

# Second Stakeholder Meeting for **Outdoor Sources**

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# 1. Background

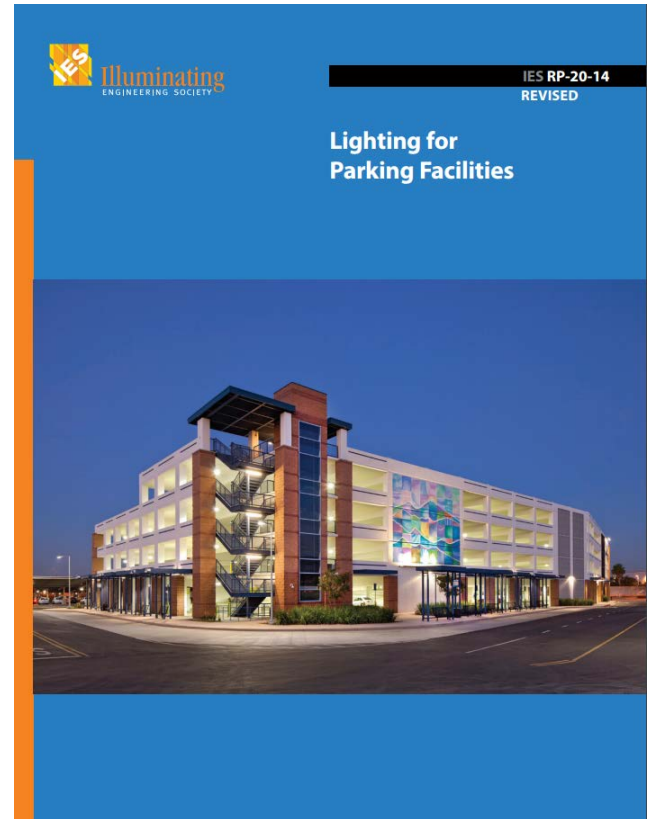
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# Introduction to Outdoor Lighting Power Allowances

- Nonresidential outdoor lighting is regulated under Title 24, Part 6
  - General Hardscape is Table 140.7-A
  - Specific Applications is Table 140.7-B
- Revise prescriptive lighting power allowances (LPA) for nonresidential outdoor lighting systems
  - Table 140.7-A (General Hardscape) was updated in the 2016 code cycle
  - Table 140.7-B (Specific Applications) mostly unchanged since 2008
  - New LPAs allow the use of low color temperature (3000K) luminaires
  - All LED baseline used for calculated LPAs

# Relevant Code History

- IES RP-20
  - Sets lighting levels for parking lots and garages
    - Updated partway through 2016 Title 24, Part 6 code change (in 2014)
      - 10<sup>th</sup> Edition Handbook, TM-15-11, RP-8-14, RP-20-14, RP-33,14, and G-1-03
    - Hardscape LPA (Table 140.7-A) based on RP-20-14



# Why Are We Proposing This Code Change

- Trends
  - LED technology is being installed more because of lower cost, higher efficiencies, and higher quality equipment.
- By 2025 virtually all outdoor lighting sales will be LED<sup>1</sup>



1. <http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/energysavingsforecast14.pdf>

## Why Are We Proposing This Code Change

- Trends
  - LEDs can provide increased acuity, brightness, and even distribution
  - Lower LPAs do not cause poor lighting quality



## LED Baseline



- Do you have concerns about an all LED baseline?

## 2. Proposed Code Changes

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# Proposed Code Change

## Lower LPAs for all nonresidential outdoor spaces:

- Prescriptive change → New construction and alterations
  - Specific Applications, Table 140.7-B
    - Based on 3000K LEDs instead of legacy technology
  - General Hardscape, Table 140.7-A
    - Based on higher efficacy LEDs
    - Not calculated yet – new LPAs still being developed

