Applications Considerations for Combined Heat & Power in Multifamily Buildings

Presented by:

Marc Zuluaga, PE

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Steven Winter Associates
307 7th Avenue NY, NY
212-564-0200

Who we are

Steven Winter Associates, Inc.

Building Systems Consultants - Founded 1972

- 20,000 + units of NYC housing in past several years – “owner’s rep’s for energy”
- 4 of first 5 ENERGY STAR High Rise Multifamily Buildings in the Country
- Actively Involved in NYC City Code Greening Efforts
- Strong emphasis on training: Local 32BJ, BPI
- Applied building research with NREL, NYSERDA and HUD

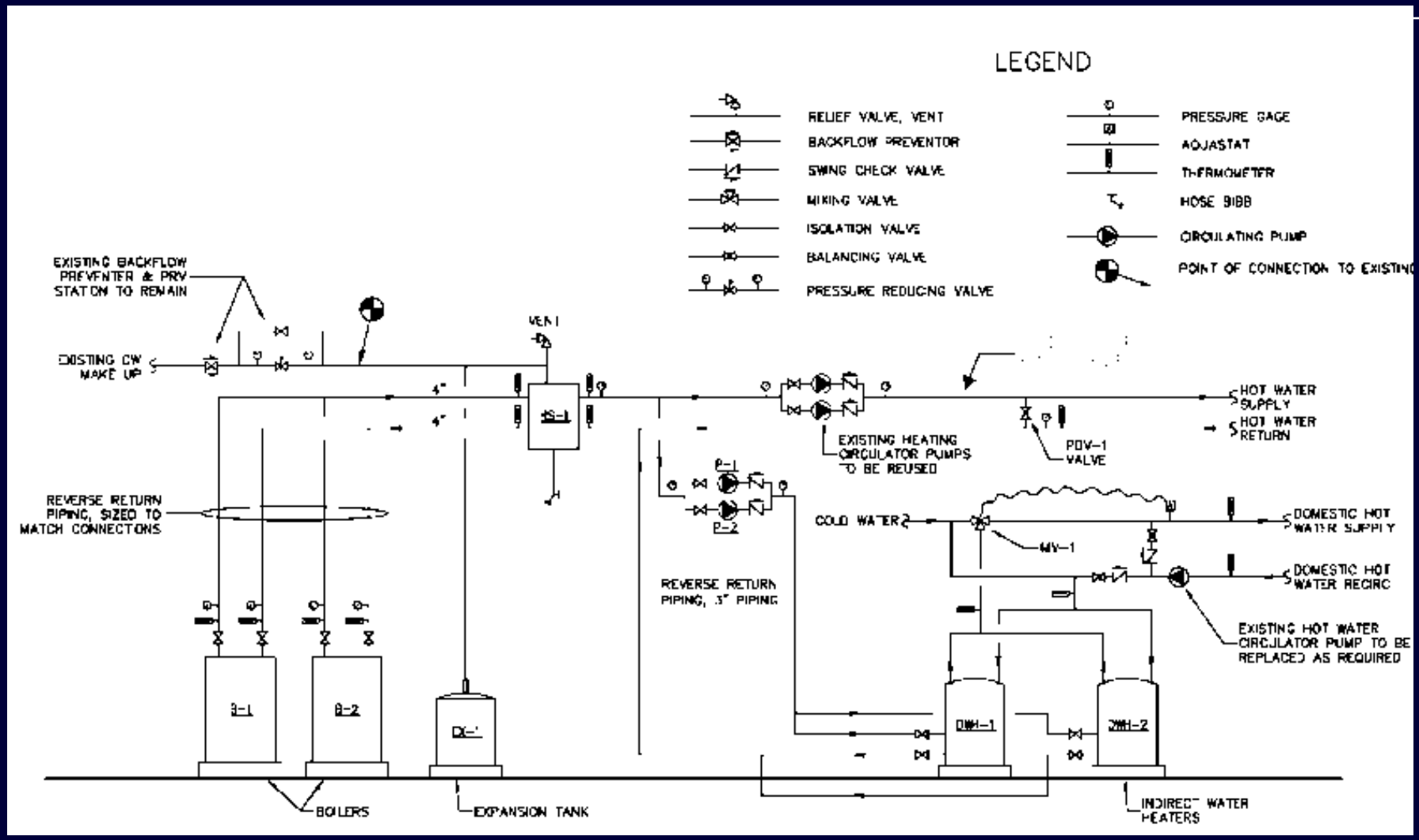
NYC Multifamily Market Characteristics & Considerations

