GREEN AUDIT REPORT

PAC GREEN AUDIT REPORT AND SUSTAINABILITY ACTION PLAN

TOWARDS A CARBON NEUTRAL AND ZERO WASTE CAMPUS

PUBLIC AFFAIRS CENTRE
Committed to good governance

Submitted in April, 2019

By SAGE Sustainability
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EXECUIVE SUMMARY

Green audit conducted at PAC was initiated to assess the performance of the campus post interventions on renewable energy and rain water harvesting in preceding years. The aspirations of PAC team are to optimize water and energy use, maintain a green and biodiverse campus and avoid sending any waste to landfills. Considering baseline year for energy, emissions and rain water harvesting as 2015-16, post which the interventions were carried out, comparison with audit year (2018-19) revealed trends in energy consumption and corresponding emissions. For biodiversity the baseline survey was carried out in 2017 and for waste and water, baseline is taken as the audit year as in the absence of internal meters or waste accounting data from the previous years may not be reliable.

Green Audit Score card, a tool developed by SAGE Sustainability helps organizations measure their relative performance on waste, water, biodiversity, emissions and energy. Six parameters with equal weightage help in making comparable assessment against their own policies and practices and comparisons with standards as well as benchmark and peers. A score of 18 would indicate best practice in that parameter. The six parameters are policy, policy, practice, stakeholder connect, usage/number/value, normative value and comparison with peers/standards/benchmark. Based on the values, PAC's score is high on biodiversity and campus emissions followed by energy and water. Waste received lowest scores and therefore needs much more attention than any other parameter. With the action from committed stakeholders, PAC can aim to become the benchmark for **organizational carbon neutrality as well as a zero waste organization**.

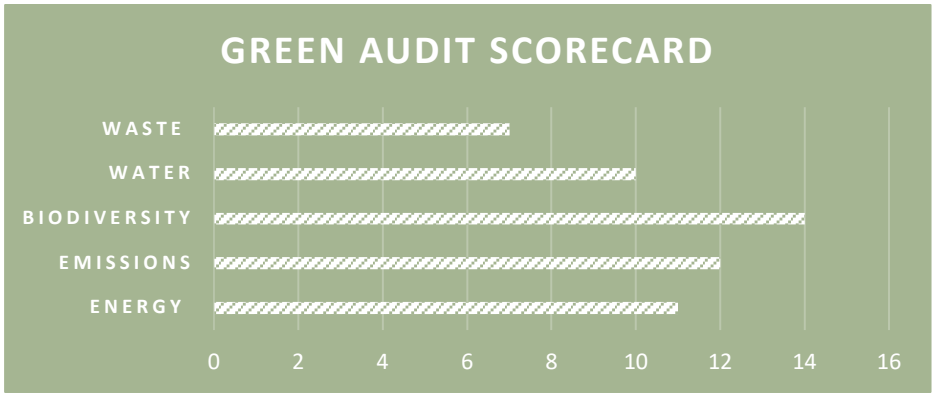


Figure 1: Green Audit Score Card (SAGE Methodology)

SUSTAINABILITY DASHBOARD (2018-19)

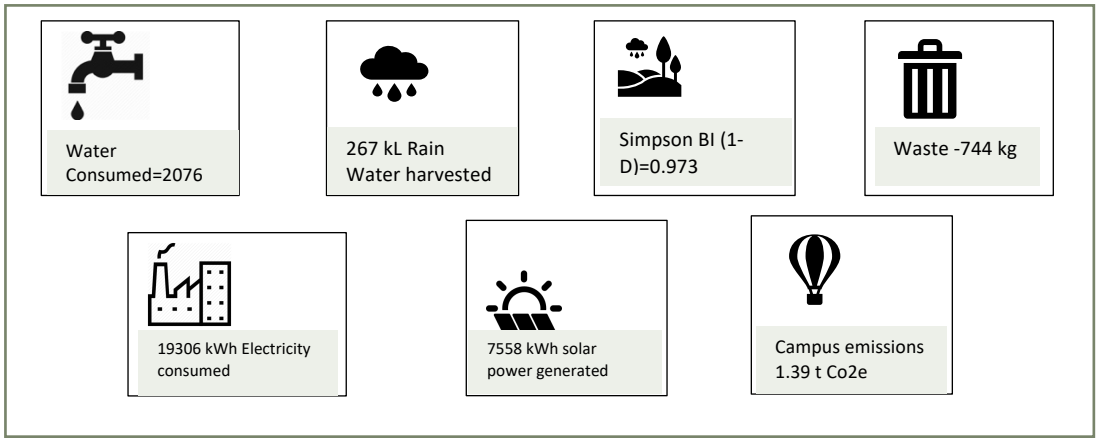


Figure 2: Sustainability Dashboard 2019

INTRODUCTION

The **Public Affairs Centre** (PAC) is a not-for-profit research think tank based out of Bengaluru, Karnataka. The focus of the organization is to improve the quality of governance in India. The institute conducts research activities in two major fields, public policy and participatory governance. Assuring that the civic interest of the citizens are at the forefront, the organization wants to also assure that it is inspiring positive environmental change.

There are about 44 number of staffs working at PAC. This includes employees, consultants, housekeeping staff and gardeners on the payroll. As a think tank most of the work involves desk research. PAC offers a five day week with standard holidays, and the year averages around 245-250 working days. For the purpose of this report, the working days are taken as 250. Office timings are around: 8:30 AM to 4:30 PM- 8 hours per day. Some of the data also includes data for caretaker family that lives on the campus.

VISION AND MISSION

PAC Vision: In pursuit of realizing its vision to improve the quality of public governance in India by creating vibrant, informed and proactive citizen engagements with the state and its institutions, Public Affairs Centre's mission encompasses a multi-pronged approach synthesizing a range of strategies and interventions.
PAC Mission: The pivotal points of PAC's mission, around which the activities of the Centre are organized are: public policy research and advocacy; participatory research on governance and social accountability including monitoring and evaluation of public services and programmes; citizen action support; civic education of children and youth; promoting citizen centred environmental governance and capacity enhancement of both the state and civil society.

CAMPUS DETAILS

PAC is located at No.15, KIADB Industrial Area, Jigani - Bommasandra Link Road; Bengaluru – 560105. It is built on a land parcel of 1.99 Acres (87091sq.ft.). There is 66091 sq. ft. of vacant land. Built up area is 21,000 sq. ft spread over two floors.
Main source of energy is BESCOM (Bangalore Electricity Supply Company) as well as a 9.9kWp roof top solar hybrid system. Main source of water is borewell along with a fully functional Rain Water Harvesting system.

JOURNEY TOWARDS CARBON NEUTRALITY AND ZERO WASTE CAMPUS

PAC has commitment to actions that ensure social and environmental responsibility (PAC Website). The focus of the organization is on promotion of its responsibility while being transparent, participatory and accountable. From the beginning, PAC is serious about its environmental footprint and so the PAC building is constructed in a way that enhances natural lighting and ventilation leaving ample space for green cover all around the campus. The combined transport facility provided by PAC to all its staff helps in reducing commuting related emissions. In pursuance of its goals towards environmental responsibility, PAC took

various initiatives in last five years. One of the initiatives was to get Rain Water Harvesting System in place. Another initiative was to opt for renewable energy and for that it installed 9.9kWp on its rooftop.

SCOPE OF THE AUDIT:

The Scope of the audit is to:

- Establish a baseline for all environmentally significant parameters such as water, energy, emissions, waste and biodiversity (2015).
- Examine trends for environmental parameters from 2015-2019
- Offer PAC a SAP (Sustainability Action Plan) for optimizing energy, water, waste for best results for carbon footprint, water neutrality and zero waste commitment. Provide direction to the organization for continually improving its footprint based on soft/hard measures.
- Provide the results with reference to standards, company policies, industrial best practices, compliance or statutory and regulatory requirements.

METHODOLOGY

DATA COMPILATION

Preliminary data requirement was sent to the Sustainability Reporting Team (Finance and Environment). Data on biodiversity, energy, water and waste was collected from the PAC team over electronic means with in-person clarifications. Further requirements were listed out. The data collected includes sample electric bills, transport bills, as well as purchase bills. This data helped in planning for the site visit, site survey and questionnaires as well as stakeholder consultations.

SITE VISIT AND BIODIVERSITY SURVEY

Site visits were undertaken on 16th of January, 2019 and on 11th March, 2019. The first site visit was focussed on getting an overall feel of the place to conduct the site survey as well as biodiversity assessment. Second visit included audit and stakeholder survey was carried out to collect information on energy, water, waste, biodiversity and emissions.

FOCUSSED GROUP DISCUSSIONS

Discussions with stakeholders provide legitimacy to the pace at which sustainability action plan can be constructed. The objective of the exercise was to gain insights into the level of information about PAC Sustainability, map aspirations of the stakeholders and look for inputs from the team. Stakeholders readily put their names for various committees which could be functional units for PACs move towards a carbon neutral and zero waste campus. This meeting also clarified that a Sustainability Action Plan for a year would be a reasonable time to get traction.

EMPLOYEE SURVEY QUESTIONNAIRE

Questionnaire was to know individual connect with sustainability and to assess awareness, behaviours and attitudes to help shape up Sustainability Action Plan. The exercise was conducted through "Survey Monkey online forms" on 11th March, 2019. Appendix I. Survey results indicate that most stakeholders agree or strongly agree on their concern about the. Most also agree that environmental issues are important problems to be solved.

Picture 1: Pictures of stakeholder consultations.

On reliability of media information, most people agree to varying degrees that they do not know how much media information on the environment is reliable, however there are some who disagree with that opinion. There is varied opinion also on the confusing information on adopting pro-environmental behaviours. There is difference of opinion on whether the pro-environmental behaviour helps save money and that pro-environmental behaviours are expensive.

It is interesting that when asked if individual action is important to solve environmental problems there is an overwhelming agreement to that. To the question that individual action will not improve the environment, there is varied opinion, from strong agreement to strong disagreement. It is interpreted that most people think individual action is important and then there is difference of opinion on the outcomes of the action.

Most people agree that their pro environmental behaviour is independent of whether someone is watching it or not, or despite inconveniences. There are some who agree that inconveniences cause them to avoid pro environmental behaviour. Linking action and behaviour, there is a strong sense of cause and effect and most people think that everyone is responsible for global warming. However, there is varied opinion in the statement that solution to global warming will come about independent from me.

