LiTES
LIGHTING TECHNOLOGY ENERGY SOLUTIONS

LIGHTING TECHNOLOGY ENERGY SOLUTIONS PROGRAM FINDINGS

Key Findings

1. Advanced/networked lighting controls (ALC/NLC) were shown to reduce energy use an average of 29.19% in small to medium commercial buildings
2. Measurement & Verification (M&V) sites were shown to net energy savings of 515,968 kWh, corresponding to Greenhouse Gas (GHG) emission reductions equivalent to 299.45 metric tons of avoided CO_2
3. Market education and utility incentives are still necessary to break down barriers and increase adoption of advanced/networked lighting controls in small to medium commercial buildings

LiTES Utility Incentive Alternatives, Survey Findings and Recommendations

Develop Survey Questions → DOE Review & Concurrence → Prepare Survey Tool → Surveys & Interviews

LiTES IDENTIFIED UTILITY INCENTIVE ALTERNATIVES

Incentive Strategy	Incentive Range
Set Incentive/Watt Controlled	$0.185 - $0.80/Watt
Set Incentive/kW Reduced	$150 - $185/kW
Set Incentive/kWh Saved	$0.18 - $0.25/kWh
Set Incentive/Sq. Ft. Design Area Controlled	$0.05 - $0.75/sq. ft
Set Incentive/ ALC/NLC Fixture Installed	$15 - $45/NLC Fixture installed

LiTES CONSUMERS ENERGY ALC/NLC PROJECTS

Building Type	Location	ALC Project Area Controlled (Sq. Ft.)	Project Cost ($)	Incentive Paid ($)	Energy Savings (kWh)
Manufacturing	Clare, MI	8,000	$14,250	$6,204	24,814
Education/School	Concord, MI	80,000	$92,150	$17,819	71,272
Manufacturing	Grand Rapids, MI	80,000	$165,400	$82,700	520,770
Manufacturing (6 Facilities)	Jackson, MI	38,000	$506,637	$240,141	960,570
		48,000			
		57,000			
		65,000			
		67,000			
		95,000			
Education/School	Ottawa Lake, MI	85,000	$160,000	$77,130	308,528
Manufacturing	Spring Lake, MI	78,000	$408,558	$153,304	613,215

LiTES DTE ENERGY ALC/NLC PROJECTS

Building Type	Location	ALC Project Area Controlled (Sq. Ft.)	Project Cost ($)	Incentive Paid ($)	Energy Savings (kWh)
Manufacturing	Auburn Hills, MI	25,000	$74,643	$10,271	191,006
Office	Detroit, MI	10,000	$30,000	$2,600	41,656
Manufacturing	Farmington Hills, MI	20,000	$61,897	$10,313	190,677
Hospital	Lapeer, MI	55,000	$470,521	$40,620	585,620
Hospital	Mt. Clemens, MI	95,000	$733,959	$82,097	1,198,036
Food Service (Distribution)	Novi, MI	10,000	$60,070	$2,457	45,495
School	Orchard Lake, MI	42,000	$43,329	$4,708	92,886
Office	Troy, MI	22,000	$19,700	$2,683	50,652
Office	Troy, MI	12,000	$98,000	$8,000	105,695

