



Installing Natural Gas-fueled Combined Heat and Power (CHP) Systems



A Guide to Required Permits, Inspections and Available Incentive Programs for Property Owners and the **Construction Industry**





Contents

Commissioner's Welcome	2
Property Owners	
I. What Is CHP?	3
II. How Do I Decide if CHP is Right for My Building?	4
Construction Industry	
III. CHP Installation Process	7
IV. Gas Connection: Application, Approval and Inspection	8
V. Con Edison Electric Interconnections	10
VI. New York City Department of Buildings: Permit Applications and Inspections	12
• Reciprocating Engines	
• Microturbines	
• Special Requirements for High-Pressure Gas Service	
VII. New York City Fire Department: Permit Applications	16
• Capacity of 500 kW and Less	
• Capacity Greater than 500 kW	
VIII. New York City Department of Environmental Protection: Permit Applications and Inspections	19
• Air Permits	
• Environmental Quality Review	
IX. Installation, Inspection and Sign Off	20
• DOB Inspection	
• Gas Activation	
• DOB Final Inspection	
• Fire Permanent Permit Sign Off	
• Con Edison Electrical Interconnection Testing	



Commissioner's Welcome

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Dear Fellow New Yorker:

The Department of Buildings is helping make New York City a national leader in sustainability. We're committed to improving the energy efficiency of buildings, since they generate 75% of our City's greenhouse gas emissions. By focusing on small and large buildings – and new and existing construction – we're making it easier for the real estate industry and homeowners to go green.

Property owners, homeowners, the industry and the Department can do this together. The Department's Buildings Sustainability Board determines which new green products and materials are safe and what safety improvements are needed to bring them to New York City. We are also working with utility companies and coordinating our efforts with the NYC Fire Department and NYC Department of Environmental Protection to make it easier to embrace green technologies – including combined heat and power systems.

This guide to installing CHP systems is just one tool we're providing to make going green easier. Together, we can make New York a greener, greater City for us and for generations to come.

Sincerely,



Robert D. LiMandri
Commissioner
New York City Department of Buildings



I. What Is CHP?

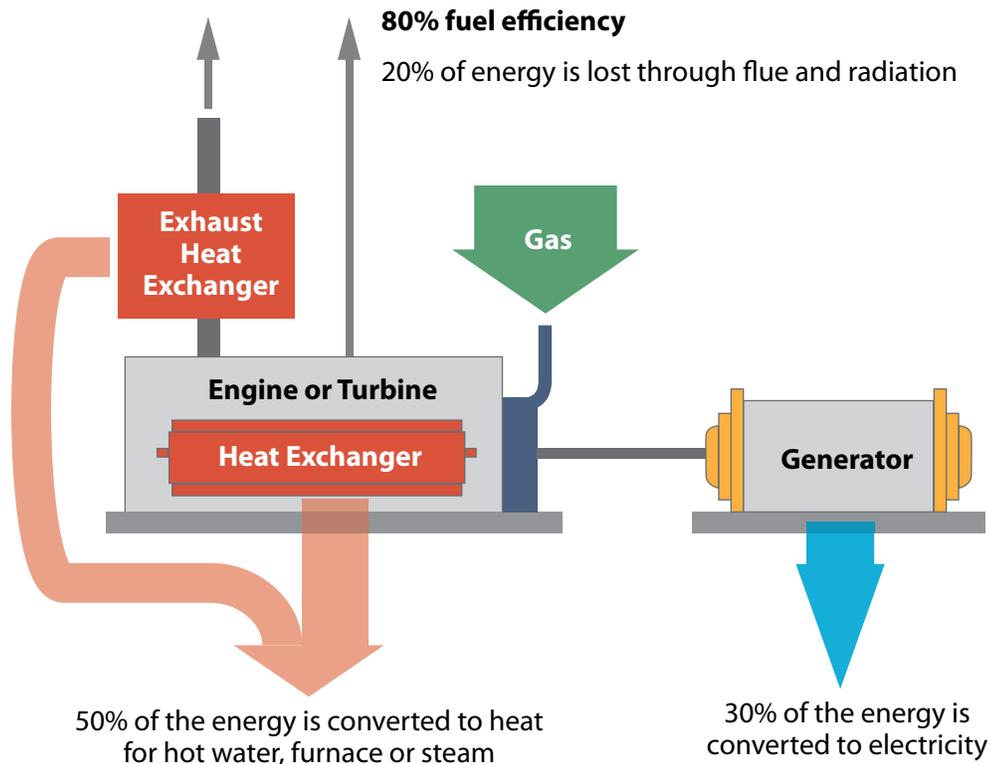
Generators heat up when they produce electricity. Combined heat and power – or CHP – systems can capture this heat and use it to regulate a building’s temperature or heat water. This can save money by cutting the amount of energy needed from a utility company. CHP systems also improve our environment by lowering the demand on New York City’s electrical grid – helping local power plants be more efficient and reducing our carbon emissions.