On what specifically constitutes good or bad behaviour there is split between agreements and disagreements. Most people agree that they make environmentally conscious decisions anywhere at work and everyone agrees slightly, mostly or strongly that PAC is an environmentally conscious organization. An overwhelming aspiration is reflected when everyone agrees that PAC can be a leader in creating environmental consciousness. Green instils pride in most of the stakeholders and most people also think that green is important for PAC to align with the donors or partners or like-minded donors. Most also agree that Green will help to connect better as a team and to attract good talent.

On actions and aspirations, there is an overwhelming support for adopting reduction, reusing and recycling even if it is inconvenient. There is a range of opinion on whether they have enough time to actively change the environment and the fact that people will like to do something but they do not have enough time. Most people agreed that they care about environment while purchasing stuff.

On energy use at PAC, most people are either satisfied or very satisfied and about 70% people have mentioned about the solar energy use to other people either once, twice or many times. Even on paper use majority of the stakeholders think that PAC is careful for printing only necessary information, some responded that they are not careful and some don't know. On emissions, some believe that they are doing the best they can, but a large majority thinks that they can improve on transport related emissions. A large number of people think that the improvement is required and some think that they are doing the best they can. Some also think that they are not doing well.

On waste segregation there is minor agreement on not doing well. Majority however thinks that there can be improvement in waste segregation. Similar trends are for recycling and waste water management. On wet waste management most people think that they can improve and again some think that already the best is being done. Water consumption requires improvement and again some think that the best is being done.(Responses in Appendix 1)

OBSERVATIONS AND MEASUREMENTS

On the date of site survey, the observations were made on some of the information provided; flow rates, and inventories were made for lighting, plug in load, facilities, solar roof top, water tanks , waste assessment etc. Read Appendix 3 for methodology.

BASELINE AND AUDIT FINDINGS

During the pre-audit stage it was decided that the baseline is taken as 2015-16. As most initiatives towards energy and water conservation were taken post 2015, the impact of interventions could be assessed.

Year 2015 is taken as baseline year. Data from 2015-16, 2016-17, 2017-18, 2018-19 was taken on electricity consumption, purchase bills for goods and services such as transport, taxi bills, drinking water, cleaning products, milk and water. However, preliminary calculations revealed that only transport related data accounts for substantial emissions for the organization. Therefore the emissions for milk, cleaning products and other such purchases was excluded from the emissions boundary.

ENERGY

Audit objective is to establish baseline and measure progress on energy footprint and assessing result of interventions carried out in the previous years.

- Energy quantification on demand side and wherever there is significant scope of improvement.
- Energy quantification on supply side and wherever there is considerable scope of improvement.
- Standardizing energy use per person to monitor the progress.
- Solutions for optimizing energy consumption.

POLICY:

While there is no explicit Energy policy per se in the baseline year (2015-16) or even in the audit year (2018-19), there is a clear commitment that is apparent in the passive solar design of the building. A passive solar building makes use of natural climatic conditions for lighting and ventilation and therefore reduces energy consumption. It draws natural light and ventilation for all areas of the building while reducing direct heat ingress. A clear commitment to renewables and moving away from carbon loaded power is apparent from passive solar design coupled with rooftop solar installation.

STAKEHOLDER AWARENESS:

Through a stakeholder meeting and questionnaire that engaged the full staff of PAC, questions were asked on the consumption of energy units per day. A group of 5-6 staff members discussed and answered the questions. While one of the teams was close to the actual units consumed from BESCOM as well as solar, most other teams provided a range of answers varying from 15 units a day to 90 units for regular power and 50-400 units for solar. However, everyone agrees that there is a scope to have improvement in energy use. Some of the suggestions that came out from stakeholder consultation was to reduce consumption by 20%, and achieving 100% renewable energy usage or become self-sufficient.

ENERGY CONSUMPTION:

(All Energy and Fuel resources and quantities used)

Three main sources of energy are consumed at PAC which are electricity, cooking fuel and fuel for transport. For Electricity, three sources, BESCOM, roof top solar and DG set provide for all the requirements at the campus.

Annual Electricity Consumption by Source					
		2015-16 (kWh)	2016-17 (kWh)	2017-18(kWh)	2018-19(kWh)
Power supply (Electricity)	Solar (onsite)-9.9 kWp hybrid PV panels-net metering in place	0	5320.83	6300.33	7558.77
	BESCOM	23150.46	18755.46	15139.9	11674
	DG (back-up generator)	1061.18	350.95	179.46	74.18
LPG					
		2015-16 (Kg)	2016-17 (kg)	2017-18 (Kg)	2018-19 (kg)
Cooking Fuel	LPG	170.4	170.4	170.4	170.4
Transport Fuel					
		2015-16(L)	2016-17(L)	2017-18(L)	2018-19(L)
Transport (Tempo traveller)	Outsourced vendor (Diesel)	4455.78	4545.26	4509.47	4133.68
Transport (Cars)	Diesel (Toyota Etios)	84.94	265.32	456.00	759.92

Figure 3: Annual Electricity Consumption, Cooking Fuel and Transport Fuel from baseline to audit year

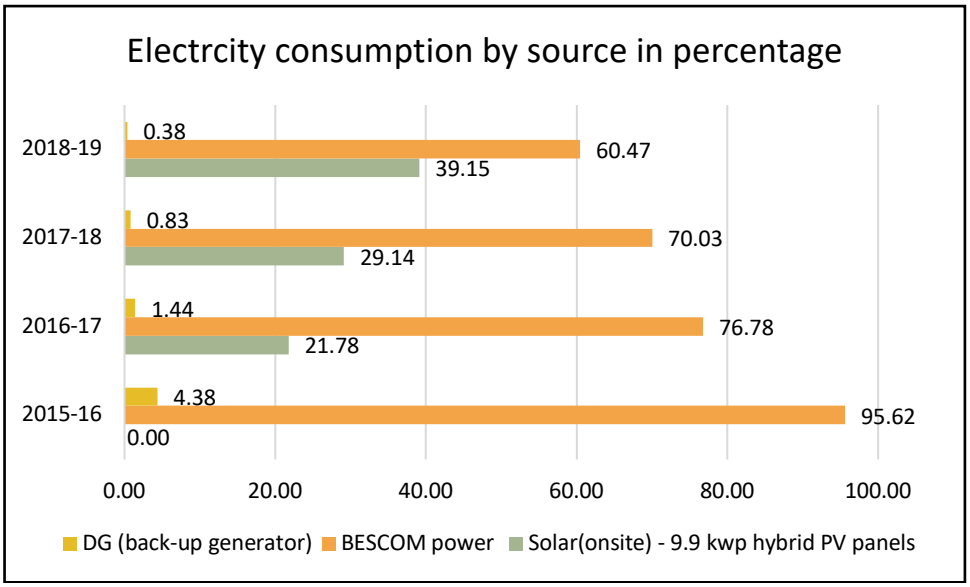


Figure 4: Electricity consumption by source from baseline year (2015-16) to audit year (2018-19) in percentages.

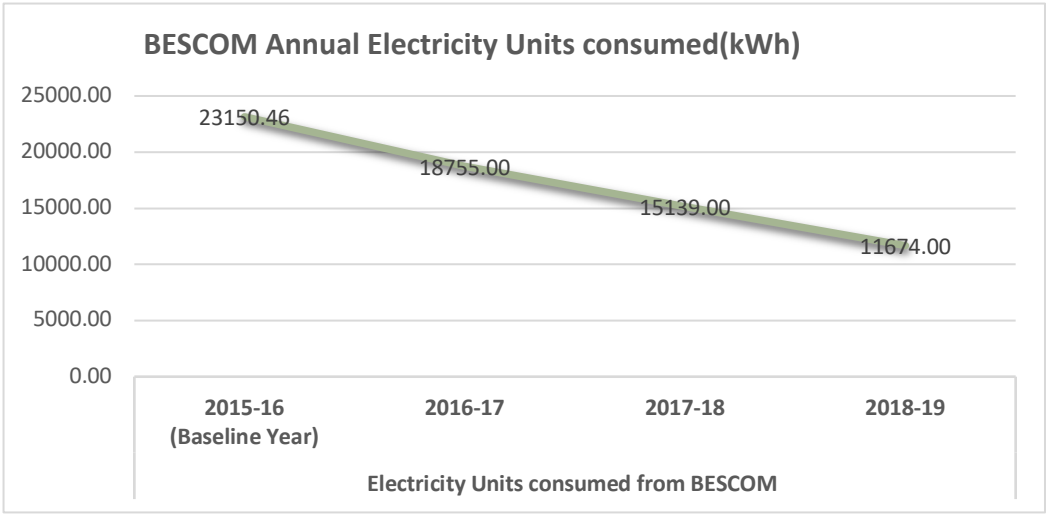


Figure 5: BESCOM Annual electricity units consumed (kWh) from baseline year to audit year

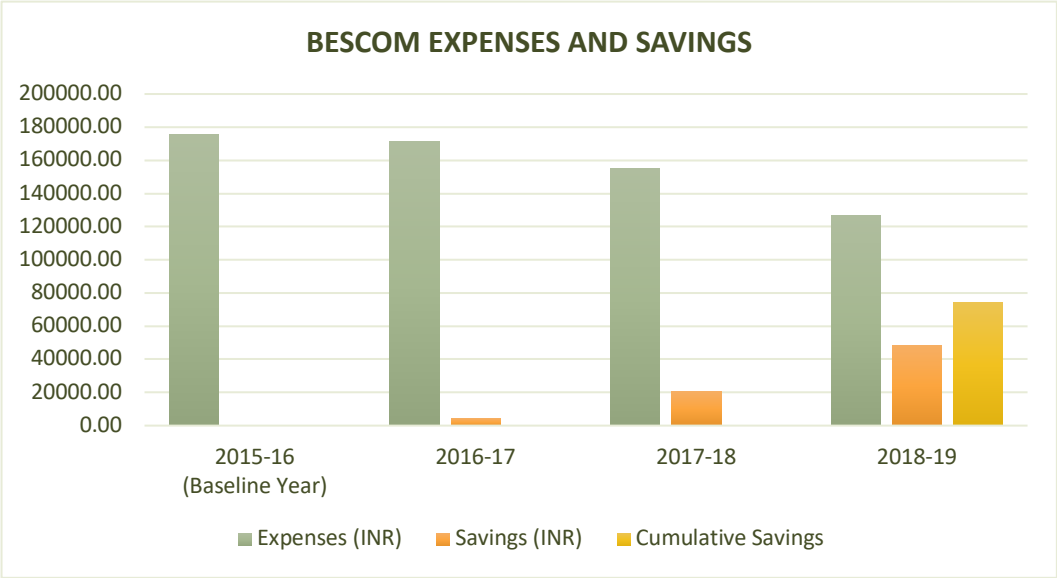


Figure 6: Annual and cumulative BESCOM savings from baseline to audit year.

