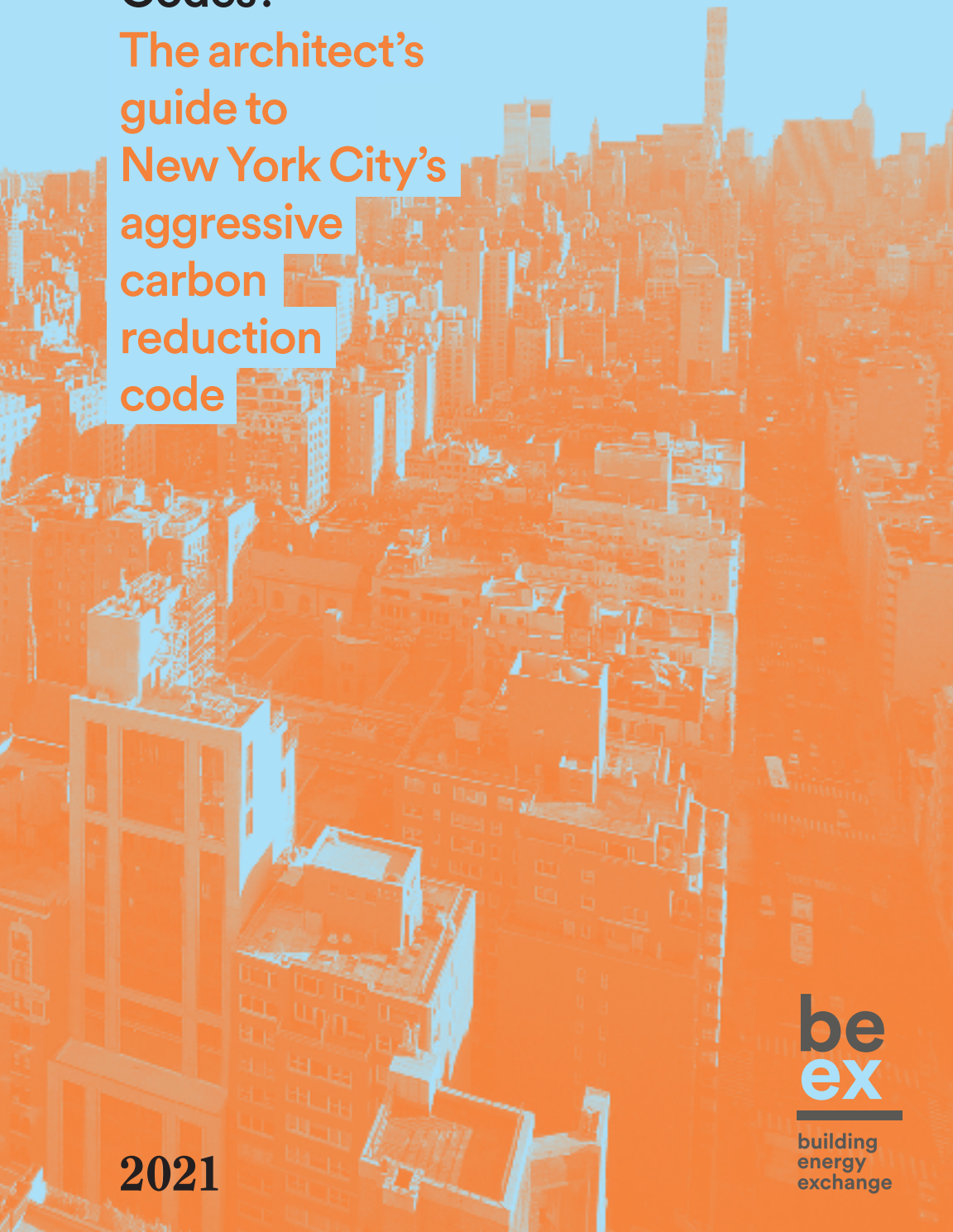
Who Cares About Energy Codes?

The architect's guide to New York City's aggressive carbon reduction code

ARCHITECT ADVISORY COUNCIL



2021

be ex
building energy exchange

In 2025, New York City will become one of the first cities in the world to adopt a predicted energy use code, as part of Local Law 32 of 2018. Building Energy Exchange's Architect Advisory Council's 2020 initiative has shown that the profession must radically adapt to meet these ground-breaking requirements, and provides actionable recommendations to catalyze the design and construction of predicted energy use code compliant buildings, as well as the integration of high performance building practices in architecture.

