

**HVAC/Lighting Renovations
= Energy Savings**

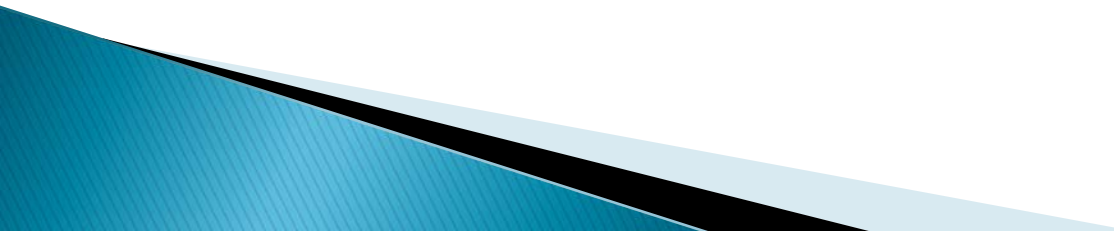


INTRODUCTION

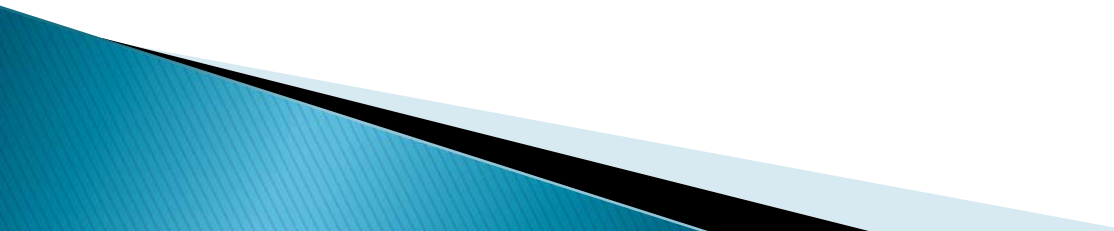
Keith Parker, P.E.

Kentucky Department of Fish and Wildlife
Resources

Director of Engineering



PROBLEMS

- ▶ Higher energy costs competing for limited funds.
 - ▶ Increased maintenance due to aging building and outdated HVAC controls.
 - ▶ Staff complaints (too hot, too cold).
- 



Local Paper

NO TV? NO BIG DEAL FOR SPORTS FAN

SPORTS, B1

WEDNESDAY

JUNE 12, 2013

The State Journal

FRANKFORT, KENTUCKY ■ 50c ■ STATE-JOURNAL.COM



Plant Board looking for cheaper electricity

Supplier Kentucky Utilities may keep increasing the cost 'for the foreseeable future'

BY RYAN QUINN
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The Frankfort Plant Board is considering changing its electricity supplier from Kentucky Utilities to a less expensive partner, if one exists.

The Plant Board has budgeted \$87.6 million of expenditures in its proposed fiscal year 2013-2014 budget, which officials and directors discussed for about four hours Tuesday. The budget

includes \$35,000 to chip in on a possible group study to explore whether a different company would offer lower wholesale electric prices.

General Manager Herbie Bannister said the Plant Board and other members of the Kentucky Municipal Utilities Association have discussed the possibility of seeking other power suppliers for eight or nine months.

"We want to know where we can go out and get energy for the City of Frankfort

in the event that we feel like our rates are too expensive with KU," Bannister said.

He said a study — the exact specifics, costs and timelines of which have not been defined — would look at suppliers such as American Municipal Power Ohio, the Indiana Municipal Power Agency and Duke Energy.

The Plant Board plans to buy more than \$40 million in power this fiscal year from KUI, which has increased its electric rates

again. Plant Board officials, backed up by a recent cost-of-service study the utility funded, say the KU increase is forcing it to raise rates on its customers.

The Plant Board's budget introduction includes a projection that, "For the foreseeable future we will experience annual, single to double digit rate increase from our energy supplier."

The document says the increases are due to KU's capital expenses required to

meet federal Environmental Protection Agency regulations and its resulting conversion from coal to natural gas.