# Proposed Code Change

## New Table 140.7-B LPAs

Lighting Application	Lighting Zone 0	Lighting Zone 1	Lighting Zone 2	Lighting Zone 3	Lighting Zone 4
WATTAGE ALLOWANCE PER APPLICATION. Use all that apply as appropriate.					
WATTAGE ALLOWANCE PER APPLICATION. Use all that apply as appropriate.					
<b>Building Entrances or Exits.</b> Allowance per door. Luminaires qualifying for this allowance shall be within 20 feet of the door.	Not Applicable	<del>15</del> <u>9</u> watts	<del>25</del> <u>15</u> watts	<del>35</del> <u>19</u> watts	<del>45</del> <u>21</u> watts
<b>Primary Entrances to Senior Care Facilities, Police Stations, Hospitals, Fire Stations, and Emergency Vehicle Facilities.</b> Allowance per primary entrance(s) only. Primary entrances shall provide access for the general public and shall not be used exclusively for staff or service personnel. This allowance shall be in addition to the building entrance or exit allowance above. Luminaires qualifying for this allowance shall be within 100 feet of the primary entrance.	Not Applicable	<del>45</del> <u>24</u> watts	<del>80</del> <u>40</u> watts	<del>120</del> <u>57</u> watts	<del>130</del> <u>60</u> watts
<b>Drive Up Windows.</b> Allowance per customer service location. Luminaires qualifying for this allowance shall be within 2 mounting heights of the sill of the window.	Not Applicable	<del>40</del> <u>16</u> watts	<del>75</del> <u>30</u> watts	<del>125</del> <u>50</u> watts	<del>200</del> <u>75</u> watts
<b>Vehicle Service Station Uncovered Fuel Dispenser.</b> Allowance per fueling dispenser. Luminaires qualifying for this allowance shall be within 2 mounting heights of the dispenser.	Not Applicable	<del>120</del> <u>55</u> watts	<del>175</del> <u>77</u> watts	<del>185</del> <u>81</u> watts	<del>330</del> <u>135</u> watts
<b>ATM Machine Lighting.</b> Allowance per ATM machine. Luminaires qualifying for this allowance shall be within 50 feet of the dispenser.	Not Applicable	<del>250</del> <u>100</u> watts for first ATM machine, <del>70</del> <u>35</u> watts for each additional ATM machine			
<b>WATTAGE ALLOWANCE PER UNIT LENGTH (w/linear ft). May be used for one or two frontage side(s) per site.</b>					
<b>Outdoor Sales Frontage.</b> Allowance for frontage immediately adjacent to the principal viewing location(s) and unobstructed for its viewing length. A corner sales lot may include two adjacent sides provided that a different principal viewing location exists for each side. Luminaires qualifying for this allowance shall be located between the principal viewing location and the frontage outdoor sales area.	Not Applicable	No Allowance	<del>22-5</del> <u>11</u> W/linear ft	<del>36</del> <u>19</u> W/linear ft	<del>45-25 W/linear ft</del>
<b>WATTAGE ALLOWANCE PER HARDSCAPE AREA (W/ft²). May be used for any illuminated hardscape area on the site.</b>					
<b>Hardscape Ornamental Lighting.</b> Allowance for the total site illuminated hardscape area. Luminaires qualifying for this allowance shall be rated for 100 watts or less as determined in accordance with Section 130.0(d), and shall be post-top luminaires, lanterns, pendant luminaires, or chandeliers.	Not Applicable	No Allowance	<del>0.02</del> <u>0.007</u> W/ft²	<del>0.04</del> <u>0.013</u> W/ft²	<del>0.06</del> <u>0.019</u> W/ft²

# Proposed Code Change

## New Table 140.7-B LPAs cont.

WATTAGE ALLOWANCE PER SPECIFIC AREA (W/ft <sup>2</sup> ). Use as appropriate provided that none of the following specific applications shall be used for the same area.					
<b>Building Facades.</b> Only areas of building façade that are illuminated shall qualify for this allowance. Luminaires qualifying for this allowance shall be aimed at the façade and shall be capable of illuminating it without obstruction or interference by permanent building features or other objects.	Not Applicable	No Allowance	<u>0.18</u> 0.100 W/ft <sup>2</sup>	<u>0.35</u> 0.170 W/ft <sup>2</sup>	<u>0.50</u> 0.225 W/ft <sup>2</sup>
<b>Outdoor Sales Lots.</b> Allowance for uncovered sales lots used exclusively for the display of vehicles or other merchandise for sale. Driveways, parking lots or other non-sales areas shall be considered hardscape areas even if these areas are completely surrounded by sales lot on all sides. Luminaires qualifying for this allowance shall be within 5 mounting heights of the sales lot area.	Not Applicable	<u>0.164</u> 0.060 W/ft <sup>2</sup>	<u>0.555</u> 0.210 W/ft <sup>2</sup>	<u>0.758</u> 0.280 W/ft <sup>2</sup>	<u>1.285</u> 0.485 W/ft <sup>2</sup>
<b>Vehicle Service Station Hardscape.</b> Allowance for the total illuminated hardscape area less area of buildings, under canopies, off property, or obstructed by signs or structures. Luminaires qualifying for this allowance shall be illuminating the hardscape area and shall not be within a building, below a canopy, beyond property lines, or obstructed by a sign or other structure.	Not Applicable	<u>0.014</u> 0.006 W/ft <sup>2</sup>	<u>0.155</u> 0.068 W/ft <sup>2</sup>	<u>0.308</u> 0.138 W/ft <sup>2</sup>	<u>0.485</u> 0.200 W/ft <sup>2</sup>
<b>Vehicle Service Station Canopies.</b> Allowance for the total area within the drip line of the canopy. Luminaires qualifying for this allowance shall be located under the canopy.	Not Applicable	<u>0.514</u> 0.220 W/ft <sup>2</sup>	<u>1.005</u> 0.430 W/ft <sup>2</sup>	<u>1.300</u> 0.580 W/ft <sup>2</sup>	<u>2.200</u> 1.010 W/ft <sup>2</sup>
<b>Sales Canopies.</b> Allowance for the total area within the drip line of the canopy. Luminaires qualifying for this allowance shall be located under the canopy.	Not Applicable	No Allowance	<u>0.655</u> 0.470 W/ft <sup>2</sup>	<u>0.908</u> 0.622 W/ft <sup>2</sup>	<u>1.135</u> 0.740 W/ft <sup>2</sup>
<b>Non-sales Canopies and Tunnels.</b> Allowance for the total area within the drip line of the canopy or inside the tunnel. Luminaires qualifying for this allowance shall be located under the canopy or tunnel.	Not Applicable	<u>0.084</u> 0.057 W/ft <sup>2</sup>	<u>0.205</u> 0.137 W/ft <sup>2</sup>	<u>0.408</u> 0.270 W/ft <sup>2</sup>	<u>0.585</u> 0.370 W/ft <sup>2</sup>
<b>Guard Stations.</b> Allowance up to 1,000 square feet per vehicle lane. Guard stations provide access to secure areas controlled by security personnel who stop and may inspect vehicles and vehicle occupants, including identification, documentation, vehicle license plates, and vehicle contents. Qualifying luminaires shall be within 2 mounting heights of a vehicle lane or the guardhouse.	Not Applicable	<u>0.154</u> 0.81 W/ft <sup>2</sup>	<u>0.355</u> 0.176 W/ft <sup>2</sup>	<u>0.708</u> 0.325 W/ft <sup>2</sup>	<u>0.985</u> 0.425 W/ft <sup>2</sup>

