



C2014: C&I LIGHTING SATURATION AND REMAINING POTENTIAL

Kick-off Meeting
March 31, 2021

ers



DISCUSSION OVERVIEW

- 01 Introductions
- 02 Project overview
- 03 Lighting market background & impacts
- 04 Project scope and budget

ers energy & resource solutions

INTRODUCTIONS



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30+ Years of Experience



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7+ Years of Experience



PROJECT OVERVIEW

PROJECT OBJECTIVE

Research Objectives:

1. Characterize the current status of the Connecticut C&I lighting market
2. Forecast the remaining potential for lighting programs
3. Update impact parameters for calculating lifetime gross savings

Program administrators (PAs) will use this information to target initiatives, allocate resources, and meet savings goals. Phase 1 results to be finalized in time for 2022 plan.

The Connecticut estimates will build upon approaches and leverage tools developed in Massachusetts, adapting to and recognizing Connecticut differences.



HIGH-LEVEL SCOPE

Phase 1

Objective: understand the current status and trajectory of the CT market, building upon existing tools, models, and approaches used in MA.

Timeline: results to be finalized/presented by July 1st to inform program planning for 2022.

Activities:

- Conduct 20 distributor in-depth interviews to collect market indicators for market modeling
- Transform stock turnover model developed for MA to be CT-specific – used to estimate potential
- Calculate adjusted measure lives based on dual baseline

Budget: approximately \$100,000

Phase 2

Objective: deep-dive to better understand remaining potential and validate findings from phase 1.

Timeline: Q3-Q4 2021

Activities:

- Specific next steps based on CT market share outcomes estimated in Phase 1 (see slide 20)
- Includes data collection (targeted on-sites/virtual data collection, expert panel, and other surveys)

Budget: approximately \$300,000

The two-phase approach is designed to provide insight into the status of the market and update impact parameters in time for 2022 plan and then conduct a deep-dive of the market to understand remaining potential.



WHY DO WE CARE?

Lighting accounted for 56% of the 2019 Connecticut C&I Energy Efficiency Portfolio energy savings

We assume that the market potential for lighting savings is shrinking quickly – similar to other jurisdictions

Need to better understand how the market is changing to target remaining opportunities

A rapidly transforming market also means baselines are shifting quickly leading to a decrease in lifetime savings

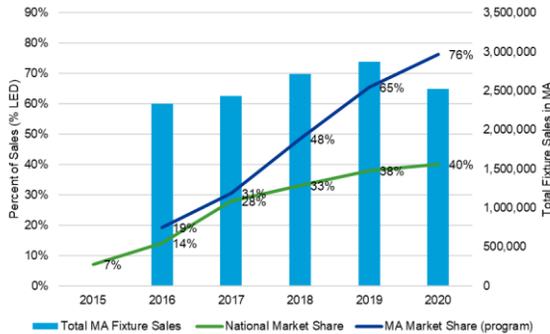


LIGHTING MARKET BACKGROUND

WHAT DOES CT'S C&I LIGHTING MARKET LOOK LIKE?

- Historic market share/sales data is unavailable in Connecticut, so we will need to collect this information to identify the remaining market potential.
- MA faced a similar problem and developed a detailed model to estimate – and project– market share by equipment type. MA model is a stock turnover model calibrated to annual on-site saturation surveys. We can use this information in MA and available national data to guide a CT-specific model to estimate market share and saturation.

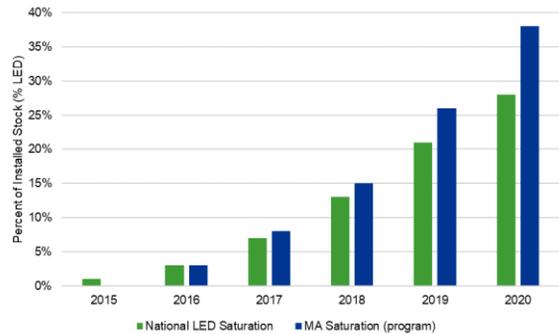
LED Market Share Inputs



Sources of market share estimates:

