Stretch Energy Codes: Helping Practitioners Reach the Moon

Ithaca Green Building Policy

Nick Goldsmith, Sustainability Coordinator
City of Ithaca and Town of Ithaca

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Agenda

Ithaca Green Building Policy

- Background
- Recommendations
- The Easy Path
- Next Steps
Background
Background

- City and Town are separate municipalities
- 37 square miles
- Total population of 50,000+
- Student population about 30,000
- 60% renters
- Median household income $46,360
Background

- Climate action at state and local government level now more important than ever
- Ithaca has a history of sustainability efforts
Green Building Policy Project

- Grant-funded
- Broad scope
- Collaborative – City and Town of Ithaca
- Oversight and guidance
A successful green building policy should be FAIR

1. Flexible
2. Affordable
3. Impactful
4. Reachable
Possible Actions

<table>
<thead>
<tr>
<th>Approach</th>
<th>Examples</th>
<th>Penetration</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Carrot</strong></td>
<td>Incentivize</td>
<td>Tax credits, rebates</td>
</tr>
<tr>
<td>8</td>
<td>Recognize</td>
<td>Energy Star, LEED, Architecture 2030 / District 2030</td>
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<tr>
<td>7</td>
<td>Encourage</td>
<td>Bulk purchasing, Solarize, HeatSmart, model behavior by targeting net-zero for new city buildings</td>
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<tr>
<td>6</td>
<td>Finance</td>
<td>PACE, performance contracting, other</td>
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<tr>
<td>5</td>
<td>Support</td>
<td>Training (contractors, building operators, building code officials, others), Cooperative Extension navigators</td>
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<tr>
<td>4</td>
<td>Advocate</td>
<td>Web sites, Green Building Tour, discourage fossil fuels</td>
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<tr>
<td>3</td>
<td>Pressure</td>
<td>Require energy score to be shown on listings, benchmarking</td>
</tr>
<tr>
<td>2</td>
<td>Require</td>
<td>Code requirements, ordinances</td>
</tr>
<tr>
<td>1</td>
<td>Stick</td>
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**Take-aways**

- Encouraged to use a Balanced approach.
- Can not reach our goals with only softer approaches that are not mandatory.
Recommendations
Recommendations

Mandate

- New buildings must meet energy efficiency requirements

Incentives

- Broad incentive package proposed to promote early adoption of best practices

Future Code Cycles

- Requirements become more stringent in 2025 and 2030
**Recommendations**

A mandate with two compliance options

<table>
<thead>
<tr>
<th>Whole Building Path</th>
<th>-OR-</th>
<th>Easy Path</th>
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<tbody>
<tr>
<td>• Third-party verified</td>
<td></td>
<td>• Point system</td>
</tr>
<tr>
<td>• LEED: 17 energy points (Commercial)</td>
<td></td>
<td>○ Achieve minimum of 6 points to pass</td>
</tr>
<tr>
<td>• Passive House (Comm./Residential)</td>
<td></td>
<td>○ Easy to use</td>
</tr>
<tr>
<td>• HERS Rating of 40 (Residential)</td>
<td></td>
<td>○ Emphasis on affordability-driven features and electrification</td>
</tr>
<tr>
<td>• NGBS with 80 EE points (Residential)</td>
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Incentives

Incentive package proposed for projects that:

- Meet requirements of the next code cycle
- Fossil fuel free
- Meet walkability criteria
- Commit to share energy use data

Incentive package
  - Recognition
  - Property Tax abatements
    - Green Building Tax Exemption
  - Additional square footage
    - Height, stories, lot coverage, parking requirements
  - Building Permit relief
    - e.g. streamline; cost reduction or rebate
Future Code Cycles

2019: Base requirements with incentives for reaching 2025 requirements

2025: Requirements increase with incentives for reaching 2030 requirements

2030: Requires net-zero carbon buildings
When Would This Policy Apply?

Proposed policy would cover:

- All new construction (residential, commercial, industrial, etc.)
- Gut renovations
- Additions over 500 square feet

NYS Stretch Energy Code would cover:

- New additions less than 500 sq ft
- Limited renovations

Historic buildings are exempt from policy, but encouraged to reduce carbon emissions.
The Easy Path
Can you get six points?

### Efficient Electrification
- Heat pumps for space heating: 2 - 4 points
- Heat pumps for domestic hot water heating: 1 point (residential/hotel only)
- Electric stove and heat pump dryer and no fossil fuels in building: 1 point (residential/hotel only)

### Affordability Improvements
- Smaller building/room size: 1 - 2 points (resid./hotel only)
- HVAC system and distribution in heated space: 1 point
- Efficient building shape: 1 point
- Right-lighting: 1 point (commercial only)
- Window-to-wall ratio: 20% overall: 1 point

### Renewable Energy
- Renewable energy system: 1 - 3 points
- Biomass system: 3 - 4 points

### Other Points
- Development Density: 1 point
- Walkability: 1 point
- Adaptive reuse: 1 point
- Meet NY Stretch Energy Code: 1 point
- Custom energy Improvement (no fossil fuels): 1 - 2 points
EE1 Heat pumps for space heating

Electric heat pumps are more energy efficient than fossil fuel based space heating equipment.

**Requirement:**
Heat pumps for space heating

**Possible Points: 2-4**
2 points (Commercial) or 3 points (Residential) for air source heat pumps. 3 points (Commercial) or 4 points (Residential) for ground source heat pumps.
Efficient Electrification

EE2 Heat pumps for water heating

Electric heat pumps are more energy efficient than fossil fuel based water heating equipment.

**Requirement:**
Water heating systems that use heat pumps (Residential, Hotels, and Dorms).

**Possible Points:** 1
**EE3 Electric stove and ventless heat pump clothes dryer**

Electric stoves and heat pumps clothes dryers are more energy efficient than fossil fuel based equipment.

