pathways to 2030

calculate
your carbon emissions

Use the BE-Ex Carbon Calculator:
be-exchange.org/ll97-calculator

compare
to LL97 GHG limits

Compare your current calculated GHG emissions with Local Law 97 (LL97) limits and determine the percent reduction required for compliance.

choose a pathway
to meet your reduction target

Choose a pathway below to decarbonization measures that can help you achieve your GHG reduction target.

5 – 10%
reduction

select one of the following options:

A. Moderate existing tenant measures
B. Moderate base building measures

10 – 25%
reduction

select one of the following options:

A. Moderate base building + Moderate existing tenant measures
B. Deep base building measures
C. Deep tenant fitout measures

> 25%
reduction

select the following:

Deep base building + Deep tenant fitout measures

owner / tenant collaboration

While LL97 places the responsibility to meet emissions limits on building owners, close collaboration between tenants and owners is critical to achieving the required GHG reductions. As part of tenant lease negotiations and tenant improvement projects, energy efficiency and GHG reduction will be an important element to reduce both base building and tenant emissions. Achieving LL97 compliance will require thoughtful owner-tenant engagement, to inform choices and behaviors that result in greater energy efficiency and emissions reductions.

read the report: be-exchange.org/beexreport/commercialdata

learn more: be-exchange.org

March 2023

tearsheet

Turning Data into Action
GHG Reduction Pathways for Commercial Office Buildings

typology 2 / 4

Packaged Cooling Systems with Steam Heating

Cooling Systems
- DX Units
- Packaged Rooftop Units

Heating Systems
- District Steam
- Steam Boiler

Heating Fuel
- District Steam
- Dual Fuel
- Electric
- Natural Gas
- Oil
- Propane

be ex
building energy exchange

CODEGREEN

sustainable energy partnerships

Report Partners

typology 2: Packaged Cooling Systems with Steam Heating

Typology at a Glance

The statistics below reflect this typology's fraction of citywide office building floor area, and the resulting energy use and greenhouse gas (GHG) emissions of all large office buildings, citywide.

Gross SF
104.4M SF
30%

# of NYC buildings
800
39%

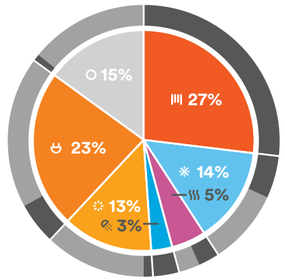
GHG Emissions
750,000 tCo_2e
34%

Site Energy Use
8.5B kBtu
30%

Average Site EUI
81 kBtu/sf /yr

Whole-building GHG distribution

This pie chart depicts the breakdown of GHG emissions by end-use system, as well as the split between base building and tenant usage for each system.



building systems
- heating
- cooling
- ventilation
- hot water
- lighting
- plug loads & conveyance
- process / other

% from base building
% from tenant

Packaged Cooling Systems with Steam Heating

building emissions by system

This shows the breakdown of GHG emissions by end-use system, as well as bar charts depicting base building vs. tenant usage for each system.

BUILDING SYSTEM	%GHG (WHOLE BUILDING)	BASE BUILDING	TENANT
heating	27%	100%	0%
cooling	14%	35%	65%
ventilation	5%	50%	50%
hot water	3%	100%	0%
lighting	13%	5%	95%
plug loads & conveyance	23%	23%	77%
process / other	15%	5%	95%
GHG breakdown	43%	43%	57%

retrofit packages

moderate decarbonization

The potential GHG savings percentages listed below reflect estimated base building and/or tenant space emissions savings from baseline whole-building emissions. The total savings range for moderate decarbonization measures includes the combined savings from both base building measures and existing tenant measures.

