



(Bowrampet (v), Near pragathi nagar, on Miyapur-medchal high way,
Quthbullapur, Medchal, Hyd-500043)

Index For 7.1.3

1	Policy for Energy Utilization and Environment	7.1.3(1)
2	Green Audit Repot	7.1.3(2)
3	Environment Audit Report	7.1.3(3)
4	Energy Audit Report	7.1.3(4)
5	Documents Related to clean and green campus Initiatives	7.1.3(5)
6	Report on clean and green campus Initiatives	7.1.3(6)
7	Documents Related to Environment Promotion Activities beyond Campus	7.1.3(7)

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Bowrampet, Quthbullapur, Hyderabad-500 043.



Policy for Energy Utilization and Environment

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PRINCIPAL
DRK Institute of Science & Technology
Bowrampet, Gullibullapur, Hyderabad-500 040.



Policy for Energy Utilization and Environment

The Energy utilization and Environment Policy of DRK Institute of Science and Technology, Hyderabad is to manage energy in such a systematic way so as to minimize its impact on the environment. The policy implies to explore the renewable energy resources to reduce the burden of the government and to find out substitute natural resources as solutions to the energy crisis.

This environment and energy policy is binding for all the components of the institution and applies to all its stakeholders and to the various activities undertaken by the institution. It will help us to embed efficiency and environmental awareness into our everyday activities, thus helping us to realize our responsibilities and commitment to conservation of natural resources and to limit its usage. The **Enviro Club**, an official platform devoted to the cause of environmental awareness, to undertake green initiatives, and to conduct green literacy programmes to save energy and to protect the environment.

Policies:

- To assess our energy usage and measure its impact on the environment.
- To count CO₂ emissions generated by our means of transportations- vehicles.
- To reduce local air pollution emissions using environment-friendly vehicles, including bicycles, public transportation and use of pedestrian-friendly roads.
- To install photovoltaic solar panels for the generation of alternate energy.
- To install LED bulbs in the complete campus to save energy.
- To develop systematic waste management mechanism.
- To develop rain water harvesting unit.
- To undertake tree plantation drive.
- To take additional measures to continuously improve our energy consumption.
- To develop and maintain an environmental management system which is ISO: 14001• and an Energy Management System based on ISO: 50001.
- To ensure the availability of necessary resources to achieve our objectives.
- To encourage use of advanced technology to minimize energy consumption, atmospheric emissions and noise, particularly from our vehicle fleets.

- To engage in dialogue with the government agencies, municipal corporation and the affiliating university and actively work with the local organizations in the areas of environment, energy efficiency and sustainable development.
- To monitor and respond to emerging environmental and energy issues. To strengthen our employees and students environmental knowledge and skills in order to improve our own environmental performance.
- To provide information and training opportunities on energy saving measures.
- To offer opportunities for employees and students to engage in initiatives those contribute to environmental protection.
- To train our employees and students through our **Enviro Club** to make them **Go Green Specialists** and partners to plant trees each year.

This policy will be communicated to the students and employees via internal communication channels, and will be made available to all the stakeholders on the institutional website. The Environment and Energy Policy, objectives and targets will be reviewed on a regular basis by the Enviro Club Convener and its members under the guidance of the Principal of the college.

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PRINCIPAL
DRK Institute of Science & Technology
Bowrampet, Gullibulapuri, Hyderabad-500 043



GREEN AUDIT REPORT

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DRK Institute of Science & Technology
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CERTIFICATE OF COMPLETION

This is to certify that

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Bowrampet (V), Medchal (district), Hyderabad-500043

has successfully completed

GREEN LAND SCAPE AUDIT

The study was completed by Rekhapalli Environmental Solutions & Technologies Pvt Ltd

Dr Rekhapalli Srinivasa Rao

*Green, Eco & Energy Lead Auditor
Certified ISO-14001 Auditor
Member of WEC*

Issued by

Rekhapalli Environmental Solutions & Technologies Pvt Ltd



June 2024

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DRK Institute of Science & Technology
Bowrampet, Dist: Medchal
Hyderabad - 500043

Green Landscape Audit



Bowrampet (V), Medchal (District),
Quthbullapur (Mandal), Hyderabad-500043

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Bowrampet, Qulibullapur,
Hyderabad - 500 043.



S.no	Contents	Page No.
01.	Acknowledgement	04
02	Executive Summary	05
03	Introduction	07
04	Recommendations	13
05	Conclusion	15

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DRK Institute of Science & Technology
Bawaliapet, Guntur

Acknowledgements

REST Pvt Ltd



Dr Rekhapalli Srinivasa Rao
Green, Eco & Energy Lead Auditor
Certified ISO-14001 Auditor
Member of WEC

15 June 2024

Green Landscape Audit

The REST Pvt Ltd acknowledges with thanks the cooperation extended to our team for completing the study at DRK Institute of Science & Technology (DRKIST).

The interactions and deliberations with DRKIST team were exemplary and the whole exercise was thoroughly a rewarding experience for us. We deeply appreciate the interest, enthusiasm, and commitment of DRKIST team towards environmental sustainability.

We are sure that the recommendations presented in this report will be implemented and the DRKIST team will be further improving their environmental performance.

Kind regards

Your sincerely

Dr Rekhapalli Srinivasa Rao

Green, Eco & Energy Lead Auditor

Certified ISO-14001 Auditor

Member of World Environment Council

Director, REST Pvt Ltd

PRINCIPAL
DRK Institute of Science & Technology
Bowrampet, Guntur Dist.
Hyderabad - 502003

Executive Summary

The growth of countries across the world is leading to increased consumption of natural resources. There is an urgent need to establish environmental sustainability in every activity we do. In a modern academy, environmental sustainability will play a critical role in the very existence of an organization.

An educational institution is no different. Built environment, especially an educational institution, has a considerable foot print on the environment. Impact on the environment due to energy consumption, water usage and waste generation in an educational institution is prominent. Therefore, there is an imminent need to reduce the overall environmental footprint of the institution.

As an institution of higher learning, DRK Institute of Science & Technology (DRKİST) firmly believes that there is an urgent need to address the environmental challenges and improve their environmental footprint.

True to its belief, DRKİST maintain good landscaping in its campus. REST congratulates the DRKİST for their efforts to create a truly green campus.

Based on the data submitted by DRKİST team, following improvement opportunities have been identified in the campus in terms of landscaping.

- Implement ecosystem restoration by development of theme gardens in used areas of the campus
- Develop green corridors between existing areas in the campus
- Develop natural areas to encourage bird roosting and nesting in built-up areas
- Increase tree density and canopy cover in the built-up areas by planting more fruit yielding trees.
- Conduct regular flora surveys for improving the existing data.
- Develop strategies for regular monitoring prevention of invasive plant species.

By addressing the improvement opportunities, the campus would be able to achieve the following benefits:

- Identifying & implementation of proper measure for conservation of endangered floral species in the campus
- Reduce the microclimate temperature of the campus by 1-2° C which is significant
- As many of the species have the capability to absorb contaminants in the air and therefore this would lead to better air quality in the campus
- This can evolve as an excellent educational campus for spreading awareness on biodiversity and benefit the nation at large.


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Bowrampet, Qutubullapur,
Hyderabad - 500 043.

Introduction

Urbanisation and its effect on loss of biodiversity

Urbanization causes biodiversity to decline. As cities grow vital habitat is destroyed or fragmented into patches not big enough to support complex ecological communities. In the city, species may become endangered or even locally extinct as natural areas are swallowed up by the urban jungle.

Ironically, it is urban growth that is often responsible for the introduction of non-native species, either accidentally or deliberately, for food, pets or for aesthetic reasons.

Documentation of Flora

Knowledge on biodiversity of any geographical region is a paramount importance for sustainable management and conservation plans. The foremost task in the conservation process is to prepare an inventory of species. It is necessary to have full knowledge regarding the habit, habitat, distribution and phenology of various plants for their proper conservation.

The documentation of flora will help in identifying, documenting and promoting the conservation of native flora in India. This in turn will help in promoting native species for landscapes as they suit one growing interest in “Low maintenance” gardening and landscaping.

Many species are vigorous & hard and can survive winter, cold, and summer heat. These species once established, can flourish without irrigation or fertilization and are resistant to most pests & diseases.

Need for documentation of Flora

The knowledge building on significance and importance of various flora existing around us is the need of the hour. Loss of the biodiversity is likely to result in loss of various other taxonomic groups.

Serve as a ready reckoner:

Most of the campuses have huge landscape with diverse floral species. Nevertheless, the availability of information on these species is minimal. Hence, the documentation of the species would serve as an educational material on the details of species existing within the campus.

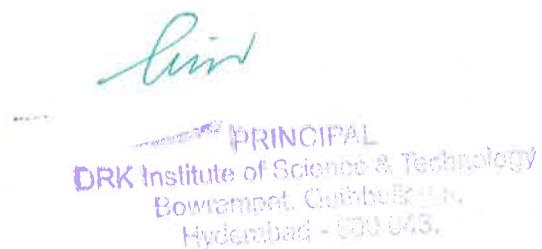
Public Visibility:

Despite having various biodiversity initiatives in place within the campus most of the campuses lack the visibility of the measures taken in conservation. The sudsy will create awareness & visibility of the campus on various conservation measures implemented to the occupants as well as to the visitors.

Also, the organization will gain globally amongst its shareholders for the positive steps taken towards protecting biodiversity.

Conservation of Species:

Due to Urbanization most of the floral species are under tremendous pressure. The need of the hour is to conserve and protect these species. The study would help in identifying such species in the campus which need to be conserved.



DRKIST carbon sequestration through plantation

Carbon sequestration through plantation is one of the important steps towards achieving carbon neutrality. In carbon footprint calculation of DRKIST, carbon sequestration through plantation is considered and due credit has been given.

No. of trees considered for carbon footprint calculation : 1800 trees

Total compound area of campus (approx. in Sq. ft) : 2.5 Acre

CO₂ absorbed by a tree in one year : 18 KG

Total CO₂ sequestered : 1800trees x 18 KG of CO₂/year
: 32.5 tons of CO₂



Plantation & Maintenance techniques

Selection of species

- Native species like Azadirachta indica (Neem), Pongamia pinnata (Pongam tree), Cassia fistula (Indian shower tree), Butea monosperma (Flame of the forest) and also fruit bearing species like Mangifera indica (Mango), Manilkara sapota (Chikoo), Syzygium cumini (Jamun Tree), Psidium guajava (Guava), Annona squamosa (Custard apple), Punica granatum (Pomegranate), Phyllanthus emblica (Indian Gooseberry), Citrus sinensis (Sweet lime) and Citrus limon (Lime) to be selected for plantation. Royal Palm, Neem, Ashoka, Coconut, Rela trees, Rain Tree. etc already planted in DRKIST.
- Saplings of 2-3 ft height to be considered for plantation in public areas
- Plantation can be taken up as avenues (roadside plantation) and green belts (thick plantation in one area)
- Fruit plantation can be taken up in protected areas, institutions with large areas. Special care to be taken in maintenance since these plants also generate revenue

Digging of pits

Pits to be dug about one month prior to the plantation date and it should be exposed to sunlight

This will help in killing of harmful disease-causing bacteria and virus.

- In places of no availability of proper sunlight, dry trash to be filled in the pit and burnt.
- Pit size should be normally 2ft or 3ft and in soils which are very hard 4ft³ or above to be dug.
- Further to the digging of pit, the bottom of the pit should be loosened up to 6-9 inches.

LM
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DRK Institute of Science & Technology
Bowrampet, Qutubabad,
Hyderabad - 500 013.

4. While digging, we can observe different soil profiles. Topsoil will be soft and contains enough nutrients for nourishing the plant. The topsoil should be deposited on one end and hard soil on the other end. While filling the pit with soil, the topsoil only should be used. The topsoil from the non-plantation area around the pit to be collected and mixed with manure and used for filling of the pit.

Transportation

- Visit to the nurseries and enquire about plant species like availability, size, age and girth prior to the plantation. Also, the size of the packet in which the plant is existing to be enquired.
- Ensure that the material is available in the nursery and allotted to pick up
- The saplings to be watered one or two days prior to the movement of plants to plantation area
- The plants to be procured at least 15 days prior to plantation.
 - The saplings to be watered as soon as they reach the plantation area and regularly thereafter.
 - They should be kept in shade, non-windy & protected areas.

The above said steps to be followed for movement of plants near to the pits within the plantation area. Enough water to be stored for watering the plants after plantation. Also, tools and manpower to be kept in place to ensure proper plantation of saplings. If the sapling is bushy with many branches, then the branches are to be trimmed before plantation.

Plantation

- The poly bag around the root ball to be carefully cut with a knife / sickle / scissors without disturbing the roots
- Rope and stakes are to be kept ready to support the plant after plantation.
- Regular watering to be done to the plants followed by mulching (loosening of top 3-4 inches of soil)
- Mulching will help in conservation of moisture, aeration of roots and control of weeds.

- Note: At least 5% of extra plants to be procured for timely gap filling and to ensure 100% survival. Care to be taken for these plants like other plants.

Terrace Farming

Rooftop gardens are man-made green spaces on the topmost levels of industrial, commercial, & residential structures. They may be converted into play spaces, give shade and shelter, or simply be there as a living, green area. Besides the benefit, roof plantings may give food for the birds and small creatures, control temperature, hydrological benefits, architectural enhancement, habitats or corridors for wildlife, recreational opportunities, and in large scale, it may even have ecological benefits. The process of cultivating food on the rooftop of buildings is sometimes referred to as rooftop farming. Rooftop farming is generally done using the green roof, Hydroponics, Aeroponics or Air-dynaponics systems or container gardens.

Recommendation at DRKIST:

- Generate income and can provide some local employment for the poor-can be educated to the local people.
- Utilizing otherwise unused roofs to make an income internally.
- Engaging in low time-consuming work that can be shared with other jobs.
- Establishing food security by providing fresh, safe, & healthy produce for the hostels.
- Contributing to environmental sustainability & natural resource management.
- Reducing heat on residents living on the top floor of buildings, which helps them save electricity by means of fans or AC less.

Recommendations for Enhancing Flora in Campus

1. Implement Ecosystem Restoration

- Develop naturalised areas in the Open Area segments.
- Wastelands in the campus can be converted to a park.
- 'Theme Gardens' can be developed in unused areas of the campus to increase proportion of natural area.

