



2014 Commercial Building Stock Assessment: BPA Brown Bag / May 20, 2015

Christopher Frye

Senior Manager, Market Research and Evaluation

Aaron James

Market Intelligence Analyst

NORTHWEST ENERGY EFFICIENCY ALLIANCE

Overview / Agenda

- Acknowledgements
- General Overview of CBSA Study
- Purpose / Value of Conducting CBSA
- CBSA 2014 High Level Findings
- Recommendations / The “Next” CBSA

Acknowledgements – Utility Partners



Accelerating energy efficiency in partnership with:



Acknowledgments – Contractors

NAVIGANT

CLEARResult

Formerly PECl
(Assessment)



Recruitment
Contractor

General Overview of CBSA

Commercial Building Stock Assessment

- Conducted periodically since 2003
- Provides input into regional power plan and utility conservation assessments
- Provides “baseline” of current use
- Conducted region-wide
- Developed through collaborative process

CBSA 2014 – General Study Overview

Component	Characteristic
New Sample Frame Source	270K Records
Number of Buildings Assessed	864 Across ID/MT/OR/WA <ul style="list-style-type: none">• 12 Building Types• Location Type / Size / Vintage• Hospitals/Universities Separate
Sites w/ Corresponding Billing Data	Over 600 Sites (60%+)
Sites w/ On-Site Audit Information	100 Percent
Dataset Contents	Nearly 800 Variables in Dataset <ul style="list-style-type: none">• More than 14K Lighting Fixture• Over 2,300 HVAC Systems• Embedded Data Centers• Renovation History
Future Update	<ul style="list-style-type: none">• Oversample Cases• BPA / PSE / SCL / SnoPUD

CBSA 2014 Onsite Survey Distribution

Building Type	Number of Buildings Surveyed
Assembly	105
Food Service / Restaurant	43
Grocery	74
Hospitals*	31
Lodging	72
Office	117
Other	81
Residential Care	70
Retail	132
Schools (K-12)	75
Universities*	21
Warehouse	43
TOTAL	864

CBSA 2014: General Process

Initial Recruitment Contact

- Explain study, outcomes and value
- Screen to confirm building type

Schedule Assessment

- Performed by engineering technician
- Generally follows energy audit procedures

Acquisition of Billing Data

- Participant “sign-off” of billing data release
- Requires coordination of utility partners

Purpose / Value of Conducting CBSA

Sources of CBSA “Value”

Increase accuracy of Power Plan/CPAs

- Provides random/representative sample
- Informs market characterization key points

Provides data for measure analysis/UES

- Critical input for RTF and UES development
- Potential to capture new measures in sector

Allow programs to envision opportunities

- Potential target sectors based on findings
- More detail to assess savings potential

High Level Findings

CBSA 2014: Regional Floor Area

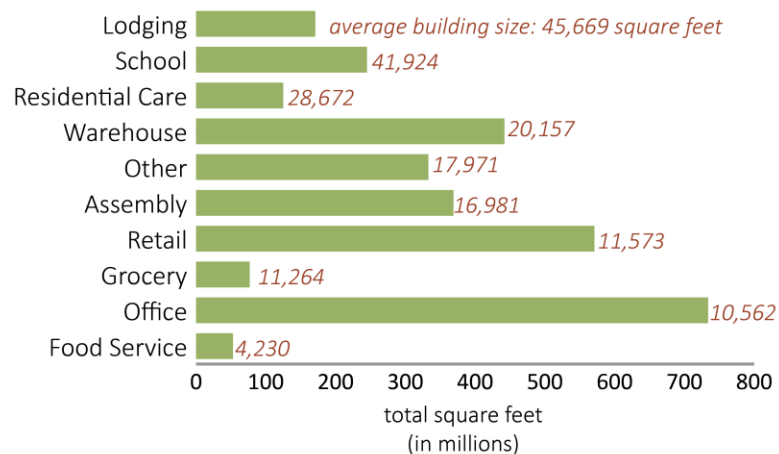
Total Regional Floor Area



Increase in floor area is due to new construction, renovation, and differences in the population frame.

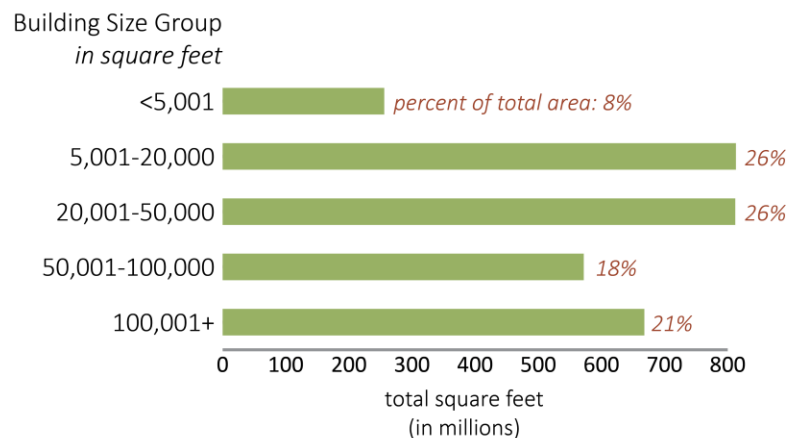
Floor Area by Building Type

Office buildings have the most square feet while lodging buildings have the largest floor area per building.



