



KONGUNADU COLLEGE OF ENGINEERING AND TECHNOLOGY
(AUTONOMOUS)
NAMAKKAL – TRICHY MAIN ROAD, THOTTIAM
DEPARTMENT OF MECHANICAL ENGINEERING
CENTRE OF EXCELLENCE DETAILS

Laboratory Name: Centre for Energy Studies

Laboratory Incharge: Mr.N.Kawin

Lab Technician : Mr.P.Ramesh



Figure 1 Centre for Energy Studies

Area of the laboratory: 556.61 Sq.m.

Objectives:

- To establish a facility on solar thermal power equipments.
- To establish performance assessment test facility for solar thermal equipments.
- To develop simulation facility for validating the experimental setup.
- To facilitate R&D for cost reduction of solar thermal power equipments.

Description:

- Centre for Energy Studies laboratory is utilized by the students to develop their skills relevant to current and emerging employment market needs in solar thermal energy.
- This laboratory is primarily focused on researching solar thermal equipment and providing exposure, motivation to the students and research community to work on the area of solar energy.
- From this centre, students engage pioneering work on solar thermal technologies including design of solar hot water systems, dryers, space heating and cooling system which the project are carried out using state-of-art facilities, allowing them to gain hands on experience in

advanced sustainable energy solution.

- The centre provides the performance assessment test facility for solar thermal equipments and simulation facility for validating the experimental setup.
- The centre equips students with multidisciplinary technical knowledge and skills need to address the challenging task of energy requirement in response to the growing global population.
- The Centre has experimental setup for evaluating the thermal performance of Solar water heaters, Solar dryers, Solar stills - water purification and distillation and Heat exchangers.

Equipment details:

- Lux Meter
- Air Blower
- Thermocouple
- Solar Pyranometer
- Anemometer
- USB Temperature Data Logger
- Digital Thermo Anemometer and K-Type Thermocouple
- Digital Humidity Meter
- Rotameter
- IR Temperature Gun

The following setups are available to evaluating the thermal performance:

- Solar green house dryer
 - ❖ Igloo, Modified Quonset, Quonset, Tropical, Pyramid and Parabola
- Solar water heater
- Solar air heater with guide vanes
- Single pass solar air heater
- Double pass solar air heater
- Helical coil heat exchanger
- Spiral coil heat exchanger
- Solar still type – 1 (2 nos.)
- Solar still type – 2
- Compound parabolic collector – symmetric
- Portable tube bender
- Centrifugal Test Rig
- Shell and Tube Heat Exchanger
- Cyclone Separator
- Dry Scrubber



Figure 2 1:10 Scale Physical Model of Electrostatic Precipitator of 3x210MW Mejia Power Plant

Description:

- The model was developed in collaboration with TryCAE Industrial Engineering Pvt. Ltd., Trichy, as part of a consultancy project valued Rs. 5, 00,000.
- The primary objective of this model is to measure the pressure drop and velocity reduction in the Electrostatic Precipitator (ESP), based on an existing model. The prototype consists of two units, each powered by 30 HP motor and equipped with a centrifugal fan.
- Each unit contains guide vanes, positioned within the duct at points where the airflow direction changes. Additionally, a hopper is incorporated to collect dust particles.
- A GD screen is placed in front of the ESP cone to regulate airflow velocity, with its design modified to meet the required dimensions.
- Inside the ESP, MDF sheets are used to diffuse dust particles, which are then collected in the hopper. Each unit also includes an exhaust duct to expel the filtered air.
- This consultancy service aims to validate the design of ESP using 1:10 scale models, ensuring optimal performance and efficiency before full-scale installation.
- A scaled-down prototype (1:10) is developed and tested to assess performance. Subsequent full-scale implementation issues prompt iterative re-testing of the model, incorporating reverse engineering methodologies to refine design parameters