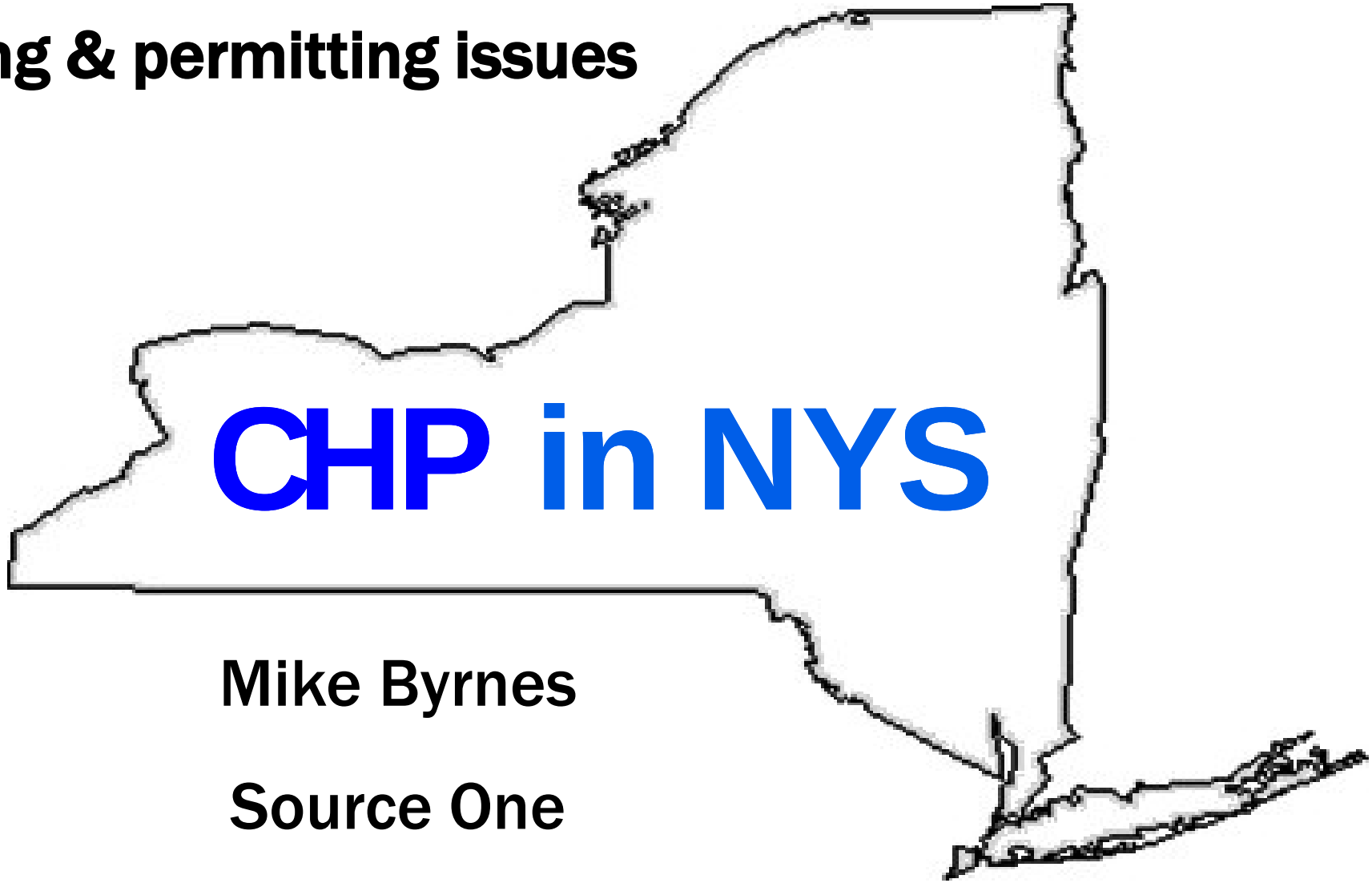
Siting & permitting issues



CHP in NYS

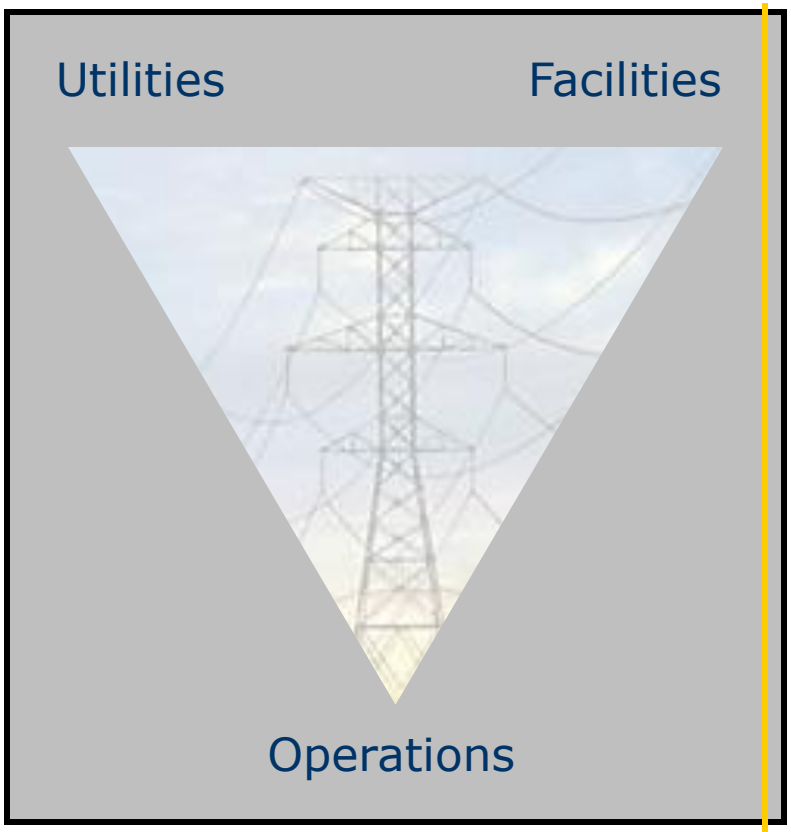
Mike Byrnes

Source One

Integrated Approach

CHP 2008

- ⇨ **Technical**
- ⇨ **Regulatory**
- ⇨ **Financial**



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Advantages of On-Site generation

CHP 2008

- ⇨ Improved reliability
- ⇨ Operational savings
- ⇨ Less Polluting
- ⇨ Improves value of asset
