

# Energy Audit Report



## **VELS INSTITUTE OF SCIENCE, TECHNOLOGY AND ADVANCED STUDIES (VISTAS)**

Velan Nagar, P.V. Vaithiyalingam Road, Pallavaram, Chennai-600 117,  
Tamil Nadu, India

Audit Date: 17th Mar 2020

*Pragnaa*

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## **Section 1: Executive Summary**

Educational institutions now a day are becoming more sensitive to environmental factors and more concepts are being introduced to make them eco-friendly. To preserve the environment within the campus, various viewpoints are applied by the several educational institutes to solve their environmental problems such as promotion of the energy savings, recycle of waste, water reduction, water harvesting etc... The activities pursued by the university can also create a variety of adverse environmental impacts. Environmental auditing is a process whereby an organization's environmental performance is tested against its environmental policies and objectives. Green audit is defined as an official examination of the effects a University has on the environment. As a part of such practice, internal audit (Green Audit) is conducted to evaluate the actual scenario at the campus.

Green audit can be a useful tool for a University to determine how and where they are using the most energy or water or resources; the University can then consider how to implement changes and make savings. It can also be used to determine the type and volume of waste, which can be used for a recycling project or to improve waste minimization plan. Green auditing and the implementation of mitigation measures is a win-win situation for all the University, the learners and the planet. It can also create health consciousness and promote environmental awareness, values and ethics. It provides staff and students better understanding of Green impact on campus. Green auditing promotes financial savings through reduction of resource use. It gives an opportunity for the development of ownership, personal and social responsibility for the students and teachers.

The audit process involved in Initial Data Collection, Site walk through with the team of VISTAS with the views management including the policies, activities, documents and records.

This was followed by staff and student interviews, collection of data, review of records, observation of practices and observable outcomes.

The baseline data collected from Vels University, VISTAS, Pallavaram, Chennai are analyzed and conclusion made.

We thank the Management of VISTAS, Dr. Arun, Director-IAQC and Professor CSE and other team members for supporting the complete audit process.

We are happy to submit this green audit report to the **VELS INSTITUTE OF SCIENCE, TECHNOLOGY AND ADVANCED STUDIES (VISTAS).**

Mr. S.K. Srinivasan  
Mr. R. Murali  
Mr. S. Babu

Pragnaa Shree Venture India Pvt. Ltd

## **Section 2: Introduction to VISTAS**

Vels Group of Institutions run by the Vael's Educational Trust, a charitable, non-profitable organization was established in 1992 by Dr.Ishari K.Ganesh to commemorate the fond memory of his father Shri.Isari Velan, the Former Deputy Minister in the popular Govt. of Dr.M.G.R who was also associated with the film industry. Taking education to the humble thresholds of first-generation learners and weaker sections of the society has ever been the objective of Vael's Trust. The vision of Vael's is to inculcate self-reliance and discipline among the youth and also to improve the quality of higher education.

The multifaceted, need based, magnificent Vels Group of Institutions under Vael's Educational Trust highlight the commitment and dedication towards the noble cause of higher education. Lighting the lamp of education on countless thresholds hidden in the folds and crevices of India, Vael's holds high the blazing beacon of quality Education

Indeed, this institution of higher learning and excellence is a leviathan in the ever-expansive ocean of education. The moving spirit behind Vels success story is the founder Chairman and Managing Trustee Dr. Ishari K.Ganesh. Believing staunchly in the philosophy of work, placed on the pedestal of worship, he is a visionary and inspiring academician, who breathed into generations and generations of students, the unsullied breath of quality education, tempered by discipline and enlivened by dedication.

Vels College of Pharmacy was started in 1992. Subsequently, Vels College of Physiotherapy (1993) and Vels College of Science (1993) were started. The Deemed to be University status was conferred, to the above different colleges, after fulfilling all the procedures on 04.06.2008 by the MHRD, Govt. of India with the registered name **VELS INSTITUTE OF SCIENCE, TECHNOLOGY AND ADVANCED STUDIES (VISTAS).**

Now VISTAS has blossomed into a multi-disciplinary Institute offering more than 100 UG & PG programs, besides Doctoral programs, through 15 Schools and 45 Departments. Programs have the approval of the relevant Statutory Regulating Agencies such as UGC, AICTE, PCI, BCI, NCTE, DGS etc. VISTAS has a student strength close to 13000 and faculty strength close to 696 with 329 of them having terminal degree. The School of Maritime Studies was awarded “A” grade by the Indian Register of Shipping (IRS) in Nov-2016. VISTAS has been accredited by NAAC with a CGPA of 3.01 / 4 (A) grade in March 2019. B.E., Mechanical Engineering, B.E., Computer Science & Engineering, Master of Business Administration, B.Pharmacy and B.E., Marine Engineering programmes have been accredited by the NBA. VISTAS is also recognized as a Scientific and Industrial Research Organization (SIRO) by the Ministry of Science and Technology, Government of India. The green and plastic free Main Campus is located at Pallavaram around 2 km from Pallavaram railway station and nearly 4 km from Chennai Airport. The School of Physiotherapy and the School of Maritimes Studies are located on a separate campus at Thalambur, 20 km away from the main campus.

The structure of Governance in VISTAS facilitates Autonomy, Transparency and Accountability through participation of various stakeholders. It provides the differentiation and integration of various activities in VISTAS. The Organizational structure has been designed as per UGC Regulation. The Regulatory bodies of VISTAS include Board of Management, Academic Council, Planning and Monitoring Board, Board of Studies and Finance committee. They have been functioning as per guidelines of UGC and Memorandum of Association and they meet periodically. The various key stakeholders of VISTAS, which includes faculty, students, parents, industry experts, academic peers and alumni, are involved in decision making at every level. For smooth functioning of VISTAS several sub-committees comprising the faculty and student representatives have been constituted. In order to decentralize administrative / academic machinery, authority has been delegated by setting up of Deans for various Schools, Admissions, Academics, Research, Student Affairs, Faculty, IQAC, etc., For transparent functioning, the Admission, Academics, Administration, Accounts and Examination processes are automated by using ERP.

