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AABC Commissioning Group

AIA Provider Number 50111116



## NYC's Audit & RCx Statute – LL87/09

Course Number: CXENERGY1826

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***Director of Sustainability Enforcement***



April 26, 2018

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# Course Description

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In 2009, New York City enacted a law that mandated buildings over 50,000 gross square feet must undergo periodic energy audits and implement identified retro-commissioning measures.

NYC is a pioneer in implementing an energy audit and RCx statute on this scale that also features penalties for building owners that are non-compliant.

This session examines the program and data derived since inception, including lessons learned and presents a look into the City's additional commissioning code requirements.

# Learning Objectives

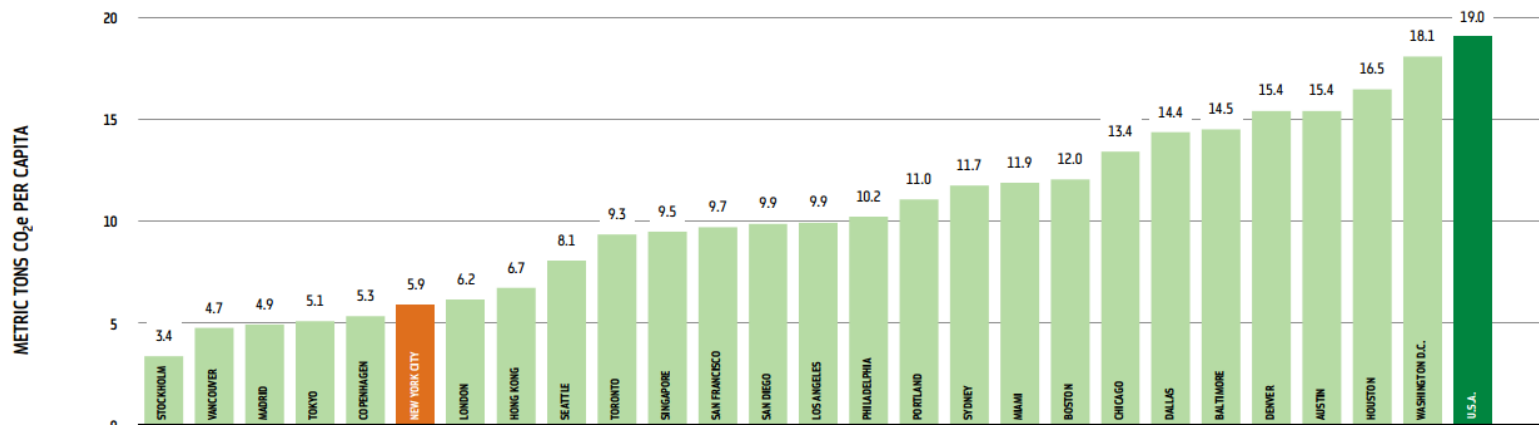
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At the end of the this course, participants will be able to:

1. Learn more about how LL87/09 is being implemented in NYC.
2. Understand how LL 87/09 interacts with other programs such as Energy Star and LEED.
3. Learn about the role that service providers play in LL 87/09.
4. Learn about the new commissioning code requirements in NYC.

# Per Capita GHG Emissions (2010)

Figure 1: Per Capita Greenhouse Gas Emissions for U.S. and International Cities (excluding Agriculture and Non-Local Processes\*)



\* City greenhouse gas inventories do not typically include all sources of emissions included in the U.S. greenhouse gas inventory, including emissions from agriculture, chemical production, fossil fuel extraction and refinement, cement production, and other industrial sources. To allow for comparability between city and U.S. per capita GHG emissions, the U.S. per capita GHG emissions have been reduced by 2.3 metric tons per person, which, based on the U.S. GHG inventory, is the U.S. per capita share of GHG emissions from sources not accounted for in city inventories. Per the Kyoto Protocol, national inventories do not include emissions from aviation and shipping. Accordingly, city inventories also exclude these emissions sources.

Sources: U.S. EPA, Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2008 (April 2010); city greenhouse gas inventories; New York City Mayor's Office of Long-Term Planning and Sustainability analysis.

Transportation is **not**  
the primary source  
of emissions in NYC

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What is the source  
of NYC's emissions?

