

# OUTDOOR LIGHTING



**WHAT  
DO  
WE  
KNOW?**

**WHAT  
SHOULD  
WE  
KNOW?**



**WHY SHOULD WE  
CARE?**

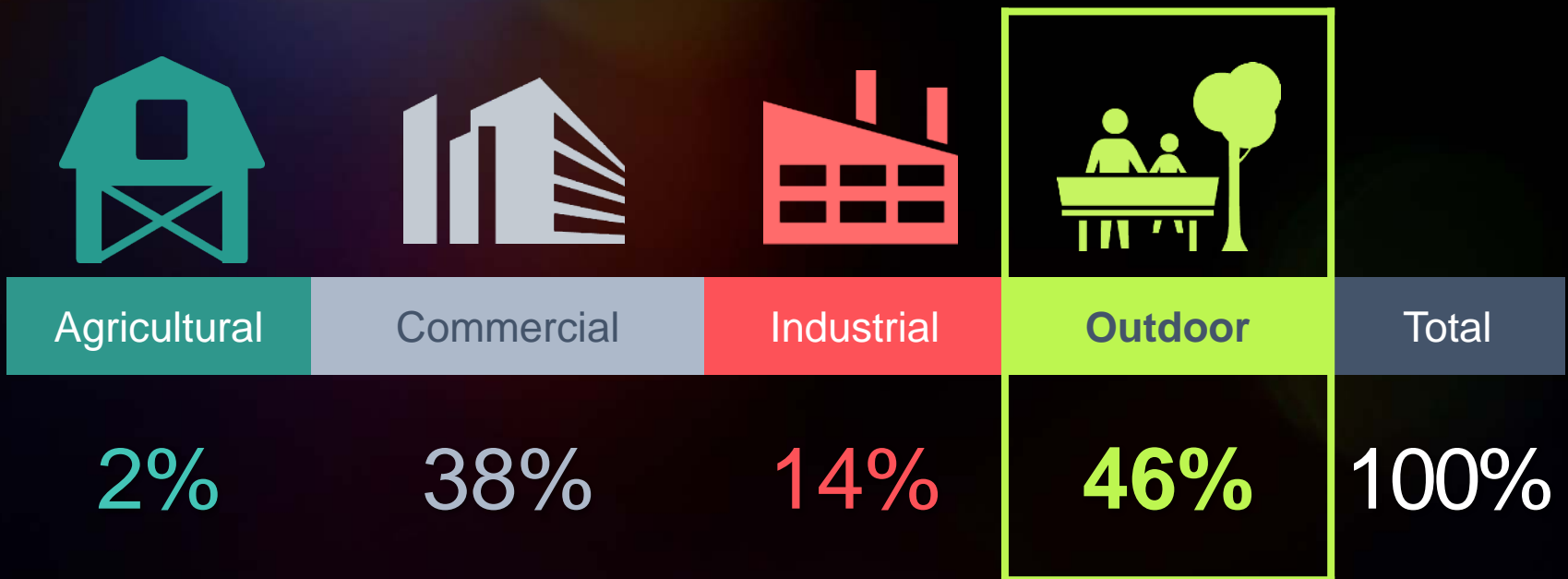


~ 370

aMW

# LOT OF PROGRAM ACTIVITY

## Savings By Sector (aMW)

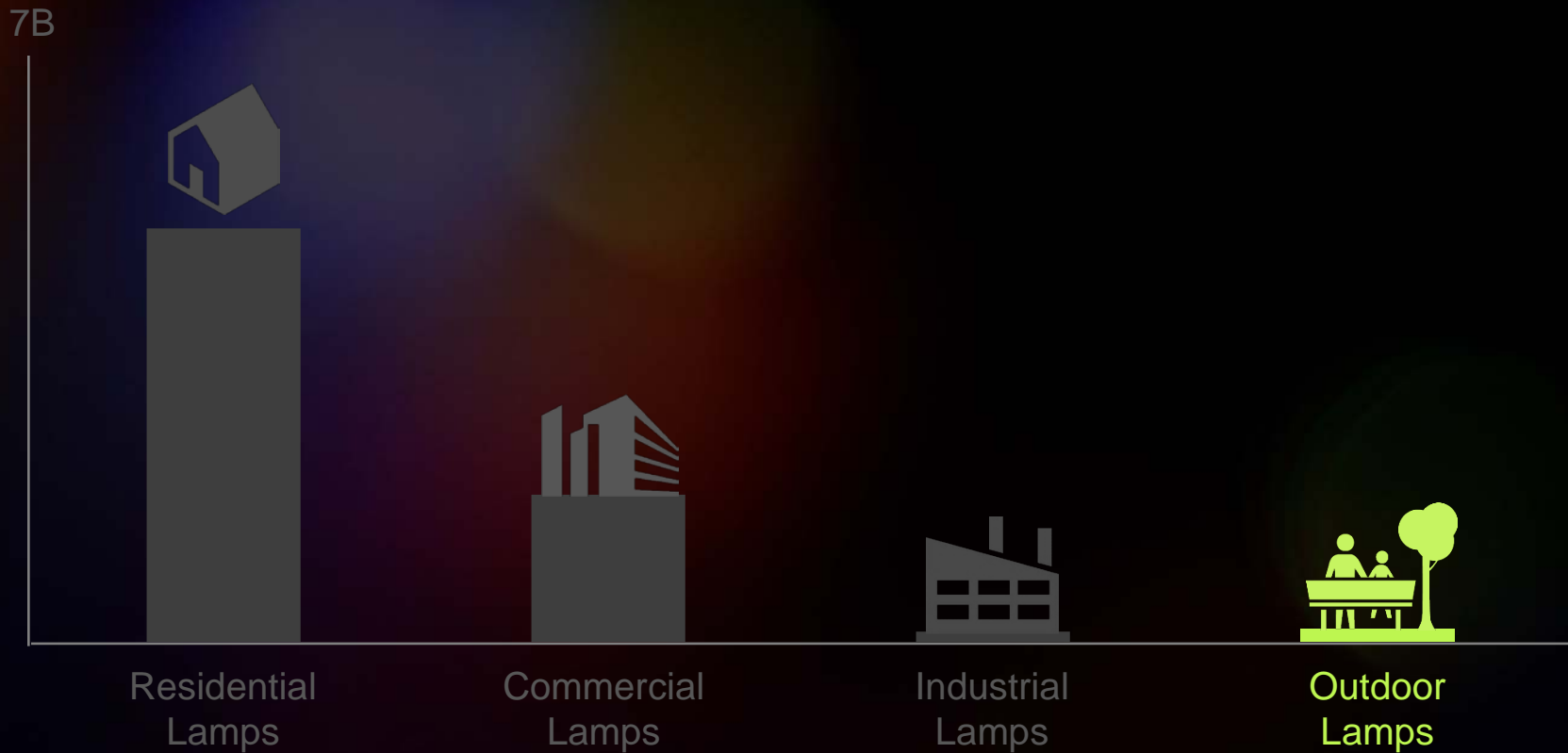


Source: BPA Option 1 Program Data for FY15