2. Enhance Ecosystem Protection

- Protect and maintain the existing Open Area segments

3. Planting more fruit yielding trees

- Increase tree density and canopy cover in the built-up areas

4. Increase number of Native Plants in the Landscape area

- Increase native plants to boost native biodiversity
- Bees, butterflies and other insects
- Healthy native plant growth will help in easy identification of invasive alien species

5. Introduce more native species in Open Areas

6. Preventing/ Decreasing Invasive Alien Species Spread

- Identify potential threatening species in advance and implement quarantine measures
- Mass Eradication techniques for larger spreads
- Commitment to complete eradication
- Manual Uprooting of small populations

livi
DRK Institute of Science & Technology
Bowrampet, Quthubpura,
Hyderabad - 500 043.

7. Develop natural areas to encourage bird roosting and nesting in built-up areas

8. Introduce features to attract birds in the built-up areas

- Bird feeders
- Water troughs/ Bird baths
- Nesting material

9. Plant ownership programmes should be initiated several trees should be planted and owned by visitors and students. The names of such visitors/ students should also be displayed.

10. There shall be a digital platform where student and staff get details about plants and animals in the campus. This may include name, information systematic position as per standard classification, usage, value, further references etc.,

11. Students and staff shall take initiative to start live campus discussion groups where green conservation and awareness shall be the main agenda.



— PRINCIPAL
DRK Institute of Science & Technology
Bowrampet, Guntur District,
Hyderabad - 502 322

Conclusion

As seen in the carbon sequestration calculation, tree plantations lead to a tremendous reduction in net emissions of the campus. Therefore, DRKIST needs to develop a roadmap to include tree plantation as a strategy to reduce overall carbon emissions of the campus.

More Biodiversity conservation and preservation methods are suggested and DRKIST may apply for a branding or ranking w.r.t. its biodiversity.

Water ponds in the form of Rain water cum Roof water harvesting ponds should be developed and it will improve aquatic biodiversity also.

Heritage trees identified must be well preserved and protected taking it as a pride and privilege. It develops a strong sense of love, respect and reverence to the visitors of the campus.

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PRINCIPAL
DRK Institute of Science & Technology
Bowampet, Qutubabad
Hyderabad - 500 085



ENVIRONMENT AUDIT REPORT

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PRINCIPAL
DRK Institute of Science & Technology
Bowrampet, Qutbiogullapur, Hyderabad-500 043.

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DRK Institute of Science and Technology

Bowrampet (V), Medchal (district), Hyderabad-500043

has successfully completed

ENVIRONMENTAL AUDIT

(WATER & WASTE MANAGEMENT)

The study was completed by Rekhapalli Environmental Solutions
& Technologies Pvt Ltd

Dr Rekhapalli Srinivasa Rao

Green, Eco & Energy Lead Auditor

Certified ISO-14001 Auditor

Member of WEC

PRINCIPAL

DRK Institute of Science & Technology
Bowrampet, Gouthbullahpur,
Hyderabad - 500 043.

Issued by

Rekhapalli Environmental Solutions & Technologies Pvt Ltd



June 2024

Environmental Audit (Water & Waste Management)



Bowrampet (V), Medchal (District),
Quthbullapur (Mandal), Hyderabad-500043



Liaqat Ali
PRINCIPAL
DRK Institute of Sciences & Technology
Bowrampet, Quthbullapur,
Hyderabad - 500 043

S.no	Contents	Page No.
01	Acknowledgement	04
02	Executive Summary	05
03	Environmental Audit	07
04	Water & Waste Management	08
05	Recommendations	11
06	Conclusion	23

Principals
DRK Institute of Science & Technology
Bowrampet, Qutubullapur
Hyderabad - 500 040

Acknowledgements

REST Pvt Ltd



Dr Rekhapalli Srinivasa Rao
Green, Eco & Energy Lead Auditor
Certified ISO-14001 Auditor
Member of WEC

15 June 2024

Environmental Audit (Water & Waste Management)

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PRINCIPAL
DRK Institute of Science & Technology
Bowrampet, Qutubullapur,
Hyderabad - 500 043.



Dr Rekhapalli Srinivasa Rao
Green, Eco & Energy Lead Auditor
Certified ISO-14001 Auditor
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Executive Summary

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As an Institution of higher learning, DRK Institute of Science & Technology (DRKİST) firmly believes that there is an urgent need to address the environmental challenges and improve their environmental footprint.

True to its belief, DRKİST has not yet implemented rainwater harvesting and water conservative methods in the campus. Hence, the college can also investigate the following recommendations:

- **Attain water positive status:** DRKİST should focus on capturing the harvested rainwater to substitute freshwater consumption, work on sustainable groundwater beyond the fence and create a framework towards attaining water positive status over a period. Presently, DRKİST is consuming nearly 5000 L of fresh water per day. Since metering is not available, the water consumption is calculated rather than measure value. The first step is to increase the water conservation activities in the campus to reduce water consumption at source. The next step is to increase the rainwater harvesting capacity to completely offset the freshwater requirements of the plant. Water getting harvested in those structures can offset the freshwater consumption of the college.

- **Install water efficient fixtures:** The best way to conserve water is at the source. Therefore, DRKIST will have to install water efficient fixtures to reduce water consumption. Some of the water efficient fixtures are:
 - Waterless urinals
 - Electronic taps (e-taps)
 - Electronic flush urinals (e-flush)
 - Foam taps
 - Spring loaded push taps
 - Low flush cistern
- **Install sewage treatment plant / rootzone treatment:** DRKIST uses more than 5000 L of fresh water per day. Considering that 100 L (least value) of water is being let to drain without treatment, good opportunity exists to reduce freshwater consumption by treating the sewage water and using the recycled water for gardening and flushing application. Install biogas plant and phytoremediation in series to recycle water and reduce freshwater consumption.
- **Install water flow meters:** Water flow meters are vital in understating the water consumption patterns of the campus. Presently, the water consumption is calculated rather than being measured. Water flow meters gives an accurate status if water consumption in the campus and from the water consumption values, the roadmap for water conservation activities can be prepared.
- **Segregate waste at source:** DRKIST has provided bins for waste collection. DRKIST must embark on awareness creation methods to increase the effectiveness of collection and provide more bins for proper waste segregation.
- **Maintenance of waste management yard:** The waste management yard is to be maintained just like raw materials storage room. Waste is nothing but a resource in wrong place. Therefore, by maintaining the waste management yard, quality of wastes can be maintained.

Environmental Audit

DRKIST and REST are working together to identify opportunities for improvement in water management, and waste management. This report highlights all the potential proposals for improvement through the audit and analysis of the data provided by DRKIST for water consumption and waste management. The report details the process conducted for the analysis such as on ground surveys performed for listing the type of water consumers with consumption per year, types of waste generated and disposal mechanisms.

Submission of Documents

Environmental audit at DRKIST was carried out with the help data submitted by DRKIST team. DRKIST team was responsible for collecting all the necessary data and submitting the relevant documents to REST Pvt Ltd for the study.

Preliminary Study

After the receipt of documents, a desktop review of the data for quality check, followed by preliminary study was carried out by REST Pvt Ltd. In case of discrepancy/inadequacy/non-clarity of data, REST Pvt Ltd team got in touch with the DRKIST team for clarification/additional information.

Environmental Audit

Data submitted and collected during the visit was used to assess the water and waste management practices of the campus and finally provide necessary recommendation for environmental improvement.

Note: Environmental audit is based on the data provided by DRKIST team. The scope of the study does not include the exclusive verification of various regulatory requirements related to environmental sustainability.

REST Pvt Ltd has the right to recall the study, if it finds (a) major violation in meeting the environmental regulatory requirements by the location and (b) occurrence of major accidents, leading to significant damage to ecology and environment.

Water Conservation

To achieve a water positive status by continuous reduction of freshwater consumption should be the ultimate focus of DRKIST. Increased and focused attention should be given to attain water sustainability in future by inculcating the discipline of water conservation.

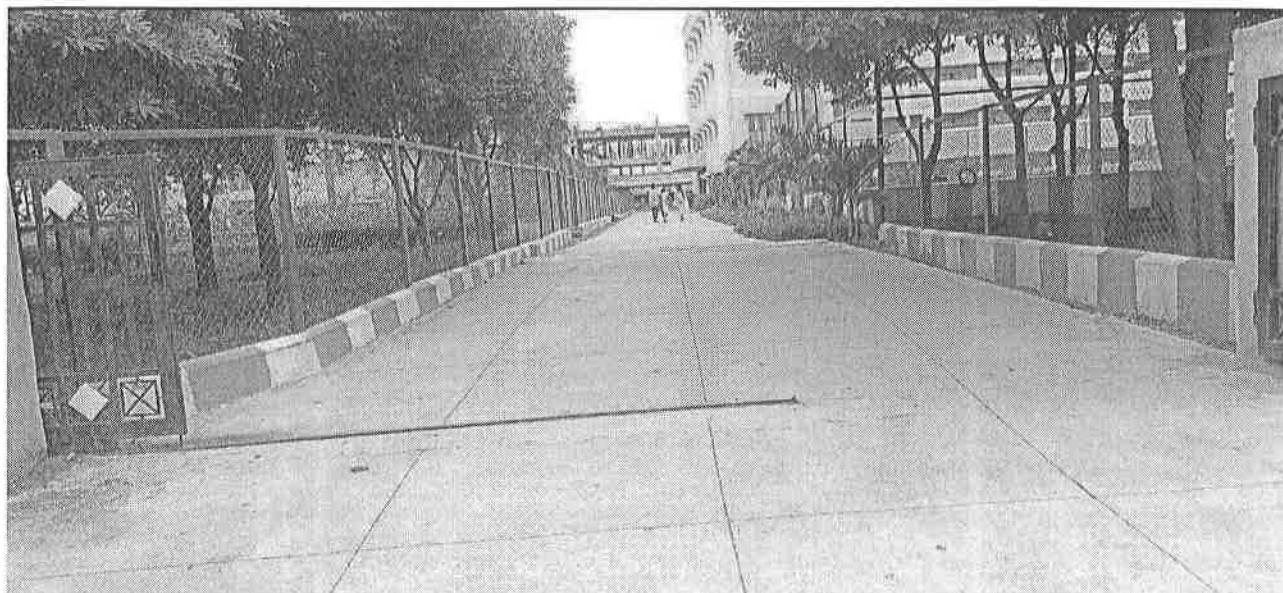
Fresh water consumption of DRKIST : 5000 L per day

Rainwater harvesting : Proposed for enhancement

According to the report, 'Water in India: Situation & Prospects', India is the largest consumer of groundwater in the world with an estimated usage of 230 km³ per year. Approximately 60 per cent of the demand from agriculture and irrigation, and about 80 per cent of the domestic water demand, is met through groundwater. As per the Department of Drinking Water and Sanitation nearly 90 per cent of the rural water supply is from groundwater sources. This has led to an increased pressure on aquifers and the resulting hydrological imbalance.



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PRINCIPAL
DRK Institute of Science & Technology
Bowrampet, Qutubullapur,
Hyderabad - 500 043.



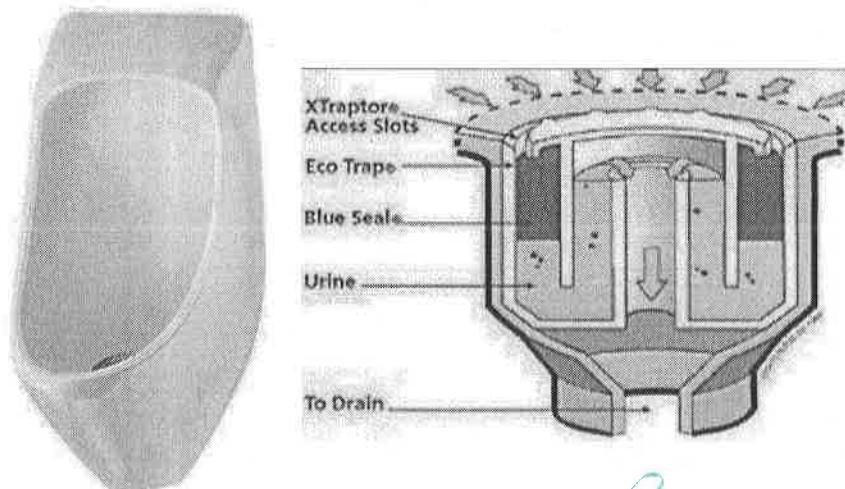
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PRINCIPAL
DRK Institute of Science & Technology
Bowrampet, GuttaBellur
Hyderabad - 500 043

Recommendations for water conservation

1) **Waterless urinals:** Waterless urinals look like regular urinals without a pipe for water intake. Men use them normally, but the urinals don't flush. Instead, they drain by gravity. Their outflow pipes conduct to a building's conventional plumbing system. In other words, unlike a composting toilet, which leaves you to deal with your waste, these urinals send the urine to a water treatment plant.

- a. Urine flows into the drain insert of the Eco Trap.
- b. Inside of the Eco Trap the urine moves through a floating layer of proprietary immiscible Blue Seal liquid, which creates a barrier, preventing sewer gases and urine odours from entering the restroom area.
- c. The urine below the Blue Seal barrier overspills into the central tube and travels down into the drain line.

Waterless Urinal

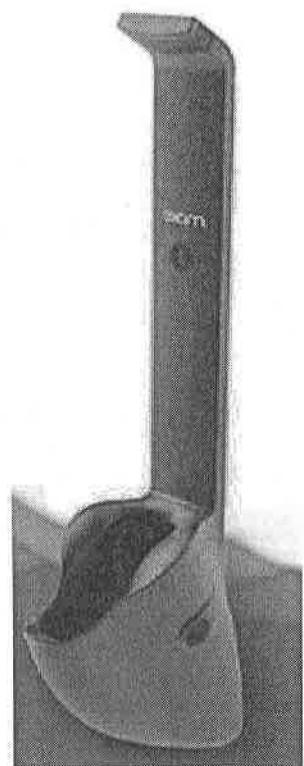


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Bowrampet, Outhbullapur,
Hyderabad - 500 043.