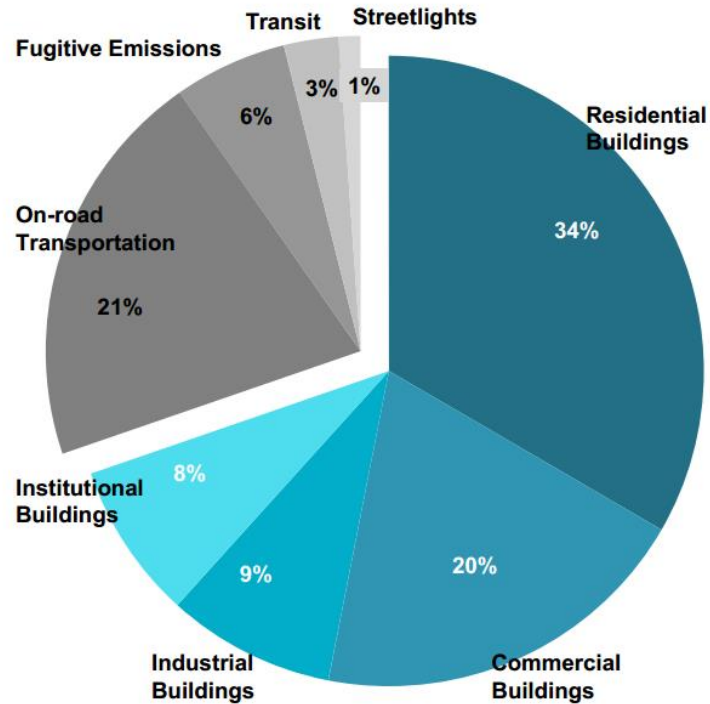
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# NYC Emissions by Sector

**New York City 2013 Greenhouse Gas Emissions by Sector**



Source: New York City Mayor's Office of Long-Term Planning and Sustainability

# NYC's Sustainability Plan

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PlaNYC

- 30% x 2030



# The Greener, Greater Buildings Plan

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**LL 84/09**

Benchmarking

**LL 85/09**

NYC Energy  
Conservation  
Code

**LL 87/09**

Audits & Retro-  
commissioning

**LL 88/09**

Lighting  
Upgrades & Sub-  
metering

# Implementation of LL87/09

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- **NYC Department of Buildings** is responsible for implementation and enforcement
- Failure to comply with the LL87/09 subjects properties to fines of \$3000 the first year and \$5000 for each additional year of non-compliance

# What is LL87/09?

## Energy Audits & Retro-commissioning of Base Building Systems in Covered Buildings



### LOCAL LAWS OF THE CITY OF NEW YORK FOR THE YEAR 2009

No. 87

Introduced by Council Member Gennaro, the Speaker (Council Member Quinn), Brewer, Comrie, Dickens, Garodnick, Gioia, James, Koppell, Lappin, Mitchell, Palma, Recchia Jr., Reyna, Rivera, Stewart, Liu, Yassky, Sears, White Jr., Mendez, de Blasio, Mark-Viverito, Vann, Avella, Vacca, Gerson, Jackson, Gonzalez, Ferreras, Vallone Jr., Barron, Arroyo, Crowley and Mealy

#### A LOCAL LAW

To amend the New York city charter and the administrative code of the city of New York, in relation to requiring energy audits and retro-commissioning of base building systems of certain buildings and retro-fitting of certain city-owned buildings.

*Be it enacted by the Council as follows:*

Section 1. Chapter 3 of title 28 of the administrative code of the city of New York is amended by adding a new article 308 as follows:

#### ARTICLE 308 ENERGY AUDITS AND RETRO-COMMISSIONING OF BASE BUILDING SYSTEMS

**§28-308.1 Definitions.** As used in this article, the following terms shall have the following meanings:

**BASE BUILDING SYSTEMS.** The systems or subsystems of a building that use energy and/or impact energy consumption including:

1. The building envelope.
2. The HVAC (heating ventilating and air conditioning) systems.
3. Conveying systems.

# What are Base Building Systems?

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- HVAC (Heating, Ventilation and Air Conditioning)
- Electrical and Lighting
- Domestic Hot Water
- Building Envelope
- Conveying Systems





