



Building Energy Policies and Municipal Opportunities in Illinois

Presentation to the MMC
Environment Committee

11/16/2021

nbi new buildings
institute

 **MEEA**
MIDWEST ENERGY EFFICIENCY ALLIANCE

 **slipstream**

Agenda

- Partner introductions
- Building energy policies and why they matter
- Mechanisms to drive building energy policies
 - International (IECC) - State Codes
 - Code compliance
 - State amendment/adoption
 - Complementary local stretch codes and building performance standards
 - Programs to support building policies
- Focus on the municipal role





Accelerating climate solutions. For everyone.

Slipstream accelerates solutions
that equitably solve energy
challenges.

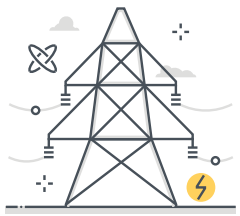
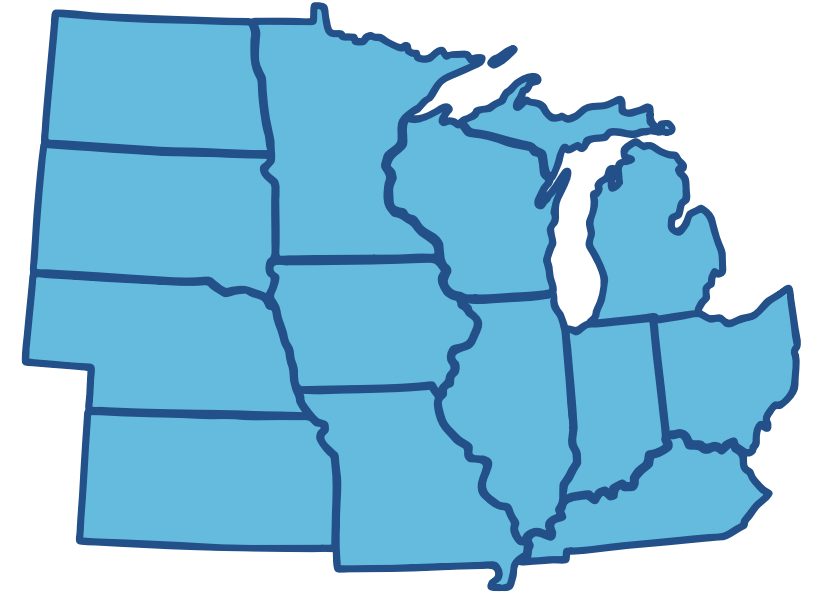
We deliver research, technical
assistance, financing, education
and training, and programs



Midwest Energy Efficiency Alliance

The Midwest Energy Efficiency Alliance (MEEA) is a collaborative network, promoting energy efficiency to optimize energy generation, reduce consumption, create jobs and decrease carbon emissions in all Midwest communities.

MEEA is a non-profit membership organization with 160+ members, including:



Electric &
gas utilities



State & local
governments



Academic &
Research institutions



Energy service
companies &
contractors



California Lottery Santa Fe Springs | Santa Fe Springs, CA Credit: LPAS Architecture + Design

Mission

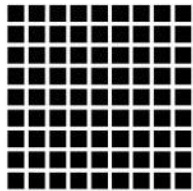
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To achieve better buildings that are zero energy, zero carbon, and beyond – through research, policy, guidance and market transformation – to protect people and the planet.

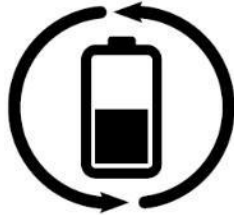
The Five Foundations of Zero Carbon Building Policies



Energy
Efficiency



Renewable
Energy



Grid Integration
+ Storage



Building
Electrification



Life-Cycle
Impacts



Zero
Carbon
Building
Policy





Climate and Equitable Jobs Act

- **Efficiency:** Statewide Stretch Code
- **Renewables:** 100% Zero-emissions power sector by 2045
 - 40% Renewable Energy by 2030
 - 33-42% rooftop/community solar (\$11B private investment over 10 years)
- **Grid Integration:** 1.4MW of Energy Storage over 10 years (\$4.6B private investment)
- **Electrification:**
 - Rebates for Electric Vehicles, and Electric Vehicle Charging Infrastructure (1M cars/\$1.5B private investment)
 - Expanded Utility Efficiency Programs which Allow Rebates for Building Electrification