- ⇨ Attractive to tenants
- ⇨ Extends life of existing chilling and electrical equipment
- ⇨ Saves capital (Third party own and operate)

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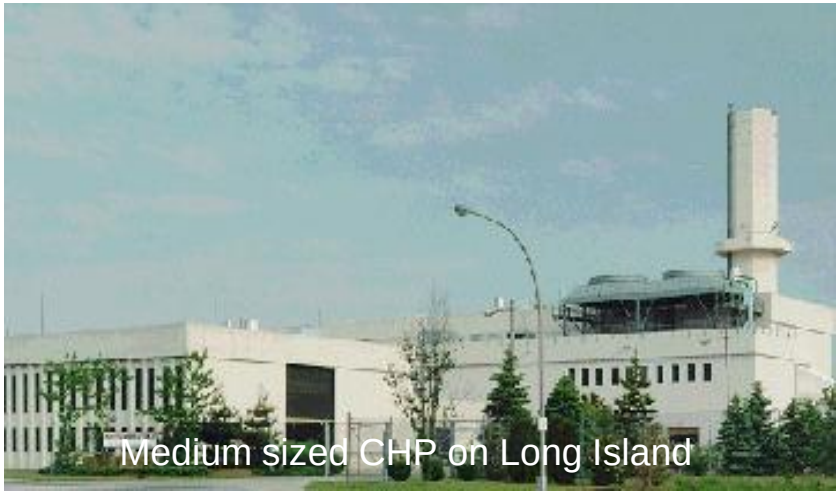
CHP Fatal Flaws

- ⇨ Fuel Availability
- ⇨ Regulatory issues
- ⇨ Siting restrictions
- ⇨ Constructability
- ⇨ Thermal/electric mix
- ⇨ Capital cost
- ⇨ Financial analysis