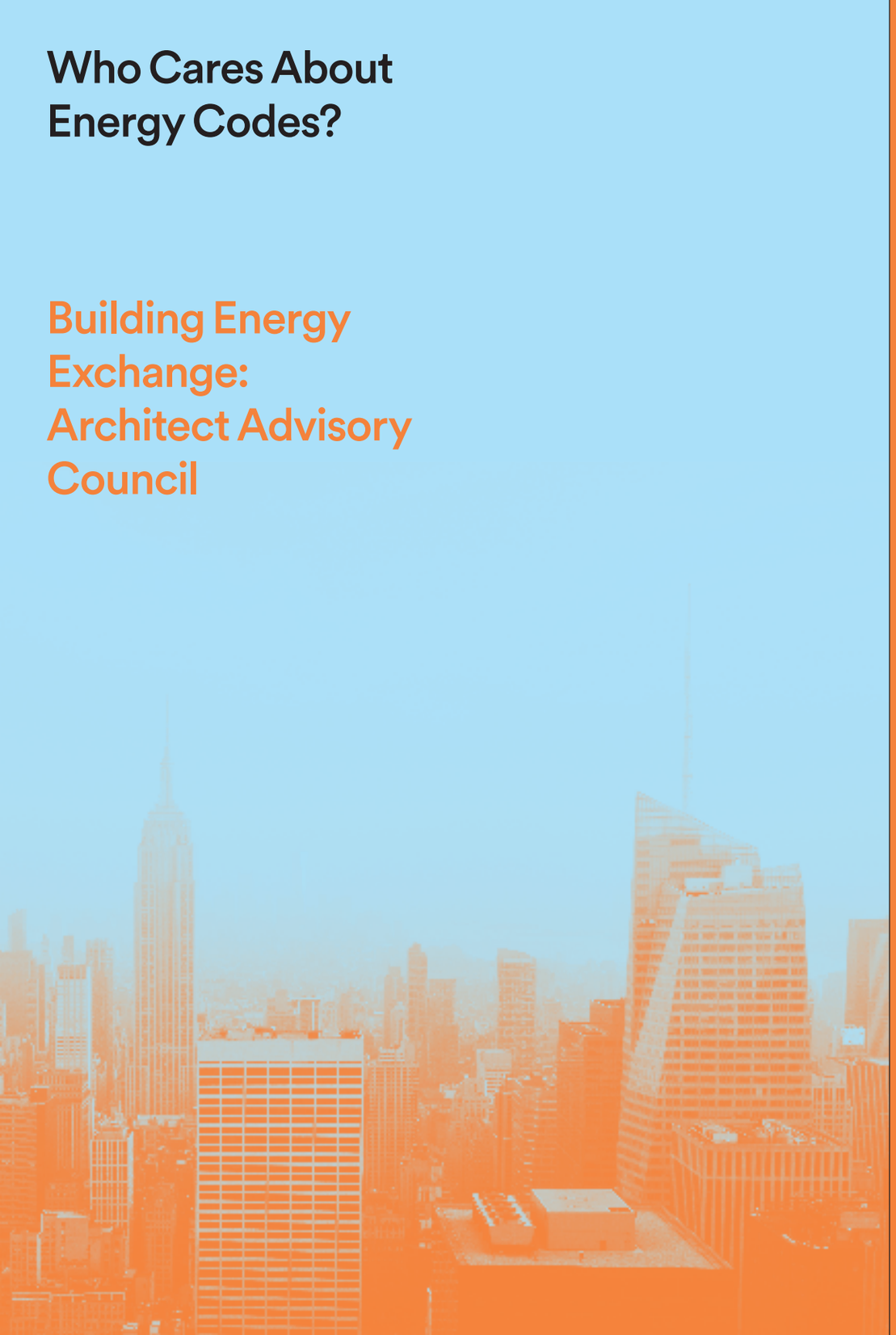
The recommendations from the Architect Advisory Council span three key topics:

- Profession
- Process
- Practice

Made possible with the generous support of NYSERDA

Who Cares About Energy Codes?

Building Energy Exchange: Architect Advisory Council



Contents:

4 About The Council
6 Executive Summary
10 Introduction

Profession Understanding the Architect's Role in Energy Performance 18

- Compliance expectations
- Risk, liability, and compensation
- Performance design strategy
- Energy design tools

Process Integrating Performance into the Design and Construction Process 34

- A new business as usual
- Energy performance design is the new accessibility requirement

Practice Creating a Streamlined and Integrated Practice 40

- The performance gap
- Verification and accountability

46 Conclusion

About the Council

Supporting Building Energy Exchange's (BE-Ex) mission to accelerate the transition to healthy, comfortable, and energy efficient buildings, the BE-Ex Architect Advisory Council was convened to help inform how the building design and construction industry must rapidly evolve to address the effects of climate change.

High performance buildings are central to New York City's plan to reduce emissions 80% by 2050, and the City is enacting changes to codes and regulations that fundamentally transform building performance requirements.

The BE-Ex Architect Advisory Council's 2020 initiative proposes ways the profession must adapt to meet these new ambitious requirements, and provides actionable recommendations to normalize high performance building practices in architecture.

The Building Energy Exchange convened a group of leading architects and engineers with demonstrated experience in high performance design and construction, and related organizational representatives, to serve on the 2020 council, including:

BE-Ex Architect Advisory Council 2020 Co-Chairs

Gina Bocra, AIA, LEED Fellow, Chief Sustainability Officer, NYC Department of Buildings
Chris Corcoran, Program Manager, Team Lead - Codes, Products, and Standards, NYSERDA
Fiona Cousins, PE, CEng, LEED Fellow, Principal, Arup
Bruce Fowle, FAIA, LEED AP, Founding Principal Emeritus, FXCollaborative
John Lee, RA, Principal, Distant Lands
Richard Yancey, FAIA, LEED AP, Executive Director, Building Energy Exchange

Project Lead

Rebecca Esau, AIA, LEED GA, Manager, Projects, Building Energy Exchange

Architect Advisory Council Members

Architects

Illya Azaroff, FAIA, +LAB Architect PLLC, incoming 2021 President AIA New York State
Kai-Uwe Bergmann, FAIA, BIG – Bjarke Ingels Group
Stephanie Carlisle, Carbon Leadership Forum
Jared Della Valle, FAIA, Alloy
Carl Elefante, FAIA, FAPT, Quinn Evans
Rocco Giannetti, FAIA, NCARB, LEED AP, Gensler
Mark Ginsberg, FAIA, LEED AP, Curtis + Ginsberg Architects
Stefan Knust, AIA, LEED AP BD+C, WELL AP, CPHC, Ennead Architects
Yasemin Kologlu, RIBA, LEED AP BD+C, Skidmore, Owings & Merrill
Deborah Moelis, AIA, CPHD, Handel Architects
Dan Piselli, AIA, LEED, CPHD, FXCollaborative
Mallory Taub, WELL AP, LEED AP BD+C, Gensler
Kim Yao, AIA, 2020 President AIANY, Architecture Research Office (ARO)

Engineers

Elias Dagher, PE, LEED AP, CPHC, Dagher Engineering
Sarah Sachs, LEED AP BD+C, Buro Happold

