

# 240 CPS / ITP Project

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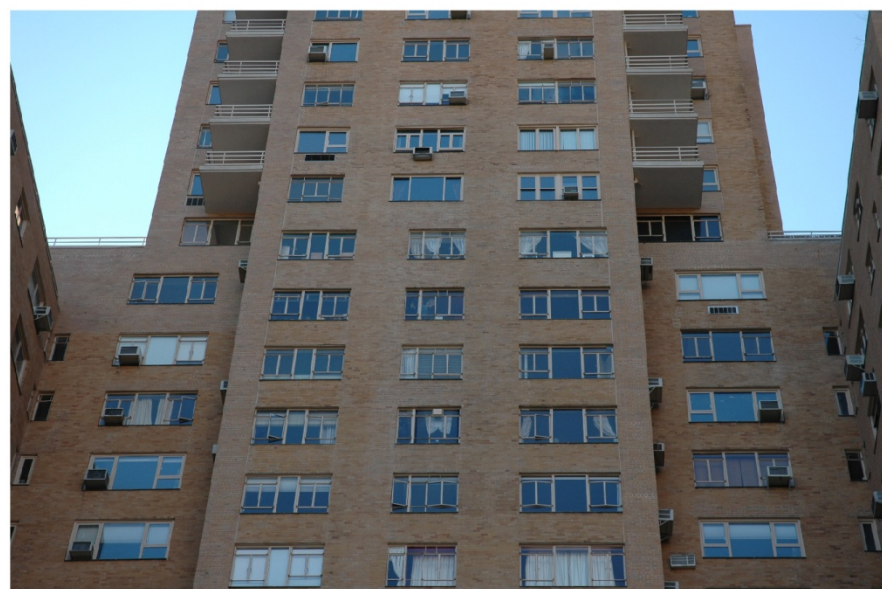
Photo by Trix Rosen

# History

- Built in 1940.
- We acquired in 1976.
- Landmarked in 2002.
- Major renovation 2005-2007 including façade, storefronts, electrical, hallways, lobby.
- Won a Lucy G Moses Preservation Award from NY Landmarks Conservancy in 2007.
- Added to National Historic Register in 2007.
- Windows have been a point of contention.



BEFORE



AFTER

BEFORE



AFTER



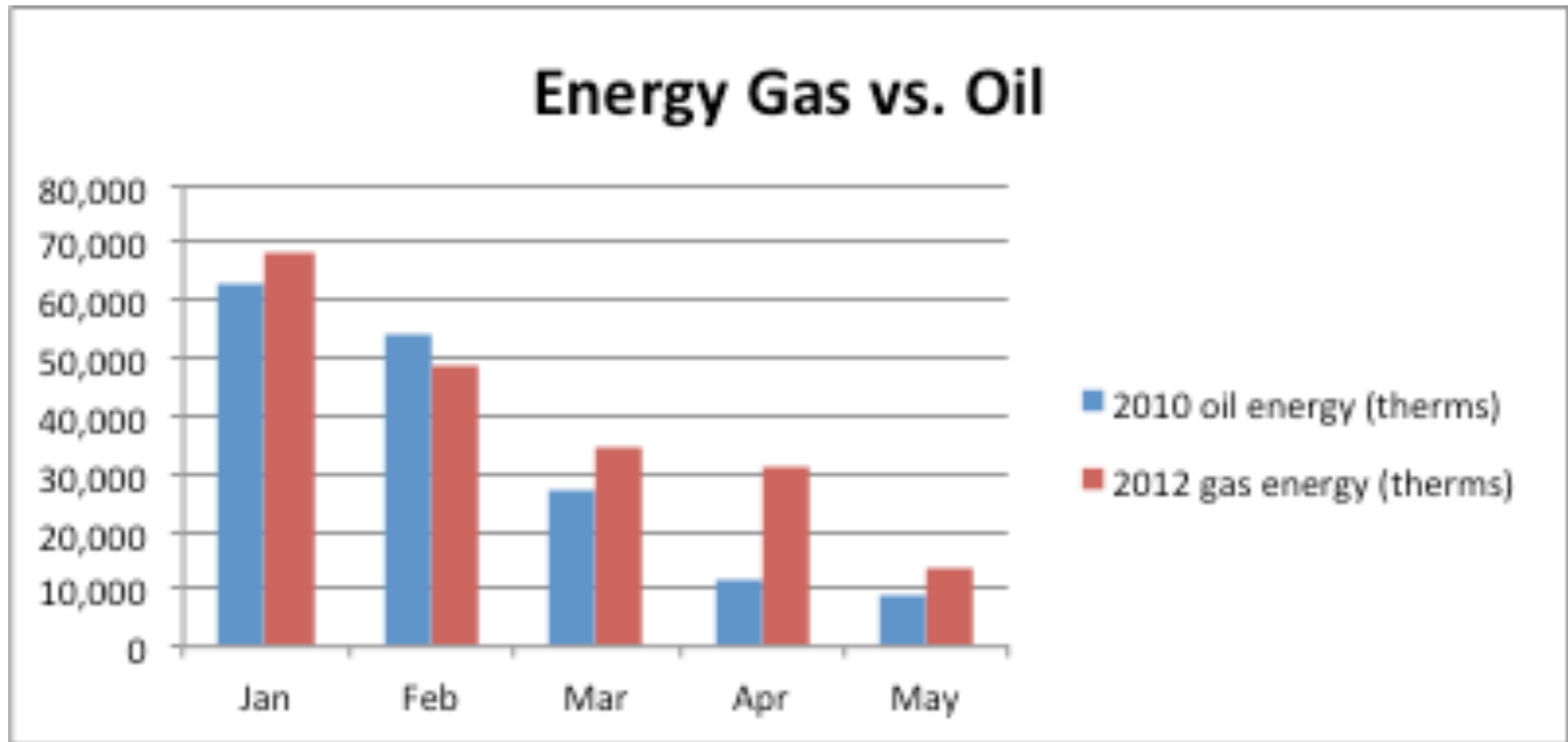
# Energy (so far)

