

# Municipal Energy Code Support



**CSC Webinar June 11, 2015**

# Municipal Energy Code Support

- Initial program provided from 2010-2012
- For support of the 2010 ECCCNY
- (2009 IECC)

# Municipal Energy Code Support

- Plan Review Service
- Energy Code Hotline
- Field Inspection Assistance
- In-Office Training & Presentation Programs

# Municipal Energy Code Support

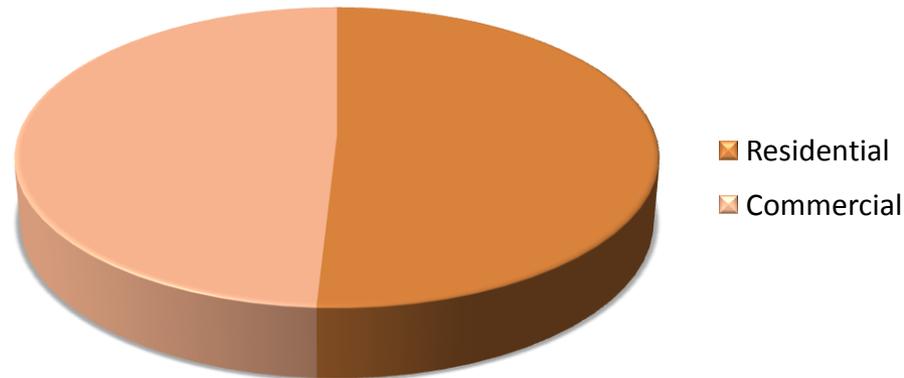
## Plan Review Service Provided For

- Code Enforcement Officials
- Design Professionals
- Other Stakeholders

# Municipal Energy Code Support

## Initial Plan Review Breakdown

- 51% Residential Plan Reviews
- 49% Commercial Plan Reviews



# Municipal Energy Code Support

## Plan Review Deliverables

- Plan Review Checklist
- Inspection Checklist (Residential)
- Code Compliance Narrative Report
- On-call Consultation

# Municipal Energy Code Support

## NYSERDA ENERGY CODES SUPPORT

### Residential Plan Review Checklist

Chapters 1,2,3,4 & 6 of the 2010 ECCCNYS, as amended by Chapter 1 of the 2014 Supplement to the New York State Energy Conservation Construction Code (the "2014 Supplement")

Project #: \_\_\_\_\_ Date: \_\_\_\_\_ Name of Evaluator(s): \_\_\_\_\_  
 Building Contact: Name: \_\_\_\_\_ Phone: \_\_\_\_\_ Email: \_\_\_\_\_  
 Building Name & Address: \_\_\_\_\_  
 Subdivision: \_\_\_\_\_ Lot #: \_\_\_\_\_ Conditioned Floor Area: \_\_\_\_\_ ft<sup>2</sup>  
 Climate Zone: \_\_\_\_\_ County: \_\_\_\_\_ Jurisdiction: \_\_\_\_\_  
 Compliance Approach:  Prescriptive  Trade-Off  Performance  Compliance Software  Other  
 Compliance Software Used: \_\_\_\_\_ Green Building/Above-Code Program?  Yes  No  
 Building Type: 1- and 2-Family, Detached:  Single Family  Modular  Townhouse  
 Multifamily:  Apartment  Condominium  
 Project Type:  New Building  Existing Building Addition  Existing Building Renovation  
 Special Considerations:  Historic Building  Commercial Space

ECCCNYS Section #	Pre-Inspection/Plan Review	Code Value	Verified Value	Complies			Comments/Assumptions <sup>1</sup>
				Y	N	N/A	
103.2	Construction drawings and documentation available. Documentation sufficiently demonstrates energy code compliance.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Insulation materials and their R-values			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Fenestration U-factors			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Area-weighted U-factor			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Mechanical system design criteria			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Mechanical and service water heating system and equipment types, sizes and efficiencies			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Equipment and systems controls			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Duct sealing, duct and pipe insulation and location			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Lighting fixture schedule with wattage			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Air sealing/ Testing Method			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
403.6	HVAC loads calculations: Heating system size(s): Cooling system size(s):		kBtu: _____ kBtu: _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	Written Statement of Compliance from Design Professional			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

## Plan Review Checklist

General Permit Data Entered

Values and Compliance Entered

# Municipal Energy Code Support

## NYSERDA ENERGY CODES SUPPORT

### Residential Inspection Checklist ECCCNYS-2010

Permit #: \_\_\_\_\_ Date: \_\_\_\_\_ Name of Evaluator(s): \_\_\_\_\_

Building Contact: Name: \_\_\_\_\_ Phone: \_\_\_\_\_ Email: \_\_\_\_\_

Building Name & Address: \_\_\_\_\_

Subdivision: \_\_\_\_\_ Lot #: \_\_\_\_\_ Conditioned Floor Area: \_\_\_\_\_ ft<sup>2</sup>

Zone: \_\_\_\_\_ County: \_\_\_\_\_ Jurisdiction: \_\_\_\_\_

Compliance Approach (check all that apply):  Prescriptive  Trade-Off  Performance  REScheck  Other

Compliance Software Used: \_\_\_\_\_ Green Building/Above-Code Program?  Yes  No

Building Type: 1- and 2-Family, Detached:  Single Family  Modular  Townhouse

Multifamily:  Apartment  Condominium  Commercial Space

# Inspection Checklist

IECC Section #	Inspection	Code Value	Plan Value	Complies			Comments/Assumptions
				Y	N	N/A	
401.3	Permanent Certificate w/ Energy Code Compliance Statistics	On Electric Panel		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
402.1.1	Slab edge insulation R-value.	Unheated: R-10 Heated: R-15	R- _____ <input type="checkbox"/> Unheated <input type="checkbox"/> Heated	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
303.2, 402.2.8	Slab edge insulation installed per manufacturer's instructions.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
402.1.1	Slab edge insulation depth/length.	2 ft. Z-4 & 5 4 ft. Z-6	← ft.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
402.1.1	Basement wall insulation R-value <sup>1</sup> .	Continuous: R-10 Z-4 & 5, R-15 Z-6 Cavity: R-13 Z-4 & 5, R-19 Z-6	R- _____ R- _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
402.2.7	Basement wall insulation depth.	10 ft. or to basement floor	← ft.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
303.2	Basement wall insulation installed per manufacturer's instructions.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
402.2.9	Crawl space wall insulation R-value.	Continuous: R-10 Z-4 & 5, R-15 Z-6 Cavity: R-13 Z-4 & 5, R-19 Z-6	R- _____ R- _____	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
303.2	Crawl space wall insulation installed per manufacturer's instructions.			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
402.2.9	Crawl space continuous vapor retarder installed with joints overlapped by 6 inches and sealed, and extending at least 6" up the stem wall.	Required		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Values from Plan Review Checklist

# Municipal Energy Code Support

## Code Compliance Narrative

- The wrong version of COMcheck was used to provide compliance with the Energy Code. The envelope compliance certificate located on Sheet A002 indicates that COMcheck Version 3.0, Release 2B was used. All Energy Code Compliance worksheets should be provided using the most current version of COMcheck, which is version 3.8.2.
- The building location provided in the envelope compliance certificate located on sheet A002 indicates that the building is located in Cookeville, Tennessee. The building location should be revised indicating the location in [REDACTED], New York.
- The climate zone location provided in the envelope compliance certificate on sheet A002 locates the building in climate zone 9b. The climate zone location should be revised to locate the building in climate zone 5 per the Energy Code, Table 301.1.

