

240 CPS / ITP Project

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Photo by Trix Rosen

History

- Built in 1940.
- We acquired in 1976.
- Landmarked in 2003.
- 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



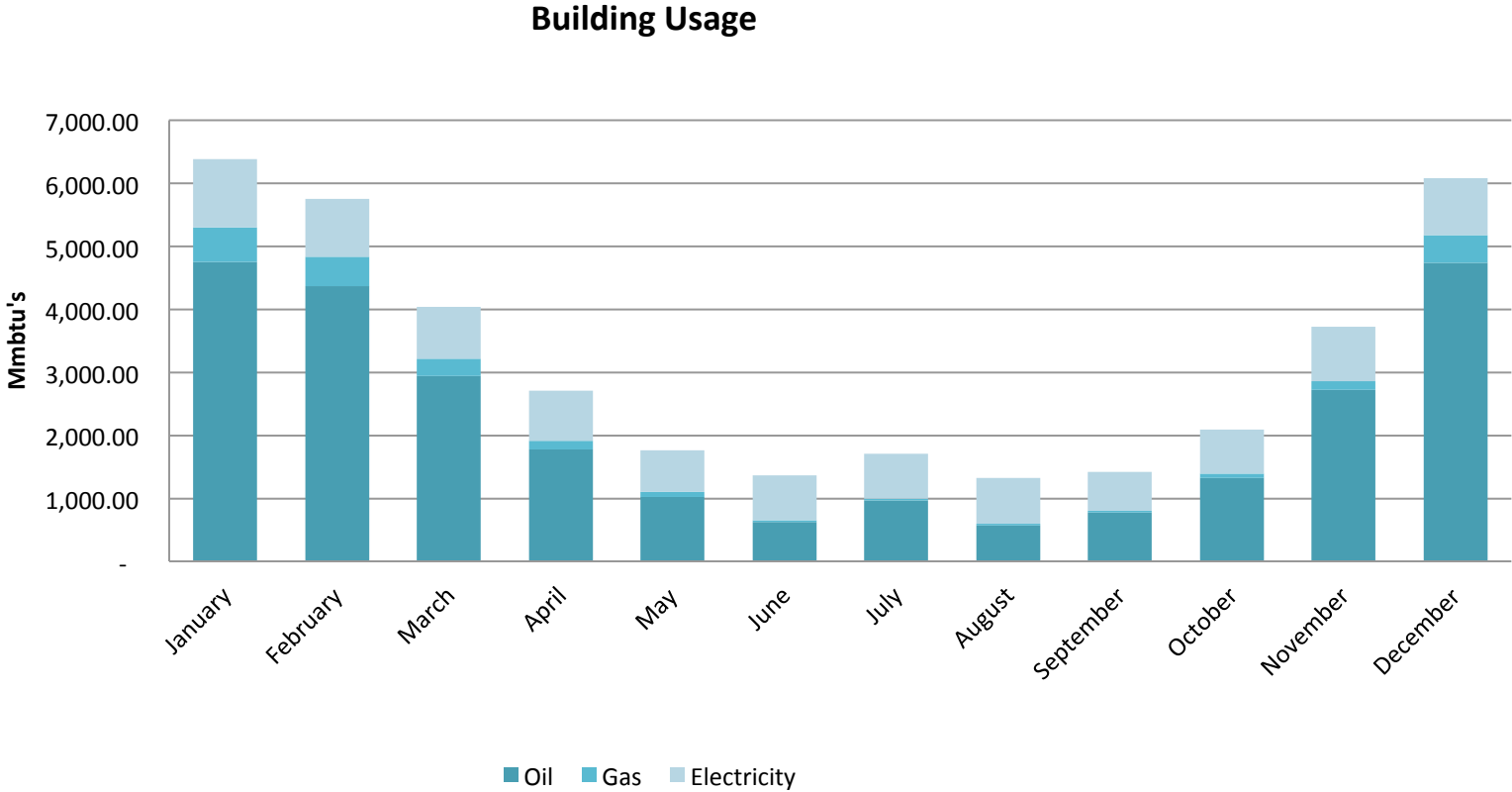
AFTER



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.
- Payback TBD, expect 5 years.
- Note: some thorny issues with natural gas.
- In July 2011, switched building electric supply to ESCO Green Mountain Energy, which buys energy credits from all renewable sources.

Building Energy Usage in 2010



Note: Does not include tenant electricity or gas.

Energy (going forward)

- Measurement and Benchmarking
- Exploring options for HVAC and windows.
- Comprehensive solution is very challenging in an occupied building of this vintage.
- Concurrently exploring alternatives for more efficient heating.
- Suitability of thermostatic radiator valves?
- Benefits of flow control for heating risers?
- Ubiquitous heat sensors :
 - to understand factors in heat loss
 - for local control
- Tradeoffs in window ACs vs. hybrid options?
- Possibilities for better distribution of heat with ventilation?
- Increased use of motion sensing, CO2 sensing?
- Considering adding a co-generation system, which would use natural gas to produce building electricity, use waste heat for hot water.
- Smarter timing of domestic water pumping to roof.
- Identifying pipe insulation problems.
- Increased use of LEDs as technology evolves.
- Considering arrangements for replacing inefficient tenant appliances.
- Investigating possible reuse of potential energy from elevator loads.
- 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.
- 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?

Why do this?

- a) So my children know I care about the planet.
- b) Bragging rights at cocktail parties.
- c) Save a few bucks.
- d) It's fun.
- e) Opportunity to make a better building.
- f) Opportunity to demonstrate feasibility to other building owners.
- g) 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.