Centre of Excellence in Energy & Environment (Renamed as Centre for Energy Studies)

Established at the National Institute of Technology Hamirpur, June 2009

- ☐ **Awards, Honors and Recognitions**

- **Received CST award of Excellence from MNRE, 2016**

FOUNDER FACULTY MEMBERS :

Name	Designation	Specialization
Dr. S. S. Chandel	Professor & Head(Retired)	Solar photovoltaic system

Dr. N. S.Thakur	Professor	Solar thermal system
Dr. S. S. Katoch	Asstt. Professor	Wastewater Treatment system
Dr. Mamta Awasthi	Lecturer	Biofuel, Environment, Bioremediation, Bioenergy

OBJECTIVES

- **To promote access to energy for productive uses that mitigate climate change and are environmentally sustainable.**
- **To produce highly trained technical manpower to meet the Global Climate & Energy Security challenges.**
- **To undertake R&D and Policy research to achieve energy efficiency , security which supports sustainable development.**
- **To facilitate long-term, reductions in greenhouse gas emissions, enhance the capacity to adapt to the impacts of climate change, and foster sustainable development using Renewable Energy Sources.**

THE CHALLENGE:

- **Energy is the key input for the socio- economic development and for improving the quality of human life in any country.**
- **The rapid industrialization and development are resulting in ever increasing demand for energy for which the fossil fuels like coal, oil and natural gas have been over exploited worldwide in an unsustainable manner. This has resulted in serious environmental impact.**
- **Energy and Environment are essential for the sustainable development as the environmental degradation and lack of access to clean energy affects the pace of development.**

- **The unprecedented challenges to environment and the future security of energy supplies and the decisions taken now will affect the life of future generation**
- **Environmental issues of Global Warming and Climate Change is a huge challenge.**
- **The challenge now is, to meet the global energy needs and development aspirations while reducing greenhouse gas emissions and responding to climatic change.**
- **The integration of climate change considerations into development priorities, innovative responses based on research, knowledge-sharing and urgent actions are all required to meet this challenge.**
- **Renewable Energy Sources offer key solutions to the current challenges facing the world's energy future. The current use of renewable energy, however, is still limited despite its vast potential.**
- **Little attention is given to Education, Research, Development and technological innovations and in the field of Energy & Environment . However, with rising concerns for energy security, & environment protection, there is revival of interest to look for new and sustainable sources of energy.**

THE APPROACH:

- **Established at the National Institute of Technology , Hamirpur w.e.f June 2009**
- **The Centre has started M.Tech [Energy Systems & Environmental Engineering] and Ph.D program w.e.f 2010 and carried out R&D in priority areas of Energy & Environment.**
- **Motive was to benefit the society besides facilitating the exchange of ideas involving key decision-makers and policy influencers in critical discussions and providing expert advice and consultation to various agencies.**
- **Developing comprehensive innovative solutions to various energy and environmental challenges promoting energy efficiency and the adoption of renewable energy sources like Solar ,Wind, Geothermal, Hydro, Biomass etc. to meet energy requirements and to consider various renewable energy policies at the local, regional, and national levels.**
- **The active involvement of stakeholders from the energy and environmental industries, academicians, society and other institutions, is essential to implement enduring policy solutions.**
- **Therefore, the Centre always intend to consult the organizations and networks already engaged in the field of energy to complement and pool the resources, thus creating added value.**

Priority Research Areas:

The thrust R&D areas for the Centre identified are as follows :

- ☐ **Energy:**
- ☐ **Training of students in Biomass, PV and solar thermal areas**
- ☐ **Energy Policy & Management Research Issues**
- ☐ **Energy Conservation & Efficiency in Buildings / Industries**
- ☐ **Energy Audit & Efficiency Improvement of Systems; Training ,Short term Courses**
- ☐ **Environment:**
- ☐ **Climate crisis/change and global warming**
- ☐ **Biodiversity/Environmental degradation**
- ☐ **Carbon footprint of energy development**
- ☐ **Environmental health issues**
- ☐ **Pollution issues/Clean drinking water/waste management**
- ☐ **Disaster Management**
- ☐ **Toxic chemicals**

Solar:

- ☐ **Solar Passive Heating & Cooling of Buildings**
- ☐ **Design & Development of low-cost Solar Space Heating /cooling Systems**
- ☐ **Manual for Architects, Engineers on Green Buildings**
- ☐ **Solar Driers, Space heating Green Houses, Low-cost green houses, Status, Survey, R&D**
- ☐ **Solar Photo Voltaic :Power Generation ; Street lighting**
- ☐ **LED lighting Systems : Demonstration & Evaluation**
- ☐ **Solar Radiation Data Measurements/, Climatic data /solar radiation data mapping**

Biomass:

- ☐ **Biomass Conversion : Gasification. Combustion ,Pyrolysis**

- ☐ **Biomass Space heating Systems ,Bio-mass Gasifier for Power generation, Water Pumping , heating, Biomass gas cook/heat stoves**
- ☐ **Biomass-solar hybrid program for sustainability**
- ☐ **Bio-fuels : Bioethanol/ biodiesel/biooil potential / Utilization; Algal biofuel development/ Microbial role**
- ☐ **Bio-energy Utilization : Bio- Gas generation; R&D for cold regions ;Biogas from Sewerage for Waste treatment , micro-turbine for biogas/ producer gas, driers, stoves, etc., and improvement in biomass furnaces, boilers etc., Improving biogas generation in cold region**
- ☐ **Waste biomass utilization for energy and other utility.**

Other renewable resources:

- ☐ **Cogeneration; Waste Heat utilization**
- ☐ **Energy From Waste**
- ☐ **Wind Resource Assessment for HP & Wind Energy applications**
- ☐ **Demonstration Geothermal Resource Potential Assessment ; Applications for space heating, power generation in HP**

Environment programme:

- ☐ **Environmental Policy Research ; Issues ; Strategy ;Guidelines**
- ☐ **Climate Change Research ;Issues**
- ☐ **Environment Impact Assessment Studies of Large projects**
- ☐ **Solid Waste Management & Testing waste for toxicity ,**
- ☐ **Design and development of equipment for waste segregation**
- ☐ **Water Resource Management, Conservation Methods ,**
- ☐ **Water Testing & Low-cost Purification systems for Rural Areas**
- ☐ **Waste-water Re-Cycling /Reuse**
- ☐ **Rainwater harvesting Systems**
- ☐ **Solid Waste Management**
- ☐ **Hazard Waste Management / demonstration**

- ☐ **Air quality testing facility development**

More areas will be identified in due course:

- ☐ **Community Development, Programmes :**
- ☐ **Awareness Programmes for Improving Energy Efficiency, Conservation & On Environmental Issues**
- ☐ **Training of Rural Youth , Rural Artisans, Women for Entrepreneur development & Income Generation Activities**

Laboratories:

The Centre have developed following Laboratories (merged into 5 laboratory space) which have developed fully/partially

- ☐ **Heat Transfer & Fluid Flow**
- ☐ **Solar Radiation Data Measurements**
- ☐ **Solar Thermal Energy**
- ☐ **Solar Photovoltaic Laboratory**
- ☐ **Bio- Energy (partially)**
- ☐ **Wind Energy system**
- ☐ **Bio-fuel Testing & Combustion**
- ☐ **Environmental Testing**
- ☐ **Design & Energy Simulation Computer lab**
- ☐ **Microbial Culture lab**