

CHP at Geisinger Medical Center



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Air Quality – US EPA

Electricity generation is the dominant industrial source of air emissions in the United States today. Fossil fuel-fired power plants are responsible for 67 percent of the nation's sulfur dioxide emissions, 23 percent of nitrogen oxide emissions, and 40 percent of man-made carbon dioxide emissions. These emissions can lead to smog, acid rain, and haze. In addition, these power plant emissions increase the risk of climate change.

Applicability

Hospitals are ideal candidates for CHP because of their 24/7 operation and relatively high off season heat load (sterilization, reheat, humidification, hot water, etc.)

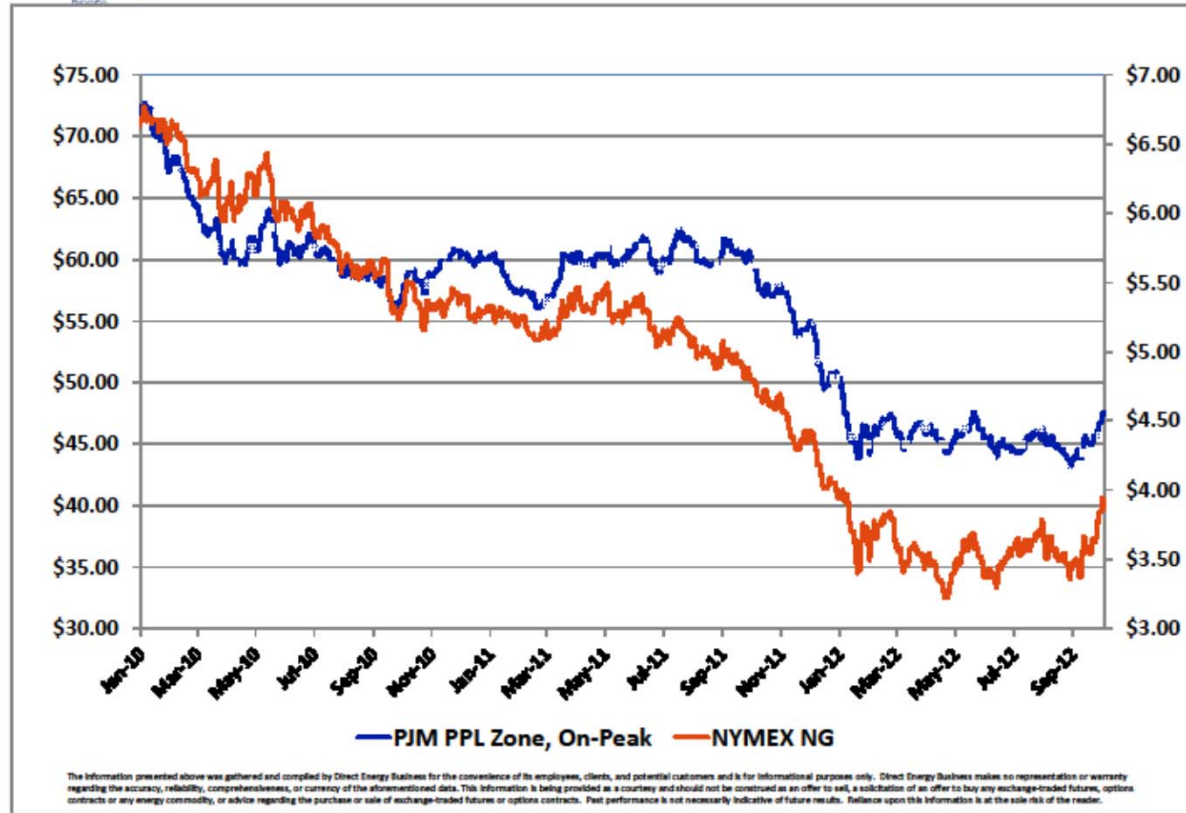
Improving efficiency and the resultant reductions in air pollution compliments healthcare's mission

