

# ENERGY AUDIT REPORT

## 2018-2023



**Internal Quality Assurance Cell**

**RAMA DEVI WOMEN'S UNIVERSITY**



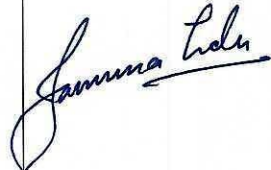

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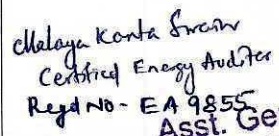

*Shapaba*  
**Registrar**  
RD Women's University  
Bhubaneswar

## ENERGY AUDIT COMMITTEE MEMBERS

### Internal Members:

Sl. No.	Name	Designation	Signature
1.	Dr. Sankar Prasad Mohanty	Associate Professor, Dept. of Education, Rama Devi Women's University, Bhubaneswar, Odisha.	
2.	Dr. Santosh Kumar Biswal	Associate Professor, Dept. of Journalism and Mass Communication, Rama Devi Women's University, Bhubaneswar, Odisha.	
3.	Ms. Jamuna Tudu	Assistant Professor, Dept. of Life Sciences, Rama Devi Women's University, Bhubaneswar, Odisha.	
4.	Dr. Monalisa Mohanty	Assistant Professor, Dept. of Biotechnology, Rama Devi Women's University, Bhubaneswar, Odisha.	

### External Member:

Sl. No.	Name	Designation	Signature
5.	Mr. Malayakanta Swain	AGM(EI.), Odisha Hydro Power Corporation Ltd., Bhubaneswar, Odisha.	 Malayakanta Swain Certified Energy Auditor Regd No - EA 9855 Asst. Gen. Manager (EI.) OHPC Ltd., BBSR
6.	Maj. Dr. Kalpana Das	Syndicate Member, Rama Devi Women's University, Bhubaneswar, Odisha.	

  
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## **PREFACE**

The energy audit in the university was conducted every year in the month of September from 2019 to 2023 to assess the energy consumption in the university campus and various hostels. The audit committee comprises of internal and external members. The committee members visited all the departments, classrooms, laboratories, washrooms and hostels. They observed and analysed the nature of energy consumption throughout the period. The energy consumption was categorised in three heads such as consumption of electrical energy, water and LPG consumption. The committee prepared a report on the present status of the university campus, their recommendations and the actions taken by the departments each year after the completion of the audit. The university was advised to lessen the electricity, water and LPG consumption. The energy audit report includes the report of 2018-2019, 2019-2020, 2020-2021 2021-2022 and 2022-2023 assessment years for administrative building, academic buildings and hostels. A cumulative report is prepared on the basis of recommendations given by the Energy Audit Committee.

## **INTRODUCTION**

Rama Devi Women's University, Bhubaneswar, Odisha has been established by an Act No. 5 of 1989 of State Legislature of Odisha as a State University vide Notification No. HE-FE-I-B-MISC-9/2015 dated 30.05.2015 and is empowered to award degrees as specified by the UGC under Section 22 of the UGC act 1956 through its own departments, its constituent colleges and/or through its affiliated colleges in regular mode with the approval of concerned statutory bodies/councils, wherever required. This is the most preferred institution in the eastern part of India, where girls are equipped with knowledge, skills, confidence and motivation for the all-round development, and are empowered to serve, strengthen and build a healthy, wealthy and peaceful nation. Apart from the remote corners of the state, students from neighbouring states like Chhattisgarh, Jharkhand and West-Bengal are pursuing undergraduate, post-graduate, diploma and PhD programmes in humanities, sciences and social sciences.

The university is built on a sprawling campus over 25.56 acres of land and located besides the NH-16 at Bhoi Nagar in Unit-IX, in the heart of the capital city of Bhubaneswar. It is 0.5 KM from NH-16; 2 KMs from Bhubaneswar Railway Station and 4.5 KM from the airport. The university campus is well connected with the length and breadth of the city. It is very close to Utkal University, State Library and surrounded by government and corporate houses. Besides, the university has 48 numbers of affiliated women's colleges covering nine districts - Khordha, Nayagarh, Puri, Jagatsinghpur, Kendrapara, Jajpur, Angul, Dhenkanal and Cuttack - of Odisha. The university is Wi-Fi enabled and at present, around 5000 students are studying in various streams of UG, PG & Ph.D. programmes.

### **1.1. Need of Energy Audit**

Conducting energy audit is crucial in any organisational set up to assess its energy efficiency. Opportunities for energy savings can be assessed through an energy audit. It can assist one organisation in better understanding how much energy one consumes and how to utilise it. An energy audit can find electrical, wiring, and ventilation safety issues, making one's house or place of business or institution safer. Needless to say, energy efficiency means using less energy to do the same job. The audit attempts to

furnish with a complete energy efficiency assessment. An energy audit is a study of a plant or facility which facilitates to find out how and where energy is used and to identify and chalk out the procedures for the purpose of energy savings. The energy audit directs us to frame a positive orientation to curtail the energy costs and subsequently to take up preventive measures. Energy audit enables a university to adapt to feasible solutions to save the energy with economic and other organizational considerations.

## **1.2. Objectives of Energy Audit**

The primary objective of energy audit in the university is to find out and strategize amicable solutions to reduce the energy loss by resorting to lower operating costs. It calculates the wastage and saving patterns of energy. The energy audit also enables the university to manage energy for its optimum use in its various locations. The current energy audit attempts to analyse electricity amount, LPG consumptions and water consumptions for last five years. Here, the energy audit in any institute enables to understand expenses incurred on electricity, water and LPG and at the same time it assesses the amount of wastages on the same energy sources. In addition, the audit intends to explore the possibility of alternative/non-conventional energy (solar energy) sources to be maximally utilized within the organization. Ultimately, this audit can create awareness among various stakeholders on energy conservation and utilization.

## **1.3. Benefits of Energy Audit**

Usually, the opportunities for energy savings are found through an energy audit. One can learn more about how much energy one consumes and how to utilize it more efficiently. By identifying potential safety issues with electrical systems, wiring, and ventilation, an energy audit can improve the safety of one's house or place of business.

Generally, the audit entails gathering and evaluating billing information for all energy providers to ascertain the overall amount of energy used, analysing site data to pinpoint energy consumption points and potential savings, performing calculations to determine

the cost/benefit of the potential savings, and creating and delivering a report outlining recommended energy-saving measures. An evaluation of the amount and location of energy used at a specific facility, as well as the identification of potential opportunities for energy savings that are quantified with estimates of the necessary investment and anticipated annual savings, are the two main outcomes of an energy/water audit.

**Energy audit is beneficial in the following manner:**

- One receives financial analysis as well as opportunities from the audit. Prioritization based on financial gain and return on investment will then be possible.
- Provide the public a reliable, comprehensible technical details on the suggested energy-saving strategies
- Furnish one with an emissions analysis to assist you in realizing the environmental advantages of your choices.
- Recognize the locations where energy is consumed and the places that require the greatest attention.

## ENERGY AUDIT REPORT 2018-19

The energy audit of the university for the session 2018-2019 was conducted in the month of September 2019 by the following committee members:

1. Dr. Sankar Prasad Mohanty, Dept. of Education
2. Dr. Monalisa Mohanty, Dept. of Biotechnology
3. Ms. Jamuna Tudu, Dept. of Life Science

The committee members conducted a survey within the campus and collected the data related to energy consumption by visiting the administrative building, academic blocks and hostels. The energy consumption data was categorized into electrical energy, water and LPG consumption.

### 4.1.1. Consumption of electrical energy

The energy consumption of the university as we know is divided into multiple categories. Out of which the major one is the consumption of electrical energy. The consumption details can be found below:

**Table 3: Consumption of electrical energy in buildings and hostels in 2018-2019:**

<b>Buildings</b>	<b>Cost Per Annum (in Rs.)</b>	<b>Average Cost (in Rs.)</b>
Academic Block-1	6,03,824	50,319
Ananya Hostel	2,50,836	20,903
Anindita Hostel	2,59,314	21,610
<b>TOTAL</b>	<b>11,13,974</b>	<b>92,832</b>

Rama Devi Women's University has been sanctioned with electricity load of 80000 KW/KVA from the TPCODL. There were four transformers, each of 500 KW/KVA sanctioned load, three were in working condition and one was on standby. The water pump in the campus was run by one transformer with the sanctioned load of 63 KW/KVA. These solar panels were earlier installed by the Green Energy Development Corporation of Odisha Ltd (GEDCOL) on the rooftop of Academic Block-1 in the year 2016-17 (Letter No – 2143, Date- 21/03/2016). The GEDCOL installed the required number of solar panels in 2016-17 and continued its services up to the year 2019. At that time, the electricity meters were established in main academic building and hostels with a sanctioned load of 122.4 KW/KVA and 29.5 KW/KVA (as per electricity bill)

respectively. The total sanctioned load to building and hostels was 151.9 KW/KVA, which was very minute amount of electricity consumed as supplied by the TPCODL. The total cost of electricity consumption in Academic Block-1 and two other hostels incurred was Rs. 11,13,974 and the average cost of per annum incurred was Rs. 92,832.

