



Benha University

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Undergraduate Course

Electric Installation Design

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Lecture (8)



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Energy Management Techniques



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*The easiest Way to Save Money is
to Waste less Energy.*

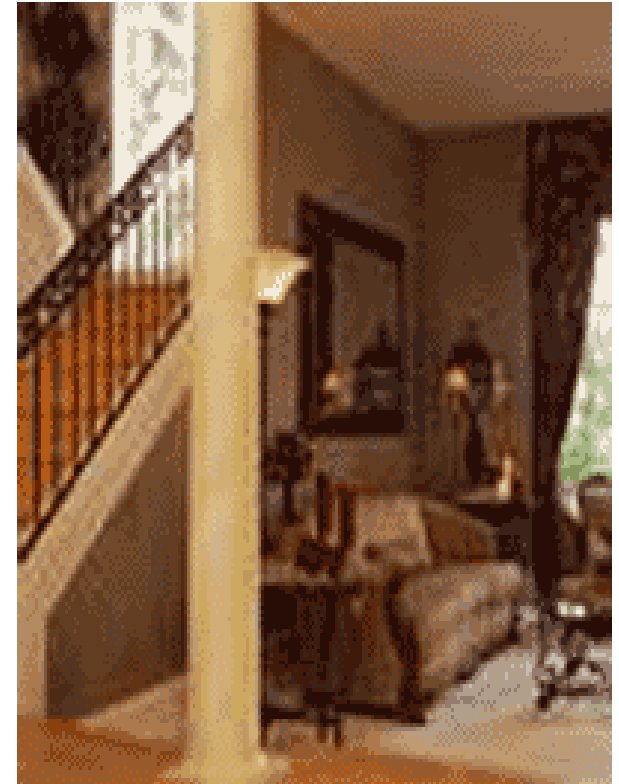
Barack Obama

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What Do We Mean By Energy?

- Direct.
- Indirect.
- Embodied.
- Gas & Oil.
- Electricity.
- In Every thing we do.

Day-to-Day Energy Use



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Energy Management

- Energy Management means lowering cost.
- Energy Management is the process of monitoring, controlling, and conserving energy in a buildings or organizations.
- Energy Management is the systematic use of management and technology to improve an organizations energy performance.

The global need to save energy

- Reduce our dependence on the fossil fuels that are becoming increasingly limited in supply.
- Good energy management leads to cost effective decision making.
- Compliance with legal requirements.

How best to manage the energy consumption?

- Metering the energy consumption and collecting the data.
- Finding and quantifying opportunities to save energy.
- Targeting the opportunities to save energy.
- Tracking the progress at saving energy.

Energy Saving Tips

- There are some relatively simple techniques that can reduce the energy consumption, lower costs, and advance conservation goals:
 1. Lighting.
 2. HVAC.
 3. Motors.

1. Lighting

- Replace incandescent lighting with compact florescent lighting.
- Take advantage of natural light by placing work areas near windows.
- Install occupancy sensor, so lights go off automatically in unoccupied rooms.

