Scaling Networked Lighting Controls through device-level data

Presented at the 2019 ACEEE National Conference on Energy Efficiency as a Resource

DIGITALIZATION & DATA ANALYTICS

22GW

We manage over 22GW of real-time operational data from solar PV, wind and storage assets

65GW

We have analysed over 65GW of operating wind assets

>7.9TWh

Our data-driven energy efficiency implementation services have saved over 7.9TWh over the last 3 years

>12,500

Our analysts review over 12,500 wind, solar and grid sensors each week
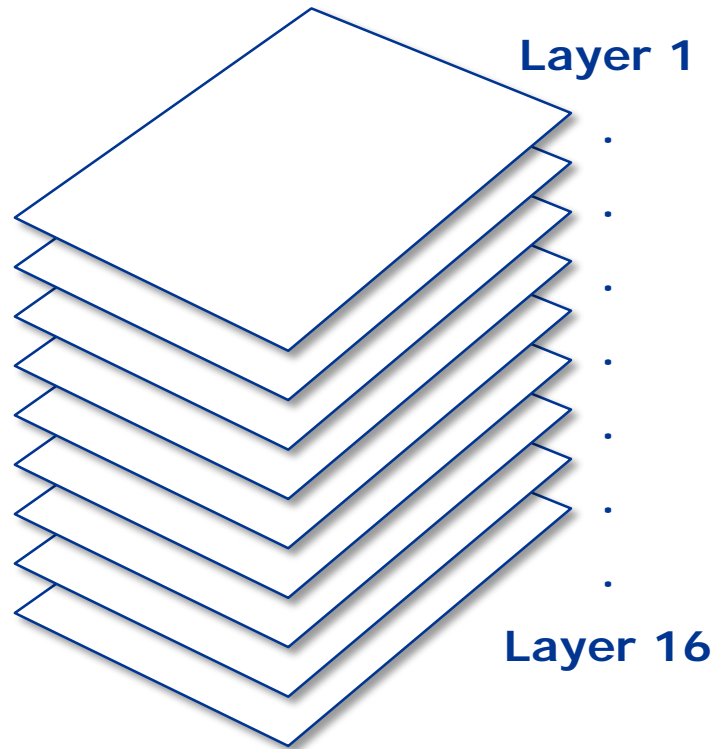
>99%

DNV GL's Smart Cable Guard detects the location of electrical cable network failures with an accuracy of greater than 99% and can prevent 65% of such failures

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What makes a lighting system "smart"?

data storage

data collection

data management
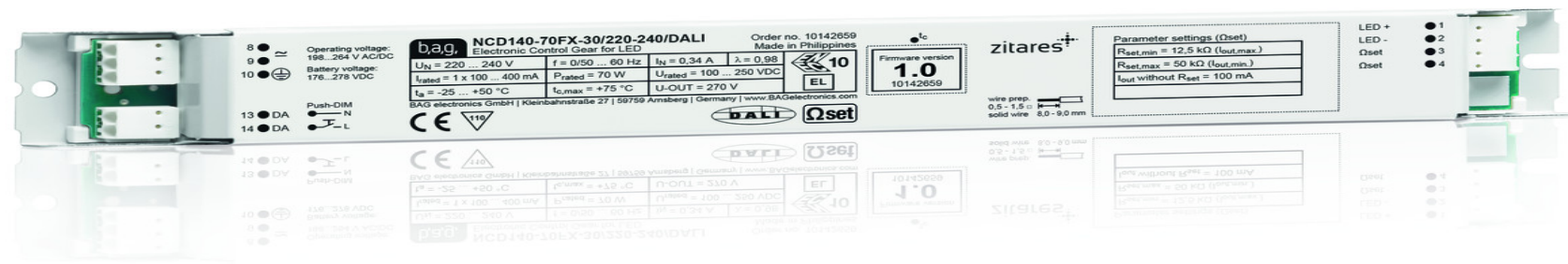
data visualization

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Networked controls stack strategies