# Proposed Code Change

## New Table 140.7-B LPAs cont.

Lighting Application	Lighting Zone 0	Lighting Zone 1	Lighting Zone 2	Lighting Zone 3	Lighting Zone 4
<b>Student Pick-up/Drop-off zone.</b> Allowance for the area of the student pick-up/drop-off zone, with or without canopy, for preschool through 12th grade school campuses. A student pick-up/drop off zone is a curbside, controlled traffic area on a school campus where students are picked-up and dropped off from vehicles. The allowed area shall be the smaller of the actual width or 25 feet, times the smaller of the actual length or 250 feet. Qualifying luminaires shall be within 2 mounting heights of the student pick-up/drop-off zone.	Not Applicable	No Allowance	<del>0.12</del> 0.056 W/ft <sup>2</sup>	<del>0.45</del> 0.200 W/ft <sup>2</sup>	No Allowance
<b>Outdoor Dining.</b> Allowance for the total illuminated hardscape of outdoor dining. Outdoor dining areas are hardscape areas used to serve and consume food and beverages. Qualifying luminaires shall be within 2 mounting heights of the hardscape area of outdoor dining.	Not Applicable	<del>0.014</del> <u>0.004</u> W/ft <sup>2</sup>	<del>0.135</del> <u>0.030</u> W/ft <sup>2</sup>	<del>0.240</del> <u>0.050</u> W/ft <sup>2</sup>	<del>0.400</del> <u>0.075</u> W/ft <sup>2</sup>
<b>Special Security Lighting for Retail Parking and Pedestrian Hardscape.</b> This additional allowance is for illuminated retail parking and pedestrian hardscape identified as having special security needs. This allowance shall be in addition to the building entrance or exit allowance.	Not Applicable	<del>0.007</del> 0.004 W/ft <sup>2</sup>	<del>0.009</del> 0.005 W/ft <sup>2</sup>	<del>0.019</del> 0.010 W/ft <sup>2</sup>	No Allowance

## Changes to Format of Table 140.7-A

- General allowance values apply to all outdoor spaces
  - Better to have separate columns for concrete lots instead of large footnote (RP-20-14)
  - Old Table 140.7-A format

TABLE 140.7-A GENERAL HARDSCAPE LIGHTING POWER ALLOWANCE

Type of Power Allowance	Lighting Zone 0	Lighting Zone 1	Lighting Zone 2 <sup>2</sup>	Lighting Zone 3 <sup>2</sup>	Lighting Zone 4
Area Wattage Allowance (AWA)	No Allowance <sup>1</sup>	0.020 W/ft <sup>2</sup>	0.030 W/ft <sup>2</sup>	0.040 W/ft <sup>2</sup>	0.050 W/ft <sup>2</sup>
Linear Wattage Allowance (LWA)		0.15 W/lf	0.25 W/lf	0.35 W/lf	0.45 W/lf
Initial Wattage Allowance (IWA)		340 W	450 W	520 W	640 W

<sup>1</sup> Continuous lighting is explicitly prohibited in Lighting Zone 0. A single luminaire of 15 Watts or less may be installed at an entrance to a parking area, trail head, fee payment kiosk, outhouse, or toilet facility, as required to provide safe navigation of the site infrastructure. Luminaires installed in Lighting Zone 0 shall meet the maximum zonal lumen limits for Uplight and Glare specified in Table 130.2-A and 130.2-B.