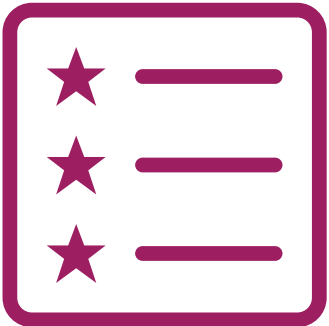
CLIMATE ACTION PLAN FOR THE CHICAGO REGION

IMPLEMENT CLEAN ENERGY POLICIES

Strategy	Municipal Role	Solution Status	GHG Reduction Potential	Cost
Support robust building energy conservation codes, benchmarking, and building performance standards to optimize energy efficiency for retrofit projects.	 ENACT	Evolving	Enabling	\$
Require high performance, all-electric, and net zero new building construction.	 ENACT	Evolving	High	\$\$\$
Adapt zoning codes and streamline development processes to accelerate investment in solar and other renewable energy systems.	 ENACT	Proven	Enabling	\$
Support state policies to advance clean energy.	 ENCOURAGE	Evolving	Enabling	¢

Poll question

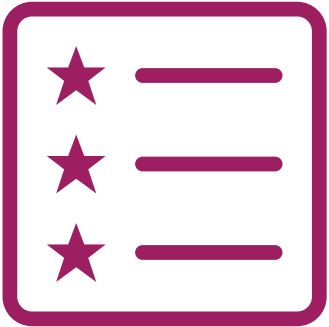
Which of the following building policies have you considered for your municipality?



(select all)

- a) EV ready policies
- b) Solar ready policies
- c) Stretch energy codes
- d) Benchmarking ordinance
- e) Building performance standard
- f) Other:

Poll question



If you answered yes to any of the previous questions, what are the driving forces for considering them?

- a) Residents expressed interest
- b) Business community expressed interest
- c) City staff want to pursue policies
- d) Other, write in the chat...



Building energy codes & policies: Why they matter



Current Energy Codes and Processes

- Energy Codes are a **set of rules** that govern the energy use of a building through mandated building practices & components
- National Model Codes developed by International Code Council and ASHRAE
- Updated on a 3-year cycle
- States/municipalities adopt and enforce the code



**International Energy
Conservation Code**



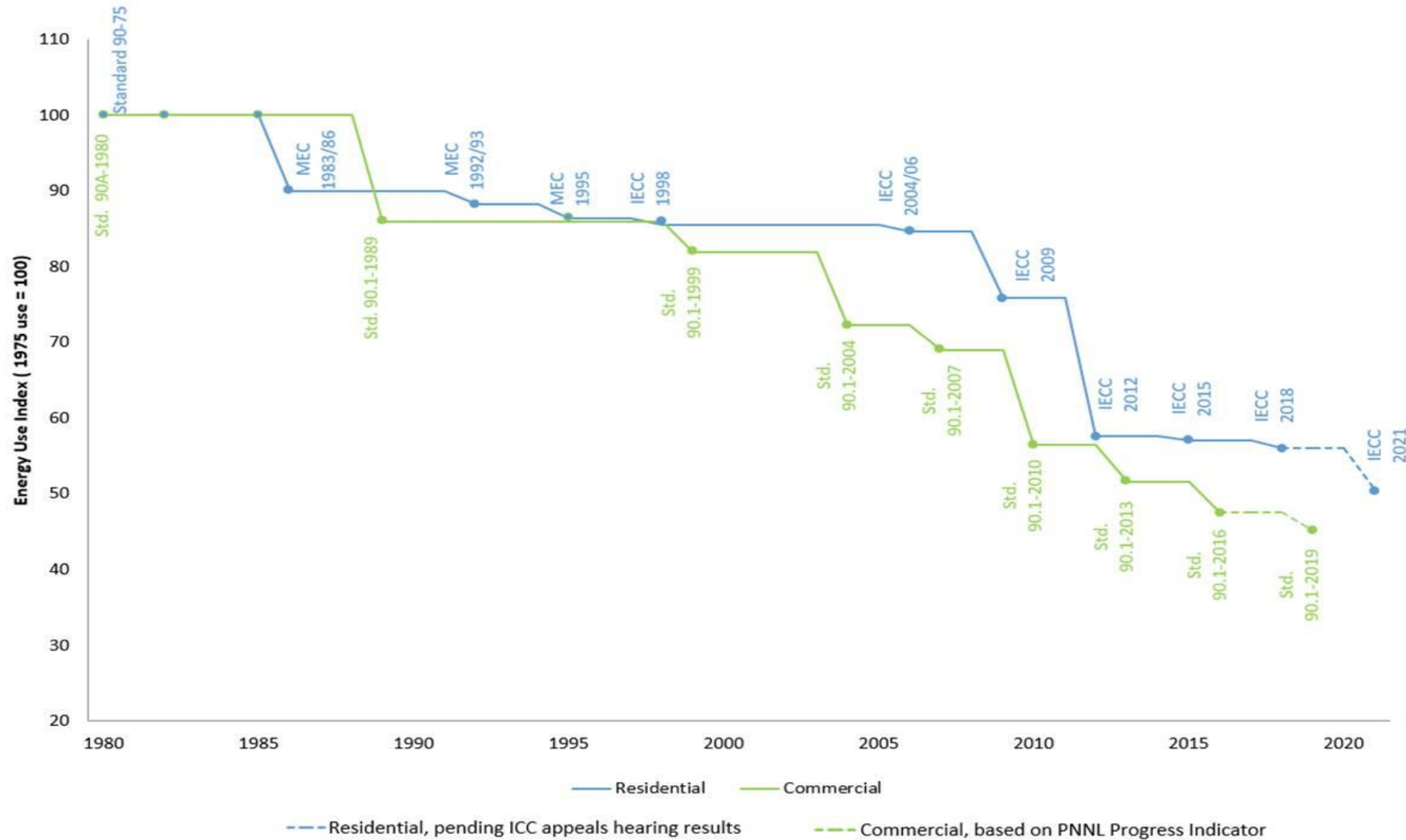
ASHRAE/IES Standard 90.1-2019
(Supersedes ASHRAE/IES Standard 90.1-2010)
Includes ASHRAE/IES addenda listed in Appendix I

