

SUSTAINABLE LIVING INC

Certificate of Completion

This is to certify that

Nimra College of Pharmacy

has successfully completed
Green landscape audit

The study was completed by Sustainable Living Inc

Hiran Prashanth

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Principal, Nimra College of Pharmacy
Jupudi, Ibrahimpatnam
Vijayawada - 521 456

Hiran Prashanth
PRINCIPAL
NIMRA COLLEGE OF PHARMACY
JUPUDI, Ibrahimpatnam
VIJAYAWADA - 521 456

Issued by Sustainable Living Inc

June 2022
GA - 03 - 22 - NCP

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**NIMRA COLLEGE OF
PHARMACY**

Carbon Footprint and Energy Audit

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Acknowledgment

Sustainable Living Inc

Hiran Prashanth
Environmental Sustainability Auditor

26 June 2022

Carbon footprint and Energy audit at Nimra College of Pharmacy

The Sustainable Living Inc acknowledges with thanks the cooperation extended to our team for completing the study at Nimra College of Pharmacy (NCP).

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

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

Kind regards,

Yours sincerely,
Hiran Prashanth

Hiran Prashanth
Environmental Sustainability Auditor
Sustainable Living In

About Auditor

Hiran Prashanth is a sustainability consultant based in London. He has over 14 years of experience in climate change and environmental sustainability. He was working with the Confederation of Indian Industry (CII) before moving to London to pursue a master's degree at King's College, London.

Hiran Prashanth has helped more than 150 organizations around the world to achieve carbon neutrality. Apart from carbon neutrality, Hiran Prashanth has also facilitated organizations to achieve net-zero energy, water neutrality, and zero waste to landfill. He has audited more than 500 companies for their sustainability performance.

Hiran Prashanth was awarded the 'Best Sustainability Assessor' by the Honorable Minister for HRD, Mr. Prakash Javadekar. Hiran Prashanth is a CII certified carbon footprint expert and a resource efficiency expert. He has trained more than 1000 industry personnel across the world on climate change and sustainability. He is a guest faculty at IIM Lucknow and SIBM, Pune. His credentials can be found on [Hiran Prashanth | LinkedIn](#). Sustainable Living Inc provides services on carbon footprint, energy audit, resource management and embodied carbon.

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, Nimra College of Pharmacy (NCP) firmly believes that there is an urgent need to address the environmental challenges and improve their environmental footprint.

True to its belief, NCP installed energy efficient LED lamps for lighting. Sustainable Living Inc Team congratulates NCP team for their efforts. Keeping NCP's work in energy efficiency, we recommend the following to be taken by the competent team at NCP:

Work towards achieving carbon neutrality: INDC emphasizes creating an additional carbon sink of 2.5 to 3 billion tonnes of CO₂ equivalent through additional forest and tree cover by 2030. NCP's net carbon emission for the year 2021-22 is 155.20 **MT CO₂e**. NCP 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. NCP has already installed solar panels for generating

clean energy for its campus. By increasing the share of renewable energy in NCP's energy portfolio, the overall carbon footprint of the college can be reduced. Considering a minimum available rooftop area in campus building as 5400 sq. ft, a minimum of 50 kWp of solar PV can be installed. As an initial step, NCP could look at installing 25 kWp of solar PV which can generate 40500 units per year. The renewable share will also reduce the 33 MT CO₂e. Achieving carbon neutrality should be one of the major objectives of NCP.

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 70W ceiling fans with energy efficient BLDC fans of 30W
- Install air conditioners energy savers to save energy in split air conditioners

Carbon Footprint and Energy Audit

Nimra College of Pharmacy (NCP) and Sustainable Living Inc 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 NCP 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 NCP. The report emphasizes the GHG emission reduction potential possible through a reduction in power consumption.

Submission of Documents

Carbon footprint and energy audit at NCP was carried out with the help of data submitted by NCP team. NCP team was responsible for collecting all the necessary data and submitting the relevant documents to Sustainable Living Inc for the study.

Carbon Footprint and Energy Audit

Data submitted and collected was used to calculate the carbon footprint of the campus and assess energy consumption and finally provide necessary recommendations for environmental improvement.

Note

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

Sustainable Living Inc 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.

OPPORTUNITIES FOR IMPROVEMENT

As a part of the overall environmental improvement study at NCP, 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 NCP 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 hostelers 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 company, 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.