- National: [NEMA lamp indexes](#)
- Massachusetts: LED Market Model forecasts (pending finalization)

LED Saturation Results

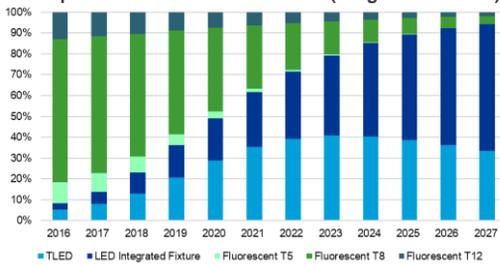


CT is likely somewhere between the upper estimates (MA) and lower estimates (US). Will extend estimates through 2028.

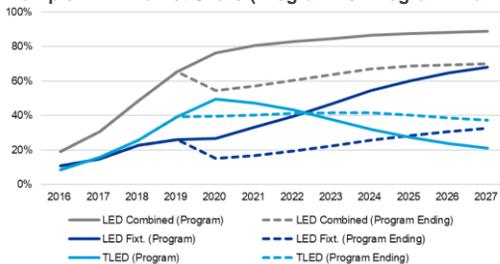


WHAT THE ANALYSIS WILL SHOW FOR CT

Example: Installed Stock Saturation (Program Scenario)



Example: LED Market Share (Program vs. Program Ending)



- For reference, here's what MA estimated for the period 2018-2027. CT will get similar estimates.
- Provides status and trajectory of C&I lighting market
- MA found the programs were succeeding in pushing customers toward higher efficiency LEDs rather than traditional TLED replacements:
 - 44% LED linear saturation in 2020 (28% national);
 - Linear growing rapidly toward LEDs, and
 - Lighting sales are dropping (because of LED lifetimes and socket conversions)



WHAT DOES THIS MEAN FOR THE PROGRAM?

Three Major Impacts

- **Gross annual savings:** Increasing saturation of LEDs (and longer life of LEDs) means there are fewer sockets available for upgrade → **decreasing achievable potential.**
- **Net annual savings:** Increasing natural adoption of LEDs → **decreasing net savings** attributable to program.
- **Lifetime savings:** As technology stock becomes more efficient, the baseline for calculating savings increases over time, which means **decreasing gross lifetime savings**
 - We account for replace on failure (ROF) and early replacement (ER) dual baselines using an **adjusted measure life (AML).**

PSD Update: AML

Gross lifetime savings for custom, prescriptive, and midstream programs should be assessed as a product of the first-year annualized savings and the AML.

Recommended AMLs for Massachusetts

Application	Equipment Type	2020	2021	2022
Ambient Linear	TLED	8.5	8.2	8.0
Ambient Linear	LED Fixture	8.8	8.5	8.3

This would compare to what currently exists for lighting in Table A4-1: Lifetimes of Measures in the 2021 PSD. Current assumptions are 13 years for retrofit measures and 15 years for lost opportunity.



**PROPOSED SCOPE
OF WORK**

PHASE I RESEARCH ACTIVITIES

Phase 1 objective: the key objective for the first phase is to characterize the current status of the market in Connecticut with a focus on market share since that is a driver of LED saturation, gross lifetime savings, and remaining market potential.

Activities:

Distributor in-depth interviews – identify CT market share

- Conduct in-depth interviews (n=20) with distributors to understand past, present, and future market share in Connecticut (2019, 2021, 2023)
- Sample frame developed from participating [distributors](#) and distributors identified using SIC (5063) and NAICS (4236) code

Market model forecasting

- Leverage existing linear lighting stock turnover model (excel-based) and convert with Connecticut specific parameters to estimate installed stock, market share and sales, and program vs. non-program sales over time (2016-2028)
- Calibrate market model using CT market share from distributor interviews
- Estimate remaining potential for linear submarkets