While CHP systems may use any kind of fuel or renewable source, this guide addresses turbines and reciprocating engines that use natural gas to generate electricity. Turbines and reciprocating engines capture waste heat, but they generate electricity differently. A mechanical engineer skilled in CHP systems can recommend the appropriate system type for your building.

This guide provides a summary of the requirements to install a CHP system. Please refer to the New York City Construction Codes, the New York City Fire Code, and the rules and regulations of the New York City Department of Environmental Protection for complete information, and consult with a New York State licensed professional engineer with expertise in CHP systems.

Combined Heat and Power Systems

CHP energy is much more efficient than non-renewable power sources.



DISCLAIMER: This is a guidance document for the convenience of the public. It does not substitute for any applicable laws, rules or regulations, and information in it regarding procedures is subject to change without notice.



II. How Do I Decide if CHP is Right for My Building?

Not all of the energy in the fuel used by a turbine or engine provides power to drive the generator. Much of the fuel energy becomes heat. It's radiated off the engine, is lost or must be taken out of the engine to protect the equipment. This is called waste heat. Systems that can use waste heat are referred to as combined heat and power (CHP) systems, otherwise known as cogeneration systems. This guide addresses two types of cogeneration systems: turbines and reciprocating engines.

The percentage of fuel that can be converted into energy is the simple cycle efficiency of the system. Depending upon the type and size, the simple cycle efficiency of a turbine or engine converting natural gas to electricity can range from 15% to 45%. When the waste heat is put to use, the system cycle efficiency can reach 80%.

Acquiring a Cogeneration System

If your building requires heat and electricity simultaneously, then a cogeneration system could be a wise investment. *The Department of Buildings highly recommends that any building owner retain the services of an independent, third-party NYS licensed and registered professional engineer with expertise in cogeneration systems to evaluate any product and the building's site-specific conditions.* The professional engineer can aid in determining the appropriate system for your building and can guide the building owner through the permitting process and utility interconnection.

The selection process for a cogeneration system will depend upon the size of the facility and the capabilities of the organization that will own and operate it. The consumer has many options:

- Pre-engineered, factory-manufactured;
- Custom designed for the site;
- Purchased; or
- Leased.

Here are a few preliminary considerations to get you started:

Economics

The current CHP systems available provide the greatest benefit to buildings with electric bills higher than \$100,000 per year and where the CHP system will run continuously. This can help you determine the appropriate size and type of system. CHP system sizes are measured in terms of kilowatts – kW – of electricity produced.

Efficiency

You should consider how much you would use the heat produced by the cogeneration system. The more the heat will be used, the better the candidate for CHP. When determining this, only contemplate the heat that's produced by the generation of electricity. If your building will use less than half of the heat that the CHP system will generate, cogeneration may not be practical. For the fastest return on investment, a good general rule is to size the CHP system according to your typical electric and thermal consumption. Your building's energy use should – at minimum – meet the CHP system's minimum output of thermal and electric energy.



Space

CHP equipment comes in various shapes and sizes, so some makes or models could be more appropriate than others for your building. Determine whether adequate space is available to house the equipment and provide supply air for combustion. Plus, you must comply with the New York City Building Code and Zoning Resolution, which may limit the location of mechanical equipment. CHP systems also include external components, including gas lines and meters entering the system, electrical lines and equipment exiting the system, vents and other distribution for the heat – and stacks to carry away waste products of combustion. These components are not necessarily confined to one room within a building.

Type of CHP System

An owner has the option of installing an inductive (also called asynchronous) or a synchronous system. Inductive generators use the power grid to excite them, and they operate while the grid is active. These systems stop working if there's a blackout. An inductive generator is easier to interconnect and operate in parallel with the grid. A synchronous system self-excites and starts on its own. These don't require the electric grid to operate and will work during a blackout. Synchronous paralleling installations may be permitted for installation by the electric utility, but the interconnection may present greater challenges in being approved by the utility. Consult with the local utility before proceeding with any grid interconnection.

Fuel Source and Pressure

This guide only addresses CHP systems that utilize natural gas as the fuel source. Some cogeneration systems require elevated gas pressure to operate efficiently. Different zones within the City are supplied with different pressures, and different City agencies have varying standards for what constitutes high-pressure. Consult with your local natural gas utility to determine the appropriate system for your facility. It is recommended that you do not purchase any CHP equipment until a complete evaluation has been made. The infrastructure investment required to deliver adequate volumes of natural gas to your building may make a CHP system impractical.

Maintenance

Most small cogeneration facilities do not require continuous on-site supervision, but all CHP facilities require maintenance. Much of the maintenance can be contracted through the engine vendors. There will be easy – but important – minor maintenance required through the life of the equipment, such as oil and filter changes. You must consider the maintenance cost when analyzing the economic feasibility of installing a CHP system.



How Can I Offset the Costs?

