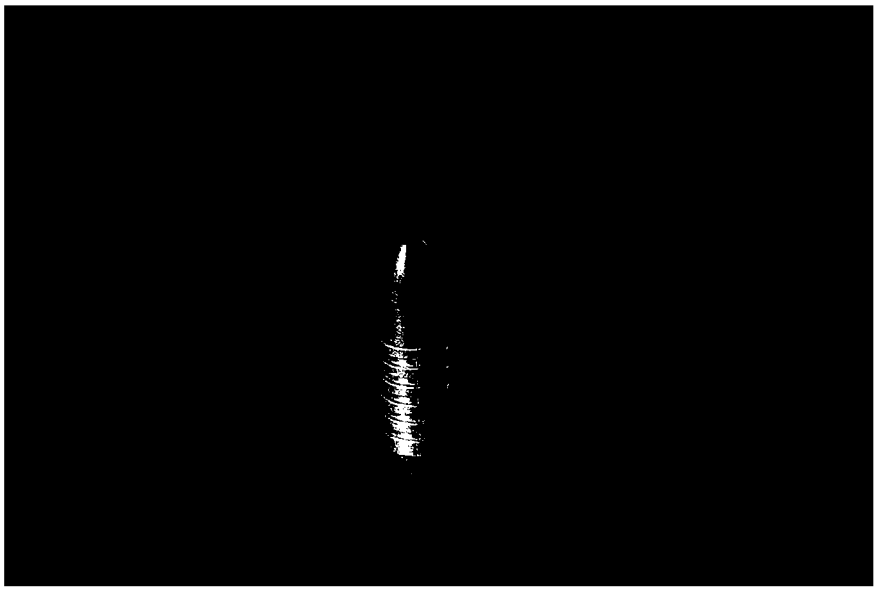
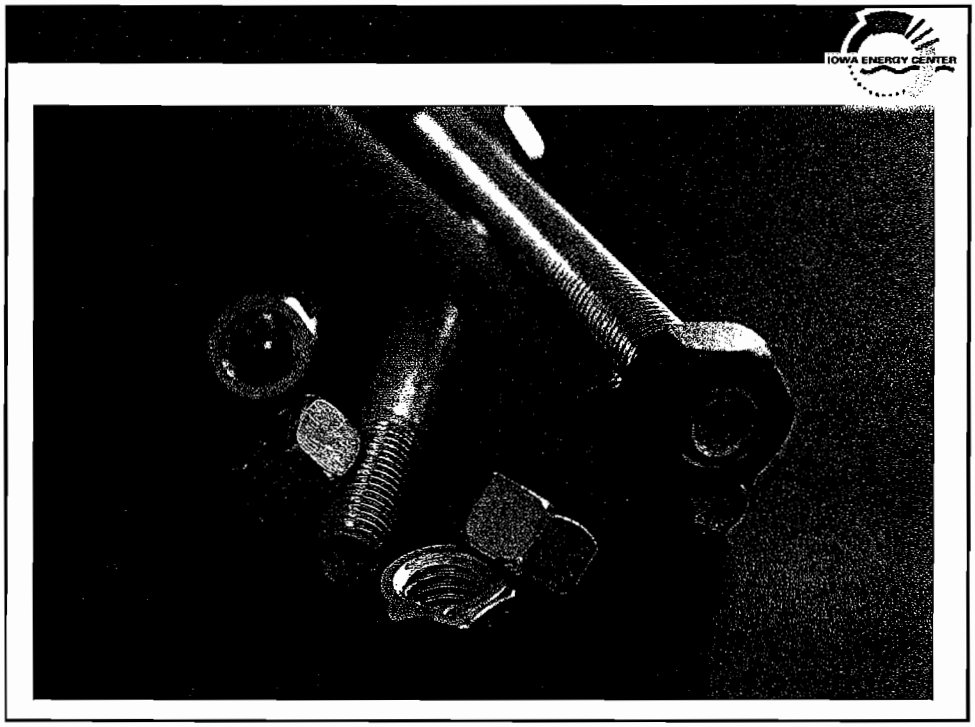
Technology for Energy Efficiency