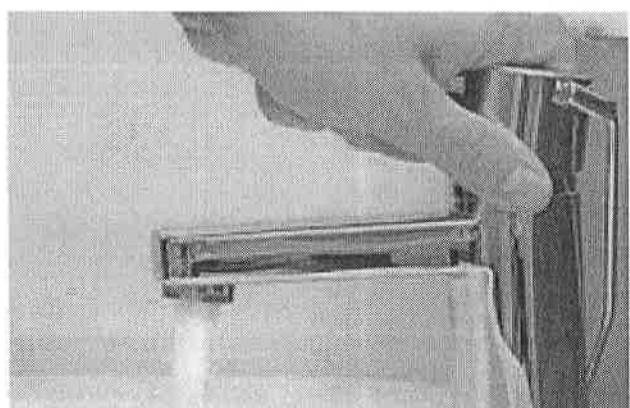
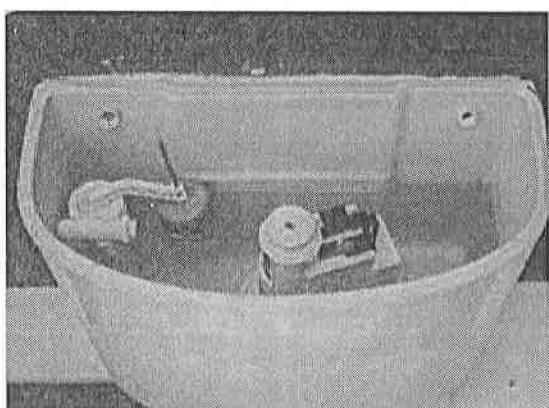
d. Approximately 1500 sanitary uses are possible with just 3 ounces of Blue Seal. When the Blue Seal liquid is gone, it is simply replenished. This only takes about 20 seconds to perform and the Eco-Trap is not touched.

e. Urine sediments are retained within the Eco-Trap. Replacement is easy and need only be done 2 to 4 times per year depending on traffic to the urinal. As tool called the X-Traptor must be used to remove the Eco-Trap. The use of the special tool helps to minimize vandalism. The entire process of replacement only takes 3 to 4 minutes.

Waterless urinals are available for women. Indian manufacturers are supplying waterless urinals technology. Ekameco is one such company providing solution for women waterless urinals. You may visit www.ekameco.com and mail info@ekameco.com for more details on waterless urinals for women.



2) Volume reduction in flush tanks: One simple method is to add a one-litre equivalent water bottle in the flush tank thereby reducing its consumption majorly. One-litre savings in the tank will help to save approximately by 20% and doesn't require any investment.



3) Rainwater harvesting: Water harvesting or more precisely rainwater harvesting is the technique of collection and storage of rainwater at surface or in subsurface



aquifer, before it is lost as surface run off. In artificial recharge, the ground water reservoirs are recharged at a rate higher than natural conditions of replenishment. According to a report by the Central Groundwater Board published in 2007, the selection of a suitable technique for artificial recharge of ground water depends on various factors.

They include:

- a) Quantum of non-committed surface runoff available
- b) Rainfall pattern
- c) Land use and vegetation
- d) Topography and terrain profile
- e) Soil type and soil depth
- f) Thickness of weathered / granular zones
- g) Hydrological and hydrogeological characteristics
- h) Socio-economic conditions and infrastructural facilities available
- i) Environmental and ecological impacts of artificial recharge scheme proposed

Rainwater Harvesting Techniques in Urban Area

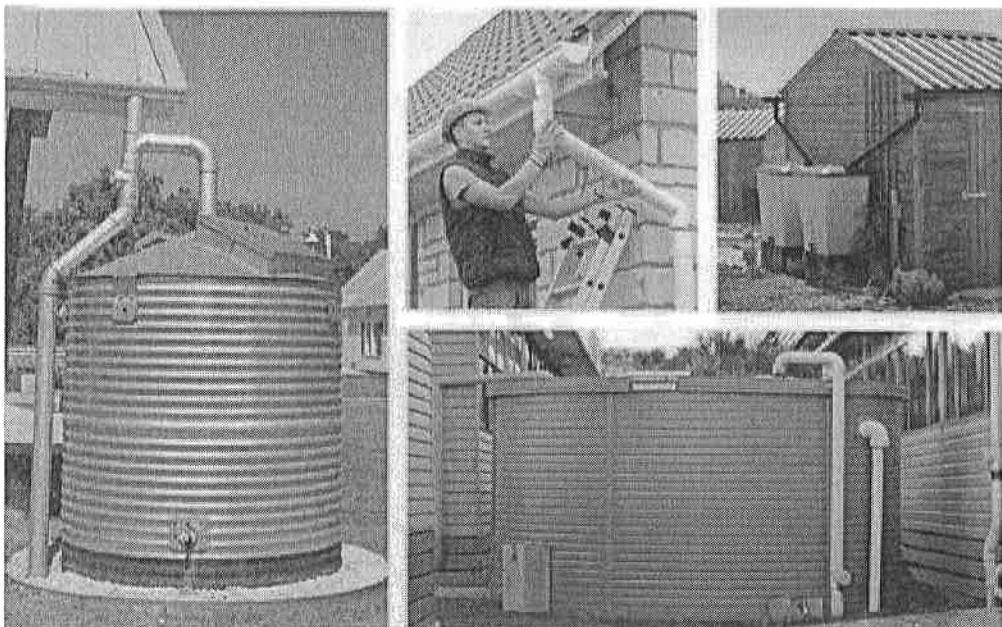
In urban areas rainwater is available from roof tops of buildings, paved and unpaved areas. This water could be stored and used to replace freshwater as well as used for recharging the aquifer. Rooftop rainwater/storm runoff can be harvested in campus through:

- Recharge Pit
- Recharge Trench
- Tubewell
- Recharge Well


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DRK Institute of Science & Technology
Bowrampet, Outbullapur,
Hyderabad - 500 043.

Recommendations at DRKIST:

1. Divert water to proper storm water channel constructed in the campus premises without wastage of any runoff.
2. Divert the water to pits at different positions in the campus such that ground water recharge can be attained.
3. Divert water to harvesting tanks or nearby water bodies in the premises
4. Reuse the collected water for gardening and for domestic uses



Display water balance/conservation status at entrance of all blocks for overall involvement of all students & staff.

It is suggested to display specific water consumption numbers in terms of domestic use at the entrance of each block to create awareness among all students and stakeholders visiting the facility. This daily/continuous awareness creation will ultimately help in reduction of water consumption by students.

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Water Saving Gadgets

It is suggested to display specific water consumption numbers in terms of domestic use at the entrance of each block to create awareness among all students and stakeholders visiting the facility. This

Electronic Taps (e-taps)

The latest trend in industries is to install electronic taps (e-taps). The advantages of using e-taps are as mentioned below:

- Unlike conventional taps, there is no twisting or turning in e-taps. They have a sensor, which cuts off water supply completely when not in use. This helps in saving up to 70% water during hand wash.

E-taps enable hands free operation. No fear of cross contamination or contact with germs. E taps score very high on hygiene. It is the most ideal choice for multipurpose and multi-user washrooms.

- E-taps can work efficiently up to raw water TDS of 1,800 ppm.

The touch free electronic taps, available in AC and DC models consume minimal power only. The AC model has an efficient battery back-up, while the DC model runs on just 4 alkaline batteries.

Operation of Electronic Taps

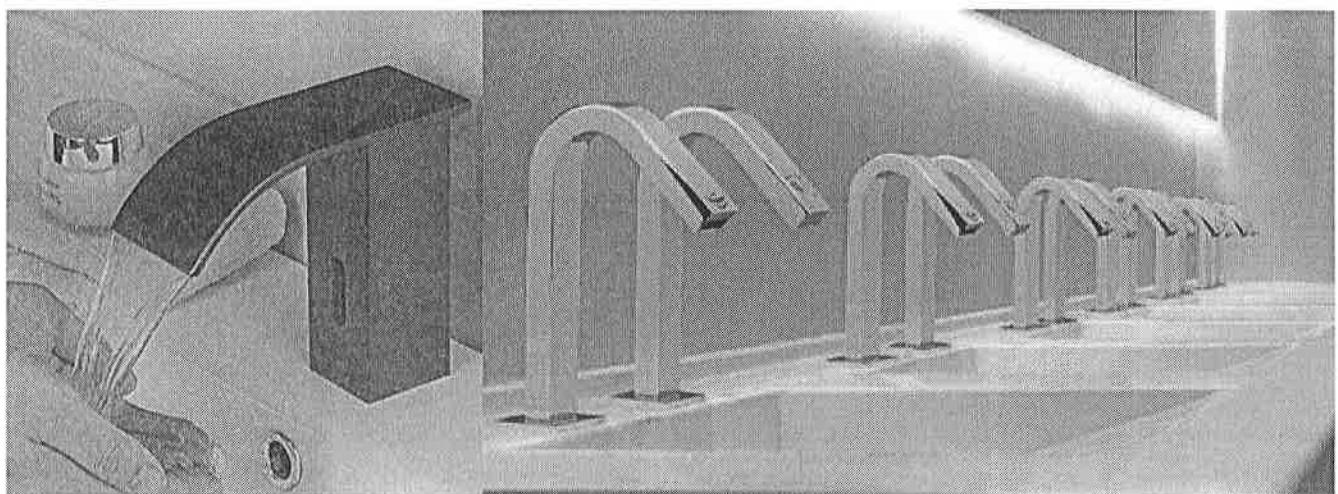
This has been successfully implemented in several hotels & restaurants. Of late, several industries have also started implementing this proposal. Thus, there is a good potential to optimize the Fresh water consumption by replacing the existing taps with e-taps.

Electronic flush (e-flush) urinals

The latest trend in industries is to install e-flush urinals. The advantages of using e-flush urinals are as mentioned below:

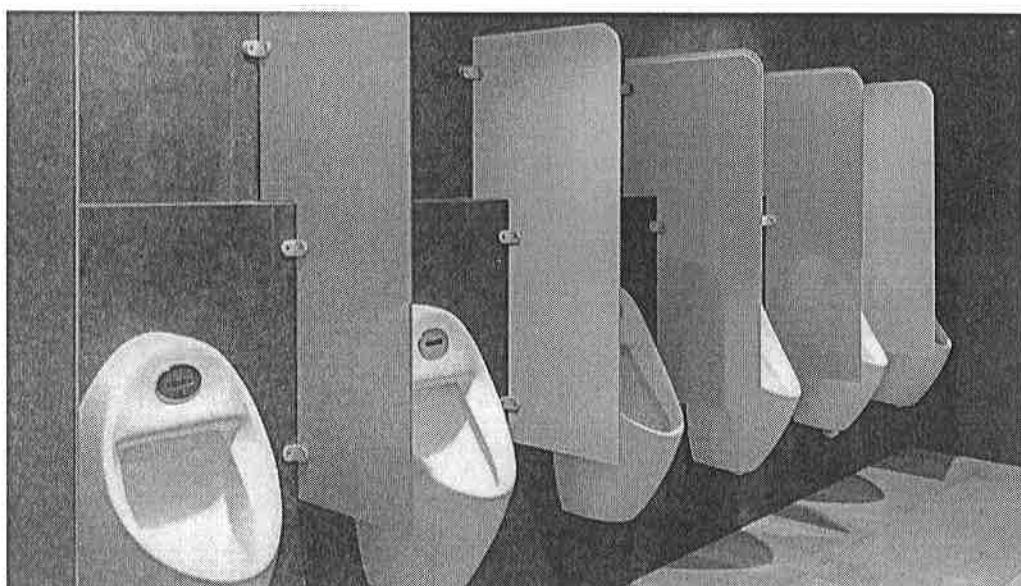
- E-flush urinals are fitted with a sensor, which senses the usage and flush with water for few seconds after use. This helps in saving 70% water during urinal flush.

- E-flush urinals enable hands-free operation and score very high on hygiene. It is the most ideal choice for multipurpose and multi-user washrooms.



- E-flush urinals can work efficiently up to raw water TDS of 1,800 ppm.
- The touch free e-flush urinals available in AC and DC models consume minimal power only. The AC model has an efficient battery back-up, while the DC model runs on just 4 alkaline batteries.

Electronic flush urinals

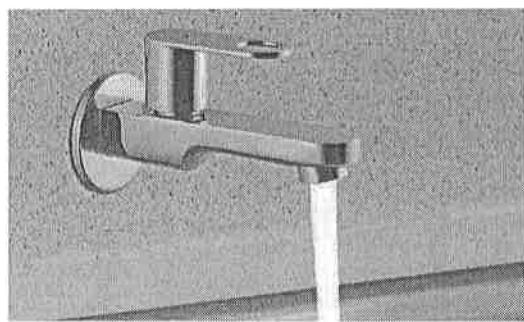


Hand wash

Foam taps

Conventional taps are used in the hand wash areas which results in wastage of large quantities of fresh water. Foam taps are a better fit in these high consumption areas. They consume 25-30% less water than conventional taps.

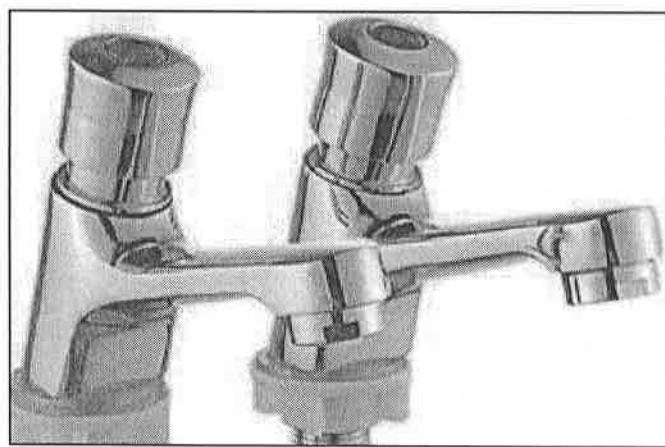
Foam taps



Spring loaded Push taps

Spring loaded push type tap is an alternate device for minimizing hand wash water. The spring- loaded push taps operate with the simple mechanism of pressing the knob for water. The knob is automatically released back to close position in 5-7 seconds. This saves about 30-40% of water compared to the conventional taps.

Spring loaded push taps

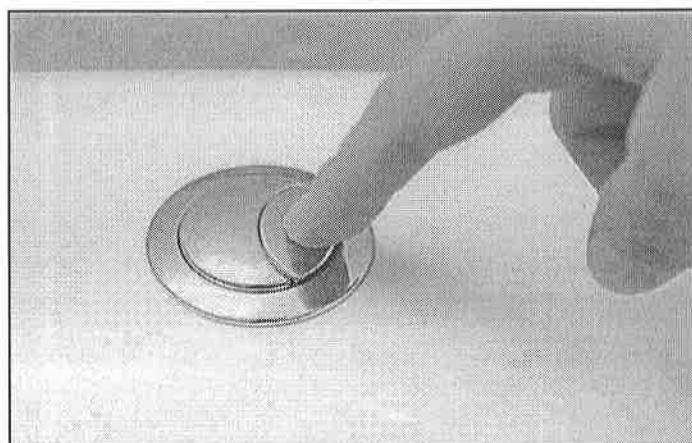


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Hyderabad - 500 043.