# Municipal Energy Code Support

## On-call Consultation

- Available by e-mail
- Individual Phone Conversation
- Conference Call between Design Team, T.Y. Lin and Code Official

# Municipal Energy Code Support Plan Review Report

- Detailed analysis of each project.
- Recommendations for remediation of deficient items.
- Recommendations for issuance of a Building Permit.

# Municipal Energy Code Support

## Turn-Around Time

- Residential – Typically 5 Business Days
- Commercial – Maximum 10 Business Days

# Municipal Energy Code Support

## Energy Code Hotline

- Response to questions from Code Officials and Other Stakeholders
- Telephone Line Staffed 8:30 am – 4:30 pm Monday - Friday, Year Round
- Response within 48 Hours

# Municipal Energy Code Support

## Program Benefits

- Consistency in answers
- Answers to all Previous Questions Readily Available to Responder for Quick Turn Around
- ICC Energy Code Commentary Utilized as Resource

# Municipal Energy Code Support

## Program Benefits

- Answers to Complex Questions vetted among team members and the Department of State Office of Bldg Standards & Codes
- Provide Checklist of Findings
- Response within 3 Days of Request

# Municipal Energy Code Support

## Field Inspection Assistance

- Provided on-site Energy Code Inspection Guidance to Code Enforcement Officials
- Provide on-site Energy Code Inspection Guidance for the Design Professional
- Provide Written Report of Findings

# Municipal Energy Code Support

## In-Office Presentation

- Provide Plan Review Presentation to Code Enforcement Officials at their office.
- Can include Code Officials from Adjoining Communities as well as Other Stakeholders.

# Municipal Energy Code Support

## Lessons Learned

- Common Deficiencies

- Fenestration (no values provided, no specifications)

- Specifications (for HVAC System equipment, Air Barrier Material and Sealing)

