

VISHWAKARMA UNIVERSITY

SDG 7 REPORT 2021





EDITORIAL BOARD OF THE SUSTAINABILITY REPORT:

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Maximising Human Potential

About This Report

The United Nations “Transforming our World: the 2030 Agenda for Sustainable Development” which includes the 17 Sustainable Development Goals (SDGs) has great importance and significance to universities. The SDGs provide for a shared global vision towards sustainable development for all. Vishwakarma University (VU) firmly believes in the vital role that universities can play in the achievement of the SDGs, and has ingrained this aspect in all of its strategies and operations. As encapsulated in its motto - maximizing human potential, VU, since the year of its inception, has worked endlessly towards creating an enabling environment to ensure the wholesome development of its students - preparing them for life and livelihood.

VU has embarked on an exciting journey to transform the VU Campus to become an EcoCampus, which will be a testbed for innovative sustainability solutions for the future. The vision of the VU EcoCampus is to develop VU as “a global Sustainability thought leader, committed to improving the society, by providing an empowering partnership for the development of technology and educating the future generation”. Sustainability with an aim to reduce the carbon footprint was the key theme of the function organised to celebrate the launch of the ‘Eco Campus’.

This report showcases VU's commitment to sustainable development goals in which VU has been actively working in partnership with diverse stakeholders. One such example is VU's Certificate Programme in Sustainability Management in Cooperation with the Hof University of Applied Sciences Germany, a program in which students gain a deep understanding of state-of-the-art business management techniques and more importantly latest sustainable methods. Likewise, the Wilo Foundation-Vishwakarma University established through a grant from the Wilo Foundation, Germany promotes research in water treatment, purification and create the much-needed social awareness about clean drinking water through its Water Quality Centre of Excellence.

From last 2 years, VU is published SDG reports under its Sustainability mission which outlined the key initiatives undertaken by the Institute to meet the Sustainable Development Goals (SDGs). This report provides a summary of the range of activities undertaken at VU during 2021 to meet the SDGs through its teaching, research, outreach and public engagement, and operations. VU conducts a diverse range of activities across the Institute, and this report lists only some of many such initiatives. Even when all of us were severely affected by the COVID-19 pandemic, VU continually strives to implement sustainability in all its core operations, including by creating a platform to showcase its efforts toward the SDGs in a comprehensive and detailed manner.

VU continually strives to contribute to the sustainable development of the nation and society at large by developing educated and productive human resources that observe and adhere to the practices of equity, inclusiveness, excellence, ethics, and professional standards.

Prof. (Dr) Siddharth Jabade
Vice-Chancellor
Vishwakarma University, Pune, India

VU's Participation in the THE Impact Rankings 2022

Vishwakarma University (VU) also participated last year in Times Higher Education (THE) Impact Rankings 2022, which looks at global universities' commitment and performance in furthering the Sustainable Development Goals (SDGs).

VU took part in the 4 SDGs listed below plus the mandatory SDG17, and the results were as follows:

Overall Ranking 1001+





7 AFFORDABLE AND
CLEAN ENERGY



Ensure access to affordable, reliable, sustainable, and modern energy for all

Vishwakarma University (VU) is committed to promoting clean and affordable energy among the community through various innovations and modules. The focus lies on encouraging and motivating students to land up to creative and sustainable solutions that could suffice the growing demands of energy and at the same time without harming the environment. The motto is to become energy efficient through potential and unique Eco – Campus initiatives.

Prioritizing the same objective of creating a sustainable environment for the users of the University campus, this unique ECOCAMPUS has been founded and the Centre of Excellence for Energy and Sustainability has been established. MoU between VU and Integrated Environmental Solution (IES) on 19th March 2019. This is an Authorized Training Partnership agreement signed between both the beneficiaries for the future of energy conservation.

