

ENERGY SYSTEM PROGRAMS
Duke Energy Strategic Approach

International Society Pharmaceutical Engineers
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The development and management of Energy System Programs need to be done with a long term strategic approach in mind.

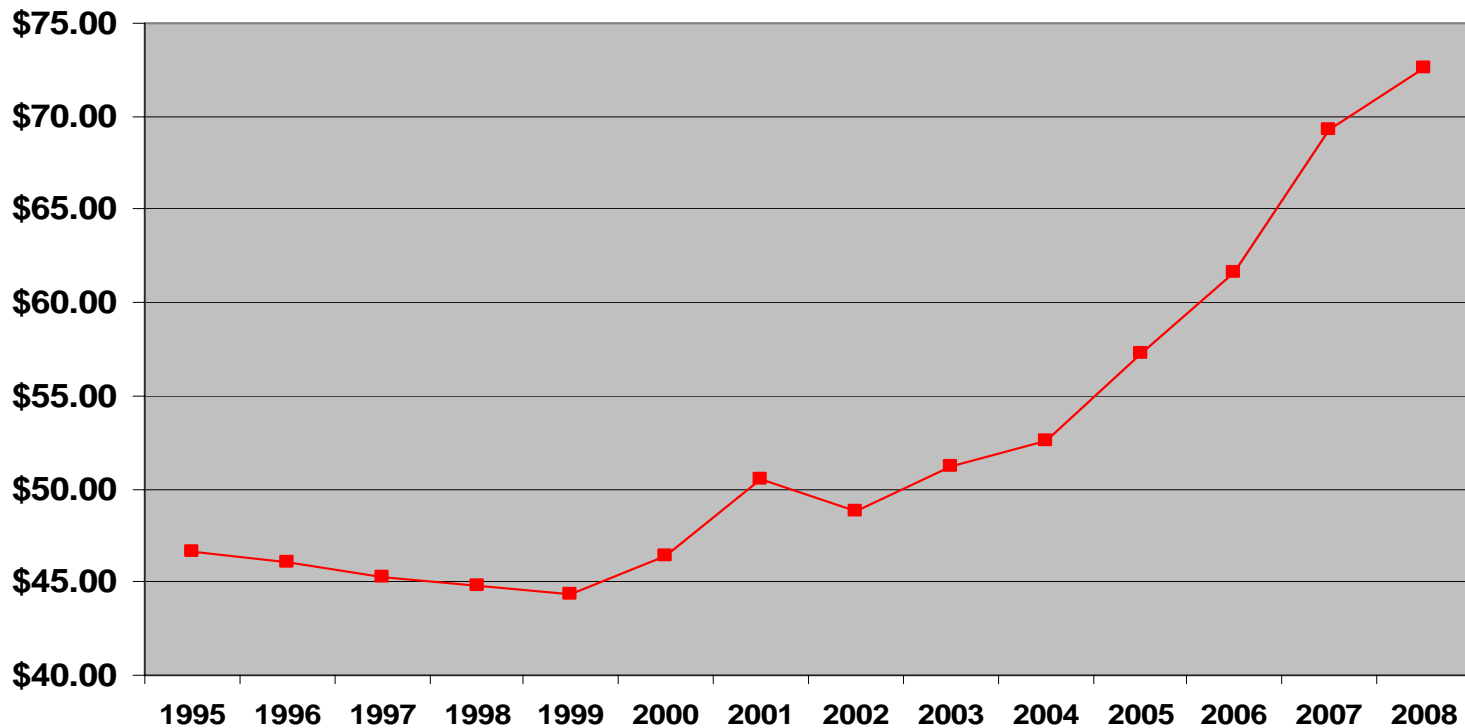
To effect a long term sustainable change in a company's energy position, new approaches in the way Energy System Programs are managed need to be considered.

Some Examples -

- I. Recognizing the volatility in energy prices and opening up the financial decision criteria to obtain approval for projects.
- II. Not just measuring energy usage by facilities and equipment but evaluating these usages against appropriate criteria.
- III. Incorporating an evaluation of the impact to a company's energy position when looking at the decision criteria for capital projects, purchases and operational process changes.
- IV. Recognizing that the Energy System Program affects the total overall cost for the facility.
- V. Dedicating a certain percentage of annual budgets to the Energy System Program and bringing outside resources into the process to deliver critical mass and continuity.

- I. Recognizing the volatility in energy prices and opening up the financial decision criteria to obtain approval for projects.

