

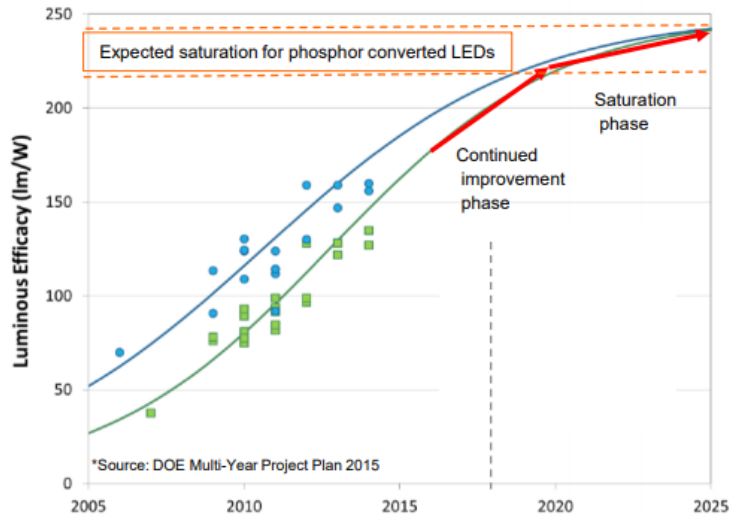
## Minority Report in support of TAG Committee Approved Interior Lighting Power Allowances: C405.2

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Due to the process of the 2018 August TAG Committee regarding deliberations on CCPs surrounding section C405.2(1) and C204.2(2), tables for Building Method and Space-by-space lighting power allowances (LPA), there was material presented separately from the CCP forms, such as the '2018 WSEC SMART BUILDING LPA'. Additional visual supporting material was provided in Power Point presentation format during the TAG meetings and is synthesized below for Council review.

1. Lighting Power Allowance Tables are becoming a smaller part of the story of lighting power use on a project than in prior years, due to the more effective use of lighting controls to turn off lights when there is sufficient daylight present, or when human presence is not sensed. This code cycle has more control requirements than ever before, aiding in energy reductions. Note, the amount of reduction from controls has not been quantified as part of this study.
2. The initial proposal to integrate the Washington State Code to match IECC showed that to do this several space types are increased, and many are decreased, relative to total connected energy allowances. If an integrated draft of WSEC 2015 and the IECC were to be accepted, the overall energy reduction would be about a 4.5% reduction.
3. LPA code reductions have traditionally been reduced over the years in blanket amounts (e.g., 10% across the board for every space type). Lighting product efficiencies have been improving, but not all space types or areas have seen the same effectiveness. Washington State is not alone in this approach. The ASHRAE 90.1 Lighting Subcommittee has also observed problems with proposed values in their Energy Standard. To align values with the IES Handbook and current recommended practices, they have generated an Addendum BB document to the 90.1 standard, which was closed for public review on September 17, 2018. As further evidence of problems with the existing LPA tables, Title 24 has also been changed to reflect a different approach, one that prescribes "ambient" and "task" lighting values for each space type.
4. The TAG lighting committee assessed the Addendum BB values, as well as the Title 24, and found that the suggestion for change should be recognized. Additionally, several test-case studies were performed that showed a handful of problems with both models (e.g., copy/print rooms, and confinement cells). Their predictions of new construction of various space-types in Washington State helped to focus our review of certain areas, so that we could effectively test spaces and reduce values for areas like "Corridors" (0.53 reduced to 0.41), "Offices" (0.93 reduced to 0.67), and "Sales areas" (1.27 reduced to 1.12). Yes, there are some areas that have been increased to respond to design-focused issues, however high priority Washington State spaces were reduced across the board.
5. The WSEC 2018 SMART BUILDING LPA values are a reduction from 2015 values by a floor weighted average of 4.5% below current WSEC code.
6. As recorded during the DOE SSL Research and Development workshop (January 29, 2018), LED efficiency is still improving, and will continue to do so for 2-3 more years but is beginning to

slow. See chart below. The main drivers for the reductions in improvement have to do with material and system efficiency (phosphors degrade), spectral efficacy (the part of the light humans use to see needs a fuller spectrum than just high output blue light, which has the potential to be damaging), and advanced manufacturing concepts.



- ⇒ Target for white LEDs: 240 – 250 lm/W
- ⇒ 2-3 years continued improvement predicted
- ⇒ Beyond 2020 entering saturation phase of marginal integral improvements

7. Layered lighting approaches, such as those that involve tunable white light, require higher LPAs so that duplicate lighting layers may enable cool or warm lighting (e.g. lighting that may be switched or dimmed between 4000°K or 2700°K) in a single space. The connected load may be higher but only select luminaires would be used at once.

Additional supporting material through means of imagery and project examples helped to emphasize the value of design as it relates to public well-being.

In light of the above points, and additional material, the TAG committee voted to approve the WSEC 2018 SMART BUILDING LPA values.