- 20 – 100 apartments (20,000 – 100,000 ft2)
- Central Heating & DHW Plants
- Directly metered Apartment Electricity
- New Construction vs. Existing
- Market Rate vs. Affordable

Combined Central Heating & DHW Plants

Modular Atmospheric Best Practice

Combined Heating & DHW Plant -- Piping



Installation at “The Eltona” in the Bronx
2, 5 kW Eco Power CHP Units

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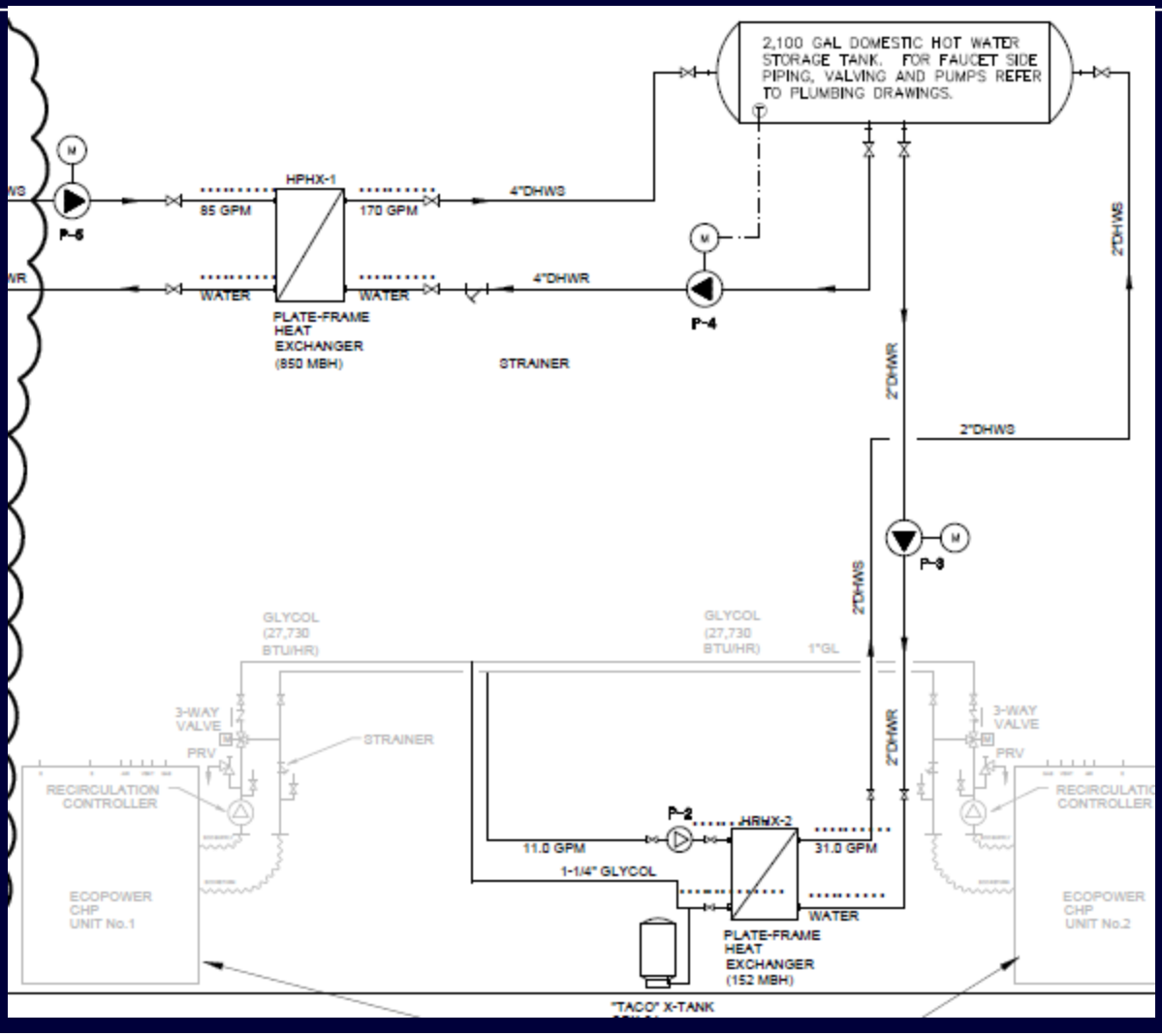
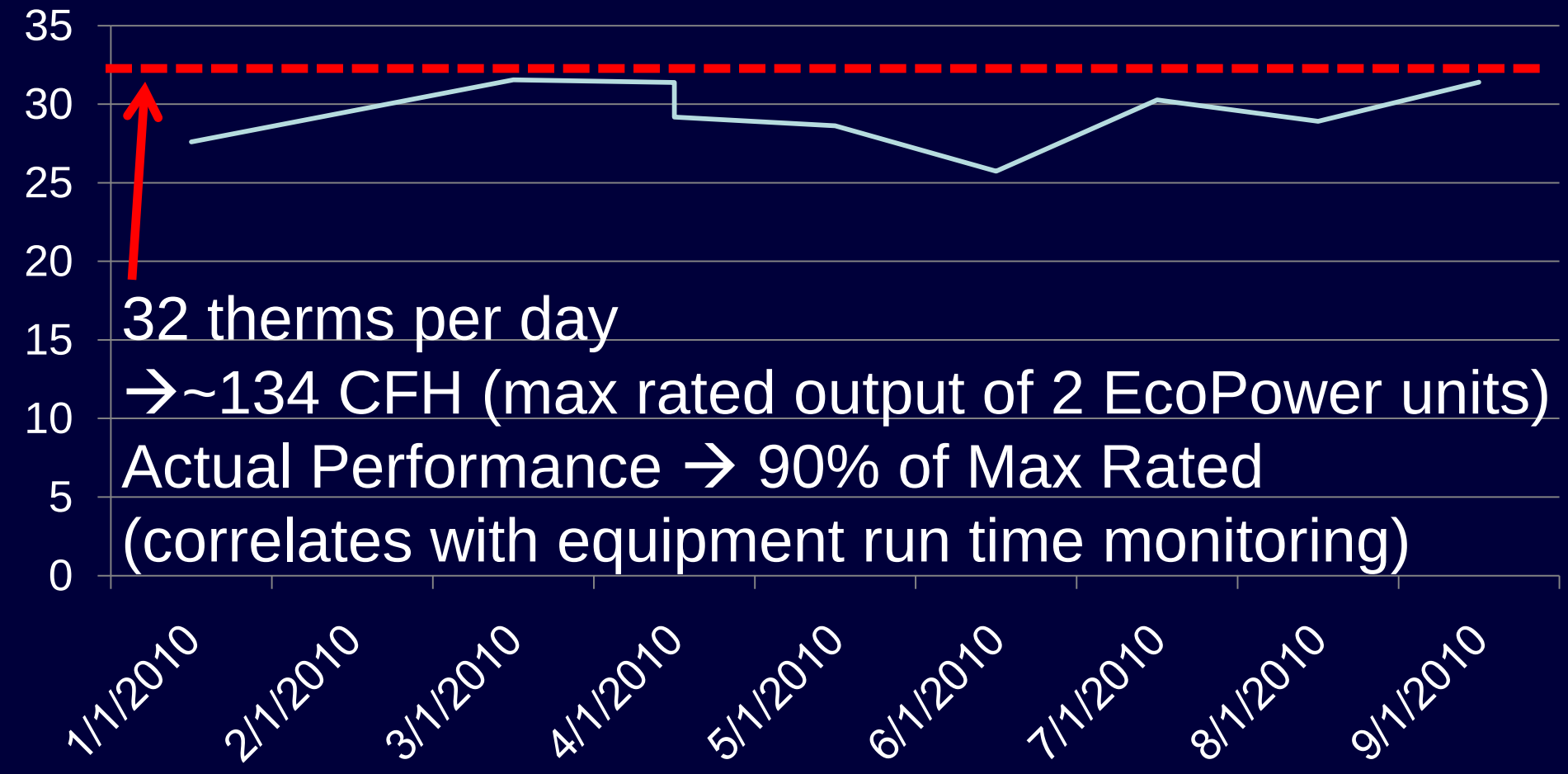
Eco Power Engine Specifications