<sup>2</sup> For Lighting Zone 2 and 3, where greater than 50% of the paved surface of a parking lot is finished with concrete, the AWA for that area shall be 0.035 W/ft<sup>2</sup> for Lighting Zone 2 and 0.040 W/ft<sup>2</sup> for Lighting Zone 3, and the LWA for both lighting zones shall be 0.70 W/lf. This does not extend beyond the parking lot, and does not include any other General Hardscape areas.

## Changes to Format of Table 140.7-A

- New proposed format for Table 140.7-A (separate columns for asphalt and concrete)

TABLE 140.7-A GENERAL HARDSCAPE LIGHTING POWER ALLOWANCE

Type of Power Allowance	Lighting Zone 0	Lighting Zone 1	Lighting Zone 2		Lighting Zone 3		Lighting Zone 4
	Asphalt/Concrete	Asphalt/Concrete	Asphalt	Concrete <sup>2</sup>	Asphalt	Concrete <sup>2</sup>	Asphalt/Concrete
Area Wattage Allowance (AWA)	No Allowance <sup>1</sup>	0.020 W/ft <sup>2</sup>	0.030 W/ft <sup>2</sup>	0.035 W/ft <sup>2</sup>	0.040 W/ft <sup>2</sup>	0.040 W/ft <sup>2</sup>	0.050 W/ft <sup>2</sup>
Linear Wattage Allowance (LWA)		0.15 W/lf	0.25 W/lf	0.70 W/lf	0.35 W/lf	0.70 W/lf	0.45 W/lf
Initial Wattage Allowance (IWA)		340 W	450 W	450 W	520 W	520 W	640 W

<sup>1</sup> Continuous lighting is explicitly prohibited in Lighting Zone 0. A single luminaire of 15 Watts or less may be installed at an entrance to a parking area, trail head, fee payment kiosk, outhouse, or toilet facility, as required to provide safe navigation of the site infrastructure. Luminaires installed in Lighting Zone 0 shall meet the maximum zonal lumen limits for Uplight and Glare specified in Table 130.2-A and 130.2-B.

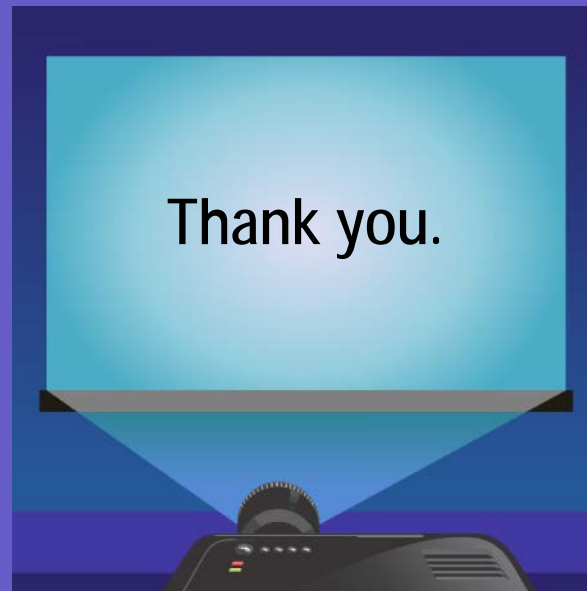
<sup>2</sup> Where greater than 50% of the paved surface of a parking lot is finished with concrete. This does not extend beyond the parking lot, and does not include any other General Hardscape areas.

# Feedback



Let's move on to...

# Technical and Market Barriers



- Nancy Clanton, Clanton & Associates
- Annie Kuczkowski, Clanton & Associates
- Mike McGaraghan, Energy Solutions
- Chris Uraire, Energy Solutions



# 3. Technical and Market Barriers

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## Technical and Market Barriers

- LEDs can provide cooler temperatures and glary light
  - LED luminaire light quality is inferior to legacy luminaires
- Possible Solutions
  - Educate contractors, building owners, etc. that **high quality** LED luminaires **can** be used in every application
  - Allowing flexibility in code
    - Low correlated color temperature (3000K) LEDs able to meet new LPAs
    - Low glare high quality luminaires are able to meet new LPAs