Organizational Representatives

Benjamin Prosky, Assoc. AIA, Executive Director, AIANY / Center for Architecture
Georgi Ann Bailey, CAE, Hon. AIANYS, Executive Vice President, AIANYS
Charlie Marino, CEA, LEED AP O+M, ASHRAE NY
Elizabeth Kelly, New York City Mayor's Office of Sustainability
Laurie Kerr, FAIA, LEED AP, LK Policy Lab
Michael De Chiara, Esq., Zetlin & De Chiara LLC
Michael Rosenberg, FASHRAE, LEED AP, CEM, Pacific Northwest National Laboratory

Executive Summary

Aggressive Carbon Reduction is not Business as Usual

In 2021, we are at an inflection point in the climate crisis: innovative solutions are becoming funded initiatives; ambitious policies are becoming laws; and the United States has re-joined the Paris Agreement. Of the sectors that contribute the most to our greenhouse gas (GHG) emissions — such as transportation and electricity — perhaps the most elusive is buildings.[1] This includes the carbon associated with building and operating our homes, offices, shops, and factories. While electric vehicles are gaining traction with commitments to phase out combustion engines and clean energy is now both cost competitive and heavily incentivized, buildings require a multifaceted and nuanced approach that must engage an incredibly diverse set of decision-makers.

New York has been one of a growing group of cities to recognize the central role of buildings in effective climate action and initiate aggressive measures to curb their emissions. For these measures to succeed, however, architects must expand their professional and ethical duty for ensuring the safety and health of our built environment to include climate action, and seize their agency in leading a rapid transition to high performance buildings. Just as the profession took on the responsibility of making architecture accessible to all, we must ensure that buildings are an effective part of the climate solution. Building performance must become a fundamental design element, no longer an afterthought with responsibility for compliance relegated to another consultant.

New York's forthcoming predicted energy use code (Local Law 32 of 2018), as well as the groundbreaking building carbon emission limits, of 2019's Local Law 97, will require fundamental changes to the practice of architecture. The Building Energy Exchange's 2020 Architect Advisory Council has outlined how the profession must adapt to comply with these new laws — and lead the path forward to a cleaner and healthier city.

The Council determined three areas that require action: the profession, the design and construction process, and the practice of architecture.

Executive Summary

- **Profession:** Architects must take a leadership role in setting a project's performance goals and standards, and in ensuring they are met. This will require changes to the way risk and liability are assigned, and a fluency with energy modeling tools and new performance technologies and systems.

- **Process:** Change comes slowly to the building sector. Architects must champion a new 'business as usual' that fully incorporates performance into every stage of the design, construction, and occupancy process; and imagine new business models to deliver on this imperative.

- **Practice:** Architects must apply their systems-thinking expertise to ensure successful outcomes through an integrated practice with clear verification, quality assurance, and accountability. They must advocate for these principles to be adopted universally as required practice.

The existential threat of climate change provides an opportunity for the profession of architecture to lead the transition to carbon neutral and energy efficient buildings, dramatically reducing their 40% contribution to the world's GHG emissions. In successfully adapting the standards of practice to meet New York's new energy code, the profession can also renew their fundamental role of shaping a better world for generations to come.

1 https://www.epa.gov/ghgemissions/sources-greenhouse-gas-emissions

Introduction Why architects should care about energy codes

Accelerating the transition to clean, efficient buildings is central to New York City's plan to reduce emissions 80% by 2050. According to the United Nations' Intergovernmental Panel on Climate Change, developed countries must reduce emissions 80% (relative to 2005 levels) by 2050 to limit global temperature increase to no more than 1.5 degrees Celsius above pre-industrial levels and avoid the worst effects of climate change. This goal is reflected in New York City and State climate policies. Currently, buildings account for 71% of New York City's total GHG emissions and must therefore account for the majority of New York City's overall 80% reduction in emissions. Meeting the 80×50 commitment will require architects to design buildings that perform to a much higher standard than previously required.

Among numerous regulations supporting New York City's 80 × 50 commitment, architects will need to adapt to two significant changes to building energy performance requirements:

1. A stringent, performance-based energy code:
In 2025, New York City will phase out prescriptive energy code requirements and adopt a predicted energy use compliance approach for all buildings over 25,000 square feet (Local Law 32 of 2018).[1] The predicted energy use approach establishes a specified energy consumption threshold for the whole building, the efficiency of which must achieve at least 30% average energy savings over today's code.

The Road to 80 × 50

Key milestones to reducing building emissions with State and City Legislation

2007
City passes PlaNYC: A Greener, Greater New York
An unprecedented and far-reaching master-plan, including a commitment to reduce greenhouse gas emissions 30% by 2030.

2014
City commits to 80 × 50.
Local Law 66
Requires revamped approach to transportation, energy, waste, and buildings to reduce citywide emissions 80% by 2050.

2017
City releases 1.5°C Climate Action Plan
Commits City to net zero emissions by 2050

2018
City passes amendment to adopt more stringent energy efficiency requirements for buildings.
Local Law 32

2019
Climate Mobilization Act (CMA) passes.
Local Laws 92, 94, 95, 96, 97, 98
Includes a suite of energy efficiency mandates for large buildings.

