

## TOWARDS A GREENER ENVIRONMENT

Amity University Rajasthan has always been an environmentally conscious and socially responsible campus which makes it truly sustainable. Surrounded by hills, this tree-lined campus is like an “Oasis” that includes beautiful landscape; a rainwater harvesting lake with running fountains and floating aquatic birds; a Neem forest with nature trail & chirping sounds of birds that enables the project to protect the natural habitat and species.

Amity University Rajasthan is LEED registered project for achieving GOLD rating from United States Green Building Council. Leadership in Energy & Environmental Design (LEED) is an internationally recognized Green Building rating awarded to projects for their remarkable efforts in achieving sustainability and low impact on environment.

### ELECTRICAL ENERGY

1. AUR has 24\*7 electric supply through JVVNL and through its own captive power back up from DG sets.
2. With a view towards an energy conscious campus, AUR has installed solar panels on terraces of various buildings and has a ground tracker solar panel system.
3. The total sanctioned load for AUR from JVVNL is 3200 KW. AUR has taken approval presently to utilize 2490 KW out of sanctioned 3200 KW. AUR has two substations and has captive power generation capability to the tune of 4700 KVA through 9 DG sets installed near sub stations. The Solar Plant can generate a total of 0.99 MW or approx. 40% of AUR's total requirement.
4. Peak load, during summers, with all three chillers of air conditioning system running is in the region of 2400 KW. The minimum load is approx 700 KW (with no chillers/ less geysers operating). This is in the months of Nov and in Feb. The electricity bill varies between a maximum of Rs 58 lakhs and minimum Rs 25 lakhs.
5. The residents are provided subsidised electricity.. The vendors are charged at a rate calculated by giving due weightage to the units consumed on JVVNL and DG supply.
6. AUR has also got net metering connection with JVVNL, any excess generation of electricity through the solar panels is channeled to JVVNL grid, thus further saving on electrical cost.
7. Fitment of Solar panels has resulted in savings of Rs 6 lakhs (approx.) per month presently.



8. **General Measures** -The measures adopted to ensure optimal utilization of electricity are as follows

- Unserviceable Pumps motor winding is done only twice after which the pump is made redundant. This is because further rewinding will increase the load current of the pump.
- General Awareness is spread amongst all stakeholders to lower consumption of electricity and take proper precautions. Proper consumption at residences/vendor outlets is monitored through fitment of electronic meters.
- Residents / Students are made aware of the need to s/w off electrical appliances like tubelight / fans before leaving their rooms. They are also advised to stop keeping appliances like TV, Air Conditioner etc in stand by mode.
- Wardens in Hostels ensure that geysers are switched off when not in use. Hostel staff ensures only optimum lighting is used in the common areas of halls, lounges and staircase.
- Attendants in various Academic Blocks ensure that lights/fans are switched off in lecture theatres and classrooms when classes are not being held. Duty attendants also ensure that only necessary lighting is switched on after 6 pm.

9. **Chiller Plants**

- Air Conditioning system is on AMC to ensure efficient operation and regular maintenance. To increase the efficiency of the chiller plants daily inspection and periodic maintenance as required is carried out.
- Preventive maintenance (descaling etc) is carried out during the lean period. This ensures that electricity consumption does not increase significantly with ageing of the chillers.
- Chiller plants are used only on as required basis. Timing of usage is between 9 am to 5 pm from 01 Apr to 31 Oct.
- Records of Chiller plant operation and Power consumption are maintained and monitored to ensure that load current does not increase.

10. **DG Sets/Electrical Panels/Transformers/line losses/Power Factor**

- A dedicated team of electrical engineer and DG operators ensure effective running of the DG sets. Planned Maintenance is carried out at regular intervals as defined for the DG sets.
- DG sets are being synchronized to ensure max load (80% of DG rated capacity) on a particular DG set is achieved before other DG set is brought in line. This ensures reduction in fuel consumption due avoidance of unnecessary



running of second DG set. Record of DG sets running and servicing is maintained.

- Timely servicing of electrical panels and transformers is carried out.
- Proper rating cables are used to ensure that no cable is overloaded. This is to ensure line losses are minimum.
- Maintaining a higher Power Factor ensures stable current and reduction in its consumption. AUR is presently achieving a power factor of 0.98. Rebate is given by JVVNL for achieving a higher PF and AUR has received a max of Rs 1.75 Lakhs in a month last year. The average rebate given by JVVNL last year was approx. Rs one lakh per month.

11. **MIS** Daily and monthly MIS reports are compiled in soft copies. The same are scrutinized and provide a check to improve the system efficiency.

### **The Way Ahead**

12. As the university expands there will be an increase in the level of power consumption. The emphasis will thus be on optimum utilization of this resource and thus concentration will be towards LED fitment and use of Solar Power. At the same time it has to be seen that existing fitments are utilized completely. Hence changeover to LED, which will be the first step, will be done in a phased manner over the next 5 years.

### 13. **Changeover to LED in Phases**

- AUR had approx 10,000 no. of 36 watt fluorescent tube lights fitted in Academic Blocks, Hostels and Residential Blocks. The 3100 tube lights fitted in Academic Blocks are proposed to be replaced by 18 watt LED tubes in the initial phase.