NCP Scope 1 emissions for 2021-22:

Sources of Scope 1 emissions in NCP:

- 1) LPG used for canteen
- 2) Diesel used for generator

S No	Fuel Type	Description	Activity Data	Units	CO2 eq. Emissions (tons)
1	Diesel	Transportation	3.75	KL	9.90
2	Diesel	Generator	0.40	KL	1.06

Total Scope 1 emissions of NCP : 11.00 Tons (for year 2021-22)

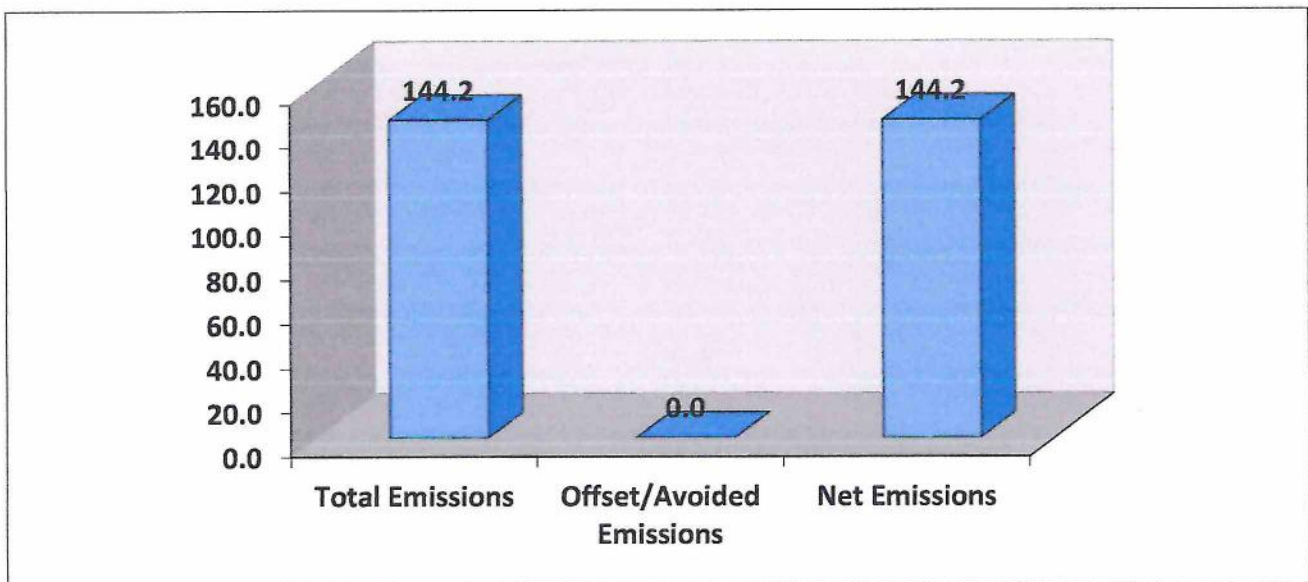
Scope 2: Electricity Indirect GHG Emissions

Scope 2 accounts for GHG emissions from the generation of purchased electricity consumed by a company. Purchased electricity is defined as electricity that is purchased or otherwise brought into the organizational boundary of the company. Scope 2 emissions physically occur at the facility where electricity is generated.

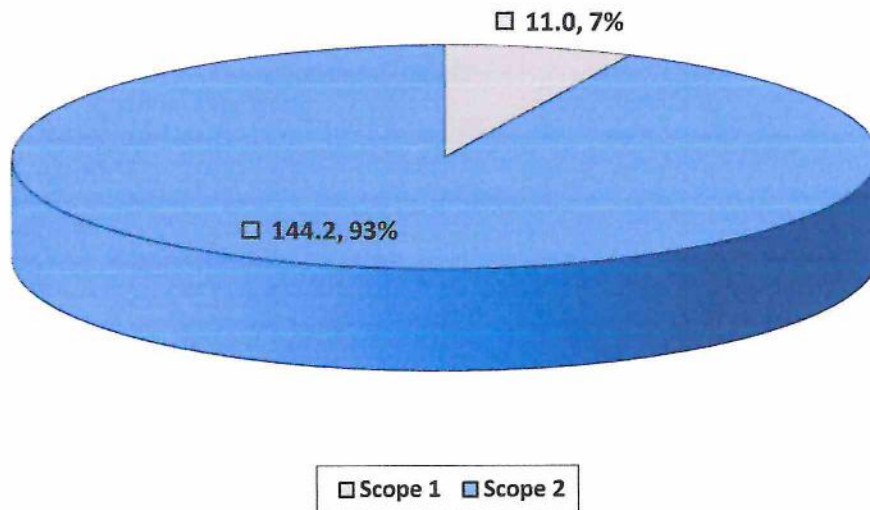
NCP Scope 2 emissions for 2021-22:

Electricity purchased from grid : 1,75,912

Scope 2 Breakup



GHG Emission Summary of NCP



Scope 1	11.00	MT CO2 eq.
Scope 2	144.20	MT CO2 eq.
Total	155.20	MT CO2 eq.