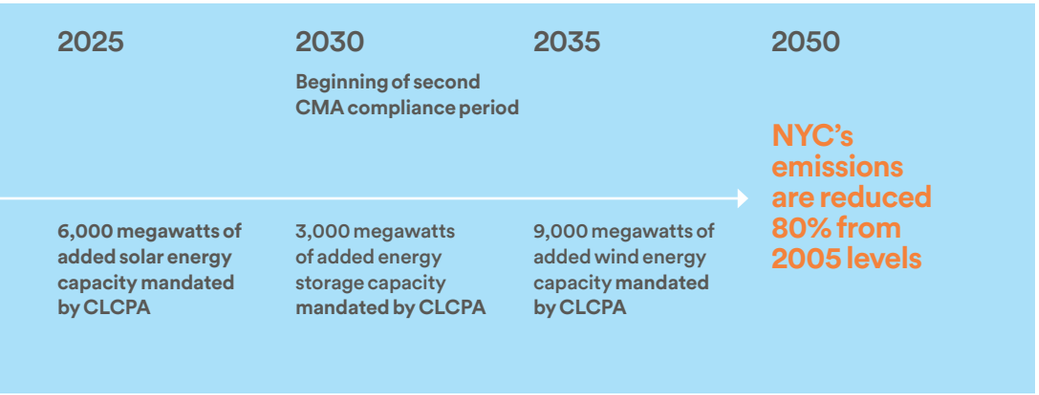
Climate Leadership and Community Protection Act (CLCPA) passes. Mandates adding significant renewable energy capacity to New York State's electric grid and investment in clean energy jobs and infrastructure.

2024
Beginning of initial CMA compliance period

Introduction

2. A GHG emissions cap on annual operational energy: In 2019, New York City passed the Climate Mobilization Act (CMA) which includes a suite of ambitious sustainability performance mandates for buildings. The CMA's centerpiece, Local Law 97,[2] requires buildings larger than 25,000 square feet to meet increasingly strict greenhouse gas emissions limits starting in 2024, or face monetary fines. Local Law 97 is expected to affect approximately 50,000 buildings on 23,000 properties, as well as all new construction above 25,000 square feet.

If New York City is to achieve its 80 × 50 commitment, a dramatic reduction of emissions in new and existing buildings must occur. This is a moment for leaders in the industry to drive transformation in design and construction by re-imagining their practices, confronting how their buildings contribute to climate change, and achieving better, more high performing buildings that benefit the health, comfort, and safety of occupants, local communities, and society at large.



notes:

1. Local Law 32 (LL32) of 2018:

Under the 2025 predicted energy use code set out in Local Law 32 of 2018, efficiency standards will be at least 30% more stringent than the 2017 code, and buildings will be required to use energy modeling to demonstrate that they meet the predicted energy use target for their building category.

Predicted energy use targets for each building category and a metric for measuring compliance are to be established by the NYC Department of Buildings and submitted to the NYC Council no later than January 1 of 2024.

2. Local Law 97 (LL97) of 2019:

Local Law 97 sets increasingly stringent carbon emission limits (in metric tons of CO2e per square foot) based on NYC building code occupancy groups for buildings 25,000 square feet or greater.

The initial compliance period (2024-2029) will require approximately 20% of existing buildings to reduce emissions, whereas the limits from the second compliance period (2030-2034) will require approximately 75% of buildings to reduce emissions. Requirements after 2034 will be determined by the Department of Buildings.

Buildings that do not comply will face annual fines set at $268 per ton of emissions that are in excess of the individual building's cap.

The intrinsic value of our buildings is expanding from individual properties to community assets. Architects have the ability to design and deliver buildings that serve not just building owners and occupants, but local communities, ecologies, and economies.
Gina Bocra, NYC Department of Buildings

Energy has not always been the driver for the sustainability criteria we establish. We are currently focused on decarbonization and trying to find practical criteria that suit the particular context.
Jared Della Valle, Alloy LLC

We would like to use energy modeling all of the time, but often the fee is scrutinized and the owner doesn't approve of the scope. We are trying to figure out ways to make this a baseline for our projects — if necessary covering the fee ourselves. This is a work in progress.
Kim Yao, ARO

I hope we can make buildings simpler and find strategies that more reliably deliver reduced energy use, like Passive House.
Dan Piselli, FXCollaborative

More liability is more insurance — make sure that is part of the contract and continuance of that insurance if needed.
Illya Azaroff, +LAB Architect

The problem is that we don't have control over either what is installed or how it's operated, so performance contracts don't work in a standard design-bid-build model. Fiona Cousins, Arup

How to take action and embrace energy codes

New York City's commitment to climate action presents a once-in-a generation opportunity for architects and design professionals to lead the effort in reducing GHG emissions from buildings. Developers and building owners alike will seek the expertise of the design industry on how to comply with new requirements and codes. To succeed, architects must claim responsibility for delivering low carbon, high performance buildings. Energy code compliance must no longer be an afterthought in the design process, relegated to another consultant.

The following pages outline action-oriented recommendations for architects to embrace energy codes and take a leadership role in solving the climate crisis. These recommendations were determined by the Building Energy Exchange's 2020 Architect Advisory Council through four roundtable workshops, surveys of the profession, and multiple in-depth interviews with council members who offered a richness of perspectives, ideas, and experience.

Profession Understanding the Architect's Role In Energy Performance

At the 2019 American Institute of Architects (AIA) national convention, member delegates voted to declare a climate emergency and adopted the Resolution for Urgent and Sustained Climate Action. The Resolution states that an architect's duty to protect the health, safety, and welfare of building occupants now includes addressing how buildings contribute to climate change. The Resolution represents a sea change in the acknowledgement of architects' responsibility to decarbonize the building industry.

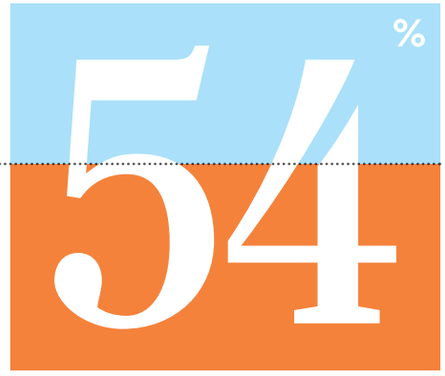
This change requires a fundamental shift in architectural practice, from integrating the tools and processes needed to evaluate climate impact, to setting energy performance goals with clients.