An enriched teaching, learning and evaluation process is carried out in VISTAS catering to the diversity of students and faculty. Students entering VISTAS enjoy a multivariate learning process. Bridge Courses are conducted to prepare the students to their respective study environments. The entire Teaching-Learning process is student centric focusing on LMS, KMS, and E-Learning resources. Interactive and instructional lectures, classroom deliberations, practical classes, hands-on training, projects, presentations, workshops and guest lectures help students to hone their technical skills. Comprehensive lesson plans are prepared regularly by faculties for effective teaching. Independent, Interactive, Collaborative and Participatory learning is encouraged and the required facilities are available for students in terms of SMART Classrooms, Wi-Fi enabled Campus, Industrial Interactions, Projects and visits. Video lectures of VISTAS recorded using EduTech, NPTEL, EDX and other MOOCs to enhance student learning. Virtual learning through the AVIEW and Moodle programs of IIT are available. VISTAS employs an effective Mentor-Mentee system for guidance and counselling students on regular basis. Class committee meetings are conducted regularly for all types of learners. Remedial and tutorial classes are conducted for slow learners to enhance the learning. Fast learners are involved in NPTEL courses, industrial problems and projects. All the programs offered by VISTAS have clearly defined POs, PSOs and COs and the outcomes are assessed through direct and indirect methods. VISTAS adopts Continuous Assessment System, where both formative and summative assessments are ensured to measure the attainment of course outcomes.

VISTAS core values are aligned to its vision and mission and are reflected in the curricular and professional growth of the VISTAS community. With Equity as its premier value and a Women's Forum as its mouthpiece, VISTAS promotes gender sensitivity among all stakeholders. Girls are given special counselling to overcome depression, abnormal behaviour etc. VISTAS have a well-defined Environment policy. The campus is green, serene and pleasant. Steps have also been taken to conserve energy and reduce carbon footprint by installing three windmills and solar street lamps. VISTAS has been adhering to the best practices such as Herbal Garden, Tobacco-Free Campus, Green Campus, Bio-gas plant, Rain Water harvesting, Renewable energy and carbon neutrality. The E-waste is again sold back to the contractors for disposal. Recently a modern waste processing machine has been installed in the

campus, for converting biodegradable waste into manure. Being situated in the heart of city, VISTAS enjoys the privilege of creation of direct and indirect employment opportunities for the local unemployed youth. Good connectivity and presence of industries in the vicinity are major advantages. The core values and the developments stated above are displayed on the Institute website. Promoting a cosmopolitan culture, VISTAS observes National festivals and birth/death anniversaries of great Indian personalities.

VISTAS follows the Best practices such as Outcome Based Education, Student Mentoring, External Academic and Administration Audit, ERP in all the activities, NSS Unit-Swach Bharat Abhiyan, Student`s Feedback about Teachers, MHRD Digital Initiatives, Research culture, Institution-Industry Interaction, Use of Renewable Energy, Internship for Students, Parent Corner in the Website etc. The Industry-Institution relationship is very strong at VISTAS. Industries are busy in developing products at the Incubation Centre. Some academic programs such as B.Tech and MBA are run in collaboration with M/s IBM. Experienced Professors are active in solving industrial problems as part of consultancy projects. Our vision is to provide quality education. Hence, as part of ensuring quality, External Academic and Administrative Audit is performed in all the departments every year.

A centre, named, 'Centre for Advanced Research and Development' (CARD) has been established with the aim of promoting research. Besides 12 advanced dedicated research labs in various schools, a Central Instrumentation lab is set up housing advanced instruments such as BET Surface Area Analyzer, Field Emission Scanning Electron Microscope, High Performance Thin Layer Chromatography, X-Ray Diffractometer, Particle Size and Zeta Potential Analyzer, Raman Spectrometer, etc. Research scholars from nearby universities also use VISTAS lab for research. Due to strong Industry – Institutional tie-up, senior faculty are busy in solving industrial problems as consultancy projects. Ten industries are active at Incubation Centre in developing products useful to the society. Staff members are given incentives to publish papers and attend seminars. During the last three years 1374 research papers have been published in the UGC listed journals. *Turnitin* software is available to eliminate plagiarism.



Under Unnat Bharath Abhiyan program, VISTAS has initiated promotion of institutional social responsibility through activities undertaken in the neighbourhood rural community. Generic Medicines are made available to the Society through Pradhan Mantri Jan-Aushadhi Yojana Scheme.

The road map of VISTAS is well-drawn. Our vision is to make this an International Institute wherein students from all the countries will assemble to enrich themselves in terms of knowledge. We want to provide physical and academic infrastructure including lab facilities which will create “reverse flow” of students. Our ambition is to have at least 100 crores worth of research projects by 2030.

Several are the paths and avenues to be explored, and exploited. Countless are the feathers to be added to the Vels cap of success. The endeavours continue with determination, “to strive, to seek, to find and not to yield”. On the whole, the Institute is committed to excellence in every activity, intelligent planning of each activity and ensuring focused effect on each of them for attaining excellence. **WE HAVE ACHIEVED A LOT, STILL WE FEEL WE HAVE MILES TO GO AND OUR JOURNEY IN HIGHER EDUCATION CONTINUES.**

### Section 3: General Information

S. No	Description (2019-20)	Male	Female
1	Students	8754	3453
2	Teachers	336	360
3	Non-Teaching Staff	259	221
4	Total	9349	4034