# PROGRAM MEASURES

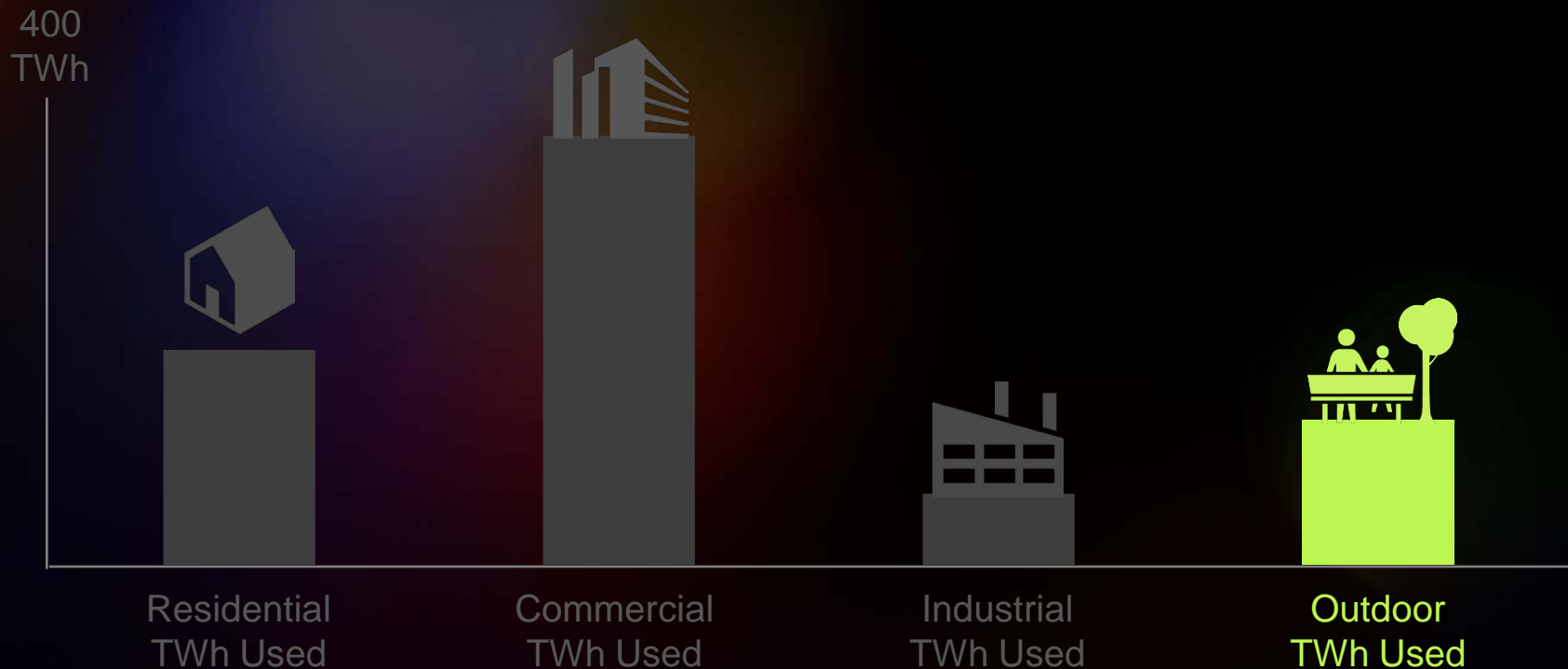
EXISTING → EFFICIENT TECHNOLOGY	% OF SAVINGS
 →  HID → LED Exterior	83%
 →  Incandescent → LED Exterior	6%
 →  Incandescent → LED Small Lamp/Fixture	3%
 →  HID → HID MH	2%
 →  HID → LED Small Lamp/Fixture	1%
 →  T12 → LED Tube	1%
Other	4%
<b>Total</b>	<b>100%</b>