## Technical and Market Barriers

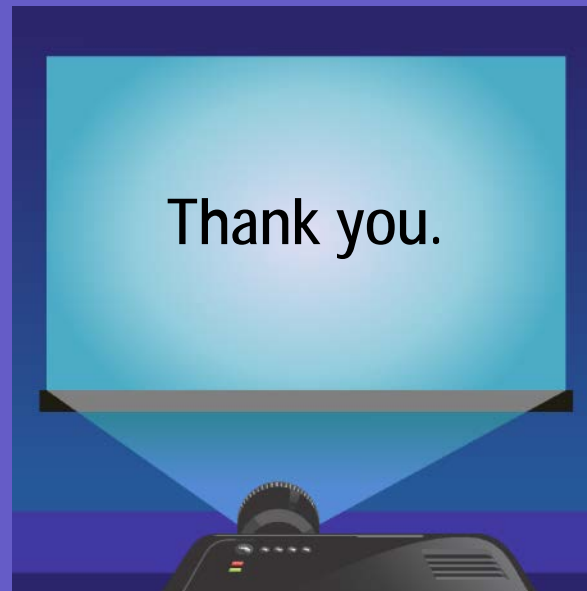
- Perception is that LEDs cannot replace every application
- Possible solutions
  - Educate contractors, building owners, etc. that **high quality** LED luminaires **can** be used in every applications
  - Allowing flexibility in code
    - Low correlated color temperature (3000K) LEDs able to meet new LPAs
    - Low glare high quality luminaires are able to meet new LPAs

# Feedback



Let's move on to...

# Compliance and Enforcement



- Nancy Clanton, Clanton & Associates
- Annie Kuczkowski, Clanton & Associates
- Mike McGaraghan, Energy Solutions
- Chris Uraire, Energy Solutions

## 4. Compliance and Enforcement

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# Compliance Process



## Design Phase

- The following compliance worksheets are completed and signed ensuring the system design specifications comply with the new code requirement:
  - Certificate of Compliance for Outdoor Lighting
  - Certificate of Compliance for Outdoor Lighting Power Allowances
  - Certificate of Compliance for Outdoor Lighting Existing Conditions

# Compliance Process



## Permit Application Phase

- Plans examiner reviews all applicable compliance worksheets and compares to construction documents to verify system design specifications are consistent
- Plans examiner may provide correction comments to the designer to resolve any issues



# Compliance Process



## Construction Phase

- Facility is constructed per design specifications
- Lighting installer completes the following Certificate of Installations:
  - Certificate of Installation for Outdoor Lighting
- Certificate of Installations are required to be submitted or posted at the building site prior to functional testing and completion of the Certificate of Acceptance

# Compliance Process



## Inspection Phase

- Building inspector reviews Certificates of Installation in the field and issues certificate of occupancy
- Building inspectors can use notes from plans examiners to identify top field verification priorities

## Discussion



- Are you aware of additional compliance or enforcement barriers that we haven't identified?

## 5. Cost-Effectiveness and Energy Impacts

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# Baseline and Proposed Conditions

## 2016 Conditions

- LPA minimally compliant with 2016 Title 24 special application (Table 140.7-B) LPAs.
- Hours of operation based on typical dimming schedules.
- Maintenance schedules based on representative use operating schedules.
- Energy costs based on energy multiplied by operating schedules and TDV cost multiplier.

## Proposed 2019 Conditions (No Changes)

- LPA compliant with proposed 2019 code change for special application (Table 140.7-B) LPAs.
- Hours of operation based on typical dimming schedules.
- Maintenance schedules based on representative use operating schedules.
- Energy costs based on energy multiplied by operating schedules and TDV cost multiplier.

# Cost-Effectiveness Analysis

## Incremental Costs

- Incremental First Cost
  - First cost per linear foot \$0.31 to \$11.14
    - Example: outdoor sales frontage
  - First cost per square foot \$0 to \$0.02
    - Example: outdoor dining
  - First cost per pump face = \$11.63
    - Example: vehicle service uncovered fuel dispenser
  - First cost per each application \$0 to \$90.71
    - Example: ATM machine
  - LED cheaper than legacy products in some applications
- Incremental Maintenance Costs over 15-year period of analysis
  - **Total Incremental Maintenance Cost (\$0)**
  - LED lifetime is longer than the 15-year period of analysis

# Cost Effectiveness Analysis

## Incremental Cost Savings (Benefits)

- Energy Cost Savings over 15-year period of analysis
  - Energy cost savings per linear foot \$3.13 to \$90.78
    - Example: outdoor sales lots
  - Energy cost savings per square foot \$0.19 to \$6.35
    - Example: non-sales canopies
  - Energy cost savings per pump face = \$1,217.62
    - Example: vehicle service uncovered fuel dispenser
  - Energy cost savings per each application \$190.33 to \$1,138.67
    - Example: drive up windows
  - *Energy cost savings explained in more detail in following slides.*