- Heating/Cooling Load Calculations

# Municipal Energy Code Support

## Lessons Learned

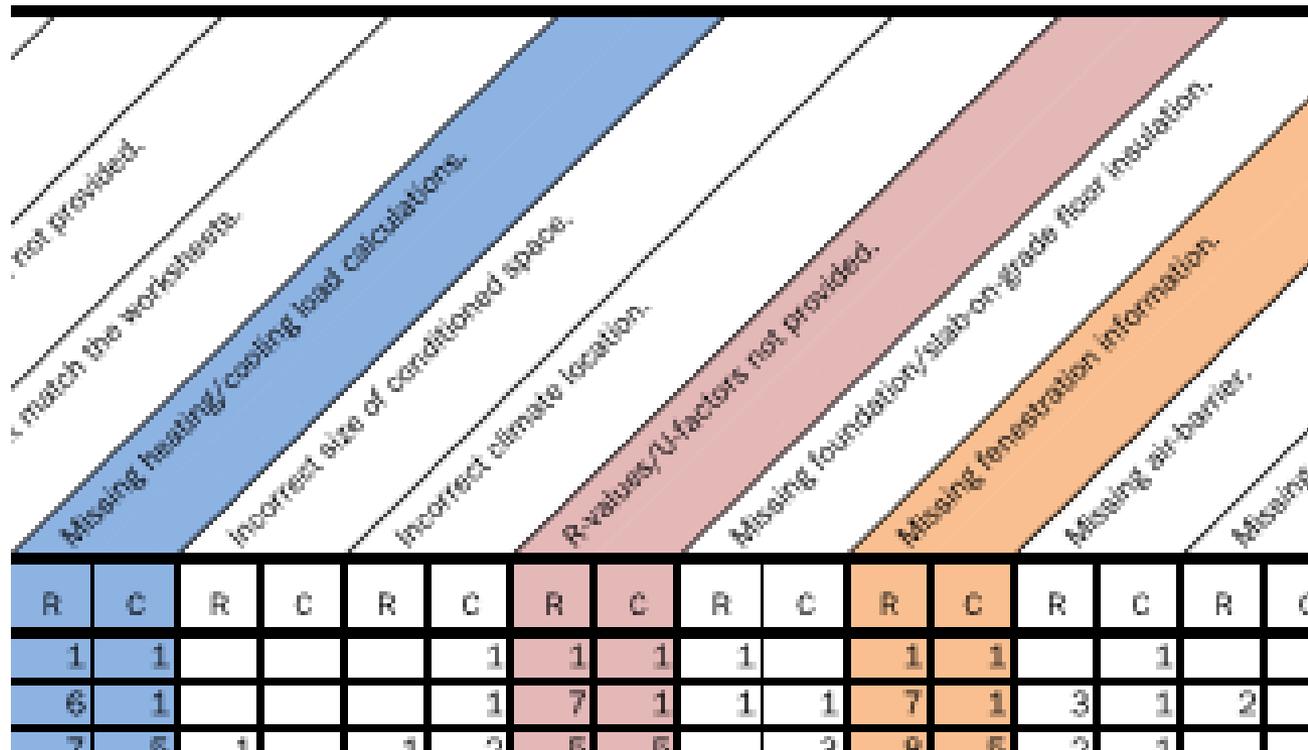
- Common Deficiencies
  - R - U Values
  
  - Water Heating Systems and Equipment
  
  - Incorrect use of Computer Generated Compliance Software



# Municipal Energy Code Support

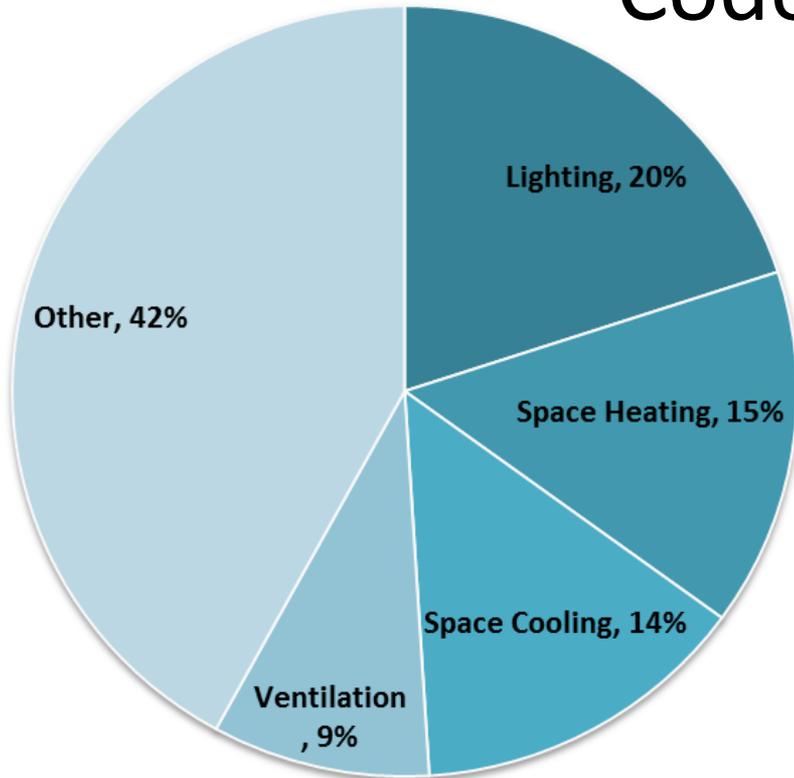
## Lessons Learned

- Common Deficiencies



# Municipal Energy Code Support

## What building components does the Energy Code address?

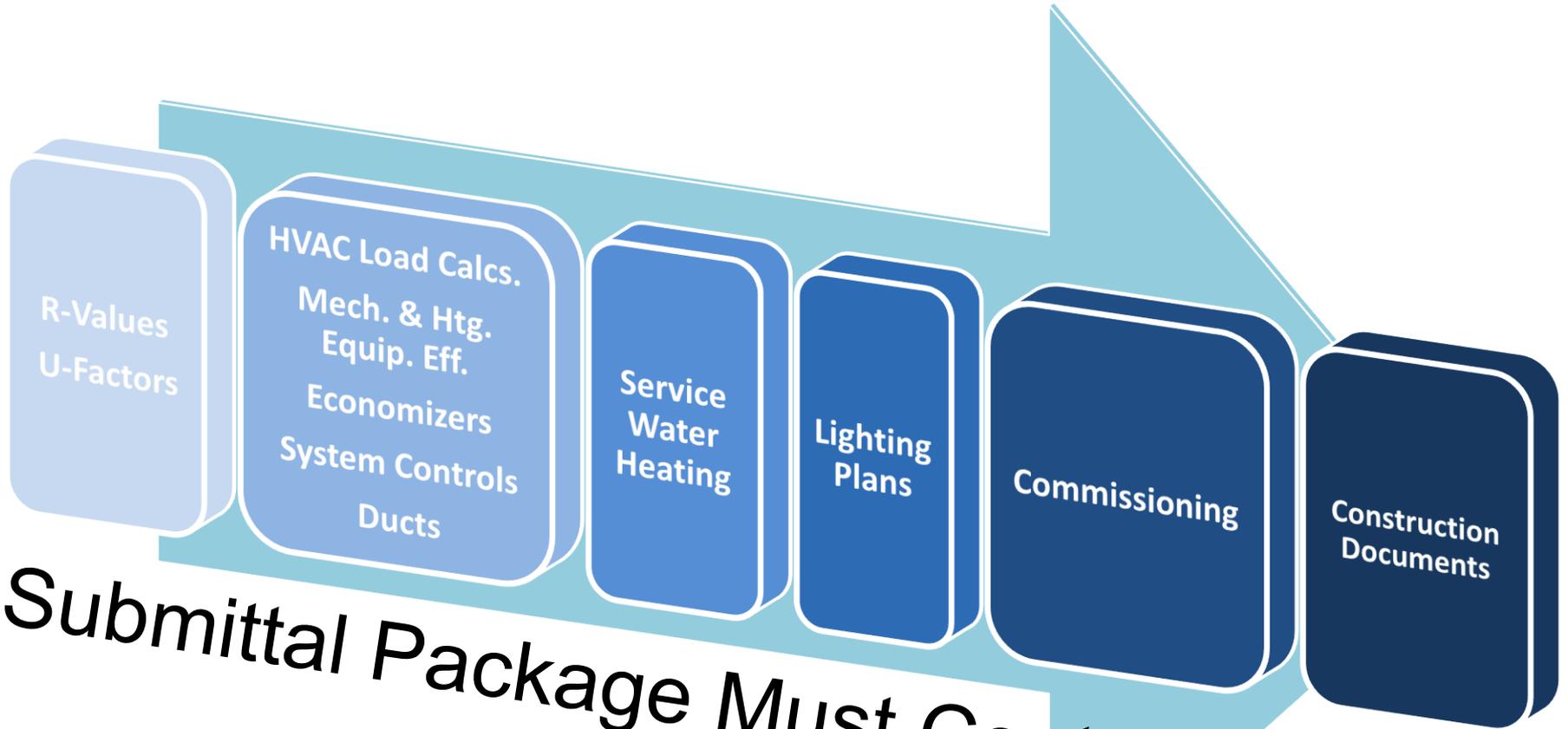


2012: ~ 5.5 billion  
commercial  
buildings  
~ 90B ft<sup>2</sup>

\$76B – Heating,  
Cooling, Lighting,  
Water Heating

Source: Buildings Energy Data Book, US DOE

# Municipal Energy Code Support

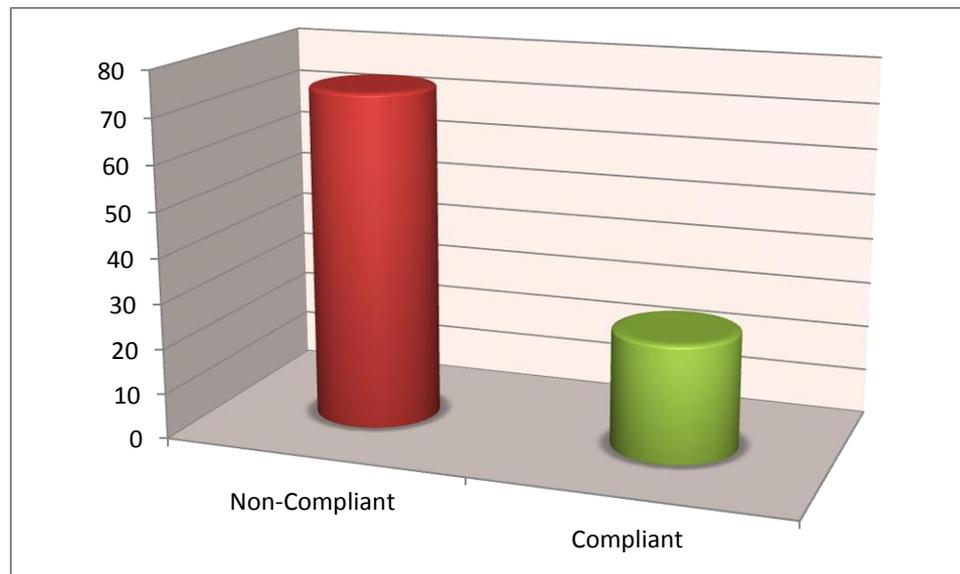