# FEWER LAMPS....



**2% Share of Installed Lamps**

# ...HIGHER WATTAGE AND OPERATING HOURS



**17% Share of Lighting Electricity Use**



# WHAT'S IN THE OUTDOOR MARKET?

Building Exterior, 234 aMW

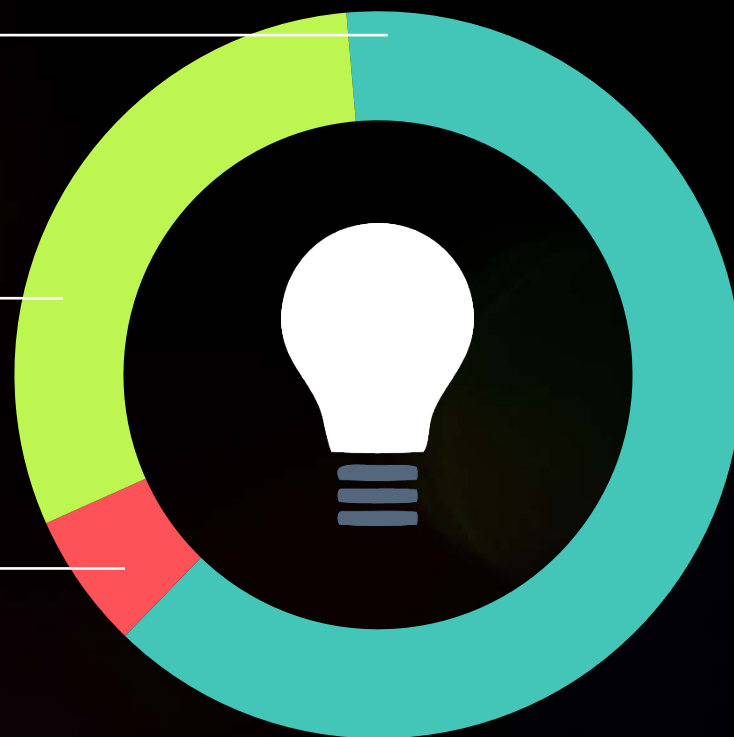
**63%**

Street & Roadway Lighting, 113 aMW

**31%**

Covered Parking Garages, 23 aMW

**6%**



# WHAT WE DID



## Data Gap Analysis

Reviewed BPA program data, CBSA, 7<sup>th</sup> Plan, DOE reports



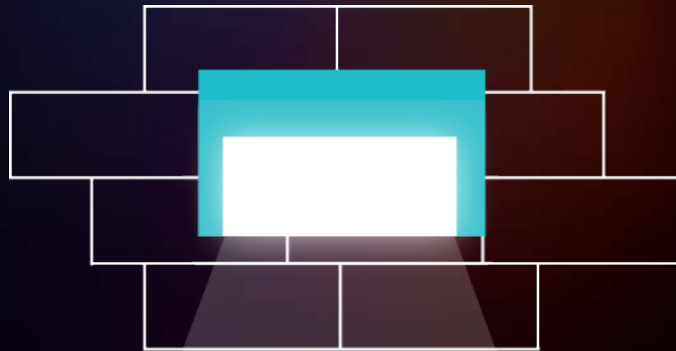
## Interviews

13 market actors specializing in outdoor lighting, short interviews at Lightfair 2016



# BUILDING EXTERIOR

# FRAGMENTED MARKET








APPLICATION	Northwest aMW
Parking Lot	107
Building Facade	55
Walkway/Area	43
Other	12
Exterior Sales	9
Sporting Field	6
Signage	2
<b>Total</b>	<b>234</b>

Source: 7<sup>th</sup> Plan estimates, based on 2014 CBSA

# HID DOMINATES STOCK

## % of Building Exterior Watts in Stock

TECHNOLOGY	2014
 HID	79%
 LF	5%
 CFL	5%
 Incandescent	8%
 LED, Induction, Neon, Other	2%



# MARKET NICHEs

**Gas Stations** – among first to adopt LED due to long operating hours





# MARKET NICHEs

**Car Dealerships** – driven by improved colored rendering, visibility and security





# MARKET NICHEs

**Sports Fields** – often municipal-owned; LED retrofits driven by desire for highly visible improvement





A nighttime photograph of a park path. In the foreground, a wooden park bench sits on a paved path. The path leads into the distance, flanked by trees and illuminated by several streetlights. The lights create a bokeh effect, with some appearing as bright white circles and others as softer, warmer glows. The overall atmosphere is quiet and serene.

