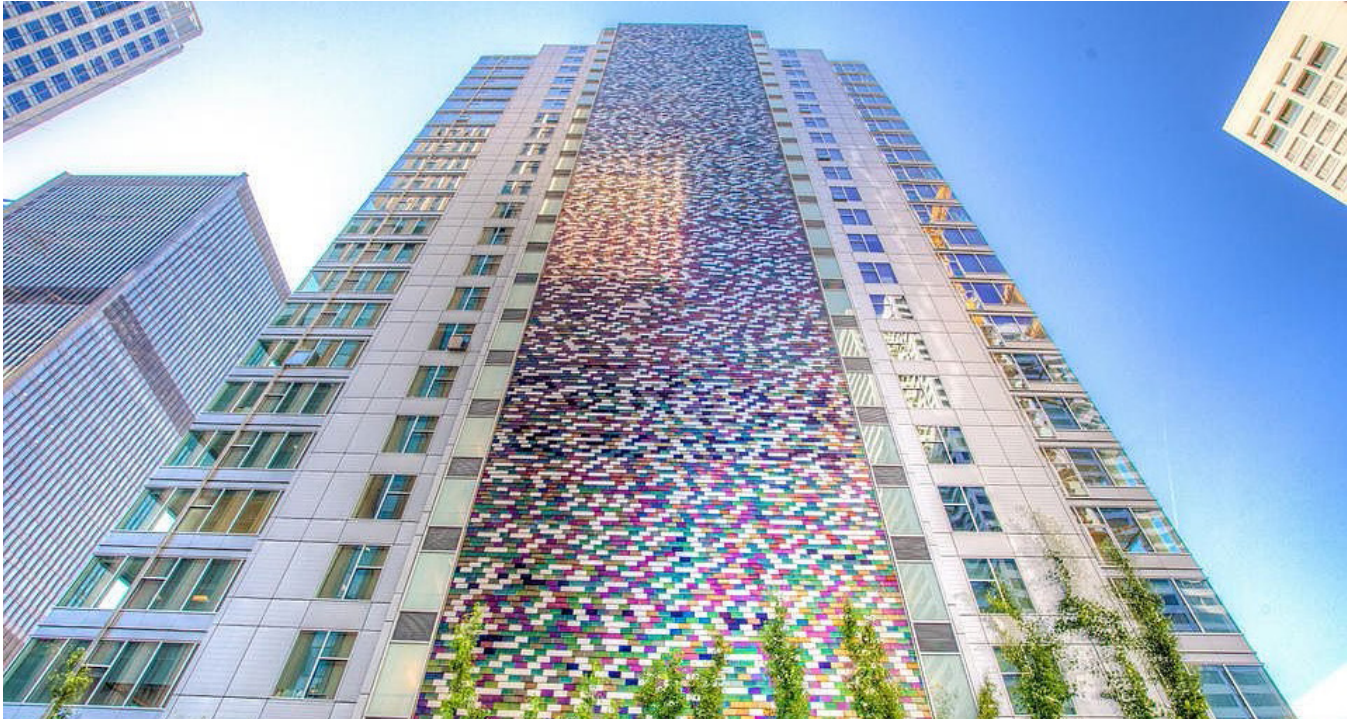


5th and Madison Condos

Decarbonizing a Piece of Seattle's Skyline



The 5th and Madison condo building. Photo Credits: Ecotope

Located in the heart of Downtown Seattle, the 5th and Madison Building is a 24-story condo tower with 126 residences that sits next to the iconic Central Library. The building achieved LEED Gold certification upon its completion in 2007, and nearly all its central equipment for heating, cooling, and hot water is original. As the building approaches its twentieth year, the condo association partnered with the City of Seattle and Ecotope on a building energy and emissions audit to identify actions that support phased compliance with Seattle's new Building Emissions Performance Standard (BEPS) over the next 20 years.