#### 4.1.2. Water consumption

Among the three major components of energy consumption in the university, water is another important component. The consumption details can be found below:

**Table 4: Water consumption in buildings and hostels in 2018-2019:**

<b>Buildings</b>	<b>Cost Per Annum (in Rs.)</b>	<b>Average Cost (in Rs.)</b>
Academic Block-1	-	-
Ananya Hostel	1,45,638	12,137
Anindita Hostel	1,46,923	12,244
<b>TOTAL</b>	<b>2,92,561</b>	<b>24,381</b>

For the year 2018-19, no water bill was procured for the academic block. At the same period, a sum of amount Rs. 2,92,561 was incurred per annum for two hostels i.e., Ananya Hostel and Anindita Hostel. The cyclone Fani severely damaged 15 overhead tanks and tank sheet covers in administrative blocks and hostels in 2019. In addition, the pipelines connected to these tanks were also damaged. This caused the irregularity of water supply to these blocks and hostels.

#### 4.1.3. LPG consumption

For preparing food at hostels and other miscellaneous requirements, LPG is getting consumed as a major source. The details of LPG consumption can be found below:

**Table 5: LPG consumption in hostels in 2018-2019:**

<b>Buildings</b>	<b>Cost Per Annum (in Rs.)</b>	<b>Average Cost (in Rs.)</b>
Ananya Hostel	1,47,751	12,313
Anindita Hostel	1,88,894	15,741
<b>TOTAL</b>	<b>3,36,645</b>	<b>28,054</b>



For the year 2018-19, a sum of expenditure amounting to Rs. 3,36,645 was incurred on LPG consumption for two hostels i.e., Ananya Hostel and Anindita Hostel. The average cost incurred on LPG consumption in two hostels was Rs. 28,054.

**Bills for the year (2018-19) is available in Annexure-1.**

#### **The energy audit committee members recommendations for the session 2018-19**

The energy audit team members after making a complete assessment of the energy consumptions in the university have recommended the following suggestions for minimizing energy consumption and for better use of resources to build a sustainable energy consumption ecology for a better future.

#### **4.1.4. Recommendations**

1. **Revamp of existing solar panels:** The university administration recommended to revamp the existing solar panels damaged due to cyclone Fani in the year 2019.
2. **Revamping water supply mechanism:** Realizing the importance of preserving water sources in the campus for the attainment of SDGs, the committee recommended the university administration to repair and revamp the water supply mechanism.

#### **4.1.5. Action Taken Report (ATR)**

1. **Establishment of new solar panels:** In order to make the solar energy more viable, the GEDCOL revised its rooftop solar units in the existing solar plants (Letter No – 2528 date- 09/10/2018).
2. **Revamping water supply mechanism:** In order to maintain water supply intact, the university administration has been proactive all the time. The university administration requested the PHD-II to resume the water supply in the campus (Letter No – 1781 Date: 8/5/2019). The university administration communicated to the Executive Engineer, BCCD-I, CESU, Bhubaneswar in order to restore electricity meant to be used for water supply in the campus (Letter No – 1864 Date: 15/05/2019). In a response to this, the Executive Engineer, PHD communicated an estimation of Rs 113.50 Lakhs for the repair and renovation of water supply and sewerage infrastructure which was severely damaged by cyclone Fani (Letter No- 5421 Date: 20/05/2019).

## ENERGY AUDIT REPORT 2019-20

The energy audit of the university for the session 2019-2020 was conducted in the month of September 2020 by the following committee members:

1. Dr. Sankar Prasad Mohanty, Dept. of Education
2. Dr. Monalisa Mohanty, Dept. of Biotechnology
3. Ms. Jamuna Tudu, Dept. of Life Science

The committee members conducted a survey within the campus and collected the data related to energy consumption by visiting the administrative building, academic blocks and hostels. The energy consumption data was categorized into electrical energy, water and LPG consumption.

### 4.2.1. Consumption of electrical energy

The energy consumption of the university as we know is divided into multiple categories. Out of which the major one is the consumption of electrical energy. The consumption details can be found below:

**Table 6: Consumption of electrical energy in buildings and hostels in 2019-2020:**

<b>Buildings</b>	<b>Cost Per Annum (in Rs.)</b>	<b>Average Cost (in Rs.)</b>
Administrative & Academic Blocks	20,25,004	1,68,750
Ananya Hostel	2,24,270	18,689
Anindita Hostel	2,64,803	22,066
<b>TOTAL</b>	<b>25,14,077</b>	<b>2,09,505</b>

Rama Devi Women's University has been sanctioned with electricity load of 80000 KW/KVA from the TPCODL. There were four transformers, each of 500 KW/KVA sanctioned load, three were in working condition and one was on standby. The water pump in the campus was run by one transformer with the sanctioned load of 63 KW/KVA. At that time, the electricity meters were established in main building and hostels with a sanctioned load of 122.4 KW/KVA and 29.5 KW/KVA (as per electricity bill) respectively. The total sanctioned load to building and hostels was 151.9 KW/KVA, which was consumed as supplied by the TPCODL. The total cost of

electricity consumption in administrative block, academic blocks and two other hostels incurred was Rs. 25,14,077 and the average cost per annum incurred was Rs. 2,09,505. It was observed that there was increase in total cost of electricity consumption in this year as compared to 2018-19 as there was an addition of a new administrative building.

#### 4.2.2. Water consumption

Among the three major components of energy consumption in the university, water is another important component. The consumption details can be found below:

**Table 7: Water consumption in buildings and hostels in 2019-2020:**

<b>Buildings</b>	<b>Cost Per Annum (in Rs.)</b>	<b>Average Cost (in Rs.)</b>
Administrative & Academic Building	9,60,054	80,005
Ananya Hostel	1,57,773	13,148
Anindita Hostel	1,73,291	14,441
<b>TOTAL</b>	<b>12,91,118</b>	<b>1,07,594</b>

For the year 2019-20, a sum of Rs. 9,60,054 was incurred for water expenses for the administrative and academic building. This was the amount which covered the expenses for both the year 2018-19 and 2019-20. The expense for water was increased from Rs. 2,92,561 to Rs. 12,91,118 per annum.

#### 4.2.3. LPG consumption

For preparing food at hostels and other miscellaneous requirements, LPG is getting consumed as a major source. The details of LPG consumption can be found below:

**Table 8: LPG consumption in hostels in 2019-2020:**

<b>Buildings</b>	<b>Cost Per Annum (in Rs.)</b>	<b>Average Cost (in Rs.)</b>
Ananya Hostel	1,30,075	10,840
Anindita Hostel	1,75,058	14,588
<b>TOTAL</b>	<b>3,05,133</b>	<b>25,428</b>

For the year 2019-20, a sum of Rs. 3,05,133 was incurred on LPG consumption for two hostels i.e., Ananya Hostel and Anindita Hostel. The average cost incurred on LPG consumption in two hostels was Rs. 25,428.

**Bills for the year (2019-20) is available in Annexure-2**

**The energy audit committee members recommendations for the session 2019-20**

The energy audit team members after making a complete assessment of the energy consumptions in the university have recommended the following suggestions for minimizing energy consumption and for better use of resources to build a sustainable energy consumption ecology for a better future.

**4.2.4. Recommendations**

1. **Construction of sewerage system:** The university administration is recommended to construct sewerage system for the well management of water drainage in the campus which can check the water wastage.
2. **Regulation to curb water consumption:** The university administration recommended to be calculative in terms of water consumption from time to time.
3. **Revamping water supply mechanism:** Realizing the importance of preserving water sources in the campus for the attainment of SDGs, the committee recommended the university administration to repair and revamp the water supply mechanism.

**4.2.5. Action Taken Report (ATR)**

1. **Construction of sewerage system:** The university administration has initiated to construct sewerage system for the well management of water drainage in the campus in the year 2019 (Letter No – 4555 Date: 15/11/2019).
2. **Regulation to curb water consumption:** In a move to save the water during the time of Covid-19 in the campus, the university requested the Water Corporation of Odisha (WATCO). As a result, the water supply reduced to one-third in the campus (Letter No- 1698 Date 19/05/2020).
3. **Revamping water supply mechanism:** In a view to check over the water leakage in the Academic Block -1, the university administration issued a letter to PHD for the replacement of damaged water tanks by new water tanks (Letter No - 1805 Date: 30/05/2020).

