



NEXTENERGY
ACCELERATING INNOVATION

DOE Lighting Technology Energy Solutions (LiTES) Program

M&V Findings Overview & Utility Incentive Recommendations

Presented to:

Michigan Public Service Commission Energy Waste Reduction Collaborative

October 15, 2019



DOE Lighting Technology Energy Solutions Program (LiTES)

- LiTES is a collaborative effort between the US Department of Energy, NextEnergy, Consumers Energy, DTE and Detroit Joint Apprentice Training Center
- The collaboration:
 - Training modules and sessions were developed and deployed with approximately 175 professionals
 - Successfully deployed advanced lighting controls systems in 28 Small & Medium Commercial Buildings (SMCB) demonstration sites
 - Captured data and perform measurement & verification(M&V) analysis at 10 sites
 - Identified advanced lighting controls system benefits/market barriers
 - Identified opportunities for increased adoption and scaling of advanced lighting systems in SMCB



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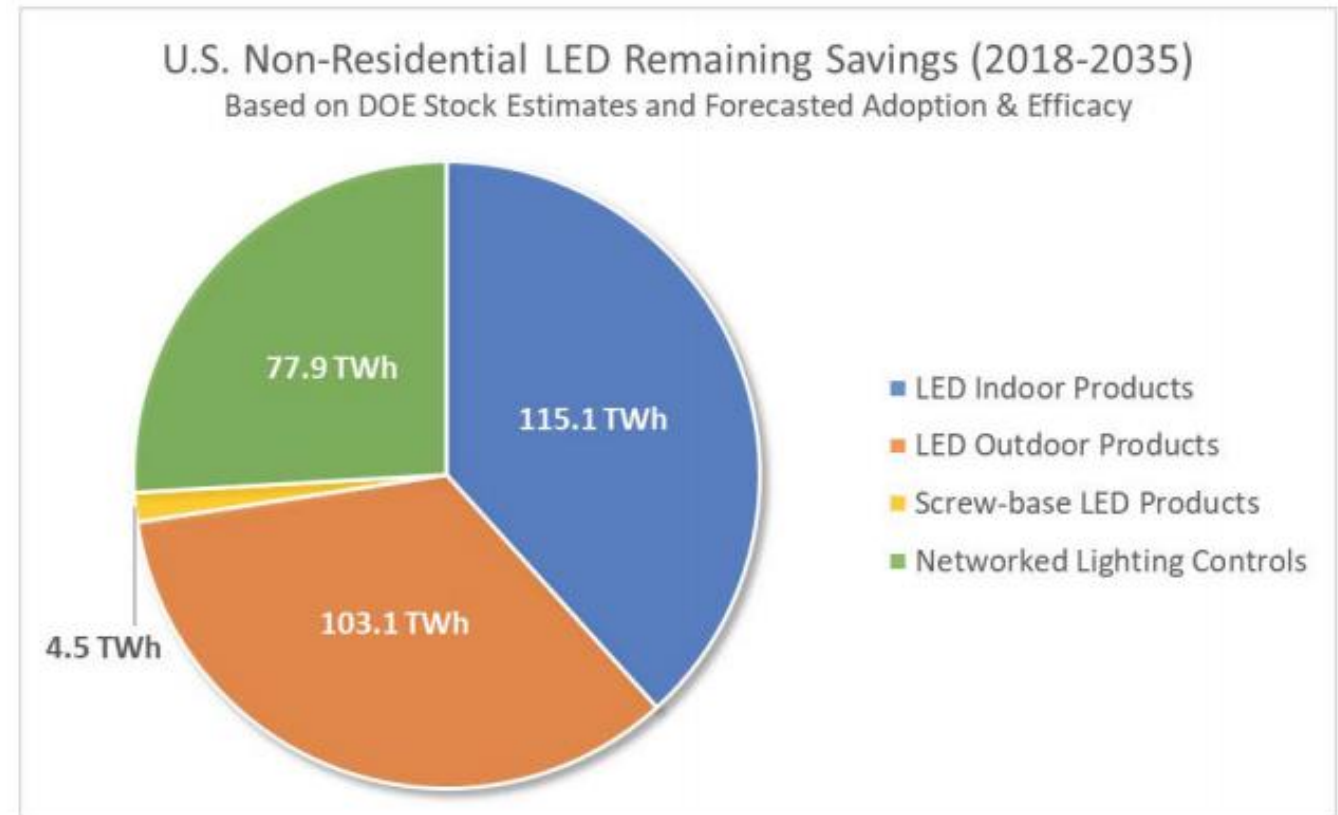
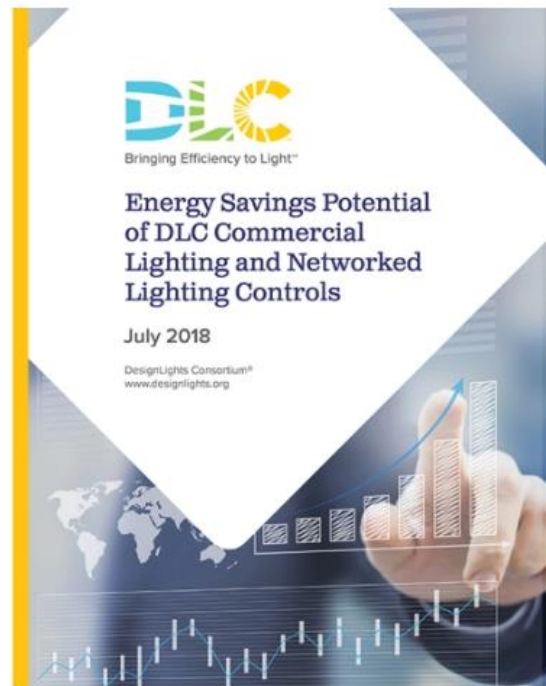
Agenda