From the baseline year 2015-16, BESCOM and DG consumption is decreasing and solar power is increasing till the audit year (2018-19). BESCOM power is reduced to nearly half the units from the baseline year (Fig.3 and Fig.4). The cumulative savings of INR 70,000 have been accumulated in four years (Fig.6). While LPG consumption and staff vehicle usage remains almost similar, the cab usage has increased substantially from baseline year to audit year (Fig. 3)

WHICH FACTORS CONTRIBUTE MOST TO THE ENERGY USE ON SITE.

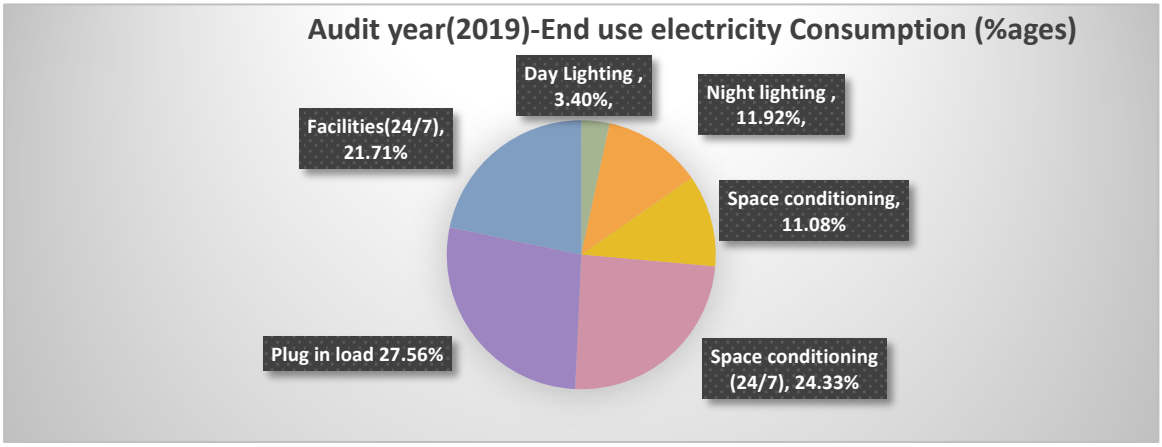


Figure 7: Audit year electricity split for end use.

Nearly 35% of the electricity consumption is used for space conditioning. Although AC is used sparingly in the conference room(11.08%), the server room air conditioning uses much of the energy (24%). Plug in load i.e. laptops, computers, printers, projectors etc. contributes to the 27.56% of the energy consumed. Facilities such as CCTV, alarms, and employee entry system consumes 21.71% of the energy consumed. Day time lighting consumption is low at 3.40% and night lighting consumes around 11.92%. Night lighting at the facility is important for making sure the pathways are well lit to avoid any break-ins etc.(Fig.7).

Picture 2: Solar Roof Top system and central courtyard

NORMATIVE ENERGY USE

Normalized energy use is important to create the context for energy consumption, setting targets and for bringing in efficiency at every end use level. Normalized energy use helps organizations compare themselves with other organizations, peers, benchmarks and standards. Energy in kilo watt hour per sqm per month (kWh/sqm/month) or year is one of the most commonly used criteria. Some of the standards prescribed are by ECBC (Energy Conservation Building Code, GRIHA (Green Ratings for Integrated Habitat Assessment) and BEE (Bureau of Energy Efficiency).

PAC has 21,000 sq. ft. built up area over two floors, which is around 1951 sqm of floor space. Energy Performance Index is a measure of Total Energy consumed in a specific built up area.

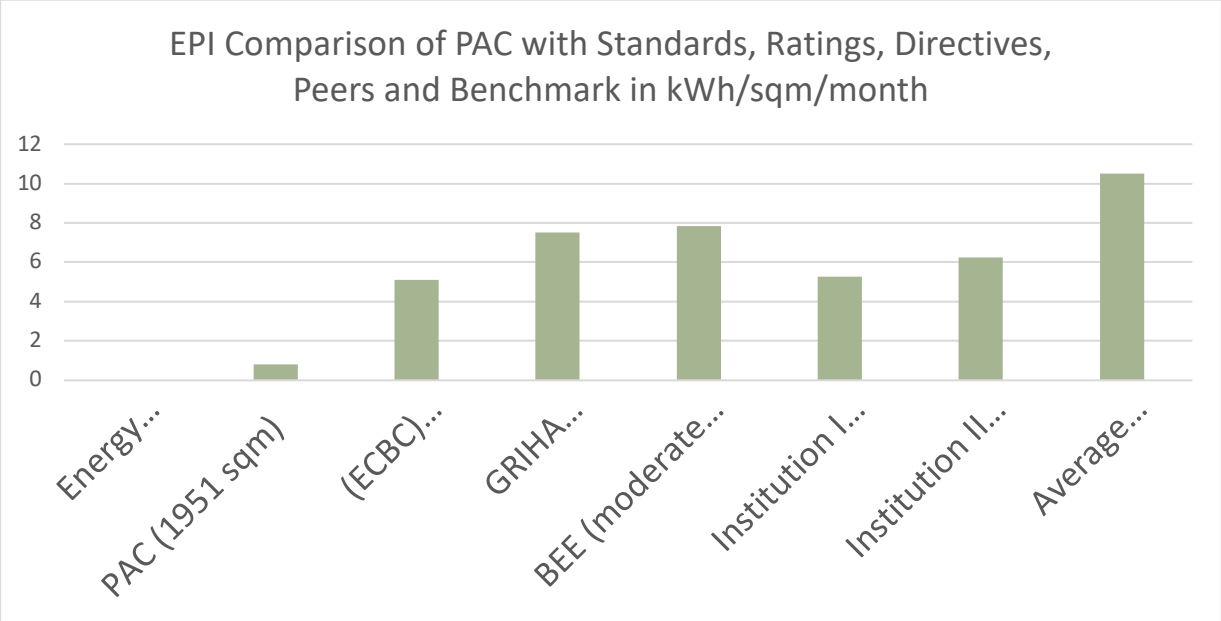
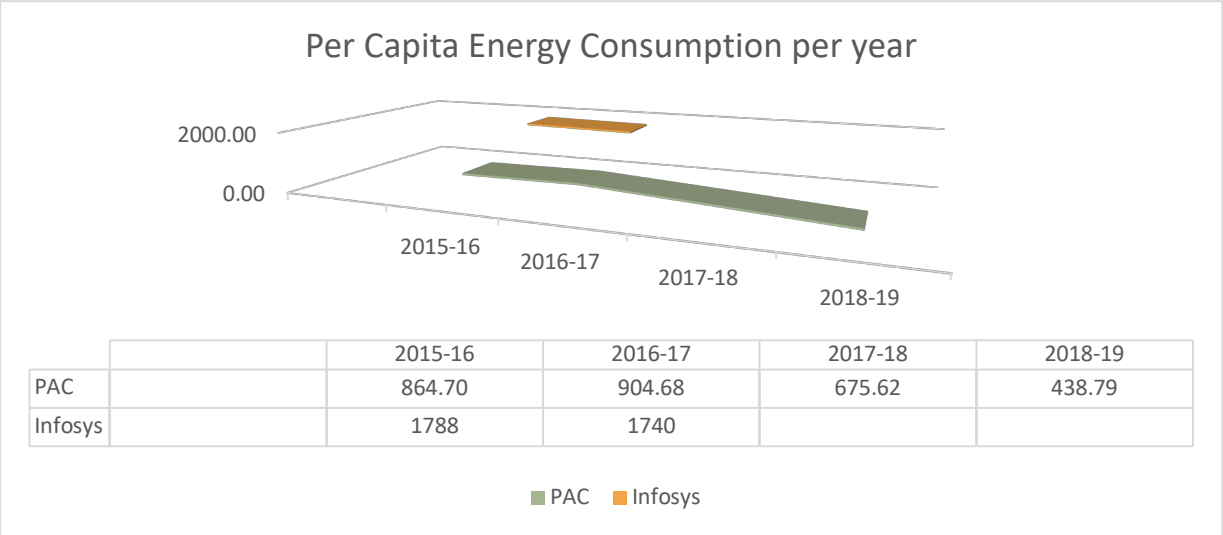


Figure 8: Energy Performance Index comparison with ratings, standards, peers an benchmark.

Energy Performance Index (EPI) in kWh/sqm/month	
PAC (1951 sqm)	0.82
(ECBC) Compliant Building	5.1
GRIHA (Institutional)	7.5
BEE (moderate climate) (Annual value provided is 94)	7.83
Institution I (Indian Institute for Human Settlement IIHS) (Comparable building space)	5.26
Institution II (Infosys) (claims to be the best in the world)- 75kWh/Sqm/year as per GRI 2017 report	6.25
Average Commercial Building	10.5
Annual Per capita consumption per year	
PAC	438
Infosys	1740

PAC's performance compared with BEE, ECBC and GRIHA rating, IIHS which has a comparable building space and finally Infosys is better for both per capita as well as per sqm power consumption.



		2015-16	2016-17	2017-18	2018-19
PAC		864.70	904.68	675.62	438.79
Infosys		1788	1740		

Figure 9: Per Capita energy consumption per year for PAC and Infosys (benchmark)

TARGET FOR ENERGY REDUCTION

Option 1:kWh/sqm/month- 5% to 10% reduction annually
Option 2: kWh/Capita/year-5% to 10% reduction annually
Some of the stakeholders mention about 20% reduction as well as 100% renewable target.