**Energy Standard
for Buildings
Except Low-Rise
Residential Buildings**

ASHRAE Standard 90.1



Model Energy Codes Efficiency



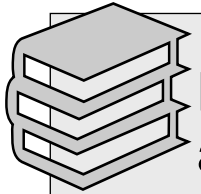
Source: ACEEE, Data from Pacific Northwest National Laboratory & U.S. DOE Building Codes Program, except 2021 which are ACEEE estimates

Municipal Role in International Energy Conservation Code (IECC)

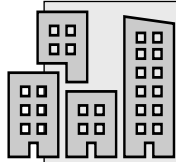
- Influencing IECC development with ICC
 - Governmental voting now Standards process
- Influencing state amendment/adoption of IECC
 - Code amendments
 - Illinois Advisory Committee
- Creating stronger codes at the local/state level – stretch codes
- Enforcing codes



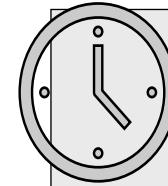
Typical Energy Code Compliance Challenges



Lack of education and awareness



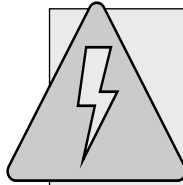
City staff resources to dedicate to enforcement



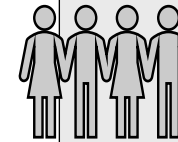
Limited paid time to attend trainings



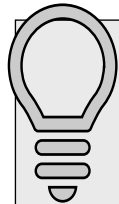
Learning curve of new construction methods



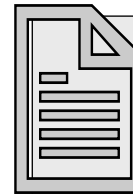
Energy Codes are not a priority or do not need to be enforced



Retiring workforce



“No market demand for energy efficiency”

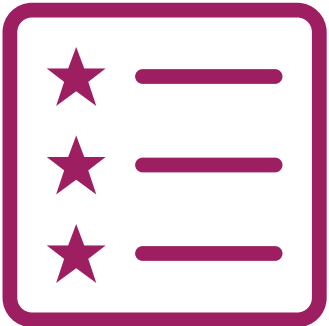


Code Complexity



POLL: Which of the following are issues you see or experience with code compliance?

(select all that apply)



- Lack of education and awareness around codes
- Challenges in city staff resources to dedicate to enforcement
- Learning curve of new construction methods
- Energy codes are not a priority or do not need to be enforced
- Limited paid time to attend trainings
- Retiring/changing workforce
- No market demand for energy efficiency
- I do not see any of these issues
- I don't know



Background on Stretch Codes

- Gives municipalities which want the ability to take meaningful action on energy use and climate change an alternative mandatory compliance path that promotes energy efficiency beyond the available code options
- Provides significant cost savings for residents and businesses
- Help gain market acceptance of the adoption of more energy efficient codes in the future



Approaches to Stretch Code Development & Adoption



Legislatively mandated or through normal adoption process

Developed uniquely for municipalities

Developed as part of (or appendix to) the larger state energy code

Developed in a stakeholder process



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Energy Codes in Illinois



Stretch Code in CEJA

Bill Elements

- Directs the Illinois Capital Development Board (CDB) to create a residential and commercial stretch energy code that can be adopted by individual municipalities.
- Stretch code must meet a set of specific “site energy index” performance targets that include “only conservation measures and excludes net energy credit for any on-site or off-site energy production.”
- Stretch code targets increase in energy efficiency every three years; first target is 9.1% more efficient than current Illinois code.
- Once formally adopted by a municipality, the stretch code takes the place of the state energy code and establishes the minimum energy efficiency requirements for new construction, additions, and major renovations.