AVERAGE ELECTRICAL ENERGY COSTS (MWhr)





ENERGY SYSTEM PROGRAMS

- I. Recognizing the volatility in energy prices and opening up the financial decision criteria to obtain approval for projects.

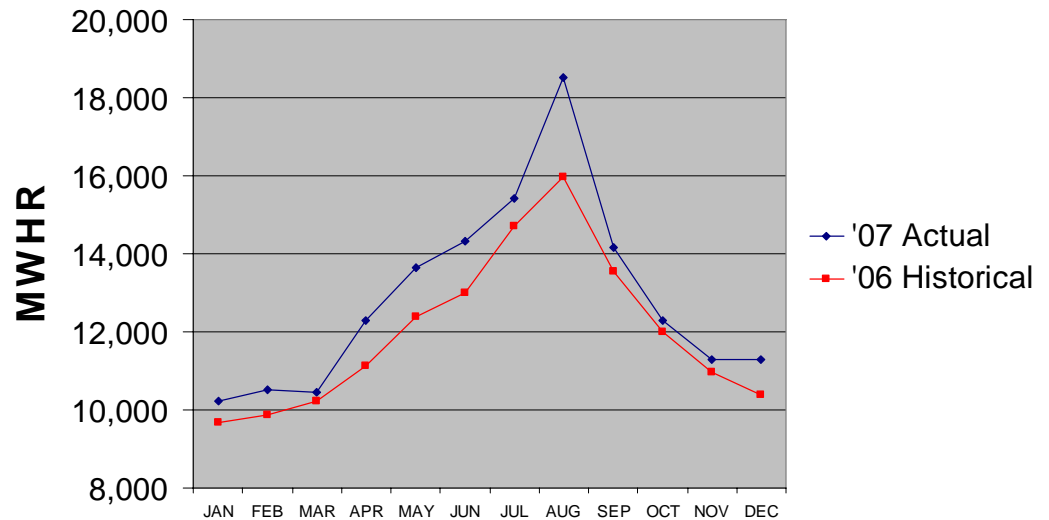
Project Costs Start of 2002	Cash Flows				IRR
	End of 2002	End of 2003	End of 2004	End of 2005	
-\$300,000	\$63,187.50	\$126,375.00	\$126,375.00	\$126,375.00	15.87%
-\$300,000	\$61,012.50	\$122,025.00	\$122,025.00	\$122,025.00	14.30%
-\$300,000	\$61,012.50	\$127,950.00	\$131,475.00	\$143,250.00	17.62%
-\$300,000	\$48,000.00	\$63,975.00	\$131,475.00	\$143,250.00	9.11%

- In 2001 using a flat energy rate of \$50.55 per MWhr this project came close to meeting the company's traditional investment criteria.
- In 2002 using a flat energy rate of \$48.81 per MWhr this project doesn't meet the company's traditional investment criteria.
- Making the investment in 2002 by opening up the decision criteria for energy projects would have provided an actual IRR of 17.62%
- Postponing the project by investing the \$300,000 in a short term one year investment of 16% and then implementing it the following year only returns an IRR of 9.11%

II. Not just measuring energy usage by facilities and equipment but evaluating these usages against appropriate criteria.

Comparing the straight energy usage of a facility from one year to the next can be misleading.

ELECTRICAL USAGE COMPARISON



- II. Not just measuring energy usage by facilities and equipment but evaluating these usages against appropriate criteria.

Using appropriate energy usage influencers such as production output and cooling degree days to perform energy evaluations can provide a better comparison on the effectiveness of the Energy System Program. A Linear Regression Analysis Tool readily available in Microsoft Excel can develop relatively accurate predictive models that can forecast future energy usage using past performance for the model development inputs.

<http://support.microsoft.com/kb/103839>



ENERGY SYSTEM PROGRAMS

II. Not just measuring energy usage by facilities and equipment but evaluating these usages against appropriate criteria.