Low flush cistern

The latest model closets are water efficient and operate in dual mode, with a single flush releasing 2 litres of water and the dual flush releasing 4 litres per flush. This results in excellent water savings.

Low flush cisterns



Install water flow meter:

Water flow meters are vital in understanding the water consumption patterns of the campus. Presently, the water consumption is calculated rather than being measured. Water flow meters give an accurate status of water consumption in the campus and from the water consumption values, the roadmap for water conservation activities can be prepared.

Water Meters would have many advantages:

- Encourage water conservation - important given strain on water resources
- Encourage allocatively efficient distribution. People would consume to where the marginal

$$\text{cost} = \text{marginal utility}$$

- In long term lower overall water consumption would reduce leading to even lower water bills.

Bindu

Waste Management

India has drawn world's attention with its high paced urbanization and industrialization. Over the last decade, India has emerged as the fastest growing country with rapid economic growth. A renewed focus on sustainable growth and development is imperative as India strives to maintain its high GDP growth rate in its pursuit of achieving developed country status by the year 2022. However, the flip side of higher economic growth has resulted in increased consumption of the natural resources, increased waste generation and hence ecological degradation.

Present status: DRKIST has initiated waste management activities inside its facility. Separate bins have been provided for different types of wastes. Waste bins are provided throughout the campus and students are being urged to use the bins effectively.

Recommendation: The waste management yard must be maintained in a similar fashion as that of a raw material storage room. Therefore, a total revamp of the waste storage yard is to be carried out. By doing so, the quality of the materials stored in the yard will not deteriorate and can be used a raw material for a subsequent process.

Enhance awareness creation, training and capacity building.

DRKIST should focus on implementing sustainable waste management practices. DRKIST should regularly interact with Pollution Control Board and TSDF operators to enhance knowledge on waste management. The team should also take efforts to communicate the waste management and other policies and activities to all students in the college.

Achieve zero liquid discharge status:

DRKIST may install a STP to treat and recycle water. The treated water from STP can be used to substitute freshwater by utilizing the treated water in both high end and low-end applications.

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HYDERABAD 500 043.

Chemistry labs effluent has variation in its pH on a large scale. The lab effluent from an educational institute generally comprises of acids like HCl, HNO₃, H₂SO₄, EDTA and bases like NaOH, CaOH, Na₂CO₃, NH₃ whose pH ranges from 2 to 13. This effluent causes adverse effects when disposed directly onto land or water bodies.

As per effluent standards, Schedule VI of Environment (Protection) Act, 1986 all the parameters should be in the prescribed standards. Neutralization is a chemical reaction in which acid and base react to form salt and water bringing the pH near to 7. This principle is used to control the variation of pH of the lab effluent.

Recommendation at DRKIST:

Employing a neutralization tank is found to be the more suitable method to achieve neutralization. Recycle this neutralized water, after Ph correction into waste water tank. Avoid drainage the laboratory waste water into storm water channel. As of the basic info from the audit team, Neutralization tank constructed for one lab. Good initiative to improve eco-score. Recommended to implement for all the Labs.

Zero Liquid Discharge

Educational Institutes should follow Zero liquid discharge to meet with the environmental regulation in a challenging way. The institute has to identify potentially recyclable streams and applicability of four R's (Reduce, Reuse, Recycle and Recover). By achieving ZLD status and due to recycling of wastewater, the fresh water consumption of the campus can be reduced.

Recommendations for short-term goals:

The treated water can be used in the campus for gardening purpose, watering plants and lawns, in toilets flushes, in HVAC Cooling, Sludge generated from the Sewage Treatment Plant shall be rich in organic content and an excellent fertilizer for horticultural purposes.

- Establish a college Environmental committee that will hold responsibility for the enactment, enforcement and review of environmental policy.
- "Save Water" posters to be affixed in the class rooms, hand washing areas.

- Carpooling, wherever possible, particularly by those who are using cars should be encouraged.
- Encourage the use of bicycles and public transport system by the community, particularly the student community.
- Year wise internal audit on green, water and energy to be conducted by respected teachers.
- Department wise awareness programmes to be organised by staff representative to each committee.
- Signage/posters should be posted in high water consumption areas in academic blocks to increase awareness regarding water conservation.
- Replace all old faucets with water saving faucets.
- The waste should be recycled or reused at maximum places possible.
- Regular checkups and maintenance of pipes, overhead tanks, plumbing systems should be done to reduce overflow, leakages and corrosion.
- It was observed that the college is keeping the environmental quality at priority in every development stage.
- Encourage students to make innovative projects like Rubber tyre benches at play grounds and sitting benches with used plastic bottles.

Hazardous and e-waste management

Hazardous Waste Management Rules are notified to ensure safe handling, generation, processing, treatment, package, storage, transportation, use reprocessing, collection, conversion, and offering for sale, destruction and disposal of Hazardous Waste. These Rules came into effect in the year 1989 and have been amended later in the years 2000, 2003, 2008 and with final notification of the Hazardous and Other Waste (Management and Transboundary Movement) Rules, 2016.

Recommendations:

1. Segregate different types of wastes as dry and wet waste
2. Hazardous waste collection into separate waste yellow-colored bags
3. E-waste collection bins
4. Initiate disposal methods with approved contractors, make few MoU with local e-waste collection consultants.

5. More number of waste bins (dry and wet) to be provided preferably for recyclable waste and for food waste. Recyclable waste can fetch revenue and food waste segregation can be utilized in bio-gas plant for producing methane which can be used for mess as fuel reducing the consumption of gas cylinders.
6. E-waste to be properly sent to recycle authorised by State PCB. The E-waste contains precious metal which can be taken out by recyclers and reused by manufacturers.

Wealth from waste:

Wealth from waste is a best technique to be implemented in the educational institutes to promote and make the pupil aware of the sustainable practices. This brings a clear idea of what we are wasting instead of making it in to a good resource. Anything of value is called a resource, whereas the waste which in turn be converted in to a valuable resource is being kicked off in to the bins.

Recommendations at DRKIST:

The wastes such as Demolition waste, garbage from the kitchens, remaining food from the canteens, paper from the offices, Water from Kitchens, water from STP and Neutralization Tank can be converted into useful products. Encourage students to make innovative projects.

Eco-friendly pavements.



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Hyderabad - 500 043.

Conclusion

Environmental sustainability is a continuous process and there is always a scope for improvement. DRKIST has displayed itself as an advocate of environmental sustainability by getting environmental audit carried out. The organization has implemented several initiatives and measures to enhance efficiency and to optimize resource intensity. The journey ahead in the path towards environmental excellence has immense scope for improvement as brought out by this report.

DRKIST needs to focus and work on areas efficiency levels needs to be enhanced. For example: waste management. The observations and suggestions put forth by the report would help the facility in improving its environmental performance and pave way for ecologically sustainable growth.

This report may be taken as a guide and roadmap for achieving higher performance rating in environmental stewardship. As one of the pioneers and leaders DRKIST shoulder the task of further 'learning-teaching-learning' to improve, excel, and continue the innovative efforts for success of their students and associates.



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Hyderabad - 500 043.



ENERGY AUDIT REPORT

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Lavni
PRINCIPAL
DRK Institute of Science & Technology
Bowrammet, Dharwad Dist., Karnataka 580 043.

CERTIFICATE OF COMPLETION

This is to certify that

DRK Institute of Science and Technology

Bowrampet (V), Medchal (district), Hyderabad-500043

has successfully completed

CARBON FOOTPRINT & ENERGY AUDIT

The study was completed by Rekhapalli Environmental Solutions & Technologies Pvt Ltd

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Dr Rekhapalli Srinivasa Rao

Green, Eco & Energy Lead Auditor

Certified ISO-14001 Auditor

Member of WEC

PRINCIPAL

DRK Institute of Science & Technology
Bowrampet, Gunturapet,
Hyderabad - 500 043.



Issued by

Rekhapalli Environmental Solutions & Technologies Pvt Ltd

June 2024

Carbon Footprint and Energy Audit



Bowrampet (V), Medchal (District),
Quthbullapur (Mandal), Hyderabad-500043

Lavanya
PRINCIPAL
DRK Institute of Science & Technology
Bowrampet, Quthbullapur,
Hyderabad - 500 043.



S.no	Contents	Page No.
01	Acknowledgement	04
02	Executive Summary	05
03	Carbon footprint & Opportunities	07
04	Energy efficiency	15
05	Conclusion	22

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PR.NO. 001
DRK Institute of Science & Technology
Bowrampet, Qutubulagam,
Hyderabad - 500 043

Acknowledgements

REST Pvt Ltd



Dr Rekhapalli Srinivasa Rao
Green, Eco & Energy Lead Auditor
Certified ISO-14001 Auditor
Member of WEC

15 June 2024

Carbon Footprint & Energy Audit

The REST Pvt Ltd acknowledges with thanks the cooperation extended to our team for completing the study at DRK Institute of Science & Technology (DRKIST).

The interactions and deliberations with DRKIST team were exemplary and the whole exercise was thoroughly a rewarding experience for us. We deeply appreciate the interest, enthusiasm, and commitment of DRKIST team towards environmental sustainability.

We are sure that the recommendations presented in this report will be implemented and the DRKIST team will be further improving their environmental performance.

Kind regards

Your sincerely

Rao
PRINCIPAL
DRK Institute of Science & Technology
Bowrampet, Qutubabad,
Hyderabad - 500081

Rao

Dr Rekhapalli Srinivasa Rao

Green, Eco & Energy Lead Auditor
Certified ISO-14001 Auditor
Member of World Environment Council
Director, REST Pvt Ltd

Executive Summary

The growth of countries across the world is leading to increased consumption of natural resources. There is an urgent need to establish environmental sustainability in every activity we do. In a modern economy, environmental sustainability will play a critical role in the very existence of an organization.

An educational institution is no different. Built environment, especially an educational institution, has a considerable footprint on the environment. Impact on the environment due to energy consumption, water usage and waste generation in an educational institute is prominent. Therefore, there is an imminent need to reduce the overall environmental footprint of the institution.

As an Institution of higher learning, DRK Institute of Science & Technology (DRKIST) firmly believes that there is an urgent need to address the environmental challenges and improve their environmental footprint.

True to its belief, DRKIST has not installed solar powered panels and maximum installed LED lights and fixtures, REST Pvt Ltd team encourages DRKIST team for their willingness towards green energy.

Keeping DRKIST work in towards green energy, we recommend the following to be taken by the competent team at DRKIST:

Work towards achieving carbon neutrality: IDRKIST emphasizes creating an additional carbon sink of 2.5 to 3 billion tonnes of CO₂ equivalent through additional forest and tree cover by 2030. DRKIST's net carbon emission for the year 2023-24 is >100MT CO₂. DRKIST should focus on energy efficiency, renewable energy, and carbon sequestration as tools that will enable them to offset the present carbon emissions and achieve carbon neutrality.

Installation of solar rooftop: Renewable energy plays a very important role in improving the environmental footprint of an organization. By increasing the share of renewable energy in DRKIST's energy portfolio, the overall carbon footprint of

the college can be reduced. The roof area available at DRKIST is around 1,50,000 sq.ft. on roof top. For the available area, roof top can be installed 50 kWp of solar PV. As an initial step DRKIST could look at installing 25kWp of solar PV which can generate 40,500 units per year. Still the renewable share will also reduce the 33 MT CO₂e. For the current assessment year power consumption to reduce, roof top can be utilized for solar power to install.

Increase the operating power factor: Presently, based on the energy bills, it is understood that the institution maintains a power factor of 0.85. Since the institution pays electricity bills for the KVAH consumed, the lower the power factor, higher is the energy bill for the same KWH consumption. It is recommended to install capacitor banks to improve the power factor and save energy bill. DRKIST can save up to Rs. 20,000 per month.

Improve energy efficiency of the college: It is recommended to adopt latest energy efficient technologies for reducing energy consumption in fans, lighting, and air conditioners. We recommend the following projects to be implemented at the earliest:

- Replace conventional 75W ceiling fans with energy efficient BLDC fans of 30W
- Install air conditioners energy savers to save energy in split air conditioners
- Replace all conventional lamps & tube lights with LED lamps & fixtures

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Bowrampet, Guntur - 522 501
Hyderabad - 500 063.

Carbon Footprint and Energy Audit

DRK Institute of Science & Technology (DRKİST) and REST Pvt Ltd are working together to identify opportunities for improvement in energy efficiency and carbon reduction. This report highlights all the potential proposals for improvement through the audit and analysis of the data provided by DRKİST for lighting, air conditioning, ceiling fans, and biogas potential.

The report also details the carbon emissions from college operations. For carbon emissions, scope 1 and scope 2 emissions are calculated from the data submitted by DRKİST. The report emphasizes the GHG emission reduction potential possible through a reduction in power consumption.

Submission of Documents

"Carbon footprint and energy audit at DRKİST was carried out with the help of data submitted by DRKİST team. DRKİST team was responsible for collecting all the necessary data and submitting the relevant documents to REST Pvt Ltd for the study.

Note

Carbon footprint and energy audit are based on the data provided by DRKİST team and discussions the REST Pvt Ltd team had with DRKİST team. The scope of the study does not include the exclusive verification of various regulatory requirements related to environmental sustainability.

REST Pvt Ltd has the right to recall the study if it finds (a) major violation in meeting the environmental regulatory requirements by the location and (b) occurrence of major accidents, leading to significant damage to ecology and environment.

Prin
PRINCIPAL
DRK Institute of Science & Technology
Bowringpet, Ghatlodiya, Sec-10
Hyderabad - 500 043.

DG Set Stack

Installation of stack as per norms

Every Organization will be equipped with a backup power or power generating devices in the absence of normal power supply. A stack of reasonable height be constructed to the DG sets to eliminate the smoke and the gases from the DG sets.

Diesel Generator exhaust stack height should be increased to as per the below calculation.

Exhaust stack height: In order to dispose exhaust above building height, minimum exhaust stack height should be, as per latest CPCB/ local pollution control board norms.

For DG set below 800 kW

$$H = h + 0.2 \times \sqrt{kVA}$$

Where H = height of exhaust stack h = height of building.

For DG set above 800 kW ~ Minimum 30 meter

In case building height is more than 30 meter

Stack Height = Building height + minimum 6 meter.

Note: Exhaust stack height should be considered of maximum value of the above.

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Opportunities for improvement

As a part of the overall environmental improvement study at DRKIST, carbon footprint calculations were also carried out. The objective of calculating the carbon footprint of the campus is find the present level of emissions from campus operation and what initiatives that the DRKIST can take to offset the emissions. By offsetting the emissions, the college can become carbon neutral in the future by adopting energy efficient processes, increase in renewable energy share and tree plantation.