# What is a Covered Building?

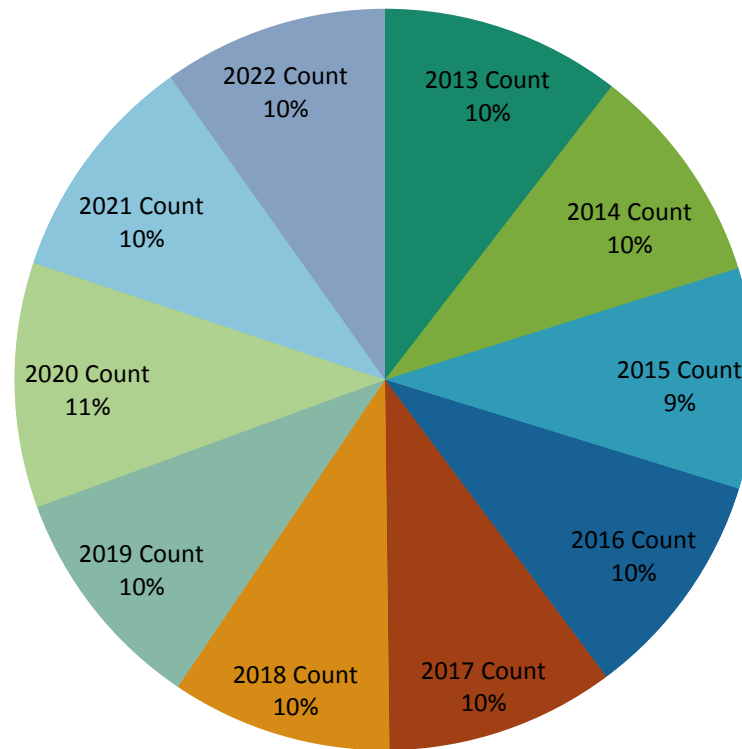
10 DIGIT BBL	BOROUGH	BLOCK	LOT	STREET ADDRESS	ZIP CODE	DOF SQUARE FOOTAGE*
1000047501	1	4	7501	WATER STREET	10004	2621563
1000050010	1	5	10	BROAD STREET	10004	1016406
1000057501	1	5	7501	BROAD STREET	10004	1354691
1000087501	1	8	7501	WHITEHALL STREET	10004	169061
1000090001	1	9	1	WHITEHALL STREET	10004	845018
1000090014	1	9	14	WHITEHALL STREET	10004	544015
1000090029	1	9	29	STATE STREET	10004	896956
1000100014	1	10	14	WHITEHALL STREET	10004	365792
1000100016	1	10	16	WHITEHALL STREET	10004	336025
1000100023	1	10	23	BROAD STREET	10004	321994
1000110014	1	11	14	WHITEHALL STREET	10004	51387

- A single building on a lot over 50,000 square feet
- 2 or more buildings on the same tax lot that together are more than 100,000 square feet
- 2 or more buildings held in condo ownership that together are more than 100,000 square feet
- The filing year is the calendar year that coincides with the last digit of the building's tax block number

Last digit of tax block number:	3	4	5	6	7	8	9	0	1	2
Year first energy efficiency report must be complete by 12/31 of:	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022

# Distribution of buildings over a ten year period

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Based on 2013 list; excludes DCAS submissions

## How is compliance achieved?

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- Owners of Covered Buildings submit an Energy Efficiency Report – EA/RCx
- Two professional statements
- Two Excel workbooks
- New for 2018 – voluntary usage of a cloud-based platform for the Energy Audit Only

# Who can do this work?

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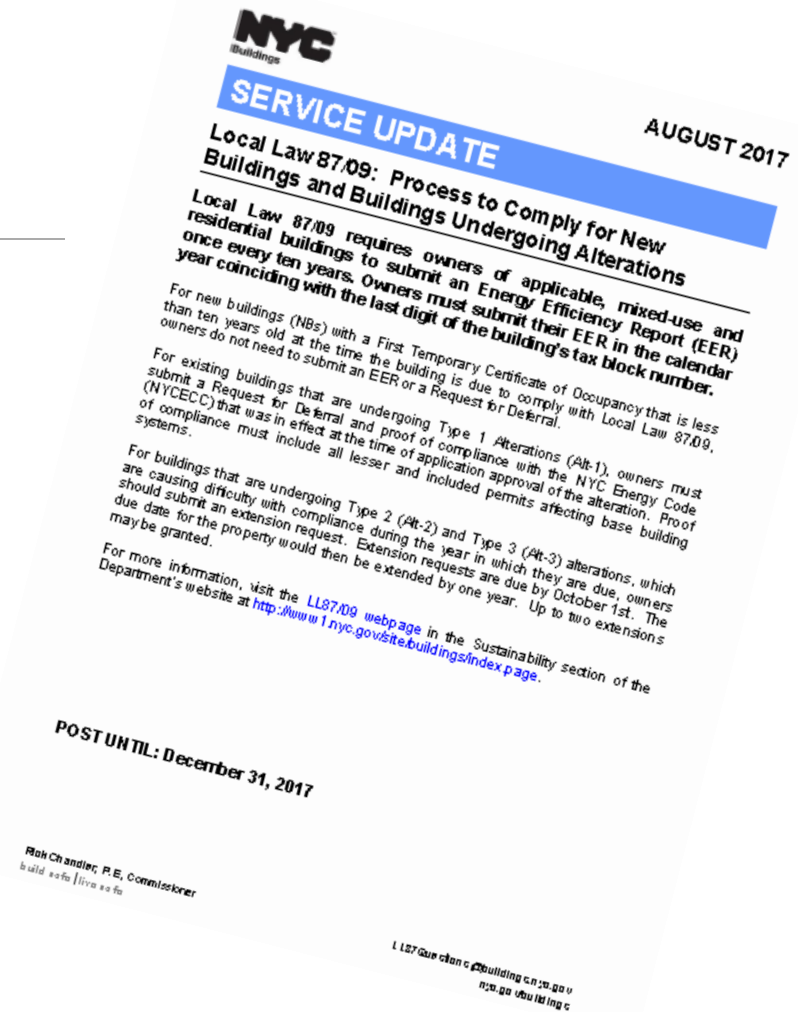
- NYS Registered Design Professionals (PE or RA)
  - *If they have the requisite additional certifications*
    - CEM/CEA from AEE
    - HPBD from ASHRAE
    - BEAP from ASHRAE
    - MFBA from BPI (for multi-family audits only)  
*for energy audits*
  - CBCP/EBCP from AEE
  - CCP from BCA
  - **BCxP from ASHRAE**
  - **CxA from AABC Commissioning Group (ACG)**  
*for retro-commissioning*