Stretch Code in CEJA

Bill Elements

- Allows for an alternative compliance path for the stretch code through "project certification by a nationally recognized nonprofit certification organization specializing in high-performance passive buildings and offering climate-specific building energy standards that require equal or better energy performance than the Illinois Stretch Energy Code." One such example would be the Passive House Institute – US (PHIUS) standard.
- Allows utilities to engage in code compliance-related education and programming that can count toward their energy savings goals.
- Chicago will still be able to adopt its own stretch code.

Residential Targets

Single-family and low-rise multifamily buildings

Stretch Code Version	Implementation Date	Site Energy Index	Performance Targets	Code Created By
2024 Residential Stretch Code	December 31, 2023	0.50	At least 50% more efficient than 2006 IECC	Set by CDB by July 31, 2023
2026 Residential Stretch Code	December 31, 2025	0.40-0.42	At least 60% more efficient than 2006 IECC*	Set by CDB in 2025
2029 Residential Stretch Code	December 31, 2028	0.33 - 0.35	At least 67% more efficient than 2006 IECC**	Set by CDB in 2028
2032 Residential Stretch Code	December 31, 2031	0.25	At least 75% more efficient than 2006 IECC	Set by CDB in 2031

*If “unanticipated burdens” are associated with previous stretch code, new code must be at least 58% more efficient than 2006 IECC and at least 5% better than 2024 IECC

** If “unanticipated burdens” are associated with previous stretch code, new code must be at least 65% more efficient than 2006 IECC; and at least 5% better than 2027 IECC

Commercial Targets

Commercial buildings and multifamily buildings higher than 3 stories

Stretch Code Version	Implementation Date	Site Energy Index	Performance Targets	Code Created By
2024 Commercial Stretch Code	December 31, 2023	0.60	At least 40% more efficient than 2006 IECC	Set by CDB by July 31, 2023
2026 Commercial Stretch Code	December 31, 2025	0.50	At least 50% more efficient than 2006 IECC	Set by CDB in 2025
2029 Commercial Stretch Code	December 31, 2028	0.44	At least 56% more efficient than 2006 IECC	Set by CDB in 2028
2032 Commercial Stretch Code	December 31, 2031	0.39	At least 61% more efficient than 2006 IECC	Set by CDB in 2031

Stretch Code in CEJA

Next Steps

- The CDB must meet by mid-November to determine next steps in CEJA Stretch Code Development.
- Recommendations for elements and requirements of the stretch code must be completed by July 31, 2023, with final language available for adoption by December 31, 2023.
- There may be opportunities for the utilities to assist in developing elements of the stretch code that could be supported by a program.
- The availability of a stretch code will now make it easier for municipalities to adopt. Slipstream and MEEA are continuing outreach.

CEJA influence on State Code Process

- Expand Advisory Committee
 - representative from a group that represents environmental justice
 - a representative of a nonprofit or professional association advocating for the environment
 - an energy-efficiency advocate with technical expertise in single-family residential buildings
 - an energy-efficiency advocate with technical expertise in commercial buildings
 - an energy-efficiency advocate with technical expertise in multifamily buildings, such as an affordable housing developer.
- Some proposed amendments that would strengthen state base code may end up in Stretch Code instead (details later in presentation)