Electrical Power	2 - 4.7 kW
Thermal Power	29,473 0 - 42652 BTU/hr
Gas Consumption	31.07 - 67.09 ft3/hr
Overall Efficiency	> 90% (Approximate)
Electrical / Thermal Output	25% / 65% (Approximate)

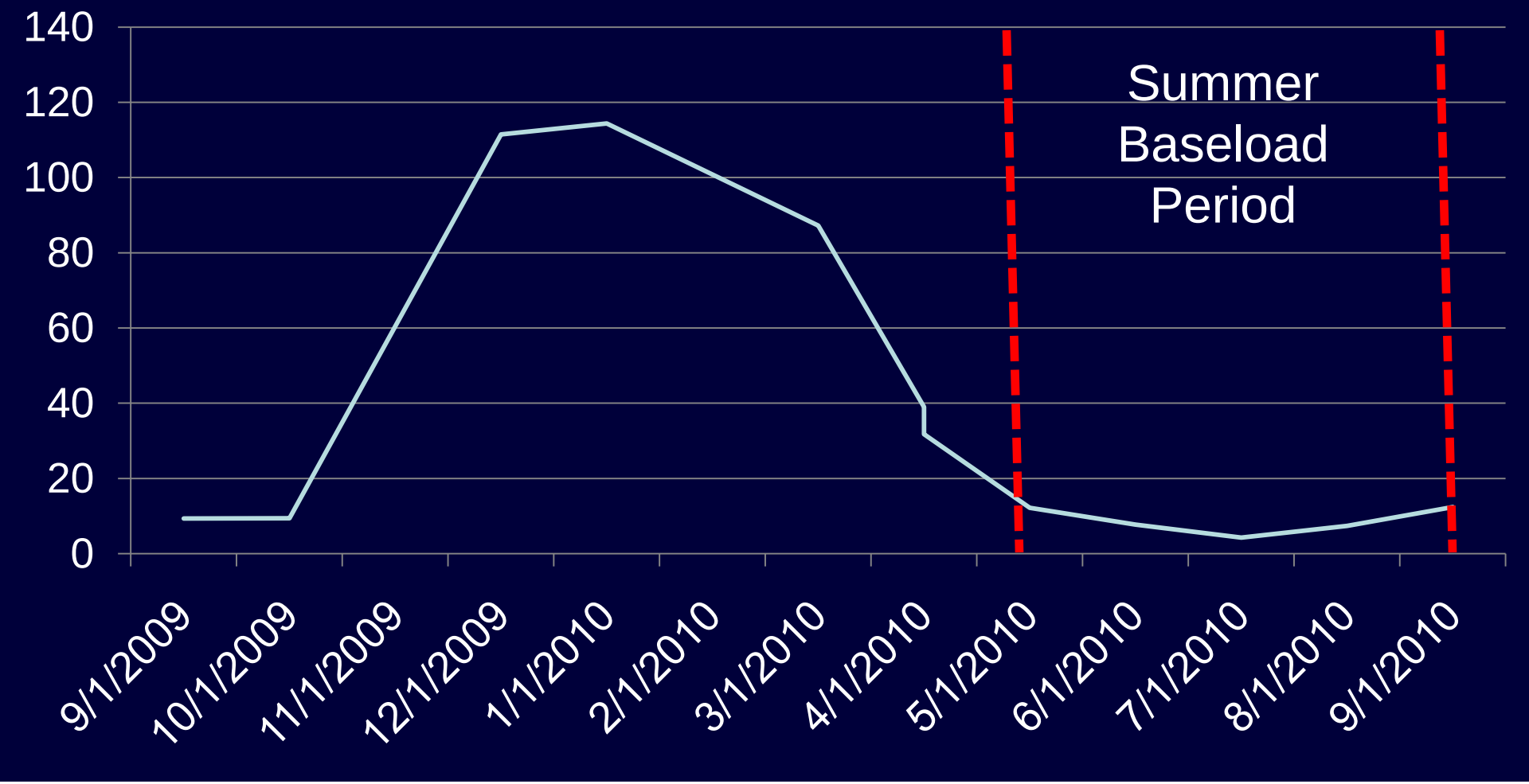
Central Plant Integration of Eco Power Units