Numerous incentive programs are available for owners who install and operate certain types of CHP systems. Utility companies and public-sector groups offer these incentives. The following information is a sample of CHP incentive programs, though be sure to contact these organizations directly for the most up-to-date information.

Con Edison

- Incentive rate (gas Rider H rate)
- Ability to participate in Targeted, Economic, and Emergency Demand Side Management and Energy Efficiency Programs
- Specifications under development for participation in NYISO Ancillary Markets
- Net metering extended to CHP and Fuel Cells under 10kW for residential customers

Visit www.coned.com/dg/incentive_programs/incentivePrograms.asp for more information.

National Grid

To learn more about National Grid's energy efficiency programs, please visit their website at http://www2.nationalgridus.com/pshome/energy/index_ny_kedny.jsp for homes and http://www2.nationalgridus.com/psbusiness/energy/index_ny_kedny.jsp for businesses.

New York State Energy Research and Development Authority (NYSERDA)

Numerous CHP programs address specific needs at various points in the process – from before installation and through the equipment's maturity. A detailed list of current programs is available at <http://www.nyserda.org/funding/funding.asp>.

Many of NYSEDA's programs cover more than one category of project. NYSEDA currently supports the following five project categories:

1. Development projects to assess the viability of new technologies and business plans;
2. Demonstration projects to select promising technologies for in-field testing;
3. Deployment projects to accelerate the adoption of proven technologies;
4. Feasibility studies for site-specific evaluations; and
5. Technology Transfer Studies to provide market intelligence to a broader audience.

Visit www.nyserda.org/programs/dgchp.asp for more information.

Federal Business Energy Investment Tax Credit

The 2009 American Recovery and Reinvestment Act allows taxpayers eligible for the federal renewable electricity production tax credit (PTC) to take the federal business energy investment tax credit (ITC). Those eligible for the PTC or ITC can receive a grant from the US Treasury Department, instead of taking the tax credit for new installations. The credit is equal to 10% of expenditures. Eligible property includes:

- Up to a two-megawatt (MW) capacity with an electricity-only generation efficiency of 26% or higher; and
- Up to a 50-MW capacity that exceeds 60% energy efficiency.

Use the Database of State Incentives for Renewables and Efficiency at

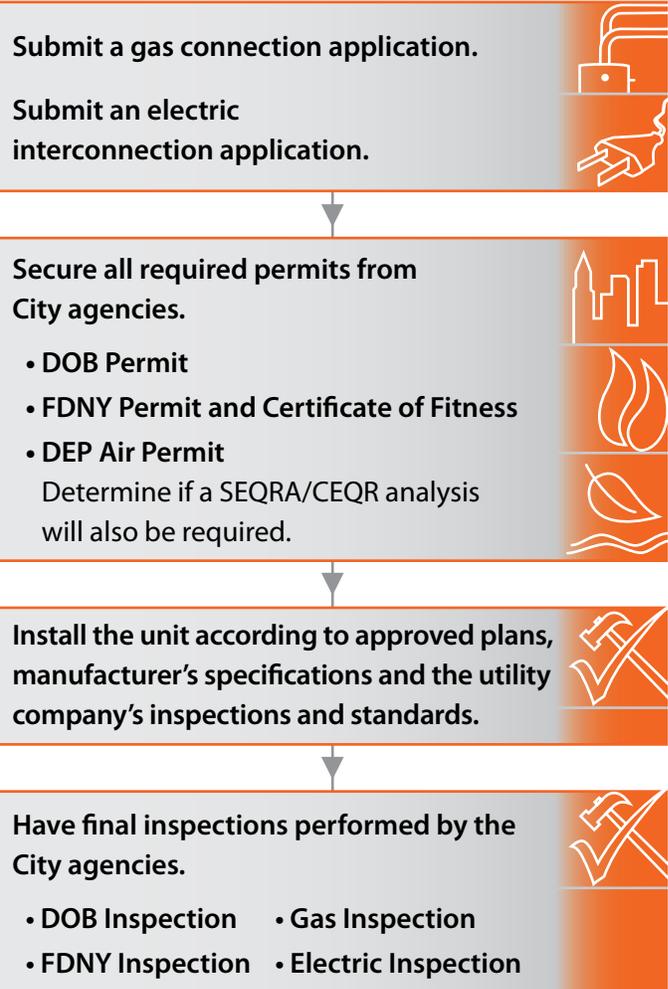
http://www.dsireusa.org/incentives/incentive.cfm?Incentive_Code=US02F.



III. The CHP Installation Process

Installation of the CHP unit must satisfy DEP, DOB and FDNY permit and inspection requirements. The gas connection utility approval is up to the outlet of the meter. The electric utility will be involved with the initial start-up and interconnection testing to ensure that the CHP equipment does not interfere with the local grid.

Once you have received sign off for permits from all agencies and the final inspection is completed, the Buildings Information System – or BIS – on the Department of Buildings’ website will display the permit and will state “Testing phase completed and final authorization for official start-up of the CHP unit installation.”





