

Boiler Conversions

SURVEYING THE OPTIONS A Report by RenewNEWYORK

EXECUTIVE SUMMARY

NEW YORK CITY'S new heating oil rules, announced by the Bloomberg administration in April 2011, applies to about 10,000 city buildings (approximately 1 percent of the total) that are responsible for 87% of all heating soot emissions in NYC.

There are two deadlines within the rule. The first requires discontinuing the use of No. 6 oil when a building's Certificate of Operation for boilers expires (or by 2015). Buildings must switch to Nos. 4 or 2 heating oil or to biodiesel, and/or to natural gas (dual fuel options are available). The second deadline requires switching from No. 4 to No. 2 oil, or to biodiesel, and/or to natural gas by Jan. 1, 2030. In buildings where boilers are due for replacement, any newly installed boiler must burn low-sulfur No. 2 heating oil, or natural gas, or a low emission fuel, such as biodiesel.

Although neither deadline imposes a switch to natural gas, some buildings are rushing to convert, attracted by its current low price and incentives. Those considering a switch may assume that gas will remain 1/3 the price of heating oil, and that this option would result in a greater savings over the long term than switching to alternative heating oils. However, such a decision could prove regrettable.

Several factors to consider when evaluating whether a switch to gas makes financial sense:

1. Estimates by the U.S. Geological Survey show that the Marcellus Shale contains 80% less extractable natural gas than previously projected by the oil and gas industry;
2. In reaction to the current glut, drillers are beginning to shut down production of some wells; a familiar tactic that has also been used by OPEC to influence oil prices.
3. The push to convert liquid natural gas (LNG) import terminals to export; and the fact that gas now sells overseas for five times the current domestic price;
4. The substantial upfront costs of a natural gas conversion, which may require that buildings take on debt, imposing a financial burden when natural gas prices inevitably increase.

Converting boilers entirely to natural gas requires the highest upfront costs of all the options, and, when viewed comprehensively, would increase greenhouse gas emissions by driving the demand for gas extracted through hydrofracking -- an environmentally destructive gas drilling technique.*

After a new Bioheat law takes effect in October 2012, No. 4 oil will cost almost as much as No. 2 oil, while B20, which is a blend of No. 2 oil and biodiesel, will cost almost the same as No. 6 oil (currently the cheapest oil) due to a tax credit which has been renewed until 2016.

Therefore, from a financial and environmental perspective, it makes sense for buildings to meet the 2015 deadline by avoiding the extensive upfront costs of converting to gas, and proceed directly from No. 6 to No. 2 oil, or consider a variety of biodiesels.

COST FACTORS FOR BOILER CONVERSIONS:

Building owners will factor into their decision the longevity of boilers (25 to 35 years) and burners (20 years) as well as the number of units in the building and any available incentives.

GLOSSARY:

What is a burner? Oil must be changed to a gas or vapor and mixed with air (a process known as atomization) in order to ensure prompt ignition and rapid combustion.

What is a boiler? A boiler is a closed vessel, usually steel, in which water or other fluid is heated. One rough analogy of boilers and burners is that the boiler is the car and the burner is the engine.

What is the tank? Oil is delivered by truck to point of use and stored on site in a large, usually steel vessel. Oil tanks can hold many thousands of gallons and larger buildings may have more than one. No tank is required for gas, which is piped directly to the building from utility mains in the streets.

OPTIONS AND COSTS FOR CONVERTING FROM NO. 6 TO ALTERNATE HEATING OILS

The existing boiler and oil tank can be used if they are in good condition. Most burners bought in the last ten years will only require some modifications. A new burner, if necessary, will cost about \$120,000.

The following required modifications would cost about \$15,000—\$20,000:

- Emptying and cleaning out the oil tank before it is filled with the new heating oil;
- Adjusting the burner settings;
- Modifying the oil pump and oil lines.

Converting to No. 2 oil or biodiesel may also require the following:

- The oil pump may need to be replaced.
- Oil tanks must be checked for leaks and repaired or replaced before converting to thinner oils, as leaks may become evident after tanks are drained of heavy Nos. 6 or 4 heating oils.

OPTIONS FOR CONVERTING TO BIODIESEL

Boilers can meet the new heating oil regulations by burning 100% biodiesel or Nos. 4 or 2 heating oils that are blended with biodiesel. A new Bioheat law (*Introductory Number 194-A*), which will be implemented in October 2012, requires all heating oils to contain at least 2% biodiesel (B2 Bioheat) made from sources specified in this law. A New York State tax credit, which was recently renewed until 2016, provides a tax credit of one cent per gallon for every 1% of biodiesel blended with heating oil, for a maximum credit of 20 cents per gallon of biodiesel. This means that a 20% biodiesel/No. 2 oil blend (B20 Bioheat) will cost almost the same as No. 6 heating oil (previously the cheapest oil available).

No. 4 heating oil is a blend of No. 6 and No. 2. The new Bioheat law also calls for reducing the sulfur content of No. 4 oil. This will require increasing the amount of No. 2 heating oil to about 60% of the total, which will reduce the cost differential between the two oils, making No. 4 almost the same price as No. 2.

OPTIONS AND COSTS FOR CONVERTING FROM OIL TO “FIRM” OR “INTERRUPTIBLE” GAS

Con Edison offers two kinds of natural gas options:

“Firm” gas refers to a gas-only system. Con Ed requires a contract, generally for five years, during which time buildings are only allowed to burn natural gas and must decommission their oil tank(s).