WATER

The objective of the audit is to:

- establish baseline and measure progress on water efficiency and usage as a result of interventions carried out in the previous years.
- quantification of water on demand side and supply side.
- standardize water use per person to monitor the progress.
- provide solutions for optimizing water use.
- Water quality assessment based on test reports.

Basic Highlights of water scenario provided by PAC before the audit:

- Total land area is 8091 sqm (87091 sq.ft.)
- Depth to Ground water is at 1500 ft.
- Campus rainfall is 870 mmm and 60 annual rainy days.
- Two storage sumps of total capacity 28,000 litres.
- One overhead water tank of total capacity 10,000 litres.
- Rooftop RWH system: water is filtered, stored and used for domestic purposes.
- RWH for recharging ground water achieved through 4 recharge pits with 200 m of contour bunding. It is estimated that about 80% of the 64 million litres of water percolates into the ground from the recharge wells, water from the open area and collected water.
- 583 ft of PVC pipe, sediment filter with FF diverter, overflow siphon system and float valves, the system is fully functional.

WATER POLICY

There is no explicit water policy in place. However, there is effort towards water conservation and self-reliance. Rain Water harvesting system put in place in 2015-16 helped the organization become self-dependent on water. There is no dependence on tanker water for the PAC campus in the audit year. PAC comes under light water user category.

STAKEHOLDER AWARENESS

The questions asked to stakeholders on water consumption per day ranged between 500 litres to 10,000 litres a day. Every stakeholder feels that the water usage can be reduced at the campus.

COMPLIANCE

It is assumed that the ‘Consent for establishment’ was taken before the building was approved. Rain water harvesting system as well as contour bunds meet or exceed compliance. It is also assumed that CGW approvals for ground water usage are secured.

However, keeping in mind the aspirations of the stakeholders and looking ahead at the futuristic compliance and enforcement, it is important to plan treatment of grey and black water which can be reused within the campus, for gardening purposes, or even recharge of ground water.

WATER SOURCE AND QUANTIFICATION:

Total water consumption is estimated at 2076 kL of which rainwater is 15 kL and bottled water is 18 kL The rest of the water used is borewell water which is estimated as 2043 kL

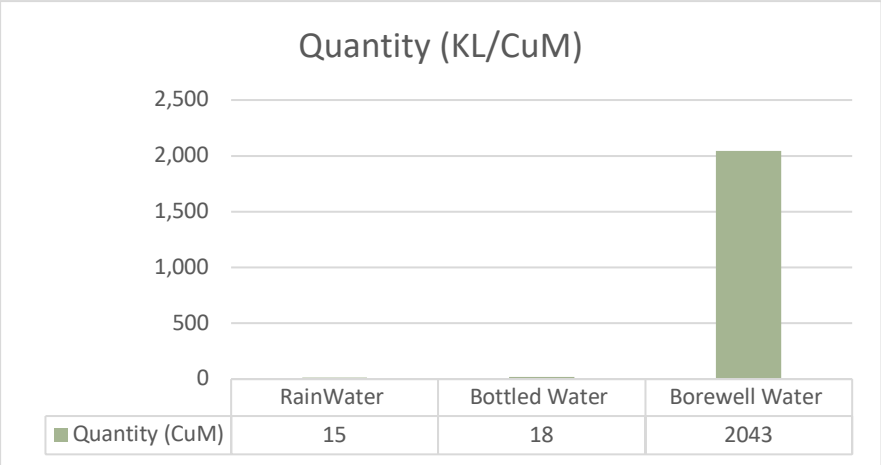


Figure 10: Annual water consumption by source -rain water, bottled and borewell water in metric cube or kilo litre in audit year (2018-19)

WATER DEMAND ASSESSMENT

Audit was conducted for all water outlets and flow rates were measured for all the taps and fixtures in washrooms, pantry, roof top and gardening outlets. Based on the flow rates and certain assumptions, following demand assessment is estimated (refer to methodology section in appendix).

NORMALIZED BASELINE

- Normalized water consumption is 39 lpcd (litre per capita per day). The water consumption norm in an office building as per IS codes is 45 lpcd. The best practice of water consumed in litres per capita per day vary from 20-22 (Adobe Complex, Noida, Vatika Business Park Gurgaon and DLF SEZ at Chennai.

NORMALIZED TARGETS

10% reduction by each end use or domestic purpose is easily achievable through some basic equipment change and behavioural modifications.

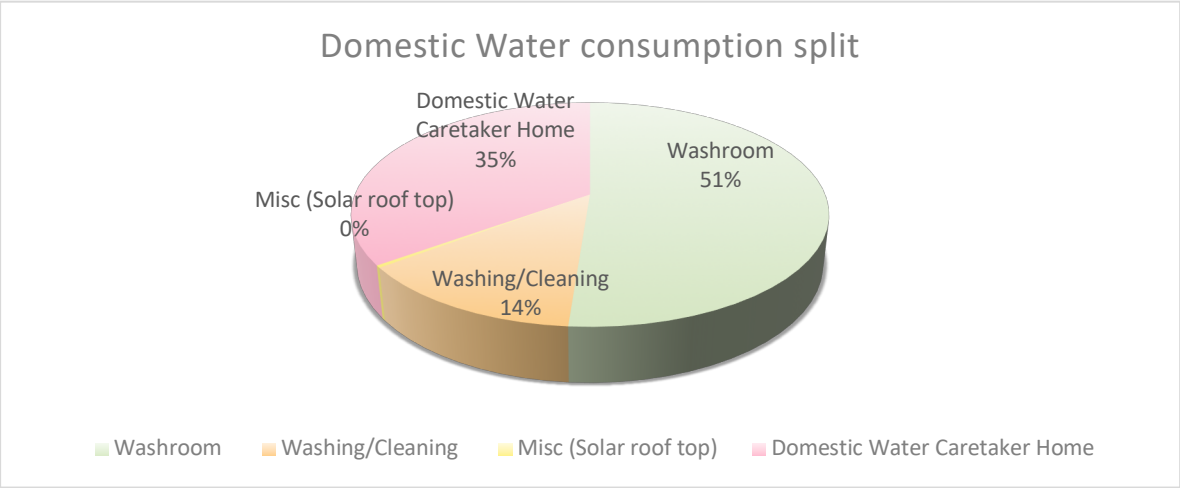


Figure 11: Domestic water consumption split

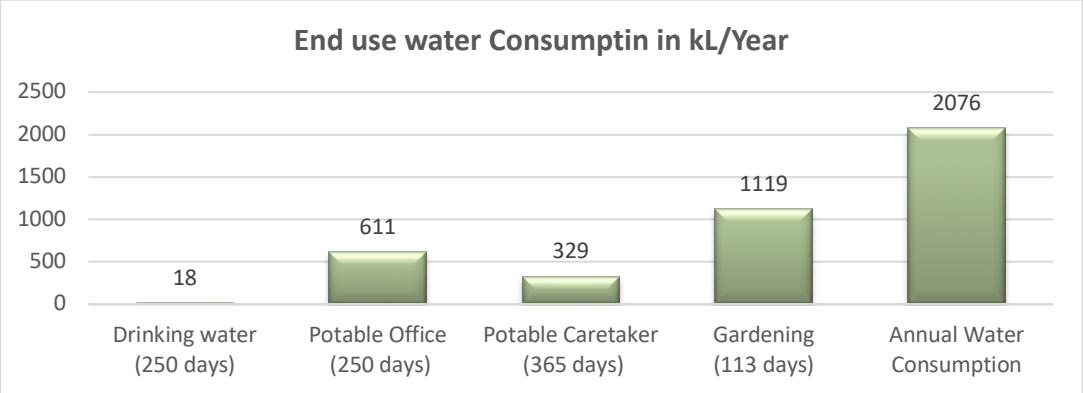


Figure 12: Annual water consumption split in audit year in kilo litre (kL)

Gardening or landscaping is the primary end use that consumes most water, followed by office domestic water and caretaker's domestic water use. Drinking water is bottled water that is not sourced from the campus.

RAIN WATER HARVESTING SYSTEM

Rainfall considered for our current analysis in Bangalore is 930.5mm annually (last 25 years data as well as data from 1901 to 2000 for long term averages) and number of rainy days are assumed to be 73.3 days (Fig.13). The actual roof area is 638.39 sqm. However, audit revealed that there are three water openings from the roof which are not leading to the rain water harvesting system. Assuming that only half of the roof serves the rainwater harvesting system, so the system is optimized to make use of the half of the roof. The current effective roof area is estimated at 319.19 sqm. Number of days served are 47 and total harvestable water and harvested water is 267306 Litre.(Fig.14)

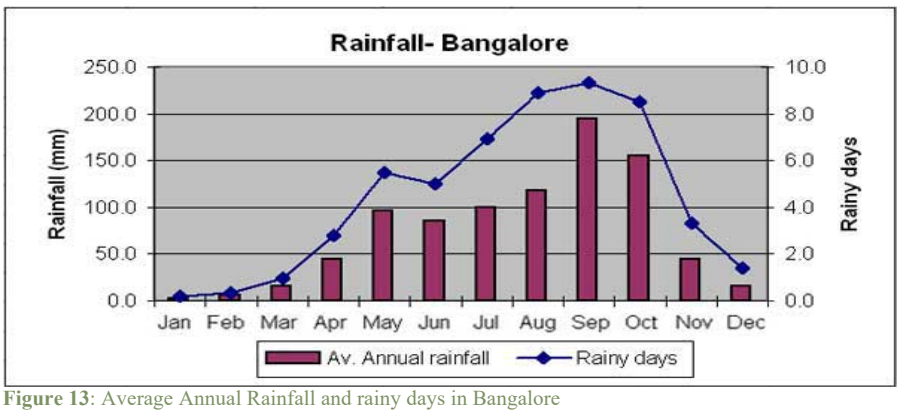


Figure 13: Average Annual Rainfall and rainy days in Bangalore

Half Roof Scenario (319.19sqm)		Full Roof Scenario (638.38 sqm)
Actual tank size (Litres)	28000	79050
Harvestable water (Litres)	267306	534620
Water harvested (litres)	**267306**	**534620**
Overflow (Litres)	0	0
Days serviced (Litres)	**47**	**94**

Figure 14: Current rain water harvested from half roof and potential.