  
**Director IQAC**  
**Rama Devi Women's University**  
**Bhubaneswar**

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**Registrar**  
**RD Women's University**  
**Bhubaneswar**

## ENERGY AUDIT REPORT 2020-21

The energy audit of the university for the session 2020-2021 was conducted in the month of September 2021 by the following committee members:

1. Dr. Sankar Prasad Mohanty, Dept. of Education
2. Dr. Monalisa Mohanty, Dept. of Biotechnology
3. Ms. Jamuna Tudu, Dept. of Life Science

The committee members conducted a survey within the campus and collected the data related to energy consumption by visiting the administrative building, academic blocks and hostels. The energy consumption data was categorized into electrical energy, water and LPG consumption.

### 4.3.1. Consumption of electrical energy

The energy consumption of the university as we know is divided into multiple categories. Out of which the major one is the consumption of electrical energy. The consumption details can be found below:

**Table 9: Consumption of electrical energy in buildings and hostels in 2020-2021:**

<b>Buildings</b>	<b>Cost Per Annum (in Rs.)</b>	<b>Average Cost (in Rs.)</b>
Administrative & Academic Blocks	28,07,776	2,33,981
Ananya Hostel	54,949	4,579
Anindita Hostel	1,36,776	11,398
<b>TOTAL</b>	<b>29,99,501</b>	<b>2,49,958</b>

Rama Devi Women's University has been sanctioned with electricity load of 80000 KW/KVA from the TPCODL. There were four transformers, each of 500 KW/KVA sanctioned load, three were in working condition and one was on standby. The water pump in the campus was run by one transformer with the sanctioned load of 63 KW/KVA. Initially, electricity meters were established in the main building and hostels with a sanctioned load of 122.4 KW/KVA and 29.5 KW/KVA (as per electricity bill) respectively. With the establishment of new administrative building, a new electricity meter of 400 KW/KVA was installed which also included the electricity load for Annapurna Hostel. The total sanctioned load to building and hostel was 551.9

KW/KVA. The total cost of electricity consumption in administrative, academic blocks and two other hostels incurred was Rs. 29,99,501 and the average cost per annum incurred was Rs. 2,49,958. It was observed that there was increase in total cost of electricity consumption in the present year as compared to 2019-20.

#### 4.3.2. Water consumption

Among the three major components of energy consumption in the university, water is another important component. The consumption details can be found below:

**Table 10: Water consumption in buildings and hostels in 2020-2021:**

<b>Buildings</b>	<b>Cost Per Annum (in Rs.)</b>	<b>Average Cost (in Rs.)</b>
Administrative & Academic Building	6,60,671	55,056
Ananya Hostel	61,726	5144
Anindita Hostel	52,113	4,343
<b>TOTAL</b>	<b>7,74,510</b>	<b>64,544</b>

A total amount of Rs. 7,74,510 was incurred on water expenses for the year 2020-21 which covered the expenses on administrative block, academic building and two more hostels. During this time, the renovation works were going on which also raised the water consumption.

#### 4.3.3. LPG consumption

For preparing food at hostels and other miscellaneous requirements, LPG is getting consumed as a major source. The details of LPG consumption can be found below:

**Table 11: LPG consumption in hostels in 2020-2021:**

<b>Buildings</b>	<b>Cost Per Annum (in Rs.)</b>	<b>Average Cost (in Rs.)</b>
Ananya Hostel	38,209	3,184
Anindita Hostel	64,638	16,159
<b>TOTAL</b>	<b>1,03,847</b>	<b>19,343</b>

For the year 2020-21, a sum of Rs. 1,03,847 was incurred on LPG consumption for two hostels i.e., Ananya Hostel and Anindita Hostel. The average cost incurred on LPG consumption in two hostels was Rs. 19,343. The consumption of LPG was reduced in the present year in compared to the previous year as the hostels were closed down because of Covid times.

**Bills for the year (2020-21) is available in Annexure-3**

#### **The energy audit committee members recommendations for the session 2020-21**

The energy audit team members after making a complete assessment of the energy consumptions in the university have recommended the following suggestions for minimizing energy consumption and for better use of resources to build a sustainable energy consumption ecology for a better future.

#### **4.3.4. Recommendations**

- 1. Revamp of existing solar panel and establishment of new solar panels:** The university administration recommended to revamp the existing solar panels damaged due to cyclone Fani in the year 2019.
- 2. Implementation of *Jal Hi Jivan* scheme:** The university administration recommended to provide tap water fit for consumption for the students. The university administration can communicate to the WATCO for installation of *Jal Hi Jivan*- water kiosks, implemented under Government Sujal Scheme in the campus.
- 3. Regulation to curb water consumption:** The university administration recommended to be calculative in terms of water consumption from time to time.

#### **4.3.5. Action Taken Report (ATR)**

- 1. Revamp of existing solar panel and establishment of new solar panels:** The administration has initiated to revamp the existing solar panels, damaged in Fani Cyclone in 2019 (Letter No. 3910 Date- 07/09/2021).
- 2. Implementation of *Jal Hi Jivan* scheme:** To meet the increasing need of water supply in newly constructed academic blocks, hotels and library, the university

administration communicated to the WATCO (Letter No -1155 Date: 03/03/2021).

- 3. Regulation to curb water consumption:** After re-opening of hostels and operating at full capacity, the university administration requested for the full-fledged water supply in the campus (Letter No - 889 Date: 11/02/2021). Again, the university administration requested the WATCO to reduce the water supply for campus as lock down continued during the time of Covid-19 (Letter 2233 Date: 30/04/2021).

  
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RD Women's University  
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## ENERGY AUDIT REPORT 2021-22

The energy audit of the university for the session 2021-2022 was conducted in the month of September 2022 by the following committee members:

1. Dr. Sankar Prasad Mohanty, Dept. of Education
2. Dr. Santosh Kumar Biswal, Dept. of Journalism and Mass Communication
3. Ms. Jamuna Tudu, Dept. of Life Science
4. Ms. Heleena Jati, Dept. of Home Sciences

The committee members conducted a survey within the campus and collected the data related to energy consumption by visiting the administrative building, academic blocks and hostels. The energy consumption data was categorized into electrical energy, water and LPG consumption.

### 4.4.1. Consumption of electrical energy

The energy consumption of the university as we know is divided into multiple categories. Out of which the major one is the consumption of electrical energy. The consumption details can be found below:

**Table 12: Consumption of electrical energy in buildings and hostels in 2021-2022:**

<b>Buildings</b>	<b>Cost Per Annum (in Rs.)</b>	<b>Average Cost (in Rs.)</b>
Administrative & Academic Blocks	35,47,959	2,95,663
Annapurna Hostel	6,46,240	71,804
Ananya Hostel	1,74,701	14,558
Anindita Hostel	2,71,497	22,625
<b>TOTAL</b>	<b>46,40,397</b>	<b>4,04,650</b>

Rama Devi Women's University has been sanctioned with electricity load of 80000 KW/KVA from the TPCODL. There were four transformers, each of 500 KW/KVA sanctioned load, three were in working condition and one was on standby. The water pump in the campus was run by one transformer with the sanctioned load of 63 KW/KVA. With the establishment of new administrative building, a new electricity

meter of 400 KW/KVA was installed in this period. A new electricity meter was installed in Annapurna Hostel with a sanctioned load of 56 KW/KVA. The total sanctioned load to building and hostels was 607.9 KW/KVA. The new Anwesha Research Hostel did not have a separate meter for electricity consumption. It was observed that there was increase in total cost of electricity consumption from Rs. 29,99,501 to Rs. 46,40,397 and the average cost also rose from Rs. 2,49,958 to Rs. 4,04,650.

#### 4.4.2. Water consumption

Among the three major components of energy consumption in the university, water is another important component. The consumption details can be found below:

**Table 13: Water consumption in buildings and hostels in 2021-2022:**

<b>Buildings</b>	<b>Cost Per Annum (in Rs.)</b>	<b>Average Cost (in Rs.)</b>
Administrative & Academic Building	2,79,583	23,299
Ananya Hostel	1,61,209	13,434
Anindita Hostel	1,97,323	16,444
<b>TOTAL</b>	<b>6,38,115</b>	<b>53,177</b>

A total amount of Rs. 6,38,115 was incurred on water expenses for the year 2021-22 which covered the expenses of administrative, academic building and two more hostels. The expenses were lesser than the previous year 2020-21 as the hostels were closed down because of COVID-19.