Floor Area by Building Size

The floor area is distributed across a range of building sizes.



CBSA 2014: Energy Use Intensity

Mean Energy Use Intensity

2009: Electric
16.0 kWh/square foot

2014: Electric
14.2 kWh/square foot

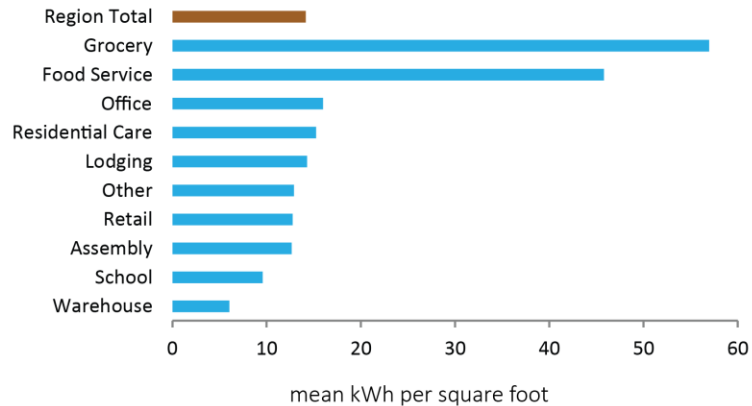
2009: Natural Gas
0.41 therms/square foot

2014: Natural Gas
0.35 therms/square foot

*Values do not include data for hospitals and universities.
The gas energy use intensities only include buildings with gas service.

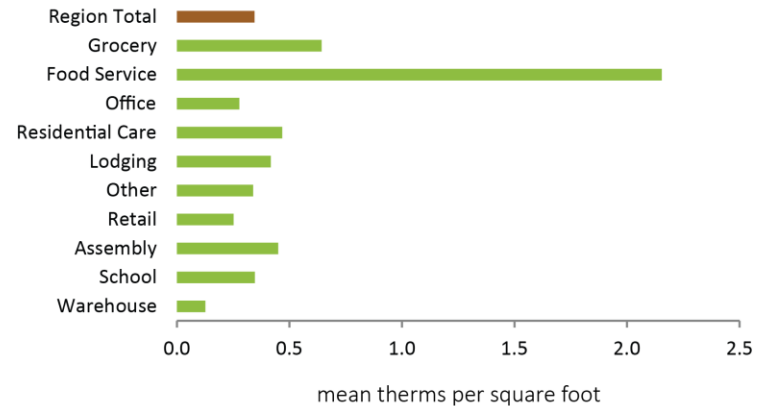
Electric Energy Use Intensity by Building Type

Average electric energy use intensity ranges widely by building type.



Natural Gas Energy Use Intensity by Building Type

Average natural gas energy use intensity ranges widely by building type.



CBSA 2014: Heating and Cooling

Finding	Implication
Low penetration of Heat Pump technology within commercial space associated with heating	Potential opportunity in increasing incidence, resulting in energy savings based on per unit reduction in energy
65 percent of regional floor area has not had HVAC system replacement or renovation	Coupled with finding that more than one-third of regional floor space is represented by systems at least ten years old indicates HVAC opportunity

CBSA 2014: Lighting

Finding	Implication
Incidence of LED lighting, roughly 20 MW relative to 2900 MW total, is still relatively small	LED remains a potential transformative technology within commercial building space
Inefficient incandescent bulbs remain a significant portion of Assembly, Lodging, and Residential Care	EISA will likely eliminate the incidence of incandescent but it appears the “turnover” may take some time, particularly in some buildings
Office and Retail space are largest energy consumers of lighting	Key targets going forward with regard to lighting opportunities and transformative outcomes related to lighting design

CBSA 2014: Refrigeration

Finding	Implication
Higher efficiency Electronically Commutated Motors (ECMs) encompass only 37 percent of condenser fan area served	Potential opportunity with regard to energy savings within refrigerated end-use systems
Recovering lost heat from refrigeration display cases, reach-ins, and walk-ins occurs on 39 percent	Indicates opportunity still exists within commercial building space to leverage energy efficient impact of heat recovery

Recommendations / Next CBSA

Future CBSA Recommendations

- Accurately characterize the population of commercial buildings prior to conducting a CBSA update study (or future CBSA).
- Expand marketing for future CBSA studies to promote regional awareness of NEEA's efforts and improve recruitment rates.
- Incorporate recruitment incentives.

Thank You

Q&A

Contact Information:

Christopher Frye, cfrye@neea.org

Aaron James, ajames@neea.org