CHP Plants

Large CHP Serving Philadelphia


Medium sized CHP on Long Island

CHP on Office Building

Micro turbines serving office building

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Development Hurdles

- ⇨ Air Permitting
- ⇨ Siting issues
  - – Physical
  - – Franchise
  - – Zoning
  - – Utility
- ⇨ Fuel Availability

Federal Emissions Thresholds

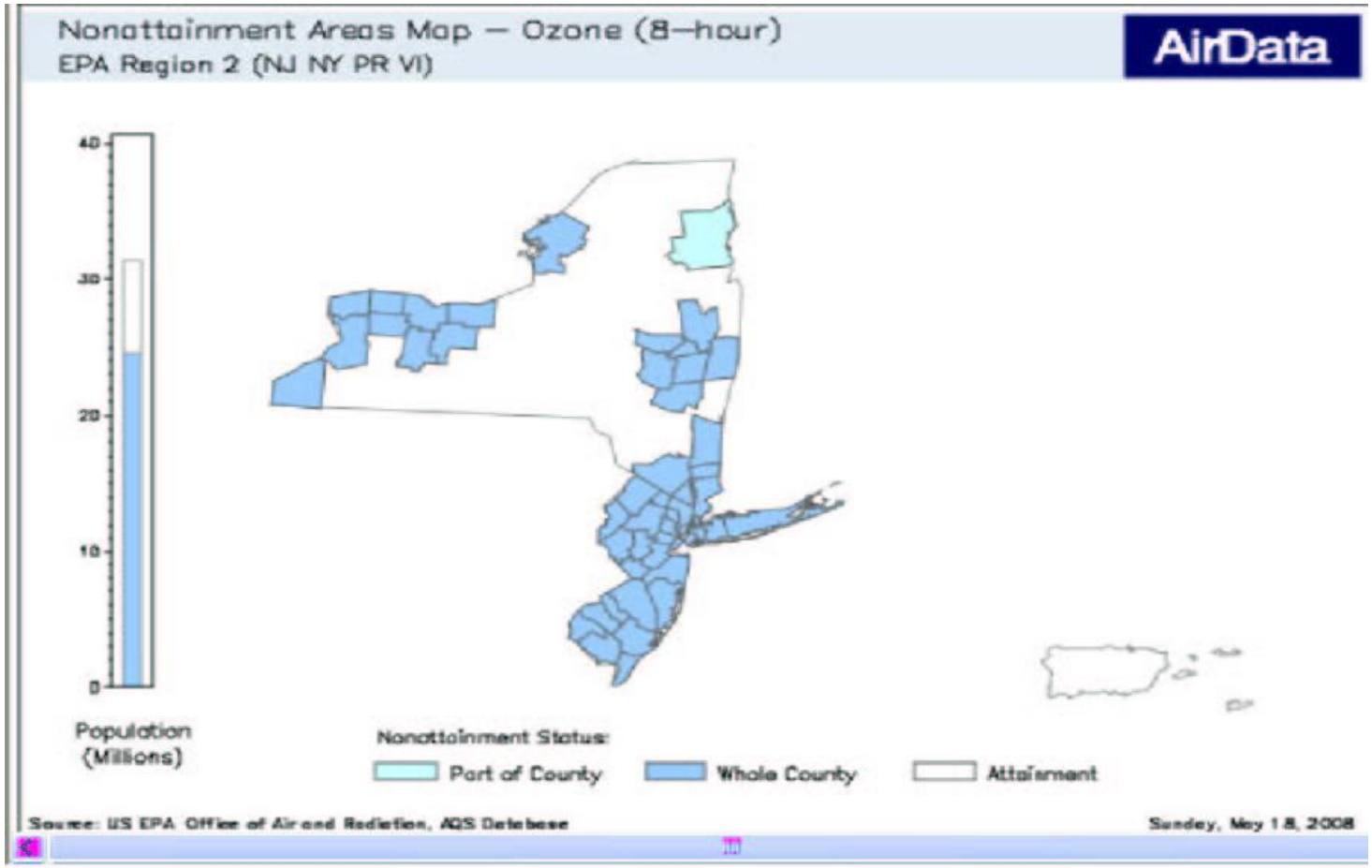
CHP 2008

200 tons per year for each regulated pollutant

- Nitrogen oxides (NOx)
- Volatile organic compounds (VOCs)
- Sulfur dioxide (SO2)
- Carbon monoxide (CO)
- Particulate matter (PM)
- Individual Hazardous Air Pollutant (HAP)
- Cumulative HAP's

