NORTHEAST CHP APPLICATION CENTER

# Clean Distributed Power on Remediated Brownfield Sites

**Tom Bourgeois**

**Northeast Combined Heat and Power Application Center**

PACE UNIVERSITY

NORTHEAST CHP APPLICATION CENTER

# What is CHP?

- Integrated Electric/Thermal Energy System
- Provides a Portion of the Electrical Load
- Utilizes the Thermal Energy for
  - Cooling
  - Heating
  - Hot Water
  - Dehumidification
  - Process Heat

PACE UNIVERSITY

NORTHEAST CHP APPLICATION CENTER

# CHP Technologies

- Electric Generation Equipment
  - Reciprocating Engines
  - Turbines / Microturbines
  - Steam Turbines
  - Fuel Cells
- Heat Recovery Systems
  - Hot Water
  - Steam
  - Exhaust Gases
- Thermally Activated Technologies
  - Absorption Chillers
  - Desiccant Dehumidification
  - Thermal Storage

PACE UNIVERSITY

# Where can CHP be Economically Attractive?

Data Centers
Colleges & Universities
Ethanol/ Biofuel Process Plants
Food Processing Plants
Hospitals
Hotels
Ice Arenas
Livestock Farms
*Industrial Sites including;*
*Chemicals, Pulp & Paper,*
*Fabricated Metals, Plastics Manufacturing, and Pharmaceuticals*

Nursing Homes
Office Buildings
Large Multi-Family Apartments
Refrigerated Warehouses
Retail Stores
Restaurants
Supermarkets
Theatres
Schools (with pools, cooling)
Greenhouses
Wastewater Treatment Facilities

NORTHEAST CHP APPLICATION CENTER

# CHP = Economic + Environmental Benefits

*Where CHP is Economically Attractive these Systems*

- Lower business costs
- Improve productivity
- Make the site more competitive generating higher profits, better services and greater tenant satisfaction.

*Clean High Efficiency CHP &Sustainability/GHG Activities:*

Significant reductions in Emissions of Criteria (regulated) pollutants and 15 to 40% reductions in $CO_2$as compared with traditional power

PACE UNIVERSITY

# Brownfield Investment Incentive Programs

Many states offer incentives for capital investments at redeveloped and remediated brownfield sites

NYS's new (June 24, 2008) Brownfield Redevelopment Tax Credit Program caps the applicable Qualified Tangible Property Credit incentive at

The lesser of **$35 Million or three times** the costs included in the Site Preparation and the Onsite Groundwater Remediation Credit components,

In the case of qualified sites that will primarily be used for manufacturing activities caps the applicable Qualified Tangible Property Credit incentive at

The lesser of **$45 Million or six times** the costs included in the Site Preparation and the Onsite Groundwater Remediation Credit components,

NORTHEAST CHP APPLICATION CENTER

# Potential Brownfields Incentives for CHP Investment

Assume a 1,000 kW CHP project with total installed costs of $1,500/kW or, a $1.5 Million project

A taxpayer holding a COC will reduce the total project cost by $180,000 to $1.32 Mil.

A taxpayer building on an EnZone can reduce total project cost by $330,000 to $1.170 Mil. a marked improvement in project payback!!

PACE UNIVERSITY

NORTHEAST CHP APPLICATION CENTER

# Brownfield Sites at Industrial Parks

**CHP + Brownfields + Industrial Parks = MICROGRIDS?**

**Many Industrial Parks require significant capital expense to upgrade electric services in order to remain viable and attractive to prospective clients**

**CHP can improve reliability and power quality at the site**

**In many states, unrelated businesses can share power, heat and steam within an industrial park WITHOUT breaching the distribution utilities franchise service territory rights**

**MICROGRIDS, or District Systems, can allow for MUCH GREATER economies of scale.. e.g. a manufacturer who has large electric power needs, but minor heat/steam needs located next to a site that has high steam needs but minor electric power needs – Greater complimentarity, much higher efficiencies, much lower system costs!!**

PACE UNIVERSITY

NORTHEAST CHP APPLICATION CENTER

# CHP's Can Play a Role in GHG Reduction, Campus and Building Sustainability Initiatives &greater power reliability at site.