Carbon footprint calculations:

To help delineate direct and indirect emission sources, improve transparency, and provide utility for different types of organizations and different types of climate policies and business goals, three "scopes" (scope 1, scope 2, and scope 3) are defined for GHG accounting and reporting purposes.

For calculating carbon footprint of the campus, Scope 1 & Scope 2 emissions are being considered. Since day scholars use college provided transportation and hostellers stay in campus, Scope 1 and Scope 2 are the highest contributor to overall emissions. For this reason, Scope 3 is not being calculated.

Scope 1: Direct GHG Emissions

Direct GHG emissions occur from sources that are owned or controlled by the institution, for example, emissions from combustion in owned or controlled DG sets, canteen, vehicles, etc.; emissions from chemical production in owned or controlled process equipment. Direct CO₂ emissions from the combustion of biomass shall not be included in scope 1 but reported separately.

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DRKIST Scope 1 emissions for 2023-24:

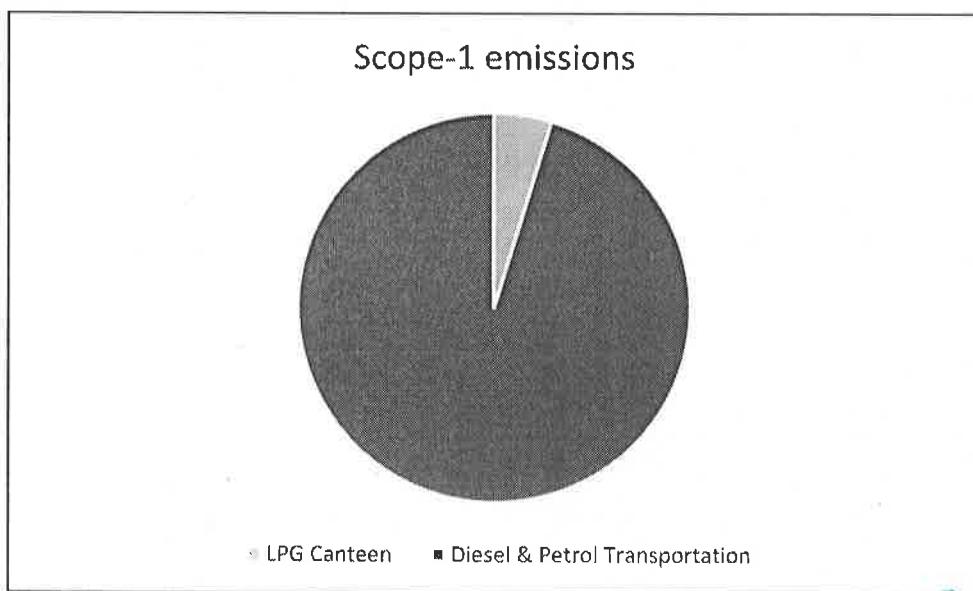
Sources of Scope 1 emissions in DRKIST:

- 1) Diesel and petrol used for college-owned transportation including Diesel consumption for the generator, 16,000 litres
- 2) LPG used for canteen: 70 cylinders/year

Scope-1 Emissions

S.No	Fuel Type	Description	Activity data	Units	CO2 eq. emissions (Tons)
1	LPG	Canteen	0.7	MT	2.1
2	Diesel & Petrol	Transportation	16	KL	42.4

Total Scope-1 emissions for DRKIST = 44.5 tons (for year 2023-24)



Scope 2: Electricity Indirect GHG Emissions

Scope 2 accounts for GHG emissions from the generation of purchased electricity consumed by DRKIST is 1,56,000 units. Purchased electricity is defined as electricity that is purchased or otherwise brought into the organizational

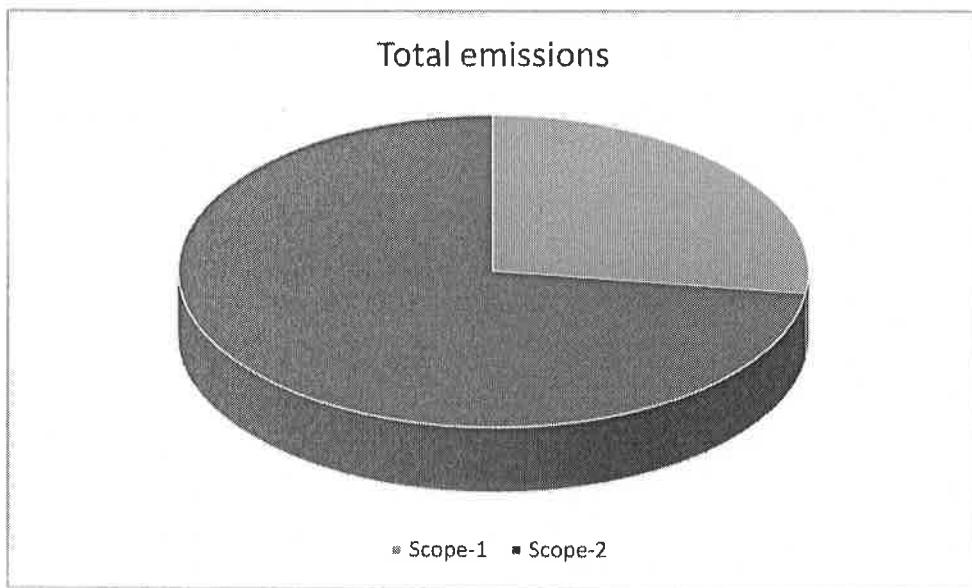
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Bowrampet, Quthubullapur,
Hyderabad - 501 042

boundary of the institution. Scope 2 emissions physically occur at the facility where electricity is generated.

DRKIST Scope 2 emissions for 2023-24: Electricity purchased from grid is 1,56,000 units.

Scope-2 Emissions		
Electricity Purchased from grid	119	MT CO2 eq.

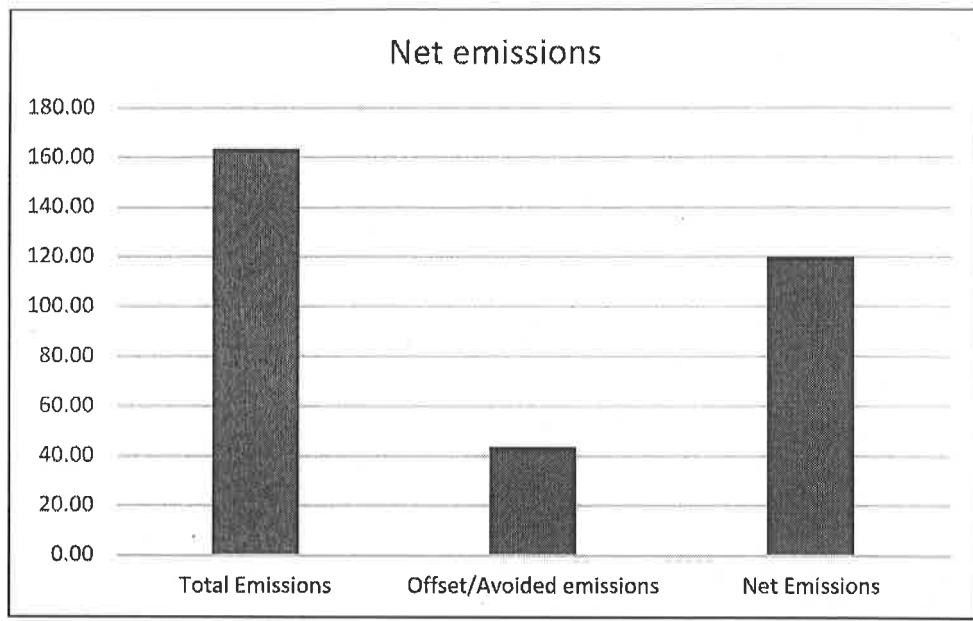
Scope-1	44.50	MT Co2 eq
Scope-2	119.0	MT Co2 eq
Total	163.51	MT Co2 eq



Reduction	CO2 from plants	1800		32.4	tons CO2
Reduction	CO2 from Solar power	2		11.2	tons CO2

Total Emissions	Offset/Avoided emissions	Net Emissions
163.51	43.60	119.91

Ram
DRK Institute of Management & Technology
Bowrampet, Qutubabad,
Hyderabad - 500 043.



Develop a roadmap to increase contribution of renewable energy in the overall energy consumption

To have a continued focus on increasing renewable energy utilization to 100% which will also lead to reduction in GHG emissions, it is suggested to develop a detailed roadmap on RE utilization. The road map should broadly feature the following aspects

- Renewable energy potential of DRKIST and the maximum offset that can be achieved at DRKIST
- Percentage substitution with renewable energy that DRKIST wants to achieve in a specified time frame

Key tasks that need to be executed to achieve the renewable energy target

- Specific financial break up for each of the projects highlighting the amount required, available and the utilization status as on date
- A regular review mechanism to ensure progress along the lines of the roadmap should be framed
- The roadmap should also highlight important milestones/key tasks, anticipated bottle DRKIST & proposed

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Renewable energy roadmap should be used as a base to frame GHG emissions reduction target

It is suggested to use the developed renewable energy roadmap to correlate the GHG reduction that each of the renewable energy project will achieve. This approach will provide a base to set targets for reduction in GHG emissions. The action plan for renewable energy will shoulder the action plan for GHG emissions reduction and work towards achieving carbon neutrality.

Explore the option of other onsite and offsite renewable energy projects

The renewable energy field has been witnessing many private investors due its increased market demand and attractive policies in many states. There are Renewable Energy Independent Power Producers (RE IPPs) who have installed RE based power plants like wind, small hydro and solar PV.

DRKIST can consider having a long-term power purchase agreement with these RE IPPs in purchasing fixed quantity of power for a period of 5 to 10 years.

"Evolve a system to monitor the implementation of various GHG mitigation opportunities DRKIST has an action plan to reduce its GHG emissions. DRKIST should also evolve a system to monitor the implementation of various GHG mitigation opportunities. It is recommended to use a Gantt chart to mark out the action plan for the activities and track its implementation. Gantt chart will serve as an excellent way to instantly monitor and comprehend all different tasks in one place which would ease tracking of implementation.

Calculation for Installation of 25 kW of Solar PV in DRKIST campus

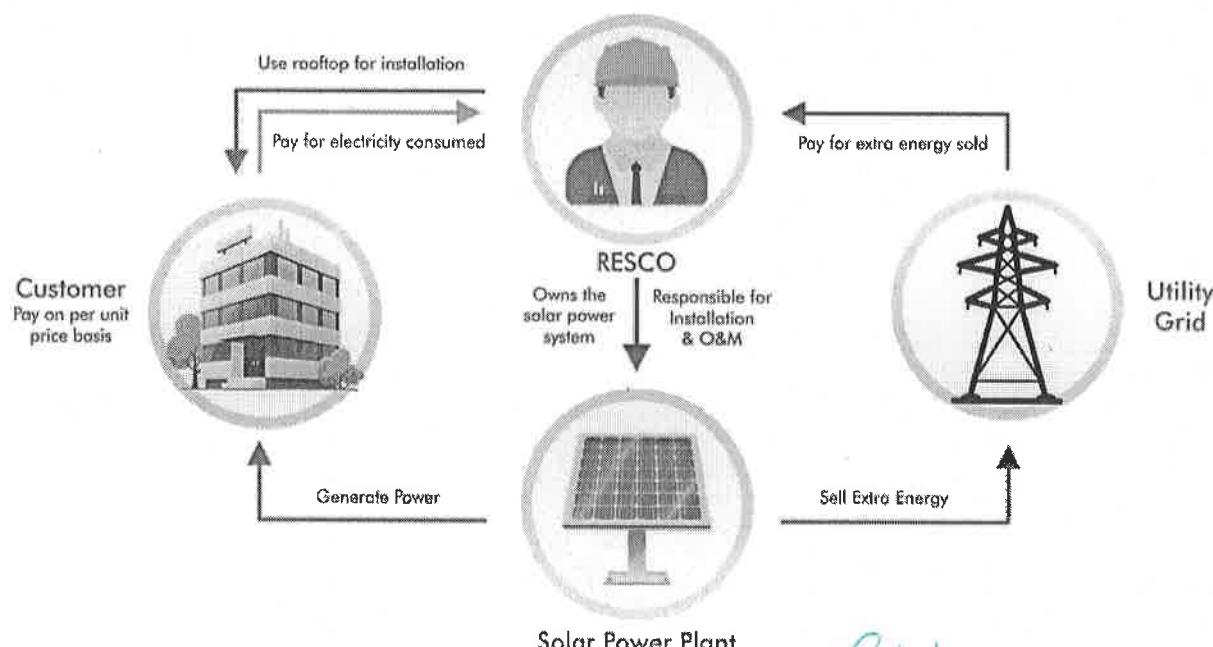
Renewable energy is one of the important steps to be taken up by the college to reduce their overall carbon footprint. Based on the details provided by DRKIST team, The roof area available at DRKIST is around 1,50,000 sq.ft. on roof top. For the available area, roof top can be installed 50 kWp of solar PV. As an initial step DRKIST could look at installing 25kWp of solar PV which can generate 40,500 units per year. Still the renewable share will also reduce the 33 MT CO₂e. For the

current assessment year power consumption to reduce, roof top can be utilized for solar power to install.

RESCO model for solar rooftop installation:

A Renewable Energy Service Company (RESCO) is an ESCO Energy service company which provides energy to the consumers from renewable energy sources. RESCO or BOOT model is about pay as you consume the electricity.

