INFORMATION BROCHURE

CENTRE FOR ENERGY AND ENVIRONMENTAL ENGINEERING

NATIONAL INSTITUTE OF TECHNOLOGY
HAMIRPUR HP 177005 INDIA

OUR VISION

To build a vibrant multicultural learning environment founded on value based academic principles, wherein all involved shall contribute effectively, efficiently and responsibly to the nation and global community.

ABOUT THE CENTRE

Centre for Energy and Environmental Engineering has been established at the National Institute of Technology, Hamirpur since June 2009. The Centre offers PG programmes in Energy Technology and Environmental Engineering. It also offers a number of courses at various levels in a number of B.Tech and M.Tech programmes of the Institute. Well equipped laboratories and qualified faculty make it an ideal centre for carrying out academic activities (Teaching, R&D and Consultancy). Centre for Energy Environmental Engineering believes in imparting quality education to the students, interaction with eminent personalities and academicians from prestigious Institutions/ industries.

The major task of the Centre is to develop comprehensive innovative solutions to various energy and environmental challenges by undertaking Environmental and Energy leadership projects. This involves promoting energy efficiency and the adoption of renewable energy sources like Solar, Wind, Geothermal, Small Hydro, and Biomass etc. to meet energy requirements and to consider various renewable energy policies at the local, regional, and national levels. The centre is actively engaged in different environmental engineering research areas pertaining to air quality monitoring, water and wastewater quality monitoring, and its treatment.

OBJECTIVES

- To provide education and training in the priority areas of Energy and Environmental Engineering.
- To promote access to energy for productive uses that mitigates climate change and sustainable development.
- To produce highly trained technical manpower to meet the Global Climate and Energy Security challenges.
- To undertake R&D projects and Policy Research Issues to achieve at domestic and commercial environment.
- To facilitate long-term reductions in greenhouse gas emissions and enhance the capacity to adapt to the impacts of climate
- Change and foster sustainable development through the use of Renewable Energy Sources.

COURSES OFFERED

Postgraduate Programmes:

M. Tech. (Energy Technology)
M. Tech. (Environmental Engineering)

Research Programmes:

Ph. D. (Energy and Environment Engineering)

Core Courses for UG Programme of Institute and Open Electives for UG and PG Programme

FACULTY

The Centre has highly learned faculty members in various areas of specializations as follows:

Name & Designation	Qualification	Specialization Area
Dr. N. S. Thakur Professor	Ph.D.	Solar Thermal and Heat Transfer Engineering
Dr. S. S. Katoch Associate Prof. (Head)	Ph.D.	Environmental/Energy Engineering [SWM,BMWM, W&W/WT, EfW, SHP, EC in Buildings, LCA]
Dr. Mamta Awasthi Assistant Prof.	Ph.D.	Bio-Fuels, Bio-Energy, Bioremediation

ACHIEVEMENT

The Centre for Energy and Environmental Engineering has received **"National Excellence Awards-2016"** for Concentrated Solar Thermal Technology (CST). The institute has been adjudged the best in the category by the Ministry of New and Renewal Energy (MNRE). Prof. Shyam Chandel receiving the National Award of Excellence on behalf of NIT Hamirpur, for effectively utilizing Concentrated Solar Technology in the Institute from Honourable Minister of Power, Coal, New & Renewable Energy, (GOI) Sh. Piyush Goyal.

RESEARCH LABORATORY

The Centre has established following Laboratories:-

- Solar Photovoltaic Laboratory
- Solar Thermal Laboratory
- Environmental Engineering Laboratory
- Computational Laboratory

R & D FACILITIES

Cambell Automatic Weather Station



- Wind speed
- Wind direction
- Solar radiation
- Ambient temperature
- Relative Humidity
- Barometric pressure
- Rain fall
- Soil Temperature