<u>2006</u>	<u>Actual</u>	<u>Clg. Deg.</u>	<u>Product</u>	<u>Product</u>	<u>2007</u>	<u>Actual</u>	<u>Clg. Deg.</u>	<u>Product</u>	<u>Product</u>	<u>Projected</u>
	<u>MWHR</u>	<u>Days</u>	<u>Output A</u>	<u>Output B</u>		<u>MWHR</u>	<u>Days</u>	<u>Output A</u>	<u>Output B</u>	<u>MWHR</u>
APR	11,124	5	162,402	140,187	APR	12,298	3	199,754	165,421	12,057
MAY	12,398	20	180,244	162,589	MAY	13,638	27	227,107	204,862	14,059
JUN	13,013	30	201,844	191,822	JUN	14,321	33	238,176	235,941	14,918
JUL	14,725	44	216,464	221,056	JUL	15,425	45	257,592	271,899	16,237

X Axis Intercept = 6,199.30

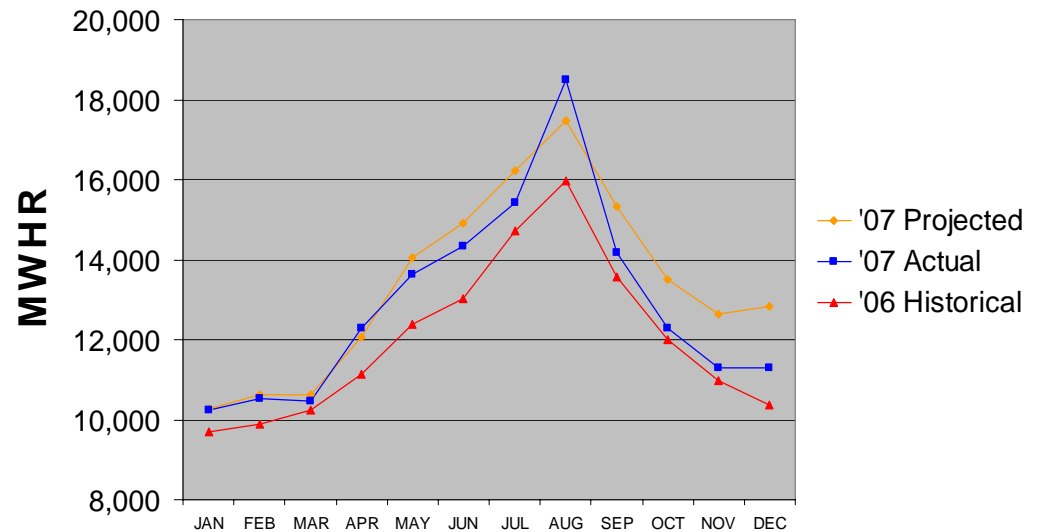
Multiplier for Clg. Deg. Days = 41.37

Multiplier for Production Output A = 0.01765

Multiplier for Production Output B = 0.01335

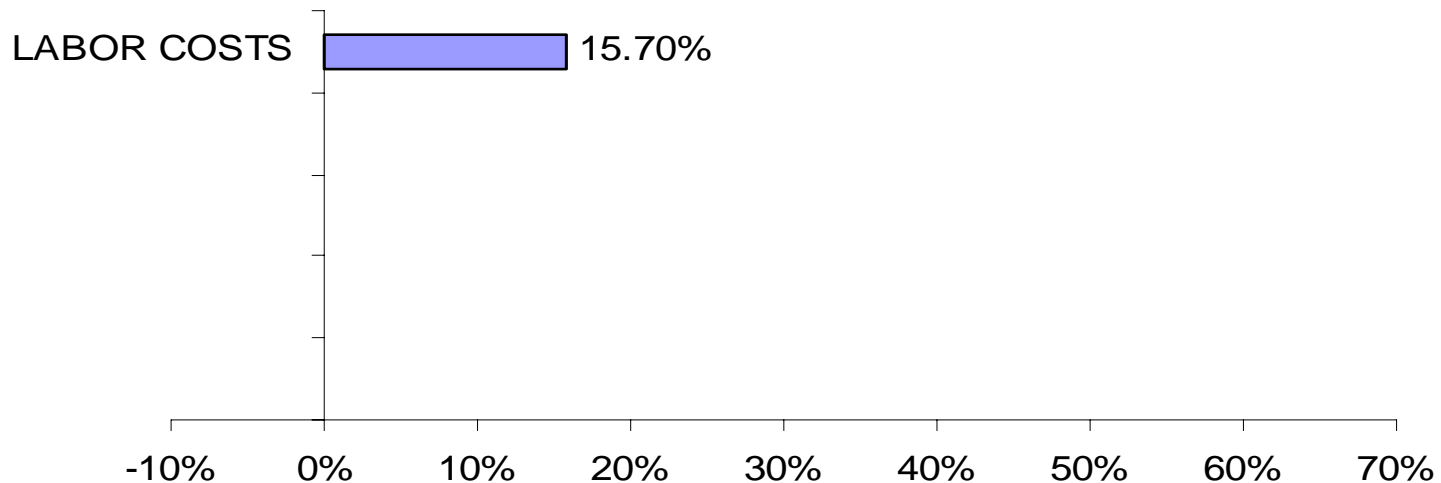
Accuracy = 98.5%

ELECTRICAL USAGE COMPARISON

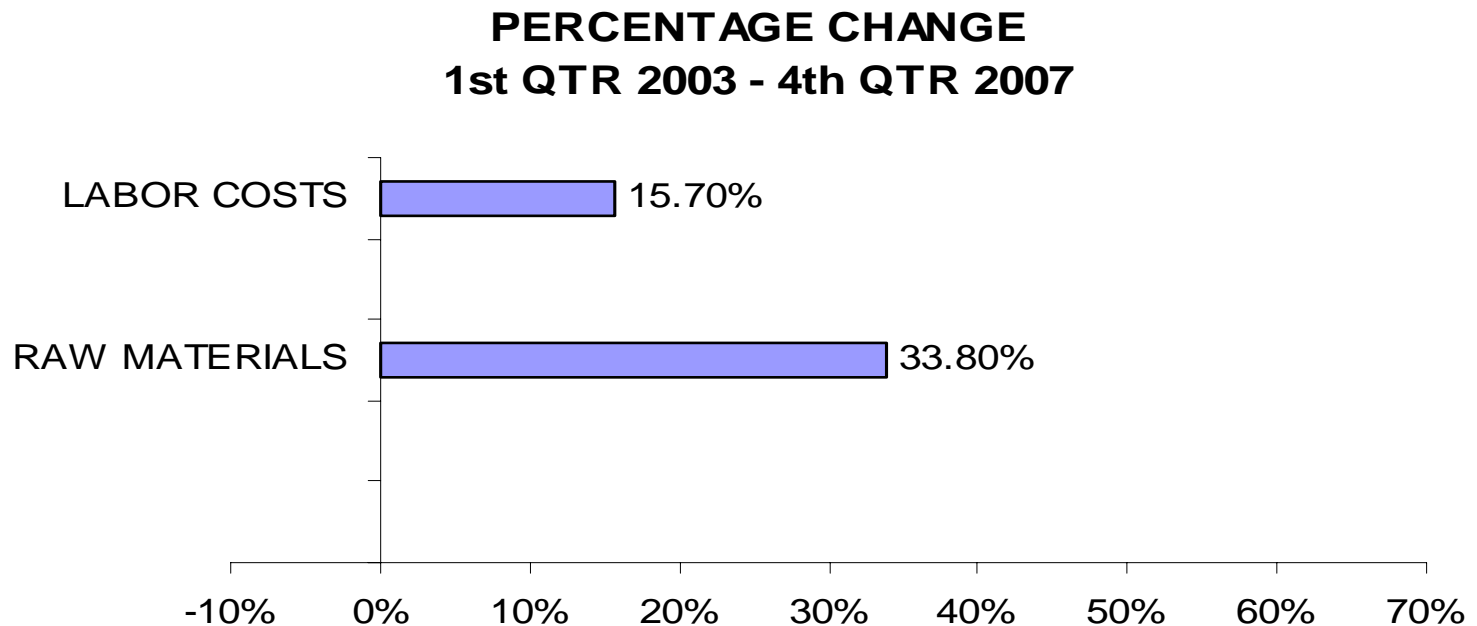


III. Incorporating an evaluation of the impact to a company's energy position when looking at the decision criteria for capital projects, purchases and operational process changes.