Region 2 Ozone Non-Attainment

CHP 2008



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Federal Emissions Thresholds

NY City is a severe non-attainment area for Ozone. Emissions thresholds are:

- Nitrogen oxides (NOx): 22.5 tpy
- Volatile organic compounds (VOCs): 22.5 tpy
- Sulfur dioxide (SO2): 100 tpy
- Carbon monoxide (CO): 100 tpy
- Particulate matter (PM): 100 tpy
- Individual Hazardous Air Pollutant (HAP): 10 tpy
- Cumulative HAPs: 25 tpy

Air Permitting

- ⇨ NYC Registration
  - For life safety use only
- ⇨ NYS Registration
  - Facilities emissions up to 50% of thresholds
- ⇨ State Facility Permit
  - Below thresholds
- ⇨ Federal Title V
  - Above thresholds

Permitting Strategies

- ⇨ CHP plants are more efficient and cleaner burning than conventional utility solutions
- ⇨ Developers should use cleanest technology available to maintain the lowest level of permit possible
- ⇨ Most CHP plants under 15 MW are easy to permit in a 6-9 month time frame
- ⇨ Air modeling and public hearings can extend permitting to 18 – 24 months
- ⇨ NYSERDA limit – 1.6 lbs/MWH

EPA Supports CHP

EPA promotes greater use of CHP because **significant cost-effective emissions reductions can be achieved** by increasing the efficiency of the nation's energy supply. CHP systems achieve effective electrical efficiencies of 50 to 70 percent, compared to average fossil-fueled power plant efficiencies of 33 percent in the United States. This improvement in efficiency translates to:

- ⇨Reduced total fossil fuel use
- ⇨Reduced emissions of regulated air pollutants
- ⇨Reduced emissions of carbon dioxide

CHP
EPA COMBINED HEAT AND POWER PARTNERSHIP

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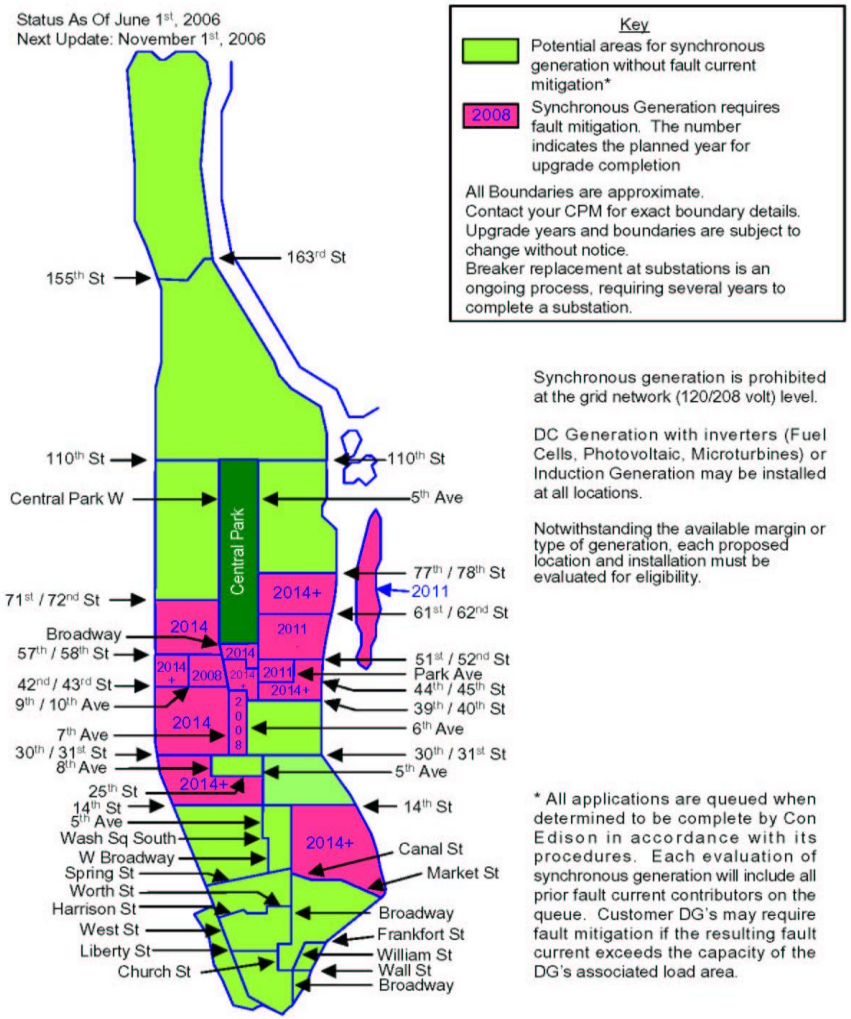
Manhattan Network Restrictions