IV. Gas Connection: Application, Approval and Inspection

A dedicated connection to natural gas service may be necessary to operate a gas-fired CHP system. Two companies provide this service in New York City: Con Edison and National Grid. Con Edison provides natural gas to the Bronx, Manhattan and Queens' First (Long Island City/Astoria) and Third (Flushing/Bayside) Wards. National Grid serves the remaining Queens wards, Brooklyn and Staten Island. If your building is located on the border of any Queens ward, contact both utility companies before proceeding.

Con Edison

Con Edison's Energy Services website at www.coned.com/es gives access to the resources necessary to process requests for new, additional, removal or relocation of gas service provided by Con Edison. Customers can also access existing requests through the Project Center.

Con Ed will assign a Customer Project Manager (CPM) to the application. The CPM will act as the single point of contact throughout the permit process. You should expect the following steps:

1. **Load Letter:** Submit a load letter to Con Edison Energy Services division.
2. **Specifications:** Con Ed will inform the applicant of the required gas specifications to follow for service.
3. **Planning Group Meeting:** All parties involved should meet to discuss all construction aspects of the project. Timelines and milestones should be set.
4. **CPM Follow-up:** CPM will follow up with the owner, consultant and contractor with a complete package so the project can be worked.
5. **Gas Meter Authorization:** The CHP unit requires a dedicated gas connection line, and a separate meter is necessary to apply for the Cogeneration Rate. (Use the Con Ed Rider H application.) A Department of Buildings' gas authorization is required for all new gas meters.
6. **Notification:** The utility must be notified prior to any CHP unit being bought or installed by a building owner.

CONSTRUCTION INDUSTRY



National Grid

The customer shall submit a gas load letter for review and processing, and it must detail the proposed installation's manufacturer, model number, firing rate and required pressure. The Gas Engineering division will determine the impact of the proposed additional load on the National Grid system and determine if it can be supplied by high-pressure service, low-pressure service or low-pressure service with a booster.

The contractor shall obtain all necessary permits and certifications. A Department of Buildings gas authorization is required for all new gas meters.

All meter sets shall be located on the outside of any building, unless it's impractical or unsafe. They shall be installed following the clearance requirements indicated in the appropriate National Grid Construction Standard.

National Grid shall not be obligated to begin construction on the gas service or to supply gas to the customer until the applicant:

1. Provides all required permits to National Grid with proof of any necessary easements and/or rights of way;
2. Has an application that has been approved by proper officers or duly authorized representatives of National Grid;
3. Makes all necessary payments; and
4. Provides a copy of the signed contract between the customer/owner and the contractor.

For information on National Grid's technical requirements, engineers should check the section of National Grid's website for Business Partners at

http://www2.nationalgridus.com/partners/index_ny_kedny.jsp.

They should also read National Grid's Blue Book "Specifications and Requirements for Gas Installations" at www.nationalgridus.com/bluebook.



V. Con Edison Electric Interconnections

For most customers with a CHP system, their monthly energy use will be reduced by the amount of electricity generated and used. CHP systems can also produce excess electrical energy that can be sold back to the electric grid in a process called Distributed Generation (DG). Con Edison defines a typical DG facility as a small electric production facility – up to 20 megawatts – that’s dedicated to support the customer’s electric load. It must conform to the utility company’s standards when connected to the utility’s electric system.

In limited cases, electricity can be directed to the local electric grid with an electrical interconnection. To install an electrical interconnection, Con Ed customers may apply through the Energy Services portal at www.coned.com/es. Electrical interconnections should be filed as distributed generation projects. Gas and electrical connections require separate applications. Visit Con Edison’s distributed generation website at www.coned.com/dg for more information.

Net Metering & Account Credits

Customers who generate more electricity than they need may qualify for net energy metering, or net metering. A net meter registers the difference between the electricity supplied by the utility company and the electricity provided to the utility company, so it will run in reverse when the CHP equipment generates more power than the customer is using.

With net metering, monthly electric bills reflect the net – or overall amount – of electricity used or supplied. When customers generate more electricity for the utility company than what they take during a billing period, they’ll receive a credit. At the end of each year, customers may be eligible for a payment or credit. The amount is based upon the wholesale rate at which the utility would have otherwise purchased the energy. See the eligibility details outlined in Rider R of the Electric Tariff, available at <http://www.coned.com/dg>.

Installation Applications

Installing an interconnecting generation system up to 2 megawatts requires an additional application. The PSC Standardized Interconnection Requirement (SIR) lays out the steps and expected timelines. It’s available at http://www.dps.state.ny.us/Modified_SIR-July2010-Final.pdf). Applications can be expedited for systems under 25 kilowatts. NYPA customers must also apply for an interconnection, and the NYPA will determine the rate.