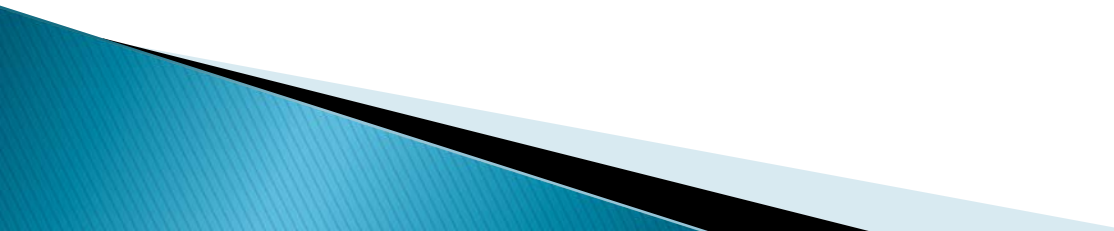
Vent Foster, the Plant Board's assistant general manager of operations, said the Kentucky Public Service Commission has granted KU permission for annualized rate increases to pay for these regulatory expenses. He said huge portions of

See ELECTRICITY, 48

"Are we seriously considering alternatives? Yes we are ... I don't see any end to the EPA regulations that are coming."

VENT FOSTER,
FEB ASSISTANT
GENERAL MANAGER
OF OPERATIONS

SOLUTIONS

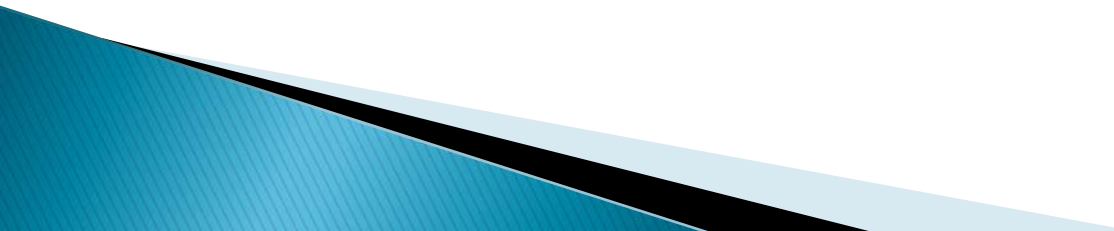
- ▶ Governor Beshear’s “Intelligent Energy Choices for Kentucky’s Future”.
 - ▶ Put out an RFP for an Energy Savings Performance Contract (ESPC) for Arnold Mitchell Building and Salato.
 - ▶ Do nothing.
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RFP

- ▶ Earthwell Energy Management, Inc selected.
 - Local
 - Experience
 - Good Track record