#### 4.4.3. LPG consumption

For preparing food at hostels and other miscellaneous requirements, LPG is getting consumed as a major source. The details of LPG consumption can be found below:

**Table 14: LPG consumption in hostels in 2021-2022:**

<b>Buildings</b>	<b>Cost Per Annum (in Rs.)</b>	<b>Average Cost (in Rs.)</b>
Annapurna Hostel	1,76,187	19,576
Ananya Hostel	99,250	11,027
Anindita Hostel	1,35,828	15,092
<b>TOTAL</b>	<b>4,11,265</b>	<b>45,695</b>

For the year 2021-22, a sum of Rs. 4,11,265 was incurred on LPG consumption for three hostels i.e., Ananya Hostel, Anindita Hostel and Annapurna Hostel as Annapurna Hostel was the new addition in the list of hostels. The average cost incurred on LPG consumption in three hostels was Rs. 45,695. The consumption of LPG was increased in compared to the previous year.

**Bills for the year (2021-22) is available in Annexure-4**

**The energy audit committee members recommendations for the session 2021-22**

The energy audit team members after making a complete assessment of the energy consumptions in the university have recommended the following suggestions for minimizing energy consumption and for better use of resources to build a sustainable energy consumption ecology for a better future.

**4.4.4. Recommendations**


1. **Revamp of existing solar panel and establishment of new solar panels:** It is recommended to install new solar panels to meet growing requirements of electricity in the campus. As means of potential alternative source of power, solar energy can be maximally utilized which also can attain the goals of SDGs. University campus can be solar energy-friendly. Some of the street lights need to be replaced by solar lights. The university administration is recommended to communicate to competent authorities and further measures can be initiated.
2. **Replacement of Fluorescent Tube Lights (FTL) by Light Emitting Diodes (LED):** The committee recommended the university administration to replace fluorescent tube lights (FTL) by Light Emitting Diodes (LED) tube lights and bulbs to curtail the amount of electricity bills in the campus.

3. **Revamping water supply mechanism:** Realizing the importance of preserving water sources in the campus for the attainment of SDGs, the committee recommended the university administration to repair and revamp the water supply mechanism.
4. **Implementation of *Jal Hi Jivan* scheme:** The university administration recommended to provide tap water fit for consumption for the students. The university administration can communicate to the WATCO for installation of *Jal Hi Jivan*- water kiosks, implemented under Government Sujal Scheme in the campus.

#### 4.4.5. Action Taken Report (ATR)

1. **Revamp of existing solar panel and establishment of new solar panels:** The university administrative communicated to the GEDCOL for renovation of solar panels (Letter No- 861 Date- 23/02/2022).
2. **Replacement of fluorescent tube lights (FTL) by light emitting diodes (LED):** Fluorescent tube lights (FTL) and bulbs were predominantly used in the university campus. As a result, the electricity expenses were rising high. In this direction, university administration has taken measures to replace tungsten light bulbs by LED tube lights and bulbs. It is quite vital to check the meter readings for the consumption of electricity which ultimately attempted to curtail the expenses as well.
3. **Revamping water supply mechanism:** In a move to preserve water in the campus, the administration communicated to the OPHCW Ltd., to repair the PHD works (Letter No – 1233 Date: 14/03/2022).
4. **Implementation of *Jal Hi Jivan* scheme:** To meet the increasing need of water supply in newly constructed academic blocks, hotels and library, the university administration communicated to the WATCO (Letter No- 2619 Date: 21/06/2021). In order to provide tap water fit for consumption for the students, the university administration communicated to the WATCO for installation of *Jal Hi Jivan*- water kiosk, implemented under Government Sujal Scheme in the campus (Letter No- 1109 Date: 09/03/2022).

  
**Director IQAC**  
Rama Devi Women's University  
Bhubaneswar

  
**Registrar**  
27 RD Women's University  
Bhubaneswar

## ENERGY AUDIT REPORT 2022-23

The energy audit of the university for the session 2022-2023 was conducted in the month of September 2023 by the following committee members:

1. Dr. Sankar Prasad Mohanty, Dept. of Education
2. Dr. Santosh Kumar Biswal, Dept. of Journalism and Mass Communication
3. Ms. Jamuna Tudu, Dept. of Life Science
4. Ms. Heleena Jati, Dept. of Home Sciences

The committee members conducted a survey within the campus and collected the data related to energy consumption by visiting the administrative building, academic blocks and hostels. The energy consumption data was categorized into electrical energy, water and LPG consumption.

### 4.5.1. Consumption of electrical energy

The energy consumption of the university as we know is divided into multiple categories. Out of which the major one is the consumption of electrical energy. The consumption details can be found below:

**Table 15: Consumption of electrical energy in buildings and hostels in 2022-2023:**

<b>Buildings</b>	<b>Cost Per Annum (in Rs.)</b>	<b>Average Cost (in Rs.)</b>
Administrative & Academic Blocks	42,36,520	3,53,043
Annapurna Hostel	14,47,788	1,20,649
Ananya Hostel	1,93,563	16,130
Anindita Hostel	3,69,421	30,785
<b>TOTAL</b>	<b>62,47,292</b>	<b>5,20,607</b>

Rama Devi Women's University has been sanctioned electricity load of 80000 KW/KVA from the TPCODL. It has four transformers each of 500 KW/KVA sanctioned load, three are in working condition and one is on standby. The water pump in the campus was run by one transformer with a sanctioned load of 63 KW/KVA. In the beginning of the session 2022-23, there is an addition to two new academic buildings (Academic Block-2 and Academic Block-3). There are three separate meters for Administrative Building, Academic Block-1 and one meter for Academic Block - 2

and Academic Block-3. Out of four UG, PG and Ph.D. hostels, three hostels have separate meters for electricity consumption except Anwasha Research Hostel. Currently, the total electricity supplied to different buildings and hostels is 923.46 KW/KVA. It is observed that there has been an increase in cost per annum from Rs. 46,40,397 to Rs. 62,47,292 and average cost per annum also rose from Rs. 4,04,650 to Rs. 5,20,607.

#### 4.5.2. Water consumption

Among the three major components of energy consumption in the university, water is another important component. The consumption details can be found below:

**Table 16: Water consumption in buildings and hostels in 2022-2023:**

<b>Buildings</b>	<b>Cost Per Annum (in Rs.)</b>	<b>Average Cost (in Rs.)</b>
Administrative & Academic Buildings	2,31,560	19,297
Ananya Hostel	1,56,324	13,027
Anindita Hostel	1,89,768	15,814
<b>TOTAL</b>	<b>5,77,652</b>	<b>48,138</b>

A total amount of Rs. 5,77,652 was incurred on water expenses for the year 2022-23 which covered the expenses on administrative block, academic blocks and two more hostels. The average cost for the year of water consumption was Rs. 48,138.

#### 4.5.3. LPG consumption

For preparing food at hostels and other miscellaneous requirements, LPG is getting consumed as a major source. The details of LPG consumption can be found below:

**Table 17: LPG consumption in hostels in 2022-2023:**

<b>Buildings</b>	<b>Cost Per Annum (in Rs.)</b>	<b>Average Cost (in Rs.)</b>
Annapurna Hostel	2,79,197	39,885
Ananya Hostel	1,36,816	11,401
Anindita Hostel	2,90,271	17,439
<b>TOTAL</b>	<b>7,06,284</b>	<b>68,725</b>

For the year 2022-23, a sum of Rs. 7,06,284 was incurred on LPG consumption for three hostels i.e., Ananya Hostel, Anindita Hostel and Annapurna Hostel and average cost of LPG consumption was Rs. 68,725. The consumption of LPG was increased in compared to the previous year i.e., 2021-22.

**Bills for the year (2022-23) is available in Annexure-5**

#### **The energy audit committee members recommendations for the session 2022-23**

The energy audit team members after making a complete assessment of the energy consumptions in the university have recommended the following suggestions for minimizing energy consumption and for better use of resources to build a sustainable energy consumption ecology for a better future.

#### **4.5.4. Recommendations**

1. **Revamp of existing solar panel and establishment of new solar panels:** It is recommended to install new solar panels to meet growing requirements of electricity in the campus. As means of potential alternative source of power, solar energy can be maximally utilized which can attain the goals of SDGs. University campus can be solar energy-friendly. Some of the street lights need to be replaced by solar lights. The university administration is recommended to communicate to competent authorities and further measures can be initiated.
2. **Initiative to conduct survey of power consumption:** The committee recommended to contact competent authorities to conduct audit of electricity consumption in the campus.
3. **Installation of separate meters to check electricity consumption:** In order to check the amount of electricity consumption in administrative, academic blocks and hostels in individual manners, the committee recommended to install separate meters.
4. **Revamping water supply mechanism:** Realizing the importance of preserving water sources in the campus for the attainment of SDGs, the committee recommended the university administration to repair and revamp the water supply mechanism.
5. **Regulation to curb water consumption:** The university administration is recommended to be calculative in terms of water consumption from time to time.