- By converting to direct metering in 2007, we believe that we substantially reduced tenant electric usage (unquantified) .
- Converted building areas to more efficient lighting in 2009. Annual building electricity bills went from \$300K to \$200K.
- Converted from #6 oil to natural gas in Feb 2011 for heating and hot water. Carbon footprint for equivalent energy production is 30% lower, based on NYSERDA guidelines. Also eliminated other nasty emissions.
- Expected payback 5 years; current outlook uncertain.
- In July 2011, switched building electric supply to ESCO Green Mountain Energy, which buys energy credits from all renewable sources.

# Energy Costs at 240 CPS

	2012 to Date	2011	2010	2009	2008
<b>ELECTRICITY</b>	128,073	195,332	199,618	203,617	299,431
<b>OIL (Conv 2/14/11)</b>	0	185,756	401,067	329,499	384,433
<b>GAS-Heat/Hot Water</b>	302,831	94,976	0	0	0
<b>GAS-Laundry/Hallways/Misc</b>	19,653	24,952	34,390	45,846	33,192
<b>TOTAL ENERGY</b>	450,557	501,017	635,075	578,962	717,055

# Oil to Gas Conundrum





# Windows/HVAC Project

- Currently working with engineering firm to investigate cost / benefits of replacing windows and installing HVAC system.
- Heat pumps replace radiators.
- Use existing radiator pipes.
- Cooling tower on roof to reduce temperature of circulated water in summer.
- Problem: 600 renovations.



240 CPS

## Window Replacement



actual therms	quest results	U=0.27 + them brk	plus infiltration
62,643	51,200	43700	38100
54,023	40,500	34700	30300
26,811	34,500	29900	26300
11,673	22,400	19900	17400
8,832	11,800	11400	11100
9,000	8,800	8800	8800
10,500	8,100	8100	8100
7,610	7,400	7400	7400
8,899	7,300	7300	7300
14,940	13,400	11700	10400
21,113	27,000	23100	20000
38,723	41,200	34900	30400
<b>212,123.35</b>	<b>222,400</b>	<b>197,200</b>	<b>177,500</b>
Cost in \$	222,400	197,200	177,500
\$1/therm			

# Energy (going forward)

- Increased use of LEDs and dimming fluorescents.
- Understand gas usage.
- Considering adding a co-generation system, which would use natural gas to produce building electricity, use waste heat for hot water.
- Considering arrangements for replacing inefficient tenant appliances.
- Identifying pipe insulation problems?
- Possibilities for better distribution of heat with ventilation?
- Increased use of motion sensing, CO2 sensing?
- Smarter timing of domestic water pumping to roof?
- White roofing?
- Possibilities for solar?

# Leaks

- A cost issue and a quality of life issue.
- Since renovation, exterior leaks are rare, but 70 year old water pipes are a problem.
- Costs average \$100K per year.
- Domestic hot and cold water, waste water and hot water for radiators.
- A statistical understanding of types and root causes would be helpful.
- Prevention ideal. Early detection would be highly beneficial.
- Cheap ubiquitous water sensors?
- Level sensors in tanks?
- Flow or vibration sensors for pipes? Leak signatures?
- Looked into coating pipes; works better for larger pipes.

# Why are we doing this?

- a) So our children know we care about the planet.
- b) Bragging rights at cocktail parties.
- c) Save a few bucks.
- d) It's fun.
- e) We may learn something.
- f) Opportunity to make a better building.
- g) Opportunity to demonstrate feasibility to other building owners.
- h) All of the above.

# Collaboration with ITP

- Share some of the challenges of a large pre-war building and our ideas about possible improvements.
- Look to students for ideas, projects and prototypes which may help us improve or suggest useful future directions.
- Low power, low maintenance, low cost wireless sensors could be a game changer.
- Unexpected innovations, like Transpiration.