Energy Code Enforcement and Compliance Process Makes Perfect

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PSD ENERGY CODES WORK

- USDOE – Pennsylvania Residential Energy Code Field Study
- Pennsylvania Construction Codes Academy (PCCA)
- NYSERDA – Energy Codes Training
- Illinois Building Energy Codes Enhancement Project
- Massachusetts Codes and Standards Compliance and Support (CSCS) Initiative
- Green Building United – Commercial Energy Code Assessment + Training
- City of Philadelphia Licenses & Inspections – Energy Code Transition Support
Tales from the City of Brotherly Love
Philadelphia Energy Code Transition

Effective October 1, 2018

Philadelphia L&I concurrency period until April 1, 2019

2009 IECC with reference to ASHRAE 90.1-2007

Residential

2018 IECC with reference to ASHRAE 90.1-2016

Commercial
Obstacles

- Concerns about industry pushback and economic development
- The energy code is complex and expanding in scope
- Pace of change is rapid compared to other disciplines
- Feasibility of getting detail from applicants
- Silos for plumbing and electrical plan reviews and inspections
- Energy code is one of many codes
#1 Make the Energy Code a Priority

- Tie to jurisdiction’s climate and sustainability goals/plans
- Partner with Office of Sustainability, City Energy Manager, etc.
- Identify champions in the jurisdiction and building department
#2 Ensure the Building Department is Adequately Supported

- Does your jurisdiction provide adequate support for the building department, including energy code enforcement?
- Determine appropriate staffing levels
- Revisit building permit fee schedule and revise if necessary
- Evaluate expertise of existing staff
- Hire and train new staff
- Eliminate political interference
#3 Identify Energy Code Changes

What are the energy code changes?

Assess overlooked items from previous code cycles

Prioritize by impact and feasibility of enforcement
#4 Make Code Interpretations and Create Enforcement Policies

**The code official may deem participation in above code programs as meeting the energy code**

- What are acceptable programs?
- What documentation is required? When?

**The code official may accept or require the use of an approved third party**

- Residential: Plan reviews, insulation and air barrier inspections, blower door tests, duct leakage tests(?)
- Commercial: Plan reviews and energy inspections

**Existing buildings**

- Change in occupancy that results in increase in fossil fuel demand → full compliance like new construction
- How is this determined?

- Change in occupancy that results in increase in fossil fuel demand → full compliance like new construction
- How is this determined?
Philadelphia Energy Code Compliance Tools

**General**
- What Code Do I Use?
- Energy Code Compliance Path Flowchart

**Residential**
- HVAC Design Form
- Insulation & Air Barrier Inspection Form
- Duct & Envelope Testing Form

**Commercial**
- Information Sheet: Commercial Energy Code Compliance
- Architectural Plan Review Checklist
- Mechanical Plan Review Checklist
- Commissioning Compliance Checklist
Residential Energy Code Compliance Information Sheet

- Links to other information and forms
- ERI path and required documentation
- Above code programs
- Duct & Envelope Testing credential requirements
- Third-party Insulation & Air Barrier requirement and credentials
• Links to other information

• Mechanical systems commissioning requirements and credentials

• Lighting functional testing requirements
WHAT CODE DO I USE?

**Single Family**
One- and two-family dwellings and townhouses

- Three stories or less: 2015 IRC + 2015 IECC [RE] (with PA amendments)
- Four stories or more and two-family (duplex): 2018 IBC + 2018 IECC [RE] (with PA amendments)

**Multifamily**
Group R-2, R-3, R-4

- Three stories or less: 2018 IBC + 2018 IECC [RE] (with PA amendments)
- Four stories or more: 2018 IBC + 2018 IECC [CE] or ASHRAE 90.1-2016

**Code Links:**
- 2015 IRC: https://codes.iccsafe.org/content/IRC2015
- 2015 IECC: https://codes.iccsafe.org/content/IECC2015
- 2018 IBC: https://codes.iccsafe.org/content/IBC2018
- 2018 IECC: https://codes.iccsafe.org/content/IECC2018P2
- ASHRAE 90.1 2016: https://www.ashrae.org/technical-resources/standards-and-guidelines/read-only-versions-of-ashrae-standards

C_004_INF
IBC Scope/IECC
Commercial
2018 IECC [CE]
ASHRAE 90.1-2016

Buildings other than:
One- and two-family dwellings and townhouses
and
Groups R-2, R-3, and R-4 three stories or less

2018 IECC [CE]
All sections designated as “mandatory”
+
one of the following options

ENERGY CODE COMPLIANCE PATHS

Prescriptive
Building Envelope (C402)
Building Mechanical Systems (C403)
Service Water Heating (C404)
Electric Power and Lighting Systems (C405)
Additional Efficiency Package Options (C406)
Commissioning (C408)

Prescriptive with Envelope Tradeoffs
Same as above + envelope tradeoffs in COMcheck
All systems documented in COMcheck

Performance
Compliance for all systems using energy modeling per C407 Total Building Performance

Above Code Programs
ENERGY STAR certification (residential occupancies only)

Prescriptive
Building Envelope (Section 5.1-5.5, 5.7-5.9)
HVAC (Section 6)
Service Water Heating (Section 7)
Power (Section 8)
Lighting (Section 9)
Other Equipment (Section 10)