Energy code amendments and process



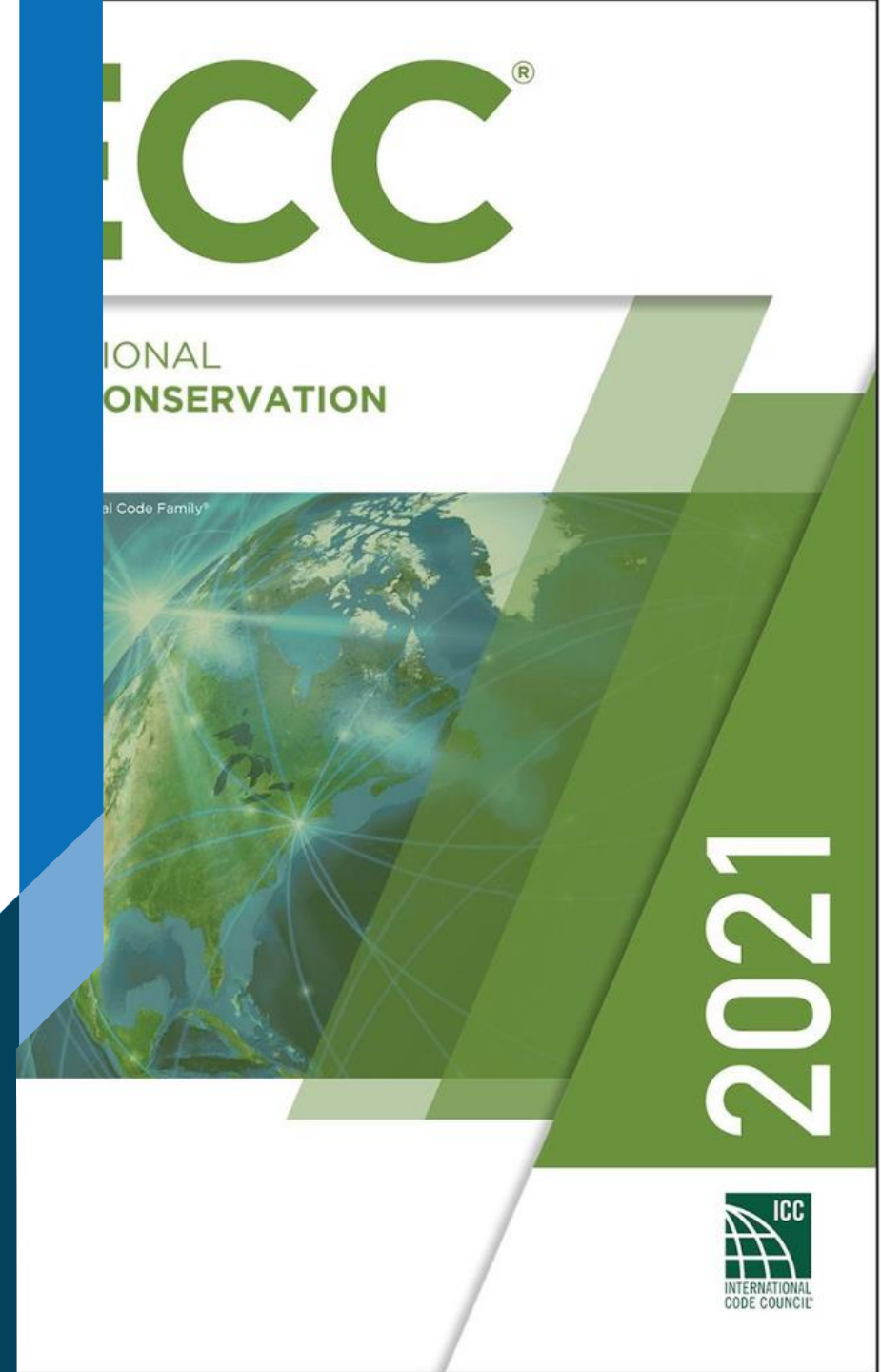
Code Amendment Process

- Call for Amendments to Energy Code
- Illinois Energy Code Advisory Council meets to hear from proponent and discusses/votes on amendments.
- Recommendation of amendments submitted to the Capitol Development Board
- Rulemaking process (which will allow for public comment) to adopt statewide code
- Stretch Code Effective December 31, 2023



Potential Stretch Code Requirements to Support CEJA Goals

- Renewables (Solar-ready/Solar Requirement)
- EV-Ready
- Building Electrification: All-Electric or Electric-Ready
- Demand Response
- Energy-Storage Ready





On-site Solar Generation

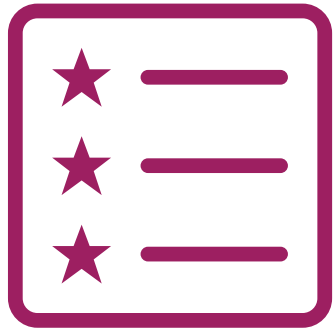
- Residential: incorporates Appendix RB into main body of text
 - Requires solar ready zone and infrastructure
 - Redirects multifamily (3+ units) to commercial requirement
- Commercial: incorporates language from 90.1-2022 for mandatory on-site solar
 - $0.25\text{W}/\text{ft}^2$ * gross area of three largest floors
 - Requires documentation of RECS retained or retired
- Why? Financially Beneficial, Reduce Future Retrofit Costs, Reduces Carbon Emissions, Improves Air Quality, Jobs, Resiliency



On-site Solar

- **R404.4.1.1 Solar-ready zone area.** The total solar-ready zone area shall be not less than 300 square feet (28 m²) exclusive of mandatory access or set back areas as required by the International Fire Code. Townhouses three stories or less in height above grade plane and with a total floor area less than or equal to 2,000 square feet (186 m²) per dwelling shall have a solar-ready zone area of not less than 150 square feet (14 m²)...
- **C405.13 On site renewable energy.** Each building site shall have equipment for on-site renewable energy with a rated capacity of not less than 0.25 W/ft² (2.7 W/m²) multiplied by the sum of the gross conditioned floor area of the three largest floors.

