Kendall Cogeneration Station

“Green Steam” lowers carbon footprint in Boston and Cambridge
Veolia by the numbers

- 250 — customers served by Veolia’s Boston-Cambridge network
- 700 — employees in Massachusetts
- 44M sq ft — area of buildings served
- 70% — percentage of Boston’s high-rise buildings served by Veolia
- 1,738 — hospital beds served (comprising all of the large healthcare facilities in Boston)

Kendall Cogeneration Station: Over a half century of reliable energy

Built in 1949, the original cogeneration plant housed power boilers and steam turbines to serve Cambridge’s electric distribution system and several industrial facilities. Following economic growth in East Cambridge in the 1960’s, the main steam line that runs from Kendall Station through Kendall Square was constructed. With the installation of new equipment in 2001, Kendall Station was transformed into a more energy efficient CHP facility, producing up to 256 megawatts (MW) of electricity and 1.2 million pounds per hour (Mlbs/hr) of steam.

Since acquiring the Boston-Cambridge district, Veolia has leveraged a portion of the plant’s waste heat, a byproduct of its electricity generation, to supplement its distribution networks with cogenerated “Green Steam.” Because Kendall Station’s heat production exceeded the existing pipe’s capacity, Veolia proposed an innovative environmental solution — constructing a second pipeline to capture the remaining excess thermal energy.

CHP: A sustainable and efficient energy solution

Combined heat and power (CHP), also known as cogeneration, recycles waste heat from its electric generation process into useful thermal energy, which is used for steam heating, heating water, or powering chillers. The simultaneous production of power and thermal energy consumes less fuel than if produced separately and can achieve up to 80 percent efficiency.

The Boston-Cambridge “Green Steam” system integrates highly efficient CHP technology with a 26-mile network — making it one of the largest and most extensive district energy systems in the United States to generate both electricity and steam.

By capturing heat previously lost to the environment, “Green Steam” greatly improves overall efficiency and reduces regional GHG emissions.

With its industrial jet engine and more than 1 million gallons of fuel oil inventory located on-site, Kendall Station is positioned to “jump-start” the electric grid following a blackout.

“Green Steam” eliminates a major source of thermal pollution to the Charles River and improves air quality by burning cleaner fuel sources.

The Carriage House (pictured) was originally used to house horses, hay, feed and carriages. Today, it contains the water treatment facility for Kendall Station.

Full “Green Steam” ahead in Boston and Cambridge

The $112 million “Green Steam” project, incorporating the new 7000-foot pipeline completed in 2013 and the acquisition of Kendall Station in 2014 with partner I-Squared Capital, minimizes environmental impacts, doubles the transport of cogenerated “Green Steam” to customers and integrates the district energy system serving downtown Boston and East Cambridge for added resiliency. By leveraging advanced CHP technology, the natural gas-fired Kendall Station recaptures thermal energy previously lost to the environment. In addition, Veolia’s retrofit of the plant in October 2016 replaced its original once-through cooling system design with an Air Cooled Condenser (ACC) — an engineering and environmental achievement that eliminates hot water discharge to the Charles River. By investing in recent reliability improvements, including upgrading the plant’s dual-fuel capabilities, the CHP plant is now able to restore electric service during a grid blackout, while ensuring reliable 24/7 “Green Steam” for customers.

“Green Steam” benefits

80% by 2050
Green Steam supports Boston and Cambridge’s goal to reduce GHG emissions 80% by 2050

61% / 36%
reduction of the region’s SO2 and NOx emissions, respectively

75%
district energy heat supply consists of recycled “Green Steam”

147,500 man hours
supported the construction of the “Green Steam” project

6%
reduction of non-transportation carbon emissions for both cities
ENERGY EFFICIENCY COMPARISONS

TRADITIONAL

- 35% EFFICIENT
- Separate heat & power (SHP)

1. Waste heat rejected to environment
2. Energy loss during transmission and distribution
3. Requires separate energy assets and personnel; increases carbon footprint

FACILITY

CHP [COMBINED HEAT & POWER]

- Up to 80% EFFICIENT
- Reliable, sustainable and cost-effective

1. Less fuel consumed and ability to leverage multiple fuel sources
2. Reduced emissions
3. Efficient, integrated energy production

FUEL INPUT

CHP PLANT

- Efficiently produces electricity and thermal energy (Used for generating steam or hot water, heat and power)

FACILITY

Commercial, Institutional and Industrial

CHP is dramatically more efficient, reliable, sustainable and cost-efficient

Resourcing the world

VEOLIA
CHP Basics

What is CHP?
Combined Heat and Power (CHP), or cogeneration, is an energy efficient technology that generates thermal energy (heating and cooling) and electricity from a single energy source. Through the production of electricity, heat is produced as a byproduct and recycled into useful thermal energy.

Benefits of CHP
CHP systems can attain up to 80 percent efficiency, as opposed to the 35 percent efficiency achieved when thermal energy and electricity are produced separately in boilers and power plants, respectively. Less fuel is combusted with CHP systems, reducing emissions, air pollutants and costs. The ability to combine CHP with other energy sources and leverage various fuel sources also provides reliability.

CHP and district energy
District energy systems produce and distribute energy from a central plant and can be combined with CHP systems to further reduce carbon emissions. For example, in Boston and Cambridge, Veolia’s district energy system leverages recovered thermal energy, or “Green Steam,” produced as a byproduct of electricity generation at Kendall Cogeneration Station to supply its steam network. This CHP technology, combined with Veolia’s recent infrastructure improvements, have improved reliability, eliminated thermal discharge to the Charles River and significantly reduced the region’s overall carbon footprint.

The Boston-Cambridge “Green Steam” system integrates highly efficient CHP technology with a 26-mile network – making it one of the largest and most extensive district energy systems in the United States to generate both electricity and steam.

“Green Steam” eliminates a major source of thermal pollution to the Charles River, improves air quality by burning cleaner fuel sources and reduces regional GHG emissions.

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