PERCENTAGE CHANGE
1st QTR 2003 - 4th QTR 2007

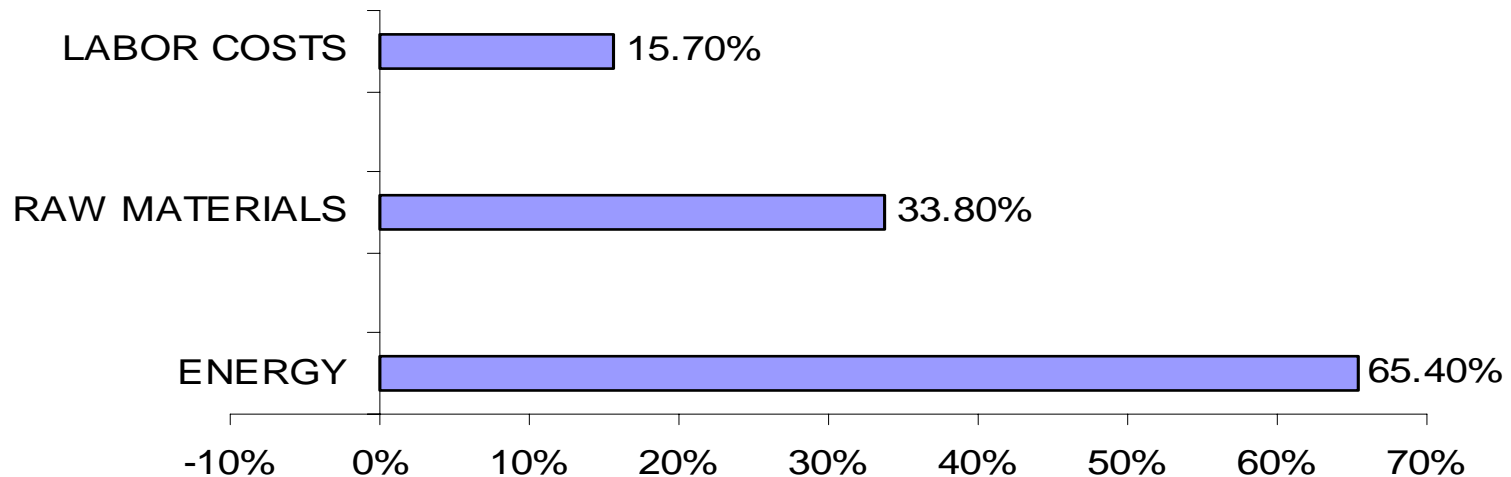


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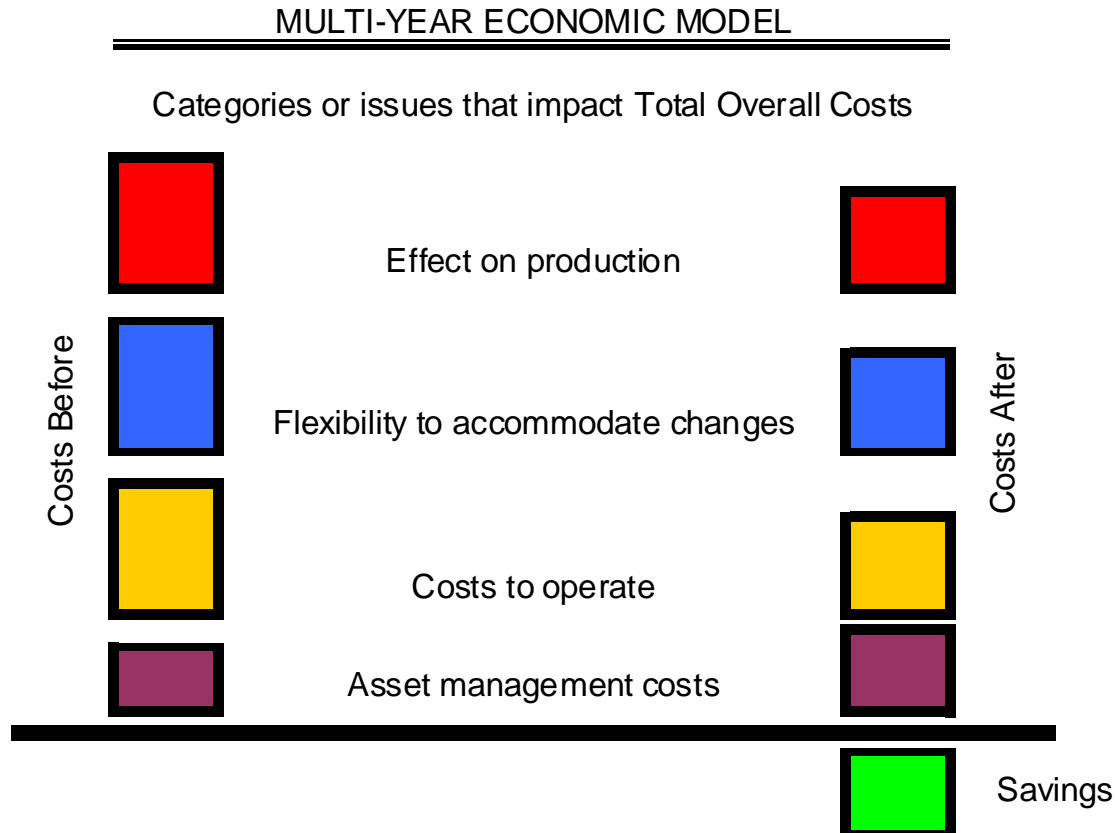


III. Incorporating an evaluation of the impact to a company's energy position when looking at the decision criteria for capital projects, purchases and operational process changes.

