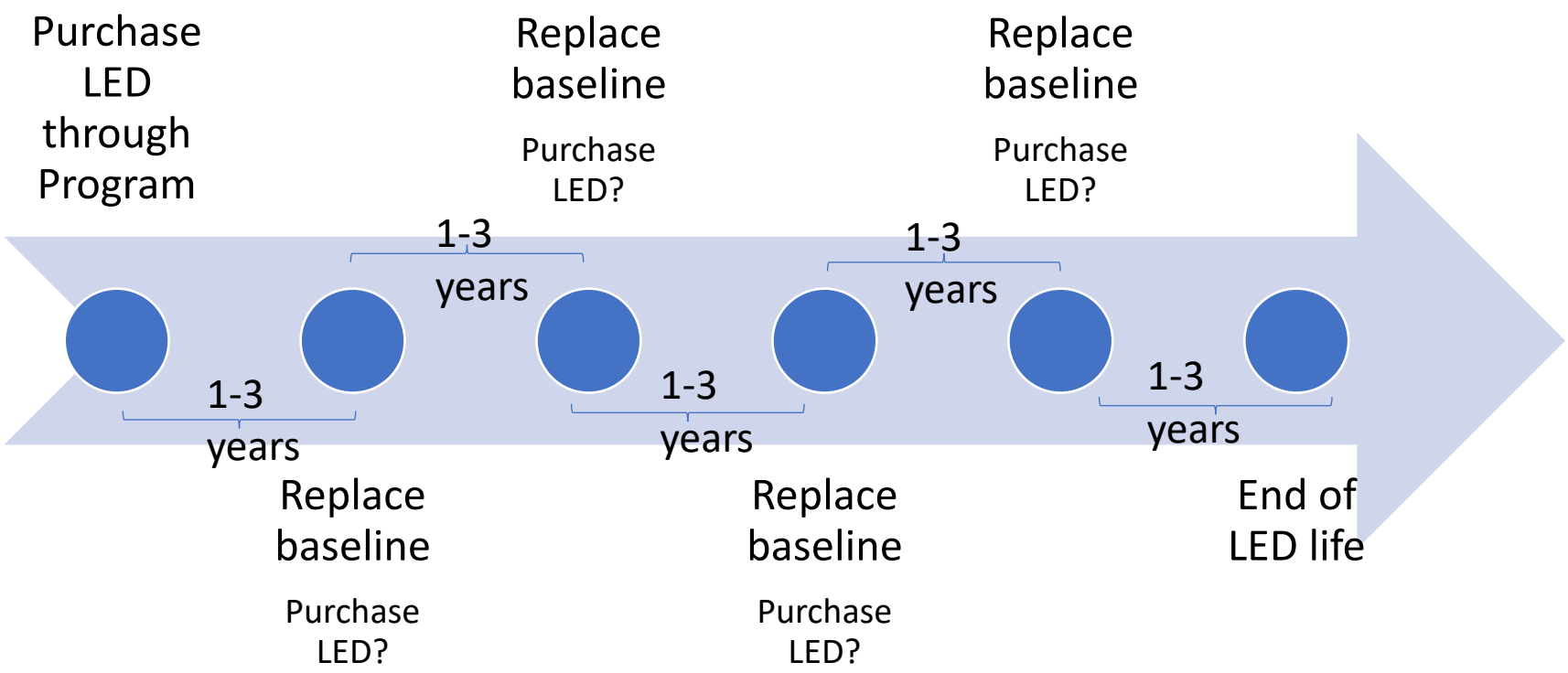
APEX ANALYTICS

Residential Lighting EUL Adjustments

June 16, 2020

The Lighting Dilemma

- Technical life between the energy efficient option (LEDs at 15+ years) is longer than current baseline standard option (halogens at 1 to 3 years)