6. **Initiative to conduct water audit:** The university administration is recommended to communicate to competent authorities to conduct water audit in the university to check water wastages for ensuring judicious use of water resources and lower the water bills.

#### 4.5.5. Action Taken Report (ATR)

1. **Revamp of existing solar panel and establishment of new solar panels:** the solar panels were re-installed on the rooftops of Academic Block –1 (Letter No – 6839 Date – 29/12/2022).
2. **Initiative to conduct survey of power consumption:** The university administrative has communicated to the Odisha Renewable Energy Development Agency (OREDA) to initiate a survey of the campus in light of installing of solar panels (Letter No – 44178 date 02/09/2022). Later, a survey was conducted by the team of OREDA in the campus on 06/09/2022 (Geo-tag pictures attached). Accordingly, the OREDA prepared a DPR in order to estimate for the installment of On-Grid Solar Plant System in the campus, both in administrative and residential buildings (Letter No. 2496/OREDA Date 19/09/2022). Further, the OREDA claimed that the annual saving in electricity bills after installation of solar power plants will be approximately of Rs. 8,04,960 which is a saving of 33.54% per year. As per the latest report, Rama Devi Women’s University, Bhubaneswar is one of the eighteen public universities where GEDCOL is the sole executive agency for the installation of rooftop solar power plant (Letter No – 9043/HE Date – 01/03/2023).
3. **Installation of separate meters to check electricity consumption:** Initially, administrative building, new academic blocks and newly added hostels had a common electricity meter for which understanding the electricity consumption in separate entities were not feasible. In this direction, steps have been taken to divide and to create sub-meters in respective locations. Wall stickers indicating the saving of electricity have been placed in the strategic locations in the campus.
4. **Revamping water supply mechanism:** There were leakages in the overhead tanks in the campus, resulting in wastage of barrels of water. In a precautionary mode, the university issued a letter to the WATCO to repair overhead tanks in the campus which can stop water wastages in the campus (Letter No – 3806



Date: 10.08.2022 and Letter No- 5140 Date: 14/10/2022). This shows that the university has been keen to preserve water sources from time to time.

5. **Regulation to curb water consumption:** As in the summer vacation, hostels were closed down during the month of May-June, 2023, the requirements for consumption were reduced. Realising this reason, the university administration communicated to the WATCO to reduce the water supply in the campus (Letter No- 2989 Date: 11/05/2023).
6. **Initiative to conduct water audit:** The administration has issued a letter to the WATCO for conducting water audit in the university to check the wastage of water for ensuring judicious use of water resources and lower the water bills (Letter No- 5139 Date: 14/10/2022 and Letter No- 5780 Date: 03/10/2023).

  
**Director IQAC**  
Rama Devi Women's University  
Bhubaneswar

  
**Registrar**  
RD Women's University  
Bhubaneswar

## ENERGY AUDIT REPORT 2018-23

Rama Devi Women's University has been sanctioned electricity load of 80000 KW/KVA from the TPCODL. It has four transformers each of 500 KW/KVA sanctioned load, three are in working condition and one is on standby. The water pump in the campus was run by one transformer with a sanctioned load of 63 KW/KVA. Currently, the total electricity supplied to different buildings and hostels is 923.46 KW/KVA. It has been observed that from 2018 to 2023, the number of administrative and academic building has increased to meet up the increased requirements of the university. To make the teaching-learning process effective, new buildings have been constructed in course of time. A new auditorium has been established in the year 2022. A library has been set up to foster the academic spirit among the students and teachers. In addition, two new hostels have been set up to the growing needs of students' accommodation. All these initiatives led to an increase in electricity consumption from 2018 to 2023.

**Consumption of electrical energy:** It is observed that there has been a significant increase in cost of electricity from Rs. 11,13,974 to Rs. 62,47,292 per annum and average cost per annum also rose from Rs. 92,832 to Rs. 5,20,607 which includes administrative building, academic building and three hostels (Ananya, Anindita and Annapurna hostel). There is no separate meter established in Anwasha Research Hostel.

**Water consumption:** It is found that the expenditure on water consumption from 2018-19 to 2020-21 has increased because of construction works in the university. Academic Block –1 was renovated while Academic Block - 2 and Academic Block - 3 came up to meet up academic requirements. Later, the expenditure on water from 2021 to 2023 has been gradually reduced.

**LPG consumption:** It is also found that the expenditure on LPG from 2018-19 to 2021 was reduced because of Covid-19 when the hostels were closed due to lockdown. However, the expenditure from 2021 to 2023 has gone up from Rs 4,11,265 to Rs. 7,06,284 as new hostel i.e., Annapurna Hostel came up to meet up students' requirements.

## INCREMENTAL DATA ANALYSIS

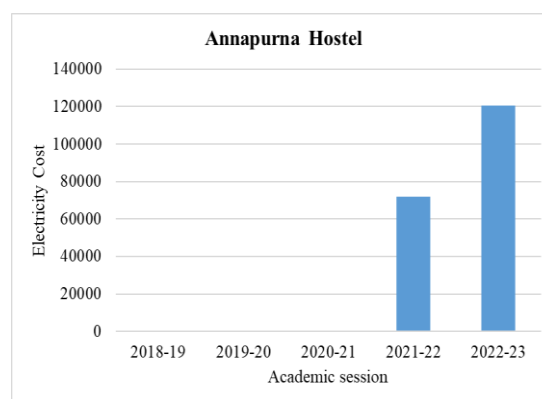
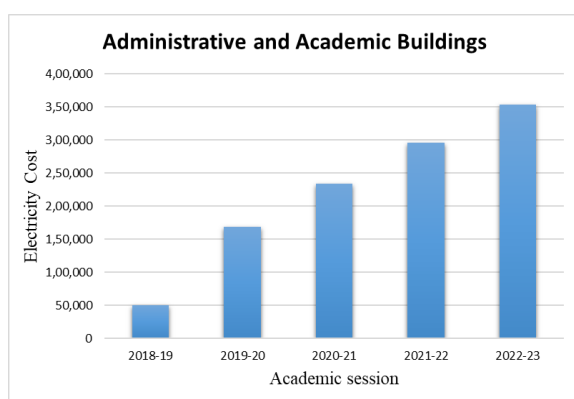
### 5.1. Incremental Data Analysis of Electricity Consumption

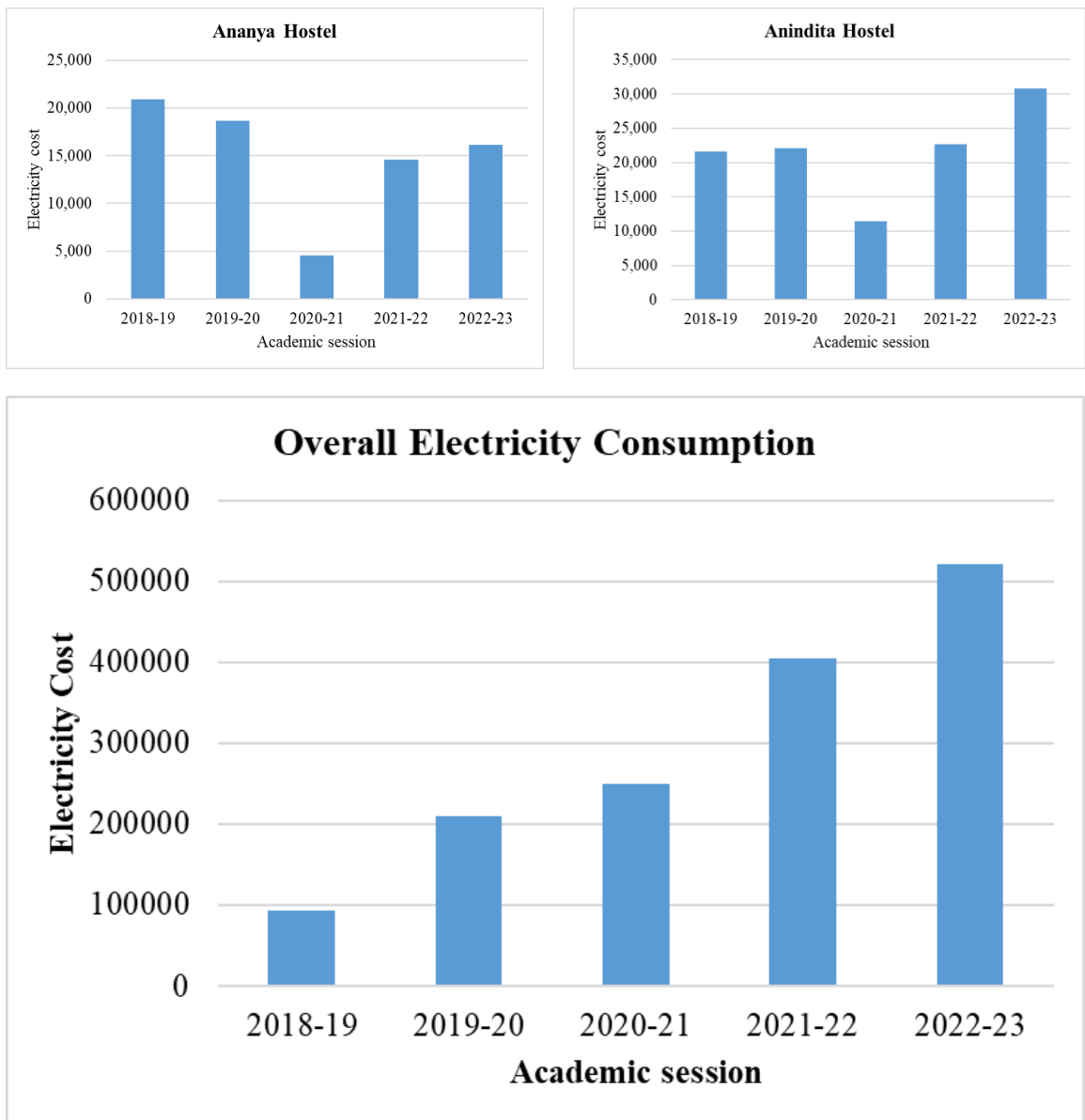
**Table 18: Consumption of electrical energy in last 5 years (2018-2023)**