New

# Exceptions

- Certain properties are not required to file
  - Class 1 pursuant to subdivision 1802 of the real property tax law of the State of New York (1,2,or 3 family dwellings that are not condominiums...)
  - New Buildings with a Certificate or First Temporary Certificate of Occupancy that is less than ten years old



# Exceptions

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- Certain properties do not have to conduct an Energy Audit if:
  - The building has received an EPA Energy Star label for at least 2 of the 3 years preceding the filing of the building's Energy Efficiency Report (EER)
  - The building has received LEED Certification within 4 years prior to the filing of the building's EER
  - The building is a SIMPLE BUILDING (no central cooling or chilled water system) and 6/7 of the items listed in the law are satisfied (only for the first filing)



# Exceptions

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- Certain properties do not have to perform Retro-Commissioning if:
  - The building has received LEED Certification within 2 years prior to the filing of the building's EER

AND

- The building has earned the points for investigation and analysis and for implementation

What are the  
obstacles service  
providers face?

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## What are the obstacles service providers face?

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- Very complicated legislation with many exceptions that aren't well understood
- Very complicated subject matter
  - ASHRAE Level II Audit
  - Retro-commissioning
  - Balancing
- NYC's complex and varied building stock
  - *Not all buildings are created equal*

## What are the obstacles service providers face?

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- *It's NEW so everyone wants to get in on the action*
- Learning curve of reporting to a regulatory authority rather than a private/public client
- Quality
- Cost

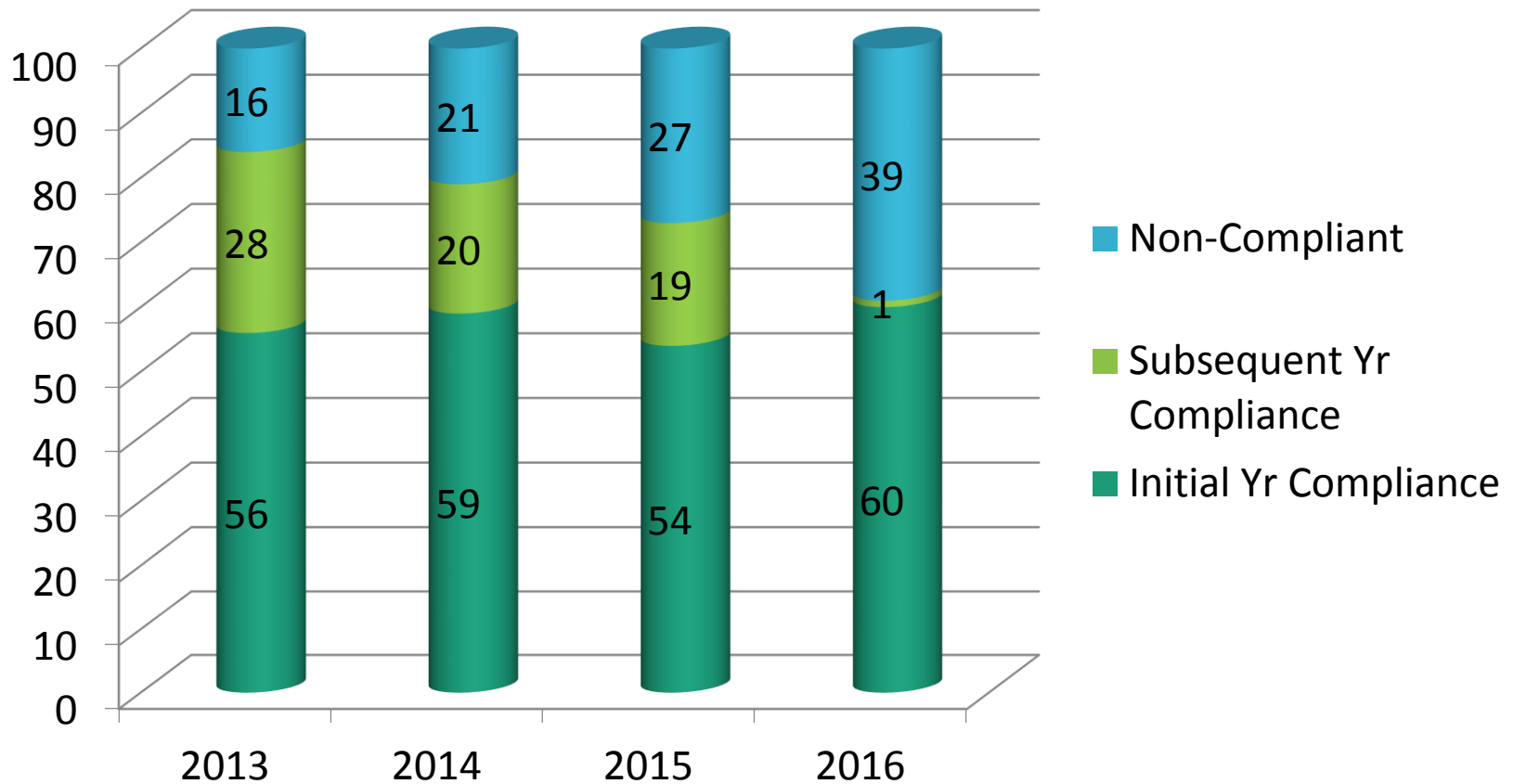
# What are the common errors that we see?

