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Optimizing Lighting Control Performance: The New Frontier

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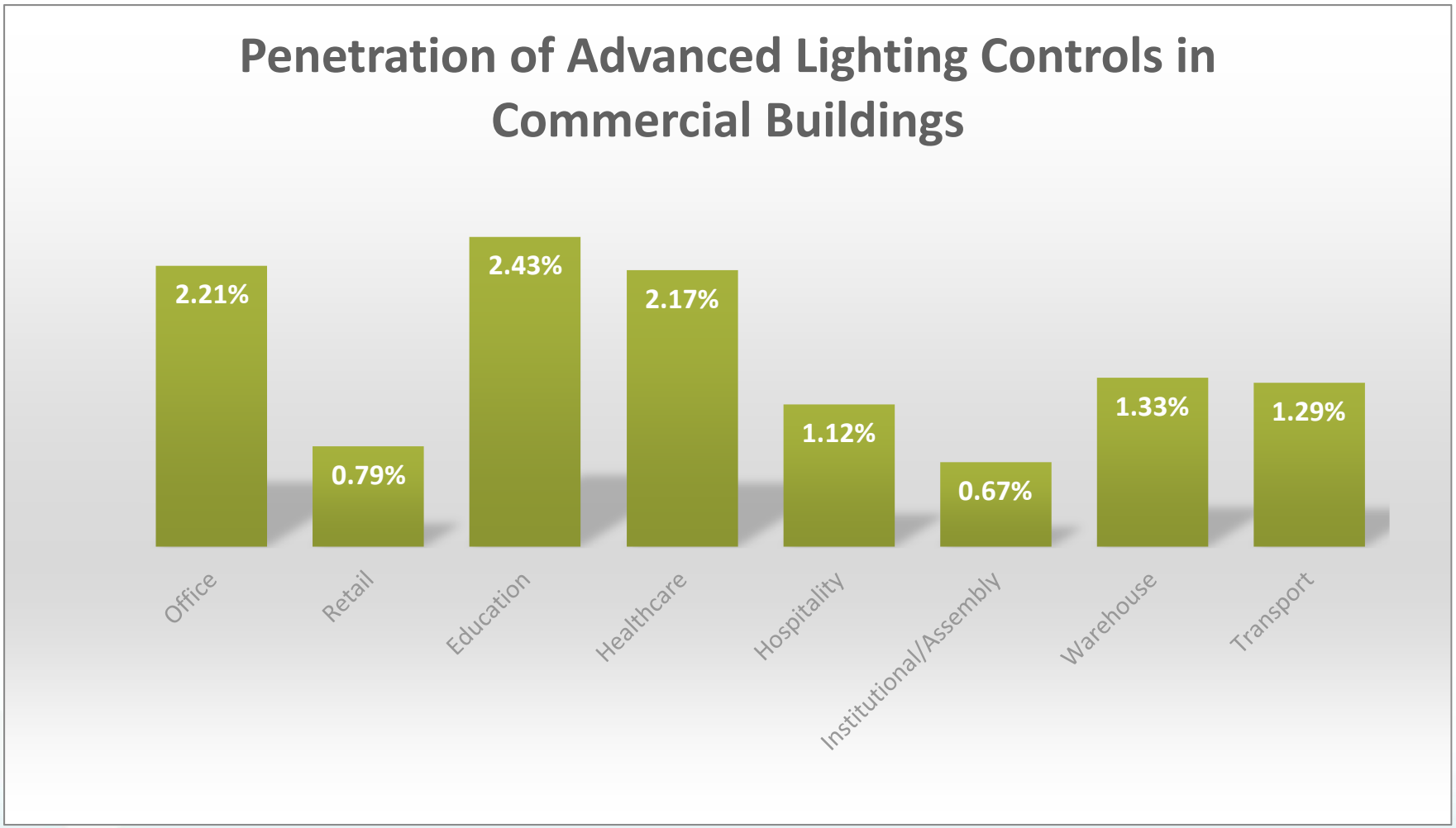
Where are we now with controls?