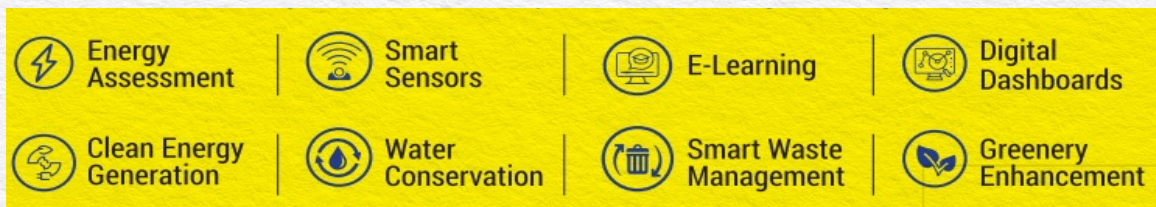
Faculty and students team focussed on carrying out simulation for the energy flow of all the buildings. Primary data collection of one building is completed. Teams aims in converting one complete room into the living laboratory to test the different energy measuring methods or technologies like use of Internet of Things, Artificial Intelligence, etc for determining energy parameters like energy flow, humidity, temperature and validating them with the help of IES, the physical modelling software.

Vision

To develop VU as a “global sustainability thought leader committed to improving the society by providing an empowering partnership for the development of technology and educating the future generation”

Mission

To holistically address the sustainability at VU by using the following:



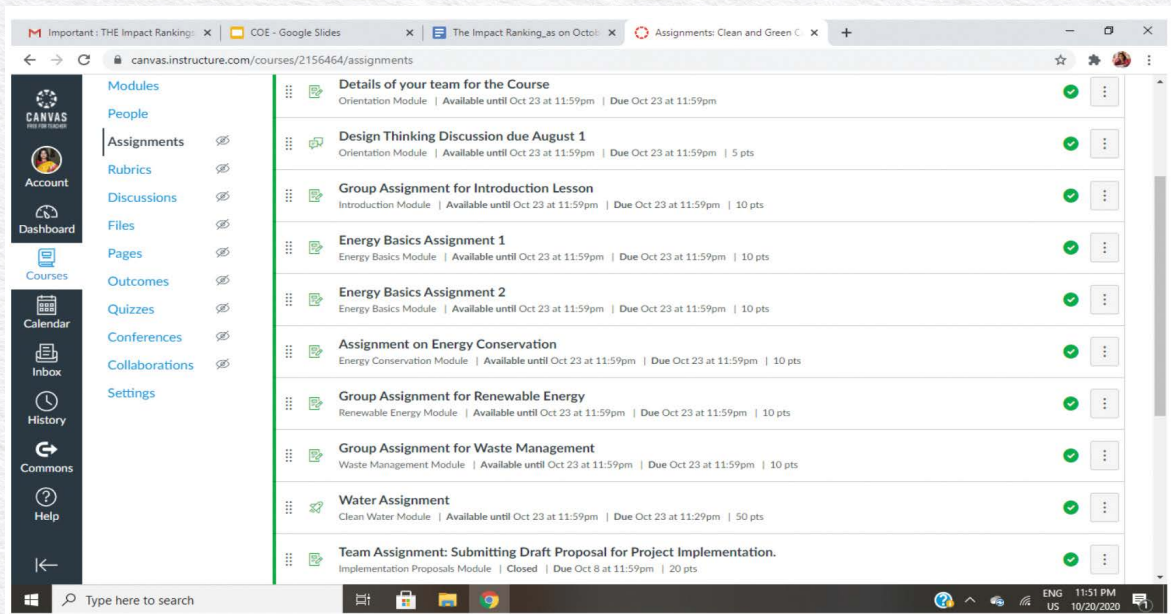
Objectives

- To make the VU campus a “Living Laboratory” or “Testbed” for research and development of new technologies.
- To focus on the demonstration of projects which showcase state-of-the-art technologies and solutions addressing real-life problems.
- To assess the performance of various types of buildings by doing energy modelling and suggesting energy conservation measures.

Energy Audit to identify areas where there is maximum energy wastage

An energy audit not only entails taking measures to improve upon energy flow from inside to outside of the building and vice versa but also considers the well-being of the people. The working plan of the building, daily functioning of all the building units like different rooms, canteens, number of vehicles used and vehicle routing are observed to be a major source of wastage and energy loss. Since behaviour of users while using any room, solid wastage observed at canteens and ratio of vehicles used per person by total number of users at campus are different parameters to identify the areas where significant loss of energy occurs. .