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- Administrative
- Misunderstanding of the legal language
- General unfamiliarity with how a proper ASHRAE Level II audit is performed
  - Energy End Use Breakdown
    - Complicated by the inclusion of tenant consumption but no obligation to address tenant owned/operated equipment
- Lack of retro-commissioning knowledge
  - Implementation requirement
- Resistance to document generally accepted practices and then produce them when requested
- Lack of design documents
- Lack of defined Current Facility Requirements



# What kind of compliance are we seeing?





# What happened along the way?



## SCIENTIFIC AMERICAN™

Permanent Address: <http://www.scientificamerican.com/article/climate-change-will-be-solved-in-cities-or-not-at-all/>  
Energy & Sustainability » News

This article is from the In-Depth Report 400 PPM: What's Next for a Warming Planet

### Cities Will Solve Climate Change, Not Nations

As world leaders gathered at the U.N. to talk about global warming, mayors set about actually doing something about climate change  
Sep 23, 2014 | By David Biello |

In the 1980s, the Chinese city of Shenzhen had some 300,000 mostly impoverished inhabitants. Today that city, the first to experience China's reforms and economic opening, has more than 15 million residents and also hosts another first in China's history—a carbon market. Shenzhen's market to reduce global warming pollution covers some 620 manufacturers and other industries that collectively grew by 9 percent in 2013. The buying and selling of permits to emit carbon dioxide pollution resulted in a drop of 500,000 metric tons in the manufacturing sector and swapping cleaner energy for coal reduced carbon dioxide emissions by an additional 2 million metric tons for the entire city.

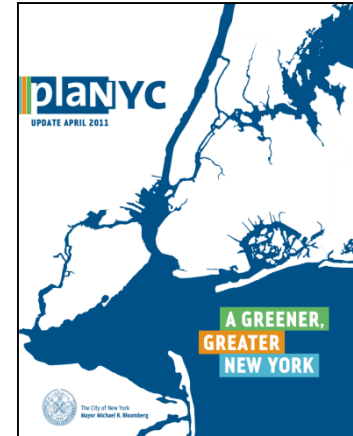
"If you can know Shenzhen can do this then you can believe Chinese government can do this as well," says Tang Jie, vice mayor of one of the largest megacities in China,



# NYC's Sustainability Plan

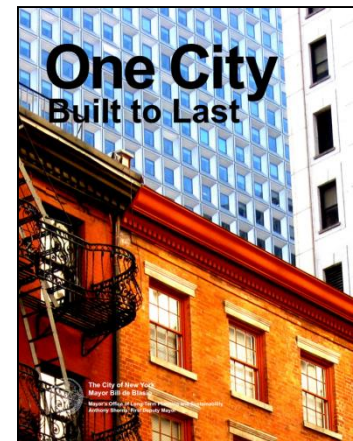
PlaNYC

• 30% x 2030



One City  
Built to  
Last

• 80% x 2050



# What happened next?

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- New Commissioning Requirements in the Code!
  - First appeared in 2014 – January 1, 2015 effective date
  - Section C408- SYSTEM COMMISSIONING
  - ASHRAE 90.1 2010- See **Appendix A in the NYCECC**
  - **§6.7.2.4- Projects complying with this standard shall also comply with Section C408 of the *New York City Energy Conservation Code*** in regards to system commissioning. When demonstrating compliance with Section C408.3.1, projects following ASHRAE 90.1-2010 must demonstrate compliance with Chapter 9 of ASHRAE 90.1-2010 as required, in lieu of Section C405 of the *New York City Energy Conservation Code*.

