CH2356 Energy Engineering

www.msubbu.in

Introduction to the Course

Dr. M. Subramanian

Associate Professor
Department of Chemical Engineering
Sri Sivasubramaniya Nadar College of Engineering
Kalavakkam – 603 110, Kanchipuram (Dist)
Tamil Nadu, India
msubbu.in[AT]gmail.com

Contents

- Need for this course
- Questionnaire
- Syllabus – coverage
- Teaching / Learning process

Need for this Course

- Faster depletion of fossil fuels, increasing gap of demand-supply
- Global warming
- Need for sustainable technologies
- Need for energy conservation
- Mandatory Energy Auditing of energy intensive industries
- Skilled manpower requirement in new technologies

Questionnaire (Duration: 15 min)

1. How much you consume per day? (i) electricity in kWh (ii) food in grams and calories.
2. What is the current environmental problem posed by fossil fuel usage?
3. What is the world's present human population? What is the rate of energy demand of world at present?
4. How long the oil and coal reserves will last at the present rate of energy consumption?
5. What is the rate of energy production (in MW) of a wind mill, which produces 8.76 Million kWh of electricity in a period of one year?
6. What is the investment required per MW of installed capacity, for coal based thermal power plant?
7. What are the upcoming technologies for sustainable production of electricity?
8. List any two energy saving conservation measures that can be implemented in a chemical industry.
9. What is the power target of 'National Solar Mission of India'?
10. What do you mean by 'cogeneration'?

Answers to the Questionnaire

1. World Average values: Electricity: 7 kWh/day/person; Food amount: 1 kg; food energy: 10 MJ/day/per person
2. Global warming due to increased GHG
3. 6.5 Billion, 16 TW
4. Oil 40 years; Coal 120 years
5. 8.76×10^6 kWh / (24 x 365) = 1 MW
6. About Rs. 6 crore/ MW
7. Wind, Solar, and Biomass
8. (i) Using variable frequency drives, (ii) Using capacitors for improving the power factor or motors
9. 20 GW by the year 2022
10. Generation and utilization of electric power and heat

Syllabus Topics

1. Energy resources – global view
2. Energy and Environment
3. Energy and Technological Society
4. Management of Energy Conservation in Chemical Industries
5. Energy Alternatives

Order of Syllabus Coverage

• Introduction, Energy–units, conversion of units	3
• Account of global energy reserves, Demand and supply of electricity	5
• Evolution of Energy	2
• Energy–Environment interactions	5
• Conventional energy technologies: thermal, hydro, nuclear	6
• Non-conventional energy technologies – solar, wind, geothermal, tidal, fuel cell, etc.	10
• Energy storage and co-generation	5
• Energy conservation in chemical industries	9

Total: 45 hrs

Instructor's Expertise on Energy

- Bureau of Energy Efficiency Certified Energy Auditor cum Energy Manager, since 2006.
- Presented two papers in National Conferences:
  - "Energy Scenario in India" at National Seminar on Safety, Health, and Environment 2009, Annamalai University, Tamil Nadu.
  - "Rural Electrification Technologies for North-Eastern India" at National Conference on Renewable Energy 2010, Tezpur University, Assam.
- Taught this course to the last two batch of students.
- Organized a Two-day programme on Energy for the faculty of various engineering colleges (9-10 Dec 2010).
- Attended short term courses such as: Solar Photovoltaics, Biomass gasification, Fuel cells, Sustainable environmental planning, Energy efficient practices in chemical industries.