Total Number of Working Days (April 2019- May 2020)	196
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<b>School Wise - Students Enrollment &amp; Staff details - 2019-2020</b>			
S. No	Name of the School	No. of Students	No. of Staff
1	School of Management Studies & Commerce	3037	107
2	School of Computing Sciences	1501	66
3	School of Life Sciences	715	39
4	School of Mass Communication	852	19
5	School of Maritime Studies	613	37
6	School of Engineering	1774	142
7	School of Basic Sciences	483	52
8	School of Hotel & Catering Mgmt.	242	14
9	School of Pharmaceutical Sciences	653	47
10	School of Physiotherapy	493	26
11	School of Ocean Engineering	157	14
12	School of Law	906	30
13	School of Languages	181	67
14	School of Education	309	28
15	School of Music & Fine Arts	82	03
16	Dept. of Aviation	209	05

## **Section 4: Facilities Available**

- Boys Hostels
- Girls Hostels
- Staff Quarters
- Three air-conditioned auditoria with a capacity of 1200, 250 & 120
- Three air-conditioned seminar halls with a seating capacity of 150
- Main Canteen is available which can cater to 200 persons at a time and Three smaller canteens are also available
- Bank with ATM
- Pharmacy
- RO Plant
- Transport facilities
- Nine Diesel Generators
- Three Wind Mills
- Waste Management
- Solar Plant
- Insurance for all students and staff members

VISTAS has three playgrounds and other facilities such as:

- Football Field
- Volleyball Court
- Basketball Court
- Ball Badminton Court
- Badminton Courts (Outdoor)
- Throw ball Court
- Tennikoit Court
- Taekwondo
- Cricket Practice Pitch (nets)
- Kabaddi Court
- Swimming Pool (25mtsX14 mts)

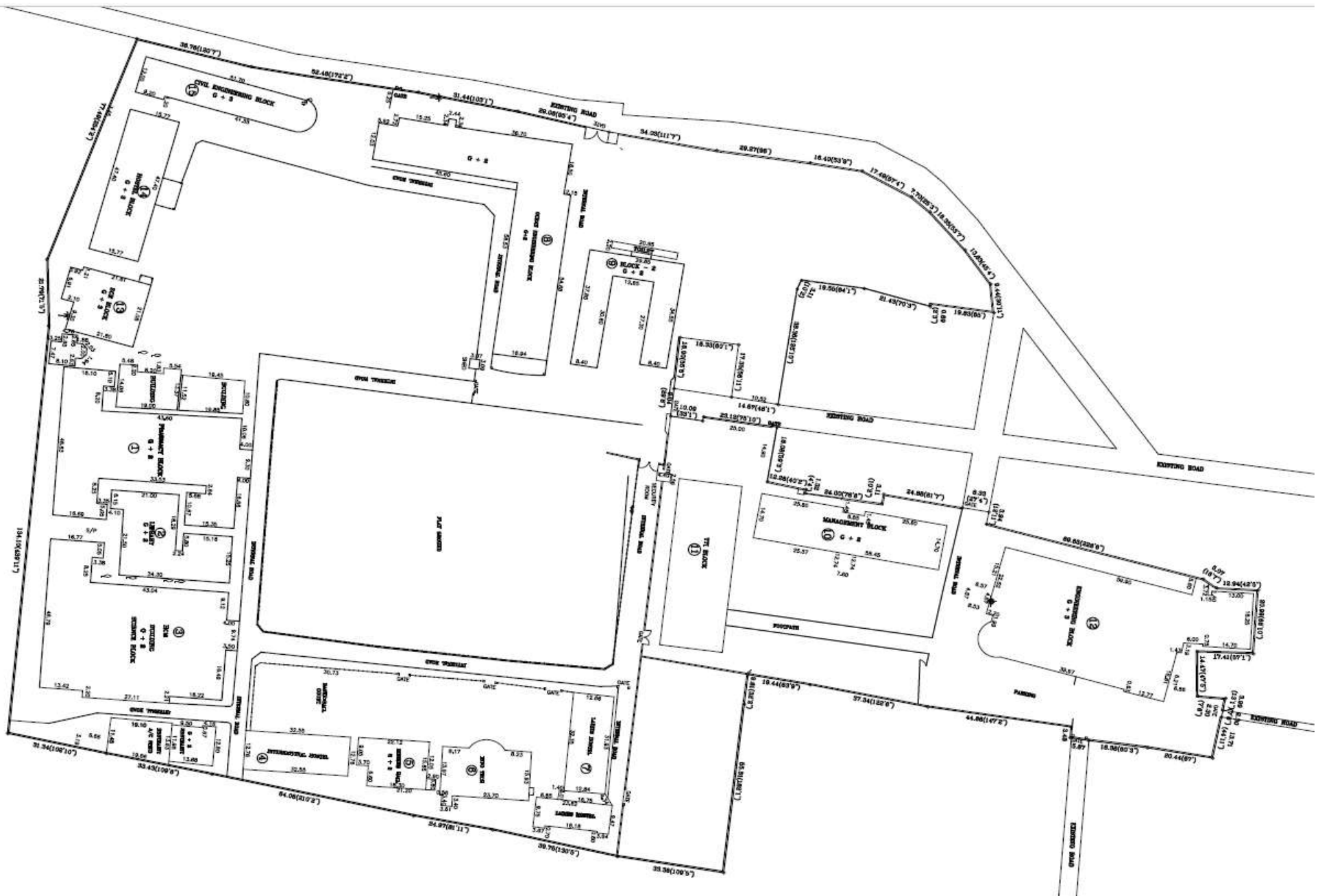
## Facilities Available

- 200 mtrs Track
- Fitness Centre (gymnasium)
- Indoor hall to play Table Tennis, Carrom and Chess
- All the Fire Safety Equipment are provided in the premises
- Having necessary Wheel Chairs and Ramps in all the buildings in campus.
- The institution is having adequate toilet facilities for physically challenged persons.
- Lift facilities are available
- All members of staff (Teaching, Non-teaching & Students) are covered through accident cum hospitalization insurance.
- Two separate Health Clinics are available - One for Boys and One for Girls.
- One Male Medical Officer and One lady Medical Officer are available.
- Tie-up with nearby hospitals namely Kamatchi Hospital, Parvathy Hospital
- Apollo Shine Clinic located within the campus.
- 24 Hrs Ambulance facility
- Nursing Assistants

## Pallavaram Campus

Total Area Size of the Campus - 14.58 acres - 59003.167 sqm.  
Build-up area - 64117 sqm (3 Buildings) =  $64117/3=21372$  sqm  
Greenery area - 17700 sqm.