# Commissioning Requirements in the NYCECC

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- NYCECC 2016 (ASHRAE 90.1 2013)
- Section ECC C408 – System Commissioning
  - Applies to : total mechanical equipment capacity  $>480,000$  Btu/h (cooling) and  $600,000$  Btu/h (combined service water and space heating); and renewable energy systems generating  $>25\text{kW}$  and energy storage systems

New



Image Source: Wikipedia Commons by AleSpa

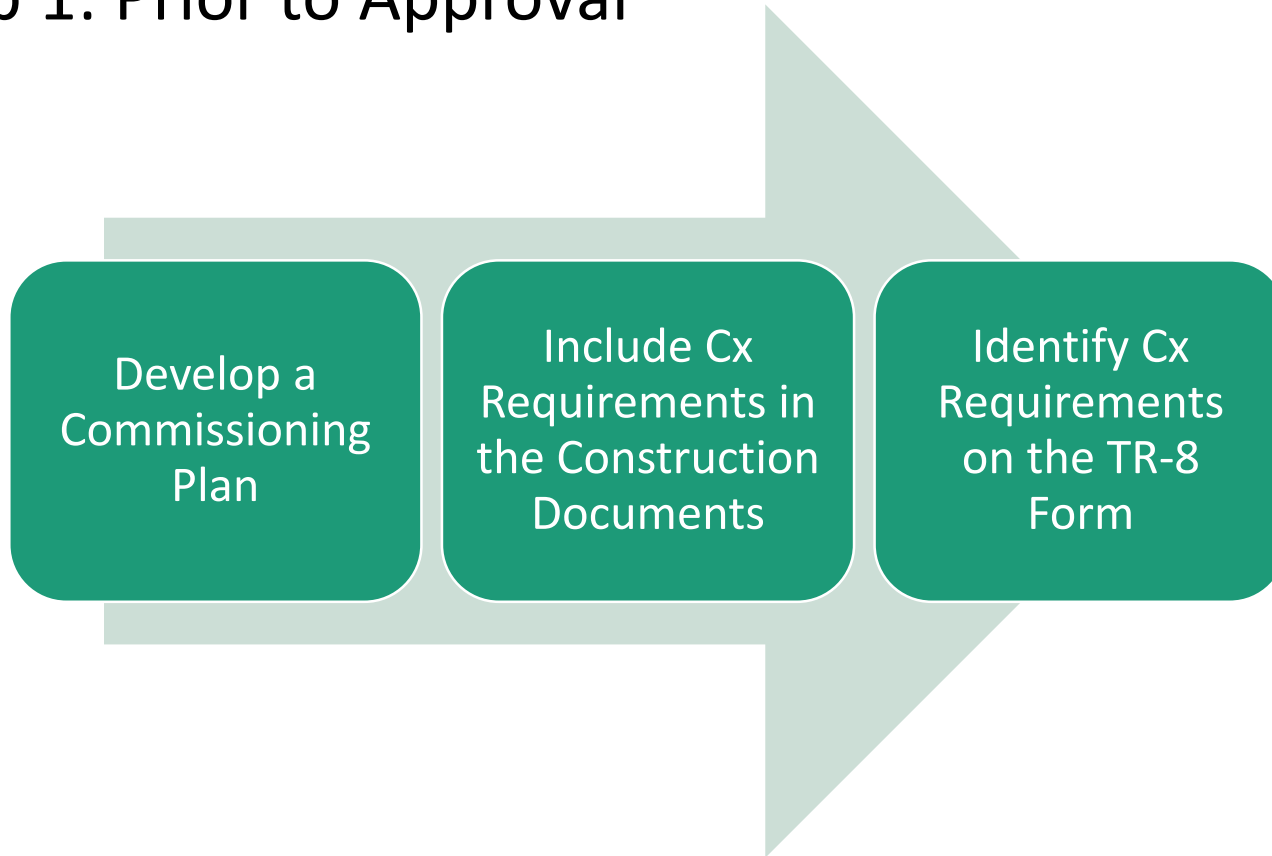


Image Source: [www.energy.gov](http://www.energy.gov)

# Commissioning Process for Compliance

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- Step 1: Prior to Approval



# Commissioning Process for Compliance

- Step 1: Prior to Approval

## PROFESSIONAL STATEMENT:

"TO THE BEST OF MY KNOWLEDGE, BELIEF AND PROFESSIONAL JUDGMENT,  
ALL WORK UNDER THIS APPLICATION IS IN COMPLIANCE WITH "2014 NEW  
YORK CITY ENERGY CONSERVATION CODE"

## NOTE:

SYSTEM COMMISSIONING IS NOT REQUIRED FOR THIS PROJECT PER C408.2 (EXCEPTION)  
TOTAL COOLING : 240,000 BTU < 480,000 BTU  
TOTAL HEATING : 460,000 BTU < 600,000 BTU