The following is a list of items to be submitted with an interconnection application:

1. Authorization letter authorizing the contractor to represent the customer in the interconnection;
2. Equipment Detail Application Form, found in the NYS Public Service Commission’s Standardized Interconnections Requirements (SIR) or filled out through the Online Project Center application process;

CONSTRUCTION INDUSTRY



3. Standardized Contract signed by the customer, available in the NYS Public Service Commission's Standardized Interconnections Requirements;
4. Three Line Diagram attached to the application;
5. Copy of the manufacturer data sheets;
6. Operations and Verification Test Procedures; and
7. Application fee, which is waived for projects under 25 kilowatts.

Application Approval Process

1. Con Ed will review the application to determine if it's complete and meets the requirements outlined in the Standardized Interconnections Requirements (SIR) and by the utility. (See EO-2115.)
2. Cost estimate for the Coordinated Electric System Interconnection Review (CESIR), typically for projects over 300 kilowatts
 - a) Applicant commits to CESIR
 - b) Utility completes CESIR
 - c) Customer commits to company construction of power distribution system modifications and construction of its own plant based on the "final" company approved design
3. Customer generation facility is tested according to standardized interconnection requirements
4. Interconnection and operation
5. Final acceptance and company cost reconciliation

Please note that different protection requirements apply (as spelled out in Con Ed's EO-2115), depending upon whether the generator is a synchronous, an induction or has an inverter interface.

Other Utility Companies

Electric customers in Far Rockaway, Queens are serviced by the Long Island Power Authority (LIPA). For more information on the programs offered by LIPA, please visit their website at <http://www.lipower.org/>.



VI. New York City Department of Buildings: Permit Applications

The Department approves CHP applications, issues permits for installation and inspects them before operation. All CHP installations must comply with New York City's Construction Codes, Electrical Code and Zoning Resolution. Together, these regulations cover fuel gas piping, egress, fire protection, fire detection, electrical power and ventilation.

The Department has different application and filing requirements for turbines and reciprocating engines. This section addresses the regulations for each of these types of CHPs. A mechanical engineer skilled in CHP systems can recommend the appropriate type of system for your building.

Reciprocating Engines

Reciprocating engines must comply with the NYC Mechanical Code, Fuel Gas Code and NFPA 37, except where the Codes are more restrictive.

Application Submission. The PW1 permit application must be filed with the Department of Buildings' Schedule C (PW1C form) for heating and combustion equipment, and a plumbing permit for gas service.

Equipment Locations. Reciprocating engines may be located outside of buildings or inside and housed in fire-resistance rated construction, as per the separation requirements of Chapter 5 of the NYC Building Code.

Filings and Inspections. The type of heat recovery system determines the filing and inspection requirements:

- **Low-pressure Heat Recovery:** No other filing is needed.
- **Heat Recovery Systems Employing Steam:** The system is deemed to be low-pressure if the relief valve is set at 15 psig or lower, so no other filing is needed.
- **Heat Recovery Systems Employing Hot Water:** The system is deemed to be low-pressure if the relief valve is set below 160 psig, so no other filing is needed. It is not necessary to file for a boiler permit and conduct inspections for low-pressure heat recovery devices, though a plumbing permit is still required.
- **High-pressure Boilers:** Water-based heat recovery systems exceeding 160 psig limits are considered to be high-pressure boilers. These require 24/7 coverage by a licensed NYC high-pressure boiler operator. When the CHP system is installed and ready to be put into service, the DOB's Boiler unit will inspect prior to operation. If all requirements have been satisfied, the inspector will issue a boiler card for high-pressure devices.



Microturbines

Microturbines with a maximum capacity of 500 kilowatts per single unit must also comply with 1 RCNY §50-01 (available at http://www.nyc.gov/html/dob/downloads/rules/1_RCNY_50-01.pdf) and NFPA 37 – unless the Codes or Rules are more restrictive.

Application Submission. A New York State licensed professional engineer must submit the Department’s PW1 form and construction documents to install a microturbine. Design professionals may not professionally certify a microturbine application.

Service Contract. At the time the Department approves the microturbine installation, the property owner must have a service contract from the microturbine manufacturer or a service company qualified by the manufacturer. This contract must be in place during the life of the unit.

Fire Alarm and Suppression Systems. The CHP equipment room shall be fully sprinklered or have an equivalent fire suppression system that is acceptable to DOB. The Fire Department must also be satisfied with the fire alarm system.

Structural Analysis. A registered professional engineer must evaluate the structural system that will support the equipment including measures necessary to mitigate vibrations.

Outdoor Locations. Microturbines may be located outdoors on grade, on a roof or setback, or within a weatherproof enclosure acceptable to the manufacturer.