Energy Efficiency Study Committee
October 2007
Floyd E. Barwig





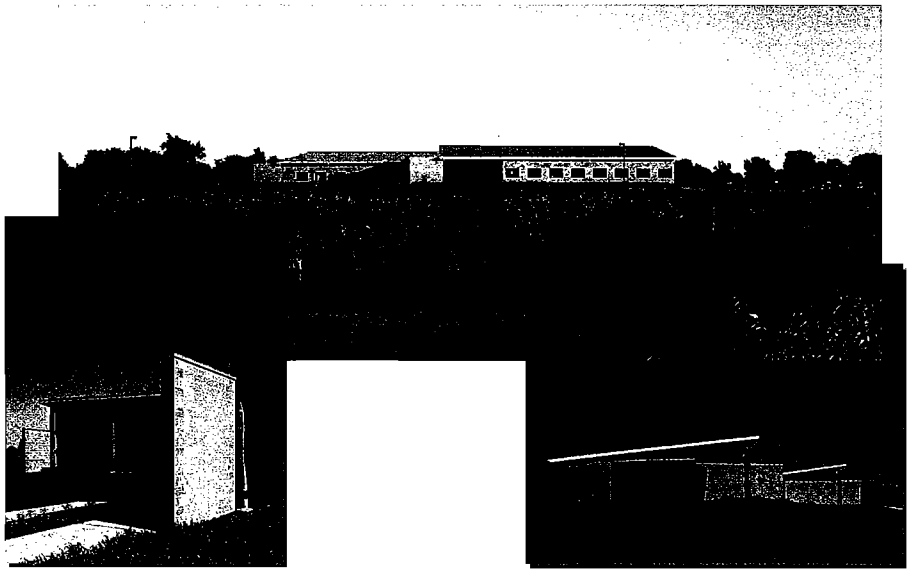
Example Opportunities

- Buildings
- Transportation
- Industry
- Power Generation
- Renewable Energy

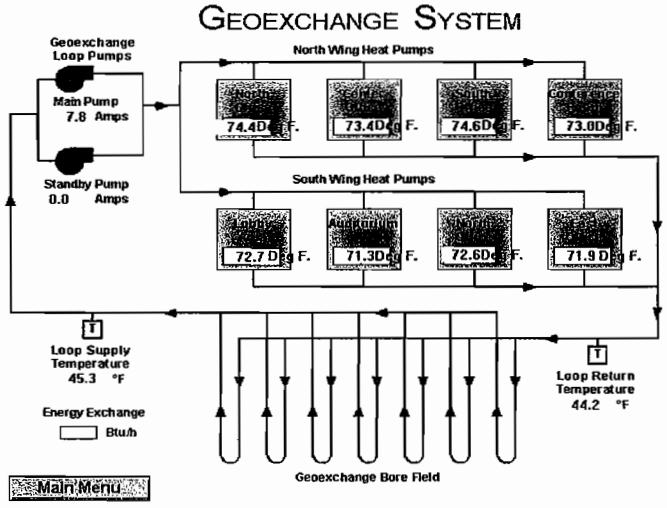
Buildings

- 38 percent of primary energy use in US
- Over 65 percent of electrical energy use in US
- Growing every time new data are collected

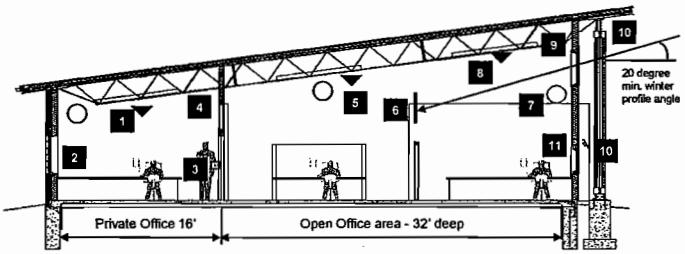
Iowa Association of Municipal Utilities (IAMU)



Geothermal Heat Pump



Daylighting



Window System

Low E, Triple Pane, Wood Frame, Operable Windows. Specifications vary by orientation.