# MARKET NICHEs

**Area Lighting** – maintenance benefits  
important to commercial customers

# BUILDING EXTERIOR DATA GAPS



**Sign Lighting**



**Area Lighting**



**Parking Lots**



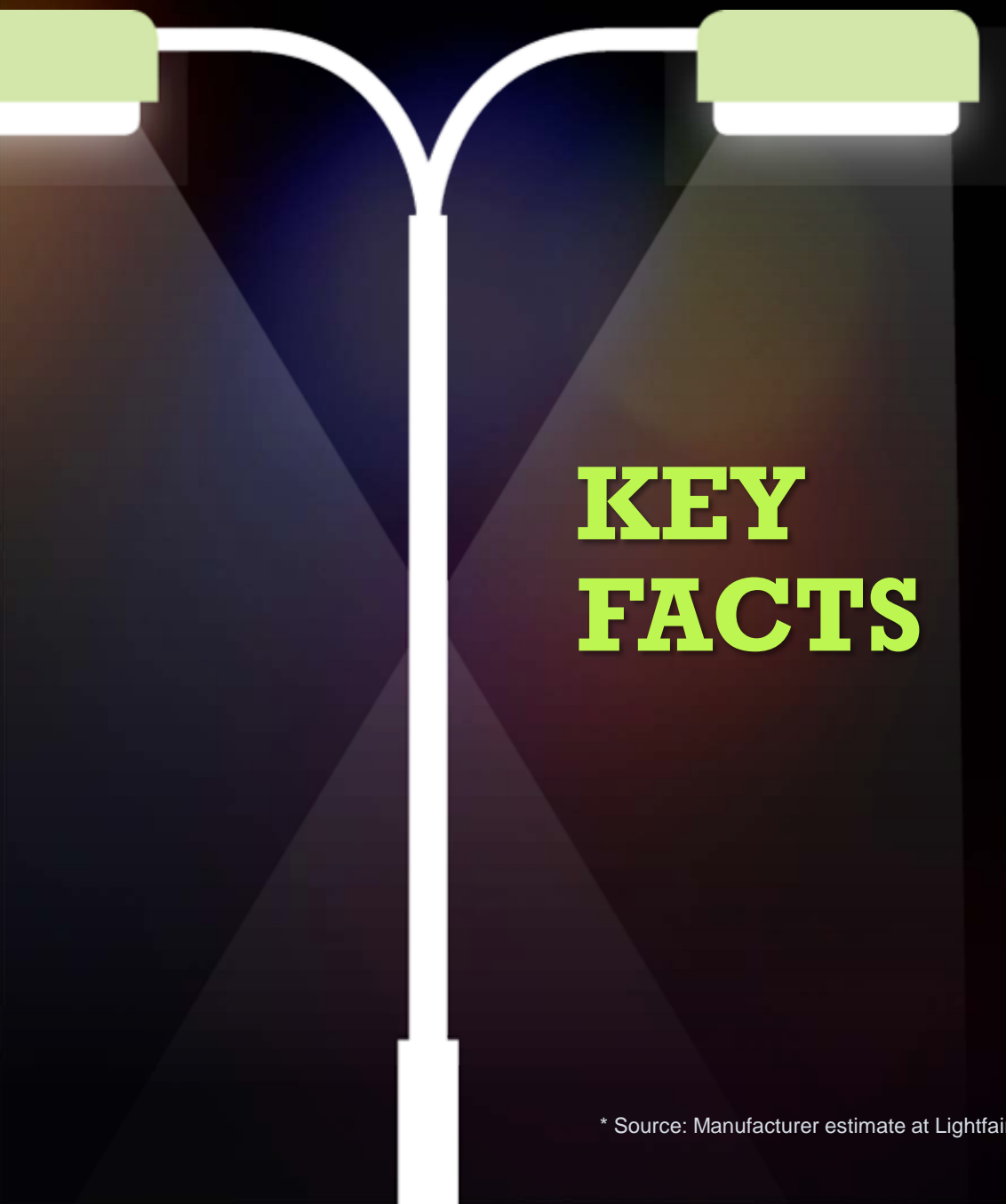
**Industrial Outdoor**

(CBSA did not sample directly)





# STREET LIGHTING



# KEY FACTS

113 aMW in NW,  
31% of outdoor

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High wattage lamps\*:

- 15% - 400 W
  - 40% - 250 W
  - 45% - 150 W
- 

Stock dominated  
by HID; rapid  
transition to LEDs

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Natural controls  
opportunity

\* Source: Manufacturer estimate at Lightfair (national)

# UNIQUE OWNERSHIP STRUCTURE



**Cities, towns, and utilities makes decisions... slowly.**

# NOT A TECHNOLOGY DEBATE

Retrofit?

Maintain?