- ALC/NLC's and their value
- Contractor Training
- M&V
- Utility Incentives and Recommendations moving forward



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C&I Lighting & Controls Savings Potential








www.designlights.org/default/assets/File/DLC_Energy-Savings-Potential-of-DLC-Commercial-Lighting-and-Networked-Lighting-Controls.pdf



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DLC Qualified Networked Systems

- Networked
- Three Minimum Control Strategies:
 - Occupancy Sensing
 - Daylight Harvesting
 - High-End Trim
- Addressable/Programmable

CONTROL STRATEGY	DLC DEFINITION
 Daylight harvesting	The capability to automatically affect the operation of lighting or other equipment based on the amount of daylight and/or ambient light present in a space, area, or exterior environment.
 Occupancy Sensing	The capability to automatically affect the operation of lighting equipment based on the detection of the presence or absence of people in a space or exterior environment.
 High-end trim	The capability to set the maximum light output to a less-than maximum state of an individual or group of luminaires at the time of installation or commissioning.
 Scheduling <small>(reported, not required)</small>	The capability to automatically affect the operation of lighting equipment based on time of day, week, month or year.
 Personal control <small>(reported, not required)</small>	The capability for individual users to adjust the illuminated environment of a light fixture or group of light fixtures in a specific task area to their personal preferences, via networked means.



Contractor Training

- Michigan Advanced Lighting Controls Training Program (MALCTP) provides comprehensive advanced lighting controls, system troubleshooting, design and maintenance training and certification
- 175 professionals trained to date
- Upcoming Training Sessions:
 - November 1, 2019





Measurement & Verification Process

- Followed International Performance Measurement & Verification Protocol (IPMVP) for 10 diverse sites
- Baseline Energy calculations were executed for each site based on IPMVP, 2012; Ch. 4.7.1
- Revenue grade meters and data loggers with +/- 2% accuracy were deployed within the test sites
- Data collection/measurement period of 4-13 weeks was dependent on site and use case



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Measurement & Verification Savings Data

