chandigarh Administration</p>
7.	Rewiring & Renovation /alteration of EI in Hostel 3	2019 - 2020	456-DHE-A4-23(8)2012PF/ 1088; dated:17.9.19	9,29,200/-	Completed	 <p>Administrative approval for incurring an expenditure of Rs.9,29,200/- (Rupees Nine Lacs Twenty Nine Thousand and Two Hundred Only) for rewiring, addition/alteration of E.I. in Hostel No.3 in Post Graduate Govt. College for Girls, Sector-11, Chandigarh is hereby accorded subject to the following conditions:-</p> <ol style="list-style-type: none"> The correctness of the Rough Cost Estimate technically shall be ensured by Engineering Department and fulfillment of provisions of CPWD Manual, DSR as adopted by the Chandigarh Administration and GFR. Availability of funds in the budget under relevant budget head during the financial year and observance of conditions prescribed in Rule 18 of DFR, 1978 e.g. the scheme should be approved one. The expenditure involved will not exceed the amount provided for the work in the plan 2019-20. The actual expenditure incurred against the administrative approval shall be intimated to this office. The correctness of the Rough Cost Estimate technically shall be ensured by Engineering Department and completed within the time schedule by the Engineering Department after its commencement. The Engineering Department shall release the last 25% payment to the contractor on receipt of completion certificate from the Principal/Director/Librarian. The expenditure shall be met under the Major Head "4202-Capital Outlay University and Other Higher Education" during the financial year 2019-20. <p>Dated Chandigarh, the 17th September, 2019</p> <p>Rakesh Kumar Popli, PCS Director Higher Education, Chandigarh Administration</p>
8.	Replacement of Aluminium wire with copper wire & Defunct 2x40w tube-light and ceiling fans in Home Science Lab	2021 - 2022	DHE-A4-23(8)2012PF/ 935; dated:11.3.22	1,96,400/-	Completed	 <p>Administrative Approval amounting to Rs.1,96,400/- (Rupees One Lakh Ninety One Thousand and Four Hundred Only) for providing replacement of damaged Aluminium Wiring with PVC Copper Wiring, defunct 2x40 Watt Tube Light, old ceiling fans and other electrical accessories installed in Home Science Labs in Post Graduate Govt. College for Girls, Sector-11, Chandigarh is hereby accorded subject to the following conditions:-</p> <ol style="list-style-type: none"> The correctness of the Rough Cost Estimate technically shall be ensured by Engineering Department and fulfillment of provisions of CPWD Manual, DSR as adopted by the Chandigarh Administration and GFR. Availability of funds in the budget under relevant budget head during the financial year 2021-22 and observance of conditions prescribed in Rule 18 of DFR, 1978 e.g. the scheme should be approved one. The expenditure involved will not exceed the amount provided for the work in the plan 2021-22. The actual expenditure incurred against the administrative approval shall be intimated to this office. The correctness of the Rough Cost Estimate technically shall be ensured by Engineering Department and completed within the time schedule by the Engineering Department after its commencement. The Engineering Department shall release the last 25% payment to the contractor on receipt of completion certificate from the Principal/Director/Librarian. The expenditure shall be met under the Major Head "4202-Capital Outlay (P)-University & Other Higher Education" during the financial year 2021-22. <p>Dated Chandigarh, the 11th March, 2022</p> <p>Lalraj Singh, PCS Director Higher Education, Chandigarh Administration</p>
9.	Replacement of CFL fittings with 2x2' LED fittings in Principal office and Administration block	2022	456-DHE-A4-23(8)2012PF/ 1088; dated:17.9.19	4,50,300/-	Completed	 <p>Administrative Approval amounting to Rs.4,50,300/- (Rupees Four Lakh Fifty Thousand and Three Hundred Only) for replacement of CFL fittings with 2x2' LED fittings in Principal Office, Administration Block and SICA Lab, Lane 2 in Post Graduate Govt. College for Girls, Sector-11, Chandigarh is hereby accorded subject to the following conditions:-</p> <ol style="list-style-type: none"> The correctness of the Rough Cost Estimate technically shall be ensured by Engineering Department and fulfillment of provisions of CPWD Manual, DSR as adopted by the Chandigarh Administration and GFR. Availability of funds in the budget under relevant budget head during the financial year 2022-23 and observance of conditions prescribed in Rule 18 of DFR, 1978 e.g. the scheme should be approved one. The expenditure involved will not exceed the amount provided for the work in the plan 2022-23. The actual expenditure incurred against the administrative approval shall be intimated to this office. The correctness of the Rough Cost Estimate technically shall be ensured by Engineering Department and completed within the time schedule by the Engineering Department after its commencement. The Engineering Department shall release the last 25% payment to the contractor on receipt of completion certificate from the Principal/Director/Librarian. The expenditure shall be met under the Major Head "4202-Capital Outlay (P)-University & Other Higher Education" during the financial year 2022-23. <p>Dated Chandigarh, the 20th May, 2022</p> <p>Anandjeet Singh Shashi, PCS Director Higher Education, Chandigarh Administration</p>

In conclusion, the T-5 tube (40W) lights were replaced with the energy efficient 20W LED lights. The LED lights give better lux level and reduce energy consumption by 100%. The copper wire replacing aluminium wiring decreased energy loss, hence increases energy efficiency.