Compliance Expectations

what's changing?

City laws will now require buildings to meet new energy performance thresholds at permitting, as well as during occupancy, or face financial penalties. Having clearly defined expectations from the outset of the project on the energy performance outcome of the building and the effort required to uphold those expectations by architects, engineers, contractors, owners, and tenants will create more successful outcomes.

Getting Involved



In a survey of 78 architecture firms in NYC, about half are not usually involved in setting the Owner's project performance goals

what do we need to do?

Set performance goals and expectations with the project owner at the outset and prioritize energy-related decisions — often considered too late in the design process when changes are ineffective and costly — in schematic design or earlier. Architects and project owners should agree at the outset of the projects to:

- **Set a specific and measurable energy performance goal and leverage electrification strategies for GHG emissions reduction and design standards such as Passive House, Net Zero, or LEED, for greater energy efficiency**
- **Pursue energy modeling at each stage of the design and construction process, including early, conceptual exploration. Discussing the associated benefits of energy modeling, as well as the cost, with the project owner will encourage buy-in**
- **Support future operational energy maintenance by submetering tenant spaces and installing a Building Management System with machine learning capabilities**
- **Once performance expectations and goals are set, create a checklist to help track development of the building's energy-related design components throughout the project to ensure the desired result**

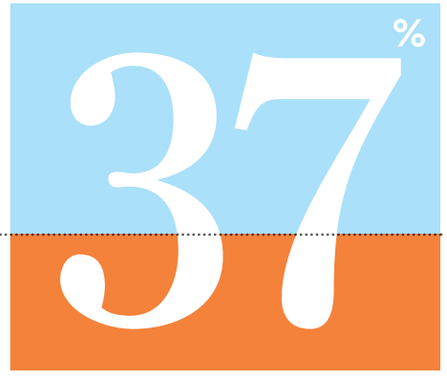
Risk, Liability, & Compensation

> Write performance goals into the contract and be more explicit about decision-making process, trade-offs between energy performance, and construction schedule or cost.
> Stephanie Carlisle, Carbon Leadership Forum

what's changing?

Contractually, architects hold most of the responsibility (and much of the liability) for a building project. However their control over the project outcomes, especially related to energy performance, can be limited. Over the last several decades, architectural contracts have evolved to protect architects against risk. This has come at the expense of authority over contracts and higher levels of compensation, causing practitioners to be marginalized with little control over the outcome of their projects. These new laws (Local Law 32 and Local Law 97) may make architects a target for lawsuits related to financial penalties imposed on poorly performing buildings. The further marginalization of practitioners must be resisted—and reversed—for architects to successfully lead the design and construction of compliant, climate positive buildings.

Consultant Contracts



In a survey of 78 NYC architecture firms, respondents reported sub-contracting directly with consultants for only 37% of projects

what do we need to do?

The design services contract needs to be modified to better reflect the level of effect and risk associated with building performance related tasks, which can vary greatly between different standards, jurisdictions, codes, and compliance requirements. Creating a task-oriented approach can better align compensation with the effort required for each task and reduce conflicts over defining additional tasks as extra services rather than part of a base contract.

Furthermore, appropriate liability limitations, related to energy performance, GHG emissions and other performance metrics, must be clearly defined in legal contracts. Architects should engage their counsel for advice regarding performance liability.

- **Itemize services, such as energy code compliance or performance standard certifications, separately, recognizing the true design costs**
- **Recommend third party (liability) review process to ensure compliance**

Gaining Consensus on Contracts

The impacts of New York City's Local Law 32 and Local Law 97 on stakeholder risk, value, and compensation are emergent and will incite changes to standardized language in legal contracts. Local convening powers, including AIANY and ASHRAE NY, have committed to hosting a roundtable to bring together key stakeholders to collectively generate and gain consensus on new contractual language that specifically addresses Local Laws 32 and 97. Those brought to the table might include representatives from AIANY, ASHRAE NY, BOMA, REBNY, and New York City Council, as well as contract lawyers and insurance experts.

Architects must become advocates and activists who help create political will, who educate clients and their end-users, who raise the standards of our industry, and who design new and retrofit old buildings that reach the highest achievable standards of sustainability and resilience.

Bruce Fowle, FXCollaborative

Profession

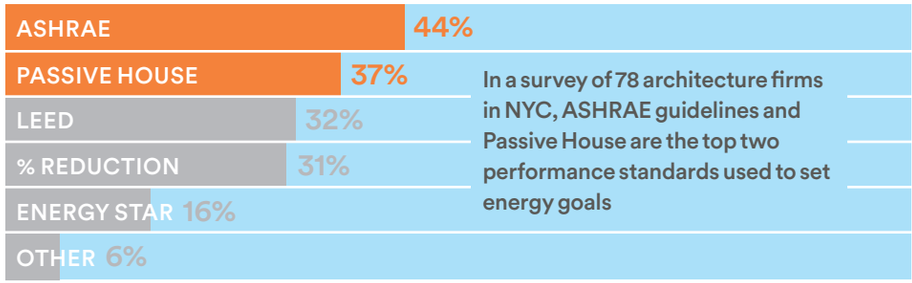
Performance Design Strategy

> Building energy performance has become an increasingly important aspect of our messaging to buyers and renters of the real estate that we develop, especially in Brooklyn.
> Jared Della Valle, Alloy

what's changing?

Starting in 2024, New York City's Local Law 97 (LL97) will place stringent annual GHG emission limits on new and existing buildings. Even many buildings with LEED Gold certification will likely face future fines, if building energy use is not reduced. Architects must work to decarbonize the building industry by designing to ambitious energy performance standards that eliminate the use of GHG emissions.

Setting Energy Goals Standards firms use to set energy goals at the start of projects



what do we need to do?

