# LOCAL LAW 97 Calculating Building Emissions & Emission Limits

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Buildings



Course # S062624

#### LOCAL LAW 97: Calculating Building Emissions & Emission Limits

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#### Learning Objectives

This course to provide an overview of the requirements in Local Law of 2019 that limit NYC buildings' Greenhouse Gas emissions. Specifically, this course will cover the aspects of buildings' annual GHG emissions, and building emissions limit specified in Local Law 97 and related NYC Administrative Code and Rules of the City of New York.

At the end of this course, participants will be able to:

- 1. Understand the general timeline and compliance pathways of Local Law 97.
- 2. Understand the definition of Covered Building in Local Law 97, and its implications when documents to demonstrate compliance with Local Law 97 are prepared.
- 3. Identify buildings' ESPM property types and GHG Emission Factors, and how to use them to calculate GHG Emissions Limit of the building.
- 4. Identify buildings' annual fuel use information and Emissions Coefficients for corresponding fuel types, and how to use them to calculate Annual GHG Emissions of the building.
- Understand how to demonstrate compliance with Local Law 97 using GHG Emissions Limit and Annual GHG Emissions for buildings following the Article 320 compliance pathway.

## LOCAL LAW 97 TIMELINE



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#### LOCAL LAW 97 COMPLIANCE BUCKETS



## LOCAL LAW 97 COMPLIANCE BUCKETS

/	Annual Emissions Limits (§ 320) 34,000 buildings	Lower Cost One-Time Compliance (§ 321) 10,500 buildings	Portfolio-Wide Reduction 3,500 buildings
	Private sector, non-rent regulated buildings*	<ul> <li>Rent-regulated buildings (&gt;35% rent reg)</li> <li>Houses of worship</li> </ul>	<ul><li>City buildings</li><li>NYCHA</li></ul>
	Buildings must reduce emissions by retrofitting to promote energy efficiency. Reduce energy waste and demand, electrify equipment, and improve building operations and maintenance practices.	Meet all applicable measures from a list of Prescriptive Energy Conservation Measures or comply with the 2030 annual emissions limit.	DCAS buildings must reduce emissions by 40% by 2025 and 50% by 2030. NYCHA buildings must reduce emissions by 40% by 2030 and 80% by 2050.
	Compliance begins in <b>2024.</b> Penalties begin in <b>2025.</b> Cap becomes more stringent in <b>2030</b> , etc. Two-year delay for <35% rent/reg (~4,000 buildings). Ten-year delay for income restricted (~3,500 buildings).	Implement prescriptive measures or meet 2030 limits in 2024 and submit one-time report by <b>2025.</b>	DCAS to meet portfolio-wide caps starting in <b>2025</b> , NYCHA starting in <b>2030</b> .

\*Adjustments available for hospitals, nonprofits, landmarks and buildings with financial hardship.

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### LOCAL LAW 97 COMPLIANCE BUCKETS





## LOCAL LAW 97: COVERED BUILDING

#### COVERED BUILDING DEFINITION – NYC ADMIN CODE ARTICLE 320

**COVERED BUILDING.** The term "covered building" means, as it appears in the records of the department of finance, (i) a building that exceeds 25,000 gross square feet ( $2322.5 \text{ m}^2$ ) or (ii) two or more buildings on the same tax lot that together exceed 50,000 gross square feet ( $4645 \text{ m}^2$ ), or (iii) two or more buildings held in the condominium form of ownership that are governed by the same board of managers and that together exceed 50,000 gross square feet ( $4645 \text{ m}^2$ ).

#### Exceptions:

- 1. An industrial facility primarily used for the generation of electric power or steam.
- 2. Real property, not more than three stories, consisting of a series of attached, detached or semi-detached dwellings, for which ownership and the responsibility for maintenance of the HVAC systems and hot water heating systems is held by each individual dwelling unit owner, and with no HVAC system or hot water heating system in the series serving more than 25,000 gross square feet (2322.5 m<sup>2</sup>), as certified by a registered design professional to the department.
- 3. A city building.
- 4. A housing development or building on land owned by the New York city housing authority
- 5. A rent regulated accommodation.
- A building whose main use or dominant occupancy is classified as occupancy group A-3 religious house of worship.