LiTES COST SAVINGS ANALYSIS

Building Type	Type of ALC/NLC System Installed	Location	ALC/NLC Incentive Paid ($)	ALC/NLC Energy Savings (kWh)	ALC/NLC Cost/Sq Ft. Controlled ($)	ALC/NLC Cost /kWh Energy Savings ($)	ALC/NLC Energy Savings/$ Incentive (kWh)	% ALC/NLC Project Cost Offset/Incentive
Manufacturing	Phillips Spacewise	Auburn Hills, MI	$10,271	191,006	$2.99	$0.39	18.60	13.76%
Manufacturing	RAB LightCloud	Clare, MI	$6,204	24,814	$1.78	$0.57	4.00	43.53%
Education/School	Lutron Vive	Concord, MI	$17,818	71,272	$1.15	$1.29	4.00	19.34%
Office	Cree Smart Cast	Detroit, MI	$2,600	41,565	$3.00	$0.72	15.99	8.67%
Manufacturing	Cree Smart Cast	Farmington Hills, MI	$10,313	190,677	$3.09	$0.32	18.49	16.66%
Manufacturing	Acuity nLight	Grand Rapids, MI	$82,700	520,770	$2.07	$0.32	6.30	50.00%
Manufacturing*	Legrand Wattstopper	Jackson, MI	$240,143	960,571	$0.52	$0.53	4.00	47.40%
Hospital	Cree Smart Cast	Lapeer, MI	$40,620	585,620	$8.55	$0.80	14.42	8.63%
Hospital	Cree Smart Cast	Mt Clemens, MI	$82,097	1,198,036	$7.73	$0.61	14.59	11.19%
Food Service (Distribution)	Acuity nLight	Novi, MI	$2,457	45,495	$6.01	$1.32	18.52	4.09%
Education/School	Digital Lumens SiteWorks	Orchard Lake, MI	$4,708	92,886	$1.04	$0.47	19.73	10.82%
Education/School	Crestron Zum	Ottawa Lake, MI	$77,132	308,528	$1.88	$0.52	4.00	48.21%
Manufacturing	Magnum OPUS	Spring Lake, MI	$153,304	613,215	$5.24	$0.67	4.00	37.52%
Office	Acuity nLight	Troy, MI	$8,000	105,695	$4.45	$0.93	13.21	8.16%
Office	Lutron Vive	Troy, MI	$2,684	50,652	$1.64	$0.39	18.87	13.62%
		Total	**$741,050**	**5,000,802**	**$51.14**	**$9.86**	**178.71**	**N/A**
		Min	**$2,457**	**24,814**	**$0.52**	**$0.32**	**4.00**	**4.09%**
		Average	**$49,403**	**333,387**	**$3.41**	**$0.66**	**11.91**	**22.77%**
		Max	**$240,143**	**1,198,036**	**$8.55**	**$1.32**	**19.73**	**50.00%**

*Customer installed ALC/NLC at 6 small and medium commercial (SMCB) manufacturing facilities

LiTES Measurement & Verification Analysis & Survey Findings

Identify Demonstration & M&V Sites → Coordinate Demonstration & M&V Sites → Verify to ASHRAE 90.1 & Install Requirements → M&V Analysis & Survey Report

LiTES ADVANCED/NETWORKED LIGHTING CONTROLS MEASUREMENT & VERIFICATION (M&V) SITE ENERGY SAVINGS DATA ANALYSIS

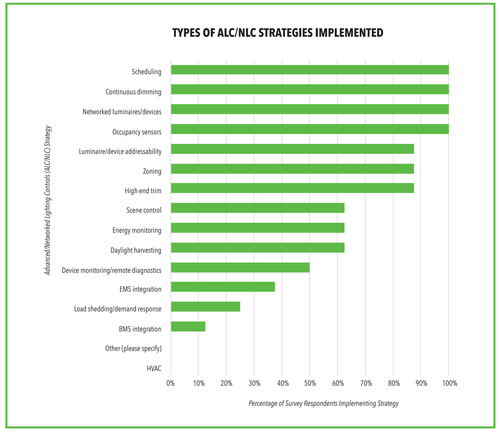
M&V Site	Building Type	ALC/NLC Technology Installed	Location	LiTES Partner Metering Site	Data Aquistion Hardware Used	Total Building Area (Sq. Ft.)	ALC/NLC Project Area Controlled (Sq. Ft.)	ALC/NLC Demo Area Metered (Sq. Ft)	Pre-ALC/NLC Energy Use Baseline for Metered Area (kWh)	Post-ALC/NLC Energy Use for Metered Area (kWh)	Energy Savings (kWh)	% Energy Savings for Metered Area
1	Education/School	RAB LightCloud	Clare, MI	Utility	Data Loggers	8,000	8,000	8,000	29,172	18,361	10,811	37.06%
2	Education/School	Lutron Vive	Concord, MI	Utility	Data Loggers	77,000	77,000	77,000	81,714	68,639	13,074	16.00%
3	Office	Cree Smart Cast	Detroit, MI	NextEnergy	Revenue Meters	496,000	10,000	7,000	6,978	5,464	1,514	21.69%
4	Office/Training Center	Crestron Zum	Detroit, MI	NextEnergy	Revenue Meters	33,000	33,000	4050	4,577	2,446	2,130	46.55%
5	Manufacturing	Acuity nLight	Grand Rapids, MI	Utility	Revenue Meters	80,000	80,000	80,000	711,335	547,728	163,607	23.00%
6	Manufacturing (Offices)	Legrand Wattstopper	Jackson, MI	Utility	Revenue Meters	38,000	38,000	38,000	177,053	115,084	61,969	35.00%
7	Manufacturing (Shipping/Receiving)	Legrand Wattstopper	Jackson, MI	Utility	Revenue Meters	67,000	67,000	67,000	124,846	68,513	56,333	45.12%
8	Manufacturing	Legrand Wattstopper	Jackson, MI	Utility	Revenue Meters	95,000	95,000	95,000	461,386	256,179	205,208	44.47%
9	Office	Eaton Wavelinx	Madison Heights, MI	NextEnergy	Revenue Meters	12,300	12,300	2,200	2,084	2,007	77	3.67%
10	Office/Training Center	Amatis dLoWireless	Warren, MI	NextEnergy	Revenue Meters	50,000	50,000	3600	6,431	5,186	1,245	19.37%
					Total	**956,300**	**470,300**	**381,850**	**1,605,575**	**1,089,607**	**515,968**	**N/A**
					Minimum	**8,000**	**8,000**	**2,200**	**2,084**	**2,007**	**77**	**3.67%**
					Average	**95,630**	**47,030**	**38,185**	**160,558**	**108,961**	**51,597**	**29.19%**
					Maximum	**496,000**	**95,000**	**95,000**	**711,335**	**547,728**	**205,208**	**46.55%**