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 NCP and the maximum offset that can be achieved at NCP
- Percentage substitution with renewable energy that NCP wants to achieve in a specified time frame
- Key tasks that needs 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 bottleNCPks & proposed

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. GOC 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

NCP has an action plan to reduce its GHG emissions. NCP 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.

Install 25 kWp of Solar PV in NCP campus

Renewable energy is one of the important steps to be taken up by the college to reduce their overall carbon footprint. Considering an availability of a minimum 5400 sq. feet of rooftop area, 50 kWp of solar PV can be installed. However, for this report calculation, only 25 kWp capacity is considered.

A renewable energy capacity of 25 kW of solar panel may be installed can generate **40,500** units of electricity per year. Additionally, 25 kWp of solar rooftop can offset **33 MT CO₂e** per annum.

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



ENERGY EFFICIENCY

Annual energy consumption of NCP campus is 1,75,912 units. There are major blocks in the campus which consumes energy for their operation. Major energy consumers are:

1. Air conditioners
2. Fans

Install Air conditioners energy saver for spilt air conditioners:

Present status: As per the data obtained from NCP team, the campus has majorly 1.5 TR units installed. There are 12 spilt air conditioners installed and operate 8 hours a day.

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.

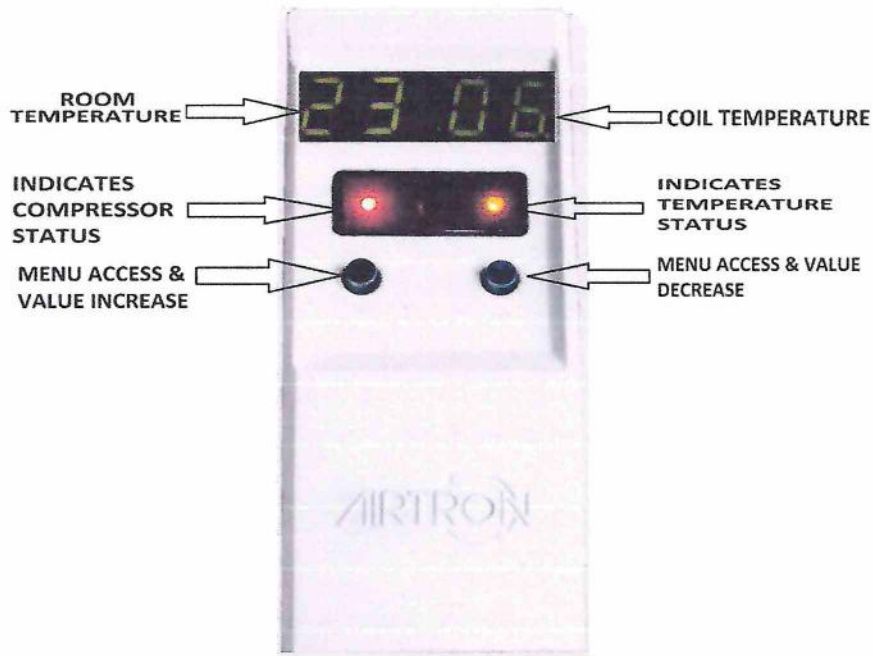
This unique device has been developed on Patent-Published technology and approved by leading MNC'S, PSU'S and Govt. Departments. The Airtron is validated by EESL (Energy Efficiency Services Ltd.), Ministry of Power, Government of India, for 44% savings. The Airtron has been validated on all AC's- Inverters, 5 Star, Splits, Multi-Splits, Packages, ducts, Windows, Cassettes from 1.0 - 20.0 TR, LG Ltd, 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 7.50/-.