	SC	U-value	VT
North/South	0.44	0.35	0.67
East/West	0.35	0.25	0.60

North Daylight Zone

1. One photosensor for every three north facing offices
2. No blinds on north windows
3. Wall box occupancy sensor for each office
4. Transom/vision glass to provide bi-directional source and transparency

Center Daylight Zone

5. One photosensor controlling all lights in center zone
6. Seasonal banner to control low angle direct sun during winter months only
7. Supply duct doubles as light shelf to control direct sun on south open office areas

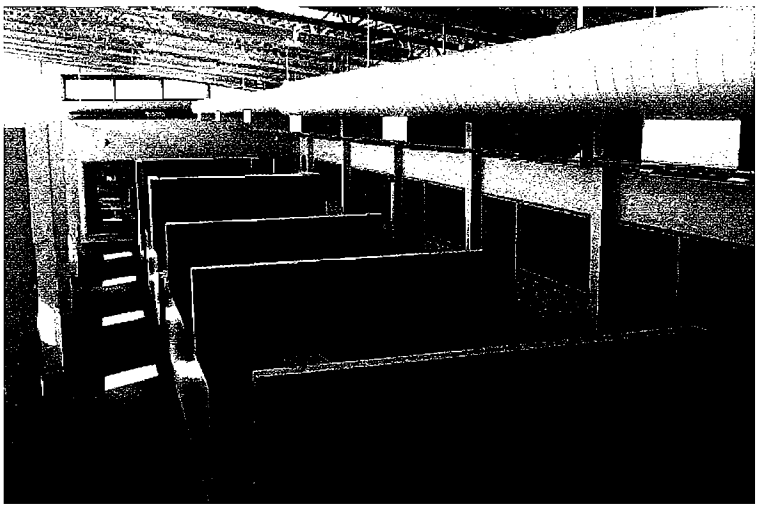
South Daylight Zone

8. One photosensor controlling all lights in south zone
9. Daylight transom window - 15' head height w/ no blinds
10. 5' roof overhang and lower sunscreen effectively blocks direct sun during cooling season
11. Horizontal blinds on south view window - light color - vertical blinds on east windows

Electric Lighting System

8' Two-Lamp Indirect Industrial Fixture mounted Upside Down
T8 lamps w/ Electronic Dimming Ballast
Illumination Level @ 30 to 35 fc
Connected Lighting Power Density at 1.15 watts per SF
White Painted Metal Deck Ceiling with 85% reflectance

Iowa Association of Municipal Utilities

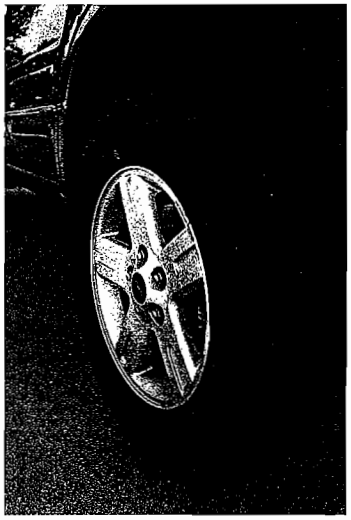


Transportation

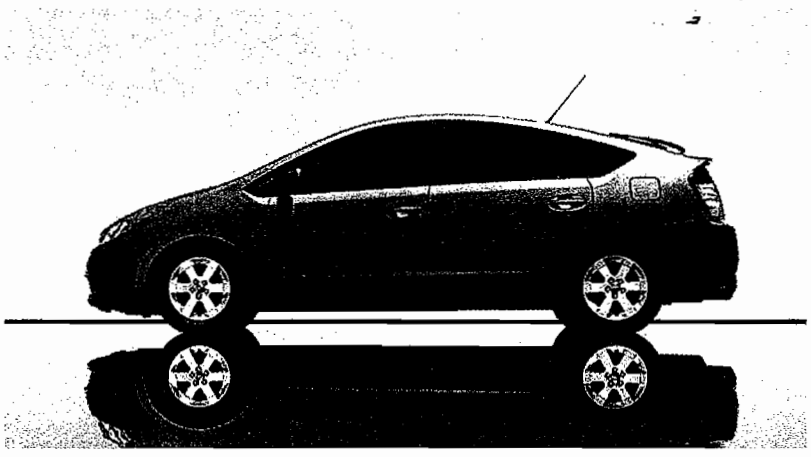
- Study by USDOE's Oak Ridge National Laboratory says US can produce 30 percent of its transportation fuels needs from biomass
- Where do we get the other 70 percent?
- Grow more? There is not enough land.
- Increase biomass productivity? That's part of the answer, but not enough.