5. Solar Energy

A grid connection photovoltaic (mono crystalline Silicon Solar PV) power system of 495 kW, which consists of solar panels, conditioning unit and grid connection equipment. When conversely, onsite energy generation exceeds the building energy requirements, due to energy storage cost limitations the surplus energy was off sets, hence, the grid connection is necessary to enable the Net Zero Energy balance

A Solar Energy Plant installed in Post Graduate Government College for Girls, Sector-11, Chandigarh, with a **capacity of 495KWP SPV.**

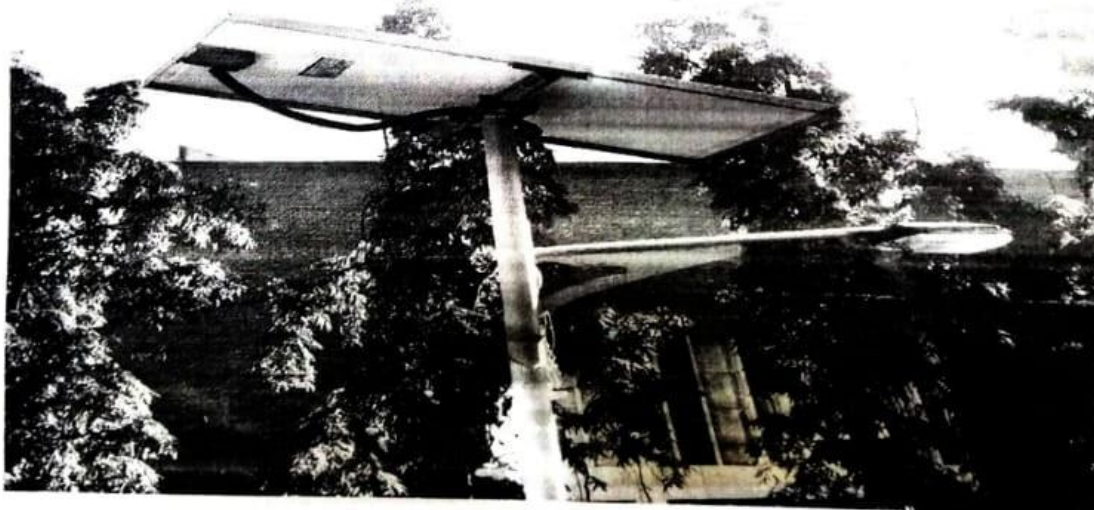
- Location of Solar Panels:
 1. Administrative Block
 2. Auditorium Block
 3. BCA Block
 4. Physics and Zoology Block
 5. Music, Sociology, Psychology Block
 6. Political Science, Botany and Geography Block
 7. New Block (BCA, Mathematics, Hindi, Punjabi Departments)
 8. Chemistry and History Block
 9. English and Home Science Block
 10. Dance Department Block
 11. Physical Education Block
 12. Hostel no 1, 2, 3
 13. Canteen

The sun is a major source of inexhaustible free energy (i.e., solar energy) for the planet Earth. Currently, new technologies are being employed to generate electricity from harvested solar energy. These approaches have already been proven and are widely practiced throughout the world as renewable alternatives to conventional non-hydro technologies. The sun is a major source of inexhaustible free energy (i.e., solar energy) for the planet Earth. Currently, new technologies are being employed to generate electricity from harvested solar energy. Solar energy is one of the best options to meet future energy demand since it is superior in terms of availability, cost effectiveness, accessibility, capacity, and efficiency compared to other renewable energy sources. Solar energy is considered to be a non-polluting, reliable, and clean source of energy. Unlike other energy sources, its use is not accompanied by the release of harmful gases (e.g., oxides of C/N/S and/or volatile organic compounds (VOCs) and particles (e.g., soot, carbon black, metals, and particulate matter (PM)). Such fossil fuel emissions from gas-fired power plants have been indicted with regard to causing neurological damage, heart attacks, breathing problems, cancer, etc. The development of novel solar power technologies is considered to be one of many key solutions toward fulfilling a worldwide increasing demand for energy. A rapid decline in solar technology costs in recent years, the overall costs to generate solar power still remain high. Incentives and rebates which are crucial for the development of the solar energy market are making it apparent that innovative approaches are still necessary to reduce the fiscal burden of various policy incentives. However, the solar industry should focus more on the quality and development of its technology. India comes under Tropical Climatic Zone that is why here a huge solar energy potential is available throughout the year.



Solar Lights:

Solar lights, a renewable energy, is an eco-friendly, cost effective, low maintenance, self-sufficient and a green alternative to the conventional energy. Solar lighting help in reducing the carbon footprint created with the utilization of non-renewable energy. Hence solar lighting systems pave way for a sustainable future and can significantly help in erasing the problems of energy crisis.



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