- 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



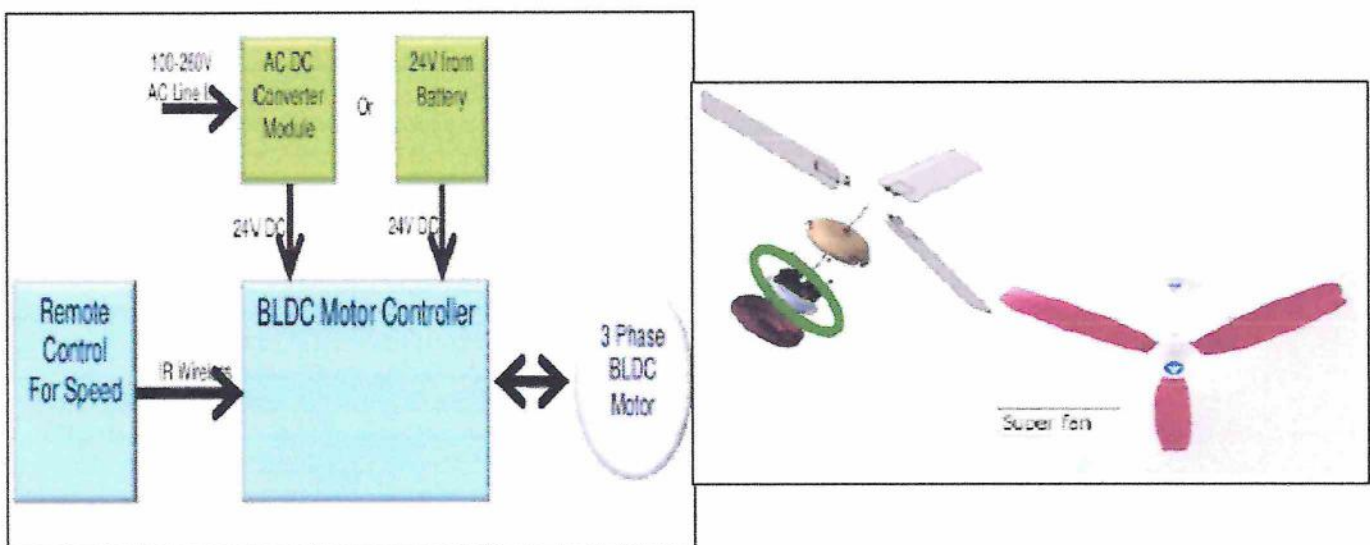
Replace Conventional Ceiling Fans with Energy Efficient BLDC Fans

During the Energy Audit at NCP, a detailed study was carried out to identify the potential for replacing the existing ceiling fans with BLDC super fans. There are 153 fans operating in NCP 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:

Calculations:



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. 7.50, the calculations are as follows:

Total no. of fans in college	:	153
No. of fans considered for calculation	:	100 (First cycle of change)
Energy consumption per fan	:	70 W
Total energy consumption of fans	:	70W X 100 fans
	:	7 kW
Super-efficient BLDC fans energy consumption	:	30 W
Savings from 70W to 30 W	:	55%
Total savings in fans energy consumption	:	55% of 7kW
	:	3.5 kW
Savings per year	:	3.5 kW X 2000 hrs X Rs. 7.50 / unit
	:	Rs. 0.75 Lakhs
Investment	:	Rs. 2, 50, 000
	:	52 months
Annual emission reduction potential	:	6.00 T CO ₂

Conclusion

NCP has initiated few energy efficiency activities in their campus. While Sustainable Living Inc appreciates the plant 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 can be adopted to install renewable energy without upfront capital investment. We in Sustainable Living Inc are sure that all the recommendations mentioned in the report will be implemented by NCP team and the overall environmental performance of the campus will be improved.

List of Vendors

Equipment	Supplier Name	Contact Person	Mail Address	Contact Number
AC Energy Saver	Gloabtel Convergence Ltd	Mr Chirag Morakhia	chirag@gloabtel.com	9324176440
AC Energy Saver	Magnatron International	Mr Kishore Mansata	indiaenergysaver@gmail.com	9748727966
BLDC Ceiling Fans	Atomberg Technologies Pvt Ltd	Ms Roshni Noronha	roshninoronha@atomberg.com	9987366655
BLDC Ceiling Fans	Versa Drives	Mr Sathish	sathish@versadrives.com	94885 94382
LED	Havells India Ltd	Mr. Sunil Sikka	sunil.sikka@havells.com	0120-4771000
LED	Kwality Photonics Pvt. Ltd.	Mr. K. Vijay Kumar Gupta	kwality@kwalityindia.com	+ 91 40 2712 3555
LED	OSRAM Lighting Pvt. Ltd.	Mr Nitin Saxena	N.saxena@osram.com	+91 124 626 1300
LED	Reckon Green Innovations Pvt Ltd	Mr Krishna Ravi	krishna@reckongreen.com	9985333559