Low margins in healthcare make this type of project more attractive

Gas vs. Electric Pricing



PJM PPL Zone vs NYMEX Natural Gas, Calendar 2013



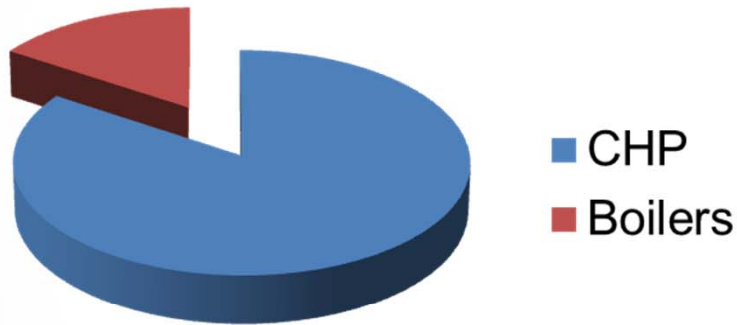
10/3/2012

Project Economics

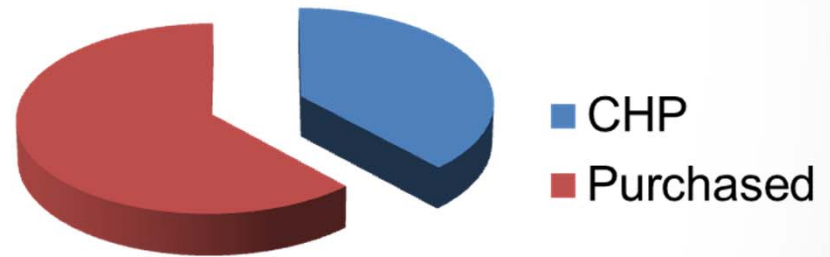
Cost of Cogeneration Project	\$5,300,000
DEP Green Energy Works Grant	\$2,250,000
PPL Act 129 Grant	\$500,000
Net Cost	\$2,550,000
Annual Savings	\$2,200,000
Return on Investment (84% IRR, \$9,367,822 NPV)	14 Months

