Educating Future Generations on Energy and Environment

International Symposium on Energy and Environment
McDonnell International Scholars Academy
Washington University in St. Louis
May 4 – 7, 2007

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Vision

“To be the fountainhead of new ideas and of innovators in technology and science”

Mission

“To create an ambience in which new ideas, research and scholarship flourish and from which the leaders and innovators of tomorrow emerge”
Areas for Special Attention in the 21st Century

- Energy
- Environment
- Water
- Preventive Healthcare
- Nutrition
- Food Security

IIT Bombay aims to be the leading centre for education and research in Energy, Environment and Water
Energy Education at IIT Bombay

- Energy Systems Engineering - Interdisciplinary programme since 1981
- Core faculty – 8+1 Adjunct
- Associated Faculty – 30
- New Department of Energy Science and Engineering in 2007 – first in India
Vision
To develop sustainable energy systems and solutions for the future

Activities and Action Plan:
- Annual student output by 2013 – to be over 120
- New ‘Zero Energy Building’ for the Dept. of ESE
- International Conference on “Globalisation and Partnerships in Energy Education and Research”, December, 2007
Energy Science & Engineering - outreach

- Annual Energy Day – Presentations of student research projects to the industry
- Annual National Conference on Energy
- Continuing Education Programmes for Industry
- International Training Programmes on Solar Energy
- Renewable Energy Network (RENET) - EU project
- Distance Education – 3 day & semester long course offerings
Research Areas (Strengths)

Energy Efficiency, Process Integration, Demand Side Management

Solar Thermal

Biomass Gasification & Pyrolysis
New Research Groups

- Fuel Cells and Hydrogen
- Solar PV
- Wind Energy
- Clean Coal Technologies
- Carbon Sequestration/ Capture

Indian Institute of Technology Bombay
Future Challenges

- Climate – Technology, systems development
- Millennium Development Goal – Providing access of modern energy services to 50% of India’s population
- Capacity Building for the Energy sector
- Balancing National Development & Global Climate priorities
- Significant R&D thrust required
- Inter-disciplinary approaches – Biotechnology – Nano-Technology, Materials Science, Systems approach
- Strategic Global Linkages and Collaborations
Environment Science & Engineering

- Established in 1977
- Centre of Excellence for Environment Education & Research – Ministry of Environment and Forests
- Core faculty – 8, Associated Faculty – 20
- Offer Doctoral and Masters programmes
- A core course on “Environmental Studies” taught to all UG Seniors as per Ministry directive
- Aim to start Two New Dual Degree Programmes
  - B.Tech.(Env. Engg.) + M.Tech.(Env. Tech.&Mgt.)
  - Six-year M.S. + Ph.D. (Env. Sci & Engg.)
CESE - Outreach

• World Environment Day - Thematic
• Annual National Conference on Recent Advances
• In-house Industrial Training programmes
• Sponsored research, consultancy and technical services
• Continuing Education Programmes for Industry and State Pollution Control Board
Future Directions

• Focus: Development and Sustainability

• Future: Bring forth transformative ambience for paradigm of sustainability through
  – Education to address global issues
  – Common platforms for outreach within India, and globally
Research Areas

1. Aerosol and Air Quality
2. Water and Wastewater
3. Environmental Biotechnology
4. Solid Wastes
5. Modelling, Planning and Management
6. Environmental Policy and Sustainable Development
WashU – CESE Collaboration Possibilities

- Ph.D. projects, Student exchange, co-advising
- Co-teaching of one UG & one PG course
  - *Introduction to Env Sci & Engg*
  - *Environmental Change & Sustainable Development*
- Quality Improvement Training for faculty from other engineering colleges
- *Action Learning Projects* for UGs - Semester-long, Field-work based, Combine UG/Grad student projects
- Organise frequent joint meeting to help crystallize collaborative work-plan