*Submittal Package Must Contain*

# Municipal Energy Code Support

## Common Deficiencies

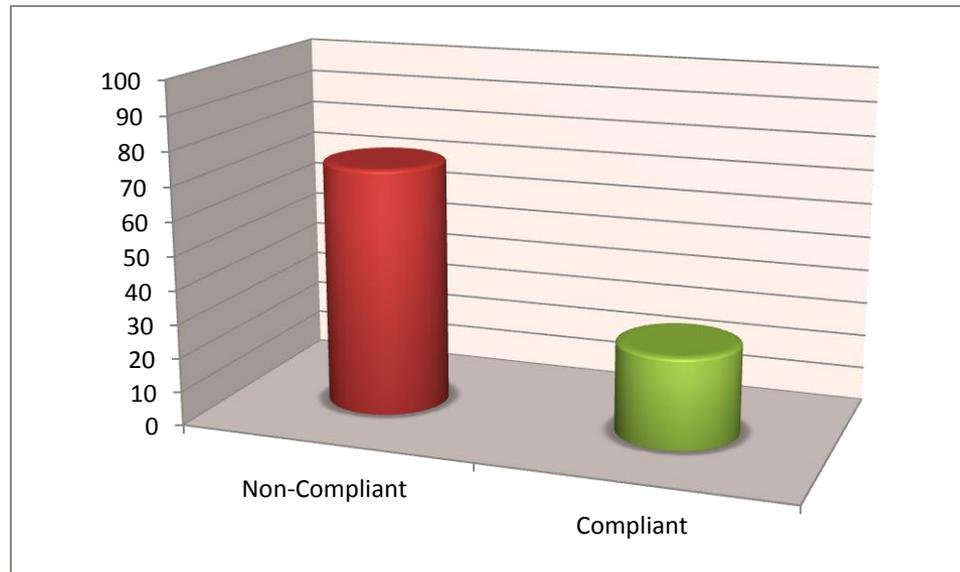
- Residential Fenestration:
  - Missing in 74% of submitted projects



# Municipal Energy Code Support

## Common Deficiencies

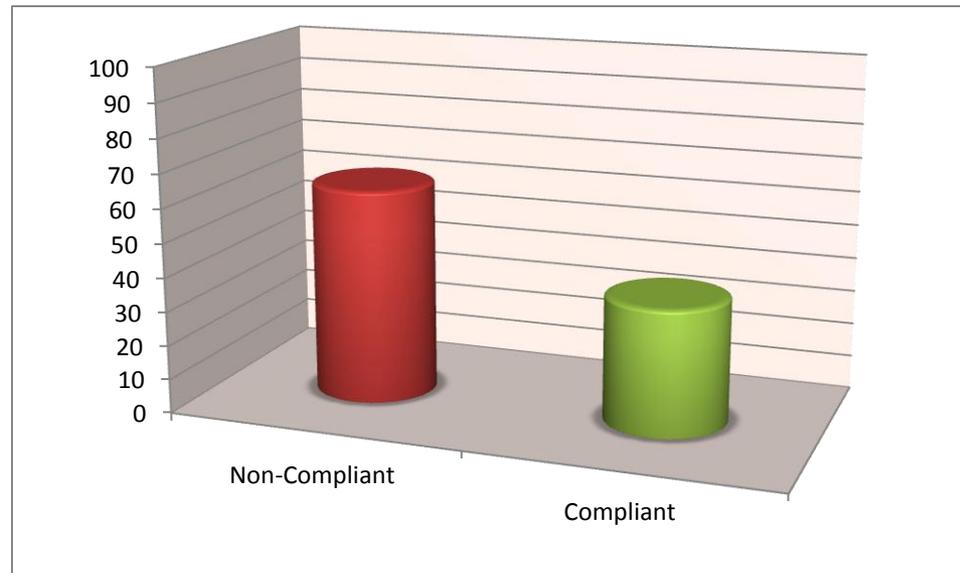
- Commercial Fenestration:
  - Missing in 73% of submitted projects



# Municipal Energy Code Support

## Common Deficiencies

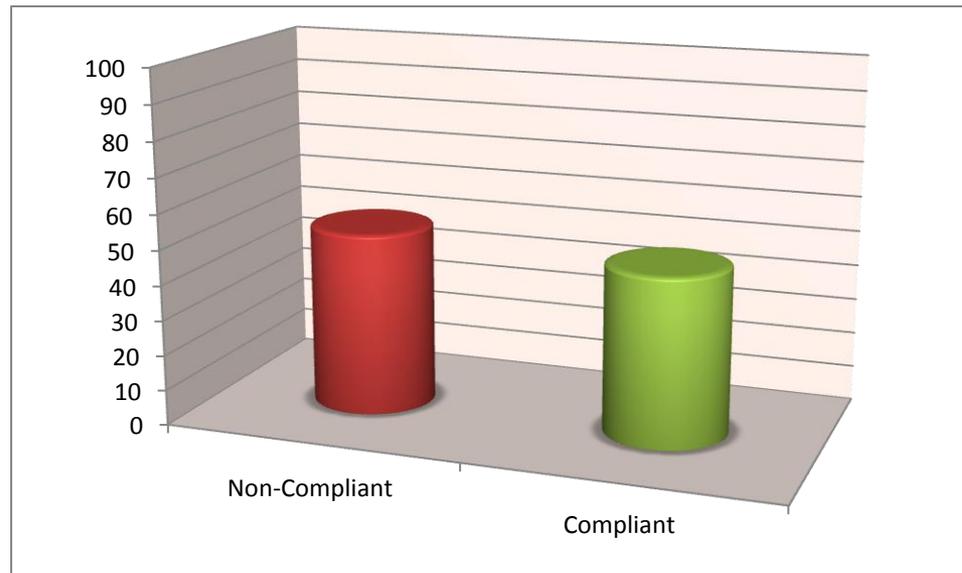
- Residential Specifications
  - Missing in 63% of submitted projects



# Municipal Energy Code Support

## Common Deficiencies

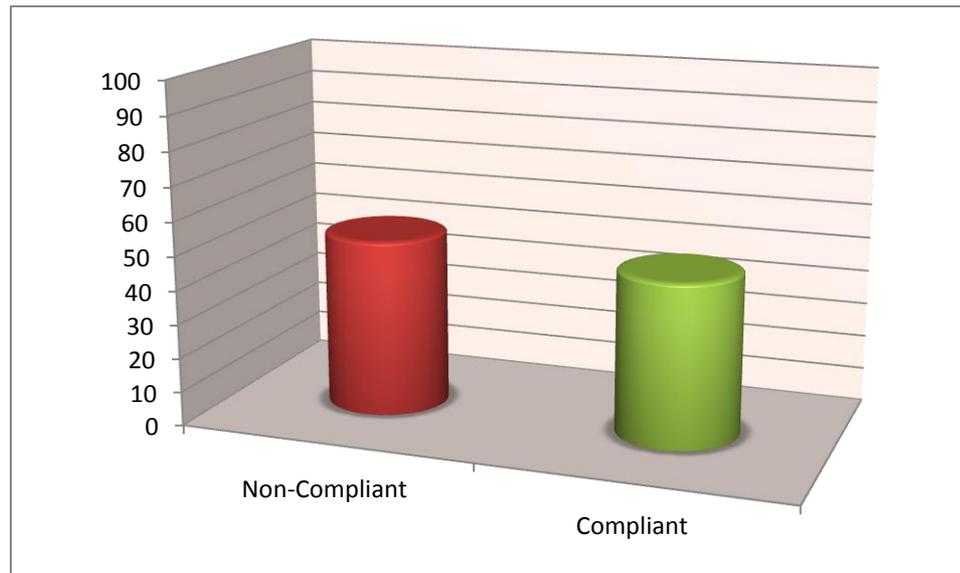
- Commercial Specifications:
  - Missing in 52% of submitted projects