- Dimming
- Task tuning
- Luminaire/sensor integration
- Individual IP addressability
- Dynamic scheduling
- Personal control

Layer 1

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Layer 16

- Load shedding
- Plug load control
- BMS integration
- Energy monitoring
- Daylight harvesting
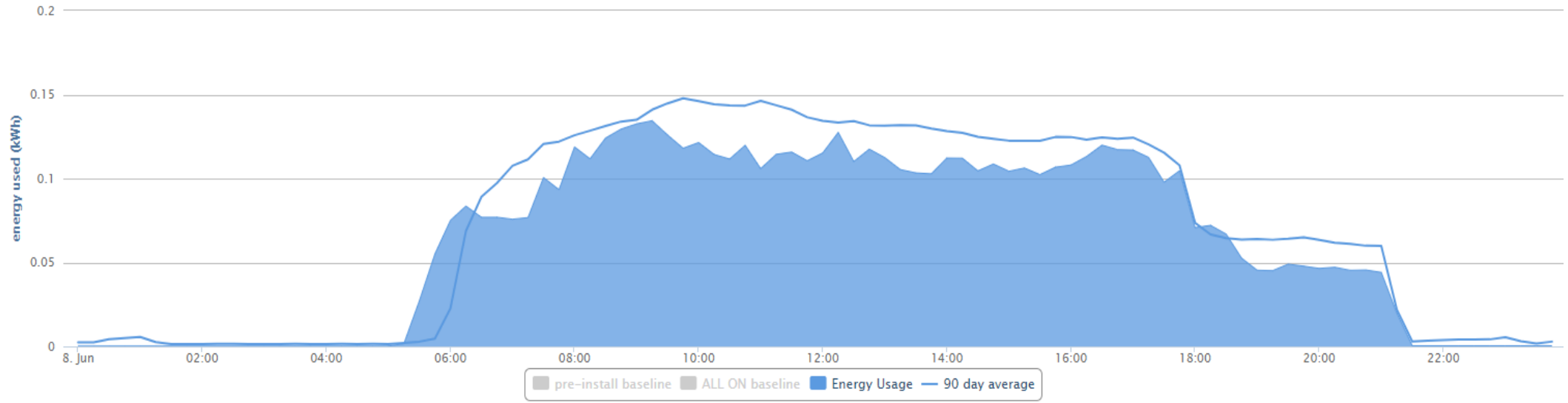- Occupancy sensing

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- Wireless sensors w/built-in meters
- Wireless Fixture Controllers w/ built-in meters
- LED drivers w/ built in meters

Source: Watt24, Enlighted, EMI

Energy Reporting

One Day Energy Usage Comparison
Energy Usage – Full Facility – Fri Jun 08, 2018

Legend: pre-install baseline | ALL ON baseline | Energy Usage | — 90 day average

Savings vs previous:	109 kWh
Savings vs ALL ON:	25 kWh
Total Energy Used	6.00 kWh
Peak 15min	0.13 kWh
Daily Average Energy Used	6.93 kWh

« Jun 07   Jun 08, 2018   Jun 09 »

Room   All Rooms
Zone   All Zones

Edit Report

The basics needed to scale NLC programs

Fully networked to a central server

<15 fixtures per zone

<15 min interval data

Data storage for >1 year

Exportable to common file type / open API

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Quasi-Prescriptive Program Design – Front End