5th and Madison's emissions targets

5th and Madison is classified as a multifamily building between 90,000 and 220,000 square feet. BEPS requires buildings this size to complete Benchmarking Verification and an initial GHG Report to identify future emissions targets by 2027. The building's first BEPS greenhouse gas intensity target (GHGIT) must be met by Oct. 1, 2032 (0.89 kgCO₂e/SF/year), followed by 2037 (0.63), 2042 (0.37), and net-zero by 2047. The building owners and its condo association will need to plan for — and take action — during most, if not all, of the five-year periods to maintain compliance with BEPS.

About

Address:
909 5th Avenue
Seattle, WA 98164

Size: 172,460 SF

Energy Mix: Electricity
and natural gas

**Greenhouse Gas Intensity
(GHGI):** 1.16 kgCO₂e/SF/year¹

**Estimated Total Utility
Cost Savings:**
up to \$15,250 annually²

¹ GHGI is based on the building's average energy usage from 2022 and 2023 billing data, not including allowed deductions for fossil fuel equipment in the condo units.

² Based on utility rates from 2022 and 2023 billing data.

Steps towards a clean energy future

About 57% of 5th and Madison's emissions could be reduced by replacing the three central systems providing domestic hot water (DHW) and heating, ventilation, and cooling (HVAC) functions with all-electric heat pump systems. Additional emissions reductions of about 23% could be achieved through lower-cost energy efficiency improvements to existing systems. Ecotope considered both the BEPS emissions targets and the need to replace equipment nearing end of life to recommend the order of upgrades.

The following building upgrades were recommended:

17% emissions reduction (no-to low-cost)	\$	Complete operations & maintenance (O & M) no-to low-cost actions such as tuning up the HVAC controls and adjusting setpoints.
6% emissions reduction (\$2,100/unit)	\$ \$ \$	Replace exhaust fan and rebalance system for right-sized ventilation per current code requirements.
19% emissions reduction (\$3,000/unit)	\$ \$ \$	Replace the failing rooftop gas-fired makeup air unit that supplies the corridors with a new packaged air handler that utilizes an electric heat pump with auxiliary electric heat (and/or a hydronic heating coil).
24% emissions reduction (\$2,500/unit)	\$ \$ \$	Upgrade the domestic hot water to heat pump water heaters and increase hot water storage.
14% emissions reduction (\$11,700/unit)	\$ \$ \$ \$ \$ \$	Replace the three gas boilers providing space heating to the units via the central condenser water loop with air-to-water heat pumps. This measure is likely the most difficult of the options studied in terms of current cost, rooftop space, and some limited structural requirements.

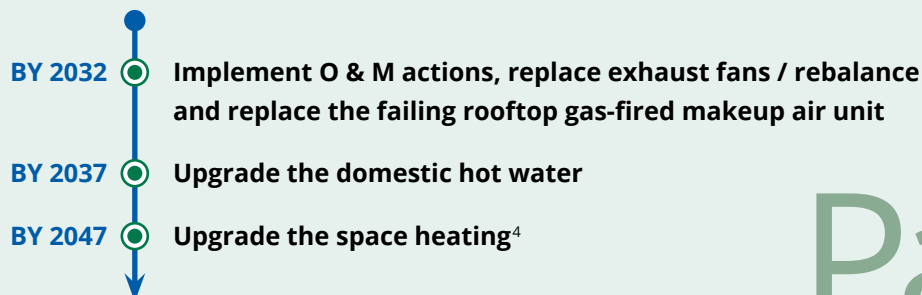
Potential BEPS Compliance Paths

While all the action items above must be done before 2047, the flexibility of the BEPS law offers 5th and Madison multiple ways to comply. In addition, BEPS allows residential condos or co-ops with individually owned units to deduct emissions from fossil fuel equipment, such as gas stoves, located in the owner's unit from the compliance GHGI. Taking this deduction for the gas stoves in all 126 units and three in-unit fireplaces accounts for about 5% of the building's emissions and reduces the GHGI to 1.11 kgCO₂e/SF/year.

³ All costs listed above are estimated relative costs, which are the cost delta between replacement of the existing higher-emissions gas equipment with a new like-for-like model versus replacement with low emissions all-electric equipment. The 2021 Seattle Energy Code places restrictions on replacement of gas and electric resistance heating equipment with limited exceptions, thus cost estimates are for informational purposes only.