1. Electrical Energy use
2. Solid waste - Students undertook internships at Indo Universal Collaboration for Engineering Education (IUCEE) and have identified how to reduce and reuse the organics waste by working on Composting. They also observed that around 250 kg wastage is generated from the campus which can be treated and converted into compost. Four students along with two faculty members are part of the IUCEE Clean and Green Campus which was launched on July 16th, 2020.
3. Number of vehicles used and vehicle routing



Collaborations

- MoU between VU and Integrated Environmental Solution (IES) on 19th March 2019. This is an Authorised Training Partnership agreement signed between both the beneficiaries for the future of energy conservation.
- MoU between VU and Qi Square Pte. Ltd. (Singapore) on 1st March 2021. Qi Square is a company providing energy advisory services and products related to following:
 1. Virtual energy audits of existing facilities
 2. Retrocommissioning and retrofitting to improve energy performance of facilities
 3. Integrated design services for new/planned facilities
 4. Green building certifications and rating systems

Vishwakarma University and Qi Square Pte. Ltd. (Singapore) collaboration to conduct activities and projects in following field:

1. Energy efficiency improvement and energy conservation projects
2. Green building development, rating and certification projects
3. Renewable energy projects
4. Environmental sustainable design of new facilities and retrofits
5. Sustainability and carbon footprint assessment/reporting projects



Training & Courses Offered

- Training on Energy Modeling: To strengthen sustainable environment activities, Qi Square conducted a training for students to learn energy modelling tools with hands-on experience virtually. This opportunity was under engagement of Centre of Excellence for Energy and Sustainability with IES and Qi Square. An elaborative four-day training program were conducted as per SGT (Singapore) time from 9th to 12th March, 2021.
- Training on different modules of IESVE, which can be used to create a 3D model of a building and simulate it for different weather conditions to identify the present or future energy consumption patterns.
- Training on data collection related to energy consumption data of various types of buildings, analysing this data, and using it for finding base load and energy conservation measures.
- An Energy Audit Elective is offered to students enrolled in the Mechanical Engineering and Architecture programs.

Activity

QI SQUARE, Singapore conducted an International Competition to calibrate Green Building Data on the platform of Btrlyf during 20-25 August 2021. This opportunity was under engagement of Vishwakarma University Centre of Excellence for Energy and Sustainability with Qi Square.

Congratulations

On winning the
**International Student Competition
for BtrLyf Model Calibration**
Conducted by Qi Square, Singapore using BtrLyf

Special thanks to the faculty team
(Prof. Dr. Kailas Patil and Mrs. Maya Kurulekar)