# Municipal Energy Code Support

## Common Deficiencies

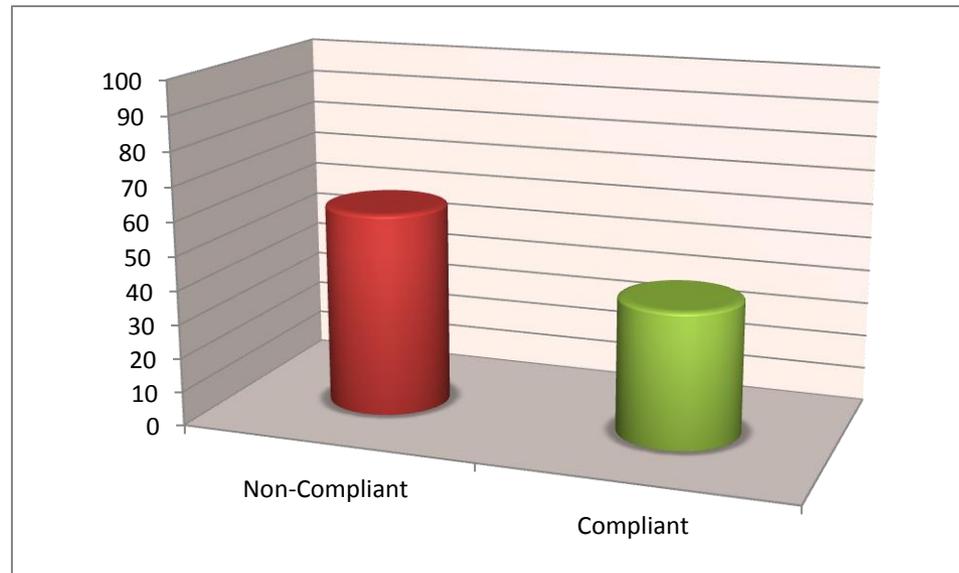
- Residential Heating/Cooling Calculations:
  - Missing in 62% of submitted projects



# Municipal Energy Code Support

## Common Deficiencies

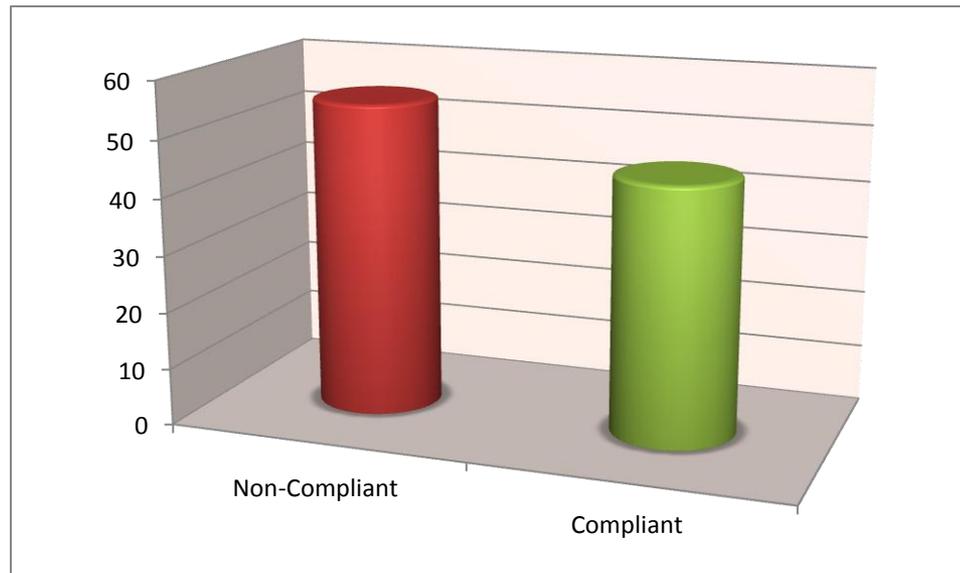
- Commercial Heating/Cooling Calculations:
  - Missing in 60% of submitted projects



# Municipal Energy Code Support

## Common Deficiencies

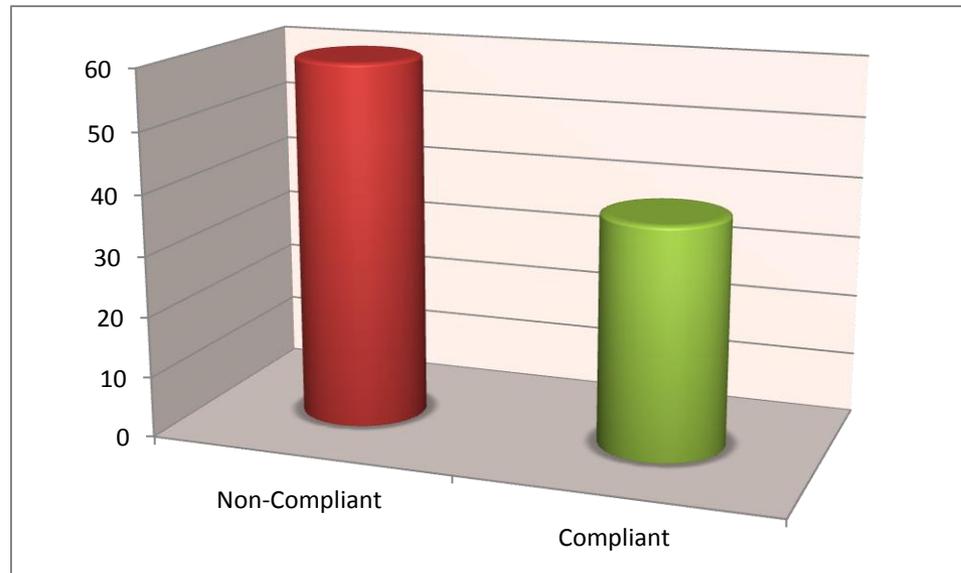
- Residential R – U Values
  - Missing in 55% of submitted projects



