Energy Awareness at WPI Through Green Tech

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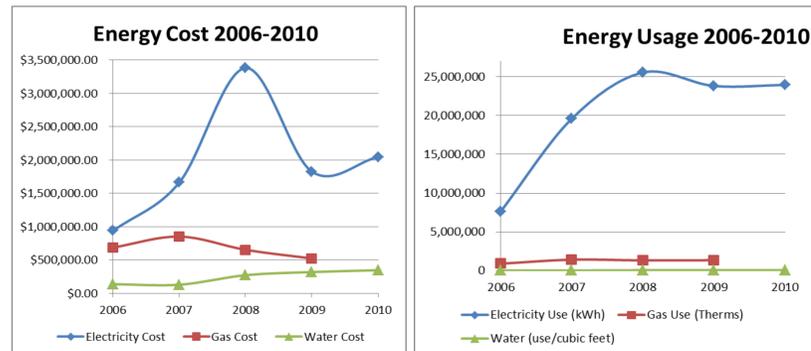**Advisor: Professor Kent J. Rissmiller (Political & Social Science)**

Abstract

The U.S. energy grid is outdated and has many flaws. WPI's energy grid like the U.S energy grid could use improvements to reduce overall cost. By implementing smart grid technology WPI can closely monitor the energy usage across campus and reduce costs. Our studies show that through active energy campaigns, WPI and it's students and faculty will have the knowledge to be more energy aware.

Project Goals

- Propose an energy awareness campaign.
  - Reduce energy usage.
- Investigate purchasing Building Dashboard®.
- Encourage other schools to adopt energy awareness campaigns through example.

Energy Consumption

Energy Cost 2006-2010 — Electricity Cost, Gas Cost, Water Cost

Energy Usage 2006-2010 — Electricity Use (kWh), Gas Use (Therms), Water (use/cubic feet)

	Energy Cost				Energy Use		
	Electricity	Gas	Water	year	Electricity (kWh)	Gas (therms)	Water (cubic feet)
2006	$938,419.45	-	$137,000	2006	7,612,575	-	50,394
2007	$1,664,140.47	$ 686,769.49	$128,641.46	2007	19,578,983	917,968	42,380
2008	$3,380,243.68	$ 851,389.34	$272,265.73	2008	25,536,895	1,439,336	81,799
2009	$1,826,593.04	$ 652,545.22	$318,738.69	2009	23,807,177	1,343,430	89,899.6
2010	$2,045,312.87	$ 522,592.34	$346,287.86	2010	23,950,316	1,368,467	91,107

From the year 2006, energy usage has dramatically increased. To fight rising costs, WPI swapped from using oil to natural gas for heating. However, even taking into account the addition of new buildings into the energy bill, WPI uses more energy than required if WPI were to focus on energy awareness.

## Current WPI Grid

WPI Facts

- Power house operates with natural gas- switched from oil due to high prices and environmental concerns.
- The Main Campus is the largest part of the electrical grid.
- WPI has less than one meter per building.
- The new recreation center will be connected to the Powerhouse for heating.

Electricity

- Main Campus of 29 buildings uses 1 electrical meter.
- Outlying residence halls each have separate meters.
- Outlying houses & buildings have individual meters.

Heating

- 23 buildings connected to WPI Powerhouse for steam.
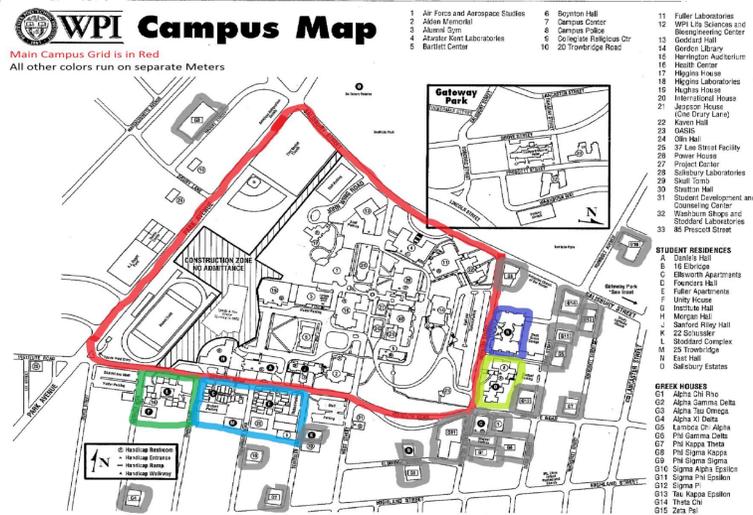
Awareness

You and the Smart Grid
- *Today*: Guess what the energy usage is till the bill comes.
- *With the Smart Grid*: Real time data of energy usage.
At Schools
- Students can learn energy conversation techniques.
- Build a sense of community while lower energy costs.
- Be prepared for new technology to assist in energy usage.

Building Dashboard for University of Colorado
Allows viewers to see real-time data of Electricity Consumption for the buildings participating. Competition ranks each building in terms of percent energy reduction.

Conclusion

- Implementing Building Dashboard® would encourage competitions of energy conservation between residence halls.
- Awareness Campaigns provide information about excessive energy use and promote better energy behavior.
- Smart Grid Technologies boost energy awareness.
- Participate in 'Compete to Reduce' national competition for 2011.
- Estimated cost for 7 buildings with 800 amps ~ $29,000.
- Maintenance fee on second year ~ $3,100.

Acknowledgments

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References

Lucid Design Group
Project Dashboard (University of Colorado)
WPI Facilities Department
DOE