## Benefit-to-Cost Ratio

Specific Application	Unit	TDV Energy Cost Savings + Other PV Savings per unit (benefit)	Total Incremental Costs per unit (PV) (cost)	Benefit-to-Cost Ratio
Building Entrances	Each	\$190.33	\$0	Infinite
Primary Entrances	Each	\$509.16	\$0	Infinite
Drive Up Windows	Each	\$489.19	\$0	Infinite
Vehicle Service Uncovered Fuel Dispenser	Each Pump Face	\$1,217.62	\$11.63	105.7
ATM Machine	Each	\$1,138.67	\$90.71	12.6
Outdoor Sales Frontage	Per Linear Foot	\$90.78	\$11.14	8.1
Hardscape Ornamental Lighting	Per Square Foot	\$0.19	\$0	Infinite
Building Facades	Per Square Foot	\$1.20	\$0.02	51.3
Outdoor Sales Lots	Per Linear Foot	\$3.13	\$0.31	10.2
Vehicle Service Station Hardscape	Per Square Foot	\$1.37	\$0	Infinite

**Cost Effective for All Specific Applications**

If Benefit-to-Cost Ratio is over 1, measure is cost effective.



## Benefit-to-Cost Ratio

Specific Application	Unit	TDV Energy Cost Savings + Other PV Savings (benefit)	Total Incremental Costs (PV) (cost)	Benefit-to-Cost Ratio
Vehicle Service Station Canopies	Per Square Foot	\$6.35	\$0	Infinite
Sales Canopies	Per Square Foot	\$2.21	\$0	Infinite
Non-sales Canopies	Per Square Foot	\$1.76	\$0	Infinite
Guard Stations	Per Square Foot	\$4.31	\$0	Infinite
Student Pick-up/Drop-off Zone	Per Square Foot	\$1.03	\$0	Infinite
Outdoor Dining	Per Square Foot	\$1.32	\$0	Infinite
Special Security Lighting for Retail	Per Square Foot	\$0.10	\$0	Infinite

**Cost Effective for All Specific Applications**

If Benefit-to-Cost Ratio is over 1, measure is cost effective.

## Annual Energy Savings Per Unit

Specific Application	Unit	TDV Energy Savings (TDV kBtu/yr)	15-Year TDV Energy Cost Savings (\$2020)
Building Entrances	Each	1,858	\$190.33
Primary Entrances	Each	5,124	\$509.16
Drive Up Windows	Each	5,059	\$489.19
Vehicle Service Uncovered Fuel Dispenser	Each Pump Face	12,475	\$1,217.62
ATM Machine	Each	11,851	\$1,138.67
Outdoor Sales Frontage	Per Linear Foot	889	\$90.78
Hardscape Ornamental Lighting	Per Square Foot	2	\$0.19
Building Facades	Per Square Foot	12	\$1.20
Outdoor Sales Lots	Per Linear Foot	33	\$3.13
Vehicle Service Station Hardscape	Per Square Foot	14	\$1.37

## Annual Energy Savings Per Unit

Specific Application	Unit	TDV Energy Savings (TDV kBtu/yr)	15-Year TDV Energy Cost Savings (\$2020)
Vehicle Service Station Canopies	Per Square Foot	65	\$6.35
Sales Canopies	Per Square Foot	19	\$2.21
Non-sales Canopies	Per Square Foot	6	\$1.76
Guard Stations	Per Square Foot	44	\$4.31
Student Pick- up/Drop-off Zone	Per Square Foot	10	\$1.03
Outdoor Dining	Per Square Foot	14	\$1.32
Special Security Lighting for Retail	Per Square Foot	1	\$0.10

# Annual Energy Savings Per Unit

Specific Application	Unit	Annual Electricity Savings (kWh/yr)	Annual Natural Gas Savings (kWh/yr)	Peak Electric Demand Reduction (kW)
Building Entrances	Each	72	N/A	N/A
Primary Entrances	Each	285	N/A	N/A
Drive Up Windows	Each	230	N/A	N/A
Vehicle Service Uncovered Fuel Dispenser	Each Pump Face	485	N/A	N/A
ATM Machine	Each	704	N/A	N/A
Outdoor Sales Frontage	Per Linear Foot	32	N/A	N/A
Hardscape Ornamental Lighting	Per Square Foot	0.12	N/A	N/A
Building Facades	Per Square Foot	0.54	N/A	N/A
Outdoor Sales Lots	Per Linear Foot	1.48	N/A	N/A
Vehicle Service Station Hardscape	Per Square Foot	0.62	N/A	N/A