- Solar Power Plant is owned by the RESCO or Energy Company
- Customer must sign a Power purchase Agreement (PPA) with actual investor at mutually agreed tariff and tenure
- Customer only pays for electricity consumed
- RESCO developer is responsible for its annual operations & maintenance (O&M)
- The RESCO gets the benefit by selling the surplus power generated to the DISCOM



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Energy Efficiency

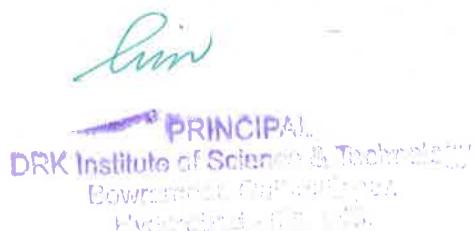
Annual energy consumption of DRKIST campus is 1,50,000 units. There are major blocks in the campus which consumes energy for their operation. Major energy consumers are:

1. Fans
2. Air conditioners
3. Lighting

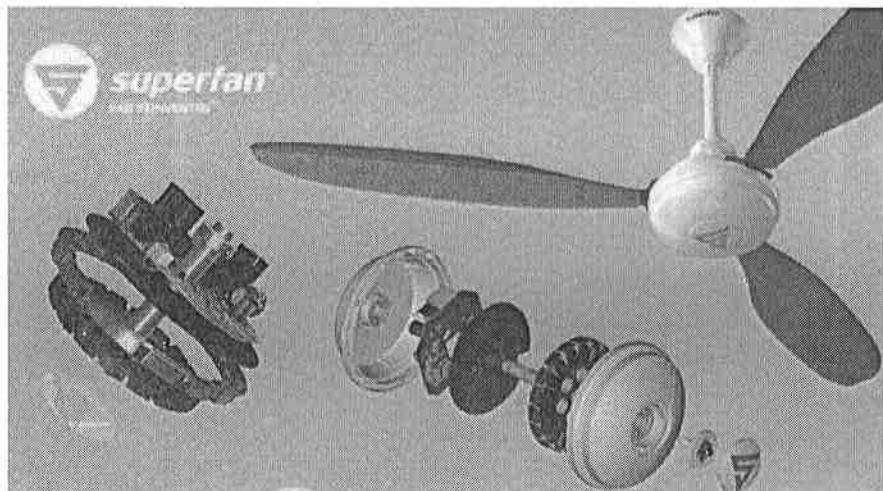
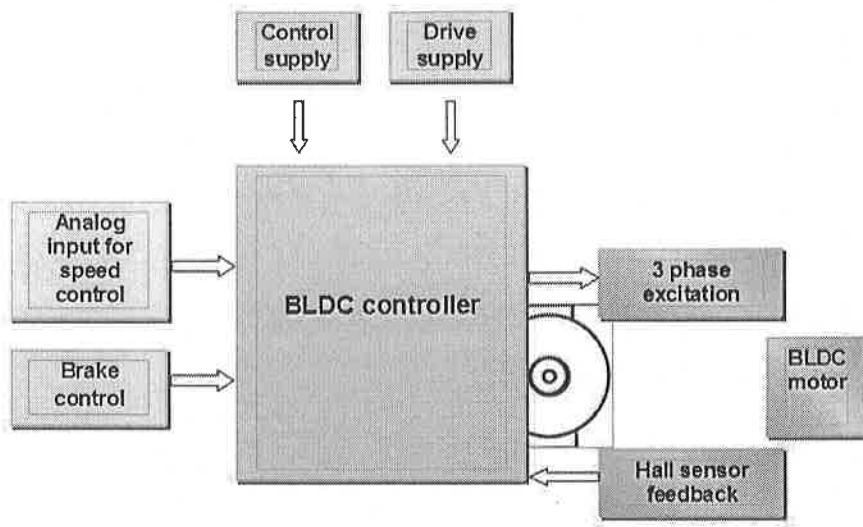
Replacement of Conventional Ceiling Fans with Energy Efficient BLDC Fans

During the Energy Audit at DRKIST, a detailed study was carried out to identify the potential for replacing the existing ceiling fans with BLDC super fans. There is 56.25kW power consumption by 750 fans operating in DRKIST campus.

Instead of conventional ceiling fans, latest technology BLDC fans which consume only 30W can be installed in the newly constructed building. A brushless DC (BLDC) motor is a synchronous electric motor powered by direct-current (DC) electricity and having an electronic commutation system, rather than a mechanical commutator and brushes. A BLDC motor has an external armature called the stator, and an internal armature called the rotor. The rotor can usually be a permanent magnet. Typical BLDC motor-based ceiling fan has much better efficiency and excellent constant RPM control as it operates out of fixed DC voltage. The proposed BLDC motor and the control electronics operate out of 24V DC through an SMPS having input AC which can vary from 90V to 270V.



The operational block diagram of a BLDC motor is as follows:



With the replacement of existing ceiling fans with Super Fans the energy consumption is likely to reduce by 55% per fixture. Considering 100 fans being replaced with super-efficient BLDC fans, 3.50 kW can be saved. Considering the average operating hours to be 2000 and unit cost as Rs.

9.0, the calculations are as follows:

$$\text{Total power consumption by fans in college} : 750 \times 75\text{W} = 56.25\text{kW}$$

No. of fans considered for calculation : 100 (First cycle of change)

Energy consumption per fan	:	75W
Total energy consumption of fans	:	75W X 100 fans = 7.5kW
Super-efficient BLDC fans energy consumption:	30 W	
Savings from 75W to 30 W	:	60%
Total savings in fans energy consumption :		60% of 56.25kW = 33.75 kW
Savings per year	:	33.75kW x 2000 hrs X Rs. 9.0/unit
	:	Rs. 6.7 Lakhs
Investment	:	Rs. 2, 50,000
	:	5 months

Annual emission reduction potential in case of replacing 50% fans : 18MT CO₂

Install Air conditioners energy saver for spilt air conditioners:

Present status: As per the data obtained from DRKIST team, the campus has majorly installed ACs 28 tons.

Recommendation:

We recommend installing "Airtron", an energy saver that can be installed at every individual unit of AC. The Airtron is the world's most advanced AC SAVER, with all the controls of a Precision AC. The Airtron's dual sensors reference the Room and Coil & Ambient Temp, and uses complex, multiple algorithms in a "closed-loop circuit" to reduce the Compressor Run-Time, to ensure the high savings while maintaining and displaying the Set temperature accurately. The Airtron is Programmable for geographical location and climate and adapts automatically to changes in season and ambient conditions.

This unique device has been developed on Patent-Published technology and approved by leading MNC'S, PSU'S and Govt. Departments. The Airtron is validated by EESL (Energy Efficiency Services Ltd.), Ministry of Power, Government of India, for 44% savings. The Airtron has been validated on all AC's-

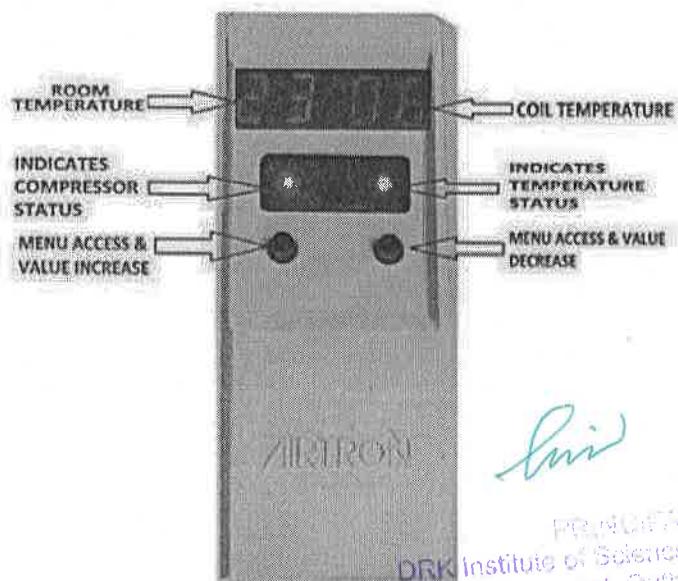
Inverters, 5 Star, Splits, Multi-Splits, Packages, ducts, Windows, Cassettes from 1.0 ~ 20.0 TR, LG Itd, Videocon Ltd, Tata Communications, L&T, Nestle, Ashok Leyland etc. The AIRTRON comes with a Remote for setting the Room Temperature, and in a Non-Flammable Polycarbonate Enclosure, with SMPS Power Supply, to tolerate wide Voltage and Current fluctuations, Surges, Spikes and Sags.

In our case, Airtron installation can reduce the energy consumption of each fixture by 15% on a conservative basis. For a total energy consumption, for air conditioners, as 20 units per hour, 3 units per hour can be saved. It is recommended to install Airtron energy saver in a phase wise manner preferably in the batches of 10 units.

Saving Calculation: Considering the operating hours to be 2000 and unit cost as Rs 9.0/~.

- Monetary annual savings : Rs 45,000/~
- Total investment : Rs 80,000/~
- Payback period : 22 months (2 years)

Annual emission reduction potential: 4.92 MT CO₂



Replacement of conventional tube lights with LED lamps

As per the data submitted, the total number of all the lighting bulbs & fixtures installed are

Power distribution from Lighting				
			Total wattage	
1. Normal bulbs	50	20	1000	watts
2. LED bulbs	50	15	750	watts
3. Normal fixtures	1500	40	60000	watts
4. LED fixtures	100	20	2000	watts
Total load			63.75	kW

Under failure replacement policy, all the normal fixtures & lamps can be changed in the first year.

The campus should be keen in harnessing the day lighting available thereby reducing the use of artificial lighting. Based on the occupancy, monitoring should be ensured to reduce excessive consumption of energy.

Major savings in energy through lighting fixtures can be achieved by replacing all the above existing fixtures with LED's meeting the required LUX levels. The LED's being less energy consuming while maintaining the equivalent lux is the more sustainable option. The replacement of lighting fixtures should be done as per failure replacement policy i.e. change the old fixture with LED when it fails

Advantages of LED

- Lower energy consumption: The energy consumption of LEDs is low when compared to the other conventional sources for the same amount of Lumen output.

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P.T.O.
DRK Institute of Science & Technology
Bowrampet, Qutubnagar,
Hyderabad - 500 043.

Performance comparison of different type lights

Type of Lamp	Lumen/Watt	CRI	Life hours
HPSV lamps	90-120	Bad (22-25)	15,000-20,000
Metal Halide lamps	65-100	Good (65-90)	18,000
LED lamps	100-150	Very Good (>80)	10,000-12,000

- **High S/P ratio:** LEDs have higher scotopic/photopic ratio (S/P ratio). The eye has two primary light sensing cells called rods and cones ~ cones function in day light and process visual information whereas rods function in night light. The cone dominated vision is called photopic and the rod dominated vision is called scotopic. The S/P ratio indicates the measure of light that excites rods compared to the light that excites cones. In office environments, illumination is more effective if the S/P ratio is high as it is under scotopic region. LEDs hence are ideally suited for these applications as they have a high S/P ratio.
- **Longer life-time:** LEDs have longer life time of around 1,00,000 hours. This is equivalent to 11 years of continuous operation or 22 years of 50% operation.
- **Faster switching:** LED lights reach its brightness instantly upon switching and can frequently be switched on/off without reducing the operational life expectancy.
- **Greater durability and reliability:** As LEDs are solid-state devices and uses semiconductor material; they are sturdier than conventional sources that use filaments or glass. LEDs can also withstand shock, extreme temperatures and vibration as they don't have fragile materials as components.

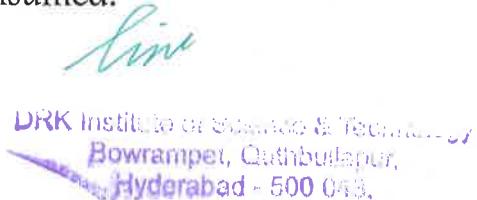

 Dr. N. M. Bowrampet, L.D.L.
 Bowrampet, Hyderabad
 Hyderabad - 500 043.

- **Good Colour Rendering Index (CRI):** The colour rendering index, i.e., measure of a light sources' ability to show objects as perceived under sunlight is high for LEDs. The CRI of natural sunlight is 100 and LEDs offer CRI of 80 and above.

LED offers more focused light and reduced glare. Moreover, it does not contain pollutants like mercury. LED technology is highly compatible for solar lighting as low-voltage power supply is enough for LED illumination.

Additional recommendations:

- Solar power plant capacity should be increased so that it fulfils at least 70% of the electricity requirements.
- Eco-friendly parameters should be included in the purchase of articles and goods for the college campus.
- Installation of sensor-based electrification items like fans, lights etc., can save electricity.
- The awareness should be made among the faculty, students and other employees regarding clean Development Mechanism to reduce consumption of electricity and natural resources.
- It is suggested to install water meter near tube well so as to record each day demand. This will help in assessment and reduction of water consumption in and also saving cost of energy consumed.



Conclusion

DRKIST has initiated few energy efficiency activities in their campus. While REST Pvt Ltd appreciates the DRKIST team for their efforts, we would like to emphasize that opportunity exists further reduce the energy consumption. Installation of renewable energy is to be given major focus. RESCO model (long term) can be adopted to install renewable energy without upfront capital investment. We in REST Pvt Ltd are sure that all the recommendations mentioned in the report will be implemented by DRKIST team and the overall environmental performance of the campus will be improved.



PRINCIPAL
DRK Institute of Science & Technology,
Bowrampet, Quthbullaapur,
Hyderabad - 500 043.



DOCUMENTS RELATED TO CLEAN AND GREEN INITIATIVES

7.1.3(5)

Lavanya
PRINCIPAL
DRK Institute of Science & Technology
Bommalpet, Qutubullapur, Hyderabad-500 043.



(Bowrampet (v), Near pragathi nagar, on Miyapur-medchal high way,
Quthbullapur, Medchal, Hyd-500043)

Ref.NO: DRKIST/Green Campus /NOV 2019/02

Date: 21-11-2019.

CIRCULAR

All the staff and students of all branches here by informed that program is going to be conducted on Green Campus Date 28/12/2019 at 10am. In this Regard all students and staff must attend the program without fail.

