Measuring Code Compliance: PNNL Pilot Study in Wisconsin

Isaac Elnecave,
Senior Policy Manager
Midwest Energy Efficiency Alliance

October 17, 2012

The Source On Energy Efficiency

MEEA
Midwest Energy Efficiency Alliance

Agenda

- PNNL Pilot Study
- Code Enforcement in Wisconsin
- Structure of Compliance Evaluation Work
- Obstacles in Completing Work
- Results
- Recommendations

The Source On Energy Efficiency

MEEA
Midwest Energy Efficiency Alliance

PNNL Pilot Study

The Source On Energy Efficiency

MEEA
Midwest Energy Efficiency Alliance

Background on PNNL Methodology to Measure Compliance

- American Recovery and Reinvestment Act Calls for States to Develop Plan to Achieve 90% Compliance with the 2009 IECC/ASHRAE 90.1-2007
- States Need Methodology/Tool to Measure Compliance
- PNNL Developed Tool to Meet this Need.

The Source On Energy Efficiency

MEEA
Midwest Energy Efficiency Alliance

Pilot Studies

- PNNL Provided Funding for 10 States to do Pilot Studies on the Methodology.

- Purpose of Pilot Study to Test Drive the PNNL Methodology:
  - How Much Would it Cost
  - How Long Would it Take?
  - What are the Obstacles to Completion?
  - What Problems Could be Identified in the Performing the Evaluations?

PNNL Methodology

- PNNL Protocol calls for Evaluation of 44 New Residential; 44 New Commercial; 44 Existing Residential and 44 Existing Commercial
- Residential and Commercial Checklists Developed for Each Climate Zone
- Evaluation targets chosen Randomly using a Random Site Generator
- Results Inputted into a Tool called “Store and Score” which Generates a Score as well as Aggregrating Results to Give Information About the Type of Compliance/Non-Compliance

Background on Wisconsin

- Wisconsin Chosen as One of the Pilot States
- Focus on Evaluation of New Commercial Construction
- Wisconsin Positioned to Meet Aggressive Schedule
- Wisconsin has Experienced/Capable Staff

Enforcement In WI

- WI Codes Uniform and Statewide Includes Energy
- All Plan Reviews done by Building and Safety Division except for Madison, Milwaukee, and Janeville.
- 25 Plan Reviewers @ 5 Regional Offices
- Inspection by 10 State Inspectors supplemented by 220 Delegated Municipalities
- Coordination between State and Delegated Munis

Wisconsin Commercial Code Enforcement

- Plans Submitted to Central Office and Regional Office
- Wisconsin Maintains Database of Submitted Commercial Plans
- Plan Review and Inspection Done by State Inspectors or By Accredited Municipalities

Evaluation Methodology

- Wisconsin Code Agency Used Random Generator to Determine Number of Inspection in a Given County; then Used its Sortable Database to Generate the Specific Project
- 28 Small; 10 Medium; 4 Large and 2 X-Large
  - Original 44 Building Selected Had to be Partially Revised Because Projects Abandoned due to Economy
- Plan Review/Inspections Done by 2nd Parties i.e. State Employees who were not assigned to the specific region.
- Staff Working on Evaluations Specifically Trained on How to Evaluate Level of Compliance in Buildings.

Obstacles to Completion

- **Season Mattered. Construction Stopped During the Winter. Made Completion Difficult.**
- **Evaluation Done During the Recession. Many Construction Projects Abandoned.**
- **Particularly Large Projects Were not Completed Within Time Frame Given to do Evaluation.**

Areas of Compliance/Non-Compliance

- Highest Compliance Rates
  - Heating and Cooling to Each Zone Controlled by Thermostat Control
  - Temperature Controls have Following Features: dead band controls, setpoint overlap, off-hour controls, automatic shutdowns and setback controls
  - Installed Lamps and Fixtures Consistent w/ Lighting Drawings
- Lowest Compliance Rates
  - Fenestration and Doors Labeled for Air Leakage
  - Fenestration Products Rated in Accordance with NFRC
  - Insulation on Automatic Circulating Hot Water Systems and First Eight Feed of Non-Circulating Systems w/o Integral Heat Traps
- Most Frequently Not Observed
  - Doors/Fenestration Meeting Maximum Air Leakage Requirements
  - Return Air and Outdoor Air Dampers Meet MinimumLeakage Requirements.

Observations

- 98% of Projects Used ComCheck
- Use Minimum Number of Auditors to Conduct Study
- Use Two Different Time Spans (Small vs. Large Projects)
- Train Inspectors to Pay Attention to Small Details
- Compare HVAC and Envelope Calculation
- Pay Attention to Potential Problems in R-value (comparison between plans and ComCheck worksheet)

Recommendations

- Rearrange Checklist to Include Both Plan Review and Inspections
- Edit Sheets to Match IBC Requirements
- Allow for the use of Different R-Values/U-Values for Different Sections of an Element
- Avoid Use of Negative Questions
- Allow for On-Site Visual Inspections

Contact Information

Isaac Elnecave

Sr. Policy Manager

ielnecave@mwalliance.org

Midwest Energy Efficiency Alliance

(312) 784-7253

The Source On Energy Efficiency

MEEA

Midwest Energy Efficiency Alliance