• A Building > 25,000 sf







Total GSF: 46,000 sf < 50,000 sf

**Building 1 ONLY** is COVERED BUILDING as 26,000 sf is greater than 25,000 sf.

Total GSF: 51,000 sf > 50,000 sf

Not Only Building 1 (26,000 sf), But Also Building 2 (15,000 sf) and Building 3 (10,000 sf) are COVERED BUILDINGS.

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### LOCAL LAW 97: Area Definitions by DOF

- Department of Finance determines "Gross Square Feet"
  - DOF has record of gross square feet on all the buildings on a lot, otherwise know as the BBL

#### Covered Buildings List:

https://www.nyc.gov/site/buildings/codes/sustainability.page (must be used Only to identify Covered Buildings)

Building can dispute their DOF square footage data, if inaccurate (on website)

#### Disputes

If you believe your property is erroneously listed on the CBL due to the square footage of your building, contact the Department of Finance at **sustainablebuildings@finance.nyc.gov**. Please include the following in the email:

- · borough, block, and lot number of the building
- · contact information: name, email address or/and telephone number
- explanation of your dispute

## e Feet"

#### Local Law 97 Covered Buildings (CY 2024) All properties subject to Local Law 97

The presence or absence of any property on this list cannot be construed to relieve anyone from compliance with LL97 or any other applicable law. The following lists have been compiled using preliminary data and are subject to change. They are intended only as a reference for building owners to consider in consultation with legal representatives and registered design professionals (RDPs).

BBL	ADDRESS	BOROUGH	ZIP CODE
1000010010	1 ANDES PLACE	MANHATTAN	10004
1000010101	1 LIBERTY ISLAND	MANHATTAN	10004
1000010201	1 ELLIS ISLAND	MANHATTAN	10004
1000020001	4 SOUTH STREET	MANHATTAN	10004
1000020002	10 SOUTH STREET	MANHATTAN	10004
1000030001	10 BATTERY PARK	MANHATTAN	10004
1000030010	1 SOUTH STREET	MANHATTAN	10004
1000047501	1 WATER STREET	MANHATTAN	10038
4000050040	445 DROAD OTDEET		10001

 1
 0
 0
 1
 5
 3
 0
 0
 0

 Borough code
 Block #
 Lot #

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#### LOCAL LAW 97: Area Definitions by DOB

- Department of Buildings defines "Gross Floor Area" in 1 RCNY 103-14
- "Gross Floor Area" is normally not identical to DOF's Gross Square Feet
  - Also not aligned with Zoning Floor Area or Conditioned Floor Area
- "Gross Floor Area" is directly used to calculate a building's GHG Emissions Limit
- RDP is responsible for determining the Gross Floor Area

#### 1 RCNY 103-14 defines as:

**Gross floor area**. Gross floor area is the total area in square feet of all floors and spaces in a covered building, as measured between the exterior surfaces of the enclosing fixed walls. Gross floor area includes vent shafts, elevator shafts, flues, pipe shafts, vertical ducts, stairwells, light wells, basement space, cellar space, mechanical/electrical rooms, and interior parking. Gross floor area does not include unroofed courtyards or unroofed light wells. For atria, gross floor area only includes the area of atrium floors. For the purposes of calculating gross floor area in tenant spaces, interior demising walls should be measured to the centerline of the wall.

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## LOCAL LAW 97: Buildings with Shared Energy Service



- Shared Energy Service Two or more buildings share energy service if such buildings share a meter or other point of connection to the energy supply or energy distribution system.
- Combined Report Building 1 and Building 2 sharing a natural gas meter may file a combined report, <u>provided</u> Building1 and Building 2 follow the same LL97 compliance pathway. (See Slide 9 for example where Combined Report is not allowed.)
- BIN level Calculation Even when a combined report for two buildings sharing energy service are submitted, annual building emissions and emission limits <u>for each building (BIN level)</u> must be separately calculated.