Minimum Clearance Requirements for All System Components:

- 4 feet from a wall or parapet
- 5 feet from any exhaust termination or chimney
- 8 feet from any building opening, including doors, operable windows or intake openings

Minimum Clearances for Any System Located Outdoors on Grade:

- 50 feet from any subway entrance, exit, vent or other opening
- 20 feet from any above-ground flammable or combustible liquid storage tank
- 10 feet from any lot line (or 4 feet if in or adjacent to a Manufacturing zoning district)
- 5 feet from any vent or fill line of any flammable or combustible liquid storage tank
- 5 feet from any motor vehicle parking space

Indoor Locations. CHP equipment must be enclosed within a minimum 2-hour fire-resistance rated enclosure, and the room must be sprinklered. The room must have ventilation, gas detectors and alarms. These alarms must alert a location that is constantly attended and must trip the microturbine. No combustible storage is permitted in the CHP equipment room. A dedicated mechanical equipment penthouse housing the equipment shall be classified as Occupancy Group F-2 and ventilated, and no combustible materials may be stored there.



Special Requirements for High-Pressure Gas Service

Dedicated gas piping is required for a CHP system that uses high-pressure gas. This is to prevent accidental tapping into an elevated pressure pipe that has other uses, such as for domestic appliances that operate at a lower pressure and use a four-inch water column.

A single building may not have CHP systems with a total nominal electrical capacity (at standardized operating conditions) that exceeds 2,000 kilowatts. The natural gas inlet pressure to the system cannot exceed 3 psig, but the pressure can be boosted to greater than 15 psig within the unit or room enclosure. DOB considers high-pressure gas to mean pressure greater than 15 psig. (FDNY considers high-pressure gas to be greater than 6 psig.)

Low-pressure Gas Boosters

Some systems that require more than the four inches of water inlet pressure must have a low-pressure gas booster to reach their necessary $\frac{1}{2}$ to 1 psig to operate. In these cases, this equipment will only require the types of controls and installation components needed for low-pressure gas boosters.

External Compressors

The following requirements must be met for systems utilizing high-pressure gas with an external compressor:

- **Solid welded joints.** Gas connections between the compressor and the CHP equipment must be solid-welded; threaded joints are not permitted.
- **Flame arrestor.** A flame arrestor must be installed upstream of the gas compressor to prevent flames traveling to the natural gas distribution lines.
- **Limits to length of pipe.** The gas compressor and combustion device must be in the same room, and the gas piping that connects them shall not exceed 12 feet.
- **Site-specific approval.** External compressors must obtain a site-specific approval from OTCR. To learn more about OTCR, visit http://www.nyc.gov/html/dob/html/forms/forms_otcr.shtml.

Gas Detector and Alarm. The gas detector's alarm must sound at a supervised location on the premises to alert people of any abnormal conditions in the system. The detector must also trip the generator.

Automatic Gas Shut-off Valve. An automatic shut-off valve must be installed. It must be activated by a malfunction alarm from any component of the turbine system.

Emergency Gas Shut-off Valve. A normally closed solenoid gas shut-off valve is required. It must be located immediately after the equipment connection that provides dedicated service to the valve. This emergency gas shut-off valve must have manual and remote controls outside the door(s) to the CHP equipment room – and at the on-site supervised location. Signs must clearly identify the gas shut-off valve and controls.

Shut-off Valves. NYC Fuel Gas Code §409 requires that piping systems shall be provided. A dedicated distribution pipe or a main gas shut-off valve serving multiple gas systems is usually located at the gas meter and must be protected from damage. It must also be readily accessible, allowing

CONSTRUCTION INDUSTRY



emergency responders to shut the flow of gas in an emergency. The Department of Buildings' commissioner must approve an outside gas service line shut-off valve or other shut-off device or method before installation.

Security. Locked doors must prevent unauthorized access to CHP systems that use high-pressure gas, but the equipment must be readily accessible to the Fire Department and for maintenance and repair. CHP systems should also be protected from vehicular impact.

Signage. Signs clearly stating "HIGH-PRESSURE GAS" must be posted on or in front of systems that are served by high-pressure gas. Signs must also be on the outside of all doors that give access to any equipment room housing equipment that uses high-pressure gas.

Fuel Shut-off Diagram. A diagram shall be conspicuously posted on any door or gate leading to a CHP system utilizing high-pressure gas. The diagram must indicate the locations of all manual and automatic fuel shut-off valves.

Listing Requirement

The NYC Construction Codes requires CHP equipment to be listed, or approved, by an approved agency, such as Underwriters Laboratories. This requirement applies to the components of a CHP system, including heat recovery devices, electrical power distribution devices, gas vents, turbines, and engines. All listing information needs to be indicated on the construction documents.

Electrical Interconnection Documentation

The applicant must submit the following information with the CHP application:

- Documentation from the utility company confirming that the proposed electrical interconnection requirements have been preliminarily satisfied; or
- An affidavit from the property owner that there will be no interconnection with the electrical grid.

CHP Systems Greater Than 500kW Capacity Per Unit

The Department of Buildings must review and approve any CHP system capable of producing more than 500 kilowatts per unit. This review will be based upon site-specific conditions before the permit is issued. For further information, please contact OTCR to initiate a review.