# Section 5: Layout



## Section 6: Vision, Mission and Core Values

### Vision

- To make the Institute an epitome of excellence in higher education providing high quality education and rigorous training in multiple streams of choice with ample scope for all-round development for the betterment of the society.

### Mission

- Effectively **imparting knowledge** and inculcating **innovative thinking**.
- Facilitating **skill enhancement** through add on courses and **hands on training**.
- Doing original, socially relevant, **high quality research**.
- Facilitating appropriate **co-curricular, extracurricular and extension activities**.
- Instilling the **spirit of integrity, equity, professional ethics and social harmony**.

### Core Values

#### VISTAS believe that:

- VISTAS students and scholars should be well-founded on the pursuit of knowledge through, teaching and learning research, with fellowships required on the basis of intellectual merit, ability and the potential for excellence.
- Perspectives, arising from diverse knowledge background, that re-define our identities, deepen scholarly inquiry and enrich path breaking newer knowledge horizon.

- Cherish the key values of academic freedom, creative and innovative thought, ethical standards and integrity, accountability and social justice, nurturing open mind and open society.
- Foster inquiry-led and evidence-based approach to creative knowledge; facilitate a vibrant academic ambience to the nurture the intellectual climate.

## **Section 7: Management's Commitment**

The Management of the VISTAS has shown the commitment towards the green auditing during the audit meeting. They were ready to encourage all green activities. It was decided to promote all activities that are environment friendly such as awareness programs on the environment, campus farming, planting more trees on the campus etc., after the green auditing. The management of the University was willing to formulate policies based on green auditing report.



## **Section 8: Scope and Goals of Green Auditing**

A clean and healthy environment aids effective learning and provides a conducive learning environment. There are various efforts around the world to address environmental education issues. Green Audit is the most efficient and ecological way to manage environmental problems. It is a kind of professional care which is the responsibility of each individual who are the part of economic, financial, social, environmental factor. It is necessary to conduct green audit in University campus because students become aware of the green audit, its advantages to save the planet and they become good citizen of our country. Thus, Green audit becomes necessary at the University level.

## **Section 9: Benefits of the Green Auditing**

- More efficient resource management
- To provide basis for improved sustainability
- To create a green campus
- To enable waste management through reduction of waste generation, solid-waste and water recycling
- To create plastic free campus and evolve health consciousness among the stakeholders
- Recognize the cost saving methods through waste minimizing and managing
- Point out the prevailing and forthcoming complications
- Authenticate conformity with the implemented laws
- Empower the organizations to frame a better environmental performance
- Enhance the alertness for environmental guidelines and duties
- Impart environmental education through systematic environmental management approach and Improving environmental standards
- Benchmarking for environmental protection initiatives
- Financial savings through a reduction in resource use
- Development of ownership, personal and social responsibility for the University and its environment
- Enhancement of University profile
- Developing an environmental ethic and value systems in youngsters.
- Green auditing should become a valuable tool in the management and monitoring of environmental and sustainable development programs of the University.

## **Section 10: Target Areas of Green Auditing**

Green audit forms part of a resource management process. Although they are individual events, the real value of green audits is the fact that they are carried out, at defined intervals, and their results can illustrate improvement or change over time. Eco-campus concept mainly focuses on the efficient use of energy and water; minimize waste generation or pollution and also economic efficiency. All these indicators are assessed in process of “Green Auditing of educational institute”. Eco-campus focuses on the reduction of contribution to emissions, procure a cost effective and secure supply of energy, encourage and enhance energy use conservation, promotes personal action, reduce the institute’s energy and water consumption, reduce wastes to landfill, and integrate environmental considerations into all contracts and services considered to have significant environmental impacts. Target areas included in this green auditing are water, energy, waste, and Environment.

## Section 11: Methodology

The purpose of the audit was to ensure that the practices followed in the campus are in accordance with the Green Policy adopted by the institution. The criteria, methods and recommendations used in the audit were based on the identified risks. The methodology includes: preparation and filling up of questionnaire, physical inspection of the campus, observation and review of the document, interviewing responsible persons and data analysis, measurements and recommendations. The methodology adopted for this audit was a three-step process comprising of:

1. Data Collection – In preliminary data collection phase, exhaustive data collection was performed using different tools such as observation, survey communicating with responsible persons and measurements.

Following steps were taken for data collection:

- Site Visit
  - Data about the general information was collected by observation and interview.
  - The power consumption of appliances was recorded by taking an average value in some cases.
2. Data Analysis - Detailed analysis of data collected include: calculation of energy consumption, analysis of latest electricity bill of the campus, Water consumption, Waste Generation and Greenery Management.
  3. Recommendation – On the basis of results of data analysis and observations, some steps for reducing power and water consumption were recommended. Proper treatments for waste were also suggested. Use of fossil fuels has to be reduced for the sake of community health.

The above target areas particular to the University was evaluated through questionnaire circulated among the students for data collection.

The following data collected for the following areas during the assessment.