- **Specify all-electric equipment in buildings to help achieve LL97 compliance by reducing GHG emissions (based on the State's commitment to achieve 100% clean electricity by 2040)**
- **Reduce a building's energy demand by leveraging passive heating and cooling strategies, high performance equipment and appliances, and building an airtight, highly insulated building envelope. Consider using the Passive House standard to reduce a building's energy demand while increasing occupant health and comfort**
- **Design to net zero carbon emissions, where a building is fully powered from on- or off-site renewable energy, to reduce or eliminate GHG needed to power the building***

* not all off-site renewable energy counts towards net zero or LL97 rules

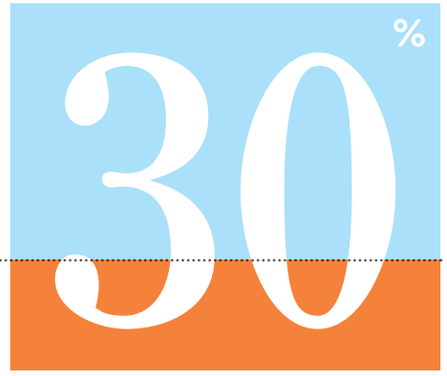
Profession

Energy Design Tools

what's changing?

Starting in 2025, New York City's energy code will require all projects 25,000 sq ft or greater to submit an energy model for compliance. Architects must become fluent in building energy performance and leverage the robust tools of energy modeling, from project concept to completion, to achieve energy performance requirements and truly lead on climate action.

Energy Modeling in House



In a survey of 78 architecture firms in NYC, only 30% conduct in-house energy modeling

Best results are achieved when energy performance discussions take place at every step of the way: from early client engagement to post completion and marketing.
Yasemin Kologlu, SOM

what do we need to do?

- **Utilize software to make energy modeling and design seamless**
- **Involve project designers, MEP engineers, and energy modeling consultants early in the process**
- **Simplify ways to communicate energy modeling data to the team as well as the project owner**
- **Address the future impact of climate change by using climate projections, as well as current weather data in energy modeling calculations**

There are many different types of energy models that are each appropriate for different stages of the design process. Begin performance design early during schematic design with simple energy models that test options and concepts with respect to anticipated building performance. Continue to utilize energy models during design development and construction documentation to ensure the design stays on track to achieve performance goals. During construction administration, track changes in a calibrated energy model so that when the building is handed over to the owner, an accurate prediction of energy performance is captured.

Energy Design Tools

Project Delivery Phase	Concept & Schematic Design	Design Development & Contract Documents	Construction & Operation
Energy Modeling Type	**Design Performance Modeling**	**Building Energy Modeling**	**Building Operation Modeling**
Energy Modeling Use	• iterative • creates a baseline energy model • informs design decisions such as siting, orientation, and other passive strategies • models daylight penetration, glare, thermal comfort, natural ventilation, and other factors • establishes thermal zones and HVAC options • compares cost, aesthetics, and performance • uses a Typical Meteorological Year (TMY) data	• compares multiple HVAC system options • allows refinement and modification of design choices as needed • predicts a building's anticipated energy use compared to a baseline case • demonstrates project compliance with energy codes • tests strategies and allows for quality control checks • uses a Typical Meteorological Year (TMY) data • only as accurate as the assumptions	• incorporates actual utility bills, energy use patterns, operations, and real weather conditions • compares actual energy use with predicted use • can be used to locate discrepancies and refine operations to meet energy goals
Energy Modeling Software (whole building modeling; typically used by engineers or energy modelers)	• OpenStudio • IES Virtual Environment (Gaia) • TAS	• DesignBuilder • EnergyPro • eQUEST • IES Virtual Environment • OpenStudio • Simergy • TAS • TRACE700 • Bentley OpenBuildings Energy Simulator	• DesignBuilder • IES Virtual Environment • OpenStudio • TAS
Design Performance Modeling Software (simple modeling; typically used by architects or energy modelers)	• Green Building Studio • Sefaria • COMFEM/RESFEN • Ladybug/Honeybee • Cove.tool • Solemma Climate Studio		

Energy Modeling Education

Most architects today are not skilled energy modelers, nor is energy modeling required learning in architectural education. Energy modeling is quickly becoming an essential tool in design practice, and all architects must become as familiar with it as they are with drafting and BIM tools. Energy modeling specialists are needed to fill the demand for expertise in conducting complex energy models.

The New York Institute of Technology (NYIT) School of Architecture and Design recognizes the priority of developing this skilled workforce and has committed to working to expand their energy modeling courses for architecture students.

The City College of New York, CUNY recognizes the priority of developing this skilled workforce and the Architecture division has added an energy modeling course for architecture students. This accompanies a current building energy modeling course for Sustainability and Engineering students. Additionally, CUNY's Institute for Urban Systems and Building Performance Lab will work to expand energy modeling skills through experience-based programming and internships where energy modeling can be practiced in applied project work.

> We tell our clients that an energy model can sometimes save on envelope costs as you can prove the envelope works with lower safety margins.
> Deborah Moelis, Handel Architects

Energy Modeling Resources:
The following resources from AIA provide strategies to integrate building performance and energy modeling into the design process:

Architect's Guide to Integrating Energy Modeling in The Design Process: http://content.aia.org/sites/default/files/2016-04/Energy-Modeling-Design-Process-Guide.pdf

Architect's Guide to Building Performance: http://content.aia.org/sites/default/files/2019-06/AIA_BPSGuide_2019_FINAL.pdf

Process Integrating Performance into the Design and Construction Process

The shift towards low- to no-carbon buildings in NYC and across the United States is at opposition with today's standard practice of design and construction. The business as usual process deters collaboration and siloes architects, engineers, contractors, and other practitioners into smaller, segmented roles. In standard practice, energy performance is often considered solely the responsibility of the mechanical engineer, and considered after many critical design decisions have already been made. Building performance, however, spans across all disciplines and permeates nearly every decision throughout the design and construction process. A new delivery model that improves coordination and facilitates collaboration across disciplines will result in high performing buildings that support New York City's commitment to reduce GHG emissions 80% by 2050.