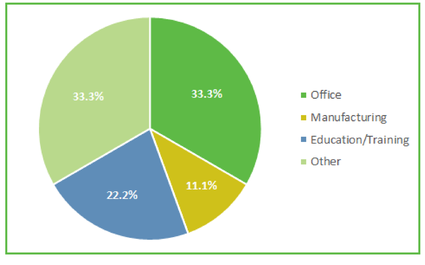
LiTES ADVANCED/NETWORKED LIGHTING CONTROLS M&V SITE GREENHOUSE GAS EMISSIONS REDUCTION IMPACTS

M&V Site #	Building Type	Location	ALC/NLC Demo Area Metered (Sq. Ft.)	Baseline Energy Usage (kWh)	Post ALC/NLC Installation Energy Usage (kWh)	Energy Savings (kWh)	CO2 (Lbs)	CH4 (Lbs)	N2O (Lbs)
1	Education/School	Clare, MI	8,000	29,172	18,361	10,811	13,751.77	0.72	0.19
2	Education/School	Concord, MI	77,000	81,714	68,639	13,074	16,630.34	0.88	0.24
3	Office	Detroit, MI	7,000	6,978	5,464	1,514	1,925.87	0.10	0.03
4	Office/Training Center	Detroit, MI	4,050	4,577	2,446	2,130	2,709.82	0.14	0.04
5*	Manufacturing	Grand Rapids, MI	80,000	711,335	547,728	163,607	208,108.12	10.96	2.94
6*	Manufacturing (Offices)	Jackson, MI	38,000	177,053	115,084	61,969	78,824.15	4.15	1.12
7*	Manufacturing (Shipping/Receiving)	Jackson, MI	67,000	124,846	68,513	56,333	71,655.94	3.77	1.01
8*	Manufacturing	Jackson, MI	95,000	461,386	256,179	205,208	261,024.07	13.75	3.69
9	Office	Madison Heights, MI	2,200	2,084	2,007	77	97.38	0.01	0.00
10	Office/Training Center	Warren, MI	3,600	6,431	5,186	1,245	1,584.09	0.08	0.02
	Totals		**381,850**	**1,605,575**	**1,089,607**	**515,968**	**656,312**	**34.57**	**9.29**

LiTES ESTIMATED CO2 EQUIVALENT EMISSIONS PER EPA CALCULATOR

CO2 Equivalent Emissions for Baseline Energy Use	931.5 Metric Tons
CO2 Equivalent Emissions for Post ALC/NLC Installation Energy Use	632.2 Metric Tons
CO2 Equivalent Emissions for Energy Savings	**299.4 Metric Tons**





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