On-Site Solar Poll Questions



- 1) Should new **residential** construction be required to be solar-ready?
 - a. Yes
 - b. No
 - c. Unsure
- 2) Should new **commercial** construction be required to install solar (with reasonable exceptions)?
 - a. Yes
 - b. No
 - c. Unsure
- 3) If these requirements were in the stretch code and not in the base code, how would that affect your interest in adopting stretch code?
 - a. More likely to adopt
 - b. Neutral
 - c. Less likely to adopt
 - d. Unsure



Electric Vehicles

- Residential: One- and two-family dwellings
 - Requires one EV-ready space/dwelling unit
 - Requires minimum capacity of 9.6kVA for charging
 - Redirects multifamily to commercial requirement
- Commercial: EVSE, EV-ready, EV-capable required by occupancy type
 - Allows trading up to meet required percentages
- Why? Reduce barriers to EVs in the state, Reduce Future Retrofit Costs, Reduces Carbon Emissions, Improves Air Quality

Electric Vehicles

TABLE C405.14

ELECTRIC VEHICLE CHARGING INFRASTRUCTURE REQUIREMENTS

<u>OCCUPANCY</u>	<u>EVSE SPACES</u>	<u>EV READY SPACES</u>	<u>EV CAPABLE SPACES</u>
<u>Group B Occupancies</u>	<u>15%</u>	<u>NA</u>	<u>40%</u>
<u>Group M Occupancies</u>	<u>25%</u>	<u>NA</u>	<u>40%</u>
<u>R-2 Occupancy</u>	<u>NA</u>	<u>100%^a</u>	<u>NA</u>
<u>All other Occupancies</u>	<u>10%</u>	<u>NA</u>	<u>40%</u>



Electric Vehicle Poll Questions

- 1) Should new **residential** construction be required to be EV-ready?
 - a. Yes
 - b. No
 - c. Unsure
- 2) Should some percentage of **commercial** parking spaces be required to have EV charging equipment and be EV-ready?
 - a. Yes
 - b. No
 - c. Unsure
- 3) If these requirements were in the stretch code and not in the base code, how would that affect your interest in adopting stretch code?
 - a. More likely to adopt
 - b. Neutral
 - c. Less likely to adopt
 - d. Unsure



Building Electrification

- All-Electric Requirement OR
- Electric infrastructure required for:
 - Water heating
 - Space heating
 - Clothes drying
 - Cooking
 - “Other”
- Requirements for:
 - Branch circuits and labeling
 - Physical space and other associated needs (i.e. condensate drains)
- Why? Reduce future retrofit costs, reduces carbon emissions, improves indoor and outdoor air quality





Electric-Ready Water Heating

C405.16.2 Combustion water heating equipment. Gas-fired water heaters with a capacity less than 300,000 Btu/h (88 kW) shall be installed in accordance with the following:

1. A dedicated 208/240-volt branch circuit with a minimum capacity of 30 amps shall terminate within 3 feet (914 mm) ...
2. A condensate drain that is no more than 2 inches (51 mm) higher than the base of the installed water heater ...
3. The water heater shall be installed in a space with minimum dimensions of 3 feet (914 mm) by 3 feet (914 mm) by 7 feet (2134 mm) high, and
4. The water heater shall be installed in a space with a minimum volume of 700 cubic feet (20,000 L)

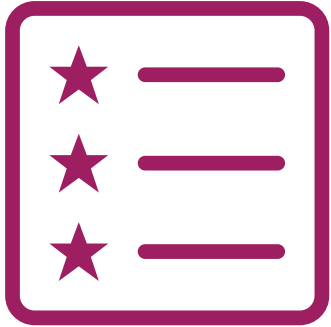
Building Electrification Poll Questions

1) Should new **residential** construction be required to be all-electric or electric-ready?

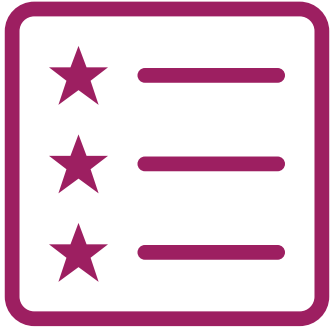
- a. All-electric
- b. Electric-Ready
- c. No requirement
- d. Unsure

2) Should **commercial** construction be required to be all-electric or electric-ready (with reasonable exceptions)?

- a. All-electric
- b. Electric-Ready
- c. No requirement
- d. Unsure



Building Electrification Poll Questions (cont.)