There is a scope of additional rain water potential for the entire roof area. The full roof which is 638.38 sqm will serve for 84 days. However, it will not be able to utilize the full harvestable water capacity which is 534620 litre (Fig.14).There will be an overflow of 59485 litre with existing capacity. To make full use of the full roof and entire rain water available the storage capacity would require an upgradation to 79050 litre. Fig. 15 depicts monthly water demand and water availability.

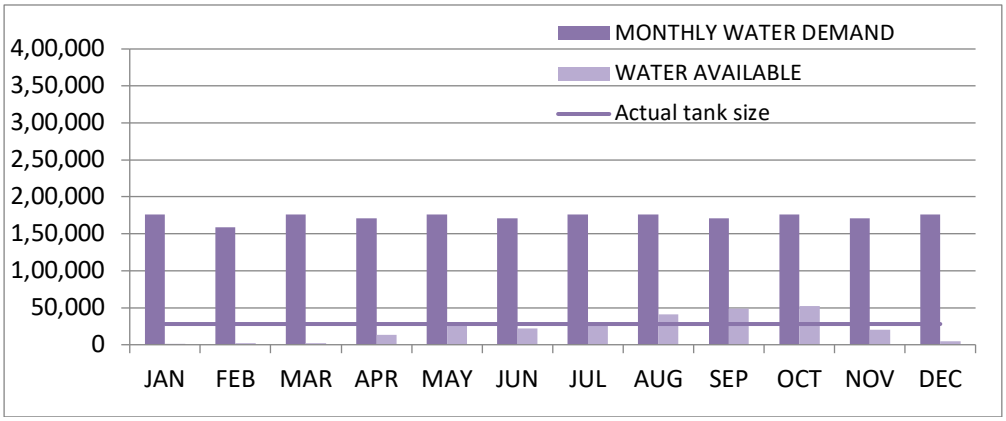


Figure 15: Data chart monthly water demand, storage and tank capacity (28000 L) for roof size 319.19 sqm.

WASTE

Waste generated at the campus as such is very insignificant amount, yet as a responsible organization it is important that the waste is handled as per the compliance, norms and best practice.

During the audit it was found that the wet and dry waste are insignificant, not more than a kilogram every day from the campus and an equal amount from the caretaker family. However, owing to a large volume of biomass generated by dried and fallen leaves account for an opportunity that can be made use of for producing large amounts of compost.

POLICY

There is no explicit policy on waste segregation and management. A clear policy with pointers on reduce, reuse, recycle will help in setting the tone for optimum waste management. In this case it can have emphasis on segregating, recycling and composting.

STAKEHOLDER AWARENESS

Stakeholder assessment on amount of waste generated ranges from 1 kg a day to around 5 kg and some estimated around 2 kg which is close to reality. Everyone suggests that the waste management can be improved.

COMPLIANCE

Following observations were made during the audit which need immediate attention owing to regulatory requirements.

1. No waste segregation.
2. Black/greywater is drained out of the campus in an untreated manner. It may be important to explore this further with BWSSB for grey water released from the campus. As per the information gathered from the open sources, STP is required for a 2000 sqm commercial complex.[1] As such there is no process water and very low volume of black water.
3. Open burning of the waste.
4. Safe storage, transport, treatment and disposal of various categories of industrial hazardous waste mentioned in the rules. One of the main features of this rule is that the occupier of the activities generating hazardous wastes or handling the hazardous wastes becomes legally responsible for taking all steps to ensure that such wastes are properly handled, labelled, stored and disposed off without any adverse impact on the environment. Since there is no hazardous waste generated by the organization, this law may not be applicable

TYPE AND VOLUME OF WASTE

Total Waste generated by the campus is wet waste, dry waste, e waste and sanitary waste. Total waste comes out to be 744.6 kg.

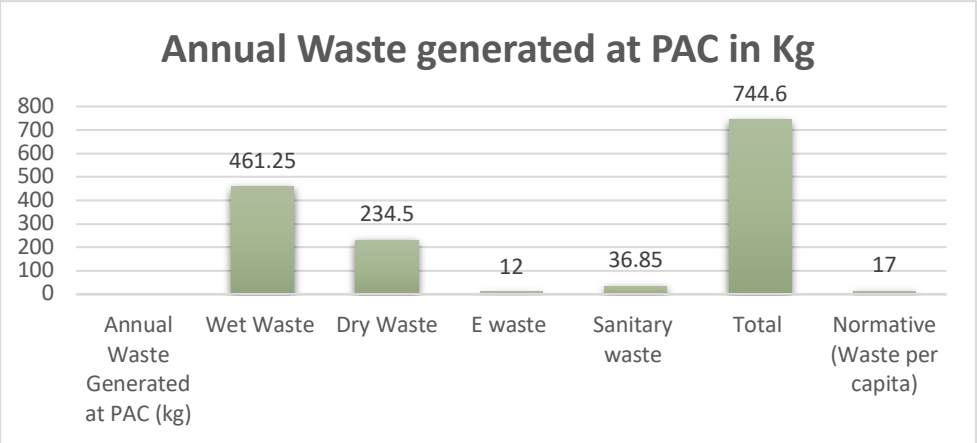


Figure 16: Annual cumulative and type of waste generated in kilograms in audit year

SEGREGGATION

Waste segregation requires changes in 1) Equipment available for waste 2) Labelling- Necessary information provided on the bins 3) Behavioural changes through a commitment on segregation.

[1] "For commercial buildings (existing), the BWSSB has made STP and dual-piping system must for those measuring 2,000 sqm and above. Existing buildings of educational institutions measuring 10,000 sqm and above should also comply with the norms." (India Today at https://www.indiatoday.in/india/story/bengaluru-bwssb-stps-lakes-sewage-citizens-978341-2017-05-21)

RECYCLING

Recycling vendors who can pick up the recyclables once a week/fortnight can be arranged. In the meantime, a neat covered storage facility will help in keeping the waste in recyclable condition.

COMPOSTING

A large amount of biomass available can assure the nutrition requirements of seemingly nutrition deprived soil. A functional composting system will assure that the water needs of the campus go down as co benefits, as would the fruit and vegetable bearing capacity of the land will increase simultaneously.

SANITARY WASTE INCINERATOR

Home sanitary waste incinerator with capacity to incinerate five to ten and store two to three napkins per day could meet the requirement of the campus.

BASELINE NORMALIZED

Around 17 kg of waste per capita per annum is only a little over a kilogram of waste produced by every employee of the organization per month. If composting is being carried out on the campus, the target can be set to maintain per capita waste generated. At such low quantities it is likely that the fruit peels etc. are not a regular feature at the campus. In case the campus move towards that objective of healthier eating, such waste may increase and should not be considered negative.

WASTE HANDLERS

Waste handlers should be provided with (Personal Protective Equipments) PPE's such as gloves to handle the waste for composting. In case of recyclable waste, the organization can set a target for diverting 90% away from landfills. Various applications are available that pick up recyclable waste.

Waste as a resource policy should be aimed at maximising composting, and recycling. Some of the suggestions from the stakeholders is about waste upcycling and those ideas can be taken forward.

BIODIVERSITY

The scope of the audit is to have a baseline on all flora and fauna and to arrive at a plan to increase biodiversity at the campus with full awareness of what trees or plants can be added that enhances the biodiversity index of the campus while providing other necessary requirements such as native, drought resistant, noise reduction etc.