Winners

Gaurav Firodiya
(Architecture)
Won vouchers worth \$200

Suyash Sabnis
(Mechanical Engineering)
Won vouchers worth \$200

Aqueel Kadri
(Computer Engineering)
Won vouchers worth \$100

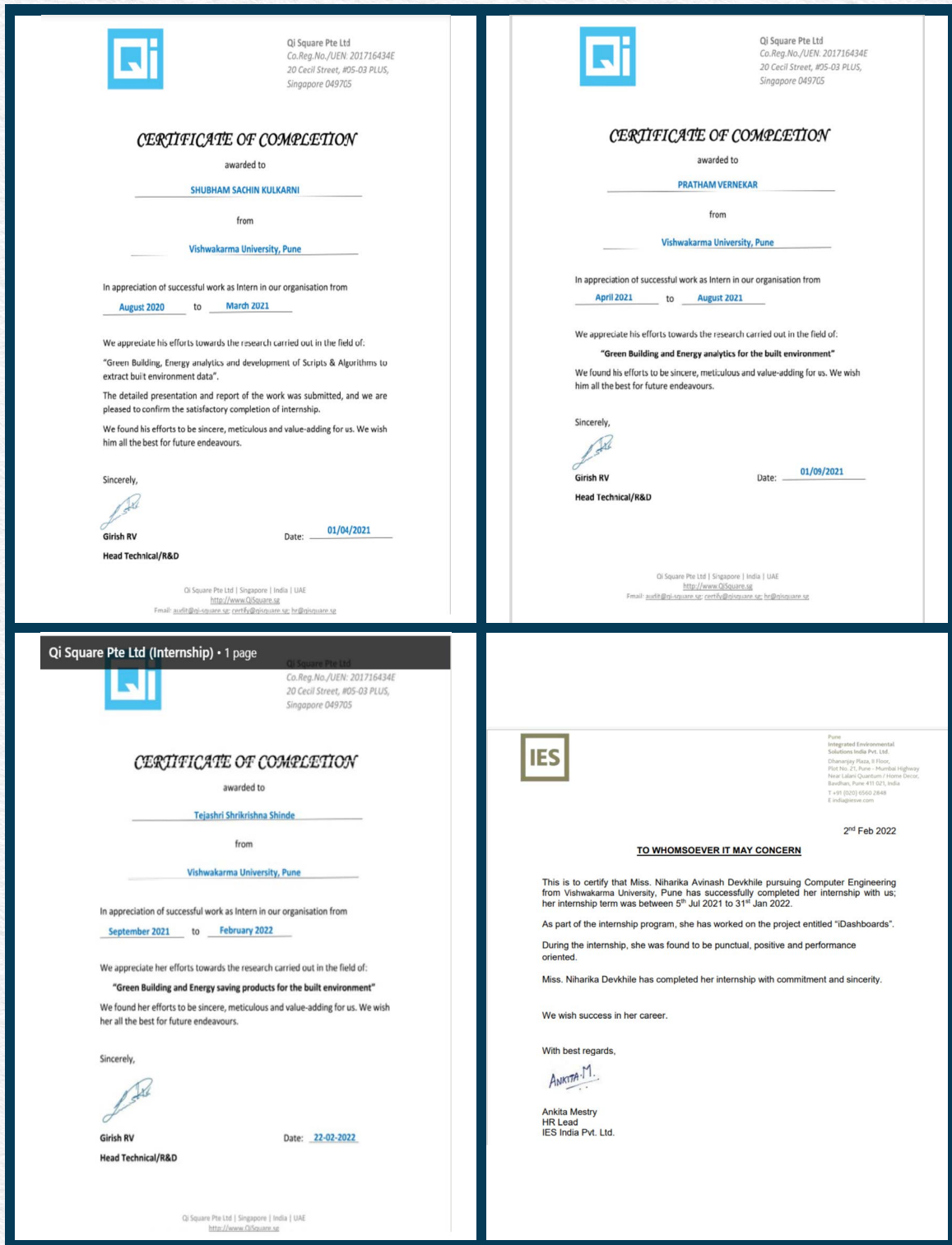
Special Mention
Award for building data tool creation

<https://www.vupune.ac.in/happenings/our-students-gaurav-firodiya-suyash-sabnis-and-aqueel-kadri-won-prizes-in-an-international-competition-conducted-by-qi-square-singapore-to-calibrate-green-building-data-on-the-platform-of-btrlyf-during-20-25-august-2021>

Internships

SR. NO.	YEAR	NUMBER OF STUDENTS	HOST ORGANIZATION	STATUS OF INTERNSHIP	NAME OF INTERNSHIP
01	August 2020 - March 2021	07	Qi Square	Completed	Green Building, Energy Analytics, And Development of Scripts and Algorithms to Extract Built Environment Data
02	Sep 2020 - June 2021	03	IES	Completed	Visualization and Unity Development
03	April 2021 - August 2021	06	Qi Square	Completed	Green Building and Energy Analytics for Built Environment
04	Jan 2021 - June 2021	04	Energy & Sustainability CoE at VU	Completed	<ol style="list-style-type: none"> 1. Creating a mobile application for calculating electricity consumption and/or Carbon footprint of a household using flutter. 2. Providing Analysis reports and Dashboards to monitor energy consumption and providing recommendations based on previously simulated IES-VE projects. 3. Creating an Energy Database of various residential and industrial hubs, location-wise. 4. Creating an informative website to display various research and virtual energy audit applications. 5. Allowing users to study and interact with previous case studies and Members of the Eco-campus at VU. 6. Allowing team members to post and add articles and various blogs related to programs and industrial connect with Eco-Campus 7. Implementation of various energy monitoring systems and pre-defined methodologies to calculate effective energy cost. 8. Development of a mobile application to control various appliances in the building of a campus. Also storing and monitoring the energy consumption through the same application.
05	July 2021 – January 2022	01	IES	Completed	iDashboards
06	Sept 2021- February 2022	5	Qi Square	Completed	Green Building and Energy Saving Products for Built Environment