VII. New York City Fire Department: Permit Applications

The New York City Fire Department reviews proposed plans and issues permits for CHP units in which natural gas is compressed on-site to a pressure greater than 6 psig. The Fire Department considers this to be high-pressure gas. For these systems, there must be a person at the location during business hours who holds a Fire Department-issued Certificate of Fitness. The C of F holder is trained by the manufacturer (or its authorized agent) to shut down the equipment in an emergency.

CHP Systems - Capacity of 500 kW and Less Per Unit

Once the installation is complete for a microturbine or reciprocating engine that uses high-pressure gas and produces less than 500 kilowatts per unit, the applicant shall mail the following documents to FDNY:

1. DOB-approved plans, which include:

- a. Local and remote annunciation system;
- b. Automatic shut-off valve initiated by malfunction alarm;
- c. Remote- and manual-controlled emergency gas shut off;
- d. Signage indicating “emergency gas shut off” at the fail-in-place gas shut-off valve and controls;
- e. Restricted access to CHP equipment by locked doors;
- f. Signage indicating “high-pressure gas”;
- g. Fire suppression system;
- h. Verification that no combustibles are stored in CHP equipment room;
- i. Flame arrestor installed upstream of the gas compressor; and
- j. Piping connecting the gas compressor with the combustion device 12 feet or less in length.

2. Copy of DOB PW1 form

3. Proof of CHP service contract

4. A copy of FDNY Certificate of Fitness

5. Inspection request letter

Mail these documents to:

FDNY District Office Headquarters

Attn: Chief Inspector

9 MetroTech Center

Brooklyn, NY 11201-3857

(718) 999 – 2457/2458



CHP Systems - Capacity Greater Than 500 kW Per Unit

For CHP units that generate more than 500 kilowatts of electricity, the Fire Department will evaluate submitted documents based upon site-specific conditions. During the design phase, the project's applicant – the New York State licensed professional engineer – should make an appointment with FDNY's Technology Management Unit. During this meeting, the applicant should present his or her conceptual design and demonstrate compliance with NYC Construction Codes, NYC Fire Code and applicable NFPA standards.

Upon submission of the application to the Department of Buildings, the applicant should submit the following to FDNY:

1. Mechanical Plans

A. Gas meter room, compressor, turbine and duct burner installation:

1. FDNY plan examination form TM-1
2. Copy of DOB PW1
3. Copy of any Commissioner's Determination applications approved by DOB
4. Copy of approval letter from DOB Electrical Advisory Board
5. Installation layout
6. P&I diagrams
7. Process description
8. Test reports for compressor, turbine and duct burner
9. Hazard analysis
10. Emergency shut down (ESD) procedure

B. The enclosure fire suppression system for turbines and CHP systems utilizing high-pressure gas:

1. FDNY plan examination form TM-1
2. Copy of DOB PW1
3. Installation layout
4. Hydraulic calculations



2. Electrical and Alarm Plans

A fire alarm riser diagram must be provided. It must indicate all alarm systems serving the CHP system area, including, but not limited to: initiating and annunciating appliances; gas detection systems; heat; smoke and flame detection systems; alarm portion of the fire suppression system; and pre-action alarm, if applicable. The applicant must also submit the following documents to the Fire Department:

- A.** For fire alarm systems for compressor and CHP rooms (including interfaces with building's fire alarm):
 - i. FDNY plan examination form TM-1;
 - ii. Copy of DOB PW1;
 - iii. Installation layout; and
 - iv. Riser diagram.

- B.** For fire and gas detection systems:
 - i. FDNY plan examination form TM-1;
 - ii. Copy of DOB PW1;
 - iii. Installation layout; and
 - iv. Riser diagram.

- C.** For pre-action sprinkler systems:
 - i. FDNY plan examination form TM-1;
 - ii. Copy of DOB PW1;
 - iii. Installation layout; and
 - iv. Riser diagram.

- D.** For the alarm portion of a turbine fire suppression system:
 - i. FDNY plan examination form TM-1;
 - ii. Copy of DOB PW1;
 - iii. Installation layout; and
 - iv. Riser diagram.

3. Emergency Action Plans, Fire Protection Plans and Fire Safety Plans

Fire protection, fire safety and Emergency Action Plans (EAP) shall be filed with the Fire Department and shall address CHP system installation. FDNY may require that additional documentation be submitted and additional studies be performed. The FDNY letter of approval will indicate which appropriate inspection unit(s) should be contacted for inspection.



VIII. New York City Department of Environmental Protection: Permit Applications and Inspections

In regulating CHP systems, New York City's Department of Environmental Protection is primarily focused on the emissions produced by the combustion of natural gas and the stack used to vent the equipment. DEP separately addresses CHP electric generation and heat capture.

Air Permits

Applicants must obtain a DEP air permit to operate a CHP system. See the NYC Air Code for vent stack standards. Obtaining an air permit may require taking measures to mitigate the impact of emissions. For example, DEP may require a stack be located in a specific location or may require a backhouse be installed. Since this work may entail large capital costs, it is highly recommended that property owners thoroughly satisfy DEP's requirements before continuing with a CHP installation. The applicant must also obtain a DEP notice of no objection when submitting an application for a construction permit to DOB.