ECM #		Construction Cost	M&V Cost	Energy Savings	Mtce Savings	Rebate	Simple Payback w/o Rebate	Include In Financial Model	Total Cost	Total Savings	M&V Cost
Mitchell Building											
1	Retrofit existing lighting	\$38,176.00		\$4,197.00	\$854.00		7.6		\$0.00	\$0.00	\$0.00
1A	Replace existing lighting with new fixtures.	\$81,387.00		\$5,528.00	\$915.00		12.6	X	\$81,387.00	\$6,443.00	\$0.00
1A	New ceiling associated with new light fixtures.	\$84,850.00							\$0.00	\$0.00	\$0.00
	Replace existing mercury vapor bollards with new LED bollards	\$5,600.00		\$148.00			37.8	X	\$5,600.00	\$148.00	\$0.00
2	Lighting Controls / switches	\$7,268.00		\$436.00			16.7		\$0.00	\$0.00	\$0.00
3	Domestic Water Conservation	\$6,615.00		\$842.00			7.9	X	\$6,615.00	\$842.00	\$0.00
4	Replace existing building automation controls with new Automated Logic Controls including replacing pneumatic controls with new electric DDC controls, supply air temperature reset based upon box positions, chilled water reset based upon 3-way valve position, domestic hot water pump control, and repair of ductwork on AHU-2.	\$80,185.00		\$12,043.00			6.7	X	\$80,185.00	\$12,043.00	\$0.00
5	Material to replace existing fan powered boxes with new.	\$38,709.00							\$0.00	\$0.00	\$0.00
5	Labor to replace existing fan powered boxes with new.	\$45,098.00							\$0.00	\$0.00	\$0.00
6	Insulate domestic hot water line	\$20.00		\$4.00			5.0		\$0.00	\$0.00	\$0.00
7	Install solar water heating for domestic hot water.	\$15,822.00		\$1,228.00			12.9		\$0.00	\$0.00	\$0.00
	Window Film	Considered but not recommended									
	Convert Plenum Return to Ducted Return	Considered but not recommended									
Salato Center											
1	Energy Efficient Lighting	\$8,021.00		\$1,235.00	\$265.00		5.3	X	\$8,021.00	\$1,500.00	\$0.00
2	Lighting Controls / switches	\$1,266.00		\$85.00			14.9		\$0.00	\$0.00	\$0.00
3	Domestic Water Conservation including cooling tower makeup repair.	\$1,900.00		\$887.00			2.1	X	\$1,900.00	\$887.00	\$0.00
4	Replace existing Barber Coleman Controls with Automated Logic Controls including outside air control of HP-1, tying control of HP-6&7 together. Also repair HP-7 supply ductwork and EF-1 speed control.	\$40,250.00		\$1,677.00			24.0	X	\$40,250.00	\$1,677.00	\$0.00
8	Convert Boiler and Cooling Tower for HVAC to Geothermal	\$175,000.00		\$5,123.00			34.2		\$0.00	\$0.00	\$0.00
9	Replace Boiler for HVAC	\$71,300.00		\$575.00			124.0		\$0.00	\$0.00	\$0.00
10	Replace Cooling Tower for HVAC	\$67,500.00		\$10.00			5750.0		\$0.00	\$0.00	\$0.00
7	Install solar water heating for domestic hot water.	\$13,063.00		\$1,715.00			7.6	X	\$13,063.00	\$1,715.00	\$0.00
6	Insulate hot water line in mechanical room	\$212.00		\$22.00			9.6	X	\$212.00	\$22.00	\$0.00

Earthwell's Plan

- ▶ Energy audit for project development and create a baseline.
 - ▶ Project Implementation.
 - ▶ Measurement and verification, annually.
- 

Low Hanging Fruit

- ▶ Lighting Retrofit
 - T12 to T8 and Compact Fluorescent.
- ▶ HVAC renovations
- ▶ HVAC Controls
 - Automated Logic Corporation

Project

- ▶ Earthwell was hired for the lighting renovations and HVAC Controls.
- ▶ Springfield Contracting for the HVAC renovations.

These were two separate contracts that were run concurrently.

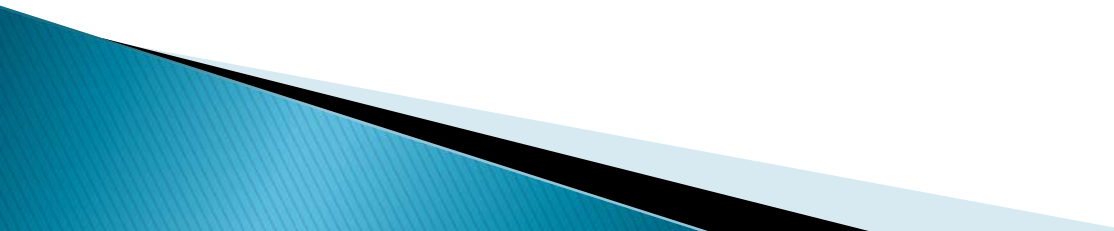
Cost

- ▶ Earthwell
 - \$204,903
 - No Change Orders!!!
- ▶ Springfield Contracting
 - \$155,385
 - \$4306.70