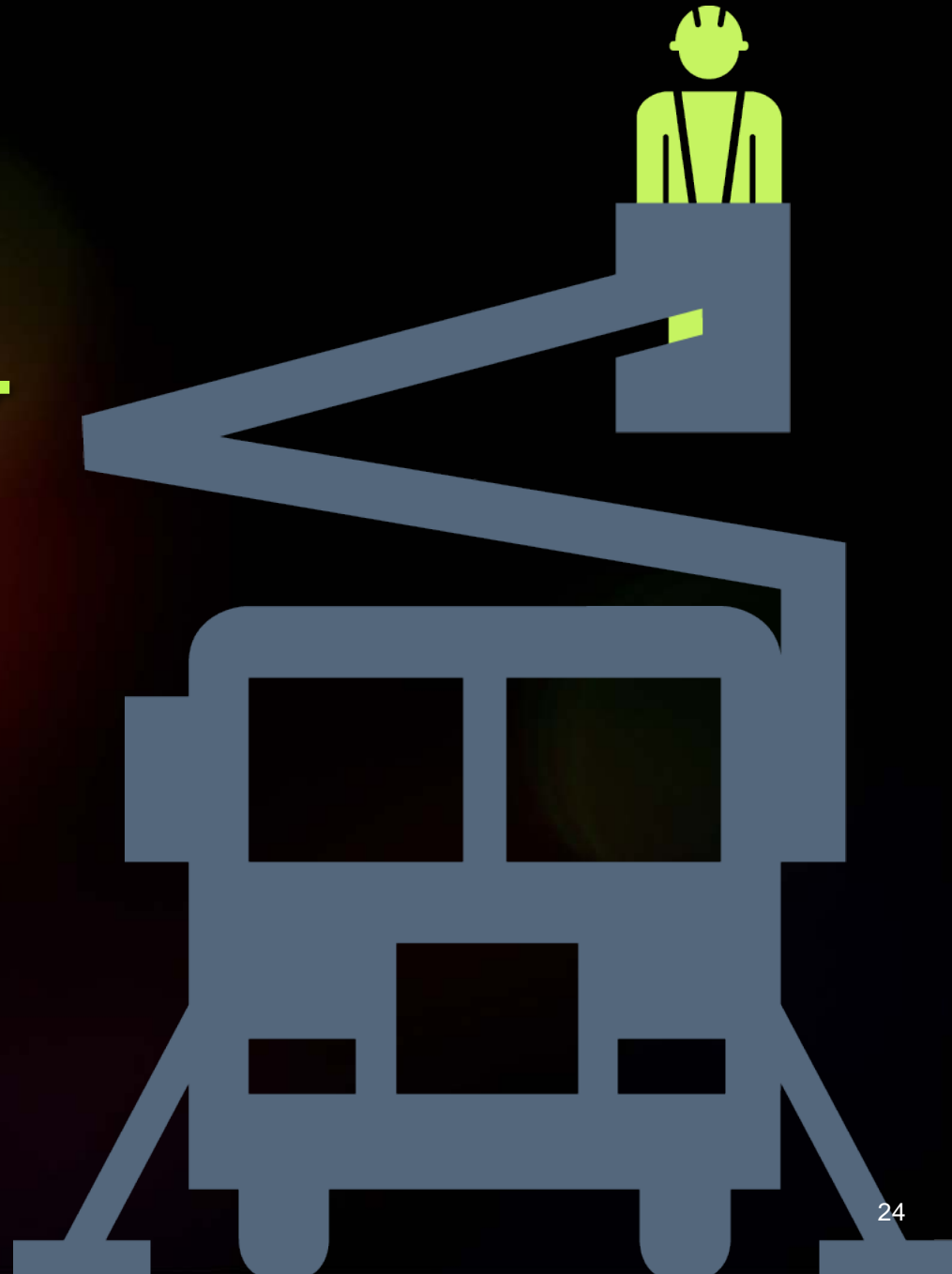




**SALES NOW 80% LED**

Manufacturer Estimate at Lightfair

**SAVING  
ENERGY IS  
SECONDARY**





	STATE	YEAR(S)	LAMP TYPE	COUNT
Seattle	WA	2009-Present	HPS to LED	85,00 total (48% residential, 15% pedestrian, 37% arterial) 41,000 converted so far (2014)
Olympia	WA	Unclear	HPS to LED	4,500 total ( 3,200 city owned (1st), 1,300 PS
Takima	WA	2014-Present	HPS to LED	4,400
Went	WA	2015-present	HPS to LED	2,600
Bellevue	WA	2015-Present	HPS to LED	4,242 targeted by project
Everett	WA	2015-Present	HPS to LED	2,300 (roughly one third of all lights)
Marysville	WA	2011-2012	HPS to LED	roughly 100 (second round)
Longview	WA	2013	HPS to LED	2,023 to LED (another 564 MH lamp/ballast)
Wenton	WA	2013	HPS to LED	3,865 (out of 6,00 approximately)
Portland	OR	2015-Present	HPS to LED	54,000 total (4,800 decorative, PBOT pays/maintains 41,000 lights Portland Gen. Elec. 44,000)
West Linn	OR	2014 (Unclear)	HPS to LED	500
Astacada	OR	2014 (Unclear)	HPS to LED	340
Wake Oswego	OR	2013-2014	Unclear to LED	3,680 total (1,400 converted)
Eugene	OR	2015-Present	Unclear to LED	9,600 total (5,000 converted)
resham	OR	2013-Present	HPS to LED	8,000
Wilwaukee	OR	Unclear	HPS to LED	2,000
ackamas	OR	2013-2015	HPS to LED	5,000 total (55% of street lights in the district)
pringfield	OR	2014	LED Retrofit kits	1,000
alem	OR	2015-Present	HPS to LED	8,000 plus new installations of 70-80 per year
oise	ID	2010-2012	HPS to LED	10,000 total (1,500 converted)
esier	ID	2015	HPS to LED	395
aho Falls	ID	2015	HPS to LED	80 (trial run)

# LOTS OF LED PROJECTS



**NEW DESIGNS**  
LEARNING FROM  
**PREVIOUS**  
**EXPERIENCES**

# GLARE BOMBS AWAY



# DARK SKY ORDINANCES

HID

LED





# DATA GAPS

Not captured  
in the CBSA.

No comprehensive data  
on market size and mix.