## Annual Energy Savings Per Unit

Specific Application	Unit	Annual Electricity Savings (kWh/yr)	Annual Natural Gas Savings (kWh/yr)	Peak Electric Demand Reduction (kW)
Vehicle Service Station Canopies	Per Square Foot	2.84	N/A	N/A
Sales Canopies	Per Square Foot	0.88	N/A	N/A
Non-sales Canopies	Per Square Foot	0.61	N/A	N/A
Guard Stations	Per Square Foot	1.70	N/A	N/A
Student Pick-up/Drop-off Zone	Per Square Foot	0.36	N/A	N/A
Outdoor Dining	Per Square Foot	0.85	N/A	N/A
Special Security Lighting for Retail	Per Square Foot	0.04	N/A	N/A

# Annual Statewide Energy Savings Methodology

## Key Assumptions in Calculating Statewide Energy Savings

For new construction:

- 2016 CASE Report methodology used:
  - Construction activity estimated by Lighting Zone
  - No construction estimates for outdoor spaces – proxies used to estimate outdoor construction

For existing building floor stock:

- 7% of the existing lighting systems are retrofitted per year
- Same methodology for new construction used

Lighting Zone	Percent of Land Mass (Source: 2010 US Census)	Percent of Construction Activity (Estimate)
LZ0	9	0
LZ1	1	0.1
LZ2	85	9.9
LZ3	5	90
LZ4	0	0

# Annual Statewide Energy Savings Methodology

Assumptions for Statewide Estimates - Specific Applications		Applied to % of Building S.F. in Category								
Lighting Allowance	Assumptions	Office, LG & SM	Retail	Restaurant	Food (Grocery)	Warehouse, Ref & NR	Hotel	School	College	Other
Building Entrances or Exits	<b>1 per 5000 sf of building interior</b> (20 occupants per door, 250 occ/sf)	100%	100%	100%	100%	100%	100%	100%	100%	99%
Primary Entrances to Senior Care Facilities, Police Stations, Hospitals, Fire Stations, and Emergency Vehicle Facilities	<b>1 per 5000 SF of gross building area</b> (1 primary entrance per building)									1%
Drive Up Windows	<b>1 per 1500 SF of gross building area</b> (2 locations per building; 1000 sf building)			30%						
Vehicle Service Station Uncovered Fuel Dispenser	<b>1 per 100 sf of gross building area</b> (1 fuel dispenser face per 25 sf of station building interior)									0.01%
Automated Teller Machines	<b>400W MH luminaire as typical standard practice, switch to 250W limit for first location, 2500 sf per ATM installation.</b>									1%
Outdoor Sales Frontage	<b>0.2 LF per sf of gross building area</b> (1 display parking space per 50 sf of building interior)									1.5%
Hardscape Ornamental Lighting	<b>0.1 SF per SF of gross building area</b>	50%	50%	50%	25%		50%	25%	25%	5%
Building Facades	<b>30' building height, 2 floors per building</b> (20% of applicable facades are lit)	25%	50%	50%	25%		50%	25%	25%	5%
Outdoor Sales Lots	<b>4 SF of sales lot per sf of gross building area</b> (1 display parking space per 50 sf of building interior)									1.5%

# Annual Statewide Energy Savings Methodology

Assumptions for Statewide Estimates - Specific Applications		Applied to % of Building S.F. in Category								
Lighting Allowance	Assumptions	Office, LG & SM	Retail	Restaurant	Food (Grocery)	Warehouse, Ref & NR	Hotel	School	College	Other
Vehicle Service Station Hardscape	11 SF per SF of gross building area									1%
Vehicle Service Station Canopies	1.2 SF of canopy per SF of gross building area									1%
Sales Canopies	0.1 SF of canopy per SF of gross building area									5%
Non-sales Canopies	0.1 SF of canopy per SF of gross building area	25%	25%	25%	25%		25%	25%	25%	5%
Guard Stations	0.00043 sf per SF of gross building area (1 12x18 guard station per 500,000 sf of total construction)	100%				100%			100%	100%
Student Pick-up/Drop-off zone	0.0173 sf per SF of gross building area (1 12x72 drop off per 50,000 sf of total construction)							100%		
Outdoor Dining	1 sf per 5 sf of gross building area (20% of typical building sf)		2.5%	50%	2.5%					
Special Security Lighting for Retail Parking and Pedestrian Hardscape	1 SF per 100 SF gross building SF (1% of hardscape)		100%	100%	100%					50%



## Annual Statewide Energy Saving – New Construction

Specific Application	Unit	Statewide Construction in 2020 (millions of units)	First Year Electricity Savings (GWh)
Building Entrances	Each	0.03	2.54
Primary Entrances	Each	0.00	0.02
Drive Up Windows	Each	0.00	0.21
Vehicle Service Uncovered Fuel Dispenser	Each Pump Face	0.00	0.02
ATM Machine	Each	0.00	0.11
Outdoor Sales Frontage	Per Linear Foot	0.12	3.80
Hardscape Ornamental Lighting	Per Square Foot	5.1	0.61
Building Facades	Per Square Foot	8.0	4.36
Outdoor Sales Lots	Per Linear Foot	2.40	3.55
Vehicle Service Station Hardscape	Per Square Foot	4.40	2.74