#### GHG Emissions Limit vs. Annual GHG Emissions

#### • **GHG Emissions Limit** [in units of tCO<sub>2</sub>e]

#### of a Property with ESPM Property type A, B, and C =

Gross Floor Area of ESPM Property type A x Emissions Factor A +

Gross Floor Area of ESPM Property type B x Emissions Factor B +

Gross Floor Area of ESPM Property type C x Emissions Factor C

#### Annual GHG Emissions [in units of tCO<sub>2</sub>e]

#### of a Property with Fuel type W, Y, and Z =

Annual Use of Fuel type WxEmissions Coefficient of the Fuel type W +Annual Use of Fuel type YxEmissions Coefficient of the Fuel type Y +Annual Use of Fuel type ZxEmissions Coefficient of the Fuel type Z

#### ■ Compliance with LL97 for the property is met when GHG Emissions Limit ≥ Annual GHG Emissions

Penalty for Non-compliance: (Annual GHG Emissions – GHG Emissions Limit) tCO2e x \$268/ tCO2e

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## LOCAL LAW 97: Building GHG Emission Limit

- Each building has a GHG limit based on the property types of the spaces within the building.
  - GHG Limit = Gross Floor Area X Emissions Factor
- Article 320 defined a building emissions intensity limit in tCO<sub>2</sub>e/sf
- Based on 17 Building Code Occupancy categories

**§28-320.3 Building emissions limits.** Except as otherwise provided in this article, or otherwise provided by rule, on and after January 1, 2024, a covered building shall not have annual building emissions higher than the annual building emissions limit for such building as determined in accordance with this section based on the occupancy group of the building.

<sup>‡‡‡</sup> §28-320.3.1 Annual building emissions limits 2024-2029. For calendar years 2024 through 2029, the annual building emissions limits for covered buildings shall be calculated pursuant to items 1 through 10 of this section. For the purposes of such calculation the department shall provide a method for converting categories of uses under the United States environmental protection agency Portfolio Manager tool to the equivalent uses and occupancy groups set forth in this section. For a covered building with spaces classified in more than one occupancy group, the annual building emissions limit shall be the sum of the calculated values from items 1 through 10 of this paragraph, as applicable for each space.

- For spaces classified as occupancy group A: multiply the building emissions intensity limit of 0.01074 tCO<sub>2</sub>e/sf by the corresponding gross floor area (sf);
- For spaces classified as occupancy group B other than as described in item 6: multiply the building emissions intensity limit of 0.00846 tCO<sub>2</sub>e/sf by the corresponding gross floor area (sf);
- 3. For spaces classified as occupancy groups E and I-4: multiply the building emissions intensity limit of 0.00758 tCO<sub>2</sub>e/sf by the corresponding gross floor area (sf);
- For spaces classified as occupancy group I-1: multiply the building emissions intensity limit of 0.01138 tCO<sub>2</sub>e /sf by the corresponding gross floor area (sf);

## LOCAL LAW 97: Building GHG Emission Limit

- Each building has a GHG limit based on the property types of the spaces within the building.
  - GHG Limit = Gross Floor Area X Emissions Factor
- RCNY 103-14 defined a building emissions intensity limit in tCO<sub>2</sub>e/sf
- Based on 62 Energy Star
   Portfolio Manager Property
   Types (ESPM Property Types)

- (3) Annual emission factors. For purposes of reporting annual greenhouse gas emissions pursuant to this section, emissions factors shall be determined in accordance with this paragraph.
  - (i) Except as provided in subparagraph (ii) of this paragraph, for the purposes of reporting for calendar years 2024 – 2029, the following emissions factors apply to the following Energy Star Portfolio Manager (ESPM) property types:

ESPM Property Type	2024 - 2029 Emissions Factor in		
	tCO <sub>2</sub> e per sf		
Adult Education	0.00758		
Ambulatory Surgical Center	0.01181		
Automobile Dealership	0.00675		
Bank Branch	0.00987		
Bowling Alley	0.00574		
College/University	0.00987		
Convenience Store without Gas Station	0.00675		
Courthouse	0.00426		
Data Center	0.02381		

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## ESPM Property Types to Calculate Emissions Limit

- Outreach on converting to ESPM Property Types
  - LL97 Emissions Limits Based on Energy Star Portfolio Manager (ESPM) Property Types was posted to <u>Sustainability</u> - Buildings (nyc.gov), as well as <u>NYC Sustainable Buildings</u>
  - ESPM Methodology study completed and posted to the DOB Website
- Adjusted target to net zero by 2050 instead of 80% reduction
- Implemented in 1<sup>st</sup> major rule package



LOCAL LAW 97 Methodology for Converting Emissions Limits from Occupancy Groups to Energy Star Property Types for 2024-2029 Compliance Period