Low Lumen / High Density

- $.75 sq./ft
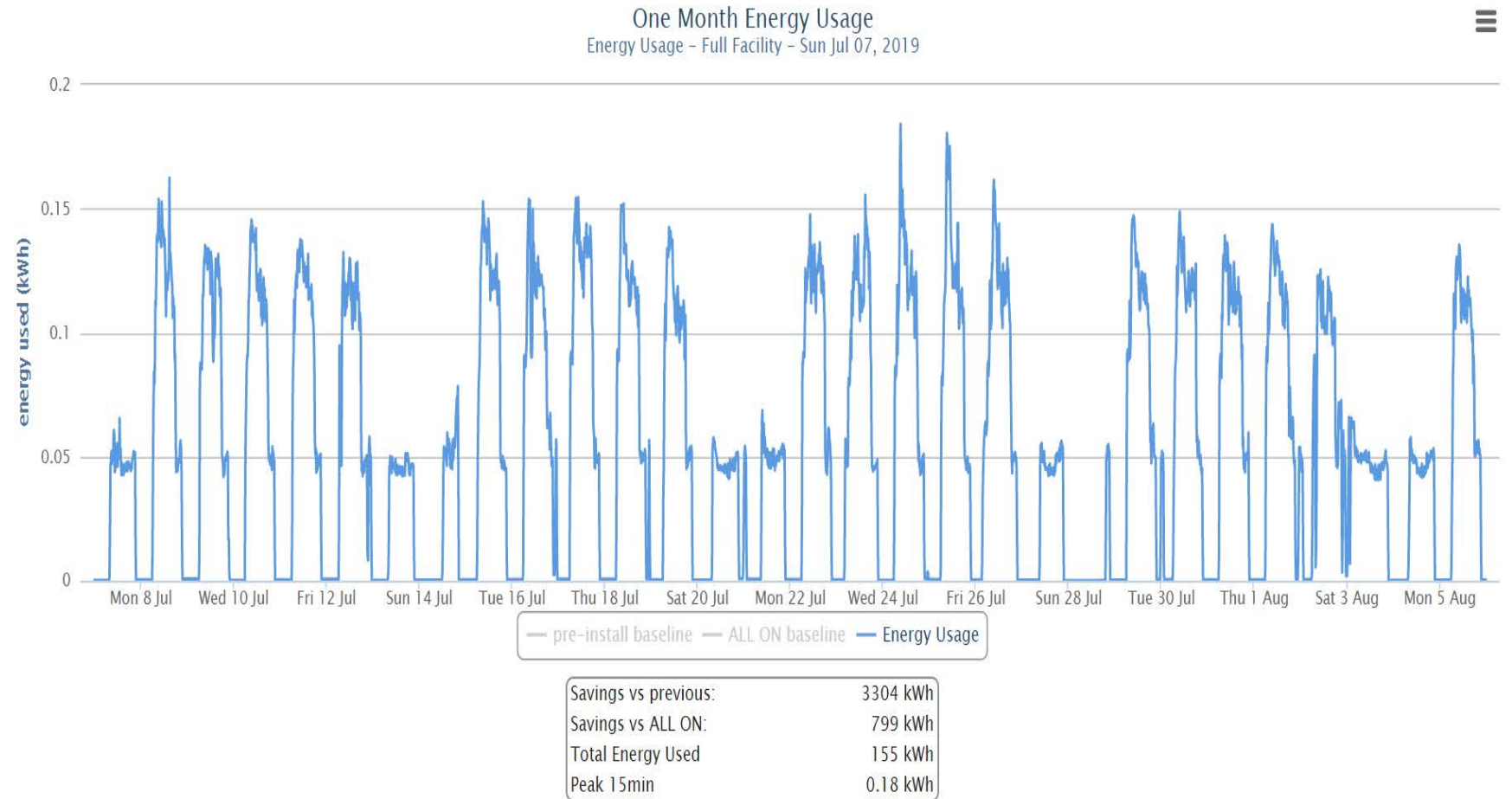- Lighting at or below 12′
- Offices, Classrooms, etc

High Lumen / Low Density

- $.030 sq./ft
- Lighting at or above 12′
- Warehouses, Gyms, etc

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Quasi-Prescriptive Program Design – Back End