Buildings	Electricity cost per annum (in Rs.)				
	2018-19	2019-20	2020-21	2021-22	2022-23
Administrative & Academic Blocks	6,03,824	20,25,004	2807776	35,47,959	42,36,520
Annapurna Hostel	-	-	-	6,46,240	14,47,788
Ananya Hostel	2,50,836	2,24,270	54949	1,74,701	1,93,563
Anindita Hostel	2,59,314	2,64,803	1,36,776	2,71,497	3,69,421
<b>TOTAL</b>	<b>11,13,974</b>	<b>25,14,077</b>	<b>29,99,501</b>	<b>46,40,397</b>	<b>62,47,292</b>

**Table 19: Average Electricity consumption per annum (2018-2023)**

Buildings	Electricity cost per annum (in Rs.)				
	2018-19	2019-20	2020-21	2021-22	2022-23
Administrative & Academic Blocks	50,319	1,68,750	2,33,981	2,95,663	3,53,043
Annapurna Hostel	-	-	-	71,804	1,20,649
Ananya Hostel	20,903	18,689	4,579	14,558	16,130
Anindita Hostel	21,610	22,066	11,398	22,625	30,785
<b>TOTAL</b>	<b>92,832</b>	<b>2,09,505</b>	<b>2,49,958</b>	<b>4,04,650</b>	<b>5,20,607</b>





**Figure 1: Depicting electricity consumption in different buildings.**

It has been observed that from 2018 to 2023, the number of administrative and academic building has increased to meet up the increased requirements of the university. To make the teaching-learning process effective, new buildings have been constructed in course of time. A new auditorium has been established in the year 2022. A library has been set up to foster the academic spirit among the students and teachers. In addition, two new hostels have been set up to the growing needs of students’ accommodation. All these initiatives led to an increase in electricity consumption from 2018 to 2023.

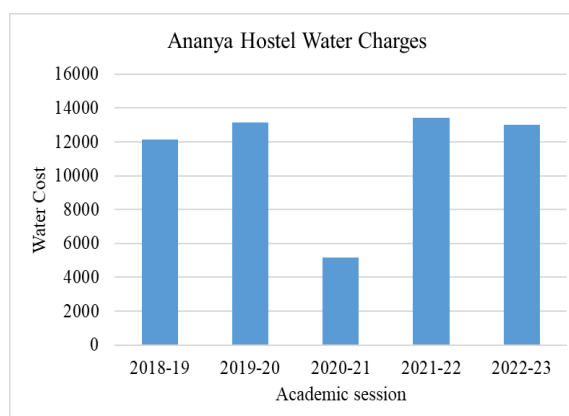
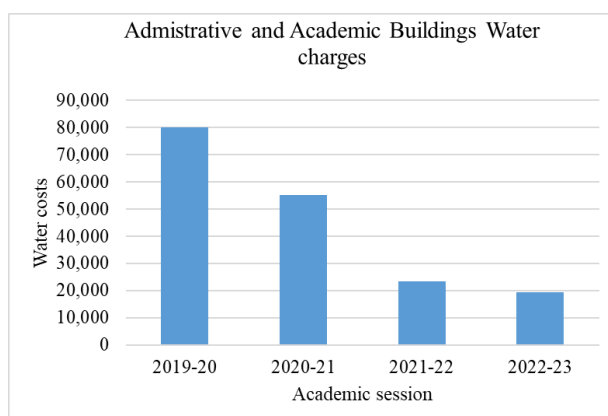
## 5.2. Incremental Data Analysis of Water Consumption

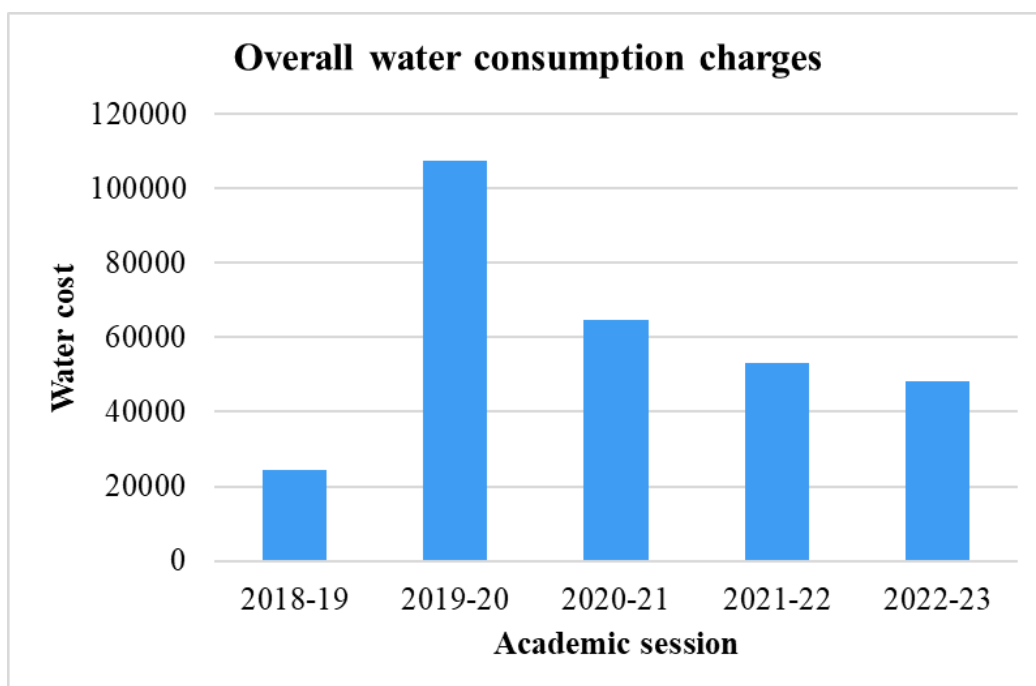
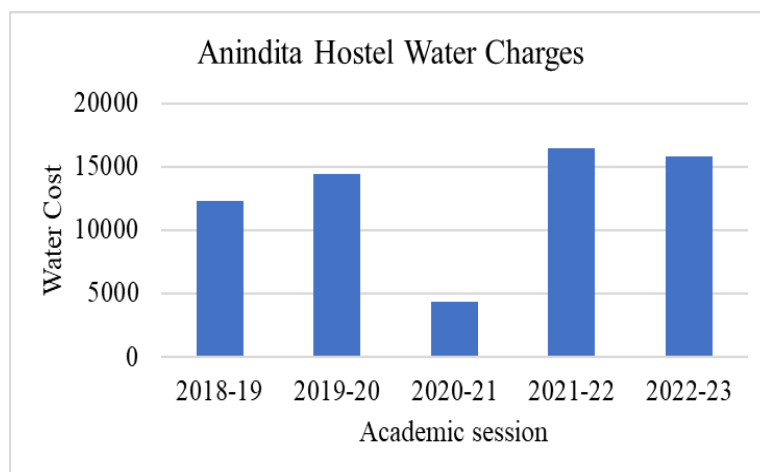
**Table 20: Water Consumption in last 5 years (2018-2023)**