https://www.linkedin.com/posts/tejashri-shinde-81006a20a_qi-square-pte-ltd-internship-ugcPost-6915025297876643840-4nD9?utm_source=share&utm_medium=member_desktop



Research with Qi Square

Since March 2020 we all are witnessing the effect of covid-19, the pandemic. The total world has faced challenges in health, economy and environmental concerns. All the activities and effects are function of energy flowing through the nature. This flowing energy has its two major components on which global climatic changes can be observed, identified, measured and addressed. The factors of this energy are temperature profile & humidity profile. They have shown the effect on climate which is critical to forecast COVID-19 cases considering environmental circumstances. Around 75% of the COVID-19 cases have recorded severe-extreme historical temperature distribution range showing relation with extreme climate change. This necessitates the solution to abate the GHG emissions reducing probability of such

pandemics in the future. So, the research mentor from Qi Square, Singapore and Student & Faculty from Vishwakarma University, have come with approach to prepare the predictive algorithm to estimate high risk dates. Physics behind the algorithm is temperature and humidity changes as per covid-19 cases. This work is focusing on to understand the impact of climate change on the pandemic, specifically focusing on Urban Heat Island effect's impact on the Covid cases. Different area for temperature and humidity changes were studied and used for predicting the algorithm to help in alarming on probable cases of such pandemic and necessary measures can be taken.

Energy consumed by manufacturing industries constitutes a large part of the total energy consumption of the world. In India, almost 50% of the total energy consumption is done by Industries. Energy bills are usually a major contributor to the operating expenses of a company. Industries can profit from the opportunities coming out of energy saving by the implementation of effective energy management using appropriate tools. An industrial plant layout is usually designed within several constraints, mainly operational. The objectives were decided by the company to study and identify energy gaps in the industrial plant and suggest suitable solutions to reduce energy consumption all while reducing the average working temperature inside the plant from 380C to an ideal value below 300C, preferably without installing an air conditioning system. The study was divided into two parts; Primarily, Data collection and observations of the plant operations and then Building Energy Modelling and simulation. The base model with existing conditions was modelled, simulated and validated with historical energy consumption data and temperature readings taken inside the plant.

The proposed solutions include limited modifications in the existing set up considering the operational constraints. The simulations run with proposed modifications indicate a maximum of 11 % savings in energy consumed by lighting and potential to reduce temperature to 33.230C from 380C. The effect of ambient factors according to the geographical location such as sun exposure, wind directions, humidity were also taken into consideration.

Output of Project completed in 2021:

<https://www.sciencedirect.com/science/article/pii/S2214785322065488?dgcid=author>

SR. NO.	PROJECT TITLE	INDUSTRY/ INSTITUTE NAME	NATURE OF COLLABORATION	NO. OF STUDENTS/ FACULTIES INVOLVED
01	Virtual Energy audit of Academic, Industrial and Commercial building - Project work converted to a paper and presented at an International conference at Phuket 2018, published in IEEE XPLORE	Energy & Sustainability CoE at VU	Student Project/ research project	5/4 3 - Computer 2 - Mechanical
02	Virtual Energy audit of Residential Bungalow - Project work converted to a paper and presented at an International conference at Thailand 2020, published in IEEE XPLORE			3/1 3 - Computer
03	Energy conservation of industrial building, Faurecia Automotive Seating Pvt. Ltd . (in process)			5/2 4 – Computer 1 - Mechanical
04	Energy consumption analysis using Digital Twin Technology. (in process)			7/2 3 – Mechanical 4 - Computer



Guest Sessions



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