



# Measuring Code Compliance: PNNL Pilot Study in Wisconsin

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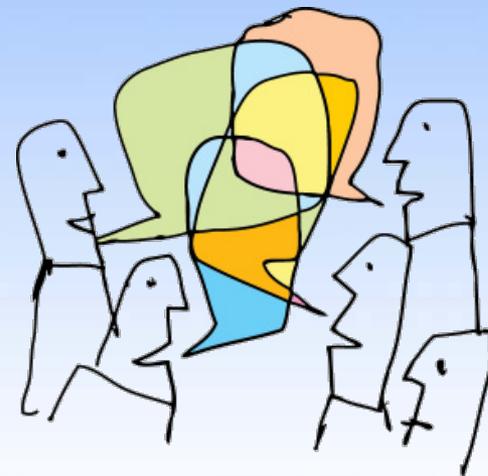


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# Agenda

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



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# PNNL Pilot Study

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# 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.

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# 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 Aggregating 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**

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# Enforcement In WI

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

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# 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 2<sup>nd</sup> 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 Feet 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 Minimum Leakage Requirements.

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# 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

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