DLC STAKEHOLDER MEETING 2018

July 9 - 11 • Boston, MA

The Future of Lighting Efficiency

Panelists

Dan Mellinger

Energy Futures Group

Kelly Seeger

Signify

Tanner Smith

Sparkfund

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The Future of C&I Lighting Energy Savings

Dan Mellinger, PE LC
Energy Futures Group

Commercial & Industrial (C&I) Lighting Energy Savings Forecast

Completed for DLC in 2018 with the intent to:

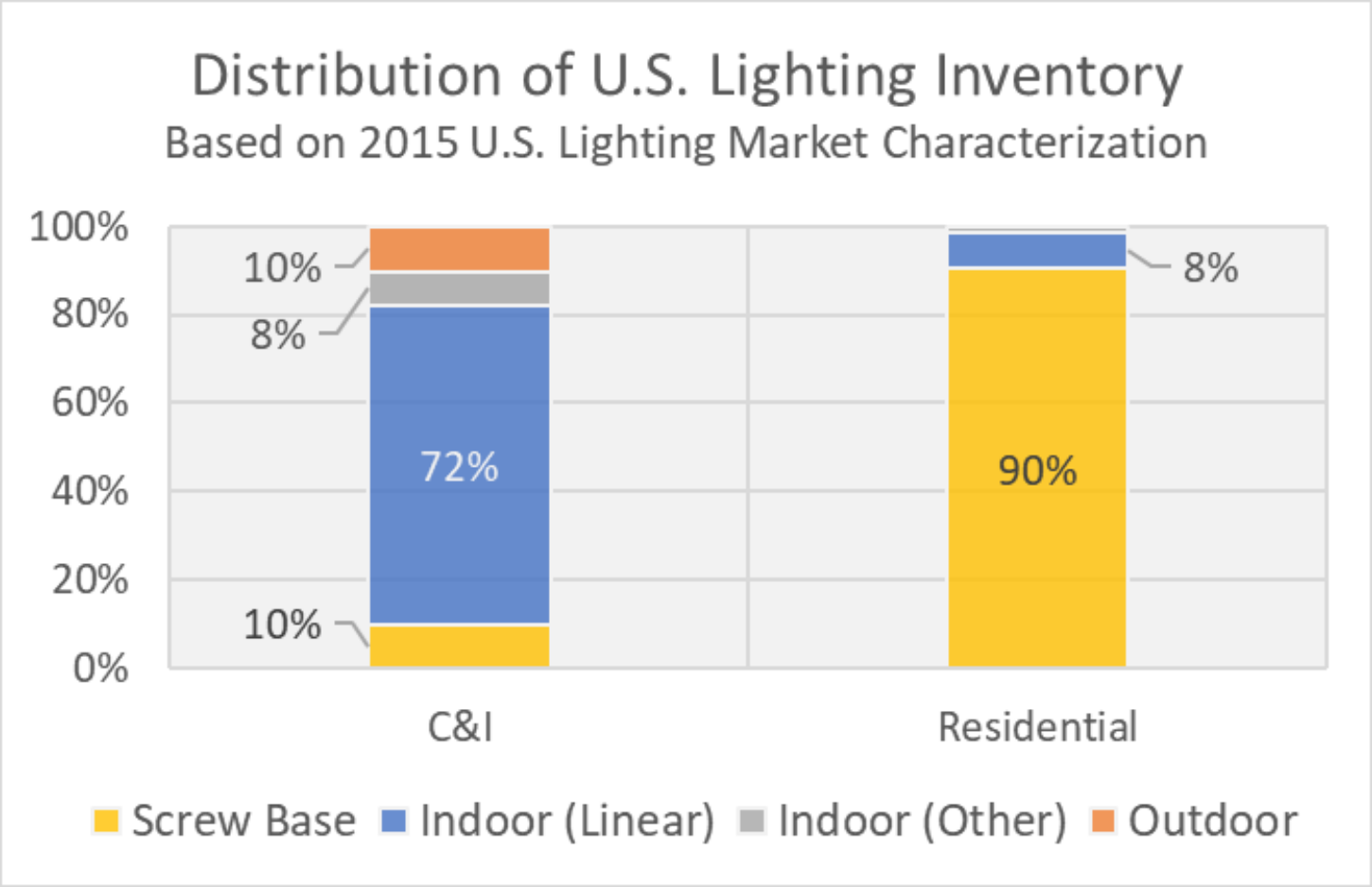
- Evaluate the long-term potential of C&I lighting savings
- Quantify the potential savings from Networked Lighting Controls
- Estimate the timeframe C&I lighting portfolios can be sustained
- Understand regional differences in adoption and savings