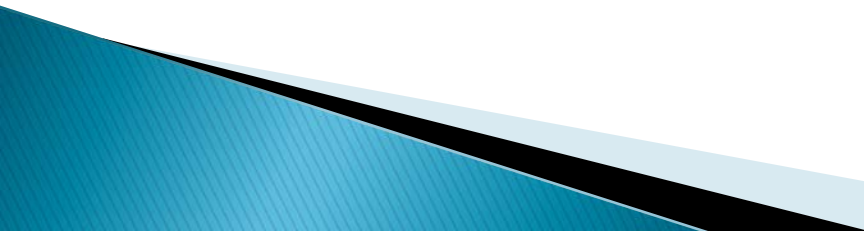
Total Cost \$364,595.70



Pay Now or Pay Later

- ▶ Use financing and let energy savings make the payments on the note.
 - ▶ Pay for the project up front and eliminate any interest costs moving forward.
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Hurdles

- ▶ Keeping building comfortable during renovations.
 - ▶ Displacing workstations.
 - ▶ Managing construction debris.
 - ▶ Dust.
 - ▶ Noise.
 - ▶ Working
 - ▶ Coordination of two contractors.
 - ▶ 12 phases
 - ▶ 4 Commission Meetings during the construction phase.
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Project Completion

- ▶ Substantial completion: January 12, 2012.
 - Contractors met completion date.

Results

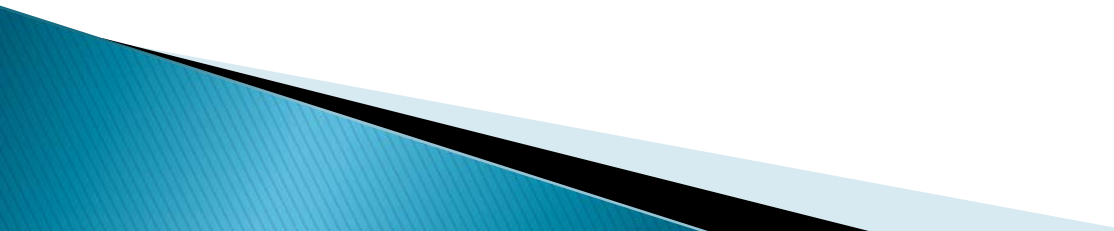
- ▶ The “Savings Guarantee Measurement” claimed a savings of \$213,723 over the course of 12 years.
 - This worked out to about 18000/year.
 - This was very conservative.

