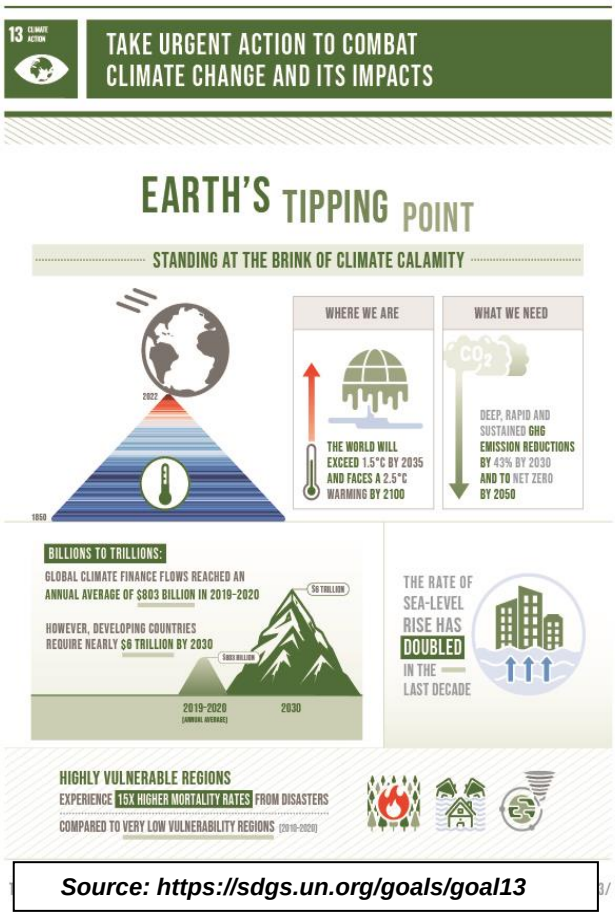
SDG 13
Climate Action

Preamble

As an institution of higher education and programmes in sciences, engineering, agriculture, management and media, KITS is committed to teach and carry out research, extension and consultancy works in the areas of Sustainable Development Goals.



Source: https://sdgs.un.org/goals/goal13

The 720 acre campus of Karunya with more than 320 acre farm land serves as experimental and demonstration laboratories, and field stations to find eco-friendly solutions to the problems in the areas of global importance and thrust areas of the institution such as Water, Food, Healthcare and Sustainable energy. The Institution's strategies and activities in the above mentioned four thrust areas compels us to work towards mitigation of climate change and adaptation measures.

Most of the Technology missions of KITS also focus on research and demonstration projects relating to the climate change mitigation, in the areas of environmental pollution, natural resources management, ecosystem preservation and biodiversity conservation.

The prevailing challenges in climate action have been recognized by the faculty and students of KITS residing in the Karunya campus for more than a decade

Green Initiatives towards Climate Action:

KITS campus located in the foothills of Western Ghats is known for its floral and faunal biodiversity. Taking up the challenge of conserving the natural resources, ecosystems and biodiversity, KITS is in the process of developing innovative scientific and technological interventions to build a carbon neutral campus. Some of the green initiatives taken by KITS in combating the climate change impacts are: Sewage Treatment Plants, paper recycling unit, vermicomposting yards, solar power plant, biogas plants, solar water heaters, LED lights, Rotary Kiln Gasification Pilot Plant for plastic waste and Salzer energy saver device.

1. **Low-Carbon Energy Use (Use of Renewable Energy Sources)**

To offset the climatic conditions and to have a sustainable environment, KITS strategizes all its operations considering the issues related to climate and environment. The following green initiatives have been implemented on campus.

- 95 kW Grid tied Solar Power Plant in the administrative block
- 20 kW Grid tied Solar Power Plant in hostels
- Solar water heating system of 85,600 LPD
- 7958 LED Tube lights
- Eco friendly Paper recycling unit
- DST funded Rotary Kiln Gasification Pilot Plant for plastic waste management

- 5 sewage treatment plants

Renewable Energy Sources and Energy Savings:

Sl.No	Description of Item	Qty	Power Savings/year
1	Solar Water heating system	85,600 LPD	15,45,718 kWh

Sl.No	Description of Item	Year	Qty	Power Consumption	
1	18W LED Tubelights	2019	5944 Nos	278179	3,39,997 Units
2		2020	1705 Nos	79794	97526 Units
3		2022	2860 Nos	133848	1,63,592 Units

Renewable Energy Sources (power in kWh)						
Source	**2016-2017**	**2017-2018**	**2018-2019**	**2019-2020**	**2020-2021**	**2021-2022**
Solar PV	129750	131560	129260	128720	123419	157783
Solar Water heating system	1545718	1545718	1545718	1545718	1545718	1545718
LEDs						**601115**
Total	**1675468**	**1677278**	**1674978**	**1674438**	**1669137**	**2304616**