1. Environment & Waste Management
2. Energy Management
3. Water Management

## **Section 12: Auditing for Energy Management**

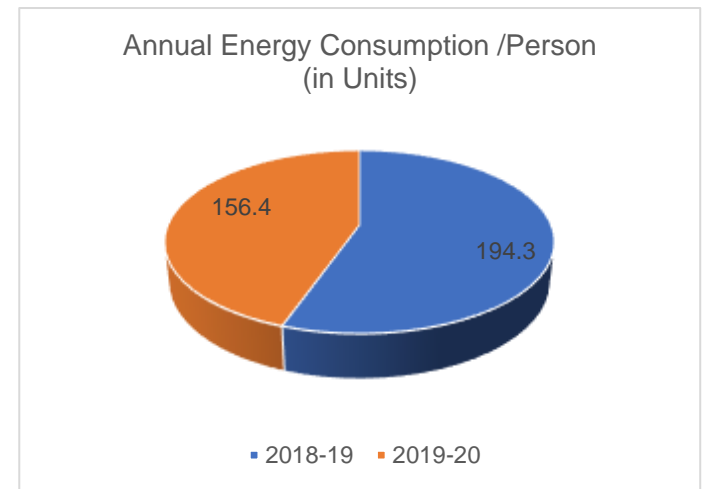
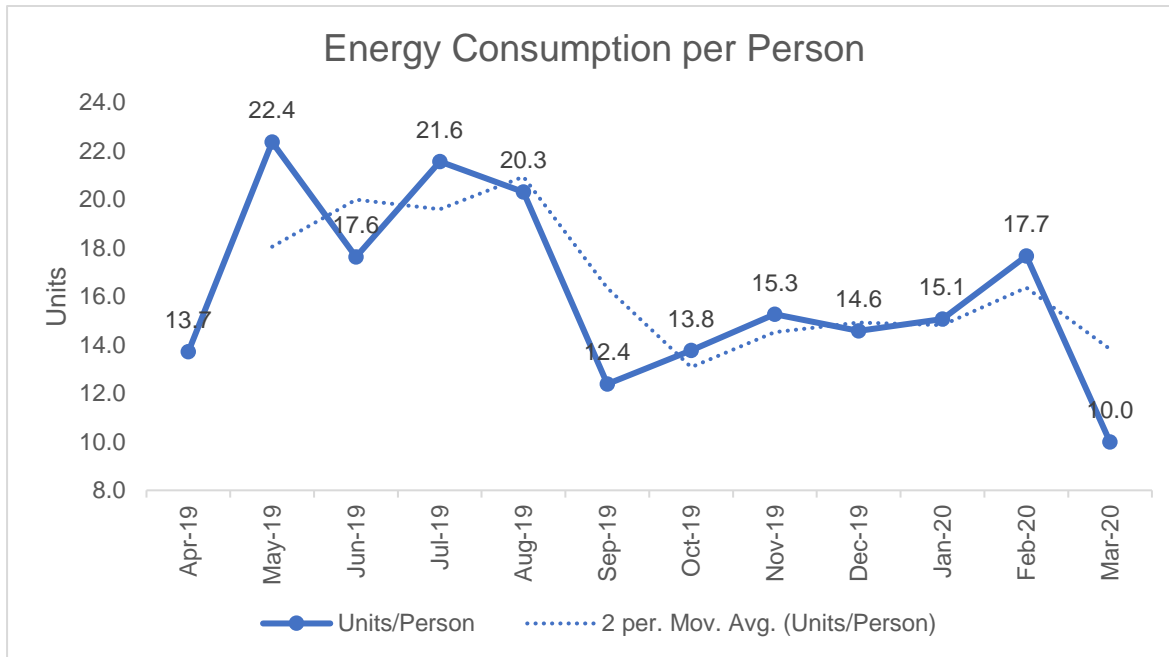
Energy cannot be seen, but we know it is there because we can see its effects in the forms of heat, light and power. This indicator addresses energy consumption, energy sources, energy monitoring, lighting, appliances, and vehicles. Energy use is clearly an important aspect of campus sustainability and thus requires no explanation for its inclusion in the assessment. An old incandescent bulb uses approximately 60W to 100W while an energy efficient light emitting diode (LED) uses only less than 10 W. Energy auditing deals with the conservation and methods to reduce its consumption related to environmental degradation. It is therefore essential that any environmentally responsible institution examine its energy use practices.

## Energy Consumption Data

S. No	Description	Apr 19	May 19	Jun 19	Jul 19	Aug 19	Sep 19	Oct 19	Nov 19	Dec 19	Jan 20	Feb 20	Mar 20
1	Electricity Consumption (Units) – Service 588	93564	89298	50058	91572	103908	10814	90174	91311	63249	68493	89055	58254
2	Electricity Consumption (Units) Service 797	66310	73985	44980	69050	71440	69450	77715	70540	54595	66350	80985	56815
3	Energy Generated from Windmill Service 588	14923	94826	74665	66857	28722	44137	11121	40273	74759	63240	58567	14591
4	Energy Generated from Windmill Service 797	8836	41090	66133	61060	67614	41338	5285	2115	2392	3517	7702	4043
Total Energy Consumption		183633	299199	235896	288539	271684	165739	184295	204239	194995	201600	236309	133703
Energy Consumption Per Person		13.7	22.4	17.6	21.6	20.3	12.4	13.8	15.3	14.6	15.1	17.7	10.0

$$\text{Overall Energy Consumption per Year / Person} = \frac{\text{Total Energy Consumption per year}}{\text{Total Number of Persons [Students + Staff]}}$$

$$\begin{aligned}
 &= \frac{2599771 \text{ Units / Per Year}}{13383} \\
 &= \mathbf{194.3 \text{ Units / Person Consumption per year (2019-20)}}
 \end{aligned}$$