# Municipal Energy Code Support

## Common Deficiencies

- Commercial R-Values/U-Factors:
  - Missing in 62% of submitted projects



# Municipal Energy Code Support

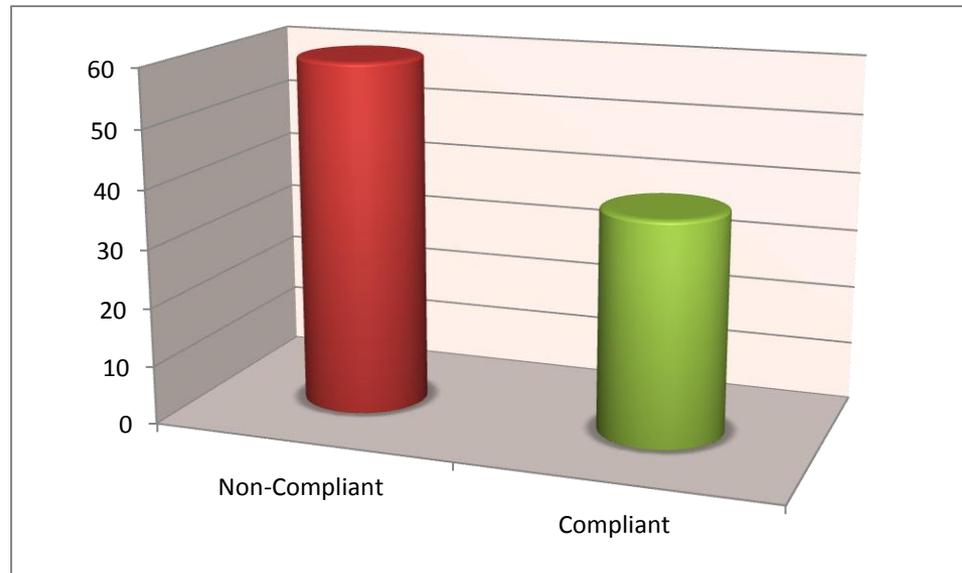
**TABLE C402.2** *Revised Thermal Envelope requirements*

Climate Zone	Zone 4		Zone 5		Zone 6	
	All other	Group R	All other	Group R	All other	Group R
<b>Roofs</b>						
Insulation entirely above deck	<b>R-25ci</b> (R-20ci)	<b>R-25ci</b> (R-20ci)	<b>R-25ci</b> (R-20ci)	<b>R-25ci</b> (R-20ci)	<b>R-30ci</b> (R-20ci)	<b>R-30ci</b> (R-20ci)
Metal buildings with R-5 thermal blocks <sup>a,b</sup>	<b>R-19+</b> <b>R-11 LS</b> (R-13+R-13)	<b>R-19+</b> <b>R-11 LS</b> (R-19)	<b>R-19+</b> <b>R-11 LS</b> (R-13+R-13)	<b>R-19+</b> <b>R-11 LS</b> (R-19)	<b>R-25+</b> <b>R-11 LS</b> (R-13+R-19)	<b>R-25+</b> <b>R-11 LS</b> (R-19)
Attic and other	R-38	R-38	R-38	<b>R-49</b> (R-38)	<b>R-49</b> (R-38)	<b>R-49</b> (R-38)

# Municipal Energy Code Support

## Common Deficiencies

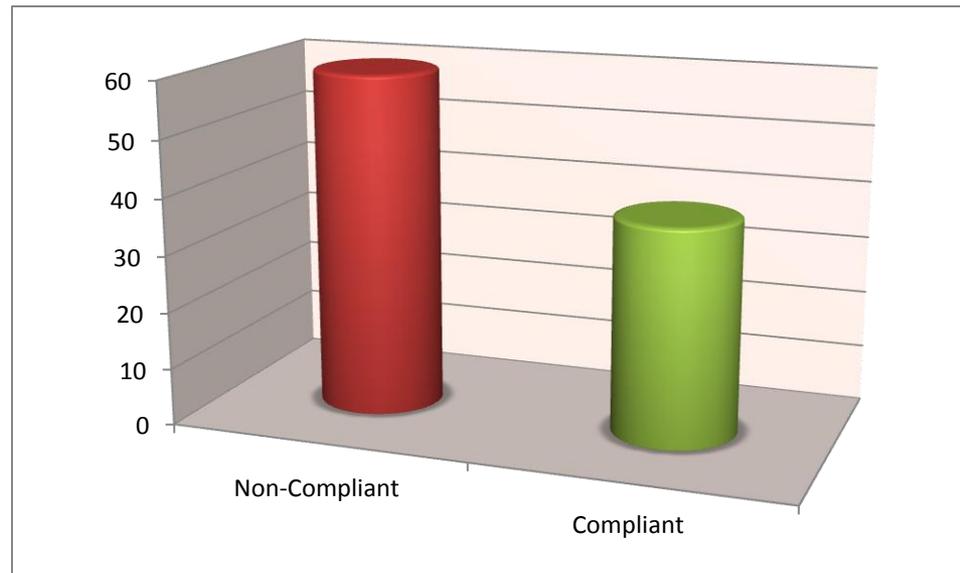
- Residential Water Heating Equipment:
  - Missing in 47% of submitted projects



# Municipal Energy Code Support

## Common Deficiencies

- Commercial Water Heating Equipment:
  - Missing in 54% of submitted projects



# Municipal Energy Code Support

## Lessons Learned

- If the plans and specifications do not show compliance, it cannot be expected that work in the field will comply.
- A submittal may be provided with the compliance documentation (i.e. COMcheck, REScheck), but still might not comply.

# Municipal Energy Code Support

## Lessons Learned

- By focusing on details, compliance can be achieved.
- The Energy Code impacts the construction from the foundation to final operational testing. (Start out wrong and it's hard to get back on track)

# Municipal Energy Code Support

## Lessons Learned

- Majority of projects submitted included compliance documentation that was not accurately reflected on the drawings.

# Municipal Energy Code Support

## Lessons Learned

- The contractors may never see the COMcheck or REScheck documents, and therefore never understand what was required.

# Municipal Energy Code Support

## Lessons Learned

- A building built from faulty plans will not comply with the Energy Code.
- Some errors are not possible to correct without de-constructing part of the building.

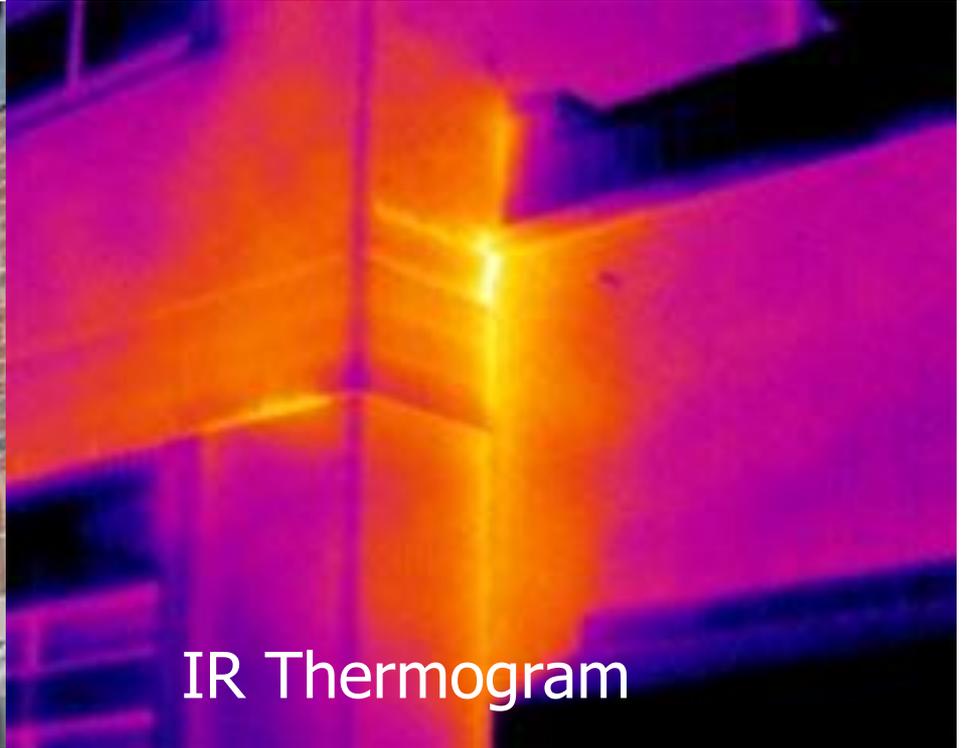
# Municipal Energy Code Support

## Lessons Learned

- Missing information or details will impact the building efficiency forever, costing the owner or end user money.