Solar Water Heater- Ladies Hostel 1

Solar Water Heater – Ladies Hostel 2

Solar Water Heater- Boys Hostel

Solar Water Heater- Boys Hostel

95 kW Grid Tied Solar Power Plant in Administrative Block

Details of Renewable Energy Sources (Solar) at KITS

a. 95 kW Grid Tied Solar Power Plant In Main Building

The 95 kW Grid – Tied Solar Power Plant has 312 Poly crystalline solar panels connected through four inverters to the Distribution Board. The power generation is monitored through online monitoring unit from the inverters.

Salient Features of Solar Power Plant:

1. Grid – Tied 95kW Photo Voltaic Poly Crystalline Solar Power Plant
2. 25 kW Capacity of Inverter of 4 Nos – Make – SMA
3. No of Inverters – 4 Nos
4. No of Strings in each Inverter – 4 Nos
5. No of Solar panels connected in each inverter – 84 Panels (Except 4th inverter - 60 Nos)
6. Total No of Modules (Panels) – 312 Nos (Each – 310 Watts) – Make – EMMVEE

b. 20 kW Grid Tied Solar Power Plant in Hostels

Salient Features of Solar Power Plant.

1. Grid – Tied 20kW Photo Voltaic Poly Crystalline Solar Power Plant
2. 25 kW Capacity of Inverter of 1 No – Make – SMA
3. No of Inverters – 1 Nos
4. No of Strings in each Inverter – 4 Nos
5. No of Solar panels connected in each inverter – 66 Panels
6. Total No of Modules (Panels) – 16 Nos (Each – 310 Watts) – Make – EMMVEE

Hostel / Specifications	Angelina Residence	Hephzibah Residence	Father Duraisamy Residence	Edward George Residence	New JVR Residence	New JMR Residence	New BRR Residence	New Bethany Residence
System Model	TWINWALL model Solar system							
Type of Collector	Flat Plate Collector							
System Capacity	3500 Lts per day	2500 Lts per day	3500 Lts per day	2500 Lts per day	3500 Lts per day	3500 Lts per day	3500 Lts per day	3500 Lts per day
No. of Units	2 Units	3 Units	1 Unit	2 Units	2 Units	2 Units	2 Units	2 Units
System Temperature	60®c	60®c	60®c	60®c	60®c	60®c	60®c	60®c
No. of Solar Collectors	1 set, 28 Collectors	1 set, 20 Collectors	1 set, 28 Collectors	1 set, 20 Collectors	1 set, 28 Collectors	1 set, 28 Collectors	1 set, 28 Collectors	1 set, 28 Collectors
Circulation and its Space	Natural Gravity Circulation System Space required 60 m^2 for 3500 LPD System and 45 m^2 for 2500 LPD System							
Application	Hot Water							
Electrical back-up heater	Auxiliary Heating With Electrical Supply of 4 Kw with thermostat							
Tank Capacity	3500 Lts with air vent provision	2500 Lts with air vent provision	3500 Lts with air vent provision	2500 Lts with air vent provision	3500 Lts with air vent provision	3500 Lts with air vent provision	3500 Lts with air vent provision	3500 Lts with air vent provision
Tank Type	Stainless steel storage tanks insulated with Glass wool Cladded with aluminium, Cage type Stainless steel Heat exchanger							
Support stands for tank and collector	Mounted on Concrete floor with steel frame and Anchoring bolts							

Hostel / Specifications	Sevugapandian Residence	Sundararaj Residence	P R Garg Residence	Dakshinamoorthy Residence	Oprah Residence	Evangeline Residence
System Model	VESAT Solar Products					
Type of Collector	Flat Plate Collector					
System Capacity	3500 Lts per day	3500 Lts per day	500 Lts per day	3500 Lts per day	3500 Lts per day	3500 Lts per day
No. of Units	2 Units	2 Units	1 Unit	1 Unit	1 Unit	2 Units
System Temperature	60®c	60®c	60®c	60®c	60®c	60®c
No. of Solar Collectors	1 set, 28 Collectors	1 set, 28 Collectors	1 set, 28 Collectors	1 set, 28 Collectors	1 set, 28 Collectors	1 set, 28 Collectors
Circulation and its Space	Natural Gravity Circulation System Space required 60 m^2 for 3500 LPD System					
Application	Hot Water					
Electrical back-up heater	Auxiliary Heating With Electrical Supply of 4 kW with thermostat					
Tank Capacity	3500 Lts with air vent provision	3500 Lts with air vent provision	3500 Lts with air vent provision	3500 Lts with air vent provision	3500 Lts with air vent provision	3500 Lts with air vent provision
Tank Type	Stainless steel storage tanks insulated with Glass wool Cladded with aluminium, Cage type Stainless steel Heat exchanger					
Support stands for tank and collector	Mounted on Concrete floor with steel frame and Anchoring bolts					