**Electrical Equipment's in the University and its Energy Consumption (Average Operation 6 hrs / day)**

<b>VISTAS</b>						
<b>S. No</b>	<b>Equipments</b>	<b>Numbers</b>	<b>Watts/ Unit</b>	<b>Whr</b>	<b>kWh</b>	<b>kWh (Month)</b>
1	Tube Light	1210	40	240	0.24	7.2
2	2X2 LED	301	35	210	0.21	6.3
3	1X1 LED	150	25	150	0.15	4.5
4	48" Ceiling Fan	897	80	480	0.48	14.4
5	Chandelier light	4	800	4800	4.8	144
6	Projector	57	100	600	0.6	18
7	Printer	34	100	600	0.6	18
8	Xerox	4	1200	7200	7.2	216
9	Exhaust fan	37	100	600	0.6	18
10	Focus light	32	300	1800	1.8	54
11	Speaker	43	25	150	0.15	4.5
12	Air conditioner(2kw)	134	3000	18000	18	540
13	Spot light	39	30	180	0.18	5.4
14	Water cooler(1.5KW)	8	1500	9000	9	270
15	TV	8	230	1380	1.38	41.4
16	Fridge	2	1800	10800	10.8	324
17	Induction stove	1	800	4800	4.8	144
18	coffee maker	1	200	1200	1.2	36
19	Water heater	2	1200	7200	7.2	216
20	cash counting machine	3	400	2400	2.4	72
21	VIBA submersible motor(2.23KW)	1	2238	13428	13.428	402.84
22	Foundation motor(5.6KW)	1	5600	33600	33.6	1008
23	Filter motor(1.5KW)	2	1500	9000	9	270
24	RO plant(0.75KW)	1	750	4500	4.5	135
25	Battery Tester	2	750	4500	4.5	135
26	PL Lamp	76	35	210	0.21	6.3
27	Sump Motor	2	1700	10200	10.2	306
28	Wall Mounting Fan	25	80	480	0.48	14.4
29	High Beam Light	6	150	900	0.9	27
30	Open Well Motors	3	3347	20082	20.082	602.46
31	0.75KW Motors	130	746	4476	4.476	134.28
32	Heater	8	1000	6000	6	180
33	Pedestal Fan	5	100	600	0.6	18
34	Automatic Machine	1	500	3000	3	90
35	Weight Balance	2	500	3000	3	90
36	Gallantry	1	1250	7500	7.5	225
37	Fume Hood	1	2000	12000	12	360

S. No	Equipments	Numbers	Watts/ Unit	Whr	kWh	kWh (Month)
38	Muffle Furnace	1	1500	9000	9	270
39	Hot Air Oven(3KW)	2	3000	18000	18	540
40	Glove box	1	1200	7200	7.2	216
41	Motor	1	1480	8880	8.88	266.4
42	Street Light	23	95	570	0.57	17.1
43	UPS	127 kVa				101.6
Total Units						7569.08

## Electrical Equipment's in the University and its Energy Consumption

Vaels Educational Trust (Service - 2)						
S. No	Equipments	Numbers	Watts/ Unit	Whr	kWh	kWh (Month)
1	Tube Light	3634	40	240	0.24	7.2
2	48" Ceiling Fan	1950	75	450	0.45	13.5
3	12" Exhaust Fan	89	70	420	0.42	12.6
4	Copier	3	800	4800	4.8	144
5	Printer	15	100	600	0.6	18
6	Air conditioner(1.55KW)	44	1550	9300	9.3	279
7	Air conditioner(2KW)	198	2400	14400	14.4	432
8	Projector	67	200	1200	1.2	36
9	Water cooler(1.5KW)	37	1500	9000	9	270
10	Incubator	3	200	1200	1.2	36
11	Fume cup board	3	200	1200	1.2	36
12	Double cone blender	2	746	4476	4.476	134.28
13	Dry granulator	1	1200	7200	7.2	216
14	Hot air oven(1.5KW)	4	1500	9000	9	270
15	Air Compressor(1.2KW)	2	1200	7200	7.2	216
16	Angle Polishing pen	1	800	4800	4.8	144
17	Stability chamber	4	1000	6000	6	180
18	Cooling Centrifuge	7	100	600	0.6	18
19	Tableting machine (Single punch)	1	2250	13500	13.5	405
20	Rotary Tablet punching machine	1	2250	13500	13.5	405
21	Orbital incubator shaker	2	160	960	0.96	28.8
22	Tray dryer	2	900	5400	5.4	162
23	Filter press(7.85KW)	1	7850	47100	47.1	1413
24	TV	4	130	780	0.78	23.4
25	Speaker	40	20	120	0.12	3.6
26	Air flow chamber	1	250	1500	1.5	45
27	Auto try box	1	50	300	0.3	9
28	Cassette AC(2.25KW)	3	2250	13500	13.5	405
29	photo calorimeter digital	1	400	2400	2.4	72
30	PH meter digital	2	150	900	0.9	27
31	magnetic stirrer	1	250	1500	1.5	45
32	Lab digital balance	15	100	600	0.6	18
33	motorized analytical balancer	1	70	420	0.42	12.6
34	GC purification panel	3	450	2700	2.7	81
35	UV VIS Spectro photometer	4	250	1500	1.5	45