Residential Lighting Energy Savings

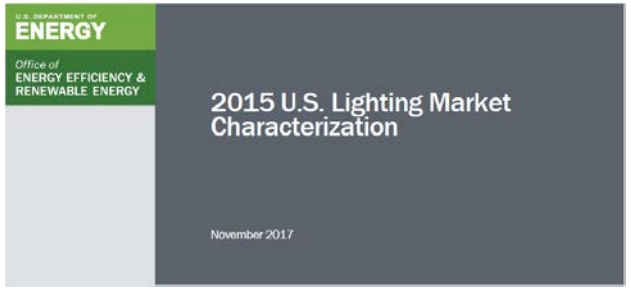
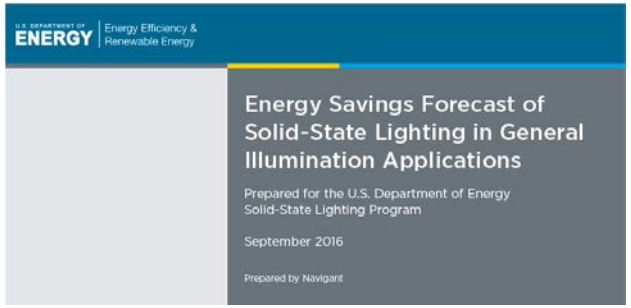
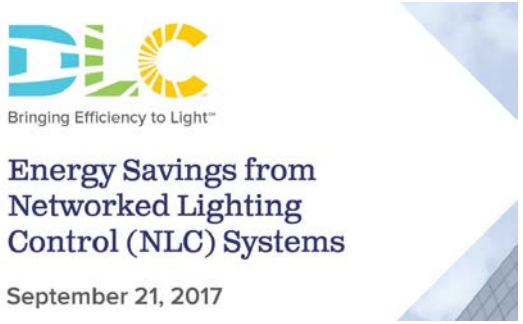
- Residential utility lighting pressures:
  - Saturation
  - Free ridership
  - EISA 2020
- Results shown are for illustration purposes only

Residential ≠ C&I

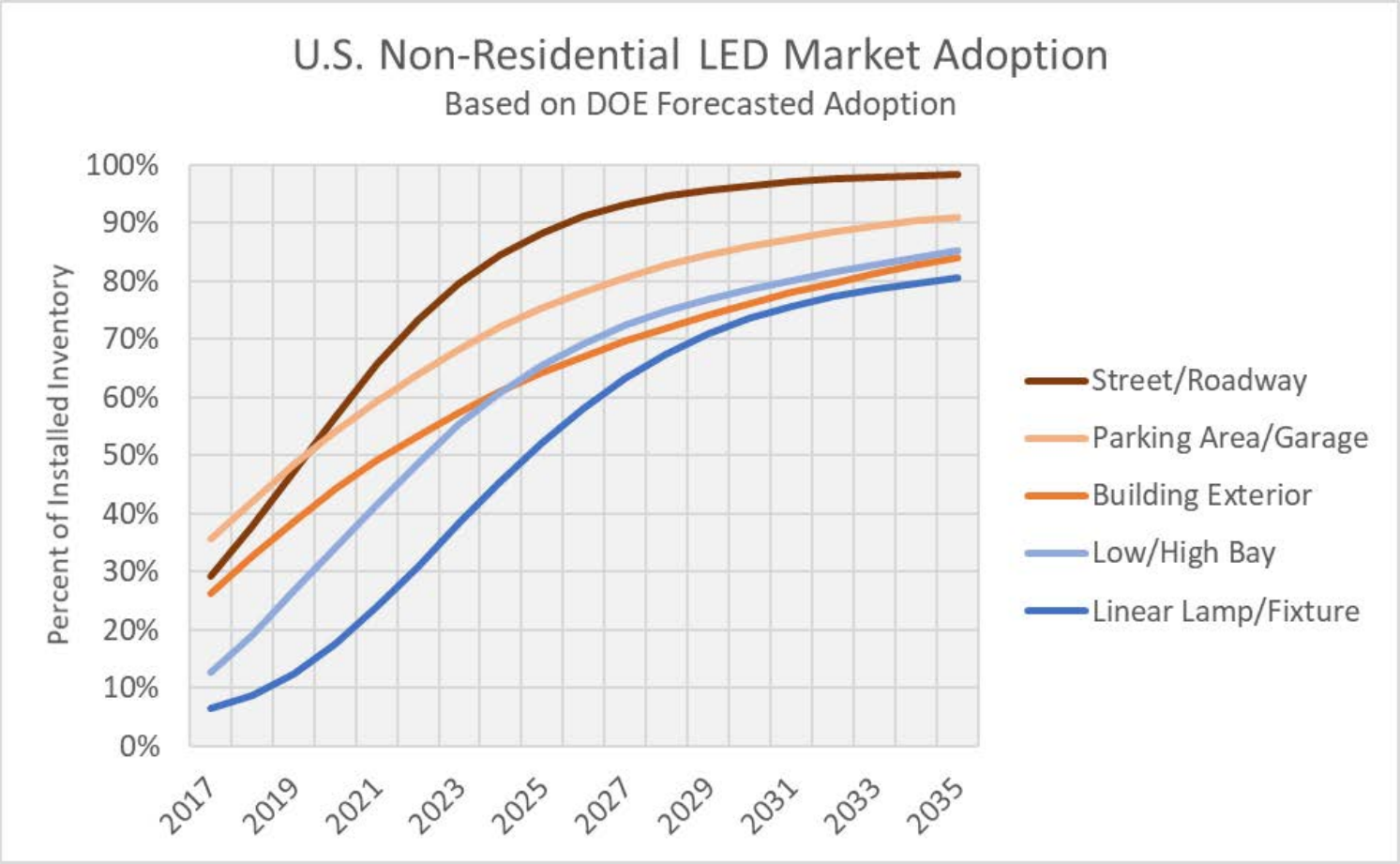
- EISA impact to C&I sector will be far less pronounced
- The vast majority of C&I installed inventory consists of linear lamps & fixtures
- C&I product categories generally have low LED market penetration and higher savings potential



