COMMERCIAL BUILDINGS FIELD STUDY

CLIMATE ZONE 5A

THE MOZINGO CODE GROUP
PROJECT SYNOPSIS

❖ Measure the impact of energy codes on commercial buildings and identify opportunities for savings through increased compliance

❖ Climate Zones 5A (NE, IA, IL) and 2A (FL)

❖ Survey 108 new office and retail buildings in each CZ

- Study began in 2017
- Will wrap up March 2020
- Both climate zones on same timeline
- We are only discussing CZ 5A work today
WHERE? - CLIMATE ZONE 5A: NEBRASKA, IOWA, ILLINOIS...
WHO? - THE TEAM

- DOE – Project Funder
- IMT – Contract Manager

Subcontractor:
- Originally: Colorado Code Consulting, lead by Shaunna Mozingo
- Currently: The Mozingo Code Group, lead by Shaunna Mozingo

Partners
- NDEE
- UNL
- MEEA
- CADMUS
- SWEEP
- Iowa State Fire Marshal’s Office
- Southface Energy Institute
WHY?

❖ Develop replicable methodology to measure energy and cost savings in commercial buildings
❖ Test methodologies for gaining access to sites
❖ Develop training and education

➢ DOE: Create methodology for states to measure impacts of commercial energy code implementation
WHAT?

Offices

Include

- Office uses, including banks, professional, government
- Mixed use where they can be evaluated separately (e.g., restaurant on ground floor and office above)

Exclude

- Buildings with medical diagnostic or treatment
- Publicly owned buildings that are not government offices
WHAT?

Retail

**Include**

- Stand alone retail, enclosed retail malls, and strip malls
- Mixed use where they can be evaluated separately (e.g., retail on ground floor and residential above)

**Exclude**

- Central plants – no complex refrigeration / HVAC
- Restaurants or grocery stores
  - Incidental use allowed (if <10% of floor area)
<table>
<thead>
<tr>
<th>WHAT?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Building Size</td>
</tr>
<tr>
<td>Small/Medium: &lt;75,000 sq ft</td>
</tr>
<tr>
<td>Large: ≥ 75,000 sq ft</td>
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<tr>
<td>Sample Size</td>
</tr>
<tr>
<td>Small/Medium: 44 office, 46 retail</td>
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<td>Large: 10 office, 8 retail</td>
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</table>
**HOW? — DATA COLLECTION PROCESS**

**PLAN REVIEW**
- **Data Collection Protocol**
  - Follow plan review guidance for each measure
- **Data Collection Form**
  - Note code requirements
  - Note plan review findings
  - Assign Building & Assembly IDs

**FIELD INSPECTION**
- **Data Collection Protocol**
  - Follow field inspection guidance for each measure
- **Data Collection Form**
  - Note as-found conditions
  - Take photos for each measure and name photos based on Building & Assembly IDs

**DATA STORAGE & QC**
- Data collection teams QC data collection forms
- Upload data collection forms & photos to Cadmus SharePoint site
- Cadmus team transfers data to Building Code Verification workbook developed by PNNL
HOW? - RECRUITMENT

- Try at least 3 approaches, tracking time
  - Direct outreach to code officials
  - Direct outreach to designers
  - Direct outreach to building owners/builders
  - Direct outreach to ICC Chapters and State Energy Offices
  - Just show up on site!
Plan Review

- Contact building department
- Request necessary documents
- Review documentation
- Complete data collection form

Field Survey

- Schedule onsite visit
- Note as-found condition
- Take supporting photographs
HOW? - FIELD INSPECTION: PHOTOGRAPHS

- Photograph all products, labels, and observed conditions for each measure
HOW? - STUDENT INTERNS

- UNL College of Architecture and Construction Management
- 5 students initially participated
- Two days of data collection training (73-point checklist)
- One day of energy code training
- Weekly webinar options
GETTING STARTED

DATA COLLECTION FORM

Building Identifier
NE01

Plan Reviewer Name
John Reviewer

Field Inspector Name
Jane Inspector

COMMERCIAL BUILDINGS
ENERGY CODE FIELD STUDY

Building Identifier

Plan Reviewer Name:

Field Inspector Name:

Example: Nebraska
# Building Code Verification Record

Copy row: Select any cell on row, then hit this button. Copy rows when measures apply differently to parts of building.

Delete Dup Row

## Code Required Factors or conditions must match actual code, option path chosen, or performance baseline.

<table>
<thead>
<tr>
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<th>Measure Description</th>
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<tr>
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<td>Y</td>
<td>(^ *) Automatic time controls; Control zones ≤25k ft²/1 floor; and override limited to 5000 sf &amp; 2 hours</td>
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<td>Daylighting control</td>
<td>N</td>
<td>Select Condition</td>
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## Building Information

- City: Grand Island
- Code: 2009 IECC
- HVAC System Type: DX cool/Furnace; Packaged (ind VRF or V)
- Occupancy: Office

## Building Comments:

- Interior lighting plans not at building department only able to confirm controls. Was able to verify mechanical and some insulation.

## Code or Performance Requirement

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## Building Identification

- NE_Grsl_SSM_O_038
- NE

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STATUS UPDATE

- Small Office Completed: 41
- Small Retail Completed: 44
- Large Office Completed: 5
- Large Retail Completed: 4

✓ 108 buildings needed
✓ 94 completed
✓ 14 to go by March 2020
FIELD TRENDS AND IMPRESSIONS

❖ Success gaining access by showing up on site, particularly as a “student doing research”
❖ Take photos on site; do plan review and fill in forms later
❖ Use city website and check latest inspection to gauge construction progress
FIELD TRENDS AND IMPRESSIONS

❖ Exterior lighting and interior LPD generally compliant
❖ Approximately 50% of lighting controls non-compliant
❖ Windows difficult to verify
❖ COMcheck submittals difficult to field verify; some did not match plans.
❖ Thermostat defaults often not set correctly
QUESTIONS?

THANK YOU!

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