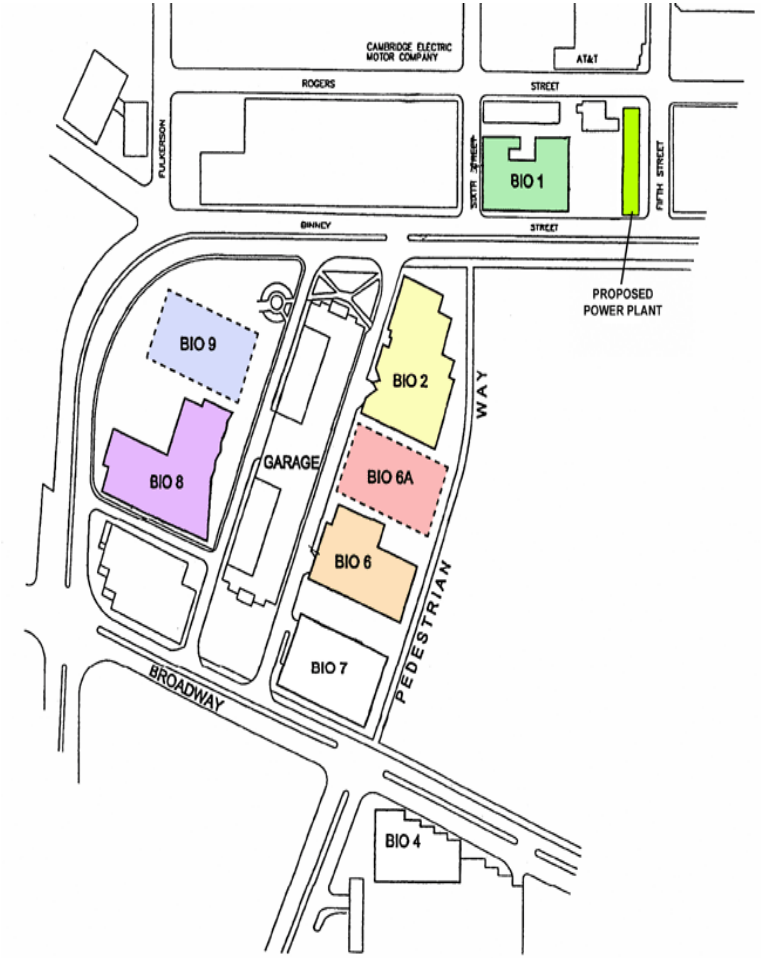
CHP 2008

- ⇨ Specific issues with Con Edison network
- ⇨ Designs are available to connect anywhere in Manhattan
- ⇨ Solutions increase cost and/or flexibility
- ⇨ All of Manhattan network scheduled to be upgraded by 2014



Utility Franchise Issues

- ⇨ As of right ability to serve your own properties if they are contiguous
- ⇨ Need to apply for permission to cross public streets
- ⇨ Becoming easier to obtain permission
- ⇨ NYSPSC ruling in Utica hospital case



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NYU Redeveloped CHP Plant

CHP 2008

Existing cogen plant built in 1982, existing boiler plant built in 1964

- Provides electricity to 10 buildings
- Provides thermal energy to 44 buildings
- Plant past its useful life, needs major re-build to restore capacity, reliability