# Municipal Energy Code Support

## Enclosure Thermal Performance



IR Thermogram

**Convective losses....  
lacking air sealing**

*Air Leakage along the corner joint*

# Municipal Energy Code Support

## Program Benefits

- Plans are scrutinized down to the details
- Subject matter experts check for strict compliance with the energy code

# Municipal Energy Code Support

## Program Benefits

- Extensive time is dedicated to Energy Code compliance. The average Code Official may not have that time available
- Even small projects require dedicated, uninterrupted time to focus on the Energy Code because it covers so many facets of the project

# Municipal Energy Code Support

## Program Benefits

- Design professionals learn exactly what is required for submittal.

(Believe it or not, it is difficult for design professionals to track and implement all of the changes to the Energy Code.)

# Municipal Energy Code Support

## Program Benefits

- Less operational cost for the owner.
  - Heating (over sized equipment less efficient)
  - Cooling (under sized equipment cycles too much)
  - Interior Lighting (illuminating only occupied spaces)
  - Exterior Lighting (light for security and architectural accent)

# Municipal Energy Code Support

## Program Benefits

- Projects are brought into compliance.
- Energy efficiency is attained
- Energy cost savings are realized

# Municipal Energy Code Support

## Program Benefits

- The Owner can invest in above code energy alternatives, funded by cost savings
- Greenhouse gas emissions are reduced

# Municipal Energy Code Support

## 2014 Energy Code Update

- More stringent requirements for commercial projects
  - Allowable glazing reduced unless used for day-lighting
  - Skylights required in many single story uses, with daylight controls
  - More stringent Air Barrier requirements

**Cont'd**

# Municipal Energy Code Support

- Building envelop requirements, more inspections necessary
- Larger HVAC systems require commissioning
- Additional areas require lighting controls
- Reduction in allowable illumination for building exteriors

# Municipal Energy Code Support

## Changes in U-Factors

Climate Zone	4		5		6	
	2010	2014	2010	2014	2010	2014
<b>Fixed Fenestration</b>	0.40 <sup>1</sup>	<b>0.38</b>	0.35 <sup>1</sup>	<b>0.38</b>	0.35 <sup>1</sup>	<b>0.36</b>
<b>Operable Fenestration</b>	0.40 <sup>1</sup>	<b>0.45</b>	0.35 <sup>1</sup>	<b>0.45</b>	0.35 <sup>1</sup>	<b>0.43</b>
<b>Entrance Doors</b>	0.85 <sup>2</sup>	<b>0.77</b>	0.80 <sup>2</sup>	<b>0.77</b>	0.80 <sup>2</sup>	<b>0.44</b>
<b>Skylights</b>	0.60	<b>0.50</b>	0.60	<b>0.50</b>	0.60	<b>0.50</b>

<sup>1</sup> Other than metal frame

<sup>2</sup> Metal Framed with or without Thermal Break

# Municipal Energy Code Support

## Air Barrier Compliance Paths

- **Tested materials**

*or*

- **Tested assemblies**

*or*

- **Whole building testing**



# Municipal Energy Code Support

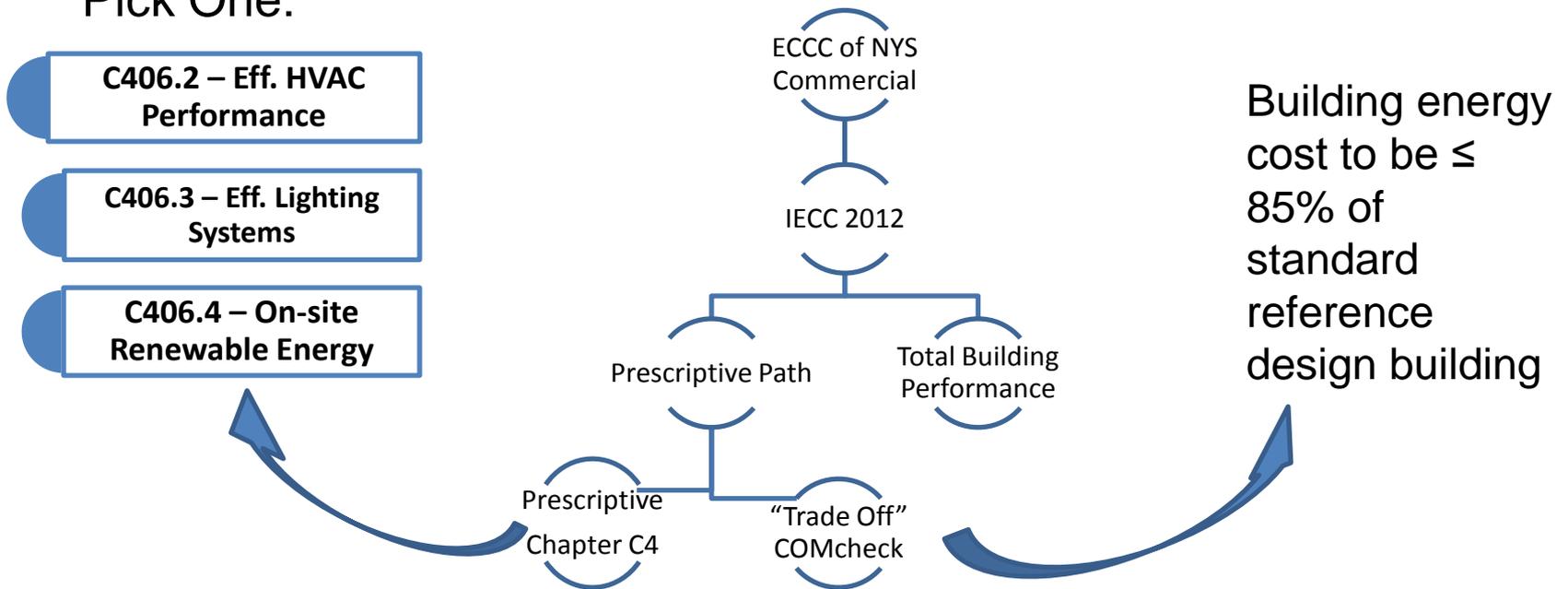
## Blower Door Testing in Commercial Buildings



