Fixing Steam Systems

Something Old;
Something New
Looking for Answers

• The Deutsche Bank Americas Foundation & Living Cities Study

• First phase: 33 buildings
  – 15 “new” (post-war)
  – 18 “old” (pre-war)

• Second phase: 200+ buildings

• At least 1 year post-retrofit bills needed
Pre-Retrofit Heating Energy Utilization

![Chart showing energy utilization comparison between new and old buildings before retrofit.](chart.png)
Case Study: 150-unit Pre/Post War
3. 150-unit Pre/Post War

Operating Cost Projections & Performance

- Building Space Heating
- Building DHW
- Common Area Electric
- Apartment Electric

Pre-Construction
Projected
Actual
3. 150-unit Pre/Post War

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Costs range from $50,000 to $250,000.
150-unit Pre/Post War

Building Space Heating
- Boiler & Control Upgrade
  - Building air sealing
  - Seal and balance ventilation
  - Window upgrade
  - Roof insulation

Domestic Hot Water (DHW)
- Boiler & Control Upgrade
  - Low-flow showerheads
  - Clothes washer upgrade

Common Area Electric
- Common area lighting upgrade
  - Clothes washer upgrade

Apartment Electric
- Apartment refrigerator upgrade
The Basics: One-Pipe Steam Retrofits

- Drying steam/eliminating water hammer
- Improved air venting
- TRVs
- Boiler controls

“Master venting”
The Basics: Quick Assessment of Steam Trap Function
The Basics: Quick Assessment of Steam Trap Function
TRVs in Action

• First cycle, TRV senses a room is already warm and stops steam before overheating occurs.

• Next cycle, the space is cooler and more steam is let in, heating the radiator more fully.
Effective Retrofits for Two-Pipe Steam

Inlet Orifices

Drop-in Valve Retrofits
Case Study: 77-unit Manhattan Coop

Heating System Recommendations

– Inlet Orifices
– TRVs
– Enhanced Central Controls

(controls consulting by Jonathan Flothow, The Steam Balancing Company)
Case Study: 77-unit Manhattan Coop

– Wireless space temp sensors
– Averaging thermostat
– Abandons steam cycle concept
– Approaches operation of simpler systems
Case Study: 77-unit Manhattan Coop

– Steam pressure reset control
  • Adjusts header pressure according to outdoor temperature

• Boiler Min   216°F
• Boiler Max   240°F
• Outside Max  55°F
• Outside Min  0°F