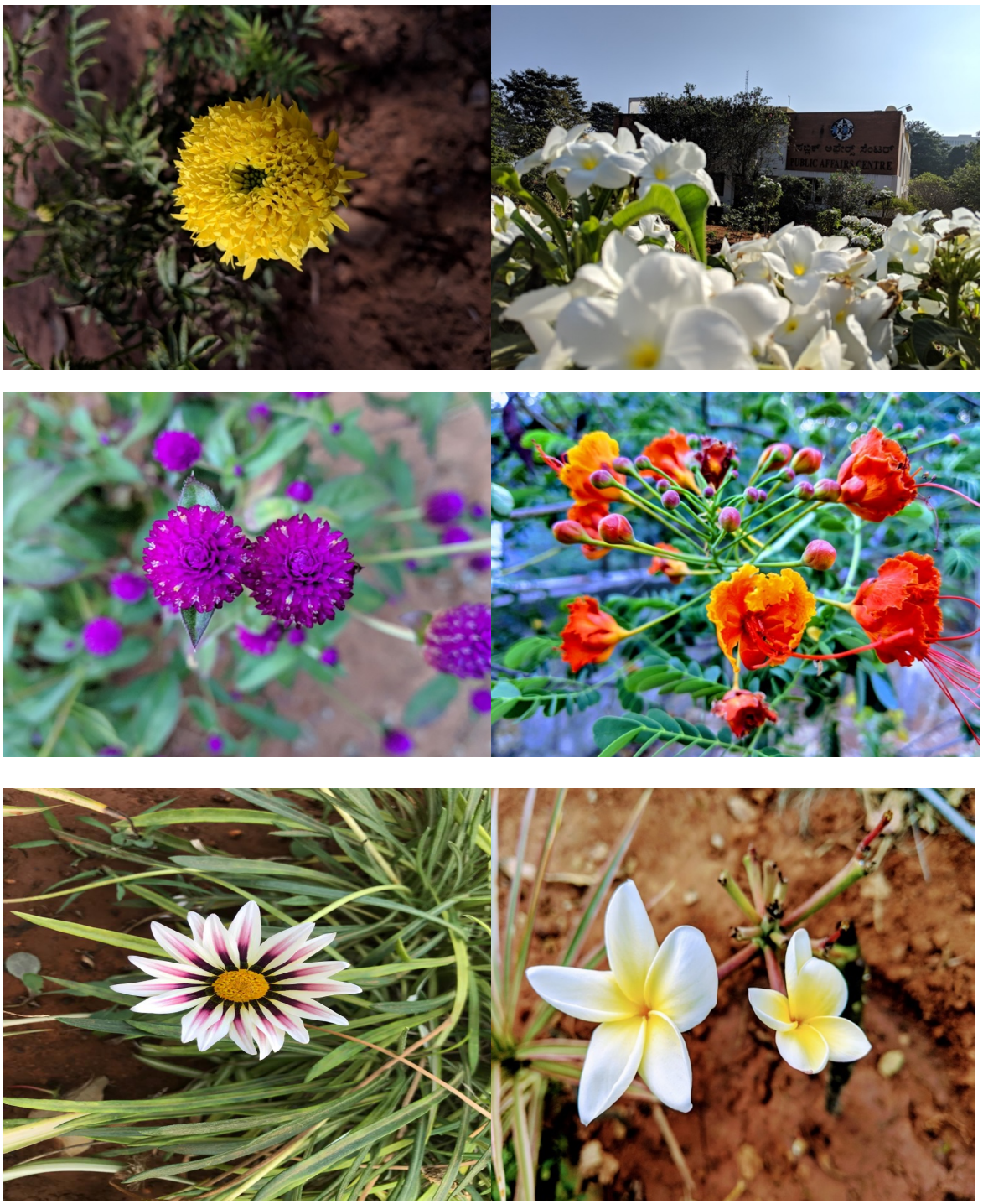
POLICY

The campus appears to be green with some very old trees, many of which are well maintained. However, there is no clear policy on biodiversity. Many of the trees are native or naturalized, however many are exotic and non-native. The biodiversity policy needs to address the aspiration of the stakeholder and work towards improving the biodiversity index. There is an informal concern for nature that is palpable from the diversity at the campus. The practice of planting a tree on an employee's birthday as a part of the celebration shows a deep value in ecology. Environment day walk around the campus to know more about the campus biodiversity is a step in the right direction that engages and connects employees to the campus.

A policy on biodiversity with criteria on enhancing biodiversity such as native, drought tolerant, red alert species, long living trees, trees with flowering in non-allergy season, must mitigate noise pollution, must mitigate air pollution, shade providing, fruit bearing, must not provide shade, trees with hollow niches can help stakeholders choose the varieties better. Grass with local variety- less water consuming, drought resistant, shade requiring can help the campus reduce its water requirement.

Picture 3:Fruiting species at the Campus

Pots can be chosen to enhance indoor air quality along with meeting elements of decorativeness and aesthetics. Self-watering helps enhance the survival rate and can be explored.



Picture 4: Collage of the flowering species at the campus.

STAKEHOLDER ANALYSIS

Most of the teams estimated the number of trees from 118 to 182 and other estimates range between the two values. All except one group feels that the biodiversity index can be improved. Nearly 40 records of tree planting by team members is documented and the recall was on Indian badam, coconut, hibiscus, rose, mango, sapota, avocado, thulasi, guava, mango, jackfruit, neem and papaya. Some of the people are aware of the health of the trees or plants. One group agreed to look after all neem plants, and another group agreed to take care of any one species. Some individuals opted for looking after rose, vegetable garden and

Peepal tree. The current audit revealed that the number of trees are far more than the earlier count. In this survey herbs, shrubs and other plants in the garden are also included for calculating biodiversity index.

Adopt a species programme as the next logical step can help in creating considerable interest in the campus.

COMPONENTS OF BIODIVERSITY

Biodiversity of a place includes both fauna and flora. As a baseline, trees and plants for Flora and mammals, reptiles, birds, amphibians and insects for Fauna are listed . Baseline conducted for trees in the year 2017-18 listed 33 species and 181 individuals. Current audit counted 505 plus individuals and 94 species.(Appendix 2). The tree species in the current audit include large and small trees, shrubs and in addition there are herbs and minor plants counted as a part of calculating biodiversity index, which was not done in the baseline.

Mammals recorded are squirrel, rat, dog, monkey, cat, cow, bats; amphibians cited are frogs; reptilian species are cobra, green vine snake, rat snake, chameleon, lizard; birds are sunbirds, Asian koel, brahminy kite, sparrows, crows, woodpecker, pond heron; insects are beetles, lady bird, snails, dragon fly, bumble bee, wasp nets, ants, spiders, butterflies, cockroaches, mosquitoes, flies, honey bees, and grass hoppers.

BIODIVERSITY INDEX

From the previous survey conducted only for trees and perhaps large trees, total number of species listed were 33 and 181 trees in total. Simpson Diversity index for that D=0.09 and 1-D index is 0.91.
Based on the current audit the Simple biodiversity at PAC is 0.1861.While Simpson Index (D) = 0.027/ Simpson Index (1-D) in 2019 = 0.973. This can be interpreted that biodiversity at the campus is fairly high.

COMPLIANCE

The area is in industrial belt, and apparently there seem to be no violation of any compliance. However, it may be important to mention that pruning for some of the trees may be carried out in an unscientific way and that may make trees prone to fungal or other pest attack. Future preparedness, in case there is a hose pipe ban should be oriented towards drought resistant varieties. There are more than twenty trees that are infested with termites and that requires immediate attention.

CARBON EMISSSIONS

POLICY AND STAKEHOLDER AWARENESS

There is no explicit policy on reducing carbon emissions, however, from the leadership team to some of the staff, there is an apparent intention to become a carbon neutral campus. A clear policy that is aligned to carbon neutrality can drive the water, energy and waste policies.

SCOPE I EMISSIONS (CAMPUS EMISSIONS)

GHG Protocol Corporate Standard classifies a company's GHG emissions into three 'scopes'. Scope I emissions are direct emissions from owned or controlled sources.

Table 1: Scope I emissions from Baseline Year to Audit year

SCOPE I Emissions (kg CO_2 e)				
	2015-2016	2016-17	2017-18	2018-19
LPG	493.58	493.58	493.58	493.58
DG Set	1201.46	397.33	203.18	83.99
Total SCOPE I	1695.04	890.91	696.76	577.57

SCOPE II EMISSIONS (CAMPUS EMISSIONS)

Scope II emissions are indirect emissions from the generation of purchased energy.

SCOPE II EMISSIONS (kg CO_2 e)				
	2015-16	**2016-17**	**2017-18**	**2018-19**
BESCOM Power *(kWh)	23150.46	18755.46	15139.90	11674
Emissions (kgCO2e)	16205.32	13128.82	10597.93	8171.80
*Factored for electricity generation, distribution and transmission losses, adjusted for export and import of electricity.				

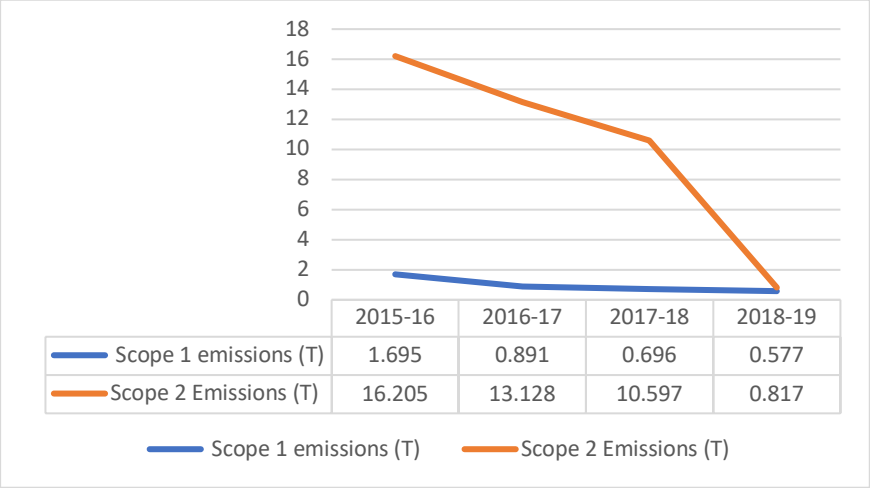


Figure 17a: Campus emissions trendline (SCOPE 1 and Scope 2 emissions)

SCOPE III EMISSIONS

Scope III emissions are all indirect emissions (not included in Scope 2) that occur in the value chain of the reporting company, including both upstream and downstream emissions. Some of the other products that account for energy consumption and therefore emissions are in very insignificant and inconsistent quantities and hence are not included in the Scope III calculations.

Table 2: Scope III emissions from Baseline Year to Audit year

SCOPE III emissions (kg CO_2 e)					
		2015-16	**2016-17**	**2017-18**	**2018-19**
Transport	Vehicle Hired	200.30	625.64	1075.25	1791.90
	Staff Transport	12,995	13,256	13,151	12,055
	Air Travel Emissions	44085	68631	62400	74388
Total		57280.3	82512.64	76626.25	88234.9

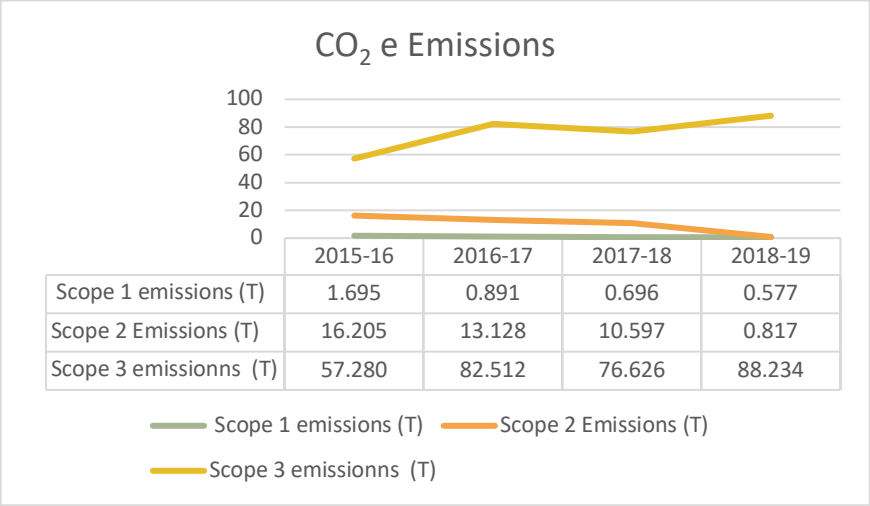


Figure 18b: Scope, I, 2 and 3 emissions from baseline to audit year.

Total Scope I, II and III emissions for the audit year 2018-19 (0.577+.817+88.234)= 89.62 tons

NORMATIVE EMISSIONS

As the total campus emissions are 1.39 tonnes CO2e, per capita emissions are 0.03 tonnes CO2e per annum.