base building measures

EMISSIONS REDUCTION MEASURES (ERMS)	POTENTIAL GHG SAVINGS (WHOLE BUILDING)
Repair/replace steam traps and control valves Install TRVs Install or Upgrade EMS/BMS & other controls Upgrade zone controls Insulate pipes Install heat recovery	4.5%
Install economizers Adjust setpoints and setbacks Install demand controlled ventilation Install VAV and thermostats in tenant spaces Map tenant BMS oversight into base building system Reset chilled water differential pressure setpoint	1.0%
Install VFDs on AHUs Convert CV system to VAV type system Install demand controlled ventilation Install exhaust fan timers Upgrade fans/air handlers	0.5%
Install DHW controls Install low-flow aerators Install low-flow showerheads Insulate DHW tank	0.5%
Install occupancy/vacancy sensors and timers Upgrade lighting to LEDs Upgrade to bi-level lighting fixtures in stairwells Delamp overlit spaces	<0.5%
Install plug load controls/timers Add elevator regenerative drives Upgrade elevator and escalator motors	0.5%

GHG savings from base building measures **6–8%**

existing tenant measures

EMISSIONS REDUCTION MEASURES (ERMS)	POTENTIAL GHG SAVINGS (WHOLE BUILDING)
Optimize server room cooling Optimize setpoints and schedules for occupied hours Calibrate sensors and controls Clean coils	2.0%
Install VAV system Optimize VAV static pressure reset schedule Install demand controlled ventilation	<0.5%
Install occupancy/vacancy sensors and timers Upgrade lighting to LEDs Upgrade to bi-level lighting fixtures in stairwells Delamp overlit spaces	2.0%
Install plug load controls/timers Use ENERGY STAR appliances Utilize sleep modes on IT equipment Move onsite IT to cloud, when possible	2.5%

GHG savings from existing tenant measures **5–7%**

total savings from moderate decarbonization measures **11–15%**

retrofit packages

deep decarbonization

Achieving deeper GHG savings for buildings more than 25% over emissions limits will require significant investment, often including electrification solutions (⚡) for heating, cooling, and hot water. A detailed engineering analysis is needed to determine the best measures for each building.♦ GHG savings listed below are from baseline whole-building emissions.

base building measures

EMISSIONS REDUCTION MEASURES (ERMS)	POTENTIAL GHG SAVINGS (WHOLE BUILDING)
⚡ Convert to water source heat pump or other electrification option, as appropriate Upgrade window glazing	14.0%
⚡ Convert to water source heat pump or other electrification option, as appropriate Upgrade window glazing	2.0%
Install dedicated outside air system (DOAS) Install demand controlled ventilation	1.5%
⚡ Convert to water source heat pump for DHW	0.5%
Install occupancy/vacancy sensors and timers Upgrade lighting to LEDs Upgrade to bi-level lighting fixtures in stairwells Delamp overlit spaces	<0.5%
Install plug load controls/timers Add elevator regenerative drives Upgrade elevator and escalator motors	0.5%

GHG savings from base building measures **17–19%**

tenant fitout measures

EMISSIONS REDUCTION MEASURES (ERMS)	POTENTIAL GHG SAVINGS (WHOLE BUILDING)
⚡ Convert to water source heat pump or other electrification option, as appropriate	*
⚡ Convert to water source heat pump or other electrification option, as appropriate	2.5%
Install dedicated outside air system (DOAS) Install demand controlled ventilation	*
⚡ Convert to electric point-of-use DHW, where applicable	*
Install new LED lighting systems Install advanced daylighting & occupancy controls	6.5%
Install plug load controls/timers Use ENERGY STAR appliances Utilize sleep modes on IT equipment Move onsite IT to cloud, when possible	6.5%

GHG savings from new tenant measures **13–16%**

total savings from deep decarbonization measures **30–35%**

* For end uses where there are measures listed but no savings shown, the whole-building GHG savings is counted in the base building column for that end use. The transition to all-electric equipment will shift some energy loads between base building and tenant systems, which is not estimated in this table.

♦ Emissions reductions are shown using the electricity carbon coefficient specified in Local Law 97 for the 2024-2029 compliance period; it is likely that the final electricity coefficient for 2030-2034 will be lower, resulting in bigger GHG reductions.