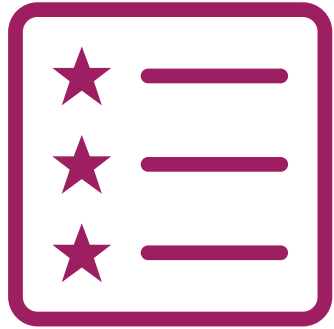
- 3) If **all-electric** requirements were in the stretch code and not in the base code, how would that affect your interest in adopting stretch code?
- a. More likely to adopt
 - b. Neutral
 - c. Less likely to adopt
 - d. Unsure
- 4) If **electric-ready** requirements were in the stretch code and not in the base code, how would that affect your interest in adopting stretch code?
- a. More likely to adopt
 - b. Neutral
 - c. Less likely to adopt
 - d. Unsure

Demand Response

- Requires demand responsive thermostats
- Requires demand responsive water heating in accordance with ANSI/CTA-2045-B
- Why? Ability to reduce utility costs through time of use program, reduces carbon emissions through grid integration



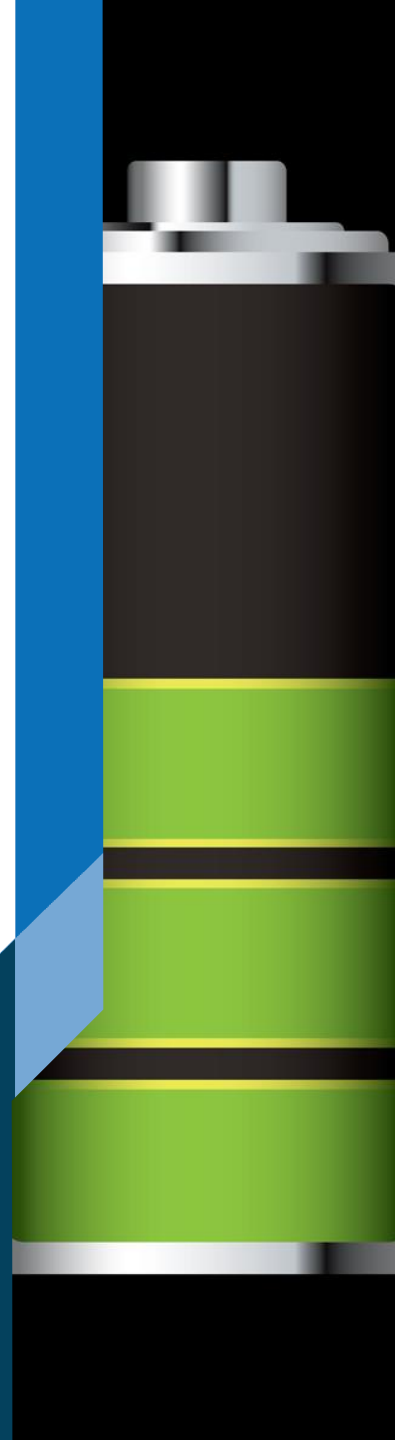
Demand Response Poll Questions



- 1) Should **residential** construction be required to install demand responsive water heaters and thermostats?
 - a. Yes
 - b. No
 - c. Unsure
- 2) Should new **commercial** construction be required to install demand responsive water heaters and thermostats?
 - a. Yes
 - b. No
 - c. Unsure
- 3) If demand response requirements were in the stretch code and not in the base code, how would that affect your interest in adopting stretch code?
 - a. More likely to adopt
 - b. Neutral
 - c. Less likely to adopt
 - d. Unsure

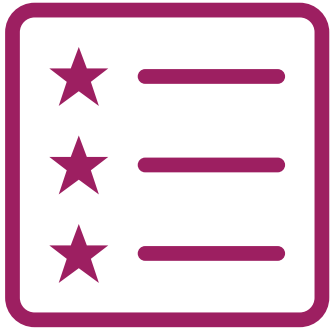
Energy Storage Ready

- Incorporates language from Appendix CB into main body of Residential or Commercial Code
 - Requires dedicated space for energy storage
 - Requires reserved space on main electrical panel
- Why? Resiliency, reduce future retrofit costs, ability to reduce utility costs through time of use program, reduce carbon emissions through grid integration



Energy-Storage Ready Poll Questions

- 1) Should **residential** construction be required to be energy-storage ready?
 - a. Yes
 - b. No
 - c. Unsure
- 2) Should **commercial** construction be required to be energy-storage ready?
 - a. Yes
 - b. No
 - c. Unsure
- 3) If energy-storage ready requirements were in the stretch code and not in the base code, how would that affect your interest in adopting stretch code?
 - a. More likely to adopt
 - b. Neutral
 - c. Less likely to adopt
 - d. Unsure





Building performance standards



Advanced Building Policies

Stretch/reach codes

Alternative compliance path that defines a higher level of energy efficiency

New construction

Building Performance Standard (BPS)

Focus on improving existing building stock through setting targets for efficiency upgrades

Existing buildings



BPS – First step, benchmarking


Benchmarking is the ongoing review of energy performance of a buildings with the goal of informing and motivating performance improvement.

