Municipal Energy Code Support

CSC Webinar June 11, 2015
Municipal Energy Code Support

- Initial program provided from 2010-2012
- For support of the 2010 ECCCCNYS
- (2009 IECC)
Municipal Energy Code Support

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

- Code Enforcement Officials
- Design Professionals
- Other Stakeholders
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Initial Plan Review Breakdown

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

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

Chapters 1, 2, 3, 4 & 6 of the 2010 ECCHYS, 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 Evaluation(s):_________

Building Contact: Name:_________ Phone:_________ Email:_________

Building Name & Address:_________

Subdivision:_________ Lot #:_________ Conditioned Floor Area:_________ ft²

Climate Zone:_________ County:_________ Jurisdiction:_________

Climate 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

<table>
<thead>
<tr>
<th>ECCNY Section #</th>
<th>Pre-Insp/Plan Review</th>
<th>Code Value</th>
<th>Verified Value</th>
<th>Y</th>
<th>N</th>
<th>N/A</th>
<th>Comments/Assumptions</th>
</tr>
</thead>
<tbody>
<tr>
<td>103.2</td>
<td>Construction drawings and documentation available. Documentation sufficiently demonstrates energy code compliance.</td>
<td>✔</td>
<td>✔</td>
<td>✔</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>400.6</td>
<td>HVAC loads calculations: Heating system size:</td>
<td>1,800 kBTU</td>
<td></td>
<td>✔</td>
<td>N/A</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

General Permit Data Entered

Values and Compliance Entered
### Residential Inspection Checklist

**Permit #:**

**Date:**

**Name of Evaluation(s):**

**Building Contact:**

**Name:**

**Phone:**

**Email:**

**Building Name & Address:**

**Subdivision:**

**Lot #:**

**Conditioned Floor Area:**

**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
- [ ] Multi-family
- [ ] Apartment
- [ ] Condominium
- [ ] Commercial Space

<table>
<thead>
<tr>
<th>Section #</th>
<th>Inspection</th>
<th>Code Value</th>
<th>Plan Value</th>
<th>Complies</th>
<th>Comments/Assumptions</th>
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</thead>
<tbody>
<tr>
<td>401.3</td>
<td>Permanent Certificate w/ Energy Code Compliance Statistics</td>
<td>On Electric Panel</td>
<td>Unheated: R-10, Heated: R-15</td>
<td>☐ Y ☐ N ☐ N/A</td>
<td></td>
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<tr>
<td>402.1.1</td>
<td>Slab edge insulation R-value.</td>
<td>Unheated: R-10, Heated: R-15</td>
<td>☐ Y ☐ N ☐ N/A</td>
<td></td>
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<tr>
<td>303.2</td>
<td>Slab edge insulation depth/length.</td>
<td>4 ft. Z-6</td>
<td>☐ Y ☐ N ☐ N/A</td>
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<tr>
<td>402.1.1</td>
<td>Basement wall insulation R-value.</td>
<td>Continuous: R-10: Z-4 &amp; 5, R-15: Z-6</td>
<td>☐ Y ☐ N ☐ N/A</td>
<td></td>
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<tr>
<td>402.2.7</td>
<td>Basement wall insulation depth.</td>
<td>10 ft. or to basement floor</td>
<td>☐ Y ☐ N ☐ N/A</td>
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<td>303.2</td>
<td>Basement wall insulation thickness.</td>
<td>Unheated: R-10, Heated: R-15</td>
<td>☐ Y ☐ N ☐ N/A</td>
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<tr>
<td>402.2.9</td>
<td>Crawl space wall insulation R-value.</td>
<td>Continuous: R-10: Z-4 &amp; 5, R-15: Z-6</td>
<td>☐ Y ☐ N ☐ N/A</td>
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<tr>
<td>402.2.9</td>
<td>Crawl space continuous vapor retarder installed with joints overlapped by 6 inches and sealed, and extending at least 6” up the stem wall.</td>
<td>Required</td>
<td>☐ Y ☐ N ☐ N/A</td>
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</tbody>
</table>
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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 Batavia, 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.
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On-call Consultation

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

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

- Residential – Typically 5 Business Days
- Commercial – Maximum 10 Business Days
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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
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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
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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
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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
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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.
Lessons Learned

- Common Deficiencies
  - Fenestration (no values provided, no specifications)
  - Specifications (for HVAC System equipment, Air Barrier Material and Sealing)
  - Heating/Cooling Load Calculations
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Lessons Learned

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

- **Common Deficiencies**

### Municipal Energy Code Support Table

| Date | R | C | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 |
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Lessons Learned

- Common Deficiencies

<table>
<thead>
<tr>
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</tbody>
</table>
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What building components does the Energy Code address?