Northwest Region Indoor Lighting Power by Control Type and Building Type

Control Type	All (n=791)	Assembly (n=104)	Food Service (n=43)	Grocery (n=69)	Lodging (n=69)	Office (n=113)	Residential Care (n=68)	Retail (n=129)	School (n=72)	Warehouse (n=43)	Other (n=81)
Manual	2,087 73% ± 2%	279 77% ± 6%	53 87% ± 7%	63 72% ± 8%	121 86% ± 3%	448 68% ± 6%	118 91% ± 3%	447 68% ± 7%	139 61% ± 8%	211 83% ± 7%	208 76% ± 6%
Occupancy Sensor	224 8% ± 1%	27 7% ± 4%	0 0% ± 0%	1 1% ± 1%	1 1% ± 1%	73 11% ± 4%	3 2% ± 2%	12 2% ± 1%	34 15% ± 5%	43 17% ± 7%	32 12% ± 4%
EMS System	256 9% ± 2%	33 9% ± 4%	2 3% ± 4%	6 7% ± 5%	0 0% ± 1%	45 7% ± 4%	1 1% ± 1%	120 18% ± 5%	30 13% ± 6%	0 0% ± 0%	18 7% ± 4%
Dimming	24 1% ± 0%	10 3% ± 2%	4 7% ± 5%	0 0% ± 0%	4 3% ± 1%	1 0% ± 0%	1 0% ± 1%	0 0% ± 0%	1 0% ± 0%	1 0% ± 1%	2 1% ± 1%
Timeclock	74 3% ± 1%	7 2% ± 2%	0 0% ± 0%	2 2% ± 3%	2 1% ± 1%	31 5% ± 3%	1 0% ± 0%	28 4% ± 3%	2 1% ± 1%	0 0% ± 1%	2 1% ± 1%
Photocell	13 0% ± 0%	0 0% ± 0%	0 0% ± 1%	0 0% ± 0%	1 0% ± 0%	4 1% ± 1%	0 0% ± 0%	8 1% ± 1%	0 0% ± 0%	0 0% ± 0%	0 0% ± 0%
Other	126 4% ± 1%	5 1% ± 1%	0 0% ± 0%	5 6% ± 3%	0 0% ± 0%	50 8% ± 4%	0 0% ± 0%	33 5% ± 3%	24 10% ± 5%	0 0% ± 0%	9 3% ± 2%
None (Continuous)	54 2% ± 0%	3 1% ± 0%	1 2% ± 4%	11 12% ± 6%	13 9% ± 3%	6 1% ± 0%	6 5% ± 2%	10 2% ± 1%	0 0% ± 0%	0 0% ± 0%	4 2% ± 1%

Source: 2014 Commercial Building Stock Assessment, NEEA, Navigant, 2014
** US National Data via CBECS available in May 2015 at
http://www.eia.gov/consumption/commercial/

Where are we now with controls?



Source: NEEP, Navigant Consulting, December 2014

Where are we now with controls?

- Utilization Rate within EE Programs less than 1%

Energy Efficiency Program	Number of Projects with ALCs	Total Number of Lighting Retrofit Projects	Utilization Rate
Efficiency Vermont (2011-2013)	<10 (2011-2013)	1,885	<0.5%
Cape Light Compact (2013)	0	291	0%
Burlington Electric Department (2013)	0	Unknown	0%
PSEG Long Island (2013)	<25	5602	<0.5%

Adoption Barriers

- Knowledge and experience
- Complexity
- Value proposition
- Lack of standardization
- Construction Process
- High Costs
- Effective EE program designs

Can Technology Solve This?

- Integrated Wireless Controls hold tremendous promise

- Occupancy, Ambient Light, Temperature
- Wireless Antenna Built-In
- Fits ½" knockout
- Targeted to OEM Fixture Market
- Connects directly to open-standard DALI Drivers

- Xitanium SR LED Driver
- Targeted to OEM Luminaire Market
- Standard DALI 2.0 Connection & Power to Sensors
- Built-In Power Meter

Can Technology Solve This?

- Integrated Wireless Controls hold tremendous promise

- Occupancy, Ambient Light
- Communicates wirelessly with other luminaires on system
- Current proprietary solution offered individually by some luminaire manufacturers
- Cree SmartCast, Philips SpaceWise, others on the way

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Can Technology Solve This?

- Integrated Wireless Controls hold tremendous promise

- Central Control and Monitoring
- Communicates wirelessly with central gateway
- Some systems include ambient, occupancy sensors built into luminaire
- Current proprietary solution offered individually by some luminaire manufacturers
- Cooper Lumawatt, Philips Starsense, Acuity Roam, many more already available

Benefits of Integrated Controls

- Reduced *design* **cost and complexity** by eliminating up-front sensor and control system layout.

  Lighting Layout = Control Layout

- Reduced *installation* **cost and complexity** by eliminating separate sensors, controls, and/or control wiring
- Reduced *equipment* **cost** through standardization of sensors & intelligence embedded and shipped with luminaire

Technology Alone Not Enough…

- Education still needed to improve awareness and knowledge of these technologies
- Tests & demonstrations for proof of concept
- Standards and standardization as early as possible to enable at-scale adoption
- Tools to estimate savings
- Utility incentives to reduce costs – especially near term
- Effective Program Designs to support it

What we are doing about it: Commercial Advanced Lighting Controls Initiative

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- Advanced Control Demonstration Projects
- Utility EE Program Specs and Qualified Products List
- Training Programs for Designers and Installers
- Advanced Control Savings Calculator
- Support for Industry Standards
- New Nationally Adopted EE Program Offerings

With Funding Support From:

Burlington Electric Department; Cape Light Compact; nationalgrid; nyserda Energy. Innovation. Solutions.; Eversource; The United Illuminating Company; Pacific Gas and Electric Company; Efficiency Vermont; PSEG Long Island We make things work for you.; neea; Natural Resources Canada / Ressources naturelles Canada; Canada; U.S. Department of Energy

Our Vision

By 2020…

- Every luminaire seen by EE programs is controlled
- Majority of luminaires are shipped from factory with embedded sensors, intelligence, meter
- Technology, installation cost and complexity dramatically reduced
- Market actors knowledgeable and skilled
- EE programs pay customers for reported savings – M&V is automated
- Lease and service based models have begun to proliferate through industry
- Consistent EE programs, strong industry partnerships

THANK YOU

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