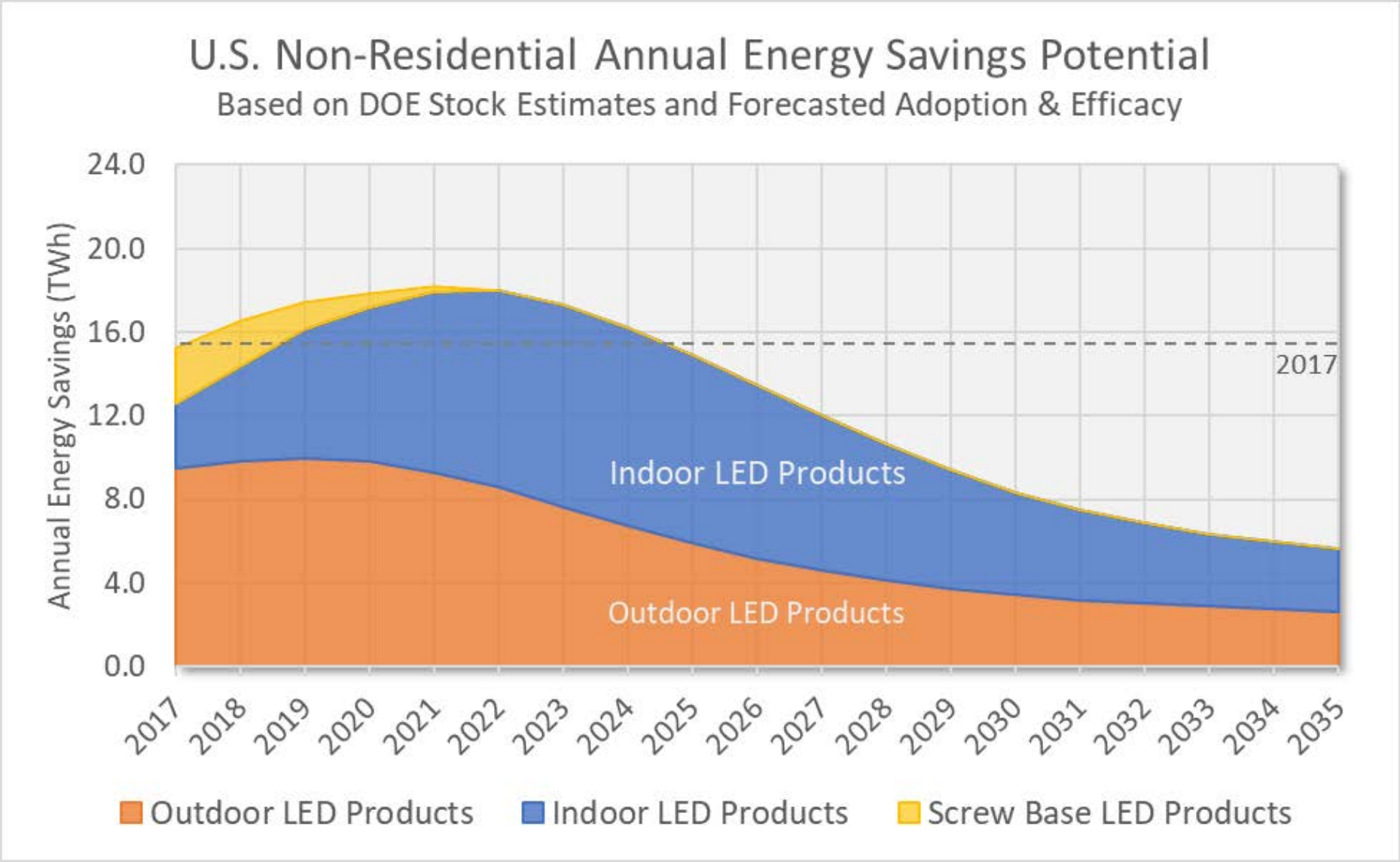
National C&I Lighting Forecast

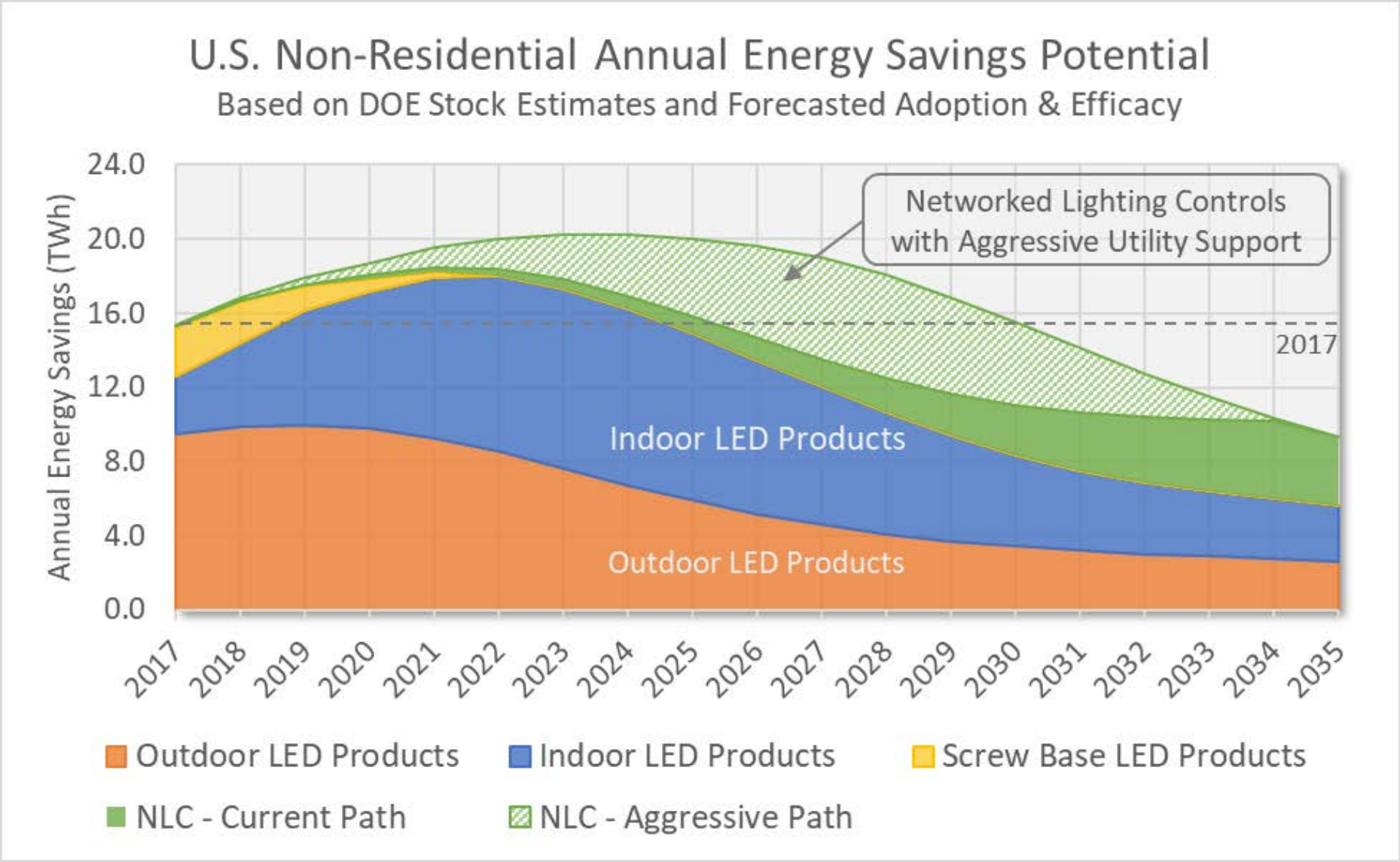
	2015 U.S. Lighting Market Characterization (U.S. DOE, 2017)	• C&I lighting inventories • C&I LED market penetration • Baseline technology characteristics
	Energy Savings Forecast of Solid-State Lighting in General Illumination Applications (U.S. DOE, 2016)	• LED adoption rates • LED efficacy forecast • NLC adoption rates • NLC savings estimate (2035)
	Energy Savings from Networked Lighting Control Systems (DLC, 2017)	• NLC savings estimate (2017)

C&I LED Adoption Forecast



- All product categories are accelerating; none have surpassed 50%
- Outdoor products have achieved higher levels due to earlier market introductions and greater savings potential
- Linear products have achieved only 6.5% LED adoption as of 2017