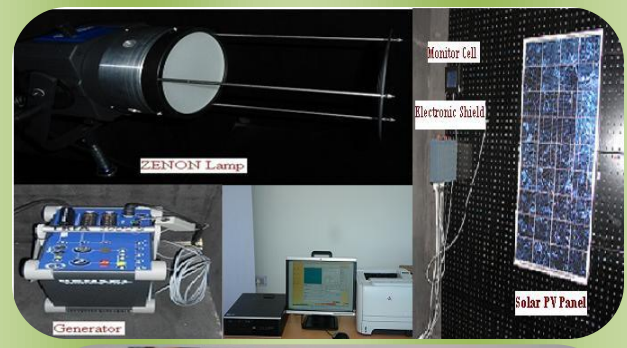
GPS based Sun Tracker Solys-2

- Global solar radiation
- Diffuse solar radiation
- PAR LIGHT [Photo Synthesis]
- Ultra Violet[UV] Radiation
- Infra Red [IR] Radiation
- Direct Normal Irradiance [DNI]

Large Area Sun Simulator-Class A

Sun simulator is used for the evaluation and Testing of solar PV modules:

- Maximum Power Output of PV Module (P_{max})
- Open Circuit Voltage (V_{oc})
- Short Circuit Current (I_{sc})
- Maximum Power Current (I_{max})
- Maximum Power Voltage (V_{max})
- Efficiency (η) & Fill Factor (FF)
- Series Resistance (R_s) & Shunt Resistance (R_{sh})



UV-Vis Spectrophotometer (Cary 300 Agilent Technologies)

- Working range (190 nm-1100 nm) past 5.0 absorbance units for measuring turbid and solid samples
- Versatile set of accessories including temperature control, liquid and solid sample holders, multicell holders, specular reflectance, diffuse reflectance, and fiber optics
- Variable slit widths for optimum control over spectral resolution
- Phase-locked wavelength drive prevents peak shifts and peak suppression at high scan speeds
- Sealed optics with quartz overcoating prevents exposure to corrosive environments and simplifies cleaning



Environmental Chamber (REMI)

- Fulfills storage conditions of 25°C – 60% Rh, 40°C – 75% Rh, 30°C – 65% Rh, 25°C – 40% Rh
- Precise monitoring of temperature and humidity conditions
- Data logger for 8 Point (4 + 4) temperature / humidity recording with sensor, printer interface and software

BOD Incubator (REMI)

- Safety thermostat to prevent over heating
- Audio visual alarm warning of Temperature variation
- High voltage safety cutoff for unit protection
- Plexi glass inner door to inspect specimens



Faculty members and students of the CEEE have published many research papers in reputed National / International Journals viz. **Journal of Renewable and sustainable Energy, Experimental Thermal and Fluid Science, Renewable and Sustainable Energy Reviews, Desalination and Water Treatment, International Journal of Sustainable Development and Green Economics** to enhance the research activities going on.

Other major equipment in Centre are **Wind Monitoring Station**, **Solar Assisted Vapour Absorption Refrigeration System**, **Solar PV- Fuel Cell & Hydrogen Energy Experimental Setup**, **Laminar Airflow Chamber, Light Mircoscope, Programmed Hot Air Oven** and Energy Simulation Software's like **WAsP 10 – Wind Atlas Analysis and Application Program**, **meteonorm 7**, **LabVIEW System Design Software** etc.