# COVERED PARKING LOTS

# KEY FACTS

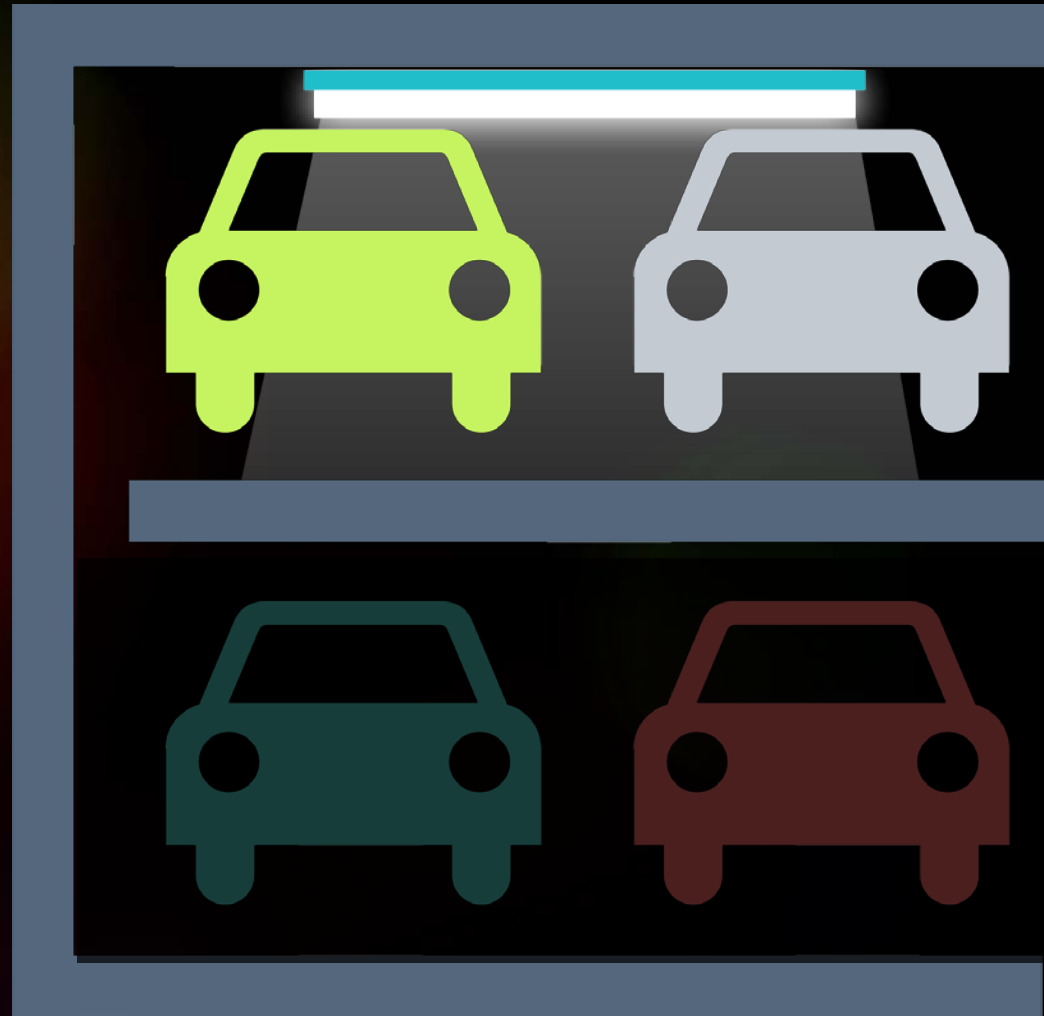
23 aMW in NW  
(6% of outdoor)

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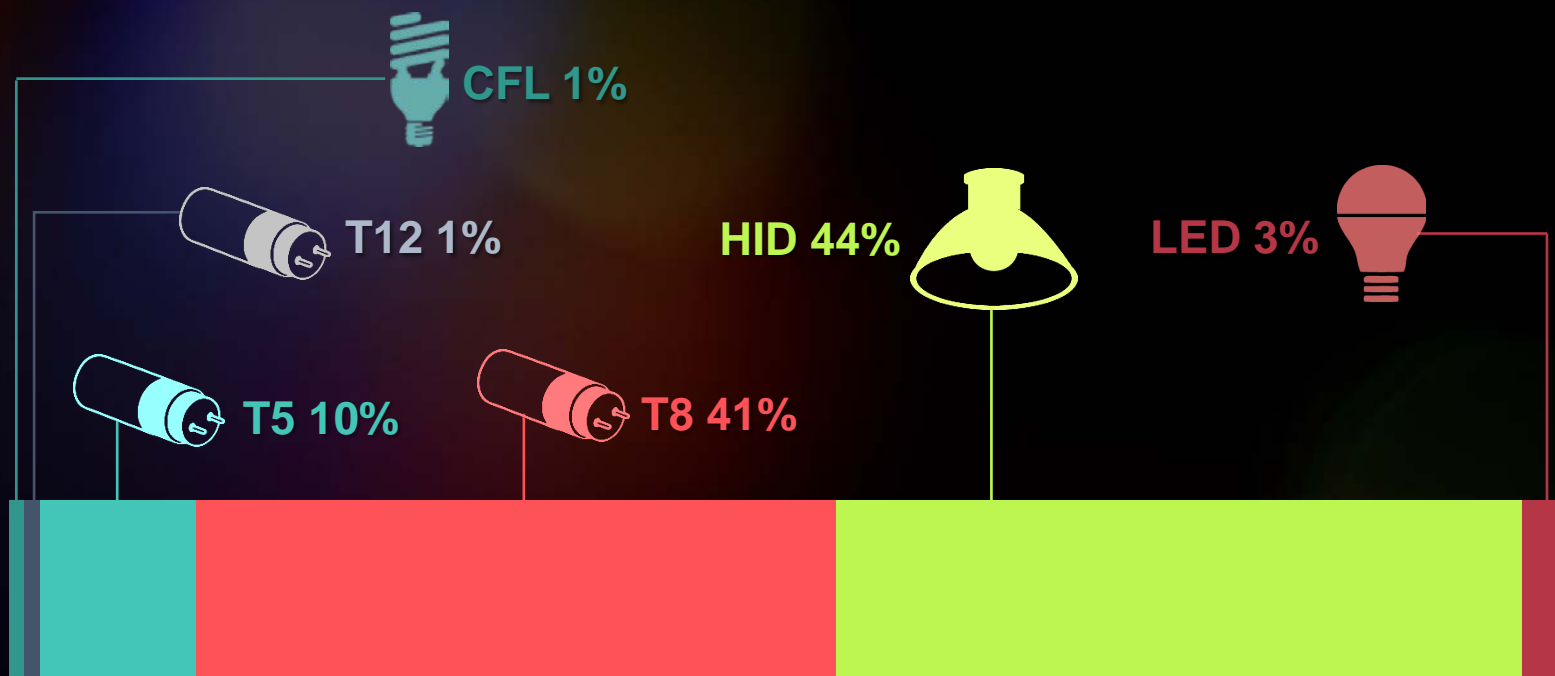
“Only need to be  
on 15% of the time”