U.S. Non-Residential Annual Energy Savings Potential
Based on DOE Stock Estimates and Forecasted Adoption & Efficacy
Annual Energy Savings (TWh)
24.0
20.0
16.0
12.0
8.0
4.0
0.0
2017
Indoor LED Products
Outdoor LED Products
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
2033
2034
2035
Outdoor LED Products
Indoor LED Products
Screw Base LED Products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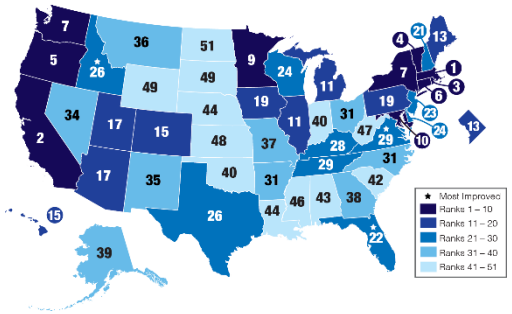
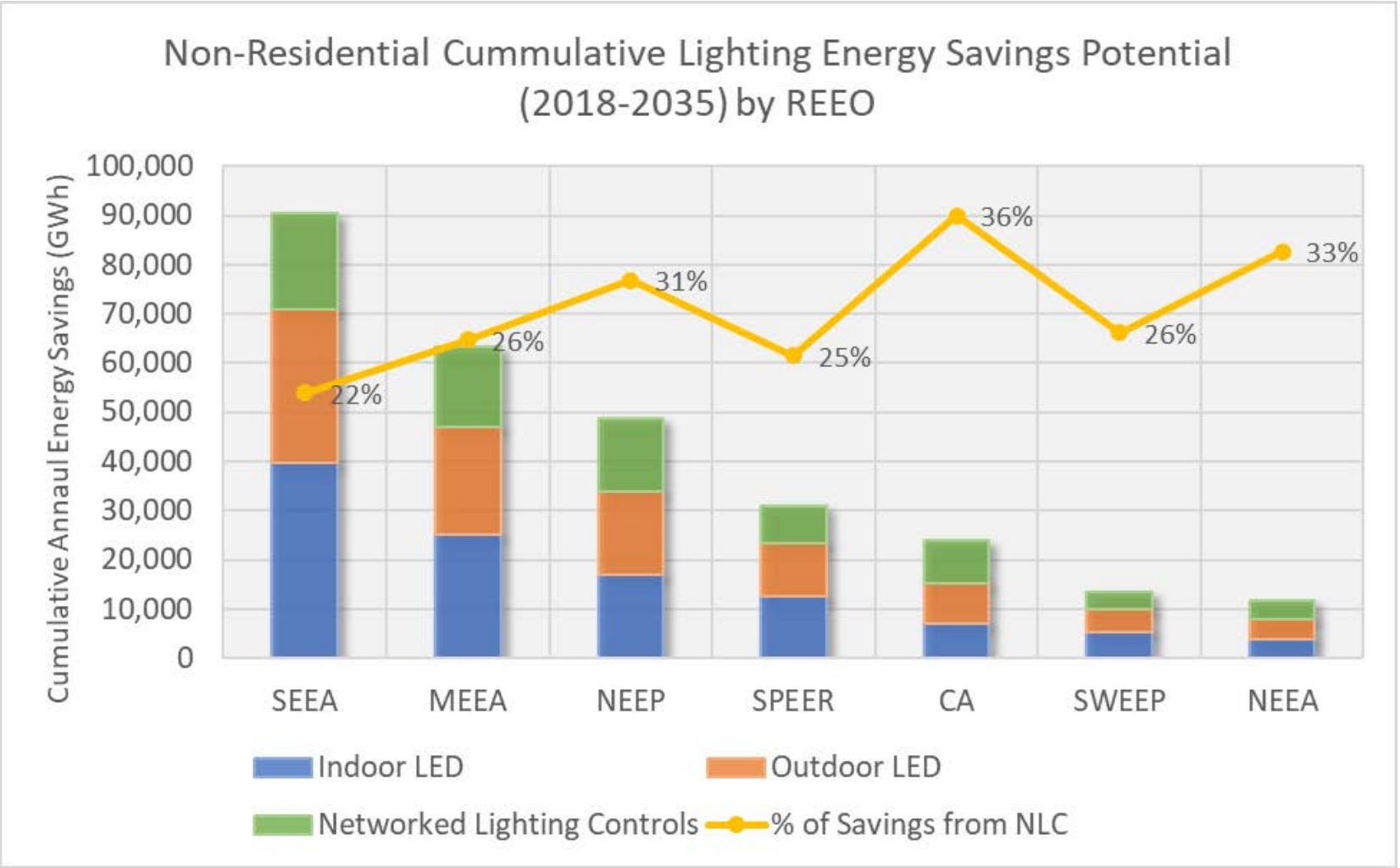
Based on DOE Stock Estimates and Forecasted Adoption & Efficacy
Annual Energy Savings (TWh)
24.0
20.0
16.0
12.0
8.0
4.0
0.0
Networked Lighting Controls with Aggressive Utility Support
2017
Indoor LED Products
Outdoor LED Products
2017
2018
2019
2020
2021
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031
2032
2033
2034
2035
Outdoor LED Products
Indoor LED Products
Screw Base LED Products
NLC - Current Path
NLC - Aggressive Path