Process A New Business as Usual

Contracting

Pre-Design

Schematic Design

Design Development

Construction Documentation

Bidding & Negotiation

Construction Administration

Occupancy

Today's standard defers energy performance design to late stages of project delivery. As the project becomes more absolute, proposed changes decrease in effectiveness and increase in cost, leaving little room for improvement from the baseline.

A new business as usual prioritizes energy performance upfront, leaving plenty of opportunities for iteration and collaboration, resulting in highly effective performance innovations without increasing project cost.

Process A New Business as Usual

Process	Today's Standard	A New Business as Usual
Contracting	• Energy performance requirements are not included in contracts • Holding few sub-contracts, the architect acts more as a design consultant than a primary stakeholder in the project	• Building performance objectives are defined in project contract • Stakeholders convene to agree on performance objectives, roles, and responsibilities • Architect holds key subcontracts, including MEP, energy modeler, façade consultant, and sustainability consultant
Pre-Design	• Energy performance is not prioritized in project requirements • Key energy performance stakeholders are not consulted	• Specific energy performance targets are established • Numerous concepts are explored and tested against performance and cost outcomes
Schematic Design	• Critical decisions such as massing, orientation, structure, materiality, and fenestration are made without testing energy performance of each scheme • Key energy performance consultants, such as engineers, energy modelers, and sustainability consultants are not brought into design process	• MEP engineers and energy modelers participate in schematic design • Design options are tested through energy modeling to ensure performance targets are met
Design Development	• Project continues to be refined without consideration of energy performance	• Design team performs regular cross checks using an energy model to ensure energy performance targets are met
Construction Documentation	• Mechanical systems are designed to meet code, resulting in baseline performance outcome	• Mechanical systems are designed in accordance with the energy performance targets of the project • Design team performs regular cross checks using an energy model to ensure energy performance targets are met
Bidding & Negotiation	• Occasionally, an energy model is made for regulatory compliance	• Design teams create an energy model demonstrating a building's predicted energy use and submit for code compliance
Construction Administration	• The architect often does not participate in construction administration, leaving numerous unchecked changes that degrade the design intent	• Architect conducts periodic site observations and approves changes • Changes are incorporated into a calibrated energy model, which is then passed off to the owner at project hand-off
Occupancy	• No commissioning is performed at occupancy • At best, building performs to code minimum	• Commissioning is performed at initial occupancy and on a regular basis over the lifetime of a building • Post-occupancy evaluations are conducted to ensure desired use of spaces • Building operations are correlated with energy model assumptions

Energy Performance Design is the New Accessibility Requirement

The Americans with Disabilities Act (ADA), a federal civil rights legislation prohibiting the discrimination of people with disabilities, was signed into law on July 26th, 1990, and forever changed architects' standard of practice. To meet the law's requirements, architects had to shift their approach to design and apply new accessibility standards throughout all aspects of their projects. Today, designing for accessibility is nothing new, but rather a fundamental skill tested during licensing exams and utilized daily during practice.

To respond to the urgency of our global climate crisis, architects must work to decarbonize the building industry. Commitments such as Architecture 2030, Architects Declare, and AIA's Resolution for Urgent and Sustained Climate Action are an important start, but not sufficient. The scale of response needed demands a sea-change at the same level as that of ADA, which made accessible design commonplace. For energy performance to become fundamental to design, architects must undergo substantial changes to their approach and standards of practice, similar to the changes that occurred when ADA was passed into law.

> The climate crisis has exposed the moral imperative borne by the architect to deliver buildings that operate efficiently so that we all can equitably participate in shared spaces in a shared economy.
> John Lee,
> Distant Lands

Practice Creating a Streamlined and Integrated Practice

New York City has some of the most ambitious building performance policies and regulations in the United States. In 2025, New York City will become one of the first cities in the world to adopt a predicted energy use code, as part of Local Law 32 of 2018. Starting in 2024, buildings 25,000 sq ft and above will be required to meet GHG emissions limits or face financial penalties. These regulations trigger significant changes to the way buildings are designed and constructed, putting designers at the center of effective climate action.

To deliver on this GHG reduction imperative, architects must work with building officials to streamline processes, increase accountability, reduce obstacles, and foster effective stakeholder collaboration.

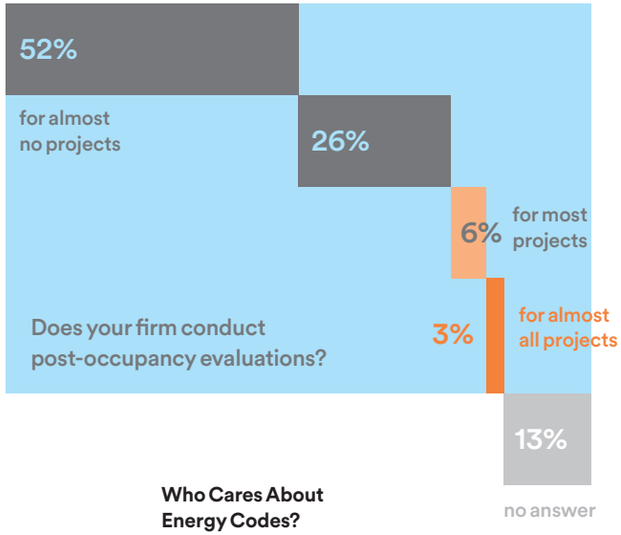
The Performance Gap

what's changing?

