



LEDs are Moving on Up: C&I Upstream LED Lighting Program

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Aaron Kwiatkowski; DNV KEMA Energy & Sustainability, Orlando, FL

Chad Telarico; DNV KEMA Energy & Sustainability, Geneva, NY

William Blake; National Grid, Waltham, MA



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Introduction

- Massachusetts Commercial and Industrial Upstream Lighting Program-also known as the Bright Opportunities Program
- Sponsors of this evaluation include: Cape Light Compact, National Grid, NSTAR, Unitil and Western Massachusetts Electric
- Oversight and guidance of this impact evaluation is provided by the Massachusetts Energy Efficiency Advisory Council (EEAC)



The Bright Opportunities Program

- This is a new upstream program
- Began offering discounts on LEDs to C&I customers in November of 2011
- Approximately 220,000 lamps were purchased in first five months
- Over 37,000 MWh savings claimed in this period
- Need for early impact evaluation to provide independent estimate of savings

Off and running...

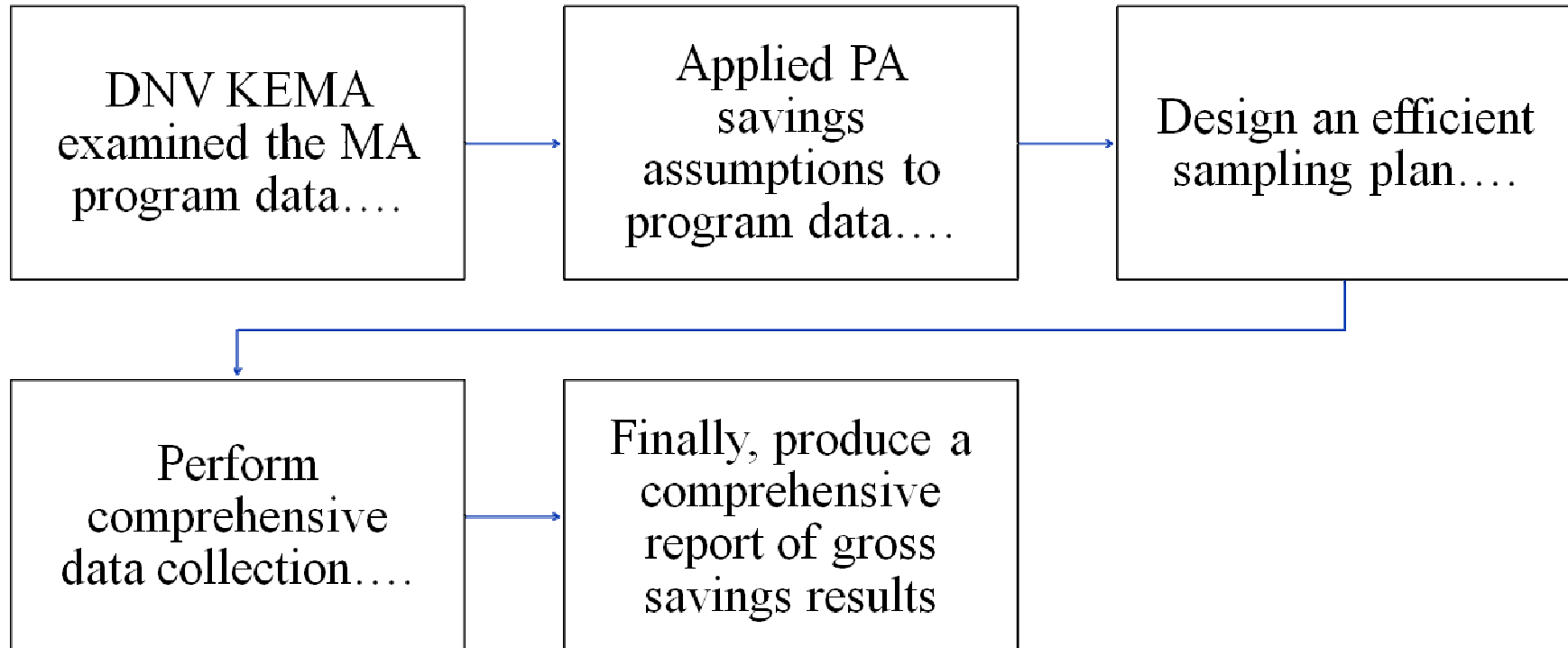
Three Big Questions

What are the building and space types where the LEDs are being installed?

What are the pre-existing bulb types and Wattages that the program bulbs are replacing?

What are the operating hours of the new LEDs?

Evaluation Approach



Key Ex-Ante Savings Assumptions

- The PAs developed per unit savings values as shown below
- Pre-existing lamp wattage was based on an assumed blend of halogen and CFL lamps
- Installed lamp wattage represents the assumed average wattage of each product type

Product Type*	Pre-Existing Lamp Wattage	Installed Lamp Wattage	Delta Watts	Annual Hours	kWh Savings
PAR20	38	8	29.8	4,500	134
PAR30	55	15	40.4	4,500	182
PAR38	61	14	46.8	4,500	211
MR16	31	8	23.4	4,500	105

* Additional LED bulb types were subsequently added to the program following the initial launch, which are currently being included in the second phase.

Upstream Impact Vs. Traditional Impact

■ UPSTREAM IMPACT EVALUATION

- Limited Tracking Data
- Low Participation Rate
- No customer application or paid incentive, buy down amount not always linked to PAs
- Not a direct install program, so facilities can use the bulbs as they need them, where they need them

■ TRADITIONAL IMPACT EVALUATION

- Tracking Data is more complete
- Much more Awareness from facility contacts
- Higher Participation Rate
- Locations of Final Install

On-Site Data Collection

- Verification of installed equipment
 - Visually identify program bulbs (type and wattage)
 - Confirm quantity installed via walkthrough
 - Investigate missing or not yet installed bulbs
 - Interview facility staff to determine what the actual pre-existing lamps were

- Metering
 - Time of use lighting loggers
 - Six to eight weeks of data

What did we set out to do?