Objectives for new plant:

- Improve overall reliability
- Achieve energy independence
- Maintain price stability
- Increase operating savings
- Improve environmental performance to current regulatory standards
- Project operating savings should cover debt service

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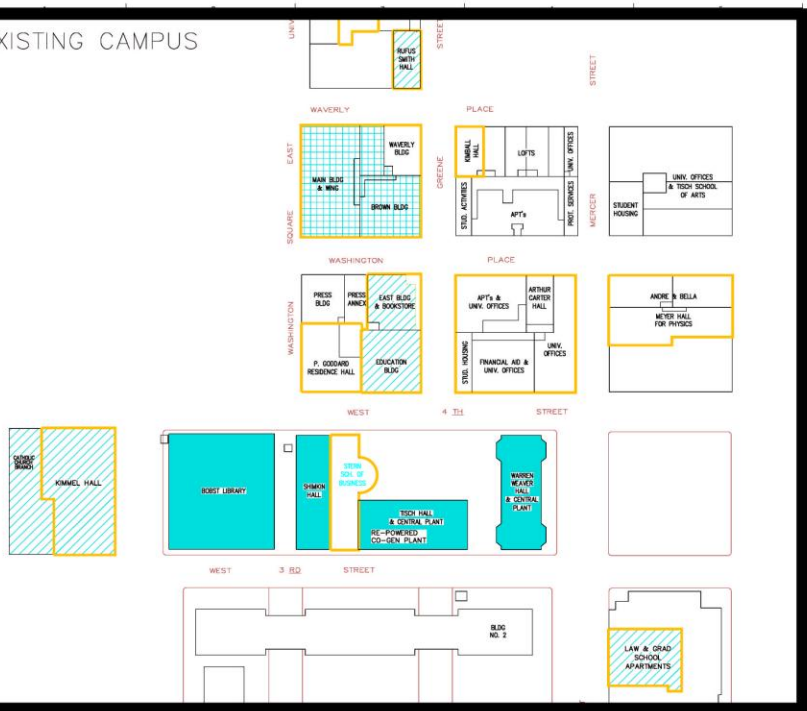
NYU Main Options

- Rebuild existing plant
- Retire plant - go back to Con Ed for Electricity and Steam
- Expand CHP plant
  - Select buildings to be served

EXISTING CAMPUS



RE-POWERED CO-GEN PLANT

EXPANDED CO-GEN PLANT

SourceOne

Power Technologies

110 WALL STREET, NEW YORK, NEW YORK 10005

Telephone: (212) 612-7600 Fax: (212) 612-7601

LEGEND

- HTHW ZONES
- CHILLED WATER SYSTEM
- CO-GEN
- CO-GEN LIFE SAFETY BACKUP
- CW — CHILLED WATER
- HW — HOT WATER
- 2 — NUMBER OF ACCOUNTS
- 1000 — PEAK KW RATING
- 100 (NYPA) — ADDITIONAL PEAK KW RATING
- SES — SES PROPOSED
- 75.00 — 24 MONTH AVERAGE MONTHLY LOAD FACTOR (%)
- COGEN SUPPLY
- BACKUP OR LIFE SAFETY
- SEASONAL COGEN POWER
- PROPOSED ADDITIONAL COGEN POWER

COGEN REDEVELOPMENT

WASHINGTON SQUARE PARK CAMPUS
NEW YORK, NEW YORK

NOT FOR CONSTRUCTION

DRAWING REVISION STATUS		
NO.	DATE	DESCRIPTION

PROJECT NUMBER:	00-000
CADD FILE NAME:	
BREF FILE:	
DATE:	August 2005
DRAWING SCALE:	AS SHOWN
DRAWN BY:	--
CHECKED BY:	--
APPROVED BY:	--

SHEET TITLE:

DRAWING NUMBER:

Major Siting Hurdles

- ⇨ Tying in new buildings
  - NYU had existing Revocable Consents from original development. Gave them the ability to serve more of their own buildings
- ⇨ Vault had to be dug on Mercer Street for cogen equipment
  - Applied for NYC vault license. Area will be de-mapped
- ⇨ Community opposition to construction
  - Multiple public hearings, negotiation with residents of surrounding buildings, Community Board, Parks Department and Manhattan Borough President
- ⇨ Air Permit
  - Existing Title V was able to be modified

