

# Energy Management is a Growing Field



## Companies wish to:

- Reduce carbon footprint
- Be LEED certified
- Be less dependent on imported energy
- Receive tax credits
- Save money

## Job titles in this field:

- Resource Efficiency Manager
- Energy Manager
- Energy Project Engineer

# Chemical Engineering is Fun Because:

- There are opportunities to experiment in the Lab and in the Pilot Plant (Pilot plants are used for larger scale testing.)
- You work with large scale equipment
- You play a key role in bringing crucial products to market like water, fuels, electricity, polymers and medicines
- You work with many technologies
- You work with people from many trades and specialties
- You are always learning

## Learn More at:

[www.aiche-metrony.org](http://www.aiche-metrony.org)

[www.aiche.org/Students/](http://www.aiche.org/Students/)

[www.che.com](http://www.che.com)

[www.cheresources.com](http://www.cheresources.com)

[www.engineeryourlife.org](http://www.engineeryourlife.org)

[www.worldwidelearn.com/online-education-](http://www.worldwidelearn.com/online-education-)

[guide/engineering/chemical-engineering-major.htm](http://guide/engineering/chemical-engineering-major.htm)

[www.aeecenter.org](http://www.aeecenter.org)

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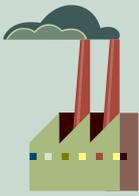
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# Chemical Engineering in Energy and Carbon Management



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## What Industries?



Any industry that uses energy – Just about all of them!

- Manufacturing
- Refineries
- Information Technology
- Hospitals
- Universities
- Commercial Real Estate

## Engineers:

- Provide Renewable Energy Support
- Identify Potential Energy Projects, Programs, and Initiatives.
- Support the Implementation of Energy Projects.
- Develop and Sustain Energy Awareness, Incentive, and Suggestion Programs.

## Energy Self Sufficiency Focus Areas

- Local wind and solar power
- Biomass power
- Geothermal power
- Wave and tidal power
- Hydropower



## Energy Efficiency Targets

- Heating, Ventilation and Air Conditioning (HVAC)
- Manufacturing process
- Heating/cooling utilities: Chilled water, boilers
- Refrigeration
- Lighting
- Data Centers
- Building envelope: Insulation, walls, windows



## Energy Efficiency Focus Areas

- Lab and manufacturing ventilation
- Advanced metering
- No-cost practice changes (control set-points, behavioral)
- Cogeneration
- Accounting for efficiency of energy supply
- Energy-efficient equipment
- “Right-sizing” equipment to demand
- Support Utility auto-demand reduction to lower electric rate.

## Chemical Engineering Skills

### Material and energy balances

- Where are the waste flows?
- How much energy is lost as waste?

### Process design

- Equipment and system sizing
- Heat integration
- System optimization

### Thermodynamics

- Heat transfer
- Process control

## Other Skills

### Economics

- Net present value
- Return on investment calculations
- Securing incentive money from government and utilities

### Vendor management

- Equipment suppliers
- Construction contractors

### Building Materials

- Insulating value
- Durability & compatibility
- Method of manufacture
- %Recycled materials

### Project Management Skills

