

# Chemical Engineering 310

## Review for Exam 1

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### Big Picture

- World Energy Sources
- World Energy Use
- President Benson's talk

### Equipment

- BYU Heating Plant
- IPP
- Cycles (Rankine, IGCC, NGCC)

### Sources of Energy

- Oil
  - Petroleum
  - Tar Sands
  - Oil Shale
- Natural Gas
- Coal
- Nuclear
- Renewables
  - Hydroelectric
  - Biomass
  - Solar
  - Wind
  - Geothermal
  - Other

### Uses of Energy

- Electricity
- Heat Engines
- Transportation
- Household

### Energy Costs

- Nominal vs. Real \$
- Capital, operating, and maintenance costs
- Fuel Costs (i.e., \$/MBtu)
- Electricity
  - Installation costs
  - Net production costs vs. source

### Energy Forecasts

- Previous forecasts
- Near term (25 years)
  - DOE
  - Doom & Gloom
- Long term (50-100 years)

### New Technology

- Power
  - Higher efficiency combustion systems
  - Fuel cells
- Transportation
  - Hybrid and electric vehicles
  - Biofuels
  - Hydrogen-powered vehicles

### Environment

- Major emissions
  - What they are
  - What fuels produce them
  - What is being done to reduce them
- Trends in emissions
- Ways to clean up or reduce emissions
- CO<sub>2</sub> issues
  - Production
  - Possible effects
  - Sequestration
- Challenges with renewables

### Security

- Dependence on imports
- Susceptibility to terrorist activities

### Thought Essay

### Terminology