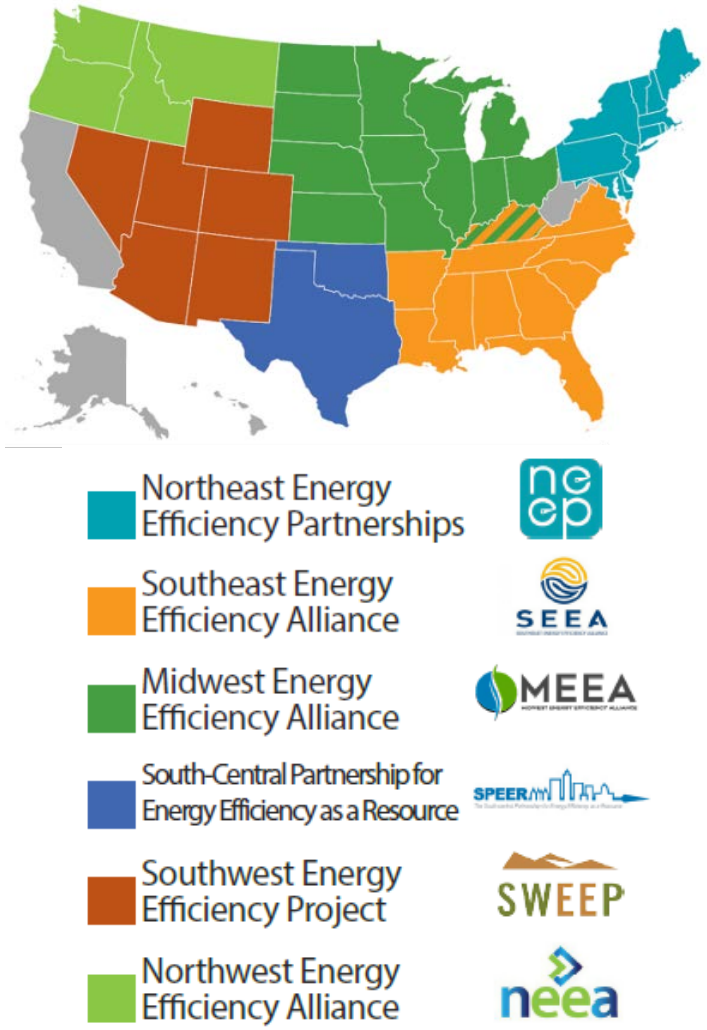
Regional C&I Lighting Forecast

National analysis results plus:

	2017 State Energy Efficiency Scorecard (ACEEE, 2017)	• State scores for utility programs and building energy efficiency policies • Used for moving states up/down the LED & NLC adoption curves and adjusting baselines
CBECS	Commercial Building Energy Consumption Survey (EIA, 2012)	• Commercial building floorspace by census region • Used for scaling national results