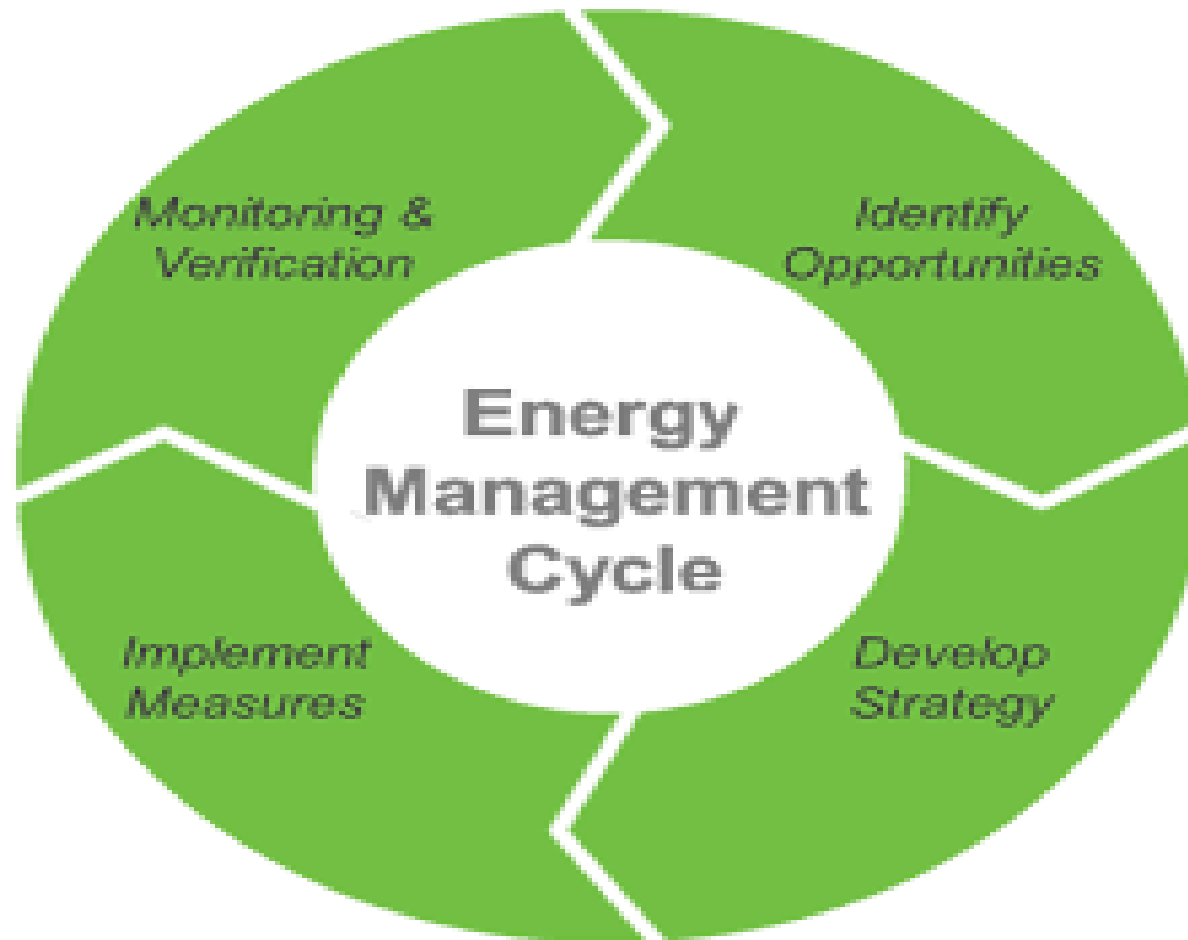
2. HVAC

- Reduce the facilities load allowing the existing system to operate less frequently.
- Implementation of an energy management system can provide great saving to HVAC equipment.
- Set zones to turn off exhaust fan when not needed and control the temperature of space at night.
- When purchasing new equipment, select units that are energy star qualified.

3. Motors

- Considered using variable speed drive motor system instead of traditional motor when loads vary significantly over the course of daily use.
- Make sure the voltage of the motor is as close to the design limit.
- Select a lower power motor and operate it at a higher load factor near optimal efficiency to justify the motor replacement.

Energy Management Cycle



Key Factors to Implement Energy Management



Internal Factors

- Reduce energy costs
- Improve competitiveness
- Apart of key performance indicators at all level
- Reduce service and maintenance costs
- Improve production and working conditions
- Improve operational safety
- Costs transparency
- Improve corporate image
- Contribute to environmental and climate protection

External Factors

- Regulatory compliance.
- Market demand for green/environmental related policies.
- Certifications and standards requirements.
- Government funding.
- Uncertainty and increase in energy prices



Successfully Energy Management doesn't just happen-it need commitment, planning, implementation, and sustained effort.

How does energy use impact the environment?

- All forms of electricity generation have an environmental impact on our air, water and land, but it varies.
- Of the total energy consumed in the United States, about 40% is used to generate electricity, making electricity use an important part of each person's environmental footprint.
- Producing and using electricity more efficiently reduces both the amount of fuel needed to generate electricity and the amount of greenhouse gases and other air pollution emitted as a result.
- Electricity from renewable resources such as solar, geothermal, and wind generally does not contribute to climate change or local air pollution since no fuels are combusted.

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Reduce the Environmental Impact of Energy Use

- **There are many actions you can take to reduce the environmental impacts of energy use:**
 1. Be more energy efficient
 2. Switch to cleaner energy resources
 3. Where you live

Ways to Improve Energy Efficiency

1. Cogeneration.
2. Efficient Electric Motors.
3. High Efficiency Lighting.
4. Increasing Fuel Economy.
5. Alternative Vehicles.
6. Insulation.
7. Plug leaks.