JANUARY 2023



 $https://home.nyc.gov/assets/sustainablebuildings/downloads/pdfs/ESPM\_mapping\_emissions\_limits\_combined.pdf$ 

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## Emissions Limit on ESPM Property Types

ESPM Primary Property Type	Building Code	GHGI Limit Group Based on Building Code	GHGI Limit Based on Building Code	GHGI at 81.13 <sup>th</sup> Percentile	Assigned GHGI Limit Based on ESPM	Assigned GHGI Limit Group Based on ESPM	Change in GHGI Limit	Count of Properties (exclude outlier)	Total Square Footage (exclude outlier)
Enclosed Mall	м	7	0.01181	0.010725	0.01074	1	-0.00107	7	3,858,780
Other - Mall	М	7	0.01181	0.01051	0.01074	1	-0.00107	33	4,243,357
Medical Office	В	2	0.00846	0.010688	0.01074	1	0.00228	43	4,836,325
Other - Services	В	2	0.00846	0.010404	0.01074	1	0.00228	6	516,859
Lifestyle Center	М	7	0.01181	0.008322	0.00846	2	-0.00335	1	33,600
Performing Arts	A-1	1	0.01074	0.008756	0.00846	2	-0.00228	29	2,061,300
Financial Office	В	2	0.00846	0.008044	0.00846	2	0	19	13,506,383
Other - Education	В	2	0.00846	0.008421	0.00846	2	0	29	2,019,852
Retail Store	М	7	0.01181	0.007982	0.00758	3	-0.00423	163	19,794,355
Other - Lodging/ Residential	R-1	8	0.00987	0.007928	0.00758	3	-0.00229	24	1,494,721
Residence Hall/Dormitory	R-1	8	0.00987	0.007499	0.00758	3	-0.00229	119	13,628,282
Library	В	2	0.00846	0.006996	0.00675	9	-0.00171	3	913,165
K-12 School	E	3	0.00758	0.006913	0.00675	9	-0.00083	187	15,631,576
Pre- school/Daycare	I-4	3	0.00758	0.006426	0.00675	9	-0.00083	15	703,846
Multifamily Housing	R-2	9	0.00675	0.007114	0.00675	9	0	11,916	1,107,877,812

Orange rows are Property Types that received a lower a GHGI limit, while green indicates a higher limit, and white indicates the limit did not change.

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## ESPM Property Types For LOCAL LAW 97



February 7, 2023

#### SERVICE NOTICE

#### Local Law 97 of 2019: Updated Building Emissions Limits

The Department of Buildings has established updated emissions limits for buildings required by Title 28 of the NYC Administrative Code, Articles 320 and 321 to have building emissions reports submitted. The new limits are based on the property types in the Environmental Protection Agency's Energy Star Portfolio Manager (ESPM), rather than the occupancy groups listed in the New York City Building Code. (See 1 RCNY § 103-14.)

Owners of covered buildings are required to submit annual building emissions reports to the Department by May 1 of each year. The report for the first compliance calendar year 2024 is due by May 1, 2025.

https://www.nyc.gov/assets/buildings/pdf/LL97\_ESPM\_sn.pdf



# Buildings

## SERVICE NOTICE

#### Local Law 97 of 2019: Updated Building Emissions Limits

#### Reports for Calendar Years 2024 & 2025

Emissions limits for calendar years 2024 and 2025 are required to be based on ESPM property types listed in 1 RCNY 103-14. Alternatively, the reports for calendar years 2024 and 2025 may use either the emissions limits assigned to occupancy groups in Administrative Code Section 28-320.3.1 or the updated limits assigned to ESPM property types (see 2024 – 2029 limits based on ESPM property types), provided that the limit assigned to at least one ESPM property type within a building is lower than that assigned to the corresponding occupancy group. Owners must report using emissions limits from a single methodology (occupancy groups or ESPM). Owners may not mix limits from both methodologies in the same report.