Establishes
baseline energy
use, using general
building
characteristics and
energy
consumption data

Allows a building
to be compared to
itself, other
buildings, or an
applicable
standard over time

On average,
benchmarking
buildings see
energy savings of
2.4% per year
(energystar.gov)





BPS Framework Overview

Step 1: Preparation

Establish **policy goals** with understanding of the city's context and **key considerations**

Perform a **market segmentation** to understand building segments and how building owners interact with the City

Establish the **stakeholder engagement** process to be used throughout BPS policy development and implementation

Step 2: Policy Making

Answer policy questions in 6 key areas to establish the **nuts and bolts of policy design**

Address **additional considerations** related to funding, staffing, data, tenants, interaction with other policy

Develop a **communications and political strategy** to pass legislation

Step 3: Implementation

Re-engage stakeholders to support **rulemaking and policy implementation**, including outreach, staffing, data collection, and reporting out

Establish **tools and resources**, such as financial incentives and resource hubs, to support building owners and workers most in need

Integrate Equity, Stakeholder Engagement, and Cost Considerations at every stage



Programs to support building policies



Utility programs

- Utilities have a statutory requirement to spend a certain amount of money on energy efficiency investments for their customers
- Programs span new construction to existing building, residential to commercial and industrial
- No programs currently exist in Illinois for advancing or supporting code, but program elements are under consideration



Building policies and utility support

- Benefits to a municipality
 - Technical resources, tools, and program implementation for residents
 - Incentives for investments
- Benefits to the utility
 - Help meet their energy savings and spending goals
 - Potential for positive customer interaction



Potential Utility Program Elements

Building code officials

- Compliance guidance
- Targeted training and education
- Circuit rider to review plans
- Energy code compliance collaborative

Design / construction community

- Design / construction technical guidance
- Targeted training and education
- Incentives for meeting design requirements
- Energy code compliance collaborative

Jurisdiction / Policy Making

- Assistance with stretch code adoption or advancement
- Energy code compliance collaborative



Programs to support building code officials

- Targeted training and education – In-person and online
- Compliance documentation assistance – Compliance checklists
- Third-party compliance – Relieves staffing constraints for review of plans and specifications
- Circuit rider – Person that works with municipalities to provide technical education and support
- Energy code compliance collaborative – Stakeholder group that collectively addresses compliance issues
- Administrative assistance – Development of a resource website, code books, helpline to provide ongoing assistance



Programs to support design and construction community

- Direct technical assistance - Program works directly with building designers
- Targeted training and education – In-person and online
- Compliance documentation assistance – Compliance checklists
- Energy code compliance collaborative – Stakeholder group that collectively addresses compliance issues
- Administrative assistance - Development of a resource website, code books, helpline to provide ongoing assistance



Programs to help municipalities advance policy

- Policymaker education and community outreach sharing resources that explain policy impacts
- Promise of utility support program to be available
 - Compliance documentation assistance and third-party compliance support for city code officials
 - Energy code compliance collaborative to address compliance issues
 - Direct technical assistance: program works directly with building designers
 - Financial incentives for builders for certain code measures
- Larger incentives for early adopting communities and builders

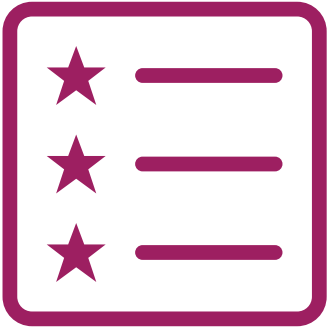


Poll question

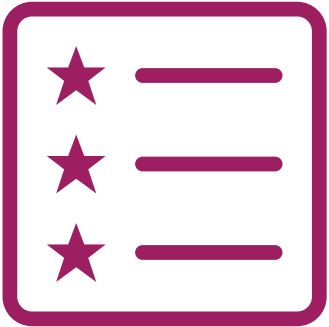
Which types of support programs are of most interest to you?

(Select all)

- a) Programs that support building code officials
- b) Programs that support design and construction community
- c) Programs that help municipalities advance policy
- d) None



Poll question

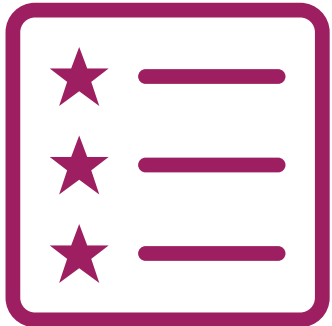


Which aspects of programs provide the most value to you and your constituents? (select all)

- a) Technical assistance and guidance
- b) In person or online targeted training
- c) Circuit riders
- d) Third party enforcement of codes
- e) Incentives for meeting or exceeding code
- f) Assistance from utilities to help advance policy
- g) None

Poll question

How would you rate your level of interest in your jurisdiction to adopt the Illinois Stretch Code?



- a) We will adopt it when it is available
- b) We will likely adopt it but have some reservations and need to learn more before doing so
- c) There is some level of interest, but priority is low
- d) This policy is not at all politically feasible
- e) Not sure right now

Let's talk



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