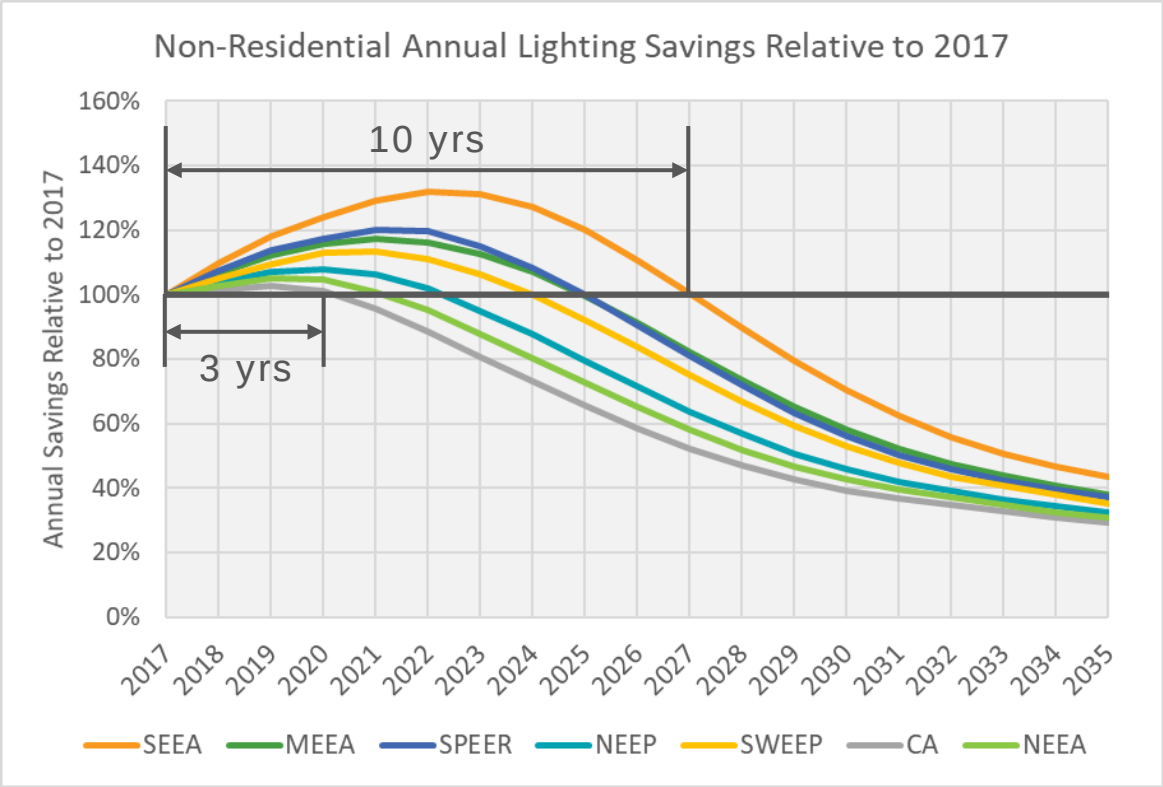


Regional Energy Efficiency Organizations (REEO)