S.No	Course Title	Date of Commencement	Venue
1	Green Campus	28/12/2019	Seminar Hall 003


Principal

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7. Head of ECE Dept.
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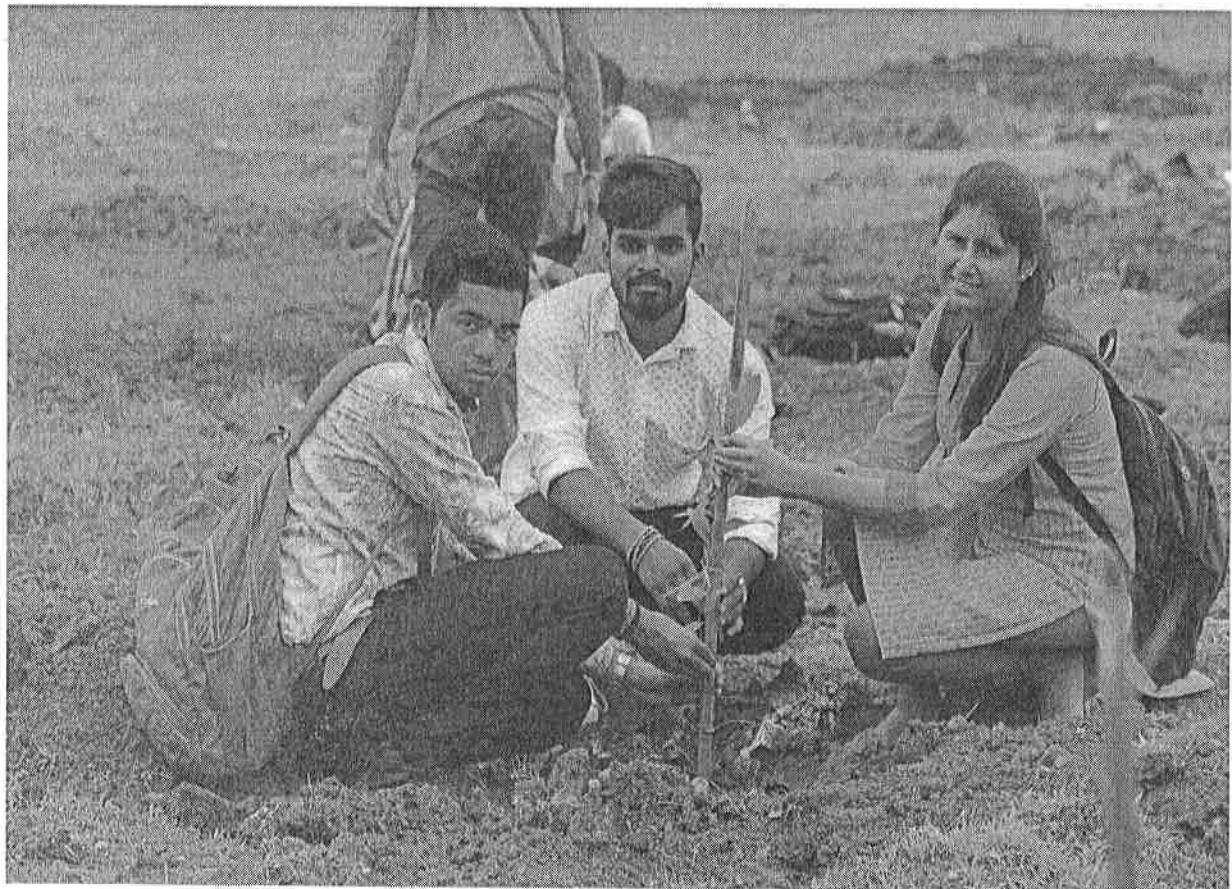
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(Bowrampet (v), Near pragathi nagar, on Miyapur-medchal high way, quthbullapur
Medchal, Hyd-500043)

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Anil
PRINCIPAL
DRK Institute of Science & Technology
Bowrampet, Qutubullapur, Hyderabad-500 043.



(Bowrampet (v), Near pragathi nagar, on Miyapur-medchal high way, quthbullapur
Medchal, Hyd-500043)

28-12=2019.

Program report

Program Name : Green Campus
Date of activity : 29-11-2022
Organized by : IQAC, DRKIST

Report:

1. Introduction:

A green campus is a section of an organization or the organization as a whole that helps to have infrastructure or development that is designed or scheduled to incur certain costs. Less water, less energy, less or no CO₂ emissions, and a cleaner, less polluted atmosphere. The Green Campus Audit is a technique for assessing environmental control system that is applied methodically in order to safeguard and maintain the environment. Verdant the combination of environmentally friendly measures and education is known as campus audit. To encourage the maintenance of a green environment, implementing user-friendly technology. It raises environmental ethics awareness, addresses environmental challenges and provides answers for a range of social and financial requirements. It bolsters the notions of "green building" and "oxygenated building," which ultimately offers a wholesome.

Lia
Principal
PRINCIPAL
DRK Institute of Science & Technology
Bowrampet, Quthbullapur, Hyderabad 500 073

A green campus program is a program that combines environmental practices and education to promote sustainable and eco-friendly practices on a campus. It can help colleges conserve natural resources, manage waste, and educate students about climate change and sustainability.

2. Role of Educational Institutions in India:

Educational establishments are crucial to the development of a country and development that begins with protecting the environment by maintaining a green campus. Effectiveness in an organization is determined by a clean and healthy atmosphere. Providing students with a supportive learning atmosphere and teaching abilities, instructive .The federal and state governments require institutions to provide environmentally friendly environment for the participants. Furthermore, all educational establishments are requested to protect the environment for coming generations and to find solutions to environmental problems (building up solid waste, wastewater, and/or effluents, and disposing of them carelessly, huge plastics' utility, excessive water use, and carelessness with water techniques for collecting and storing, etc.) by means of environmental education. Putting the Indian government's Swachh Bharath Abhiyan Scheme into Practice through the plays of the educational institutes.

3. Green Campus and Environment Policy:

The Green Campus Policy addressed how to recycle biodegradable garbage and maintain campus cleanliness through appropriate waste disposal, and the use of environmentally friendly materials to keep the campus free of dangerous pupils and the rural community through a variety of awareness-raising initiatives. An attempt are designed to reduce energy use and replace non-renewable energy sources. Using energy sources that are renewable. Department Heads, the Organization's Head, and it is the duty of Senior Managers and Management Representatives to oversee the "Go Green" programs of the college or university help keep the campus tidy and environmentally friendly while Every single person within the organization is expected to abide by the policy.

Anirudha
Principal
PRINCIPAL
DRK Institute of Science & Technology
Bowrampet, Gouthbullapur, Hyderabad-500 049

4. Environment Friendly Campus

As previously said, the organization is responsible for providing all stakeholders (students and staff) with a healthy environment and access to clean drinking water. Taking care of the plants that are grown on campus can be done with Vermicompost, farmyard manure, cow dung, and organic manure are substitutes for fertilizers made of chemicals. Every single-use, disposable plastic item that isn't compostable, Steer clear of plastic stirrers, straws, and utensils. Exhibition /awareness campaign about the benefits of organic systems and how to create a plastic-free environment options for all new and existing instructors, staff, and students should be arranged. Paperless communication in favor of e-services, e-circulars, etc. Recycling, appropriate waste management systems, and garbage disposal should all be taken into account to create an environmentally friendly campus.

5. Aims and Objectives of Green Campus Audit:

- To acknowledge the steps made in the direction of creating the gardening-focused "green campus."
- To cultivate a large number of plants on campus that release oxygen and absorb carbon dioxide in order to provide stakeholders with a clean atmosphere.
- To recognize and address various environmental hazards to the organization.
- To identify and offer baseline data to assess threat and risk to the ecosystem due to Organization development.
- To guarantee the appropriate application of local resources in the interest of humanity's future prosperity.
- To establish a few guidelines for the disposal of all waste types and employ green cover as a carbon sink.
- To evaluate an organization's campus's greenery in terms of its grass, climbers, twins, lianas, shrubs, and shown in the mitigation of environmental pollution, soil erosion, preservation of biodiversity, management of the landscape, natural topography, and vegetation.



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PRINCIPAL

DRK Institute of Science & Technology
Bowrampet, Outhbullapur, Hyderabad-500 043.



(Bowrampet (v), Near pragathi nagar, on Miyapur-medchal high way,
Quthbullapur, Medchal, Hyd-500043)

Ref.NO: DRKIST/Green Campus /NOV 2020/02

Date: 21-11-2020.

CIRCULAR

All the staff and students of all branches here by informed that program is going to be conducted on Green Campus Date 28/11/2020 at 10am. In this Regard all students and staff must attend the program without fail.

S.No	Course Title	Dare of Commencement	Venue
1	Green Campus	28/11/2020	Seminar Hall 003

Principal

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DRK Institute of Science & Technology
Bowrampet, Quthbullapur, Hyderabad-500 043.

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1. Copy to Principal.
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6. Head of CSE (AIML) Dept.
7. Head of CSE (DS) Dept.
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10. Head of MECH Dept





(Bowrampet (v), Near pragathi nagar, on Miyapur-medchal high way, quthbullapur
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Green Campus



Sahil
PRINCIPAL
DRK Institute of Science & Technology
Bowrampet, Quthubullapur - 500 043



(Bowrampet (v), Near pragathi nagar, on Miyapur-medchal high way,
Quthbullapur, Medchal, Hyd-500043)

28/11/2020.

Program report

Program Name : Green Campus
Date of activity : 29-11-2020
Organized by : IQAC, DRKIST

Report:

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Amma
Principal
PRINCIPAL
DRK Institute of Science & Technology
Bowrampet, Quthbullapur, Hyderabad 500 043.



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Quthbullapur, Medchal, Hyd-500043)

Ref.NO: DRKIST/Waste management /Jan 2021/03

Date: 20-01-2021.

CIRCULAR

All the staff and students of all branches here by informed that program is going to be conducted on Waste management Date 27/01/2021 at 10am. In this Regard all students and staff must attend the program without fail.

S.No	Course Title	Date of Commencement	Venue
1	Waste management	27/01/2021	Seminar Hall 003


Principal

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Ref.NO: DRKIST/Green Campus /NOV 2020/02

Date: 22-12-2021.

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S.No	Course Title	Date of Commencement	Venue
1	Green Campus	29/12/2021	Seminar Hall 003

Lavita
Principal

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Bowrampet, Quthbullapur, Hyderabad-500043





(Bowrampet (v), Near pragathi nagar, on Miyapur-medchal high way, quthbullapur
Medchal, Hyd-500043)

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PRINCIPAL
DRK Institute of Scilence & Technology
Bowrampet, Quthbullapur, Hyderabad-500 043.



(Bowrampet (v), Near pragathi nagar, on Miyapur-medchal high way, Quthbullapur,
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29-12-2021.

Program report

Program Name : Green Campus

Date of activity : 29-12-2021

Organized by : IQAC, DRKIST

Report:

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PRINCIPAL
DRK Institute of Science & Technology
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Ref.NO: DRKIST/Green Campus /Oct 2022/02

Date: 21-10-2022.

CIRCULAR

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S.No	Course Title	Date of Commencement	Venue
1	Green Campus	28/10/2022	Seminar Hall 003

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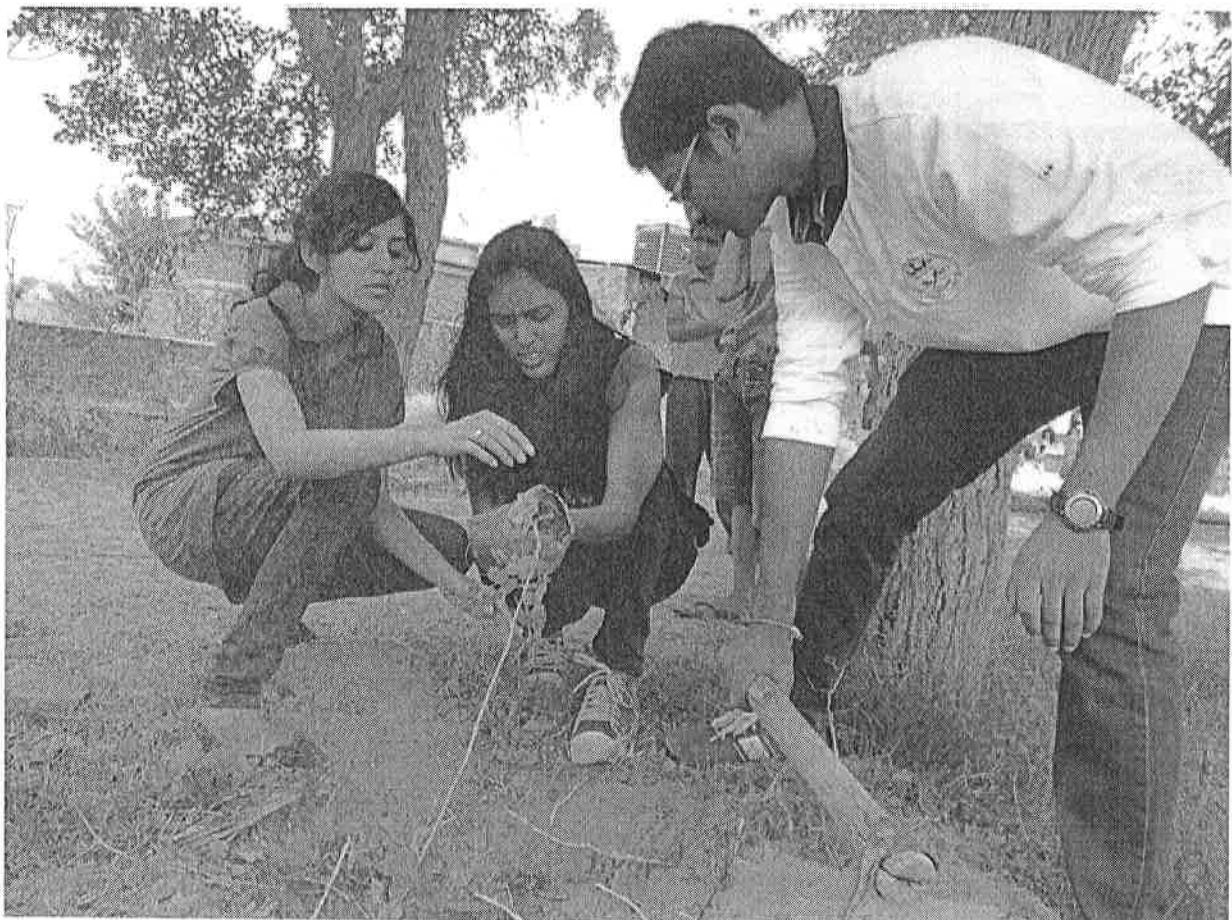
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Green Campus



Lakshmi
PRINCIPAL
DRK Institute of Science & Technology
Bowrampet, Quthubullapur, Hyderabad-500 043.



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28-10-2022

Program report

Program Name : Green Campus

Date of activity : 28-10-2022

Organized by : IQAC, DRKIST

Report:

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Principal

PRINCIPAL
DRK Institute of Science & Technology
Opp. Ashoka University, Sector-50, Noida-201301
Ph. 0120 4000143, 0120 4000143

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Quthbullapur, Medchal, Hyd-500043)

Ref.NO: DRKIST/Green Campus /Jan 2024/02

Date: 21-01-2024.

CIRCULAR

All the staff and students of all branches here by informed that program is going to be conducted on Green Campus Date 28/01/2024 at 10am. In this Regard all students and staff must attend the program without fail.