Buildings	Water cost per annum (in Rs.)				
	2018-19	2019-20	2020-21	2021-22	2022-23
Administrative & Academic Blocks	-	9,60,054	6,60,671	2,79,583	2,31,560
Ananya Hostel	1,45,638	1,57,773	61,726	1,61,209	1,56,324
Anindita Hostel	1,46,923	1,73,291	52,113	1,97,323	1,89,768
<b>TOTAL</b>	<b>2,92,561</b>	<b>12,91,118</b>	<b>7,74,510</b>	<b>6,38,115</b>	<b>5,77,652</b>

**Table 21: Average Water Consumption in last 5 years (2018-2023)**

Buildings	Water cost per annum (in Rs.)				
	2018-19	2019-20	2020-21	2021-22	2022-23
Administrative & Academic Blocks	-	80,005	55,056	23,299	19,297
Ananya Hostel	12,136	13,148	5,144	13,434	13,027
Anindita Hostel	12,244	14,441	4,343	16,444	15,814
<b>TOTAL</b>	<b>24,380</b>	<b>1,07,594</b>	<b>64,544</b>	<b>53,177</b>	<b>48,138</b>





***Figure 2: Depicting water consumption in different buildings***

It is found that the expenditure on water consumption from 2018-19 to 2020-21 has increased because of construction works in the university. Academic Block –1 was renovated while Academic Block - 2 and Academic Block - 3 came up to meet up academic requirements. Later, the expenditure on water from 2021 to 2023 has been gradually reduced.

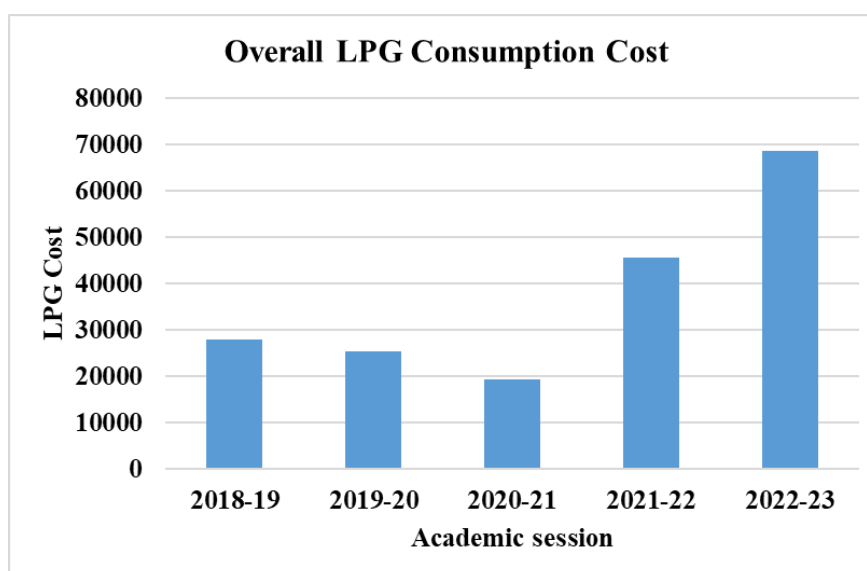
### 5.3. Incremental Data Analysis of LPG Consumption

**Table 22: LPG Consumption in Hostels last 5 years (2018-2023)**

Buildings	LPG cost per annum (in Rs.)				
	2018-19	2019-20	2020-21	2021-22	2022-23
Annapurna Hostel	-	-	-	1,76,187	2,79,197
Ananya Hostel	1,47,751	1,30,075	38,209	99,250	1,36,816
Anindita Hostel	1,88,894	1,75,058	64,638	1,35,828	2,90,271
<b>TOTAL</b>	<b>3,36,645</b>	<b>3,05,133</b>	<b>1,03,847</b>	<b>4,11,265</b>	<b>7,06,284</b>

**Table 23: Average LPG consumption in last 5 years (2018-2023)**

Buildings	LPG cost per annum (in Rs.)				
	2018-19	2019-20	2020-21	2021-22	2022-23
Annapurna Hostel	-	-	-	19,576	39,885
Ananya Hostel	12,313	10,840	3,184	11,027	11,401
Anindita Hostel	15,741	14,588	16,159	15,092	17,439
<b>TOTAL</b>	<b>28,054</b>	<b>25,428</b>	<b>19,343</b>	<b>45,695</b>	<b>68,725</b>



**Figure 3: Depicting of LPG consumption in hostels.**

It is found that the expenditure on LPG from 2018-19 to 2021 was reduced because of Covid-19. However, the expenditure from 2021 to 2023 has gone up from Rs 4,11,265 to Rs. 7,06,284 as new hostel i.e., Annapurna Hostel came up to meet up students' requirements.

## RECOMMENDATIONS

After analyzing and understanding the nature and patterns of various energy sources i.e., electricity, water and LPG in university, the Energy Audit Committee recommended the following measures:

### **Recommendations for the Conservation of Electricity**

1. **Revamp of existing solar panel and establishment of new solar panels:** The university administration is recommended to revamp the existing solar panels damaged due to cyclone Fani in the year 2019. It is also recommended to install new solar panels to meet growing requirements of electricity in the campus. As means of potential alternative source of power, solar energy can be maximally utilized which also can attain the goals of SDGs. University campus can be solar energy-friendly. Some of the street lights need to be replaced by solar lights. The university administration is recommended to communicate to competent authorities and further measures can be initiated.
2. **Initiative to conduct survey of power consumption:** The committee recommended to contact competent authorities to conduct audit of electricity consumption in the campus.
3. **Replacement of Fluorescent Tube Lights (FTL) by Light Emitting Diodes (LED):** The committee recommended the university administration to replace fluorescent tube lights (FTL) by Light Emitting Diodes (LED) tube lights and bulbs to curtail the amount of electricity bills in the campus.
4. **Installation of separate meters to check electricity consumption:** In order to check the amount of electricity consumption in administrative, academic blocks and hostels in individual manners, the committee recommended to install separate meters.

### **Recommendations for the Conservation of Water**

1. **Revamping water supply mechanism:** Realizing the importance of preserving water sources in the campus for the attainment of SDGs, the committee recommended the university administration to repair and revamp the water supply mechanism.



2. **Construction of sewerage system:** The university administration is recommended to construct sewerage system for the well management of water drainage in the campus which can check the water wastages.
3. **Regulation to curb water consumption:** The university administration is recommended to be calculative in terms of water consumption from time to time.
4. **Implementation of *Jal Hi Jivan* scheme:** The university administration is recommended to provide tap water fit for consumption for the students. The university administration can communicate to the WATCO for installation of *Jal Hi Jivan*- water kiosks, implemented under Government Sujal Scheme in the campus.
5. **Initiative to conduct water audit:** The university administration is recommended to communicate to competent authorities to conduct water audit in the university to check water wastages for ensuring judicious use of water resources and lower the water bills.

#### **Recommendations for the Conservation of LPG**

1. **Implementation of steam cooking System:** In order to minimize the LPG consumption, the university administration is recommended to implement steam cooking system in the hostels by judiciously replacing LPG gas stoves.
2. **Replacement of traditional vessels by pressure cookers:** It is recommended to use pressure cookers by replacing traditional aluminium vessels in a phased manner.
3. **Replacement of old and inefficient kitchen appliances:** It is recommended to replace old and inefficient kitchen appliances by five-star energy efficient and self-defrosting refrigerators. It is also required to create awareness among cooking staffs and students.
4. **Use of LPG in the campus:** It is recommended to create a sustained effort in bringing awareness on saving energy sources i.e., electricity, water and LPG in the campus including hostels. In this regard, printed materials related to conservation of electricity and water can be pasted in classrooms, offices and corridors of the university. Awareness drives can be initiated in the campus.

## **ACTION TAKEN REPORT (ATR)**

Based on the recommendations of the Energy Audit Committee, the university administration has undertaken various measures to save energy sources (Electricity, Water and LPG). The purpose is to align its objectives with the sustainable development goals (SDGs). Since energy sources are limited and there is a growing need for them, university has been proactive to deal these issues in an amicable manner. In this manner, the university mechanism is prudent to mobilize its energy sources in the direction of the SDGs.

### **Action Taken for the Conservation of Electricity**

As per the ‘**Recommendations for the Conservation of Electricity**’, the administration has taken visible steps to curtail the electricity bills in the campus. In a view to minimize the cost of electricity, the university has taken various steps. Since solar energy is vital as an alternative source of energy, university administration has taken measures across the campus.