**Requirement:**
Electric stoves AND ventless heat pump clothes dryers. Requires no fossil fuels in the building. (Residential).

**Possible Points:** 1
Affordability Improvements

AI1 Smaller building size

A smaller building uses both less energy and costs less. The impact of smaller buildings on energy use is almost linear, due to energy uses that scale with size: heating, cooling, lighting, etc.:

**Requirement:**
15% smaller = 1 point
30% smaller = 2 points

Residential and Hotels only

**Possible Points:** 1-2

Example: Single Family Homes*

<table>
<thead>
<tr>
<th>Floor area (sq. ft.) per Number of Bedrooms</th>
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<tbody>
<tr>
<td></td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>1,000</td>
<td>1,000</td>
<td>1,600</td>
<td>2,200</td>
</tr>
</tbody>
</table>

LEED/EnergyStar's reference table for conditioned floor area of reference home, by number of bedrooms.

*Different tables are used for multifamily buildings and hotels.
AI2 Heating systems in heated space

Heating equipment including ductwork located outside the heated space is less efficient than capturing the heat loss within the heated space. Does not apply to outdoor condensing units for heat pumps.

**Requirement:**
Place heating/cooling systems and distribution inside actively heated and finished spaces.

**Possible Points:** 1
AI3 Efficient building shape

More compact building forms are more energy efficient than sprawling forms because of reduced surface area of the thermal envelope relative to amount of floor area.

Requirement:
Exterior surface area divided by gross floor area is less than maximum value provided in reference table.

Possible Points: 1
Affordability Improvements

**AI4 Right-lighting**

Overlighting can waste unnecessary energy.

**Requirement:**
Reduce overlighting (25% lower lighting power density than the energy code) and other lighting improvements. Unnecessarily long-duration lighting operation is avoided through use of motion sensors.

Commercial only.

**Possible Points: 1**
Affordability Improvements

**AI5 Modest window to wall ratio**

Larger windows than necessary to provide access to views and natural daylight significantly increase energy use for both heating and cooling buildings.

**Requirement:**
Overall window-to-wall ratio less than 20% (individual spaces may exceed 20%).

**Possible Points:** 1
RE1 Renewable energy systems

Solar hot water and photovoltaic systems either on site or off site can be necessary components of a Net Zero Energy building.

**Requirement:**
Electric systems: 1 point per 1.2 kwh/sf/year renewable energy capacity (Residential) or per 2.4 kwh/sf/year (Commercial). Thermal systems: 1 point per 4.0 kBtu/sf/year renewable energy capacity (Residential) or per 8.0 kBtu/sf/year (Commercial).

**Possible Points:** 1-3
RE2 Biomass space heating systems

Biomass space heating systems can be carbon-neutral.

**Requirement:**
3 points (Commercial) or 4 points (Residential) for approved biomass heating systems.

**Possible Points: 3 - 4**
Other Points

OP1 Development Density

Households and businesses located in closer proximity to each other can be better served by public transit and car sharing programs.

Requirement:
Residential Density > 7 dwelling units/acre
Commercial Density > 7,000 sq ft/acre

Possible Points = 1
**OP2 Walkability**

Households located outside the core of the city (not walkable to services) generate on average almost 3 times as much CO2 due to increased dependency on vehicle trips.

**Requirement:**
Project located within ¼ mile of 5 common services or in a target development area.

**Possible Points = 1**
OP3 Adaptive reuse

According to the National Trust for Historic Preservation it can take between 10 to 80 years for a new energy efficient building to overcome, through efficient operations, the climate change impacts created by its construction.

**Requirement:**
Substantial re-purpose of an existing building that maintains at least 50% (based on surface area) of the existing building structure and envelope.

**Possible Points = 1**
Other Points

**OP4 Meet NY Stretch Energy Code**

NYSERDA has drafted NYStretch Code-Energy 2015 – a voluntary, locally adoptable stretch energy code. It is the latest stretch energy code for New York buildings and is roughly 10% more efficient than the residential provisions of the International Energy Conservation Code (IECC) – 2015.

**Requirement:**
Comply with NY Stretch Energy Code

**Possible Points = 1**
**OP5  Energy improvement of choice**

Custom solutions may provide savings which can be shown through energy analysis performed by an experienced energy professional. For a baseline, use the NYS Energy Code, latest edition.

**Requirement:**
One point for each 1.2 kwh/sf/year (Residential) or 2.4 kwh/sf/year (Commercial) reduction in energy use. Prerequisite: no fossil fuels.

**Possible Points = 2 Max**
Answers to Our Initial Questions

- Would the proposed point system work for known high-performance buildings, in other words, would they have passed? **Yes**
- Would the point system work for known non-high-performance buildings, in other words, would they have failed? **Yes**
- Would such a point system have impacted designs? **Yes. We see some examples where somewhat high-performance buildings would fail, but by pursuing extra points, could pass fairly easily.**
- Do “better” buildings score higher? **Yes**
- Would the point system be unusually cumbersome and costly? **No**
- Is the point system easy to pass? **Possibly, but that isn’t a bad thing if desired results are achieved.**
Project Status and Next Steps

• Final GBP Report approved by City Common Council and Town Board in May 2018

• Next Steps
  • Additional research – Ongoing
  • Additional Stakeholder outreach – Q4 2018
  • Codify policy recommendations – Start Q4 2018
  • Council vote on local law – 2019
Thank You!

Nick Goldsmith
Sustainability Coordinator
Town of Ithaca, NY
City of Ithaca, NY

607-273-1721 ext. 136
ngoldsmith@cityofithaca.org
IthacaGreenBuilding.com