2012: ~ 5.5 billion commercial buildings
~ 90B ft\(^2\)

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

Source: Buildings Energy Data Book, US DOE
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- R-Values
- U-Factors
- HVAC Load Calcs.
- Economizers
- System Controls
- Ducts
- Service Water Heating
- Lighting Plans
- Commissioning
- Construction Documents

Submittal Package Must Contain
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Common Deficiencies

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

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

- Residential Specifications
  - Missing in 63% of submitted projects

![Bar Chart]

- Non-Compliant
- Compliant
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Common Deficiencies

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

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

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

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

![Bar chart showing comparison between Non-Compliant and Compliant residential R-U values](chart.png)
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Common Deficiencies

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

[Bar chart showing comparison between Non-Compliant and Compliant categories]
# Municipal Energy Code Support

## TABLE C402.2 Revised Thermal Envelope requirements

<table>
<thead>
<tr>
<th>Climate Zone</th>
<th>Zone 4</th>
<th>Zone 5</th>
<th>Zone 6</th>
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<tbody>
<tr>
<td></td>
<td>All other</td>
<td>Group R</td>
<td>All other</td>
</tr>
<tr>
<td><strong>Roofs</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attic and other</td>
<td>R-38</td>
<td>R-38</td>
<td>R-38</td>
</tr>
</tbody>
</table>
Common Deficiencies

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

- Commercial Water Heating Equipment:
  - Missing in 54% of submitted projects
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.
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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)
Lessons Learned

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

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

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

Convective losses....
lacking air sealing

Air Leakage along the corner joint
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Program Benefits

- Plans are scrutinized down to the details

- Subject matter experts check for strict compliance with the energy code
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.
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.)
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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)
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Program Benefits

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

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

<table>
<thead>
<tr>
<th>Climate Zone</th>
<th>4</th>
<th>5</th>
<th>6</th>
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</thead>
<tbody>
<tr>
<td>Fixed Fenestration</td>
<td>0.40₁</td>
<td>0.38</td>
<td>0.35₁</td>
</tr>
<tr>
<td>Operable Fenestration</td>
<td>0.40₁</td>
<td>0.45</td>
<td>0.35₁</td>
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<tr>
<td>Entrance Doors</td>
<td>0.85²</td>
<td>0.77</td>
<td>0.80²</td>
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<tr>
<td>Skylights</td>
<td>0.60</td>
<td>0.50</td>
<td>0.60</td>
</tr>
</tbody>
</table>

₁ Other than metal frame

² Metal Framed with or without Thermal Break
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Air Barrier Compliance Paths

• Tested materials

or

• Tested assemblies

or

• Whole building testing
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Blower Door Testing in Commercial Buildings
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Compliance Options 2012 IECC

Pick One:

- C406.2 – Eff. HVAC Performance
- C406.3 – Eff. Lighting Systems
- C406.4 – On-site Renewable Energy

Building energy cost to be ≤ 85% of standard reference design building
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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)
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
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Newly Funded Energy Code Support

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

- On-site Energy Code inspection guidance.
  - Code Officials
  - Other Stakeholders
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Newly Funded Additional Support Services

- Energy Code training programs
- In-office training
- Continuing educational credits
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Newly Funded Additional Support Services

- Data management assistance
- Project tracking assistance
- General municipal enforcement support
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Newly Funded Energy Code Support

- Energy Code Hotline
  - Code Officials
  - Design Professionals
  - Builders
  - Suppliers
  - Other Stakeholders
## Municipal Energy Code Support

### NYSERDA PROJECT REGISTRATION

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
(585) 512-2000 - Phone or (585) 697-3449 - Fax

<table>
<thead>
<tr>
<th>Name of Municipality</th>
<th>Name of Municipal Contact Person</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Address of Municipality</th>
<th>Phone Number of Municipal Contact</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>E-mail of Municipal Contact</th>
<th>Applicant</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Project Address</th>
<th>Name of Design Professional</th>
<th>Design Professional Contact Person</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Project Started</th>
<th>YES</th>
<th>NO</th>
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<tbody>
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<table>
<thead>
<tr>
<th>Phone Number of Design Professional</th>
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</tbody>
</table>

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 completed form)
Municipal Energy Code Support

Program Contact Information:

• James Burton, T.Y. Lin, Associate Vice President
  (585) 512-2000, james.burton@tylin.com

• Scott Copp, T.Y. Lin, Sr. Project Manager
  (585) 512-2000, scott.copp@tylin.com

• Steven Rocklin, RA, T.Y. Lin, Technical Director
  (518) 641-6884, steven.rocklin@tylin.com

planreview@tylin.com    inspection@tylin.com    energyhotline@tylin.com
Municipal Energy Code Support
On Behalf of T.Y. Lin International, NYSERDA and Climate Smart Communities

Thank You for Participating