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Natural controls fit:  
GE fixtures come  
standard with  
occupancy sensors

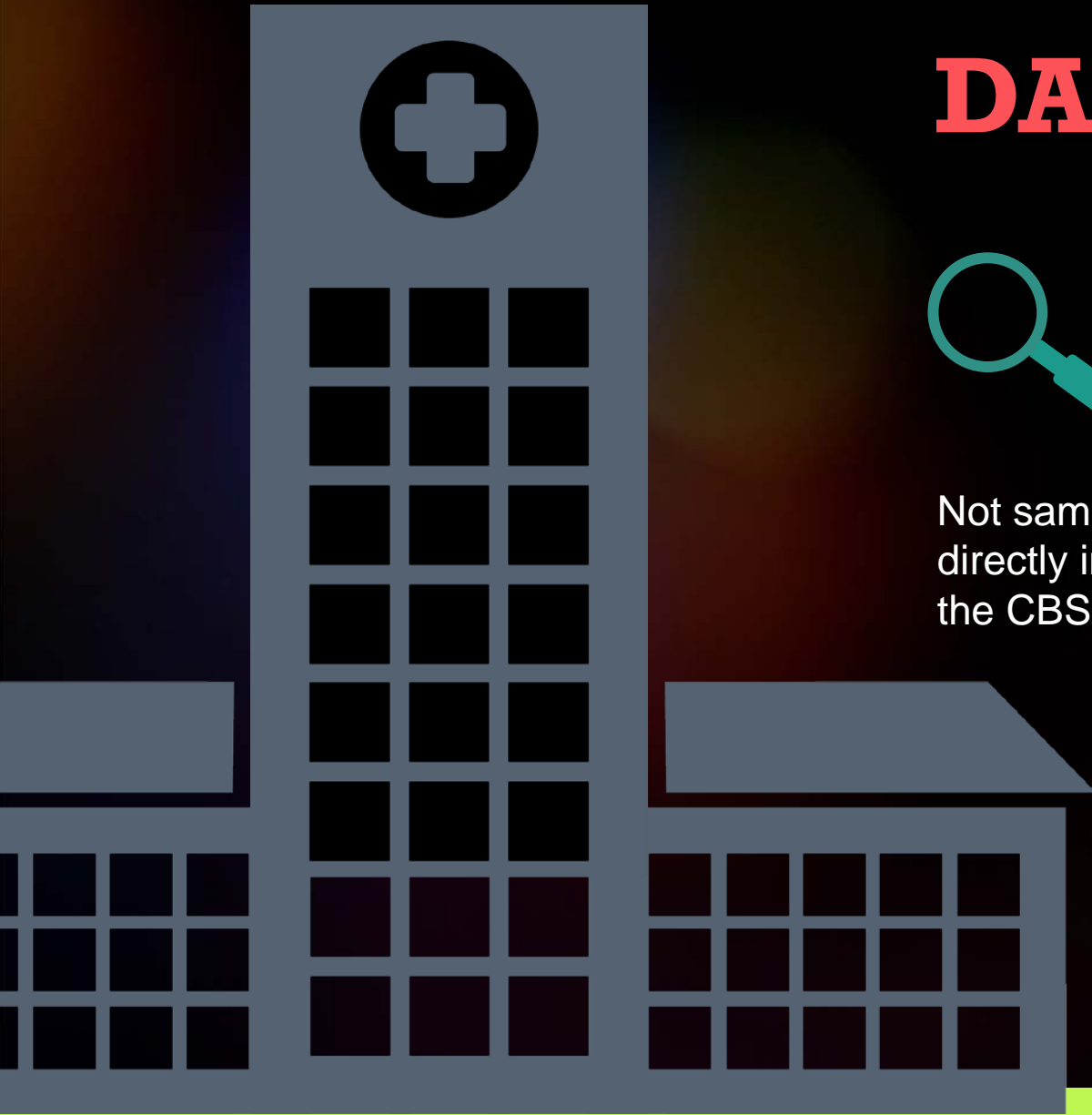


# INSTALLED TECH MIX



7<sup>th</sup> Plan assumes 20% baseline LED penetration

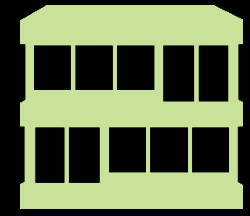




# DATA GAPS




Not sampled directly in the CBSA.



Spotty data:  
No data for universities or hospitals.  
Only one retail building in sample.