- ENG establishes the project's baseline.
- Reviews proposed solution to specs are met
- Revisits job site 2 weeks after system commissioning
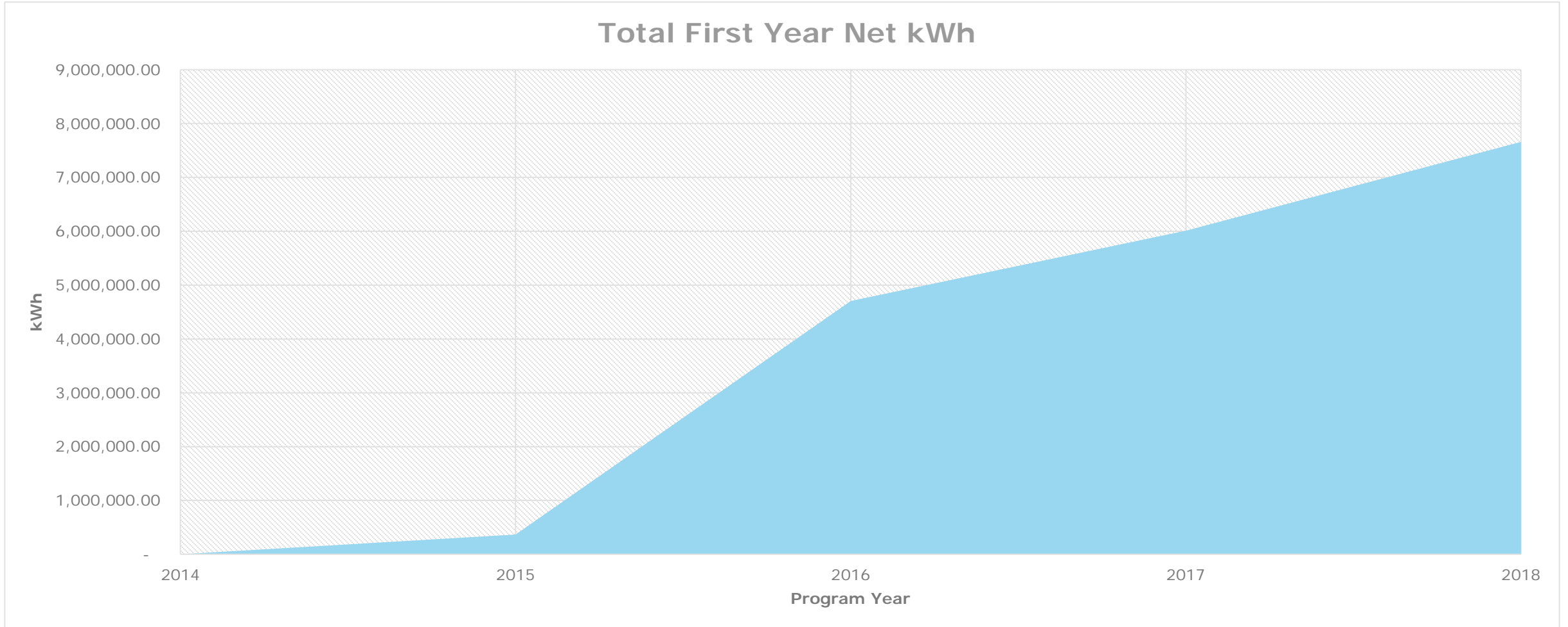- Downloads system data to complete the final app
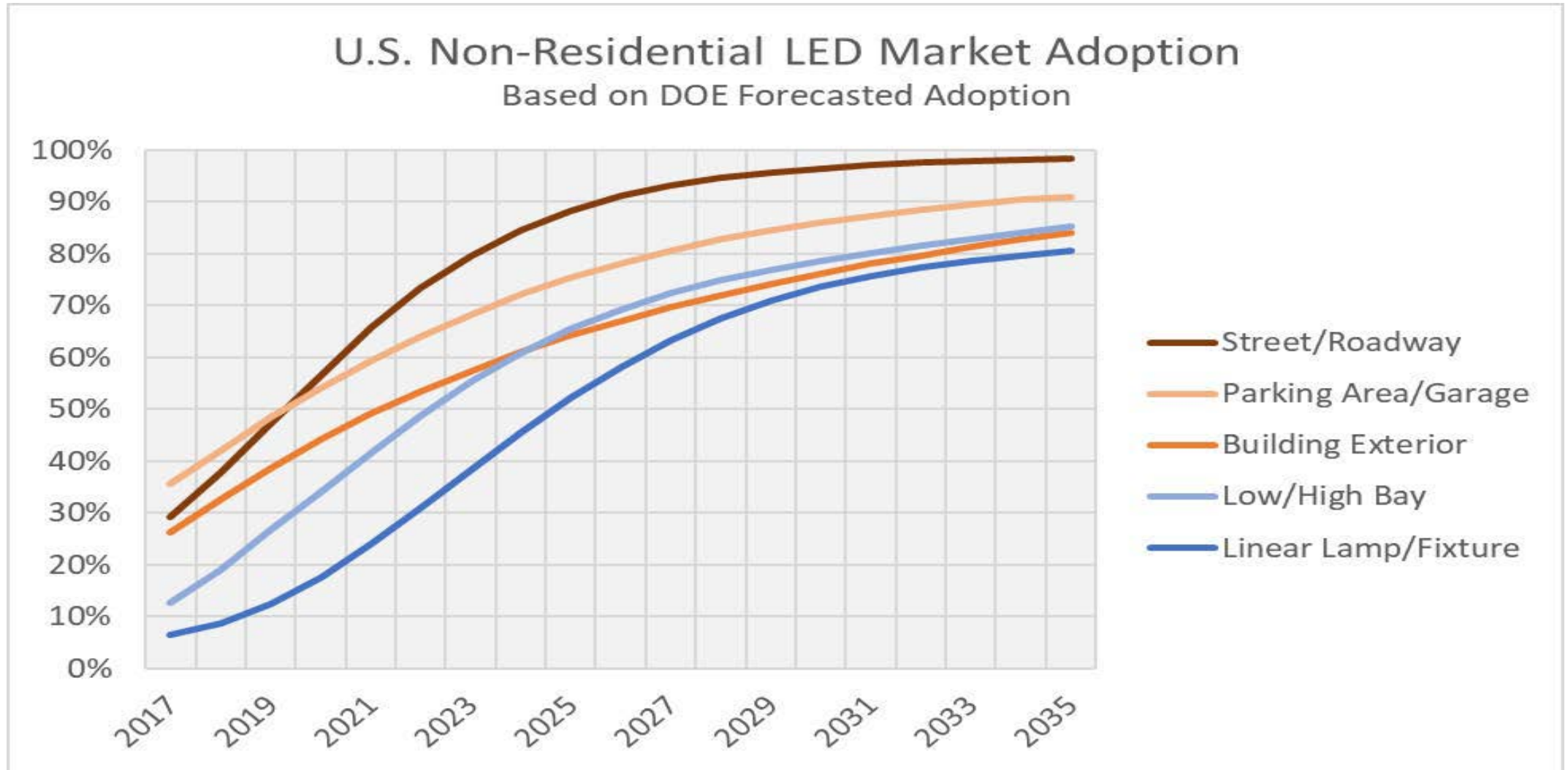

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"All energy savings (kWh) reported savings values were very reasonable, consistent"

Project	Ex Ante Reported Savings (kWh)	Ex Post Evaluated Savings (kWh)	Realization Rate
1	206,734	206,734	100%
2	252,619	252,619	100%
3	2,638,760	2,612,568	99%
4	46,405	46,405	100%
5	3,598,774	3,598,774	100%
6	248,223	248,223	100%
7	262,332	262,332	100%
Total	**7,253,846**	**7,227,654**	**100%**

Year over Year Savings

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Things are about to accelerate!

U.S. Non-Residential LED Market Adoption
Based on DOE Forecasted Adoption

Source: DLC

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Thank you!

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