- Most limits under ESPM are <u>higher</u> than the corresponding Building Code Occupancy category
- Buildings have easier compliance under ESPM
- **SOME** buildings have <u>lower</u> limits under ESPM compared to BC Occ.
  - For these buildings ONLY, they may use either ESPM or BC in calendar years 2024 and 2025 (reporting years 2025, 2026)
- ALL buildings must use ESPM starting in calendar year 2026 (reporting year 2027)

https://www.nyc.gov/assets/buildings/pdf/LL97\_ESPM\_sn.pdf

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# Buildings

## SERVICE NOTICE

#### Local Law 97 of 2019: Updated Building Emissions Limits

#### Reports for Calendar Years 2026 & After

Starting with the building emissions report for calendar year 2026, building emissions limits are required to be based on ESPM property types for all buildings.

• ALL buildings must use ESPM starting in calendar year 2026 (reporting year 2027)

https://www.nyc.gov/assets/buildings/pdf/LL97\_ESPM\_sn.pdf

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## LOCAL LAW 97: GHG Coefficients for common fuels 2024-2029

- GHG Emissions Coefficients for consumption of common fuel types are specified in :
  - Article 320.3.1.1 and 1 RCNY 103-14 (d)(3) for 2024-2029 calendar years for common fuels
    - Item 1: Utility electricity = 0.000288962 tCO<sub>2</sub>e per kwh
    - Item 2: Natural gas =  $0.00005311 \text{ tCO}_2 \text{e}$  per kbtu
    - Item 3: Fuel Oil #2 = 0.00007421 tCO<sub>2</sub>e per kbtu
    - Item 4: Fuel Oil #4 = 0.00007529 tCO<sub>2</sub>e per kbtu
    - Item 5: District Steam =  $0.00004493 \text{ tCO}_2\text{e}$  per kbtu

#### §28-320.3.1.1 Greenhouse gas coefficient of energy consumption for calendar years 2024 through 2029.

- Natural gas combusted on the premises of a covered building shall be calculated as generating 0.00005311 tCO<sub>2</sub>e per kbtu.
- #2 fuel oil combusted on the premises of a covered building shall be calculated as generating 0.00007421 tCO<sub>2</sub>e per kbtu.
- #4 fuel oil combusted on the premises of a covered building shall be calculated as generating 0.00007529 tCO<sub>2</sub>e per kbtu.
- District steam consumed on the premises of a covered building shall be calculated as generating 0.00004493 tCO<sub>2</sub>e per kbtu.

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### LOCAL LAW 97: Annual GHG Emissions

RDP will need to calculate the building's annual GHG emissions total for the property.

#### Annual GHG Emissions =

 $\sum$  (Annual fuel use X Emissions Coefficient of the fuel type)

- Calendar year annual fuel use 2024 → reporting year 2025
   Calendar year annual fuel use 2025 → reporting year 2026
   Calendar year annual fuel use 2026 → reporting year 2027...
- Annual fuel use is reported via Benchmarking
- Currently 6 months into the 1<sup>st</sup> Calendar year of LL97

### LOCAL LAW 97: Sample Calculations

[Example] Multi-family/ Commerie	cal mixed-use Building of 45,000 sf			
2024 Annual Emissions [tCO2e]				
Fuel type		2024-2029	2024	2024
Fuel type		Emissions Coefficient	Annual Fuel Use	Annual Emissions [tCO2e]
Natural Gas		0.00005311 tCO2e/kBtu	2,250,000 kBtu	119.50
No. 2 Oil		0.00007421 tCO <sub>2</sub> e/kBtu	1,050,000 kBtu	77.92
Utility Electricity		0.000288962 tCO2e/kWh	310,000 kWh	89.58
total				287.00
2024 Emissions Limit [tCOze]				
		2024 - 2029		2024
Building use	ESPM Property type	Emissions Factor [tCO <sub>2</sub> e/sf]	Gross Floor Area [sf]	Emissions Limit [tCO2e]
Multi-family	Multifamily Housing	0.00675	40,000	270.00
Commercial				
	Personal Services			
- Dry cleaner	(Health/Beauty, Dry Cleaning, etc.)	0.00574	1,900	10.91
	Repair Services			
<ul> <li>Locksmith/Shoe repair shop</li> </ul>	(Vehicle, Shoe, Locksmith, etc.)	0.00426	600	2.56
- Hardware store	Retail store	0.00758	2,500	18.95
total			45,000	302.41
2024 Annual Emissions [tCO2e]	2024 Emissions Limit [tCO <sub>2</sub> e]			
287.00	<b>&lt;</b> 302.41			

Compliant with LL97 for CY 2024 as 2024 Annual Emissions are less than 2024 Emissions Limit

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#### LOCAL LAW 97: GHG Coefficients for Fuel Cells 2024-2029

- GHG Emissions coefficients of the fuel types are specified in :
  - Article 320.3.1.1 for 2024-2029 calendar years
    - Item 6: Fuel Cells points to Rulemaking (See <u>1 RCNY 103-14</u>.)
  - 6. The amount of greenhouse gas emissions attributable to natural gas powered fuel cells shall be credited compared to the electricity grid marginal emissions factor that will be determined by the commissioner and promulgated into rules of the department.