# Municipal Energy Code Support

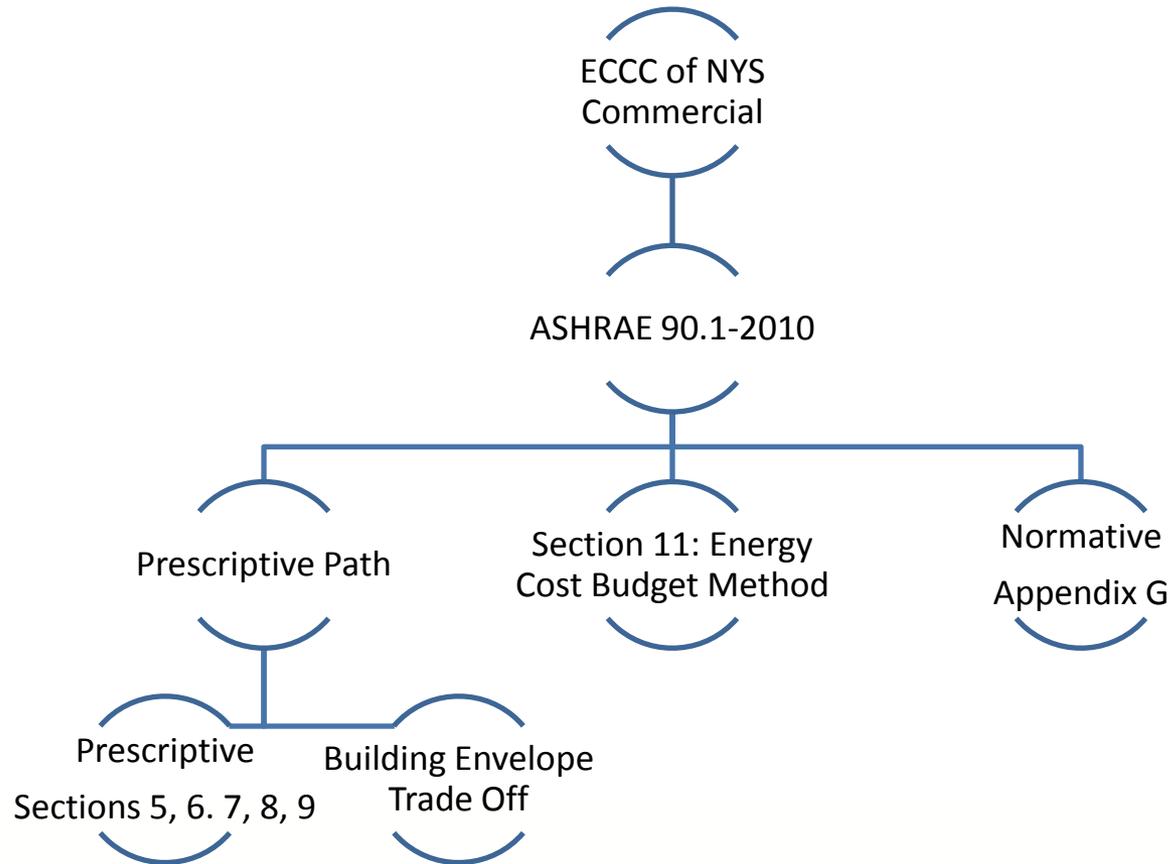
## Compliance Options 2012 IECC

Pick One:



# Municipal Energy Code Support

## Compliance Options ASHRAE 90.1



# Municipal Energy Code Support

## Newly Funded Energy Code Support

- Provide Plan Review Services for:
  - 2010 Residential Energy Code
  - 2014 Commercial Energy Code
    - 2012 IECC w/ NYS Supplement
    - 2010 ASHREA 90.1 w/NYS Supplement
  - New Energy Code coming (estimated January 2016)

# Municipal Energy Code Support

## Newly Funded Energy Code Support

- Plan Review Services Provides
  - Tabular code compliance checklist
  - Energy Code inspection checklist (residential)
  - Narrative report with recommended corrective action
  - Recommendation for permit issuance

# Municipal Energy Code Support

## Newly Funded Energy Code Support

- In office plan review presentation
  - One-on-one or small group
  - Code Officials and other stakeholders

# Municipal Energy Code Support

## Newly Funded Energy Code Support

- On-site Energy Code inspection guidance.
  - Code Officials
  - Other Stakeholders

# Municipal Energy Code Support

## Newly Funded Additional Support Services

- Energy Code training programs
- In-office training
- Continuing educational credits

# Municipal Energy Code Support

## Newly Funded Additional Support Services

- Data management assistance
- Project tracking assistance
- General municipal enforcement support

# Municipal Energy Code Support

## Newly Funded Energy Code Support

- Energy Code Hotline
  - Code Officials
  - Design Professionals
  - Builders
  - Suppliers
  - Other Stakeholders



# Municipal Energy Code Support

## NYSERDA PROJECT REGISTRATION

### NYSERDA ENERGY CODES SUPPORT

Please complete the following form and mail or e-mail the form to:

T.Y. Lin International,  
255 East Ave.,  
Rochester, NY 14604,  
Attn: Scott Copp or [planreview@tylin.com](mailto:planreview@tylin.com)  
(585) 512-2000 - Phone or (585) 697-3449 - Fax

Name of Municipality	Name of Municipal Contact Person
<input type="text"/>	<input type="text"/>
Address of Municipality	Phone Number of Municipal Contact
<input type="text"/>	<input type="text"/>
Project Address	E-mail of Municipal Contact
<input type="text"/>	<input type="text"/>
Name of Design Professional	Applicant
<input type="text"/>	<input type="text"/>
Project Started	Design Professional Contact Person
YES <input type="checkbox"/>	<input type="text"/>
NO <input type="checkbox"/>	Phone Number of Design Professional
	<input type="text"/>

Upon receipt of the registration we will mail to you a pre-paid UPS label so that you can send the plans and supporting documents to our office. We will place your project into the plan review queue and send you an anticipated date for completion of our review. Our goal is to return the completed plan review and plans to you in as short a time period as possible.

★ [Click here to submit the form](#)  
(this may not work on all servers, if not, copy and e-mail or mail completed form)

**TYLIN**INTERNATIONAL  
engineers | planners | scientists

NEWPORT  VENTURES

**TYLIN**INTERNATIONAL

Supported by  
**nyserda**  
Energy. Innovation. Solutions.

## On-line registration of projects for Plan Review

## Pre-paid shipping labels provided to applicants

# Municipal Energy Code Support

## Program Contact Information:

- James Burton, T.Y. Lin, Associate Vice President  
(585) 512-2000, [james.burton@tylin.com](mailto:james.burton@tylin.com)
- Scott Copp, T.Y. Lin, Sr. Project Manager  
(585) 512-2000, [scott.copp@tylin.com](mailto:scott.copp@tylin.com)
- Steven Rocklin, RA, T.Y. Lin, Technical Director  
(518) 641-6884, [steven.rocklin@tylin.com](mailto:steven.rocklin@tylin.com)

[planreview@tylin.com](mailto:planreview@tylin.com)

[inspection@tylin.com](mailto:inspection@tylin.com)

[energyhotline@tylin.com](mailto:energyhotline@tylin.com)

# Municipal Energy Code Support



On Behalf of T.Y. Lin International,  
NYSERDA and Climate Smart  
Communities



Thank You for Participating