“Interruptible” gas refers to a dual-fuel system that allows for burning heating oil and natural gas. Gas is considered the primary fuel and is burned most of the time. Con Ed requires buildings to switch from burning gas to oil based on supply and demand; for example, when the temperature falls to a pre-determined level, and imposes a fine if this switch is not made within a specified amount of time. Con Edison will impose a penalty on buildings that switch from firm to interruptible gas in less than five years.

Converting to firm or interruptible gas requires the following:

- The extension of a gas line to a building.

This cost is determined by Con Edison based on the proximity of a building to the gas main in the street and the anticipated revenue for gas consumption. Con Edison is currently offering discounts in certain situations, such as when several buildings are “clustered” near each other and convert to gas at the same time.

- A dedicated, ventilated, fire-rated gas-meter room (located near where the main enters the building).
Cost will vary by building.

Converting to firm or interruptible gas may also require the following:

- New gas piping from the gas main to the boiler room;
- A gas booster pump to increase the pressure required to generate an adequate supply to the boiler;
- Inspection of the chimney, and if necessary, the installation of a chimney liner.
10 gauge stainless steel liners cost about \$10,000 per floor. No rebates are offered for liners.

Specific requirements for converting to firm gas:

- Decommissioning (permanently disabling) the oil tank through removal or filling with sand or cement;
- A new burner, which will cost around \$120,000, if the existing burner is not capable of burning gas.

Specific requirements for interruptible gas:

- A new dual-fuel burner.

Overall costs for conversion from oil to gas will vary by building, ranging from roughly \$150,000 to upwards of \$1,000,000.

***FRACKING**

Hydrofracking, or “fracking,” uses vast amounts of fresh drinking water, mixed with sand and highly toxic chemicals pumped at high pressure to explode the shale rock deep within the ground to release the gas. Fracking transforms agricultural lands into industrial wastelands and has caused the contamination of aquifers, lakes, and streams across the country. The life cycle of the fracking process generates significant greenhouse gas emissions—a major contributor to climate change. Also, the industry practice of injecting frack wastewater deep into disposal wells has been linked to earthquakes. Currently, there are no treatment plants that can adequately remove the chemicals and radioactivity from the billions of gallons of wastewater generated by fracking. In addition, experts confirm that, due to the high Uranium and Radium content of the Marcellus Shale, radon is carried in the gas. This means that gas delivered to NYC apartment buildings from the Marcellus Shale will be laced with carcinogenic radon. Predictably, as gas prices rise, the immediate cost benefits of switching boilers to gas will prove to be short-lived, while the long-term economic health, safety and environment of NYC and New York State will have been sacrificed.

CONCLUSION

Proponents of natural gas conversion argue that the higher upfront costs for conversion will be offset by a long-term supply of “cheap” gas. This prediction is premised on inflated claims of shale gas reserves, as revealed by Ian Urbina’s *Drilling Down* articles in the *New York Times* and the U.S. Geological Survey. These projections are now being investigated by New York State Attorney General Eric Schneiderman and the Securities and Exchange Commission (SEC).

Choices in boiler conversion should take into account five main considerations:

1. Market prices fluctuate. Public policy is a key determinant of energy costs, along with projections of supply and various political events outside of our control. Gas has been, in the past, \$13 per unit, in contrast to current prices below \$2.

2. Financial incentives and various subsidies can make alternative oils more cost-effective than natural gas, especially when the large upfront cost of converting to gas is avoided.

3. Efficiency and conservation are crucial to reducing heating costs. Continuing to overheat our buildings is both financially and environmentally unsustainable. Energy audits can help determine the most effective ways to reduce and conserve energy. A solar thermal system can produce hot water, rather than using oil or gas, especially during warm months when heat is not needed. The NYC solar map illustrates the city’s solar potential. See: www.nycsolarmap.org. Installing relatively inexpensive devices, such as a heat management system, thermostatic radiator valves and pipe insulation, or by repairing steam traps, radiator valves and air vents, can reduce energy use and increase tenant comfort. Efficiency and conservation can offset the higher price of No. 2 oil, especially if combined with tax credits for use of B20.

4. Cost-effectiveness must be redefined to include the cost of climate change. Greenhouse gas emissions will adversely impact NYC’s infrastructure, and will cost taxpayers billions of dollars. The most cost-effective choice is also the one that is best for the environment, which means opposing an expansion of NYC’s gas infrastructure. Typically promoted as a transitional fuel, natural gas is part of the problem and not the solution. According to a 2009 Energy Information Agency (EIA) report, natural gas is responsible for 20% of all greenhouse gas emissions in the U.S. For an overview of how climate change is affecting New York State, see Leslie Kaufman, *Scientists’ Report Stresses Urgency of Limiting Greenhouse Gas Emissions*, *New York Times*, May 12, 2011

5. Advances in renewable technology are taking place every day, and alternatives to current forms of energy could become commercially viable before 2030. According to a recent Stanford University study, by 2030 we would be able to meet our energy needs entirely with wind, water and solar. Why make a commitment to old technology, just as tomorrow’s innovations are about to launch a new paradigm?

Our recommendation: Don’t be fooled into switching to gas.

To find out if you are living in a building that burns No. 6 or No. 4 heating oil, see:
<http://apps.edf.org/page.cfm?tagID=49624>