TARGET NORMATIVE EMISSIONS

Ten percent reduction in energy and water sections would lead to ten percent reduction in the emissions.

MISCELLANEOUS

Air Pollution: As the Campus is in Industrial Area, the overall outdoor air quality may not be most desirable, however, inside the campus there is limited scope of air pollution- the air emitting operations are generators, which are used sparingly, air conditioners and Volatile Organic Compounds (VOCs)from printing and spot cleaners.

Occupational Health and Safety Practices: It was observed that there is ample natural light and air in the building, which is excellent for the staff. There is an additional tree cover all around the campus which buffers the campus well. There are appropriate indoor plants in the corridors especially the likes of snake plant (Sanseivera)which are known to beat the indoor air pollution. Near the printers and other equipment that release foul air, house plants such as snake plant, money plant and areca palm can be put in large numbers.

Noise Pollution: Although it is not in the scope of the audit, there were high levels of noise pollution noticed from the neighbouring industry especially on the rear side of the building. Although the noise levels inside the building were not too loud, it may be an area of concern for the caretaker family as they live adjacent to the wall adjoining the factory causing noise pollution. There can be a recommendation for a higher wall for the industrial complex if they are over crossing the limit.[2]

CONCLUSIONS AND RECOMMENDATIONS

Overall, PAC energy, water and emissions footprint is on the lower side and PAC can emerge as a benchmark for similar sized or even larger organizations. Biodiversity Index is quite high and a little nurturing can go a long way towards creating a thick and deep green campus.

Waste is one of the areas that require immediate and urgent attention. PAC can work on declaring itself as a **Zero Waste and Carbon Neutral Campus.** For that to happen, conclusions drawn from the audit along with recommendations can provide action points to consider during 2019-2020.

ENERGY

PAC has been progressive in moving ahead towards optimizing energy and opting for renewable energy options. For electricity, data was available from BESCOM, DG sets and solar capacity for the baseline year (2015-16) as well as for 2016-17, 2017-18, and 2018-19. However, there is no internal metering for lighting, space conditioning or solar meter readings of the past. The trends for BESCOM vs Solar and DG trends clearly suggest the following:

CONCLUSIONS

1. Total Electricity consumed is 19,306 kWh in 2018-19.
2. Solar power generated from a 9.9kWp system is 7558 kWh annually.

[2] Statutory requirement- The applicant shall ensure that the ambient noise levels and ambient air quality within its premises during construction and after construction shall not exceed the limits specified in the Environmental (Protection) rules i.e. the noise level from the noise generating equipments that is DG sets, AC units shall not exceed 75dB (A) Leq during day time and 65 dB (A) Leq during night time.

3. The trends for electricity consumption clearly show a reduction in the consumption of BESCOM power and DG usage vs Solar.
4. This has resulted in overall savings of about 70,000 INR cumulatively from baseline to audit year.
5. Estimation of about 20 solar units a day during the audit period as well as from the estimates is less than the initial estimates calculated in feasibility studies. Sub-metering can help substantiate that.
6. Transport energy has been increasing from 2015-16 to 2018-19

RECOMMENDATIONS

1. Sub meters would help in monitoring energy use for various end uses such as for lighting, pumping and other plugged in load.
2. Energy Performance Index for PAC is very low, and PAC can look for relevant recognition and awards. One of the main reasons for low index appear to be the building design and construction and less dependence on air conditioning.
3. Despite having the low EPI, there is a scope for improving the index further and keeping the benchmark high.
4. This can be achieved through energy star related appliances, switching to LEDs and reducing water pumping requirements.
5. This can also be achieved through behavioural changes such as switching off lights, using less printers and less air conditioning wherever possible.
6. Transport use is already optimized through car pool and is a best practice that can be showcased.
7. LED switching for night light will have ROI for less than three years.

WATER

CONCLUSIONS

1. For water the audit year data can be taken as baseline. As there is no water meter, the audit required considerable assumptions on usage and actual flow rates.
2. About 2000kL of water consumed annually makes PAC a very light user of water.
3. Rain water harvested annually through 28000 litre storage sumps has helped in harvesting 267 kL of water optimizing at least half of the total roof area. Total days serviced are 47.
4. Contour bunding of 200 m along with four recharge pits helps in water percolation which has helped PAC become self-reliant in water. Nearly 64 million litres of water gets percolated for GW recharge (Conservative estimate).
5. Water used for gardening exceeds any other requirement, and for water within the facility, washrooms take a large share.
6. Water quality analysed is free from E coli and other bacteria. It has high levels of TDS.
7. Many taps, health faucets including those on the roof top and garden have high to very high flow rates.

RECOMMENDATIONS

1. Installation of water meters for main usage such as washrooms, gardening and care taker home.
2. Fixing aerators in water fixtures that can reduce water flow rates. This shall bring down the water consumption in washrooms, pantry and landscaping.
3. Gardening water reduction through altering watering times, mulching and composting.
4. Drinking water can be switched to an appropriate RO system with an ROI of less than a year.
5. Recycling grey water and using it for landscaping/gardening purposes. Phytorid system which is eco-friendly low maintenance plant based sewage treatment option may cost around INR 7-8 lakhs assuming waste water quantity to be 4000 litres. Please note that the system that may be installed may serve 10,000 litre a day and would require 20 sqm. of space.
6. Additional rain water can be harvested from the full roof area and that can lead to additional days serviced through rain water, provided additional storage capacity is there.

WASTE

CONCLUSIONS

1. Around 744 kg of waste is generated on the campus which can be classified as wet waste, dry waste, e-waste and sanitary waste.
2. Although quantity of the waste generated is less, waste management requires focus of the organization.
3. Burning of the waste does not meet statutory requirements.
4. Recyclables may be finding its way to landfills.
5. Dry leaves and biomass that is available in huge quantities is not used for mulching, this is also burnt along with the waste.
6. Sanitary waste in small quantities and is not currently disposed off in an appropriate manner.
7. Waste water leaves the campus untreated.

RECOMMENDATIONS

1. Segregation of waste at source.
2. Wet waste as one category, paper and plastic can be two other categories through colour coded well labelled dustbins. E waste can be collected in store and can be disposed off once in a quarter. Similarly, occasional hazardous waste such as light bulbs and batteries can be disposed off at a collection centre.
3. Setting up a composting unit that can process dry leaves along with wet waste from office as well as caretaker family.
4. Mulching-some of the biomass can be used as a direct mulch for keeping the plants well protected from direct heat.
5. Sanitary waste incinerator as used for small offices/homes.

6. Phytorid treatment option for grey or both grey and black water will make recycled water available for landscaping.

EMISSIONS

CONCLUSIONS

1. Scope I emissions have reduced from baseline year at 1695 kg to 577 kg in audit year primarily because of the reduced DG usage.
2. Scope II emissions from BESCOM electricity has also reduced substantially.
3. Scope I and II emissions are 1.39 tonnes annually and so PAC is very close to being a carbon neutral campus.
4. Scope III emissions are high and mainly from transport that includes road and transport emissions.
5. Total CO2 emissions (Scope I, II, III) are 89.62 Tonnes.
6. Air transport emissions have gone up from baseline year at 44 tonnes, and then going up to 68 and coming down to 62 and eventually going up to 74 tonnes.
7. Emissions from staff transport have stayed more or less around 12, 995 in baseline year and coming back to 12,055 after going up to 13, 256 and 13, 151 tonnes.
8. Emissions from vehicles hired have gone up substantially from 200 tonnes in baseline year, jumping to 625 and 1075 tonnes and finally leading up to 1791 tonnes in the audit year.

RECOMMENDATIONS

1. Clear policy direction on carbon neutrality. Target for less than 1 tonne would help PAC move towards carbon neutrality.
2. Scope I, II emissions can be reduced through less use of DG, LPG and reducing electricity consumption by means and measures mentioned in energy, water, waste and biodiversity sections.
3. Reduce the transport emissions by opting for video conferencing where possible.

BIODIVERSITY

CONCLUSIONS

1. PAC is a biodiversity rich campus.
2. PAC biodiversity index for plants (Simpson1-D) is quite high which is 0.973
3. PAC faunal diversity has reports on spotting mammals, reptiles, birds, amphibians, insects.
4. There is a vegetable garden that has spinach, coriander, knol-kohl, tapioca, growing, however plants look stunted and that can be attributed to nutritional deficiency.

RECOMMENDATIONS

1. For increasing biodiversity and paving way for climate resilience, drought tolerant varieties can be planted and nurtured.
2. Criteria for choosing plants based on stakeholder interest in red alert species, noise buffering, air pollution reducing, drought resistant, non-allergy season flowering, fruiting etc. or any other criteria that seem important.
3. Care for some of the species that some individuals and groups have agreed for should be taken forward.
4. Composting units will help provide the required nourishment for the campus plants and trees.
5. Plant rotation from root crops, to stem crops to leaf crop in a given patch ensures nutrition recovery and balance. As such a crop rotation plan can be devised based on season and crop rotation cycle.
6. Reporting on biodiversity and sightings on the website can enhance the interest of the stakeholders and attracting right talent for the organization.
7. Mulching is important especially during the dry season.
8. Ground cover of drought resistant grass would help in percolation of rain water.
9. Soil testing at two to three different sections in the campus.