LiTES M&V Site Energy Savings Data Analysis

Site #	Building Type	Type of ALC/NLC Installed	City	LiTES Partner Responsible for Meter Data	ALC/NLC Demo Area Metered (Sq. Ft)	Pre-ALC/NLC Baseline Energy Use (kWh)	Post-ALC/N:C Installation Energy Use (kWh)	% Energy Savings
1	Office	Cree	Detroit	NextEnergy	7,000	6,978	5,464	21.69%
2	Office/Training Center	Amatis	Warren	NextEnergy	3,600	6,431	5,186	19.37%
3	Office/Training Center	Crestron	Detroit	NextEnergy	4,050	4,577	2,446	46.55%
4	Manufacturing	Acuity nLight	Grand Rapids	Utility	80,000	711,335	547,728	23.00%
5	Office	Eaton	Madison Hts	NextEnergy	2,200	2,381	1,938	18.63%
6	Education/School	Lutron	Concord	NextEnergy	80,000	81,714	68,639	16.00%
7	Manufacturing (Offices)	Legrand Wattstopper	Jackson	Utility	38,000	177,053	115,084	35.00%
8	Education/School	LightCloud	Clare	Utility	8,000	29,172	18,361	37.06%
9	Manufacturing (Shipping/Receiving)	Legrand Wattstopper	Jackson	Utility	67,000	124,846	68,513	45.12%
10	Manufacturing	Legrand Wattstopper	Jackson	Utility	95,000	461,386	256,179	44.47%
Min					2,200	2,381	1,938	16.00%
Average					38,485	160,587	108,954	30.69%
Max					95,000	711,335	547,728	46.55%



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Process used in developing utility incentive recommendations





DOE Lighting Technology Energy Solutions Program (LiTES) 2019 Available Utility Incentives

Consumers Energy

Lighting Controls (*Pre-Notification Required)	Rebate	Unit
Interior Lighting Occupancy Sensors**	\$15	Sensor
Interior Lighting Occupancy Sensors**	\$0.08	Watt Controlled
Central Lighting Controls*	\$0	Square Foot
Interior Stairwell Controls*	\$0.40	Watt Controlled
Exterior Multi-Step Dimming Occupancy Sensors*	\$0	Watt Controlled
Exterior Multi-Step Dimming Timer Controls*	\$0.09	Watt Controlled
Exterior Lighting Occupancy Sensors*	\$0	Watt Controlled
Advanced Lighting Controls*		
Commercial, Hospitals, Schools/Universities	\$0.25	kWh Savings (annual)
Manufacturing, Industrial, Warehouses	0.18	kWh Savings (annual)
Small Business Facilities less 100,000 sq. ft.	0.25	kWh Savings (annual)

**pick one of the other per space controlled

DTE

Lighting Controls (*Pre-Notification Required)	Rebate	Unit
Interior LED Lighting under 15' w/Networked Lighting Controls		
Tier 1	\$185	kW Reduced
Tier 2	\$370	kW Reduced
Interior LED Lighting 15' or above w/Networked Lighting Controls		
Tier 1	\$290	kW Reduced
Tier 2	\$580	kW Reduced
Networked Lighting Controls Additional Incentives		
Occupancy Sensors	\$20	Sensor
Combination Occupancy & Daylight Harvesting Controls	\$25	Sensor

Tier 1: NLC system must actively use at least 3/7 qualifying NLC control features

Tier 2: Must fulfill Tier 1 requirements and actively use at least two additional qualifying NLC features.



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Perceived benefits of ALC/NLC's

(from utility surveys and interviews)

- Energy savings
- Lower installation and operating costs
- Lower impact to environment / reduce carbon emissions
- Brand attribution; utility seen as a customer education resource to help customers set and reach their own goals
- Increased customer satisfaction
- Better control of lighting (e.g. dimming vs on/off)
- Helping to meet broader utility incentive portfolio program goals
- Increased likelihood of incorporating SMCB into utility demand response programs



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Perceived barriers to ALC/NLC's

(from utility surveys and interviews)

- Lack of Awareness/Education on ALC/NCL technologies for customers and trade allies
- Lack of customer trust in contractor energy savings reported
- Challenges integrating ALC/NLC systems with customer IT security protocols
- System pricing varies significantly by manufacturer and to some extent contractor markup
- Technology issues / interoperability of ALC/NLC systems with existing building systems
- Brand differentiation /Customer confusion on ALC/NLC technologies and system capabilities
- Being careful not to overinvest into underperforming areas of the utility inventive portfolio Is this what we mean by this “brand differentiation”



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Utility Recommendations

- Standardized performance-based incentive approach to simplify customer process to perform cost/benefit analysis pre and post installation
 - DTE – kW
 - CMS – kWh
- Tiered incentives as adopted by DTE and CMS in 2019
- Standardized utility incentives calculator tool for scenario planning
- Municipal/cooperative incentive programs/participation
 - Use of state funding may require policy changes/modifications



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Questions?






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Thank you!

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