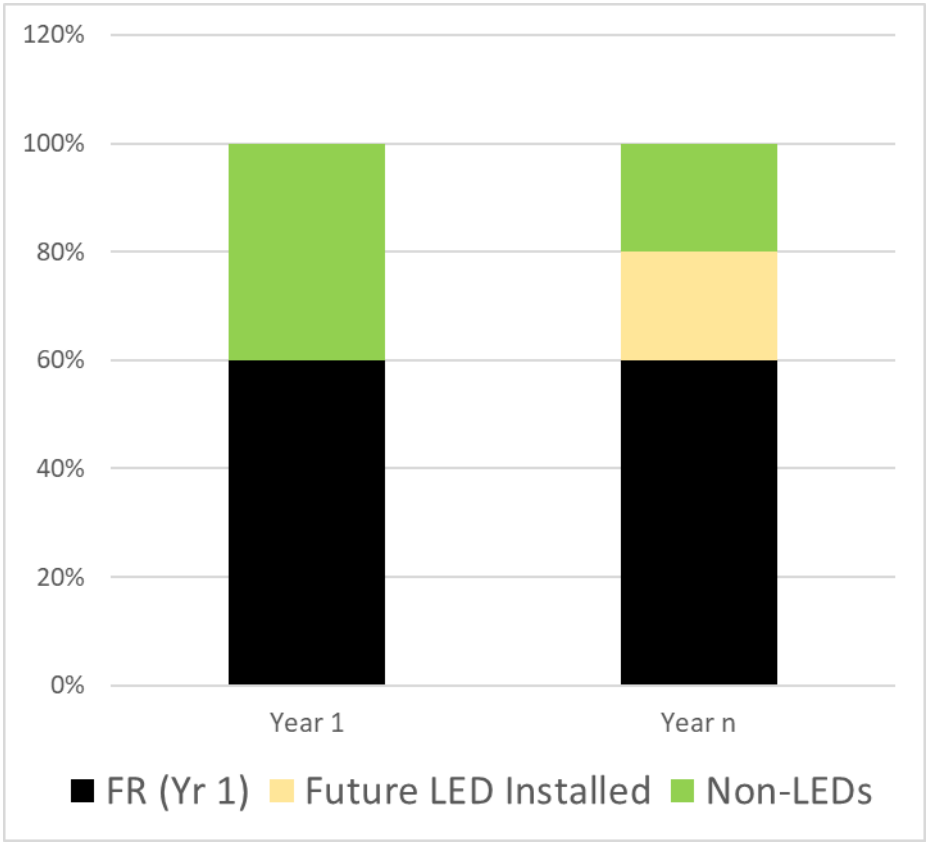
APEX ANALYTICS

# Residential Lighting EUL Adjustments

July 21, 2020

# 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)



# 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 | | | 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 | | | **48%** | **52%** | 56% | 61% | 64% | 67% | 70% | 74% | 77% | 81% | 85% | 88% | 90% |
| CFL | | | **2%** | **3%** | 1% | 1% | 1% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Halogen | | | **43%** | **40%** | 38% | 34% | 31% | 28% | 27% | 24% | 20% | 16% | 12% | 10% | 8% |
| Incandescent | | | **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 for Savings | NPV | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Annual Decline | 154.4 | 28.5 | 25.5 | 23.5 | 21.4 | 19.8 | 17.5 | 15.0 | 12.5 | 9.7 | 8.0 |
| Midlife Adjustment | 154.4 | 28.5 | 28.5 | 28.5 | 28.5 | 28.5 | 7.0 | 7.0 | 7.0 | 7.0 | 7.0 |
| | | | | | | | | | | | |
| Adjusted EUL (Years) | 5.4 | | | | | | | | | | |

# Adjusting Baseline – IL Approach (Reflectors)

- Reflectors

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Natural LED Growth per year | | | 14% | 2% | 2% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% |
| | 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 | | | 73% | 83% | 85% | 86% | 87% | 88% | 89% | 90% | 90% | 91% | 91% | 92% | 92% |
| CFL | | | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Halogen | | | 17% | 14% | 12% | 12% | 12% | 12% | 11% | 10% | 10% | 9% | 9% | 8% | 8% |
| Incandescent | | | 10% | 3% | 3% | 2% | 1% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |

| Option for Savings | NPV | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Annual Decline | 395.5 | 54.0 | 48.0 | 48.0 | 48.0 | 48.0 | 48.0 | 48.0 | 48.0 | 48.0 | 48.0 |
| Midlife Adjustment | 395.5 | 54.0 | 54.0 | 54.0 | 54.0 | 54.0 | 42.1 | 42.1 | 42.1 | 42.1 | 42.1 |
| | | | | | | | | | | | |
| Adjusted EUL (Years) | 7.3 | | | | | | | | | | |

# Adjusting Baseline – IL Approach (Other Specialty)

- Candelabra/Globes

| | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Natural LED Growth per year | | | 88% | 20% | 8% | 8% | 5% | 2% | 2% | 2% | 1% | 1% | 1% | 1% |
| | 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 | | | 24% | 45% | 54% | 58% | 63% | 66% | 67% | 69% | 70% | 71% | 71% | 72% | 73% |
| CFL | | | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% | 0% |
| Halogen | | | 2% | 2% | 2% | 2% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 1% | 0% |
| Incandescent | | | 74% | 53% | 44% | 40% | 36% | 33% | 31% | 30% | 29% | 28% | 27% | 27% | 0% |

| Option for Savings | NPV | 2020 | 2021 | 2022 | 2023 | 2024 | 2025 | 2026 | 2027 | 2028 | 2029 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Annual Decline | 144.3 | 23.7 | 21.5 | 19.1 | 17.5 | 16.8 | 16.1 | 15.4 | 15.0 | 14.7 | 14.3 |
| Midlife Adjustment | 144.3 | 23.7 | 23.7 | 23.7 | 23.7 | 23.7 | 10.3 | 10.3 | 10.3 | 10.3 | 10.3 |
| | | | | | | | | | | | |
| Adjusted EUL (Years) | 6.1 | | | | | | | | | | |