2. Education and Research on Climate Change and Action

To create awareness on the climate change, impacts, mitigation and adaptation, KITS in involved in imparting knowledge through:

- offering courses related to climate change at all levels of education.
- strengthening the research in climate action through creating infrastructure in renewable energy sources such as biomass, solar and wind
- involving faculty and students in technology missions related to the climate
- encouraging research publications though collaborations
- organizing events/workshops/conferences for dissemination of knowledge
- enhancing capacity building through guest lectures

2.1 Education Programme on Climate Action:

- KITS has integrated sustainability related issues in the curriculum by offering 113 courses covering renewable energy sources, sustainable building materials, global climate change, green and smart building across different programmes.
- The campus with 40% greenery has a rich biodiversity serving as a habitat for several indigenous plants endemic to Western Ghats, migratory bird species and a host of insects. Students are introduced to the diversity of flora and fauna through several courses highlighting nature conservation.
- KITS has introduced green solutions for natural resources conservation, rainwater harvesting, sewage treatment, paper recycling, solar energy harnessing, biogas production creating an environment with a target of achieving SDGs.
- Courses on Cleaner Production and Sustainable Development, Renewable Energy and Green Technology and Sustainable Building Concepts and Design are offered to students across disciplines.
- Courses on Natural Resources Management and Environment Conservation is offered by the School of Agriculture and Biosciences. The School offers two courses for UG and PG programs on Climate Change and Environment Conservation namely Agrometeorology and crop weather forecasting and Introductory Agro-Meteorology &Climate Change.
- Students earn non-academic credits for extension activities related to nature clubs in the areas of water, solid waste management, environment, green campus and community health.

2.2 Infrastructure Facilities in Renewable Energy Sources such as Biomass, Solar and Wind

2.2. 1 National Aeronautics and Space Administration (NASA) has set up an "AERONET" (AErosol RObotic NETwork) station at KITS to study the air quality of Western Ghats. The University signed an agreement with the Office of International and Interagency Relations, NASA. The project is managed by NASA's Goddard Space Flight Center.

2.2.2 Agrometeorology Observatory

KITS has installed a Class-B Meteorology Observatory and Automatic Weather Station (AWS) that monitors global solar irradiance, sunshine recorder, rainfall, air temperature, soil temperature at different depths, relative humidity, soil moisture, wind speed, wind direction data, as well as

photosynthetic active radiation and leaf wetness, which are critical for research and development. The recorded meteorological data contributes towards research and development under SDG-13.

2.2.3 KITS has the state -of-the-art Model facility- **Rotary Kiln Gasification Pilot Plant** for converting plastic waste into a source of energy. In collaboration with industry partner, Techurja Inc., and with the support of a 6.12 crore grant by DST, GoI, KITS has unlocked the potential of plastic through groundbreaking processes.

2.2.4 Solar and Wind Energy Laboratory

- PV Module characterization kit to study the effect of different angular positions, I-V Characteristics at different electrical connections.
- PV System characterization kit to study the efficiency of the whole PV System by studying the efficiency of individual unit.
- Solar Simulator (solar cell characterization unit) to study the dependency of solar cell output on light intensity and temperature.

2.2.4 **Wind Tunnel Experimental Set-up**

- Two wind tunnels with artificial wind generation.
- Small Wind Turbines can be tested for various wind speed profiles.
- Power Generation and Efficiency of wind turbines can be tested.
- Maximum power tracking from wind turbine power curve.

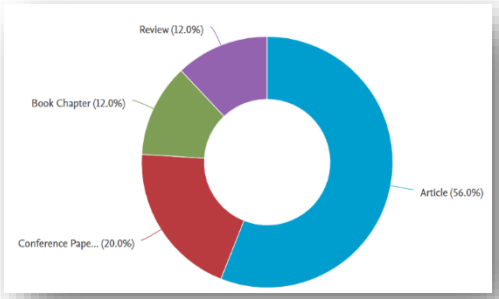
2.2.5 Eco-Friendly Paper Recycling Unit

2.2.6 Sewage Treatment Plants

2.3 Research on Climate Action and Publications

For more than a decade, KITS is involved in research activities related to climate change, mitiagation and adaptation through 10 Technology Missions (Wetland Conservation Mission, Drone Technology for Agricultural Mission, Smart Technology for Precision Farming, Green and Sustainable Manufacturing, Green Energy Technology Mission, Technology Mission for Food Security, Smart Intelligent Building Mission, Smart Vehicle Mission, Satellite and GIS Application Mission, Smart City Mission).