## Annual Statewide Energy Saving – New Construction

Specific Application	Unit	Statewide Construction in 2020 (millions of units)	First Year Electricity Savings (GWh)
Vehicle Service Station Canopies	Per Square Foot	0.48	1.36
Sales Canopies	Per Square Foot	0.20	0.18
Non-sales Canopies	Per Square Foot	3.00	1.83
Guard Stations	Per Square Foot	0.05	0.08
Student Pick-up/Drop-off Zone	Per Square Foot	0.21	0.08
Outdoor Dining	Per Square Foot	0.65	0.55
Special Security Lighting for Retail	Per Square Foot	0.62	0.02
<b>TOTAL</b>		<b>25.26</b>	<b>22.07</b>

## Annual Statewide Energy Saving - Alterations

Specific Application	Unit	Statewide Construction in 2020 (millions of units)	First Year Electricity Savings (GWh)
Building Entrances	Each	0.10	7.54
Primary Entrances	Each	0.00	0.07
Drive Up Windows	Each	0.00	0.60
Vehicle Service Uncovered Fuel Dispenser	Each Pump Face	0.00	0.06
ATM Machine	Each	0.00	0.35
Outdoor Sales Frontage	Per Linear Foot	0.37	11.70
Hardscape Ornamental Lighting	Per Square Foot	14.64	1.76
Building Facades	Per Square Foot	23.35	12.67
Outdoor Sales Lots	Per Linear Foot	7.37	10.93
Vehicle Service Station Hardscape	Per Square Foot	13.51	8.44

## Annual Statewide Energy Saving - Alterations

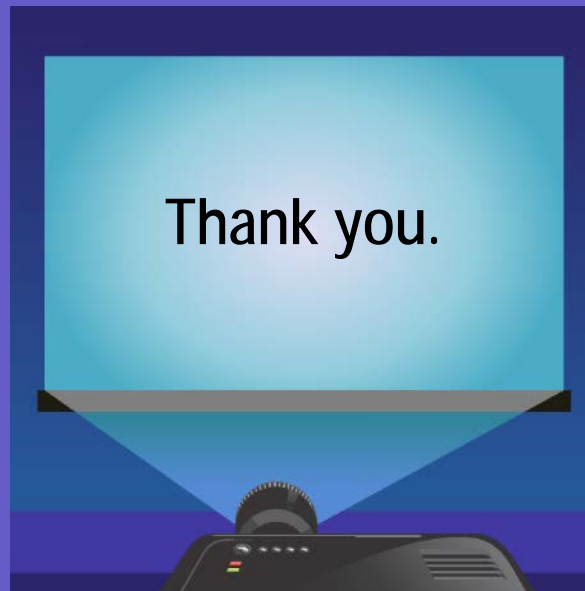
Specific Application	Unit	Statewide Construction in 2020 (millions of units)	First Year Electricity Savings (GWh)
Vehicle Service Station Canopies	Per Square Foot	1.47	4.19
Sales Canopies	Per Square Foot	0.61	0.54
Non-sales Canopies	Per Square Foot	8.67	5.32
Guard Stations	Per Square Foot	0.15	0.25
Student Pick-up/Drop-off Zone	Per Square Foot	0.70	0.25
Outdoor Dining	Per Square Foot	1.83	1.56
Special Security Lighting for Retail	Per Square Foot	1.80	0.07
<b>TOTAL</b>		<b>74.59</b>	<b>66.30</b>

# Feedback



# Let's move on to...

## Next Steps



- Nancy Clanton, Clanton & Associates
- Annie Kuczkowski, Clanton & Associates
- Mike McGaraghan, Energy Solutions
- Chris Uraine, Energy Solutions

## 6. Next Steps

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## Next Steps

- Please send any additional feedback within 2 weeks to:
  - CASE Author (see contact info at end of this presentation)
  - [Info@title24stakeholders.com](mailto:Info@title24stakeholders.com)
- Take the Title 24, Part 6 Outdoor LPA Stakeholder Survey:  
<https://www.surveymonkey.com/r/OutdoorSources>
- Keep an eye on [Title24Stakeholders.com](http://Title24Stakeholders.com) for:
  - Presentations from today's meeting
  - Draft Code Change Language
  - Notes from today's meeting
  - Draft CASE Report (will be posted in April)



# Thank you.

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# Appendix

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## References

- [Title24Stakeholders.com](https://www.title24stakeholders.com)
- [EnergyCodeAce.com](https://www.energycodeace.com)
  - See [Reference Ace](#) for 2016 Standards, Appendices, and Compliance Manuals
- [California Energy Commission 2019 Standards Webpage](#)