- How about changing the problem?

Energy Efficiency, A Resource Multiplier



Hybrid Electric Automobile



Plug-in Hybrid School Bus

Hybrid Electric Locomotive

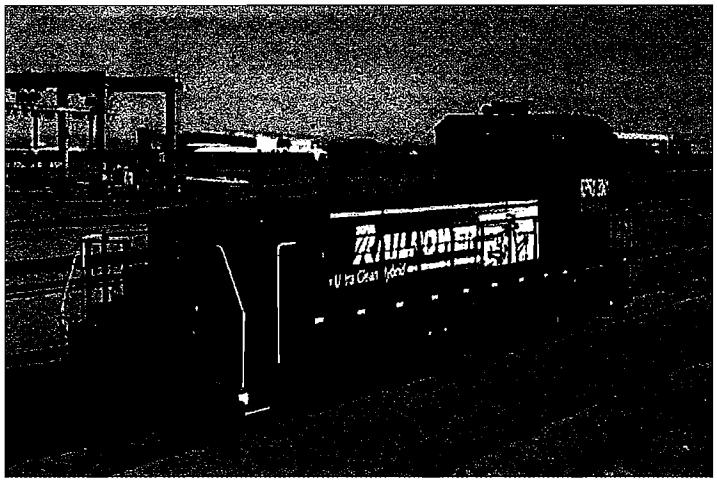
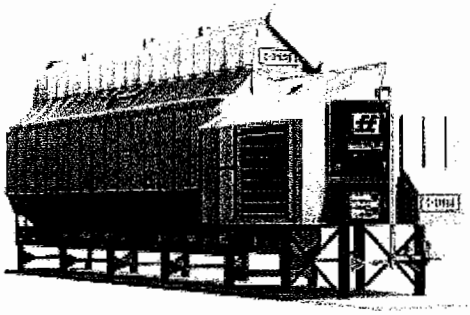


Photo source: Rail Power

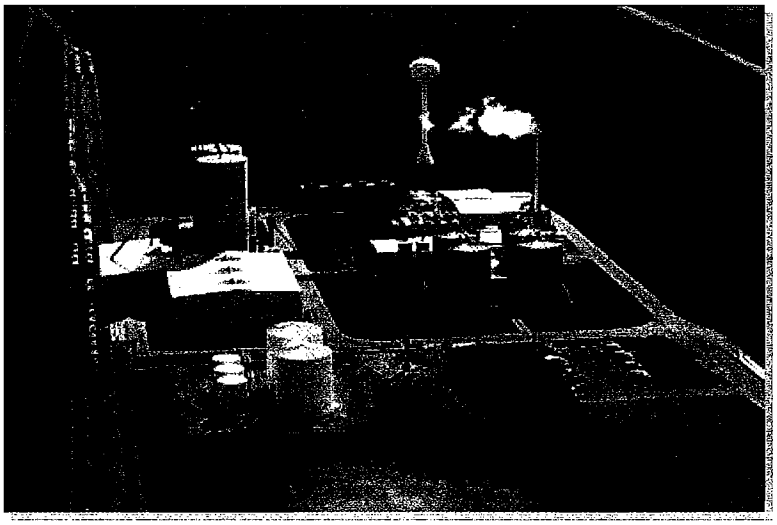
Industry



Industry

Photo source: MidAmerican Energy

Midwest Grain Processors



Renewable Energy

- Renewable energy should not be applied to drive inefficient energy using processes
- Inefficiency drives up costs

Wind to Hydrogen to Fuel Cell