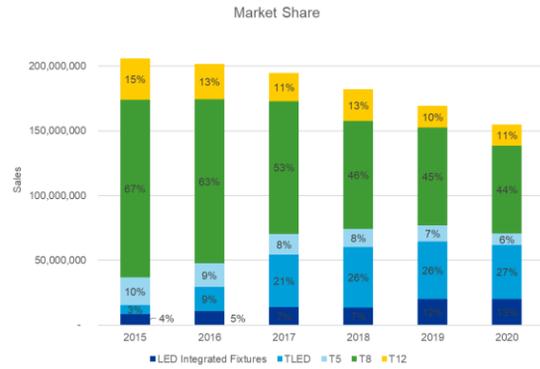
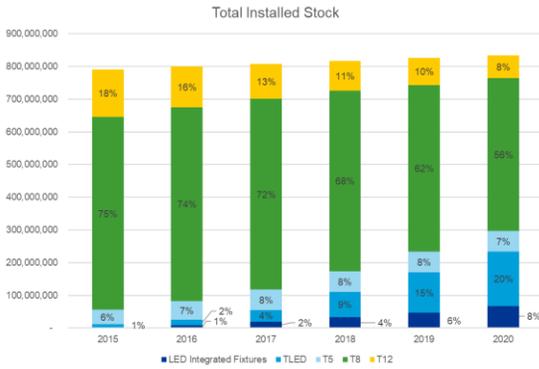


PHASE I RESULTS

- Linear fixture estimates for each year (2016-2028) and by building type
 - Number of installed sockets
 - Number of new construction, burned out, retrofitted sockets
 - Technology saturations across all sockets (T12, T8, T5, TLED, and integrated LED fixtures)
 - Program continuing and program ending scenarios
- Statewide results
 - Market sales by technology type
 - Impact parameter values, including AMLs, EULs, and industry practice baselines
 - Parameter recommendations for PSD
 - Remaining linear lighting market potential by building type for each year (2021-2028)
- Findings and insights offered by market actors through IDIs



EXAMPLE MODEL OUTPUTS



Percent of Installed Stock					
	T12	T8	T5	TLED	LED Integrated Fixtures
2015	18%	75%	6%	1%	0%
2016	16%	74%	7%	2%	1%
2017	13%	72%	8%	4%	2%
2018	11%	68%	8%	9%	4%
2019	10%	62%	8%	15%	6%
2020	8%	56%	7%	20%	8%



PHASE 1 BUDGET

Task	Description	Total
1	Project refinement, planning, interviews, kickoff	\$20,000
2	Survey design & implementation	\$34,000
3	Analysis and modeling	\$34,000
4	Draft/final report	\$15,000
Total		\$103,000

Balance to be used in Phase 2: \$296,000.



PHASE 1 DELIVERABLE SCHEDULE

All phase 1 deliverables will be completed by July 1st to inform program planning for 2022.

Schedule:

- Draft results memo by May 28th to the EAT
- Draft results to Committee for review
- Final results memo to Committee by July 1st
- Webinar of results by July 5th
- Phase 2 recommendations presentation/discuss with Committee in July

PHASE 2 RESEARCH

Phase 2 objective: the key objective for the second phase to validate and increase the certainty of the market estimates produced in phase 1. The data collection effort will depend on what the results are in phase 1 and where there are the biggest areas of uncertainty. Any additional research will be not be included in planning for 2022.

Phase 2 actions: the following is a list of potential phase 2 activities that will be determined after the results of phase 1 are produced:

Possible Phase 1 Outcome	Potential Phase 2 Activities
CT historical market share looks similar to Massachusetts	<ul style="list-style-type: none"> • Conduct targeted customer on-sites in potential areas of remaining opportunity – customer segments, application submarkets, lighting controls • Convene expert panel to review forecasts
CT historical market share looks similar to national trends/forecasts	<ul style="list-style-type: none"> • Convene expert panel to review market share results and model forecasts • Conduct customer on-site/virtual surveys to validate market-level saturation • Trade ally interviews to understand differences in the market compared to Massachusetts • Conduct customer CATI survey to update ER vs. ROF split
Additional topics	<ul style="list-style-type: none"> • Update NTG depending on results of ongoing Massachusetts research • Characterize current lighting purchasing behavior • Estimate opportunity for network-enabled control technologies



QUESTIONS?

METHODOLOGY OF STOCK TURNOVER MODEL