S. No	Equipments	Numbers	Watts/ Unit	Whr	kWh	kWh (Month)
36	Electronic weighing scale	5	800	4800	4.8	144
37	vacuum pump(1.8KW)	2	1800	10800	10.8	324
38	Overhead projector	4	100	600	0.6	18
39	LC-2010 CHT IND	2	150	900	0.9	27
40	Gas purification panel	1	750	4500	4.5	135
41	Digital calorimeter	1	100	600	0.6	18
42	centrifuge	6	100	600	0.6	18
43	Digital photo calorimeter	1	100	600	0.6	18
44	Micro plate reader	1	100	600	0.6	18
45	melting point apparatus	4	850	5100	5.1	153
46	orbital shaker	1	750	4500	4.5	135
47	water bath shaker	1	750	4500	4.5	135
48	micro centrifuge	1	100	600	0.6	18
49	FTIR system	1	250	1500	1.5	45
50	Alpha T spectrometer	1	500	3000	3	90
51	Auto clave	1	200	1200	1.2	36
52	Freeze dryer(1.8KW)	1	1800	10800	10.8	324
53	Ampoule washing machine	1	1200	7200	7.2	216
54	filling and sealing machine	1	1200	7200	7.2	216
55	bottle sealing machine	1	550	3300	3.3	99
56	Liquid filling machine	1	275	1650	1.65	49.5
57	electronic weighing balancer	1	250	1500	1.5	45
58	limit test apparatus	1	1250	7500	7.5	225
59	suction pump(1.5KW)	1	1500	9000	9	270
60	plate auto enclave	1	750	4500	4.5	135
61	Elisa reader	1	200	1200	1.2	36
62	GPS imaging system	1	1250	7500	7.5	225
63	Refrigerator	13	800	4800	4.8	144
64	Xerox	2	1000	6000	6	180
65	Autoclave	1	1000	6000	6	180
66	camera lucifer	3	7500	45000	45	1350
67	calorie counter	1	500	3000	3	90
68	Dissection microscope	5	250	1500	1.5	45
69	electronic double well water bath	2	750	4500	4.5	135
70	Hair dryer	2	1000	6000	6	180
71	Heating mantle(2KW)	18	2000	12000	12	360
72	Hot plate	2	1000	6000	6	180
73	Mixer	1	350	2100	2.1	63
74	Muffle furnace	1	1000	6000	6	180

S. No	Equipments	Numbers	Watts/ Unit	Whr	kWh	kWh (Month)
75	PH meter digital	2	200	1200	1.2	36
76	Refractometer	2	300	1800	1.8	54
77	Extractor mantle	2	1250	7500	7.5	225
78	LCD projector model	1	750	4500	4.5	135
79	UV chamber	1	1000	6000	6	180
80	Orbital shaker incubator(1KW)	2	1000	6000	6	180
81	Digital electronic balancer	2	500	3000	3	90
82	Water Heater(2.7KW)	5	2700	16200	16.2	486
83	Water cooler(1.2KW)	3	1200	7200	7.2	216
84	Submersible motor(2.2KW)	6	2238	13428	13.428	402.84
85	sump motor(2.2KW)	7	2238	13428	13.428	402.84
86	2X2 LED Light	110	35	210	0.21	6.3
87	Amplifier	3	20	120	0.12	3.6
88	lift(5.6KW)	2	5600	33600	33.6	1008
89	Grinder	4	200	1200	1.2	36
90	deep freezer	3	800	4800	4.8	144
91	Water Motor(3KW)	4	3000	18000	18	540
92	Hot air oven(2KW)	2	2000	12000	12	360
93	Insect killer machine	1	40	240	0.24	7.2
94	Mixie (0.75KW)	2	750	4500	4.5	135
95	self priming motor(0.75KW)	1	750	4500	4.5	135
96	open well motor(2.23KW)	4	2238	13428	13.428	402.84
97	Deck bakery oven(2.5KW)	6	2500	15000	15	450
98	Spot Light	52	35	210	0.21	6.3
99	Heavy duty Grinder	3	1200	7200	7.2	216
100	Refrigerator	3	800	4800	4.8	144
101	Micro oven	8	1800	10800	10.8	324
102	Sewage motor(2.42KW)	6	2424	14544	14.544	436.32
103	Analog calorimeter	5	500	3000	3	90
104	Auto analyser	1	500	3000	3	90
105	Auto clave	4	500	3000	3	90
106	microscope	4	50	300	0.3	9
107	Digital calorimeter	16	750	4500	4.5	135
108	balance weighing machine	6	100	600	0.6	18
109	Homogeniser	3	250	1500	1.5	45
110	Heating mantle	7	500	3000	3	90
111	Hemo cyclometer	5	100	600	0.6	18

S. No	Equipments	Numbers	Watts/ Unit	W hr	kWh	kWh (Month)
112	Laminar air flow machine(1KW)	4	1000	6000	6	180
113	magnetic stirrer	4	150	900	0.9	27
114	PH meter	12	350	2100	2.1	63
115	Rotary shaker	4	750	4500	4.5	135
116	UV Spectro photometer	1	750	4500	4.5	135
117	Vacuum pump(2KW)	6	2000	12000	12	360
118	vortex mixer	6	450	2700	2.7	81
119	water bath	3	200	1200	1.2	36
120	cooling incubator(1.5KW)	2	1500	9000	9	270
121	shaker incubator(1.5KW)	1	1500	9000	9	270
122	Micro wave oven	4	800	4800	4.8	144
123	rotor vapour	2	250	1500	1.5	45
124	RO plant	1	750	4500	4.5	135
125	Elisa reader	1	150	900	0.9	27
126	PCR	1	200	1200	1.2	36
127	UV Transilluminator	1	550	3300	3.3	99
128	UV-VIS_ Transilluminator	1	200	1200	1.2	36
129	Bunsen burner	4	150	900	0.9	27
130	cyclic voltameter	1	150	900	0.9	27
131	single pan analytical balance	1	120	720	0.72	21.6
132	electronic analytical balancer	5	40	240	0.24	7.2
133	Fume exhaust hood	2	200	1200	1.2	36
134	Hot plate	1	400	2400	2.4	72
135	overhead projector	1	80	480	0.48	14.4
136	polarimeter	3	200	1200	1.2	36
137	Refractometer	2	400	2400	2.4	72
138	Thermostat digital control stirrer	1	400	2400	2.4	72
139	western cadmium coil	1	250	1500	1.5	45
140	1X1 LED	110	18	108	0.108	3.24
141	coundangel meter	1	950	5700	5.7	171
142	electro chemical workspace	1	500	3000	3	90
143	RTPCR	1	900	5400	5.4	162
144	DSE`	1	750	4500	4.5	135
145	TGA	1	1000	6000	6	180
146	semi micro balance	1	150	900	0.9	27
147	HPTLC	1	1500	9000	9	270