Submit the following documents to DEP to obtain an air permit:

- Construction documents detailing connections to the stack;
- Construction documents detailing the vent stack and exhaust termination; and
- Calculations of emissions produced.

State Environmental Quality Review Act (SEQRA) & City Environmental Quality Review (CEQR)

For CHP systems that produce emissions exceeding 12.5 tons of nitrogen oxide per year, DEP will require a SEQRA/CEQR analysis. The applicant must complete an environmental assessment to determine whether the proposed activity will have an impact on the surrounding environment, including air, water, noise, human and animal habitats, and traffic. If the environmental assessment determines that a project may have environmental consequences, an Environmental Impact Statement (EIS) must be prepared. The EIS should fully describe the potential impacts and the measures that will be taken to avoid or minimize any detrimental effects the project might have. Once the EIS is complete, DEP will act as the lead agency, and it will work with other City agencies to: (i) allow the project to proceed; (ii) allow the project to proceed with actions to reduce or eliminate harmful effects; or (iii) deny approval of the project. Because this process may run 6 to 12 months, it's important to consult with DEP early in the project planning phase to determine if a SEQRA/CEQR analysis will be required.

Department of Environmental Protection
Customer Service Center
59-17 Junction Boulevard, 13th Floor
Flushing, NY 11373
311 or (718) 595-7000
www.nyc.gov/dep



IX. Installation, Inspections and Sign Off

Install any CHP system according to the plans approved by the Department of Buildings and permits issued by City agencies – and follow the manufacturer’s specifications.

Once installation is complete, property owners must be sure to have the proper inspections and final sign-off to operate the installed CHP system:

DOB Inspection

Gas piping for CHP systems using high pressure gas over 15 psig must be inspected by the Department. No self-certification of inspection is permitted (except for low-pressure systems, up to 1 psig). The inspection must include a pipe integrity pressure test of all distribution piping. Installation and assembly of all system components is subject to Special Inspection. For more information on Special Inspections, see the DOB rule: http://www.nyc.gov/html/dob/downloads/rules/1_RCNY_101-06.pdf.

To schedule an appointment, contact the Plumbing Inspection Call Center at (212) 227-2004, Monday to Friday, 8am to 4pm.

Gas Activation

The gas utility will authorize the gas to be turned on only after the CHP system has successfully completed all tests. Prior to the initial testing of the CHP installation, the unit must be separated by a lock-wing valve.

Upon satisfying the NYC Fuel Gas Code’s leakage test requirements under §406.6, the unit must be locked in the off position. The building owner or the agent responsible for the building, such as the superintendent or facility engineer, must maintain control over the lock. The project’s New York State licensed professional engineer must schedule all inspections.

The scope of the gas connection utility approval ends at the outlet of gas meter. The gas utility will be involved with the initial start-up to ensure adequate pressure reaches the CHP system.

DOB Final Inspection

Once sign off has been performed by all parties involved and the final inspection is completed, the Department of Buildings will display the permit online. This is accessible through the Buildings Information System (BIS) at nyc.gov/buildings. BIS will state, “Testing phase completed and final authorization for official start-up of the CHP unit installation.”

Fire Department Permit Sign Off

Upon completion of FDNY inspection of installation, after the owner pays the required fees and a Certificate of Fitness has been issued to the responsible party, FDNY will issue a permit to operate the CHP unit. These permits are issued to the property owner and must be renewed annually.



Con Edison Electrical Interconnection Testing

Con Edison performs electrical interconnection testing when the CHP installation is completed and all inspections and approvals by DOB and FDNY have been satisfied. Con Ed's assigned project representative – the CPM – will schedule the interconnection testing.

The following items must be satisfied:

- The generation equipment is successfully tested according to standardized interconnection requirements;
- The interconnection is operating properly; and
- Final acceptance and company cost reconciliation.

APPENDIX

NYC 2008 Construction Codes – the Building Code, Plumbing Code, Mechanical Code and the Fuel Gas Code.

You may view chapters of the 2008 Construction Codes at

http://www.nyc.gov/html/dob/html/model/construction_code.shtml.

You may purchase the 2008 Construction Codes at

<http://a856-citystore.nyc.gov/productslist.aspx?CategoryID=86&NavID=2>.

The NYC Fire Code

View the NYC Fire Code at:

http://www.nyc.gov/html/fdny/pdf/firecode/2009/fire_code_1126_2008_amended_1137_41_64_2009_final_complete.pdf

DEP Air Quality Regulations

For more information on the New York City Air Pollution Control Code, visit DEP's website at:

<http://nyc.gov/html/dep/html/air/index.shtml>



Contributors:

NYC Department of Environmental Protection

NYC Fire Department

Consolidated Edison

National Grid

New York Power Authority

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