CENTRE ACTIVITIES

- The Centre organizes training, awareness programmes for the benefit of Society in the field of energy technologies, Improving Energy Efficiency, Energy Conservation and Environment Protection for Rural Youth, Rural Artisans, and Women for Entrepreneur development leading to Income Generation. Following training were organized Repair & Maintenance of Solar Photovoltaic cell and water heating systems during Oct. 26-30, 2009.
- Short term Training Programme on "Recent Trends in Renewable Energy System Technologies" during December 21-25, 2009.
- The Centre in collaboration with University of Technology, Sydney, IND-USA Initiative, InVEST, USA; H. P. State Electricity Board; HP Power Corporation; SJVN; Tata BP Solar; Himurja; Ministry of New & Renewable Energy Sources, Govt. of India, organized a Symposium on "Policy Issues on Electricity Reforms and Solar Power Generation in HP" during July 16, 2010 at Hotel Holiday Home, Shimla.
- Short term Training Programme in Collaboration with MED, on "Application Based Global Trends in New Energy Resources, during Sep. 20-24, 2010.
- The Centre has organized a one day National Workshop on "Energy Efficient Green Building Concepts" during Nov 09, 2010 at NIT, Hamirpur.
- The Centre in collaboration with HP Patent Information Centre, HP State Council for Science, Technology & Environment; Technology Information, Forecasting & Assessment Council (TIFAC), DST, GOI, New Delhi organized a Awareness workshop on "Intellectual Property Rights in Engineering" during October 15, 2011 at NIT, Hamirpur.
- The Centre has celebrated 'National Science Day' on 28th February, 2013.
- The Centre in collaboration with Ministry of New and Renewable Energy, Govt. of India has organized a two days National Workshop on "Power Generation from Renewable Energy Sources" during March 23-24, 2013 at NIT, Hamirpur.



National Workshop on Power Generation from Renewable Energy Sources (NWPGRES-2013)

MAJOR INITIATIVES OF CEEE:

Establishment of State level Energy Park at NIT, Hamirpur

- MNRE has approved Rs.1 crore to establish state level Energy Park at NIT-Hamirpur (H.P.)

Plan to establish Solar Power Plant

- In order to achieve the target of 1MW a preliminary site survey has been carried out by CEEE to identify the various potential sites for solar power generation in NIT – Hamirpur. The Detailed Project Report [DPR] has also been prepared.

Catalyzing Shimla & Hamirpur Solar City -Role of CEEE

- Getting declared Shimla & Hamirpur to be developed as Solar Cities by HP Govt. Aug 2009. Field Survey for developing guidelines for Solar City, Hamirpur was carried out March, 2011. Centre is providing assistance to prepare the Master Plan for Solar City Hamirpur.

Policy Initiatives in Solar Passive Building Technology

- Prepared Guidelines for incorporation of Solar Passive Features in Building Byelaws for Department of TCP, Govt. of HP; HP Govt. Notification Issued on June 27 2009. Identified Priorities Areas of Research in Renewable Energy for HP Govt. July 2009.

United Nation Development Program (UNDP)/Global Environment Facility MNRE Project on Solar water heating

- Comparative Study of Flat Plate Collector and Evacuated Tube Collector is being carried out along with Centre for Energy, University of Pune & Solar Energy Centre, Ministry of New & Renewable Energy Sources.



Flat Plate Collector and Evacuated Tube Collector of the part of UNDP Project

Performance Evaluation of Hygienic Solar Steam Generating Cooking Systems [Scheffler Type] in Neelkanth Hostel of NIT-H

- A solar steam generating system based on this technology comprises elliptically shaped parabolic solar concentrators, each of 16 sq. m. size are aligned in a perfect east – west direction. Receivers are placed in the focus of each pair of dishes. The receiver is a header pipe half-filled with water. Cold water enters the receiver through the inner pipe

coming from header. Solar radiation falling onto the dishes are reflected and concentrated onto the receivers. Due to the high temperatures achieved, the water within the receiver is converted into steam which is being used to cook food for 500 students.



Hygienic Solar Steam Generating Cooking Systems [Scheffler Type] in Neelkanth Hostel of NIT

6KW Wind (5KW) Solar (1KW) Hybrid Power Generation System

- A 6 KW Wind (5KW)-Solar (1KW) hybrid system has been installed on the rooftop at Centre for Energy & Environment Engineering, NIT-Hamirpur which is providing power to centre.



6KW Wind (5KW) Solar (1KW) Hybrid Power Generation System

- **MNRE has approved** Rs. 74 Lac. for Establishment of Regional Test Centre (RTC)-Cum Technology Back-Up Unit for Solar Thermal Devices in Centre for Energy and Environment Engineering.



CONTACT

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