Starting in 2025, New York City's predicted energy use code will require an energy modeling submittal that measures a building's designed performance for all projects 25,000 sq ft or greater. Due to many factors, including constructability challenges, lack of proper commissioning, and building operations and/or occupancy patterns not occurring as designed, the energy model submitted and approved for code compliance does not typically match actual energy use once the building is occupied. Architects must close the gap between predictive energy models and actual building energy use to deliver the project's intended performance and comply with New York City's aggressive efficiency and performance targets.

Post-occupancy Evaluations

In a survey of 78 NYC based architecture firms, only 3% conduct post-occupancy evaluation for all projects



> We need to improve our contracts with MEP engineers to be more clear about what information we want and when we want it in the design process, and clearly set expectations for iterative energy analysis.
> Mallory Taub, Gensler

what do we need to do?

Adopt practices that close the gap between the energy model submitted for code compliance and the actual building energy use once occupied. Design teams should:

- **Calculate GHG emissions in the energy model submitted for code compliance**
- **Conduct site observations at key construction milestones to ensure the building is built to the intended design performance**
- **Maintain a calibrated energy model during construction to track all design changes and ensure those changes do not undermine the performance target**
- **Conduct post-occupancy evaluations to identify any discrepancies in performance**
- **Encourage owners to include energy performance expectations in tenant lease agreements, such as limiting energy use to aid compliance with LL97**

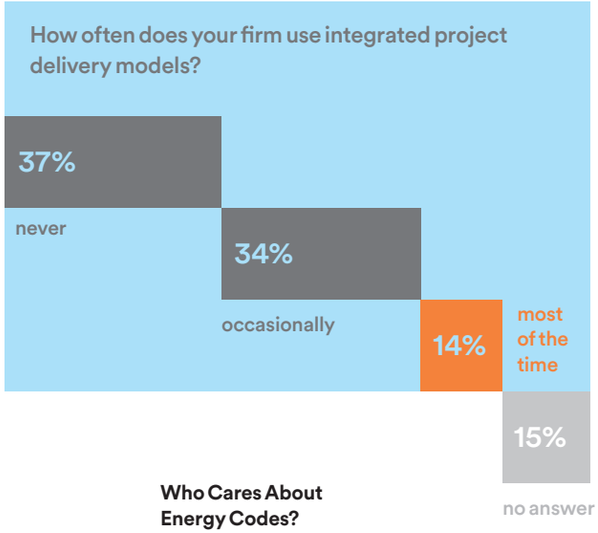
Verification & Accountability

what's changing?

Navigating New York City's quickly changing and increasingly ambitious building codes and regulations adds a level of complexity to the design and construction process, and raises the stakes for delivering projects that perform below the imposed GHG emissions limits. Projects must have tighter verification and accountability during all stages of the design and construction process and each stakeholder's responsibility to deliver the required outcome must be clearly defined. Architects must incorporate practices that encourage collaboration, such as integrated project design, and ensure projects deliver on expectations.

Integrated Project Delivery

In a survey of 78 NYC architecture firms, 37% reported they never use an integrated project delivery approach



Our QAQC model includes accurate accounting of envelope characteristics and scrutiny of plug loads and schedules of use. We'd like to do more post-construction follow-up, but clients have not always wanted to do that.
Dan Piselli, FXCollaborative

what do we need to do?

Incorporate practices that increase verification and accountability. Advocate for them to be basic standards of practice to encourage all stakeholders to fulfill their roles in achieving project performance targets, including:

- **Document performance goals established at the outset of the project and use the document as a reference throughout the design and construction process**
- **Ensure code submittal demonstrates technical sufficiency for energy code compliance**
- **Increase oversight during construction and advocate for commissioning at project completion**

Conclusion The Path Forward

Architects have a generational opportunity, as well as a professional and ethical responsibly to the public good, to lead the effort to slash the 40% of total global GHG emissions attributable to buildings. New York City's climate action commitment is a critical opportunity for architects to demonstrate this leadership, leading the building industry's dramatic transformation to reduce GHG emissions 80% by 2050. Rather than abdicating responsibility for building energy performance to others, architects must embrace energy as a fundamental design element, equivalent to light and air, creating climate positive buildings. The business as usual design approach of the future must focus on building performance. Architects, engineers, other design professionals, and their clients — must reevaluate and change their current practices. Integrated project delivery models that offer an alternative to current processes will encourage a higher level of collaboration and can dramatically improve outcomes.

New York's climate action commitment also presents an opportunity for architects to expand their services and business ventures. Architects must do more of the services they are already familiar with, such as energy modeling and construction administration, as well as less familiar services such as energy commissioning, energy model reconciliation, and post-occupancy evaluations, which help ensure their projects are fulfilling their promise of GHG reduction. Architects must step into their role as master coordinator by designing the process as well as the project. An architect's job is no longer over at the end of construction. As stewards of the built environment, they must help ensure building performance during occupancy, and can use this imperative to create new business ventures and leadership opportunities. The profession must adapt to ensure that architects lead the process of meeting these new performance goals, creating a healthier built environment for the commons and the commonwealth.

Credits:

be-exchange.org

Building Energy Exchange
Surrogate's Courthouse
31 Chambers Street, Suite 608
New York, NY 10007

(212) 349-3900
info@be-exchange.org

Acknowledgements:
The Building Energy Exchange's Architect Advisory Council was funded in part by the New York State Energy Research and Development Authority (NYSERDA)

Graphic Design by Might Could

Co-Authors:
Rebecca Esau
Richard C. Yancey
Noor Ul Ain

The project team would like to thank the Architect Advisory Council co-chairs, members, as well as code, policy, energy modeling, and legal experts who generously donated their time to advise on this project.

Disclaimer:

Notes:

The Building Energy Exchange (BE-Ex) is a center of excellence dedicated to reducing the effects of climate change by improving the built environment. BE-Ex accelerates the transition to healthy, comfortable, and energy efficient buildings by serving as a resource and trusted expert to the building industry.

learn more:
https://be-exchange.org/report/architect-advisory-council/