- The testing of LED tubes and their compatibility with the existing frames has been checked. **Similarly, there are 85 security lights of 400 watts each which has been replaced with 100/200 watts LED lamps in 2021.**

- The Tublights, chokes & starters removed from Academic Blocks will be utilized in the hostel / residential blocks. Subsequently fluorescent tubelights of Residential Blocks will be replaced, with those in hostel being replaced in the last phase.

- AUR has already replaced 1740 nos. of old fittings (inclusive of all types like security, panel and normal tube lights) with new LED in a period 18 months i.e. from Mar'2019 to Oct'2021 **saving approx. 680 units daily.**



#### 14. Electricity Generation Through Solar Power

As AUR already has a sanction of 3200 KW from JVVNL and is generating 990 KW from solar, it is estimated that there will be no requirement of additional power to be sanctioned from JVVNL for the next five years. There is also a thought to extend the ground tracking system to generate additional solar power.

### WATER MANAGEMENT

1. Water is supplied in AUR through bore wells. The present requirement of water may increase in the near future. Conservation of this resource will acquire primacy with the increase in infrastructure and personnel.

#### Water Calculation

2. AUR has five Academic Blocks, one Student Resource Centre, Five Hostel Blocks, Six faculty Blocks, One Staff Quarters Block.

3. There would be approximately 240 families' i.e. around 720 persons plus 2500 students residing in the campus. In the daytime during working hours there would be additional students, plus other faculty staff and workers, possibly an additional strength of 2000 personnel. There is a mess and also other vendors who would require water for their ventures.

4. The standard consumption of water for a family is taken as 135 litres per person per day. Students do not cook; however cooking is done for them in the mess and other places. Thus for all purposes we can assume 135 litres for them. The day scholars and faculty/staff commuting from Jaipur can be safely assumed to consume at least 40 lts per day.

5. The total Lts Per Day (LPD) is thus calculated as follows:

- a. Faculty/Staff residing inside the campus:  $135 \times 3220 = 4,34,700$  LPD
- b. Guards and Other Staff routine duties after working hrs:  $50 \times 80 = 4000$  LPD
- c. Day Scholars, Faculty & Staff =  $2000 \times 40 = 80000$  LPD
- d. Chiller Plants Requirement : 60,000 LPD ( Minimum)
- e. Laundry Requirement (Commercial purposes uses more water than household purposes) 3000 LPD

6. Total 5, 81,700 LPD without Horticulture requirement. Horticulture requirement is met through STP and rain harvested water. Chiller plant water requirement is only during the plant operation period. These are only indicative yardsticks.





7. Water is supplied to various buildings through a network of underground sumps and overhead tanks. Water from the bore well is pumped to the underground tanks, from the underground tanks it is pumped to the overhead tanks. There are a total of 34 overhead tanks (both RCC and Sintex) and 08 underground tanks. Plumbers work in shifts to ensure adequate supply to each building.

8. Aquaguard are fitted along with the water coolers for hostels and in the faculty/staff residences. The aquaguards are on AMC and regular servicing is carried out.

9. **Conserving Water and Preventing Wastage** Water conservation is very important at AUR. The aim is to reduce wastage of water. To this end the following measures are being taken:

- **Rain Water harvesting Lake** The artificial lake gets treated water from the Sewage Treatment Plant and also all the rain water from terraces of buildings, and other rain water drains comes to this lake. This water is used for horticulture, thus ensuring literally zero wastage of water.

- **Water Level Indicators** A panel having three indicators denoting the water level is being established at ground level for ease of information to the plumbers for switching pumps On/Off, thus avoiding spillage and waste of water.

- **Automated water filling system** A Solenoid valve, pressure switch, float switch arrangement is being planned for implementation for automatic water filling system at one of the hostels on trial basis. This system if implemented at all locations will promote zero wastage of water therefore conserving water.

### **Going Ahead**

10. AUR is now a fully residential campus. As the strength of students increases, the demand for water will also increase. While for around 08 months, with normal rainfall, AUR can be self sufficient, during the summer months criticality could occur. It is imperative that methods to conserve water are increased and new explored.

- **Ground Water Recharging** Ground water recharging had been done at various places. The ground water recharging is planned to be extended to borewell recharging. Two borewells have been identified for the pilot project. As AUR is in a semi bowl shape, water during rains also flows into the campus from the front and rear gates. The aim is to channelize this water to the nearest borewell for recharging through proper filtration.



- **Use of STP water in flush system hostels** Hostel Blocks are connected with a separate flush line for using the STP water.

- **Cooling Tower of Chiller Plant** The cooling tower of chiller plants utilize STP water. Thus approx. 60,000-70,000 litres of water is being saved in this manner.

- **Ground Mapping** Ground mapping of AUR periphery has been done by 2 D image resistivity method. Cracks fixtures which could store water have been found. The intent is to recharge these zones so that the water resource is within the campus.



A handwritten signature in blue ink, appearing to read "Ajay Mudaliar".

Gp. Capt. (Retd.) Ajay Mudaliar  
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