Energy Consumption

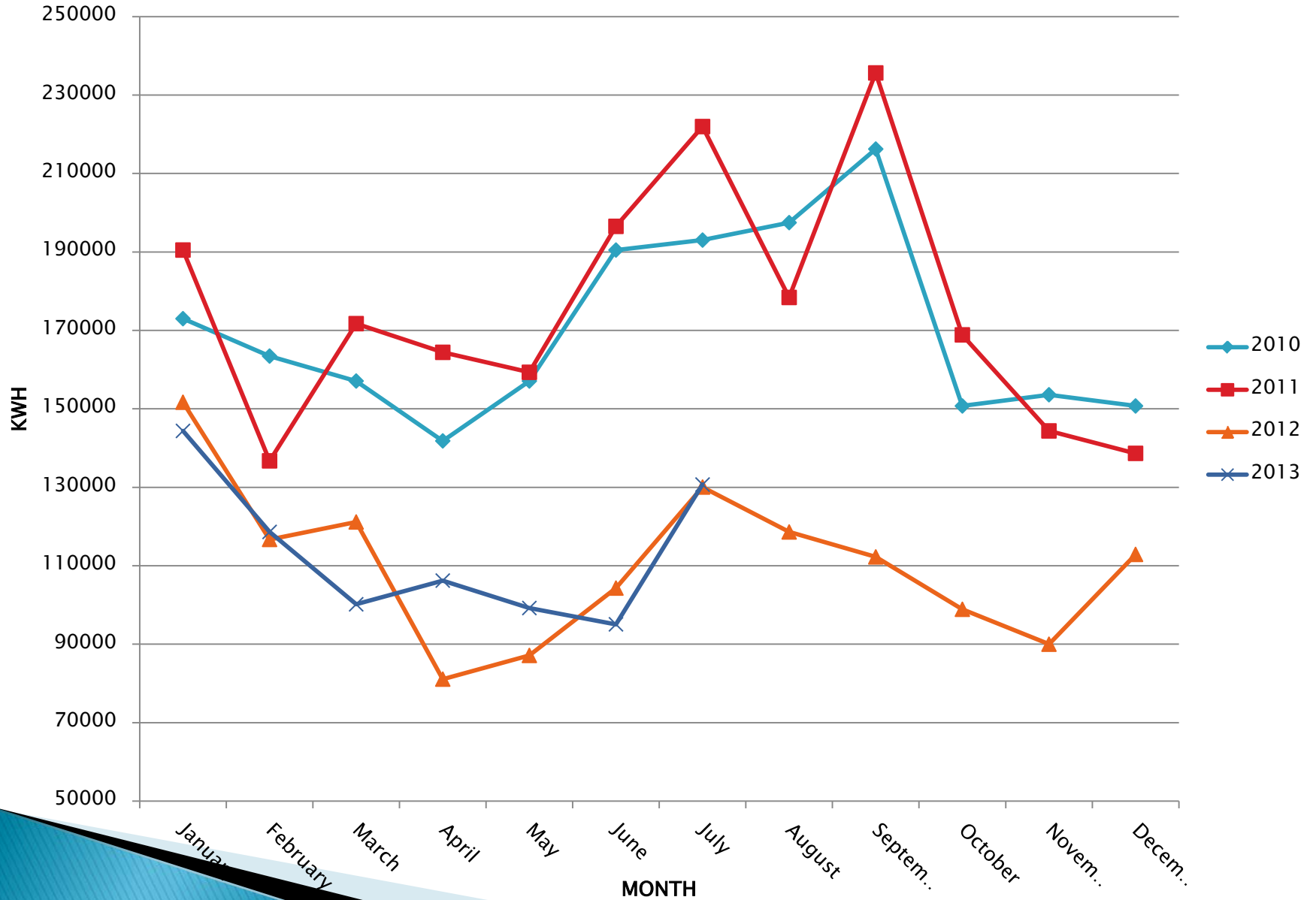
- ▶ 2010 and 2011 we averaged 2.1 Million KWHs.
- ▶ 2012 and 2013 we averaged 1.3 Million KWHs.*

Dollars You Say

- ▶ 2010 and 2011 averaged \$164,688.30.
 - ▶ 2012 and 2013 averaged \$105,187.06.

 - ▶ Savings of \$60 K per year.
 - ▶ That's a 36% savings.
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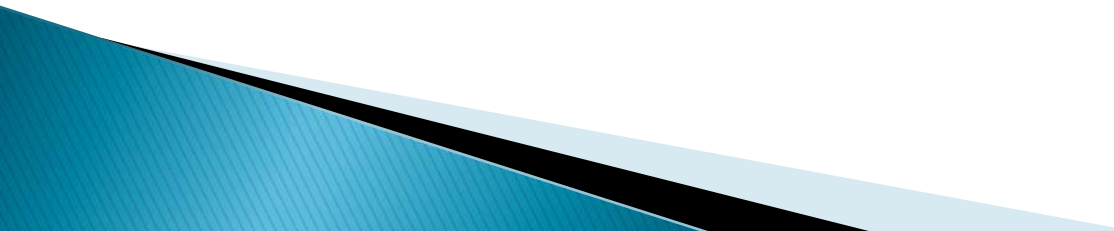
KWH/MONTH



Payback

- ▶ Remember the “Savings Guarantee Measurement”.
 - The consultant guaranteed a 18000/year savings and a 12 year payback.
 - We have saved 120000 in the first two years!!!

Closing

- ▶ Kentucky has one of the lowest utility Rates/KWH.
 - ▶ Added benefit is much more comfortable building.
 - ▶ Keep an eye on your system it will need additional tweaking.
 - ▶ Better workplace lighting and all new ceiling tiles.
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Questions

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