S.No	Course Title	Date of Commencement	Venue
1	Green Campus	28/01/2024	Seminar Hall 003

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

Principal

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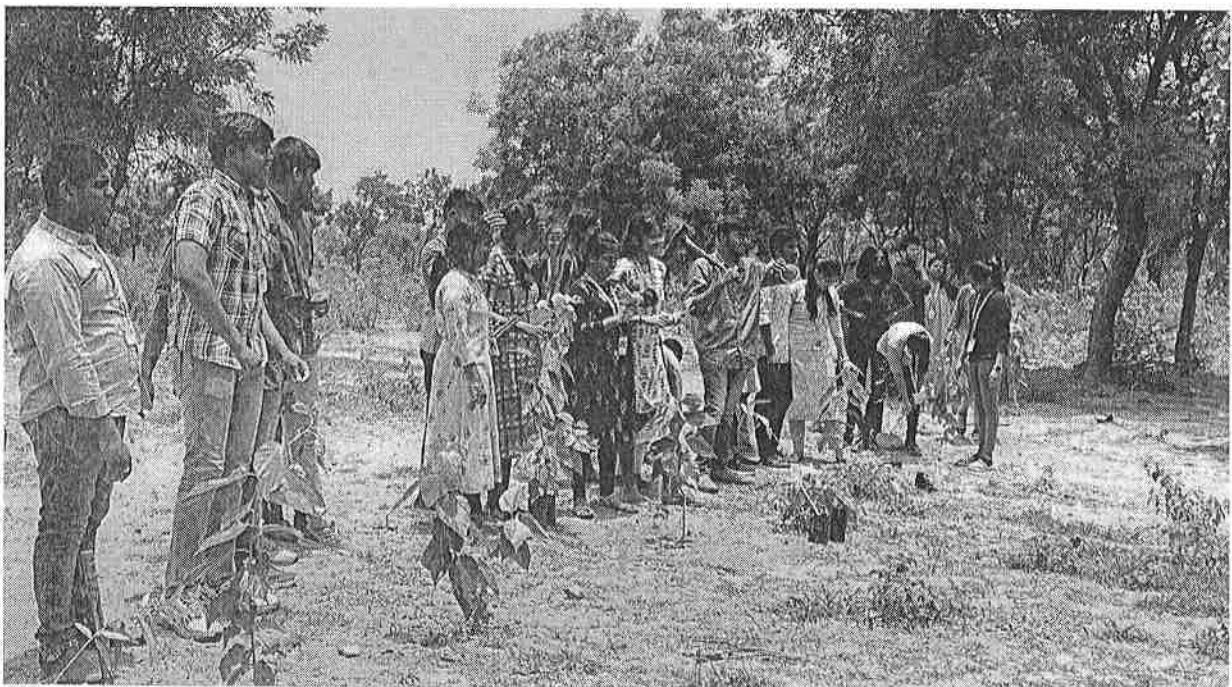
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Medchal, Hyd-500043)

Green Campus



Mr.
PRINCIPAL
DRK Institute of Science & Technology
Bowrampet, Quthubullapur, Hyderabad-500 043



(Bowrampet (v), near pragathi nagar, on Miyapur-medchal high way,
Quthbullapur, Medchal, Hyd-500043)

28-01-2024

Program report

Program Name : Green Campus

Date of activity : 28-01-2024

Organized by : IQAC, DRKIST

Report:

1. Introduction:

A green campus is a section of an organization or the organization as a whole that helps to have infrastructure or development that is designed or scheduled to incur certain costs. Less water, less energy, less or no CO₂ emissions, and a cleaner, less polluted atmosphere. The Green Campus Audit is a technique for assessing environmental control. System that is applied methodically in order to safeguard and maintain the environment. Verdant the combination of environmentally friendly measures and education is known as campus audit. To encourage the maintenance of a green environment, implementing user-friendly technology. It raises environmental ethics awareness, addresses environmental challenges and provides answers for a range of social and financial requirements. It bolsters the notions of "green building" and "oxygenated building," which ultimately offers a wholesome

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Principal

PRINCIPAL
DRK Institute of Science & Technology
Bowrampet, Quthbullapur, Hyderabad-500 043.

A green campus program is a program that combines environmental practices and education to promote sustainable and eco-friendly practices on a campus. It can help colleges conserve natural resources, manage waste, and educate students about climate change and sustainability.

2. Role of Educational Institutions in India:

Educational establishments are crucial to the development of a country and development that begins with protecting the environment by maintaining a green campus. Effectiveness in an organization is determined by a clean and healthy atmosphere. Providing students with a supportive learning atmosphere and teaching abilities, instructive .The federal and state governments require institutions to provide environmentally friendly environment for the participants. Furthermore, all educational establishments are requested to protect the environment for coming generations and to find solutions to environmental problems (building up solid waste, wastewater, and/or effluents, and disposing of them carelessly, huge plastics' utility, excessive water use, and carelessness with water techniques for collecting and storing, etc.) by means of environmental education. Putting the Indian government's Swatch Bharat Abhiyan Scheme into Practice through the plays of the educational institutes.

3. Green Campus and Environment Policy:

The Green Campus Policy addressed how to recycle biodegradable garbage and maintain campus cleanliness through appropriate waste disposal, and the use of environmentally friendly materials to keep the campus free of dangerous pupils and the rural community through a variety of awareness-raising initiatives. An attempt are designed to reduce energy use and replace non-renewable energy sources. Using energy sources that are renewable. Department Heads, the Organization's Head, and it is the duty of Senior Managers and Management Representatives to oversee the "Go Green" programs of the college or university help keep the campus tidy and environmentally friendly while Every single person within the organization is expected to abide by the policy.


Principal

PRINCIPAL
DRK Institute of Science & Technology
Bowrampet, Guntubulapur, Hyderabad-500 043.

4. Environment Friendly Campus

As previously said, the organization is responsible for providing all stakeholders (students and staff) with a healthy environment and access to clean drinking water. Taking care of the plants that are grown on campus can be done with Vermicompost, farmyard manure, cow dung, and organic manure are substitutes for fertilizers made of chemicals. Every single-use, disposable plastic item that isn't compostable, Steer clear of plastic stirrers, straws, and utensils. Exhibition /awareness campaign about the benefits of organic systems and how to create a plastic-free environment options for all new and existing instructors, staff, and students should be arranged. Paperless communication in favor of e-services, e-circulars, etc. Recycling, appropriate waste management systems, and garbage disposal should all be taken into account to create an environmentally friendly campus.

5. Aims and Objectives of Green Campus Audit:

- To acknowledge the steps made in the direction of creating the gardening-focused "green campus."
- To cultivate a large number of plants on campus that release oxygen and absorb carbon dioxide in order to provide stakeholders with a clean atmosphere.
- To recognize and address various environmental hazards to the organization.
- To identify and offer baseline data to assess threat and risk to the ecosystem due to Organization development.
- To guarantee the appropriate application of local resources in the interest of humanity's future prosperity.
- To establish a few guidelines for the disposal of all waste types and employ green cover as a carbon sink.
- To evaluate an organization's campus's greenery in terms of its grass, climbers, twins, lianas, shrubs, and shown in the mitigation of environmental pollution, soil erosion, preservation of biodiversity, management of the landscape, natural topography, and vegetation.



Principal

PRINCIPAL
DRK Institute of Science & Technology
Bowampet, Quthbullapur, Hyderabad-500 043



RTEPORT ON CLEAN AND GREEN CAMPUS INTIATIVES

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PRINCIPAL
DRK Institute of Science & Technology
Bowrampet, Outhbullapur, Hyderabad-500 043.



(Bowrampet (v), Near pragathi nagar, on Miyapur-medchal high way, quthbullapur
Medchal, Hyd-500043)

Program report

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Principal
PRINCIPAL
DRK Institute of Science & Technology
Bowrampet, Quthbullapur, Hyderabad-500 043.



DOCUMENTS RELATED TO ENVIRONMENT PORMOTION ACTIVITES BEYOND CAMPUS

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PRINCIPAL
DRK Institute of Science & Technology
Bowrampet, Gouthullapur, Hyderabad-500 043



Bowrampet (v), Near pragathi nagar, on Miyapur-medchal high way,
Quthbullapur, Medchal, Hyd-500043)

Ref No:DRKIST/Tree planting /DEC 2019/01 Date: 29-12-2019.

Circular

We are organizing a tree planting event to enhance green spaces and contribute to local biodiversity. Your participation will make a significant impact on our environment.

Copy to:

1. Copy to Principal.
2. Copy to Office room.
3. Copy to Notice board.
4. Copy to TPO.
5. Head of CSE Dept.
6. Head of EEE Dept.
7. Head of ECE Dept.
8. Head of MECH Dept

Principal
hm
PRINCIPAL
DRK Institute of Science & Technology
Bowrampet, Quthbullapur, Hyderabad-500 043





Bowrampet (v), Near pragathi nagar, on Miyapur-medchal high way,
Quthbullapur, Medchal, Hyd-500043)

Date:29-12-2019;

Program Report

1. Introduction

On 29-12-2019, DRKIST successfully conducted a tree planting campaign at Bowrampet. This event was part of our ongoing commitment to environmental sustainability and aimed to enhance local green spaces, contribute to biodiversity, and promote ecological awareness within the community.

2. Objectives

The primary objectives of the tree planting campaign were to:

Increase the green cover in the local area.

Promote environmental stewardship among participants.

Educate the community about the importance of trees and sustainable practices.

Foster a sense of community involvement and responsibility towards the environment.


PRINCIPAL
DRK Institute of Science & Technology
Bowrampet, Quthbullapur, Hyderabad-500 043

TREE PLANTING



Srinivasa
PRINCIPAL
DRK Institute of Science & Technology
Bewrampet, Quthbullapur, Hyderabad-500 043.



Bowrampet (v), Near pragathi nagar, on Miyapur-medchal high way,
Quthbullapur, Medchal, Hyd-500043)

Ref No:DRKIST/Tree planting /DEC 2020/01 Date: 30-12-2020.

Circular

We are organizing a tree planting event to enhance green spaces and contribute to local biodiversity. Your participation will make a significant impact on our environment.

Principal

PRINCIPAL

DRK Institute of Science & Technology
Bowrampet, Quthbullapur, Hyderabad-500 043

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7. Head of ECE Dept.
8. Head of MECH Dept





Bowrampet (v), Near pragathi nagar, on Miyapur-medchal high way,
Quthbullapur, Medchal, Hyd-500043)

Date:30-12-2020

Program Report

1. Introduction

On 30-12-2020, DRKIST successfully conducted a tree planting campaign at Bowrampet. This event was part of our ongoing commitment to environmental sustainability and aimed to enhance local green spaces, contribute to biodiversity, and promote ecological awareness within the community.

2. Objectives

The primary objectives of the tree planting campaign were to:

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PRINCIPAL
DRK Institute of Science & Technology
Bowrampet, Quthbullapur, Hyderabad-500 043.

TREE PLANTING



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PRINCIPAL
DRK Institute of Science & Technology
Bowrampet, Quthbullapur, Hyderabad - 500 043.



Bowrampet (v), Near pragathi nagar, on Miyapur-medchal high way,
Quthbullapur, Medchal, Hyd-500043)

Ref No:DRKIST/Tree planting /DEC 2021/01 Date: 27-12-2021.

Circular

We are organizing a tree planting event to enhance green spaces and contribute to local biodiversity. Your participation will make a significant impact on our environment.

Principal


PRINCIPAL

DRK Institute of Science & Technology
Bowrampet, Quthbullapur, Hyderabad-500 043.

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7. Head of ECE Dept.
8. Head of MECH Dept





Bowrampet (v), Near pragathi nagar, on Miyapur-medchal high way,
Quthbullapur, Medchal, Hyd-500043)

Date:27-12-2021;

Program Report

1. Introduction

On 27-12-2021, DRKIST successfully conducted a tree planting campaign at Bowrampet. This event was part of our ongoing commitment to environmental sustainability and aimed to enhance local green spaces, contribute to biodiversity, and promote ecological awareness within the community.

2. Objectives

The primary objectives of the tree planting campaign were to:

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Lwin
PRINCIPAL
DRK Institute of Science & Technology
Bowrampet, Quthbullapur, Hyderabad-500 043.

TREE PLANTING



Mr.
PRINCIPAL
DRK Institute of Science & Technology
Bowrampet, Outbullapur, Hyderabad-500 043.



Bowrampet (v), Near pragathi nagar, on Miyapur-medchal high way,
Quthbullapur, Medchal, Hyd-500043)

Ref No:DRKIST/Tree planting /SEP 2022/01 Date: 29-09-2022.

Circular

We are organizing a tree planting event to enhance green spaces and contribute to local biodiversity. Your participation will make a significant impact on our environment.

Principal

him
PRINCIPAL

DRK Institute of Science & Technology
Bowrampet, Quthbullapur, Hyderabad, Telangana, India.

Copy to:

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4. Copy to TPO.
5. Head of CSE Dept.
6. Head of EEE Dept.
7. Head of ECE Dept.
8. Head of MECH Dept





Bowrampet (v), Near pragathi nagar, on Miyapur-medchal high way,
Quthbullapur, Medchal, Hyd-500043)

Date:29-09-2022

Program Report

1. Introduction

On 29-09-2022, DRKIST successfully conducted a tree planting campaign at Bowrampet. This event was part of our ongoing commitment to environmental sustainability and aimed to enhance local green spaces, contribute to biodiversity, and promote ecological awareness within the community.

2. Objectives

The primary objectives of the tree planting campaign were to:

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PRINCIPAL
DRK Institute of Science & Technology
Bowrampet, Quthbullapur, Hyderabad-500 043.

TREE PLANTING



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PRINCIPAL
DRK Institute of Science & Technology
Bowrampet, Outrampet, Hyderabad-500 043.



Bowrampet (v), Near pragathi nagar, on Miyapur-medchal high way,
Quthbullapur, Medchal, Hyd-500043)

Ref No:DRKIST/Tree planting /OCT 2023/01 Date: 26-10-2023.

Circular

We are organizing a tree planting event to enhance green spaces and contribute to local biodiversity. Your participation will make a significant impact on our environment.

Principal

PRINCIPAL

DRK Institute of Science & Technology
Bowrampet, Quthbullapur, Hyderabad-500 043.

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8. Head of MECH Dept





Bowrampet (v), Near pragathi nagar, on Miyapur-medchal high way,
Quthbullapur, Medchal, Hyd-500043)

Date:26-10-2023

Program Report

1. Introduction

On 26-10-2023, DRKIST successfully conducted a tree planting campaign at Bowrampet. This event was part of our ongoing commitment to environmental sustainability and aimed to enhance local green spaces, contribute to biodiversity, and promote ecological awareness within the community.

2. Objectives

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PRINCIPAL
DRK Institute of Science & Technology
Bowrampet, Quthbullapur, Hyderabad-500 043.

TREE PLANTING



him
PRINCIPAL
DRK Institute of Science & Technology
Bowrampet, Dethbhullar, Muzaffarnagar - 250011