SPECIFIC RECOMMENDATIONS

FOR ENERGY

Table 3: Specific recommendations for energy

S. No	***Observations***	***Suggestions***	***Costs/Remarks/Links***
	Solutions that may require budgetary approvals		
1.	*Lighting- Incandescent & CFL bulb use . CFL (7, 11,18, 15 W) and Incandescent (60W)*	*Phase out of incandescent and CFL bulbs, to be replaced with LEDs (of 5 W, 7 W and 10W)*	***LED options:*** ***1) Eveready 10 W Round B22 LED Bulb to replace 22 W CFL*** *Lumens: 1000* *Power: 10W* ***2) Philips 7 W Globe B22 LED Bulb to replace 15 W CFL*** *Lumens: 625* *Power: 7W*
2.	*Fans, AC (non-five star rating)* *Fans may be low star rating and ACs are 3 star rated.*	*Convert to energy efficient appliances (5 Star rating)*	***Ceiling Fan:*** ***1) Atomberg Gorilla Efficio,*** *Fan blade size: 1200mm,* *Air delivery: 230cmm,* *Power: 28W -https://atomberg.com/fans/ceiling-fan/gorilla-efficio/?attribute_color=White* ***2) Havells es40w*** *Fan blade size: 1200mm,* *Air delivery: 210cmm,* *Power: 40W* *https://www.havells.com/en/consumer/fans/ceiling-fans/energy-saving/es-40-(3).html#gref* ***Air Conditioner:*** ***1) Godrej GIC 12 BAH 8 GGQG 1 Ton NXW Inverter AC*** *Capacity: 1 T* *Wattage: 766 W* *Types of HCFC Refrigerants used and their GWP potential: R-290 (Lowest GWP at 3)* *https://shop.godrejappliances.com/godrej-air-conditioners/godrej-gic-12-bah-8-ggqg-1-ton-nxw.html* ***2) Voltas Inverter Split AC 125V DZV(R-410A) 1 Ton 5 Star***

			Capacity: 1 T *Full load / Half Load Power: 860W / 422W* *Types of HCFC Refrigerants used and their GWP potential: R-290 (Lowest GWP at 3)* *https://www.myvoltas.com/inverter-ac/split-ac/voltas-sac-125v-dzv-r-410a*
3.	*Summer heat*	*Cool curtains or a couple of coolers for the staff room staff can serve the purpose.*	
4.	*Mosquito mesh*	*For some windows can assure the windows are open*	
5	*Server Room AC not working*	*Should be repaired urgently*	
6	*Sub meter installation for calculations*	*For lighting and fans, and plug in loads and other uses.*	
Solutions that may not require budgetary approvals			
7	*Behavioural changes*	*Admin to make sure lights and fans are switched off when not in use;* *; Increase awareness on energy conservation by putting notices.*	
8	*Solar meter reading*	*Every month meter reading should be recorded*	

FOR EMISSIONS

Table 4: Specific recommendations for emissions.

S. No	***Observations***	***Suggestions***	***Costs/Remarks/Links***
	Solutions that may require budgetary approvals		
1.	*Lighting- Incandescent & CFL bulb use*	*Phaseout of incandescent and CFL bulbs, to be replaced with LEDs*	
2.	*Fans, AC (non-five star rating)*	*Convert to energy efficient appliances*	
3.	*LPG Stove*	*Electric Induction cooker*	
4.	*Electric Pump*	*Solar pump*	
	Solutions that may not require budgetary approvals		
5.	*Water/ power Consumption*	*Gardening methods including mulching discussed elsewhere, time of watering*	
6.	*Cleaning agents*	*To opt for non-chemical cleaning agents*	

FOR WATER

Table 5: Specific recommendations for water

S. No	***Observations***	***Suggestions***	***Costs/Remarks/Links***
	Solutions that may require budgetary approvals		
1.	*Water flow in taps ranges from 1.9, 2,6, 7.2. 15 to 30 litres/minute for various fixtures.*	*Change to efficient water fixtures;* *Fix Aerators for all fixtures to reduce the flow rate/minute. ;* *Fix water metre to track optimum usage;*	***Option for Water aerator****- Neosystek – water reduction potential of 80% and flow rate of 3lt/min.*
2.	*Purchase of drinking water which has high embedded energy and logistics handling.*	*Options to convert rainwater to drinking water by treating through Water Purifiers or even borewell water. Water Quality data reveals no presence of bacteria, TDS values are currently*	*Based on daily demand, you require a water purifier of 10-15 litres/hour. ROI for the*

		undesirable and this water can be of potable quality.	*system shall be less than a year.*
3.	*Water for landscaping is the highest use of water annually.*	*Use of drip irrigation;* *100% recycling of grey water*	
4.	*Existing pump consumes considerable power*	*Solar pump can assure reduction of BESCOM power.*	
5.	*Grey water and black water plumbing are mixed at the rear end of the building*	*Grey water can be separated for easier treatment and reuse for gardening purposes through a low energy and low maintenance phytorid system.*	
6.	*Greywater from Labour shed is drained out untreated*	*This can be treated before draining and reused for landscaping purposes.*	
7.	*Black water is allowed to drain out untreated.*	*To meet compliance, phytorid system can be employed for both grey and black water. 1Lakh litre can be made available annually by recycling grey and black water.*	
8.	*Bare Soil exposed to high heat during summers.*	*Ground Cover could be given by indigenous grass to trap water to seep and reduce surface evaporation*	
9.	*RWH is currently optimized for half roof, for optimizing water from full roof the storage has to be more than doubled.*	*Depending upon the budget , storage capacity could be doubled or more (2.8 times) however, the option of phytorid vs additional storage capacity can be weighed.*	
Solutions that may not require budgetary approvals (or minor)			
10.	*Bare soil, somewhere roots also exposed, lot of water required for plants*	*Mulching*	***Connected with Kshithee***
11.	*Watering in day time*	*Watering morning and evening*	

FOR WASTE

Table 6: Specific recommendations for waste

S. No	***Observations***	***Suggestions***	***Costs/Remarks/Links***
	Solutions that may require budgetary approvals		
1.	*Waste is not segregated*	*Segregation of waste and create awareness on it;* *Create provision for labelled dustbins: Purchase small dustbins for paper shared by four staff; a large dustbin for plastic waste; one for misc. recycled waste such as metal, e waste to be deposited at store. One of the waste team members can take responsibility to dispose at e-collection centre.* *Segregated Dry Waste to be stored properly and disposed through recycling agencies* *Wet waste – Composting - show staff how it's done*	*Dustbins can be netted metal (cast iron for durability)*
2.	*Waste and dry leaves are burnt on site*	*Composting*	*Connected with Kshithee dimensions*
3.	*Non treated STP water is drained out*	*STP, Phytorid*	

4.	*Waste Handling*	*Reduce Reuse Recycle, including merchandising for PAC from Waste*	
5.	*No training for staff and no PPEs*	*Provide waste handling training and PPEs*	

FOR BIODIVERSITY

Table 7: Specific recommendations for biodiversity

S. No	***Observations***	***Suggestions***	***Costs/Remarks/Links***
	Solutions that may require budgetary approvals		
1.	*Soil and plants appear undernourished.*	*Adopt traditional farming methods;* *Planting more trees (flowering plants) – to attract butterfly, butterfly park;* *Create bird shelters (water ponds), Birdhouses & bird baths around the campus (Suggestions from PAC staff)* *Creating a waterbody and plant more Fruit bearing trees to attract birds and other animal species; Soil testing*	
2.	*All kind of trees especially non-native*	*Drought resistant varieties;* *Front row buffer*	
3.	*Termite infestation in about 20 trees*	*Termite treatment before starting composting*	

MISCELLANEOUS

Table 8: Miscellaneous recommendations

S. No	***Observations***	***Suggestions***	***Costs/Remarks/Links***
	Solutions that may require no budgetary approvals		
1.	*Behaviour Change*	• *Employee & care taker family – awareness / education to be eco-friendly;* • *Have a manual on eco-friendly practices of PAC to introduce to new comers;* • *Knowledge/experience sharing amongst staff of best practices in green living that they practice in daily lives;* • *Waste audit amongst staff;* • *Workshop on green living for staff;* • *Reviewing aspirations quarterly;* • *Safety drills for fire and carry out safety audit;* • *Gardener training for watering, pruning, and mulching - Best Practices*	
2.	*Indoor air quality*	• *Increase indoor plants for better quality air;*	

3.	*Eco Purchasing*	• *Having eco-friendly vendors;* • *Use paper or cloth bags; Eco-friendly stationery;* • *Reduce paper usage – to check options of bulk printing; reuse paper- Reuse one sided paper; 10% reduction in procurement of paper; Go paperless in 2 years* • *Lunch only from non-plastic boxes & Reusable Cutlery; Farm to table lunch; zero tolerance to plastics in meeting, for ordering lunch;* • *Using herbal cleaning products (non-chemical based) ; Reduce toilet paper used;* • *Having plants as mementos & jute products;*	
4.	*Suggestions from PAC staff*	• *More open sitting area* • *Flexible seating arrangement*	
5.	*Other suggestions*	• *Awareness programmes by sustainability team* • *Quarterly progress report* • *Assigning reduction targets to individuals* • *Reach out to schools for biodiversity*	

SUSTAINABILITY ROAD MAP

Sustainability Road Map will be presented during the presentation meeting.

SUSTAINABILITY ACTION PLAN FOR PAC													
Sl. No.	Categories	Year 2018-19											
		Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	Mar
ENERGY (Udita, Vivek, Vishnu Prasad, Hari)													
1	Draft an energy policy												
2	Plan on changing all CFLs to LEDs												
3	Implement setting computers to sleep within one minute												
4	Campaign on turning the lights off												
5													
6													
7													
8													
9													
10													
11													
12													

Figure 19:Screen shot of Sustainability Action Plan

Approach for each action point can be taken forward and reported to the green communication team in the following format.

Table 9 : Format for taking the action points for measuring performance.

What is the issue	What Action will we take (Action point)	Who will do it	When will it be done?	How will we monitor progress?	How will we know if we succeeded?	What will it cost ?
Water flow from the taps to be reduced	Get the aereators fixed	Find relevant aereators-X	April	Take two taps as markers,	Measure the flow, from the baseline	100-300/aereator
Avoid paper use as much as possible	Go paperless Create a policy; get approvals; assess systems	Policy:X Approvals:y Assess systems:Z	April	No. of reams used in previous quarter	If the reams used are less than previous quarter	May be some software systems

AUDIT CERTIFICATE

SAGE Sustainability Team has prepared this report for Public Affairs Centre (PAC), Bengaluru based on information submitted by the staff members as well as the data provided by them. The audit was conducted involving staff members to know the feasibility of actions that could be taken at the campus. Observations, measurements, discussions and meetings with the team led to collection and analysis of data. Assumptions were made based on the information provided by the team. While all reasonable care has been taken in the preparation of the report, details in this summary report have been compiled in good faith making best estimates where information was missing. Due care has been taken to arrive at assumptions, estimates and no representation, warranty or undertaking, express or implied is made and no responsibility will be accepted by SAGE Sustainability and its team members for any direct or consequential loss arising from any use of the information, statements or recommendations in the report.

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