S. No	Equipments	Numbers	Watts/ Unit	Whr	kWh	kWh (Month)
148	FTART	1	1200	7200	7.2	216
149	UV-visual spectro meter	1	1500	9000	9	270
150	PH meter	3	250	1500	1.5	45
151	sonic reactor	1	1500	9000	9	270
152	hot air oven	1	1750	10500	10.5	315
153	double distillation water unit	1	950	5700	5.7	171
154	XRD	1	1150	6900	6.9	207
155	Deep freezer 1	1	1500	9000	9	270
156	FESEM	1	1750	10500	10.5	315
157	confocal roman spectrum	1	1200	7200	7.2	216
158	BET surface area analysis	1	1500	9000	9	270
159	DFS	1	1000	6000	6	180
160	AFM	1	1200	7200	7.2	216
161	dossing pump(1.15KW)	1	1150	6900	6.9	207
162	Bio safety calorimeter	1	750	4500	4.5	135
163	Street Light	41	95	570	0.57	17.1
164	UPS					281.6
<b>TOTAL UNITS</b>						26418.86

## **Section 13: Recommendations – Energy**

### **General Recommendation**

#### **Energy**

- Conduct more save energy awareness programs for students and staff.
- More energy efficient fans should be replaced.
- Automatic power switch off systems may be introduced wherever possible and practicable.

### **Specific Recommendations:**

#### **Energy**

- Less usage of Diesel Generator. Monitor the Units generated Per liter of Diesel. An optimum level approximately 3 units (kWh) per liter of diesel is recommended.
- Proper preventive maintenance of Electrical system and Diesel Generator Sets
- Energy Consumption looks very high. Energy consumption 195 Units / Person / Year. Steps to initiate on Energy consumption



## **Section 14: Participation of Teams**

In VISTAS the green auditing was done with the help of Pragnaa Shree Venture India Pvt. Ltd involving different student groups, teaching and non-teaching staff. The green audit began with the teams walking through all the different facilities at the college, determining the different types of appliances and utilities (lights, taps, toilets, fridges, etc.) as well as measuring the usage per item (Watts indicated on the appliance or measuring water from a tap) and identifying the relevant consumption patterns (such as how often an appliance is used) and their impacts. The staff and learners were interviewed to get details of usage, frequency or general characteristics of certain appliances. Data collection was done in the sectors such as Energy, Waste, Greening, Carbon footprint and Water use. College records and documents were verified several times to clarify the data received through survey and discussions.

**Energy Committee**

<b>S. No</b>	<b>Name</b>	<b>Function</b>	<b>Designation</b>
1	Dr. Shanmuga Sundaram.N	Chairman	Associate Professor Dept. of EEE School of Engineering.
2	Dr. Muthuraman.V	Member	Professor Dept. of Mechanical School of Engineering.
3	Dr. Karunakaran.K	Member	Assistant Professor Dept. of Mechanical School of Engineering.
4	Dr. Vijayaraj.S	Member	Assistant Professor Dept. of EEE School of Engineering.
5	Mr. Rajasekar.M	Member	Maintenance Head Dept. of Maintenance
6	Mr. Karthik. K	Student	Electrical and Electronics Engineering, 2 <sup>nd</sup> Year
7	Mr. Govind Vishnu Ganesh	Student	Electrical and Electronics Engineering, 2 <sup>nd</sup> Year
8	Ms. S. Saghithya	Student	Electrical and Electronics Engineering, 2 <sup>nd</sup> Year

## Section 15: Best Practices / Initiatives done by the University;

### Solar System



### Wind Solar Hybrid System



## Solid Waste Management – Bio Gas Plant



The Bio Gas Collected from the plant is used for Cooking



- Biogas plant erected
- Solar lighting systems in VISTAS's campus.
- Wind Energy is used through our 3 Wind mills under the agreements with TANGEDCO.
- Energy Audit, Safety Audit, Green Audit are being conducted regularly.
- Green generators are installed to overcome the energy crises.
- Gen set usage is restricted and is used only sparingly.
- Inverter is used when there is power shutdown for short duration instead of operating generators.
- The LED lamps are progressively used in the place of other lamps.
- The University has installed three wind mills with a Capacity of 250 KW H.T. (Each) and Annual Wind Power Generation in average is around 85,028 units. Three Wind Mills are supplying power to the Tamil Nadu Power Grid and withdraws the power from the grid to the university's requirements.
- Solar lights are used in the main roads of the university.
- The Biogas plant is in operation and the Biogas produced from food waste, decomposable organic materials and kitchen wastes is used in Hostel.

## **Section 16: Conclusion**

The green audit assists in the process of monitoring and verifying the performance in the environmental arena and is fast becoming an indispensable aid to decision making in VISTAS.

The green audit reports assist in the process of attaining an eco-friendly approach to the sustainable development of the University. Hope that the results presented in the green auditing report will serve as an opportunity to improving the environment related practices and resource usage at the university as well as new activities and innovative practices. A few recommendations are added to the waste management using eco-friendly and scientific techniques. This may lead to the prosperous future in context of Green Campus and thus sustainable environment and community development.

It has been shown frequently that the practical suggestions, alternatives, and observations that have resulted from audits have added positive value to the audited Organisation. An outside view, perspective and opinion often helps staff who have been too close to problems or methods to see the value of alternative approaches. A green audit report is a very powerful and valuable communications tool to use when working with various stakeholders who need to be convinced that things are running smoothly and systems and procedures are coping with natural changes and modifications that occur.

## **Section 17: Disclaimer**

Pragnaa Shree Venture India Pvt. Ltd has prepared this report for Vels University based on input data submitted by the representatives of the University.

It is further informed that the conclusions are arrived following best estimates and no representation, warranty or undertaking, express or implied is made and no responsibility is accepted by Audit Team in this report or for any direct or consequential loss arising from any use of the information, statements or forecasts in the report.

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