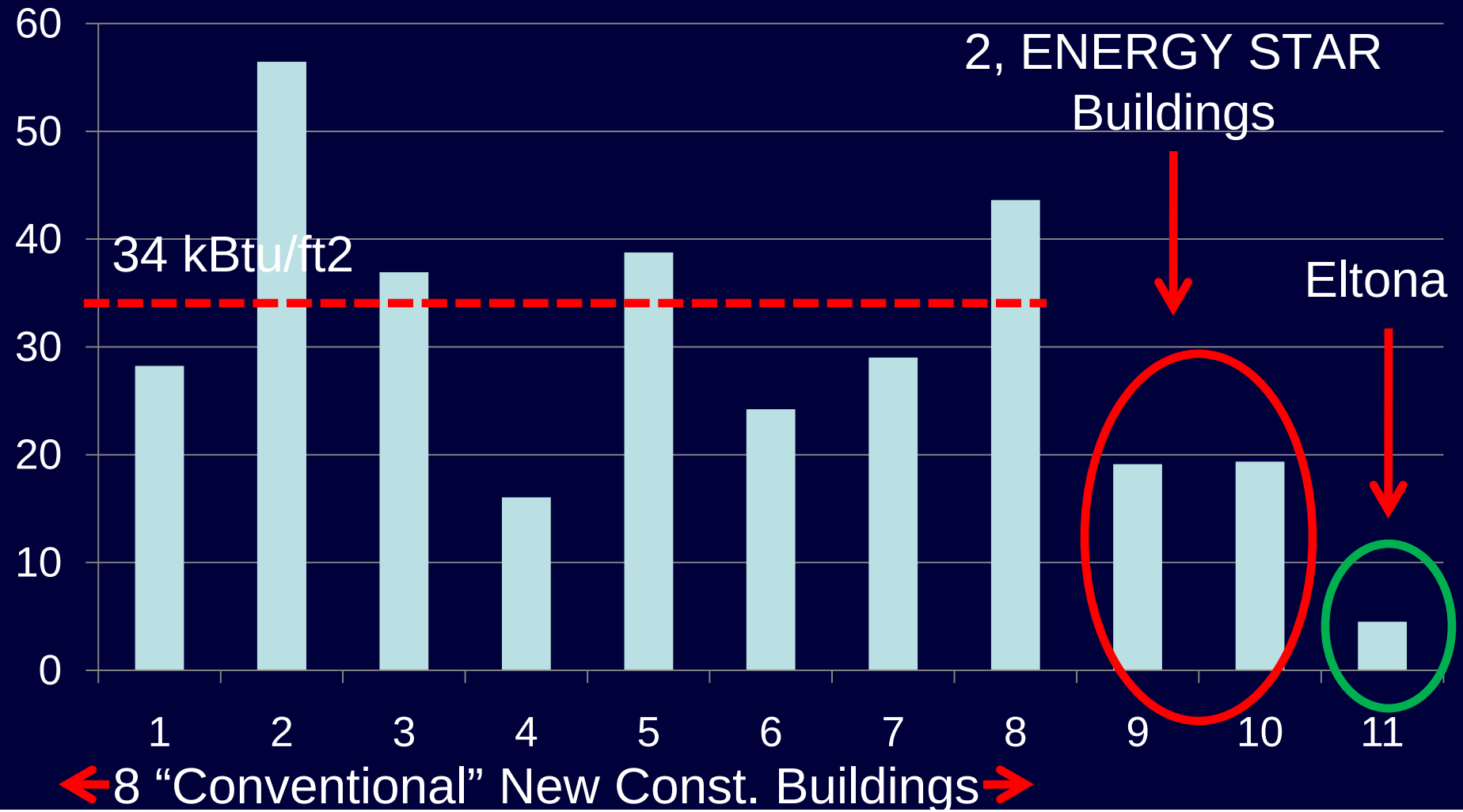
Gas Use of EcoPower Units at The Eltona
Therms per Day



Other Gas Use at The Eltona
Therms per Day



Baseload (DHW) Use in New NYC MF Buildings
kBtu per ft2



2009 – 2010 Utility Rates for The Eltona

Cogen Gas	$1.38 per Therm
Boiler Gas	$1.52 per Therm
Electricity (Blended)	$0.23 per kWh

Operating Costs Economics: Electricity

- Cost to Generate Electricity: $0.197 per kWH
- Assume 90% Run Time (7884 hrs per yr)

→Avoided Electricity = $18,010 per yr (including demand savings)

Operating Costs Economics: Gas Use

- Gas Use of CHP: 10,565 therms per yr
- Cost to Purchase Gas for CHP: $14,580 per yr

Operating Costs Economics: Thermal Recovery

- *Estimated* Displaced Gas Use Due to Thermal Energy Recovery: 5,738 therms per yr

  Assume: 85% efficient boiler plant

  Assume: *65% thermal efficiency*

  25% electric efficiency

- Avoided Gas Cost: $10,241 per yr

Operating Costs Economics: Maintenance Costs ???

- Assuming $0.02 per kWh generated:

→ $1,480 per year

Operating Cost Economics: Summary

Avoided Electric	$	18,012
Thermal Recovery	*$*	*10,241*
CHP Gas Use	$	14,579
Maintenance Contract	*$*	*1,482*
Net Annual Operating Cost Savings	$	12,192
Incremental Cost	$	95,000
Simple Payback	7.8 years	
Equipment Life	40,000+ hours 5+ years ???	

Other Multifamily Applications??