Cogen Contribution

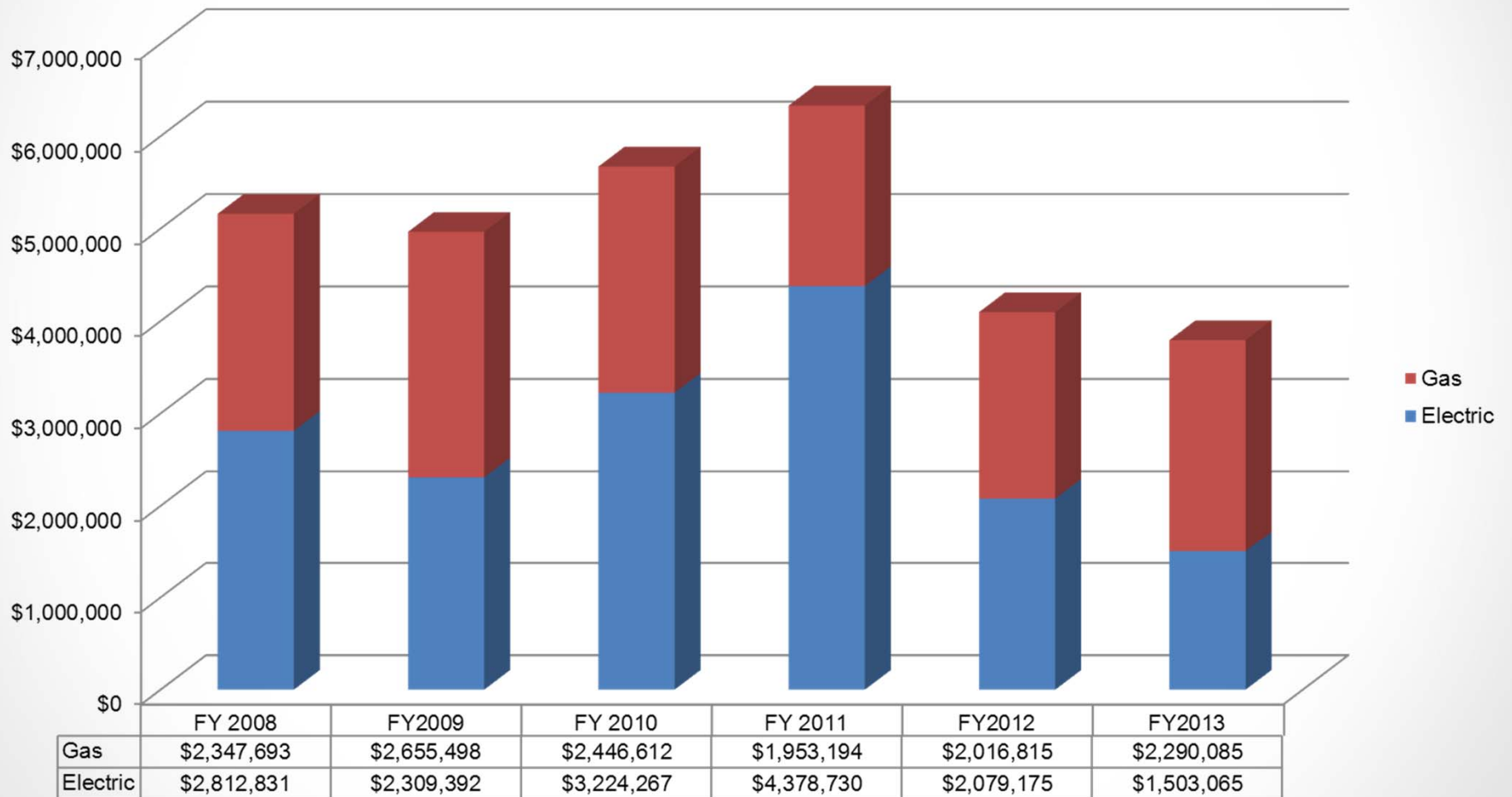
Steam Production



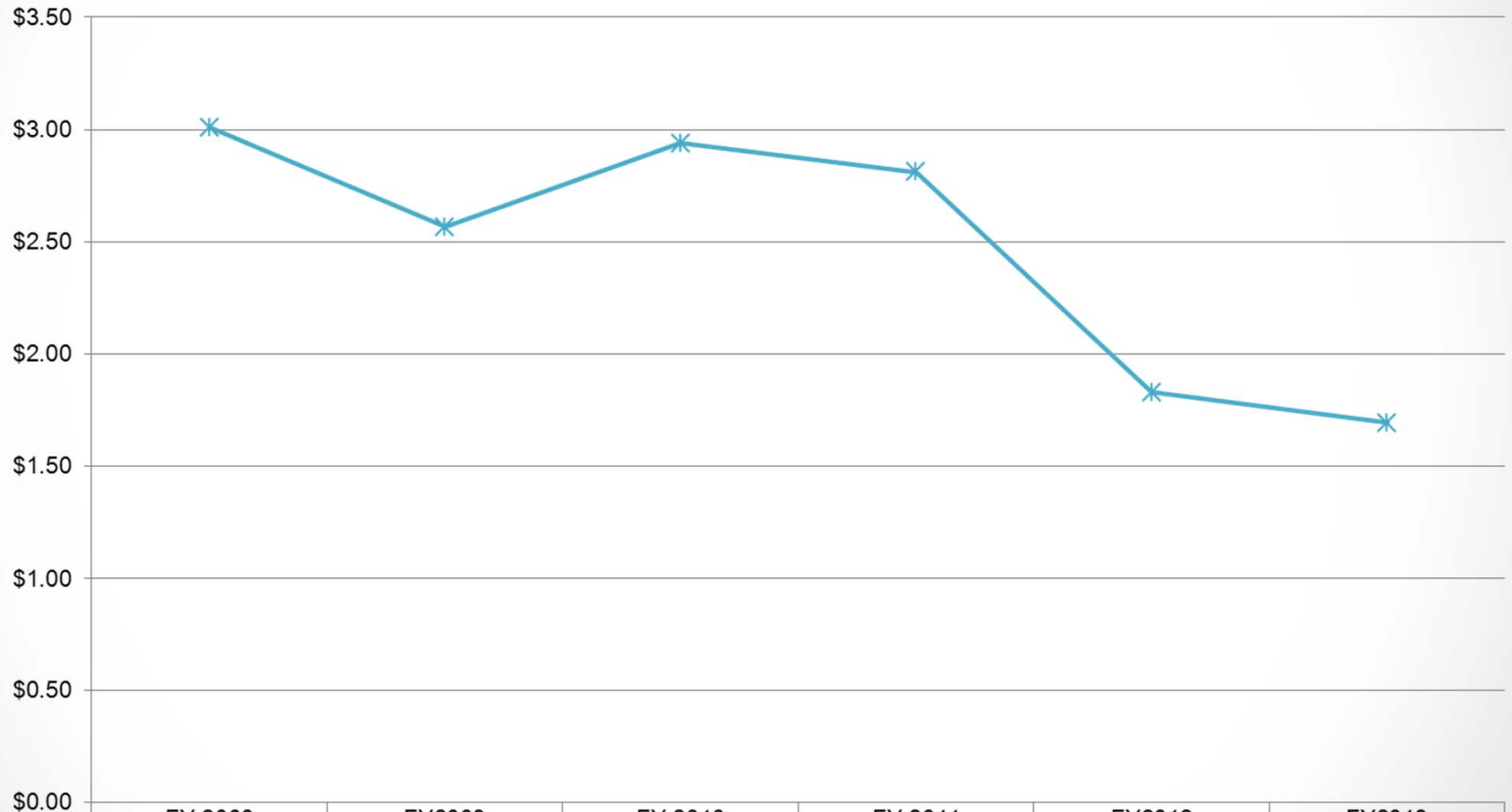
Electricity



GMC Utility Costs



Campus Energy Cost per Square Foot



	FY 2008	FY2009	FY 2010	FY 2011	FY2012	FY2013
Cost/sqft	\$3.01	\$2.57	\$2.94	\$2.81	\$1.83	\$1.69

Net Effect of Energy Reduction

	CHP
Generation(kWh)	37,600,000
Savings	\$2,500,000
Pollutants Generated	
<i>SO₂ (Tons)</i>	161.74
<i>NOx (Tons)</i>	34.33
<i>CO₂ (Tons)</i>	22,235.92
<i>Mercury (Tons)</i>	1.87
Heath Incidents per Million	
<i>Premature Death</i>	.5
<i>Chronic Bronchitis</i>	.32
<i>Hospital Visits</i>	.45
<i>Asthma attacks</i>	10.27
<i>Respiratory Symptoms</i>	489.95
<i>Work Loss Days</i>	90.37
Societal Value	\$3,812,944
Direct Medical Costs	\$467,725

Social Impacts From Previous Example Based on a Served Population of 2.6 million

Premature Death	1.30
Chronic Bronchitis	.83
Hospital Visits	1.17
Asthma Attacks	26.70
Respiratory Symptoms	1,273.97
Work Loss Days	234.96
Societal Value	\$9,913,654
Direct Medical Costs	\$1,216,085

Suggested Policy Enhancements to Promote CHP

Permit by Rule – Since there are a limited types of machines available, and all have similar emissions data, if a machine has demonstrated compliance to DEP, waive permitting for subsequent applications as is done with infectious waste processing machines

Act 129 – Require that CHP is specifically addressed in future Act 129 filings.

Utility Extensions – We are seeing exorbitant costs and delays for gas main extensions that may end up benefitting other customers.

Economic Incentives – CHP benefits from economies of scale. Unfortunately, without external incentives, smaller scale viable projects are not implemented.