Evaluation Findings – Challenges and Successes

■ Customer Participation

- Low recruitment rate relative to typical impact evaluations
- Customer contacts difficult to identify

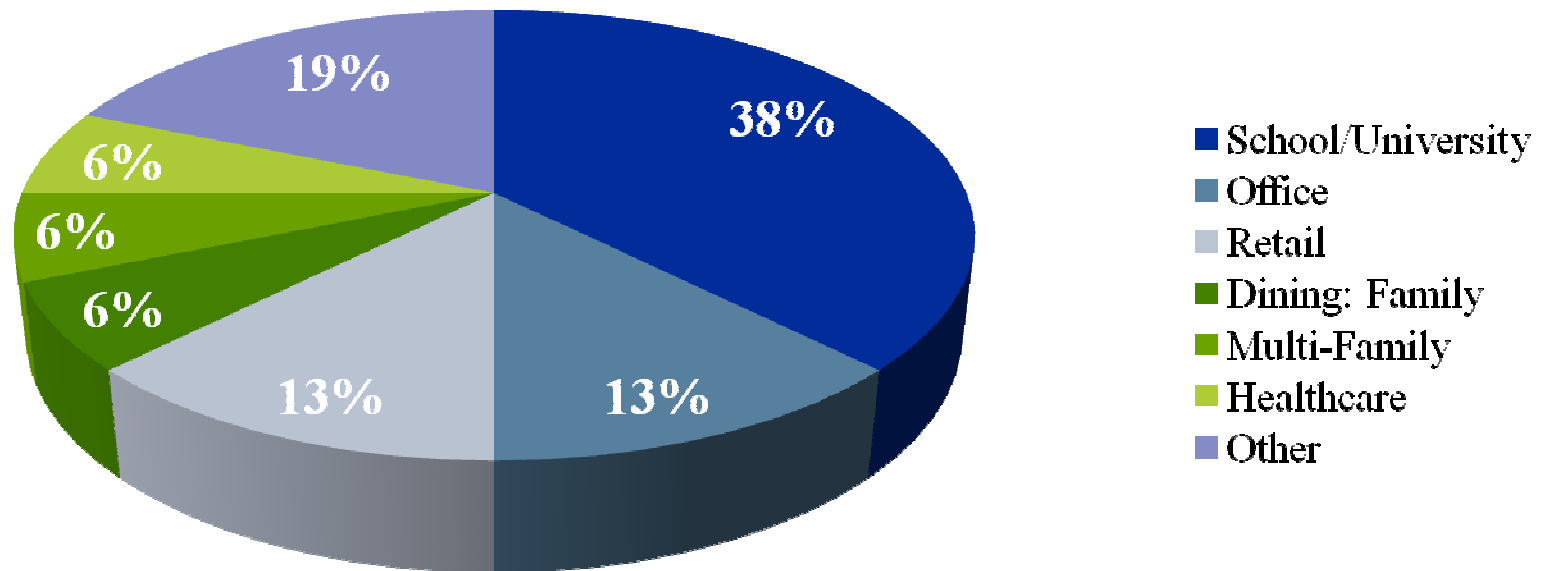
- + Instituted a monetary incentive, which provided some help
- + Knowledge of the Program Administrators responsible for the buy downs

■ Tracking Data Set

- Few records with complete information regarding installation location
- Facility address provided not always the installation location
- Several town/school districts and campuses

- + Very detailed information regarding purchased lamps
- + Program data generally very accurate with respect to quantity/type

Evaluation Findings – Building Type



- School districts and university campuses were largest customer segment
- Other includes museum, court house, hotel, cafeteria
- Many installations occurred in common spaces such as corridors, lobbies and large open spaces

Evaluation Findings Phase One-Installation Rate

	Installation Rate
Program Assumption	100%
Evaluation Finding	86%
Reasons for Deviation	<ul style="list-style-type: none">▪ Not installed yet▪ Storage▪ Waiting for burn outs▪ Large campuses▪ School districts

Evaluation Findings Phase One-Weighted Delta Watts

	Weighted Delta Watts
Program Assumption	38
Evaluation Finding	47
Reasons for Deviation	<ul style="list-style-type: none">▪ Higher wattage halogens (Pre)▪ Very few CFLs (Pre)

Evaluation Findings Phase One-Annual Operating Hours

	Annual Operating Hours
Program Assumption	4,500
Evaluation Finding	4,005
Reasons for Deviation	<ul style="list-style-type: none">▪ Lower hours for:<ul style="list-style-type: none">> Schools> Offices> Retail

Conclusions

- In conclusion we found that...
 - › Program is successfully delivering savings
 - + Positive technology adjustments (delta watts)
 - Negative installation rate and hours adjustments
 - › Some customers tend to wait for existing lamps to burn out before replacing with program bulbs
 - › School districts and universities are the most frequent customers
 - › Many customers understand where the discounts are coming from

Future Programs and Impact Evaluation

- Phase two of this evaluation is still ongoing (October 2013)
- Recommendations for future programs and evaluations include:
 - › Create more awareness – in some cases facility staff were unaware that they participated
 - › Consider offering customers a summary report of what was purchased through the program
 - › Provide final installation address in program data set
 - › Have third party QC vendor track additional information such as wattage and hours
 - › Consider offering some level of customer incentive for participating in evaluation

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For questions on this paper contact:

aaron.kwiatkowski@dnvkema.com or chad.telarico@dnvkema.com