With energy spending showing the highest rate of increase -

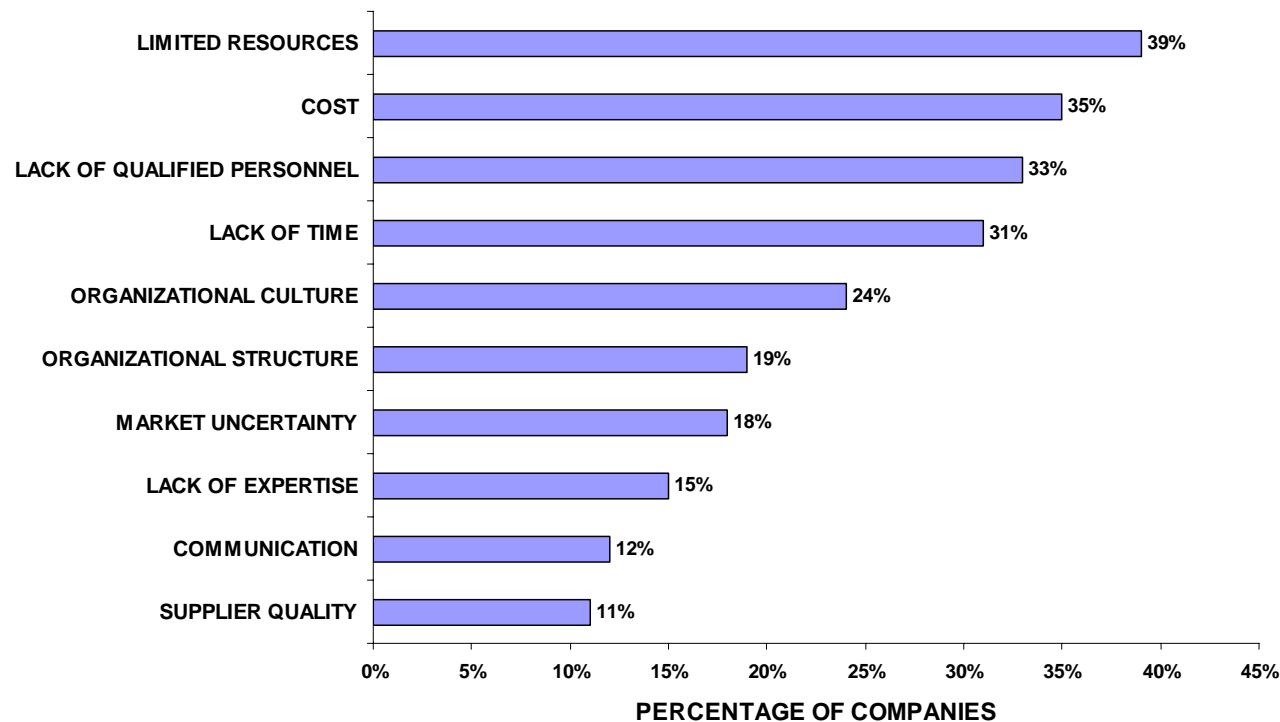
- The justification of capital projects should include an evaluation of the impact to the company's energy position.
- Engineering and facility operations need to be consulted on appropriate purchases to make sure that energy efficient equipment and controls are purchased.
- Operational process changes need to be evaluated to insure improvements in productivity are not offset by additional costs in a plant's energy spend.

IV. Recognizing that the Energy System Program affects the total overall cost for the facility.



- V. Dedicating a certain percentage of annual budgets to the Energy System Program and bringing outside resources into the process to deliver critical mass and continuity.

TOP TEN CONSTRAINTS ON PERFORMANCE IMPROVEMENT





ENERGY SYSTEM PROGRAMS

- V. Dedicating a certain percentage of annual budgets to the Energy System Program and bringing outside resources into the process to deliver critical mass and continuity.

Duke Energy has an operations group that is chartered to work as an extension of the customers staff to provide the critical mass in developing and maintaining effective Energy Systems Programs.

Our success is measured by helping the customer implement lower total overall cost solutions.

Your comments and questions are appreciated –

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