**Exception:** Natural gas powered fuel cells that commence operation prior to the later of January 1, 2023 or the promulgation of such rules, shall be credited compared to the electricity grid marginal emissions factor published in the most recent New York state energy research and development authority renewable energy standard program impact evaluation and clean energy standard triennial review, or a successor to such report issued by the New York state energy research and development authority.

#### LOCAL LAW 97: GHG Coefficients for Other Fuels 2024-2029

- GHG Emissions coefficients of the fuel types are specified in :
  - Article 320.3.1.1 for 2024-2029 calendar years
    - Item 7: Other energy sources including distributed energy resources (DER) points to Rulemaking (See 1 RCNY 103-14.)
    - DER technologies include solar, cogeneration, and energy storage systems.
  - The amount of greenhouse gas emissions attributable to other energy sources, including but not limited to distributed energy resources, shall be determined by the commissioner and promulgated into rules of the department.

#### LL97: GHG Coefficients for CY 2030-2034 in 1 RCNY 103-14

- GHG Emissions coefficients of the fuel types are specified in :
  - RCNY 103-14 Section (d)(3)(i)(a) 18 uncommon fuels for 2024-2034 calendar years
  - RCNY 103-14 Section (d)(3)(i)(b) Fuel Oil #2 & #4 for 2030-2034 calendar years
  - RCNY 103-14 Section (d)(3)(i)(c) unlisted fuels
  - RCNY 103-14 Section (d)(3)(ii) Electric, Natural Gas & Steam for 2030-2034 calendar years
  - RCNY 103-14 Section (d)(3)(iii) Time-of-Use
  - (i) Greenhouse gas coefficients for certain fuels combusted or consumed on premises for calendar years 2024 - 2034. For building emissions reports for calendar years 2024 - 2034, the GHG coefficients for fuel types combusted or consumed on premises provided in section 28-320.3.1.1 of the Administrative Code apply, except as provided in this subparagraph (i) or in subparagraph (ii) of this paragraph, provided that for any fuel type with a biogenic blend, the owner may propose an alternate coefficient pursuant to clause c of this subparagraph.

### LOCAL LAW 97: Summary of GHG Emissions Fuel Coefficients

- **70%** of electricity will be from renewable energy source by **2030**
- State aims to achieve **100% renewable** electricity by **2040**
- **ConEd** has **district steam** GHG reduction goals

	GHG Coefficient (tCO2e/kBTU)				
Fuel	2024-2029	2030-2034	2035-2039	2040-2050	
Grid Electricity per kwh	0.000288962	0.000145	0.0000866886	0.000000	
Natural Gas	0.00005311	0.00005311	0.00005311	0.00005311	
Fuel Oil #2	0.00007421	0.00007421	0.00007421	0.00007421	
Fuel Oil #4	0.00007529	0.00007529	0.00007529	0.00007529	
District Steam	0.00004493	0.00004320	0.00003200	0.00002500	

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#### GHG Coefficient change over time



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#### Summary – LL97 Calculating Building Emissions & Emission Limits

**Annual GHG Emissions** =  $\sum$  (Annual fuel use x Emissions Coefficient of the fuel type) **GHG Emissions Limit** =  $\sum$  (GFA of ESPM property type x Emissions Factor)

Compliance is met when

#### Annual GHG Emissions ≤ GHG Emissions Limit

- Reducing fuel use reduces emissions
- Reducing the fuel coefficient reduces emissions
- Electricity coefficient drops over time as renewables enter the grid
- Electricity will have the lowest coefficient in 2030, as per LL97 reporting

## **Thank You!**

## **Questions?**





Approved Continuing Education

This concludes the American Institute of Architects Continuing Education Systems Course.

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