Prescriptive + Envelope Tradeoff
Building Envelope (Section 5.1-5.4, 5.6-5.9)
Env. simulation in COMcheck, EnergyPlus, DOE-2, etc.
Other systems same as above

Performance
Compliance for all systems using software modeling:
Section 11: Energy Cost Budget Method
or
Appendix G: Performance Rating Method

ASHRAE 90.1-2016
#5 Develop Enforcement Processes

- Work with building department plan reviewers and inspectors AND with industry stakeholders
- Create or revise permit application requirements
- Create or revise plan review and inspection checklists
- Develop third party verification forms
- Process flows – what information is required to be submitted/colleced and when?
## Air Barrier & Insulation Checklist

(Based on IECG 2015 and 2015 Table R403.4.1.1)

This checklist must be completed and provided to the inspector prior to the wallboard inspection.¹

<table>
<thead>
<tr>
<th>Property Address</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Address (Mail the house location)</td>
<td></td>
</tr>
<tr>
<td>Owner/Owner’s Agent</td>
<td>2</td>
</tr>
<tr>
<td>Provide the contact information for the owner/owner’s agent and the associated permit number</td>
<td></td>
</tr>
<tr>
<td>Inspecting Company</td>
<td>3</td>
</tr>
<tr>
<td>The company responsible for conducting the inspection and completing the checklist must complete this section.</td>
<td></td>
</tr>
</tbody>
</table>

Find a qualified professional at:

- https://peconewhomes.com/builders/fi-participating-raters/
- http://www.bpi.org/sites/default/files/Locator.html

### Checklist

#### General

- A continuous air barrier is installed in the building envelope.
- The exterior thermal envelope contains a continuous air barrier.
- Breaks or joints in the air barrier are sealed.
- Air-permeable insulation shall not be used as a sealing material.

#### Ceiling/Attic

- The air barrier in any dropped ceiling/soffit are aligned with the insulation and any gaps in the air barrier are sealed.
- Recessed lighting fixtures installed in the building envelope are air tight & IC rated.
Residential Duct & Envelope Testing (DET) Certification Form

Use this form to provide test results and certify the DET performed on your property.

Property Address
Enter the house location.

Owner/Owner's Agent
Provide the contact information for the owner/owner's agent and the associated permit number.

Existing Envelope Air Leakage Information
Use this section to provide details on the mandatory Building Envelope Air Leakage testing.

(a) Blower Door Test Results
- Wind pressure
- Fan condition
- Temperature difference

(b) Visual Inspection
- Air barrier and insulation installation final inspection checklist for every wall by the owner.
- Inspection performed by the testing company.

(c) Testing Company Information
- Testing company name
- Testing company address
- Inspector's name
- Inspector's signature
- Testing date

Heating and Cooling System Duct Leakage Information

(a) Duct Certification
- Ducts are located entirely within the building thermal envelope. Testing is not required.

(b) Total Duct Leakage Test

Final Inspection Details
Check each box to confirm all inspections were performed.

Use the lines to provide any additional details about the inspection.

Air Barrier and Insulation Installation Final Inspection Checklist

Property Address
Enter the house location.

Owner/Owner's Agent
Provide the contact information for the owner/owner's agent and the associated permit number.

Final Inspection Details
Check each box to confirm all inspections were performed.

Use the lines to provide any additional details about the inspection.

Ceiling/Attic

- Recessed light fixtures installed in the building thermal envelope are sealed to the drywall.
- Insulation is installed in each ceiling assembly that separates conditioned space from unconditioned space or outdoors.
- Insulation R-value is R-49 or greater. (A minimum of R-38 insulation is allowed if the full height of unconditioned insulation extends over the top of the walls.)
- Access openings, drop down stairs, or knee wall doors to unconditioned attic spaces are sealed.

1 Exception: Values match those listed in an approved REScheck, Simulated Performance, or ERI report.
Commissioning Compliance Checklist

Note: This form applies only to new construction projects.

Project Information: ____________________________ Project Name: __________________
Project Address: ______________________________
Approved Commissioning Agency: ____________________________

☐ Owner or owner’s representative understands that they must be provided with a manual, record documents, and operations and maintenance personnel training completion report within 90 days of receipt of the certificate of occupancy per Section C106.3.

☐ Lighting Controls Functional Testing has been executed per Section C408.3. If applicable, deferred and follow-up testing is scheduled to be provided on: ________________

The following items apply only to projects with a total building cooling capacity of ≥ 480,000 Btu/h or a combined heating and service water heating capacity of ≥ 600,000 Btu/h. If this project is below these thresholds, initial here, leave the remaining items unchecked, and sign and date below. Initial: __________

☐ Commissioning Plan was used during construction and includes all items required by Section C408.2.1

☐ Systems Adjusting and Balancing has been completed per Section C408.2.2

☐ HVAC Equipment Functional Testing has been provided per Section C408.2.6. If applicable, initial and date here.
Certification training

Departmental policy and document use training

Continuing education
#7 Outreach to and Training for the Industry

- Post information and document to building department website
- E-Newsletters
- Attend and present at industry association events (e.g. HBAs, ASHRAE)
#8 Enforce Requirements and Continuous Improvement

- Stick to your guns
- Be consistent
- Monitor and assess what’s working and what’s not
- Revise processes as necessary
QUESTIONS

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