# KEY TAKEAWAYS



**1** Outdoor lighting is, by itself, a large end-use

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**2** Building exterior, streetlighting, and covered parking lots are the main market segments

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**3** Streetlighting is rapidly moving to LED—  
nearly every retrofit is LED

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**4** Nearly half of lighting program savings  
(for FY15 option 1 utilities) are from outdoor  
measures (nearly all HID to LED changeouts)

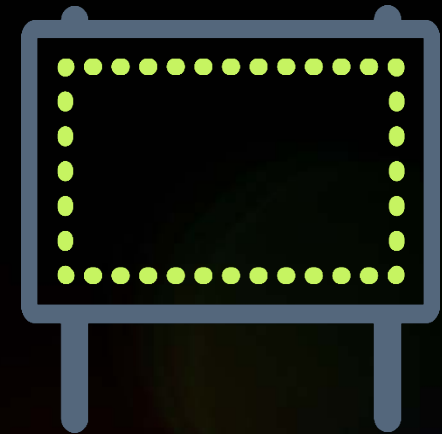
# KEY REMAINING DATA GAPS



Streetlighting market  
size and mix



Parking garage and  
parking lot market size



Sign lighting market  
size and mix



# POTENTIAL RESEARCH STRATEGIES



# STREET LIGHTING STOCK ASSESSMENT



Direct count from  
towns, cities, state DOTs,  
and utilities



Supplement with  
sampling approach based  
on roadway miles, stratified  
by type of roadway

# PARKING STOCK ASSESSMENT

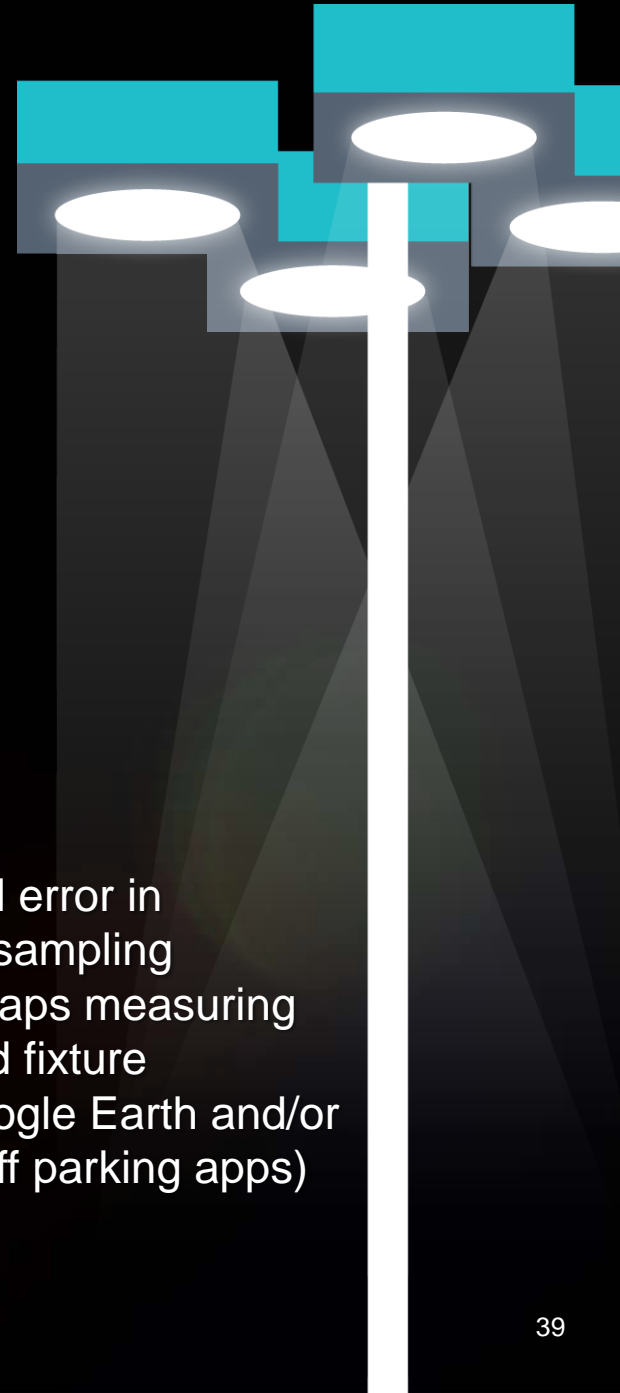
1

Vet CBSA figures with series of top down and/or bottom up checks.



2

If checks reveal error in CBSA, pursue sampling approach (perhaps measuring parking lots and fixture counts with Google Earth and/or web scraping off parking apps)





# APPENDIX



# DEFINITIONS AND DATA

Subsegment	CBSA Data?	CBSA Definition	Typical applications	CBSA Representativeness Caveats
<b>Building Façade</b>	Yes	Used directly to light the building façade. This includes mounted down lights, and flood lights directed at the façade.	Wall mounts; wall wash	None
<b>Exterior Sales</b>	Yes	Used to highlight items the building is selling for areas indicated as exterior sales.	Pole lighting	None
<b>Streetlighting/ Roadway</b>	No		Street, Roadway, Decorative, Arterial	N/A
<b>Parking Lots</b>	Yes	Used to light the building's parking lot (typically lights on poles throughout the parking area)	Pole lighting	Not sampled directly; no stand alone lots; small sample in key building types.
<b>Parking Garage</b>	Yes		Low/high bay	Not sampled directly; no stand alone garages considered; small sample in key building types.
<b>Walkway / Area</b>	Yes	Used to light the path/walkway or an area where people would congregate	Bollards, Landscape, Decorative Streetlamps	Not sampled directly; no stand alone areas
<b>Gas Station / Canopy</b>	Yes		Fuel Pump Canopy	None
<b>Signage/Billboard</b>	Yes	Used for signage (lights up text)	Sign lighting	Only covered if part of building; no road/highway
<b>Airfields</b>	No			N/A
<b>Stadiums</b>		Used to light a sporting field.	High Output	N/A
<b>Traffic Signals</b>	No		Traffic signals	N/A