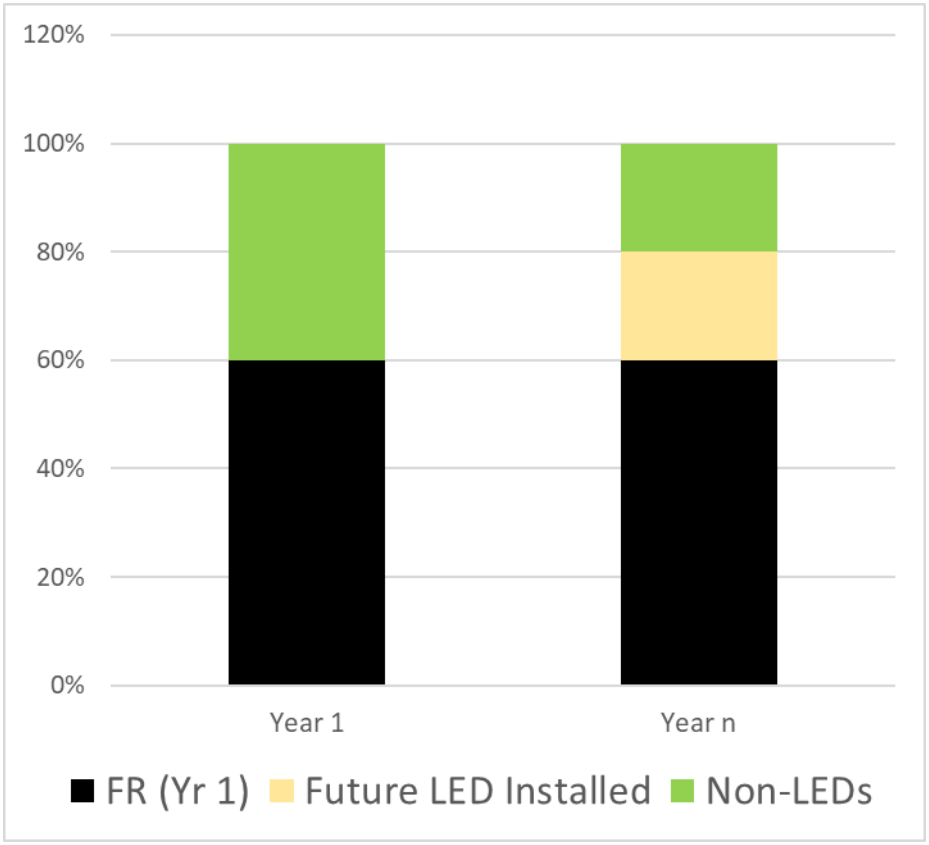


Approaches to Adjusting Measure Life

- Negotiated “sunset” year
- Model to estimate the likelihood the socket would be filled with an LED
- Take half of the technical life

Conceptual Approach to Modeling

- Freerider savings already zeroed out
- Adjust the year-to-year savings for the non-freeriders
- May not reflect typical consumer (e.g., laggards)



IL Modeling Approach

- Proposed by VEIC as part of TRM process
- Total of approximately eight meetings over six months
- Stakeholders include VEIC, evaluators, utilities, Energy Futures Group
- Finalized end of May 2020

Adjusting Baseline – IL Approach (A-lines)

- Start with stipulated forecast of naturally occurring adoption
- Based on non-program states recent market share, plus DOE saturation forecast

Natural LED Growth per year		46%	8%	8%	8%	5%	5%	5%	5%	5%	5%	5%	3%	2%
	Baseline Lighting Forecast Committee Derived Assumptions for Market Share Absent a Program													
	2016	**2017**	**2018**	**2019**	**2020**	**2021**	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
LED		33%	**48%**	**52%**	56%	61%	64%	67%	70%	74%	77%	81%	85%	88%	90%
CFL		3%	**2%**	**3%**	1%	1%	1%	1%	0%	0%	0%	0%	0%	0%	0%
Halogen		50%	**43%**	**40%**	38%	34%	31%	28%	27%	24%	20%	16%	12%	10%	8%
Incandescent		14%	**7%**	**5%**	5%	5%	4%	4%	3%	3%	3%	2%	2%	2%	2%

Adjusting Baseline – IL Approach (A-lines)

- Calculate converted baseline adjustment
- Delta watts decreases accordingly

	For LED Purchased in 2020										
			2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
	Baseline	LED (+CFL)	57%	62%	65%	68%	70%	74%	77%	81%	85%	88%
		HAL	38%	34%	31%	28%	27%	24%	20%	16%	12%	10%
		INC	5%	5%	4%	4%	3%	3%	3%	2%	2%	2%
			100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
	Cumulative % of initial non-freeriders (i.e. those that would have purchased inc/hal) who would have shifted			10%	18%	25%	30%	39%	47%	56%	66%	72%
		LED Watts	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5	9.5
	1st year base watts		47.1									
Non-Freerider delta watts (gross)			37.5	33.6	30.9	28.2	26.1	23.0	19.8	16.4	12.8	10.6

Adjusting Baseline – IL Approach (A-lines)

- Result is a stream of gross or net savings that can be adjusted as a stream, truncated life, or mid-life adjustment.
- Options for how to claim savings
- Note they limit the stream to 10 years

Option 1: Stream of savings

Delta Watts Stream	NPV	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
	235.25	37.5	33.6	30.9	28.2	26.1	23.0	19.8	16.4	12.8	10.6

Option 2: Truncated Lifetime

	NPV	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Truncated Life	235.25	37.5	37.5	37.5	37.5	37.5	37.5	11.3	0.0	0.0	0.0
Lifetime = 235.25/37.5 = 6.3 years											

Option 3: Mid-life adjustment

	NPV	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Mid-life Adjustment	235.08	37.54	37.54	37.54	37.54	37.54	10.14	10.14	10.14	10.14	10.14

Adjusting Baseline – IL Approach (Reflectors)

- Reflectors

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
LED	**73%**	**83%**	85%	86%	87%	88%	89%	90%	90%	91%	91%	92%

Stream of savings and truncated measure life

NPV	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
321.72	45.3	40.3	37.8	35.2	32.6	30.0	28.6	27.3	26.0	24.6
Truncated Life = 321.73/45.3=7.1										

Adjusting Baseline – IL Approach (Other Specialty)

- Candelabra/Globes

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
LED	**24%**	**45%**	54%	58%	63%	66%	67%	69%	70%	71%	71%	72%

Stream of savings and truncated measure life

NPV	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
159.38	22.1	20.0	17.8	16.3	15.7	15.0	14.4	14.0	13.7	13.3
Truncated Life = 159.38/22.1 = 7.2										