WINDOW SCHEDULE												
NO.	SIZE		AREA (sf)	MATERIAL		GLAZING	GLASS TYPE	LOCATION	ENERGY ANALYSIS			NOTE
	WIDTH	HEIGHT		FRAME	COLOR				U-FACTOR	SHGC	AIR LEAKAGE	
W1	4'-6"	9'-0"	41.5	ALUM.	BLACK	DOUBLE GLAZED	IGU LOW-E, CLEAR	1st	0.35	0.32	≤ 0.20 CFM/SF	1
W2	3'-0"	9'-0"	27	ALUM.	BLACK	DOUBLE GLAZED	IGU LOW-E, CLEAR	1st	0.35	0.32	≤ 0.20 CFM/SF	1

### NOTES:

1. AIR LEAKAGE: PROVIDE FLASHING, WINDOW DAMS, EXPANDABLE FOAM SEALANT, AND CAULKING AT ROUGH OPENING/WINDOW FRAME JOINTS TO CREATE A CONTINUOUS AIR BARRIER WITH SURROUNDING WALL SYSTEM.
2. AIR LEAKAGE: PROVIDE FLASHING, EXPANDABLE FOAM SEALANT, AND CAULKING AT ROUGH OPENING/SKYLIGHT FRAME JOINTS TO CREATE A CONTINUOUS AIR BARRIER WITH SURROUNDING ROOF SYSTEM.
3. SEE DWG. A-003 FOR DETAILED HOUSE ELEVATIONS.
4. MANUFACTURER'S AIR INFILTRATION RATES BASED ON 6.24 PSF (300 PA) STATIC PRESSURE DIFFERENTIAL, TESTED PER ASTM E 283.



# Commissioning Process for Compliance

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- Step 1: Prior to Approval



## COMMISSIONING:

OWNER SHALL ENGAGE A REGISTERED DESIGN PROFESSIONAL OR APPROVED AGENCY TO PROVIDE COMMISSIONING SERVICES IN COMPLIANCE WITH SECTION C408 OF 2014 NYCECC. THE SPECIFICATIONS SHALL BE PROVIDED BY A COMMISSION AGENT AND TO BE SUBMITTED WITH DESIGN DOCUMENTS FOR BID.

### SYSTEMS AND ASSOCIATED CONTROLS TO BE COMMISSIONED:

1. HEATING, COOLING, AIR HANDLING AND DISTRIBUTION, VENTILATION, AND EXHAUST SYSTEMS, AND THEIR RELATED AIR QUALITY MONITORING SYSTEMS.
2. AIR, WATER, AND OTHER ENERGY RECOVERY SYSTEMS.
3. MANUAL OR AUTOMATIC CONTROLS, WHETHER LOCAL OR REMOTE, ON ENERGY USING SYSTEMS INCLUDING BUT NOT LIMITED TO TEMPERATURE CONTROLS, SETBACK SEQUENCES, AND OCCUPANCY BASED CONTROL, INCLUDING ENERGY MANAGEMENT FUNCTIONS OF THE BUILDING MANAGEMENT SYSTEM.
4. PLUMBING, INCLUDING INSULATION OF PIPING AND ASSOCIATED VALVES, DOMESTIC AND PROCESS WATER PUMPING, AND MIXING SYSTEMS.
5. MECHANICAL HEATING SYSTEMS AND SERVICE WATER HEATING SYSTEMS.
6. REFRIGERATION SYSTEMS.
7. RENEWABLE ENERGY AND ENERGY STORAGE SYSTEMS.
8. OTHER SYSTEMS, EQUIPMENT AND COMPONENTS THAT ARE USED FOR HEATING, COOLING OR VENTILATION AND THAT AFFECT ENERGY USE.

COMMISSIONING PLAN SHALL FOLLOW ALL NECESSARY STEPS AS PER SECTION C408.2.1 OF 2014 NYCECC.

## TRAINING AND MANUALS:

UPON COMPLETION OF THE JOB, ALL APPLICABLE OPERATING AND SPECIFICATION MANUALS TO BE DELIVERED TO THE BUILDING STAFF. CONTRACTOR SHALL PROVIDE TRAINING FOR THE BUILDING MAINTENANCE STAFF TO ASSURE THAT THE SYSTEM IS MAINTAINED AND OPERATED PROPERLY.