1. **Revamp of existing solar panel and establishment of new solar panels:** These solar panels were earlier installed by the Green Energy Development Corporation of Odisha Ltd (GEDCOL) on the rooftop of Academic Block-1 in the year 2016-17 (Letter No – 2143 Date- 21/03/2016). The GEDCOL installed the required amount of solar panels in 2016-17 and continued its services up to the year 2019. Later, in order to make the solar energy more viable, the GEDCOL revised its rooftop solar units in the existing solar plants (Letter No – 2528 date- 09/10/2018). The administration has initiated to revamp the existing solar panels, damaged in Fani Cyclone in 2019 (Letter No. 3910 Date- 07/09/2021). As a result, the university administrative communicated to the GEDCOL for renovation of solar panels (Letter No- 861 Date- 23/02/2022). Later, the same panels were re-installed on the roof tops of Academic Block –1 (Letter No – 6839 Date – 29/12/2022).
2. **Initiative to conduct survey of power consumption:** The university administrative has communicated to the Odisha Renewable Energy Development Agency (OREDA) to initiate a survey of the campus in light of installing of solar panels (Letter No – 44178 date 02/09/2022). Later, a survey was conducted by the team of OREDA in the campus on 06/09/2022 (Geo-tag pictures attached). Accordingly, the OREDA prepared a DPR in order to estimate for the installment

of On-Grid Solar Plant System in the campus, both in administrative and residential buildings (Letter No. 2496/OREDA Date 19/09/2022). Further, the OREDA claimed that the annual saving in electricity bills after installation of solar power plants will be approximately of Rs. 8,04,960 which is a saving of 33.54% per year. As per the latest report, Rama Devi Women's University, Bhubaneswar is one of the eighteen public universities where GEDCOL is the sole executive agency for the installation of rooftop solar power plant (Letter No – 9043/HE Date – 01/03/2023).

3. **Replacement of fluorescent tube lights (FTL) by light emitting diodes (LED):** Fluorescent tube lights (FTL) and bulbs were predominantly used in the university campus. As a result, the electricity expenses were rising high. In this direction, university administration has taken measures to replace tungsten light bulbs by LED tube lights and bulbs. It is quite vital to check the meter readings for the consumption of electricity which ultimately attempted to curtail the expenses as well.
4. **Installation of separate meters to check electricity consumption:** Initially, administrative building, new academic blocks and newly added hostels had a common electricity meter for which understanding the electricity consumption in separate entities were not feasible. In this direction, steps have been taken to divide and to create sub-meters in respective locations. Wall stickers indicating the saving of electricity have been placed in the strategic locations in the campus.

#### **Action Taken for the Conservation of Water**

It is inevitable to preserve water sources which are essentials for the attainment of the SDGs. Access to safe water, sanitation and hygiene is the most basic human need for health and well-being. Billions of people are still lacking the access to these basic services. The demand for water is rising owing to rapid population growth, urbanization and increasing water needs from agriculture, industry, and energy sectors. The demand for water has outpaced population growth, and half the world's population is already experiencing severe water scarcity at least one month a year. Water scarcity is projected to increase with the rise of global temperatures as a result of climate change. Water availability is becoming less predictable in many places. In some regions, droughts are

exacerbating water scarcity and thereby negatively impacting people's health and productivity and threatening sustainable development and biodiversity worldwide. Ensuring that everyone has access to sustainable water and sanitation services is a critical climate change mitigation strategy for the years ahead.

As per the '**Recommendations for the Conservation of Water**' in view of the importance of the above issues and solution, the university administration has well-understood its courses of action.

1. **Revamping water supply mechanism:** The cyclone Fani severely damaged 15 overhead tanks and tank sheet covers in administrative blocks and hostels in 2019. In addition, the pipelines connected to these tanks were also damaged. This caused the irregularity of water supply to these blocks and hostels. In connection, university administration requested the PHD-II to resume the water supply in the campus (Letter No – 1781 Date: 8/5/2019). In order to maintain water supply intact, the university administration has been proactive all the time. The university administration communicated to the Executive Engineer, BCCD-I, CESU, Bhubaneswar in order to restore electricity meant to be used for water supply in the campus (Letter No – 1864 Date: 15/05/2019). In a response to this, the Executive Engineer, PHD communicated an estimation of Rs 113.50 Lakhs for the repair and renovation of water supply and sewerage infrastructure which was severely damaged by cyclone Fani (Letter No- 5421 Date: 20/05/2019). In a view to check over the water leakage in the Academic Block -1, the university administration issued a letter to PHD for the replacement of damaged water tanks by new water tanks (Letter No - 1805 Date: 30/05/2020). In a move to preserve water in the campus, the administration communicated to the OPHCW Ltd., to repair the PHD works (Letter No – 1233 Date: 14/03/2022). There were leakages in the overhead tanks in the campus, resulting in wastage of barrels of water. In a precautionary mode, the university issued a letter to the WATCO to repair overhead tanks in the campus which can stop water wastages in the campus (Letter No – 3806 Date: 10.08.2022 and Letter No- 5140 Date: 14/10/2022). This shows the university has been keen to preserve water sources from time to time.
2. **Construction of sewerage system:** The university administration has initiated to construct sewerage system for the well management of water drainage in the campus in the year 2019 (Letter No – 4555 Date: 15/11/2019).

3. **Regulation to curb water consumption:** In a move to save the water during the time of Covid-19 in the campus, the university requested the Water Corporation of Odisha (WATCO). As a result, the water supply reduced to one-third in the campus (Letter No- 1698 Date 19/05/2020). After re-opening of hostels and operating at full capacity, the university administration requested for the full-fledged water supply in the campus (Letter No - 889 Date: 11/02/2021). Again, the university administration requested the WATCO to reduce the water supply for campus as lock down was continuing during the time of Covid-19 (Letter 2233 Date: 30/04/2021). As in the summer vacation, hostels were closed down during the month of May-June, 2023, the requirements for consumption were reduced. Realising this reason, the university administration communicated to the WATCO to reduce the water supply in the campus (Letter No- 2989 Date: 11/05/2023).
4. **Implementation of *Jal Hi Jivan* scheme:** To meet the increasing need of water supply in newly constructed academic blocks, hotels and library, the university administration communicated to the WATCO (Letter No -1155 Date: 03/03/2021 and Letter No- 2619 Date: 21/06/2021). In order to provide tap water fit for consumption for the students, the university administration communicated to the WATCO for installation of *Jal Hi Jivan*- water kiosk, implemented under Government Sujal Scheme in the campus (Letter No- 1109 Date: 09/03/2022).
5. **Initiative to conduct water audit:** Last not the least, the administration has issued a letter to the WATCO for conducting water audit in the university to check water wastages for ensuring judicious use of water resources and lower the water bills (Letter No- 5139 Date: 14/10/2022 and Letter No- 5780 Date: 03/10/2023).

It is observed that university administration has been proactive in tapping the maximum utility of water in the campus. Many a times, university communicated to the competent authorities to prevent the water wastages by repairing or revamping the infrastructure pertaining to water supply. When there is lesser need of water be in administrative block or academic blocks or hostels, the administration is keen to act upon accordingly which ultimately attempt to save the water in the campus. In a view to create awareness among the students, faculty members and non-teaching staffs in the campus, administration has taken measures. Wall stickers indicating the saving of water have been placed in

the strategic locations in the campus. The university has been assertive to adapt to various water saving schemes like *Jal Hi Jivan*- water kiosks, implemented under Government Sujal Scheme in the campus.

### **Action Taken for the Consumption of LPG**

In hostels, the cooking mainly depends on LPG consumption as a means of energy sources. Apart from the summer vacation and Dusshera vacation (approx. 45 days), the hostel mess functions throughout the year. The current demand of LPG consumption in hostels is approx. 22-25 LPG cylinders per month required in each hostels with an annual demand of approx. 300 commercial LPG cylinders, each of weighing 19kgs. At present, the cost of each cylinder is Rs. 1877.50 excluding of all taxes and delivery charges. Thus, the annual bill for LPG costs approx. Rs. 7,06,284.

**As per ‘Recommendations for the Conservation of LPG** and in order to curtail the LPG consumption, cooking staffs and students have been counselled in various hostels in the university by using pressure cookers and other utensils with lids in a phased manner.

### **CONCLUSION:**

The energy audit was conducted in the campus in from 2018 to 2023. The committee members observed that from 2018 to 2023, the number of administrative and academic building has increased to meet up the increased requirements of the university. To make the teaching-learning process effective, new buildings have been constructed in course of time. A new auditorium has been established in the year 2022. A library has been set up to foster the academic spirit among the students and teachers. In addition, two new hostels have been set up to the growing needs of students’ accommodation. All these initiatives led to an increase in electricity consumption from 2018 to 2023. The expenditure on water from 2021 to 2023 has been gradually reduced. Owing to increasing in hostels in the university, the consumption of LPG is increased. Precisely, the university is taking innovative measures like installing solar panels to minimize the level of energy consumption.

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