Mercer Street Vault Location

Mercer Street Vault Location

General Arrangement - two 5.5 MW gas turbines –Plan View of Vault

CHP 2008

Drivers for Decision to Expand CHP Plant

CHP 2008

- ⇨ Good experience with existing plant
- ⇨ Expand capacity to supply energy to 30 University buildings, increasing reliability, savings and positive environmental impact
- ⇨ Removal of University buildings from over-burdened local utility lines
- ⇨ Large initial capital investment ($110 – 120 million)
- ⇨ Responsible investment because of immediate environmental benefits and long-term financial benefits
- ⇨ Best decision for NYU and community

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Local Utility vs. NYU Emissions

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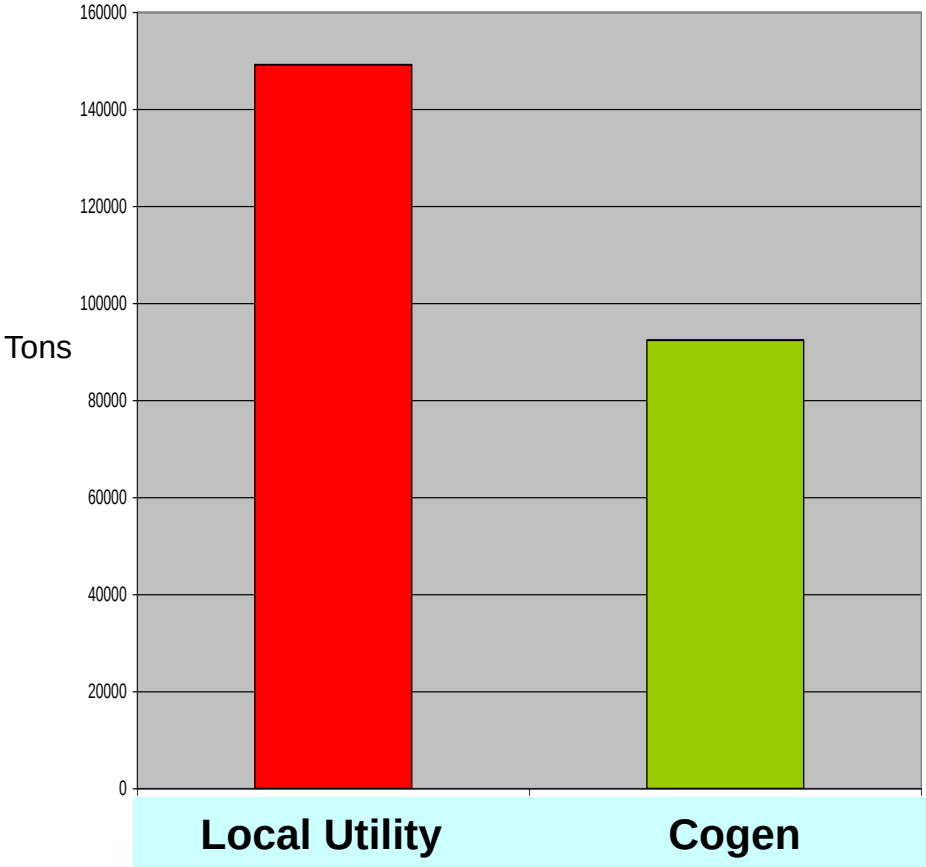
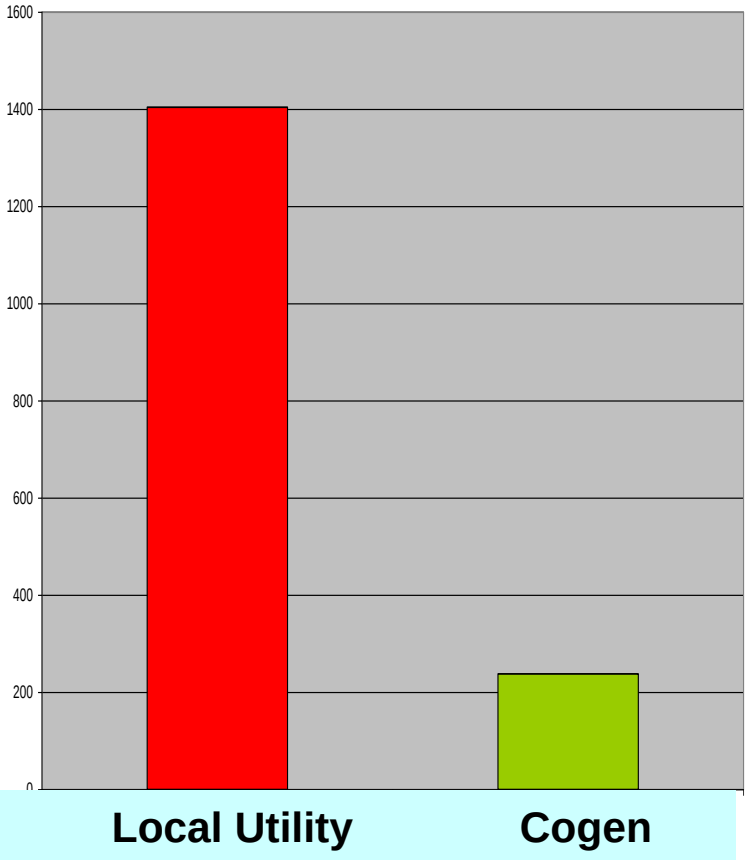
Greenhouse Gases