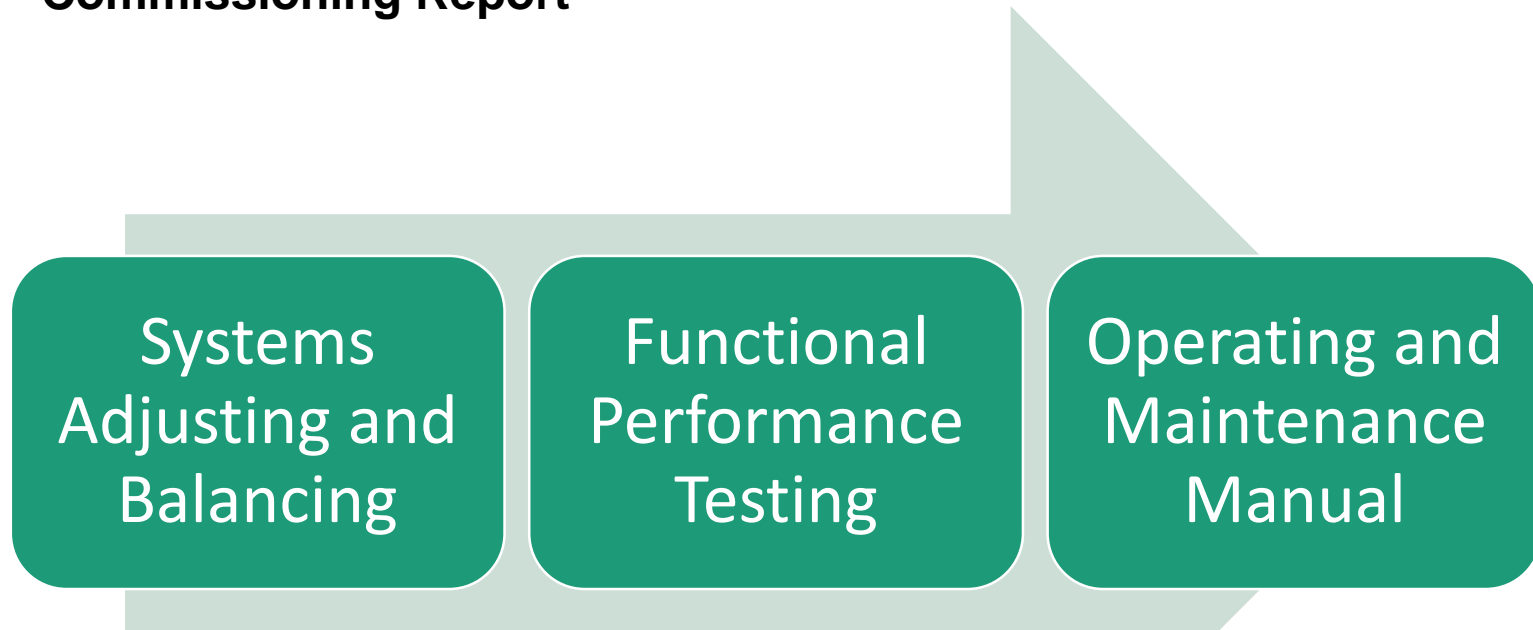
- \* ALL MOTORIZED DAMPERS SHALL BE CLASS 1 RATED FOR AIR LEAKAGE. MOTORIZED DAMPERS SHALL AUTOMATICALLY SHUT WHEN SYSTEM NOT IN USE.
- \* ALL EQUIPMENT MUST BE UL/REFERENCE STANDARD APPROVED

MECHANICAL EQUIPMENT AND BUILDING SYSTEMS SHALL BE CONSTRUCTED, INSTALLED AND MAINTAINED IN ACCORDANCE WITH THE 2014 NEW YORK CITY MECHANICAL CODE AND THE 2014 NEW YORK CITY FUEL AND GAS CODE.

# Commissioning Process for Compliance

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Step 2: Implement and submit **Preliminary Commissioning Report**



**SEND LETTER TO DOB TO CERTIFY THAT  
BUILDING OWNER RECEIVED THE REPORT**

# Commissioning Process for Compliance

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## Step 3: Complete and submit **Final Commissioning Report**

- Final Commissioning Report certification must be made to the DOB within-
  - **18 months** of C of O or first TCO for new buildings under 500,000 Square Feet
  - **18 months** of sign-off for alterations
  - **30 months** of C of O or first TCO for new buildings 500,000 sq. ft. and greater (an extension may be requested based on good cause)

# Commissioning Process for Compliance

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## DOB Rule is in development

- A Commissioning Sub-Committee was convened to debate the requirements for Commissioning
- Questions to be answered in the Rule:
  - **RESOURCES**- Where are the forms for commissioning?
  - **CREDENTIALS**- Who can do commissioning?
  - **ENFORCEMENT AND PENALTIES**- What happens if an owner doesn't do required commissioning?

## And now what?

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- 2019 NYCECC is expected in late 2019/early 2020
- Stretch Code adoption
- Will apply to most commercial buildings
- Will include envelope commissioning
- 20% better than 2018 IECC (ASHRAE 90.1 2016)

This concludes The American Institute of Architects  
Continuing Education Systems Course

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