WSEC 2018 SMART BUILDING LPA

per TAG 8.10.2018 meeting

Building Area Values

Categories	WA 2018
BUILDING AREA TYPE	LPD
Automotive facility	0.60
Convention center	0.65
Court house	0.70
Dining: Bar lounge/leisure	0.79
Dining: Cafeteria/fast food	0.70
Dining: Family	0.70
Dormitory	0.61
Exercise center	0.65
Fire station	0.53
Gymnasium	0.65
Health care clinic	0.70
Hospital	0.90
Hotel	0.70
Library	0.78
Manufacturing facility	0.89
Motel	0.70
Motion picture theater	0.61
Multifamily	0.41
Museum	0.80
Office	0.65
Parking garage	0.14
Penitentiary	0.65
Performing arts theater	1.00
Police station	0.70
Post office	0.67
Religious building	0.80
Retail	0.90
School/university	0.65
Sports arena	0.75
Town hall	0.71
Transportation	0.50
Warehouse	0.40
Workshop	0.90

Space by Space

Categories	WA 2018
COMMON SPACE-BY-SPACE TYPES	LPD
Atrium - First 40 feet in height (per foot)	0.48
Atrium - Above 40 feet in height (per foot)	0.70
Audience Seating Area	
In an auditorium	0.61
In a convention center	0.65
In a gymnasium	0.34
In a motion picture theater	0.82
In a penitentiary	0.67
In a performing arts theater	1.06
In a religious building	1.22
In a sports arena	0.33
Otherwise	0.23
Banking activity area	0.79
Breakroom (see Lounge/breakroom)	
Beauty salon, barber area	1.00
Classroom/lecture hall/training room	
In a penitentiary	1.38
Otherwise	0.84
Computer room	1.33
Conference/meeting/multipurpose	0.97
Confinement Cell	0.70
Copy/print room	0.56
Corridor	
In a facility for the visually impaired (and not used primarily by the staff) <sup>b</sup>	0.71
In a hospital	0.71
In a manufacturing facility	0.41
Otherwise	0.41
Courtroom	1.25
Dining area	
In a penitentiary	0.42
In a facility for the visually impaired (and not used primarily by the staff) <sup>b</sup>	1.38
In bar/lounge or leisure dining	0.86
Cafeteria or fast food	0.63
In family dining area	0.71
Otherwise	0.52
Electrical/mechanical	0.42
Emergency vehicle garage	0.52
Food preparation	1.29
Guest room	0.41
Laboratory	
In or as a classroom	1.17
Otherwise	1.7
Laundry/washing area	0.59
Loading dock, interior	0.38
Lobby	
In a facility for the visually impaired (and not used primarily by the staff) <sup>b</sup>	2.49
For an elevator	0.71
In a hotel	0.51
In a motion picture theater	0.23
In a performing arts theater	1.25
Otherwise	1.11
Locker room	0.52
Lounge/breakroom	0.67
In a healthcare facility	
Otherwise	
Office	
Enclosed	
Enclosed <250	0.88
Enclosed >250	0.79
Open plan	0.67
Parking area, interior	0.15
Pharmacy area	1.9
Restroom	
In a facility for the visually impaired (and not used primarily by the staff) <sup>b</sup>	1.26
Otherwise	0.78
Sales area	1.12
Seating area, general	0.23
Stairway (see space containing stairway)	
Stairwell	0.55
Storage room	
< 50 SF	0.4
50SF-1000SF	0.38
All other Storage	0.38
Vehicle maintenance	0.6
Workshop	1.26

BUILDING SPECIFIC SPACE-BY-SPACE TYPES <sup>a</sup>	
Automotive - (See Vehicular maintenance, above)	0.6
Convention center – exhibit space	0.5
Dormitory living quarters	0.84
Facility for the visually impaired <sup>b</sup>	
In a chapel (and not used primarily by the staff) <sup>b</sup>	0.7
In a recreation room (and not used primarily by the staff) <sup>b</sup>	1.77
Fire stations – Sleeping quarters	0.2
Engine rooms	0.45
Gymnasium/fitness center	
In an exercise area	0.9
In a playing area	0.85
Health care facility	
In an exam/treatment room	1.4
In an imaging room	0.85
In a medical supply room	0.62
In a nursery	1.37
In a nurse’s station	1.11
In an operating room	2.26
In a patient room	1.15
In a physical therapy room	0.91
In a recovery room	1.25
Library	
In a reading area	0.96
In the stacks	1.16
Manufacturing facility	
In a detailed manufacturing area	0.8
In an equipment room	0.76
In an extra high bay area	1.42
(greater than 50-foot floor-to-ceiling height)	
In a high bay area	1.24
(25 - 50-foot floor-to-ceiling height)	
In a low bay (< 25-foot floor-to-ceiling height)	0.86
Museum	
In a general exhibition area	0.84
In a restoration room	1.1
Performing arts theater Dressing/fitting room	0.41
Post office	
Sorting area	0.76
Religious buildings	
In a fellowship hall	0.54
In a worship/pulpit/choir	0.85
Retail facilities	
In a dressing/fitting room	0.51
In a mall concourse	1.03
Sports arena – playing area	
–For a Class 1 facility	2.94
For a Class 2 facility	2.01
For a Class 3 facility	1.3
For a Class 4 facility	0.86
Transportation	
In a baggage/carousel area	0.39
In an airport concourse	0.25
deleted – see “Seating Area-general”	
At a terminal ticket counter	0.51
Warehouse – storage area	
For medium to bulky palletized items	0.33
For smaller, hand-carried items	0.69