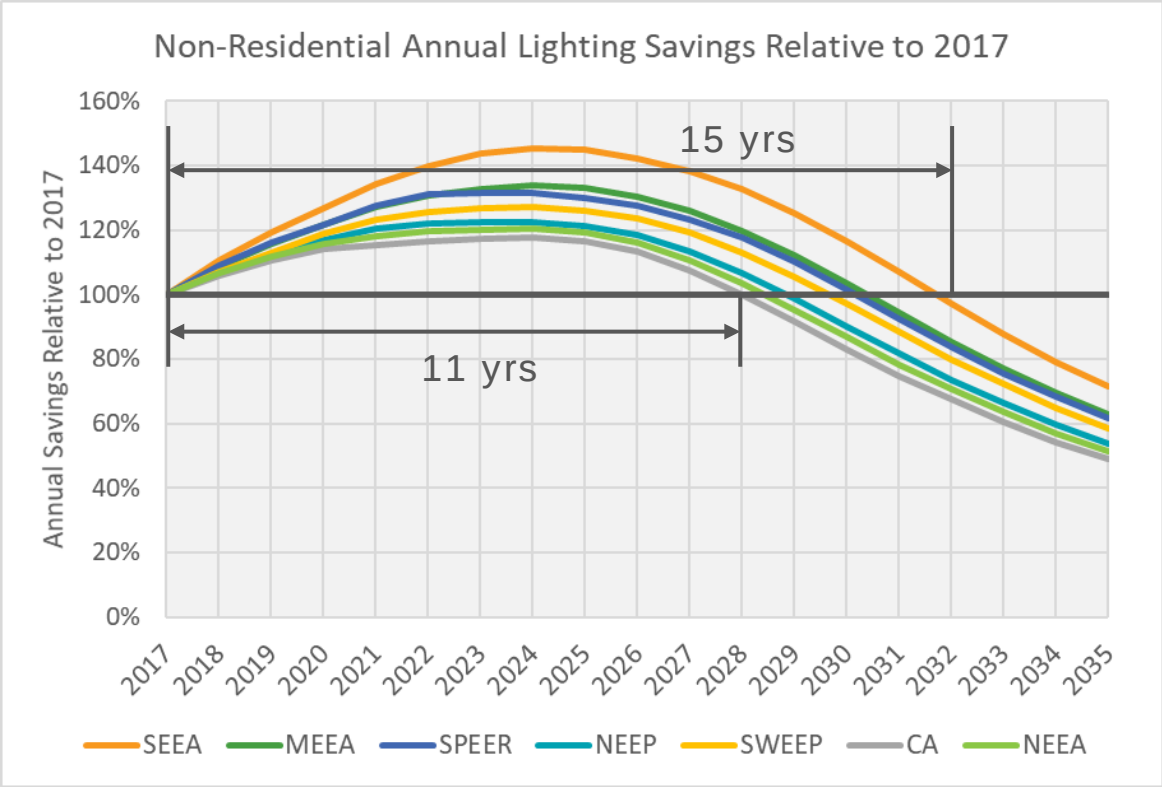


NLCs Create a Sustainable Savings Path

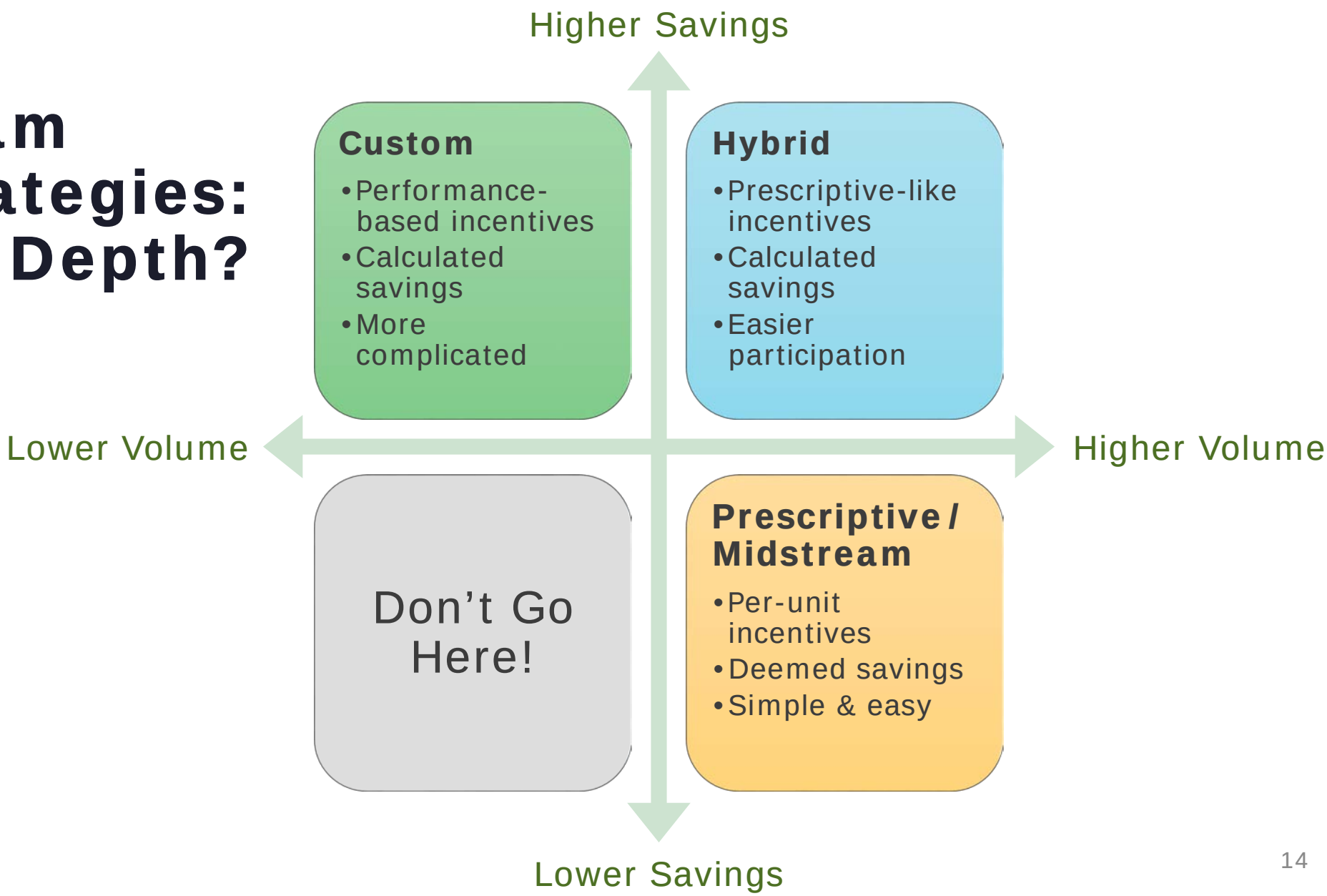
C&I Savings without NLC



C&I Savings with NLC



NLC Program Design Strategies: Breadth or Depth?



NLC Program Spotlight

Hybrid

Wisconsin Focus on Energy

- $/SF NLC rebate with calculated savings
- Up to $0.25/SF
- Bonus for energy monitoring

Prescriptive

Bonneville Power Authority

- $/unit "kicker" rebate for NLC
- Indoor LED fixtures and highbay
- $40-100 adder

Midstream

MassSave and National Grid RI

- $/unit point of purchase rebate
- LED troffers with integrated NLC
- $40-45 adder

(also offers a Performance Lighting program)

Conclusions

Savings Wave, Not a Cliff

- Residential utility programs may be facing a cliff, but C&I utility programs will be riding a wave of savings for many years

NLCs Now

- Utility support for Networked Lighting Controls must ramp up now to capture savings during LED adoption

Sustain Program Savings with NLC

- Regardless of state or region, a path exists to maintain C&I lighting portfolios at or above current levels until the late 2020s

Breadth AND Depth

- Utility programs should employ a multitude of program strategies and service delivery models