50 research documents (articles, books, conference and review papers) have been published by the faculty and students of KITS related to SDG 13 in collaboration with 18 countries and with around 95 other academic and research institutions. Since the inception of SDGs in 2018, there is increase in publication of research documents from 2 in the year 2018 to 17 in the year 2023. This depicts the inolvement of KITS in climate action.



2.4 Capacity Building Activities:

To enhance the knowledge on climate change impacts, mitigation and adaptation and to build capacity, nine national and international seminars, experience sharing workshops, conferences and training programmes were conducted.

2.4.1 A Two-day event on the theme of 'Climate Change' and 'Sustainable Agriculture'

Karunya Technology Business Incubation Park (KTBIP) and the School of Agricultural Sciences organized A Two-day event on the theme of 'Climate Change' and 'Sustainable Agriculture' with a view to commemorate India's G20 Presidency and its theme, 'Vasudhaiva Kutumbakam' (One Earth One Family), with a focus on sustainable and environment-friendly lifestyles during May 10th and 11th, 2023. The event showcased the creative endeavors of the students of B.Sc. (Hons) Agriculture, with a focus on the theme 'Climate Change - causes, impacts, and mitigation'. The exhibits were in the form of models, charts, paintings, presentations, blogs, and vlogs, highlighting the importance of sustainable agriculture and its impact on the **environment.**

The students displayed various products, methodologies, farming practices, cultivars, and artefacts. These products included herbal products, bio-fertilizers, vermin compost, souvenirs based on dry leaves, seedlings, and plantings.

2.4.2 International Conference on 'Integrated Water Resources Management: Prospects and Challenges'

Karunya Institute of Technology and Sciences, Coimbatore organized an International Conference on "Integrated Water Resources Management: Prospects and Challenges" from 8 to 9th December 2022 sponsored by the Ministry of Jal Sakthi, Govt. of India. The conference delibrated upon the themes of hydrology, geospatial techniques, application of IoT and AI in water resources management, agriculture, water quality, water treatment technologies, wetland ecology, decision support system, water conservation and groundwater recharge, the impact of climate change on water resources, water economics, governance, policies and capacity building. A total of 4 keynote lectures and 6 theme papers were presented. Around 120 papers were presented in 12 technical sessions.

2.4.3 Water Summit

KITS organized Water Summit India 2022 on 18th September 2022. Renowned experts in the field of water technology deliberated and prepared the Water Vision document for Coimbatore. Twenty renowned experts from across the country representing diverse academic and research organizations, industry, Government and NGO outfits participated in the Water Summit. The Vision Document was prepared highlighting innovative, novel and practical suggestions for facing the challenges in the water sector of different hydro-ecological zones of India. This will help to combat the climate change impacts.

KITS in dissemination of knowledge on the aspects of Climate Change and Action

3. KITS Climate Action Plan shared with local government and local community groups

KITS has a policy on Mitigating the Impact on Climate and the Environment which has been posted in the website for public. Link: https://www.karunya.edu/iqac/sustainability

4. Commitment to carbon neutral university (according to Greenhouse Gas Protocols)

Green audit is carried out regularly. With the support of this policy, efforts are taken continuously to reduce greenhouse gas emission and support the environment to improve the climate.
Standard Used: United Nations Framework Convention on Climate Change :

Total Scope 1 and 2 carbon emissions in tCO2e (tonnes (t) of carbon dioxide (CO2) equivalent (e).

a. Base line Year: 2015

Total Electricity Consumption: 7417799 kWh: CO_2 Emission- 4989.8 tonnes

b. Reporting year (2021-2022)

- Total Electricity Consumption for the campus and residences: 3862181 kWh: CO_2 Emissions – 2598 tonnes
- Vehicles:
  - No. of buses from KITS to Coimbatore -10
    Running 2000 km approximately per month – 10 *2000 *12 = 2,40,000 km
    CO2 Emission – 28.68 tonnes
  - No. of cars – 10

Running 3000 km approximately per month – 10*3000*12 = 3,60,000 km
CO2 Emission – 49.395 tonnes

CO_2 Emissions (Scope 1 and Scope2 together) – Reporting Year (2021-2022) – 2676.075 tonnes

CO_2 emission reduction due to Renewable Energy sources:

Renewable Energy Sources (power in kWh)						
Source	2016-2017	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022
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CO_2 emission reduction **– 1550.2 tonnes**

The Institution is committed to achieve zero carbon emission (carbon neutrality) by 2060.