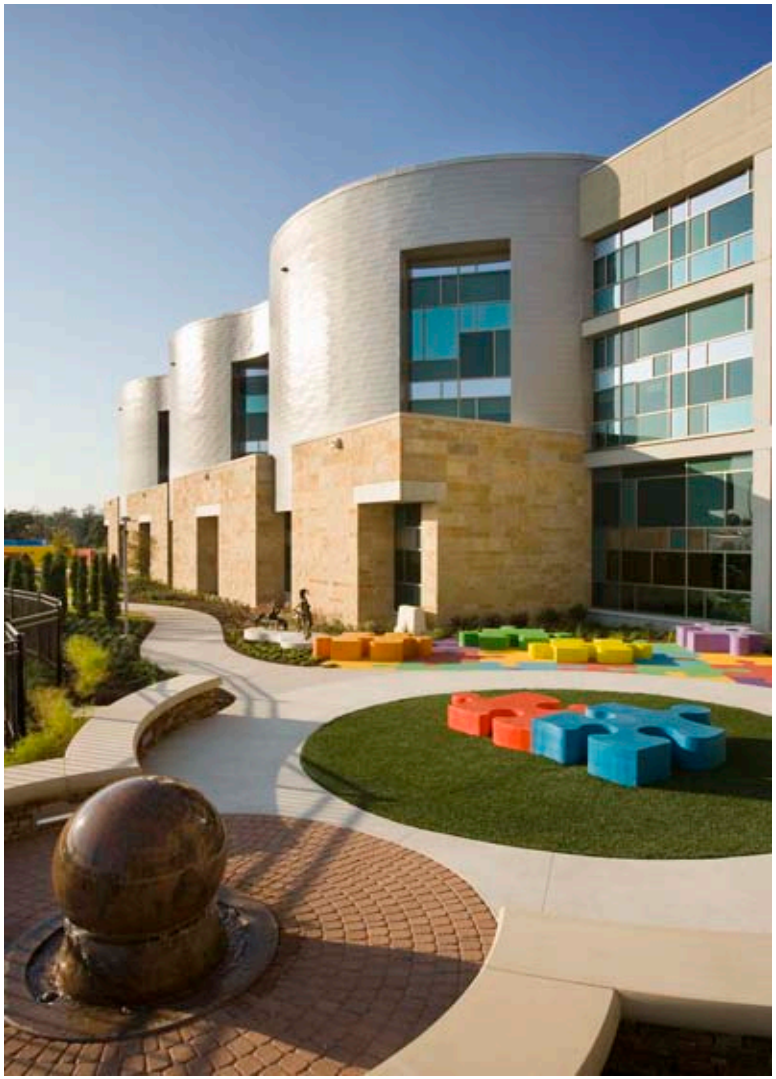
Case Study: Dell Children's Hospital

4.5 megawatt natural gas-fired CHP

Encompasses a brownfield site

>75% total system efficiency

First LEED Platinum Hospital in North America, Awarded January 2009



PACE UNIVERSITY

**Dell Children's Hospital in Austin, TX www.dellchildrens.net**

NORTHEAST CHP APPLICATION CENTER

## Clinton Hill Apartments-Brooklyn, NY

- 600 kW CHP System
- Waste heat recaptured for 700 units for domestic hot water
- Operating efficiency of 82%
- Reduces CO2 emissions 1,680 tons per year
- Requires 23% less fuel that conventional mean

PACE UNIVERSITY

# Northeast Application Center Contacts

**Beka Kosanovic**

**NAC Co-Director for Technical Assistance**

**(413) 545-0684 (voice)**

**kosanovi@ecs.umass.edu**

**Tom Bourgeois**

**NAC Co-Director for Education and Outreach**

**(914) 422-4013 (voice)**

**tbourgeois@law.pace.edu**

http://www.northeastchp.org/nac