Regulated Pollutants



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Cooper Union

- ⇨ 300 kW micro-turbine plant in LEED Platinum building
- ⇨ Supplying electricity, chilled water and hot water
- ⇨ Cooper Union worked with Office Power to develop project

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Cooper Union

- ⇨ 200 kW recip engine plant in historic building.
- ⇨ Supplying electricity, chilled water and hot water
- ⇨ Can be placed on roof if not visible from street
- ⇨ Needed to design low dunnage so that packages not visible over parapet
- ⇨ Issues with Con Ed re-connecting the building to steam system

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Zoning Issues

- ⇨ Mechanical equipment in existing buildings is considered an “accessory use” and is an as of right ability to install
- ⇨ Large CHP in a separate building must be zoned Industrial in NYC

Fuel Availability Issues

CHP 2008

- ⇨ 200 & 230 Park Avenue
  - Micro turbines 960 & 1800 kW
  - Projects signed with developer
  - Gas available from Con Ed but lines need to be run through Grand Central Station
  - Issues with easements, ownership
  - Will be completed but delaying projects
- ⇨ NYU
  - Existing gas services on property, 30” low pressure and 20” medium pressure line needed to be re-located. Con Ed very co-operative
  - Will not allow customers to receive transmission level gas

Sound and Vibration Issues

CHP 2008

- Parker Towers
  - 9 recip engines 1350 kW total
  - Original plant built w/o sound attenuation
  - Developer installed enclosures later, complaints continued
  - Generators failed due to winding failures, poor packaging
  - Project eventually shut down
- Biogen Idec
  - 6000 kW gas turbine installed in basement of research building
  - Sound attenuated enclosure
  - Double floor installed in first floor
  - No sound or vibration from unit

Stacks and Smells

- **205 West End Avenue**
  - Used existing incinerator stack
  - Heat from continuous exhaust created noxious odors
  - New stack installed
- **NYU**
  - Evaluated existing stack, determined it was in good condition and could be used for new plant
  - Made permitting much easier

Power Quality Issues

CHP 2008

- ⇨ Small cogeneration plants normally run at nameplate rating
- ⇨ Building power quality issues such as unbalanced loads, harmonics lead to overheating, failure of generators
- ⇨ Power quality study should be done prior to installation
- ⇨ Repair power quality issues or design around them
  - – De-rate engines
  - – Install isolation transformers, surge suppressors, harmonic filters

Lessons Learned

- ⇨ CHP must be properly sized and utilized to be effective
- ⇨ Load study should include power quality check
- ⇨ Permitting issues can usually be worked through
- ⇨ Interconnection issues are still difficult but better than they were
- ⇨ Fatal flaw analysis should be done early w/o spending large amounts of money