Meet Greenhouse Gas Intensity Target Path:

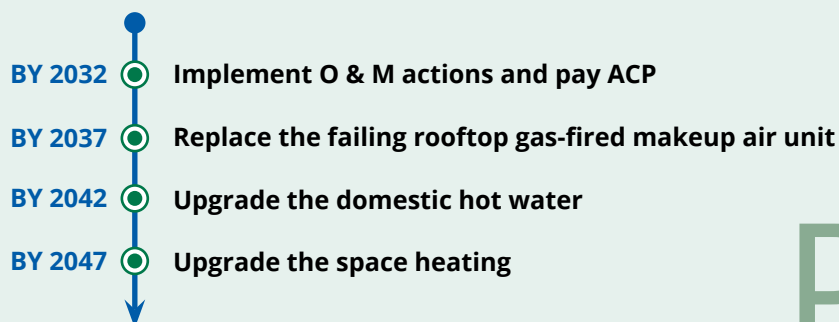
This is the most straightforward option to address failing equipment issues over a 15-year horizon:



Path 1

Alternative Compliance Payment Path:

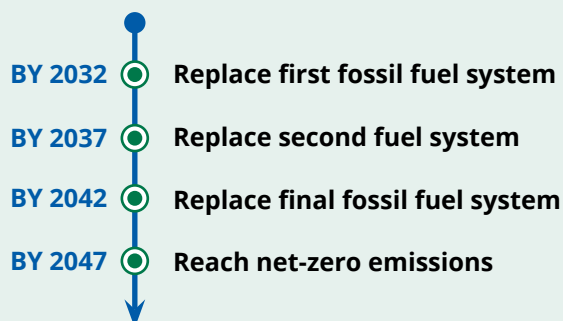
This option gives the owners more time to make larger improvements by implementing the O & M actions by 2032 combined with a small Alternative Compliance Payment (ACP), estimated at less than \$290 total per condo.⁵



Path 2

Multifamily Prescriptive Path:

Owners can replace either an existing fossil fuel domestic hot water or space heating system with an energy code-compliant electric heat pump system in lieu of meeting the GHGIT at each interval — no energy modeling needed.



Path 3

⁴ New heat pump technologies continue to come to market; it may be possible to strategically plan out retrofits over the coming years to maximize options and optimize costs.

⁵ The ACP is proportional to the difference between the building's actual emissions and building's emissions target. It is only available in 2031–2035 and the resulting revenue will fund emissions reductions in under-resourced buildings. After 2032, one upgrade during each remaining compliance interval would be needed to meet the GHGITs.



The failing makeup air unit provides ventilation for the building and needs to be replaced soon.



The existing HVAC boiler, likely one of the last pieces of fossil fuel equipment to be replaced.



The view from the roof, where new heat pumps will be installed in the 2040s to provide space heating for residents.

Net-zero emissions is achievable, even for large residential buildings

By using any of the scenarios above and taking the in-unit cooking equipment deduction, 5th and Madison could meet its 2047 net-zero emissions target. For many buildings, meeting emissions targets can be achieved over time by making initial low-cost operations improvements while planning for replacing end-of-life, fossil fuel equipment with lower-emissions equipment.

Why reduce building emissions?

In Seattle, buildings are one of the largest sources of climate pollution, responsible for 40% of our City's greenhouse gas emissions. These emissions pollute our air, accelerate climate change, and harm people's health and the environment, disproportionately affecting communities of color and people with lower incomes. Seattle's new [Building Emissions Performance Standard \(BEPS\)](#) requires buildings greater than 20,000 SF to reach net-zero emissions by 2041 to 2050, and is one of the most impactful climate actions Seattle is taking.

Get started today.

Addressing emissions from buildings is one of the most powerful levers for tackling climate change. Get started on your own path by talking with your facility staff and independent service providers to explore lower emissions options like heat pumps well before you need to replace equipment. Contact cleanbuildings@seattle.gov for more information about free City technical support.