Interior Lighting Campaign 2015 – 2019 Results and Integrated Lighting Campaign

February 6, 2020

Michael Myer and Felipe A. Leon

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PNNL-SA-150979

BUILDINGS

Building Technologies Office 2020 Peer Review

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The 2020 Department of Energy (DOE) Building Technologies Office (BTO) Peer Review will be held on May 4-7, 2020, in Arlington, Virginia, at a new location, the Hyatt Regency Crystal City. The eighth annual BTO Peer Review encompasses many of BTO's active research, development, validation, and systems integration projects. Independent experts will assess the progress and contributions of projects and portfolio activities toward BTO's mission and goals, and these assessments will be used to enhance the management of existing efforts, gauge the effectiveness of projects, and design future programs. The meeting will also provide an opportunity to promote collaborations and partnerships.

Additional event details and registration information coming soon.

Please contact btopeerreview@ee.doe.gov with any questions.

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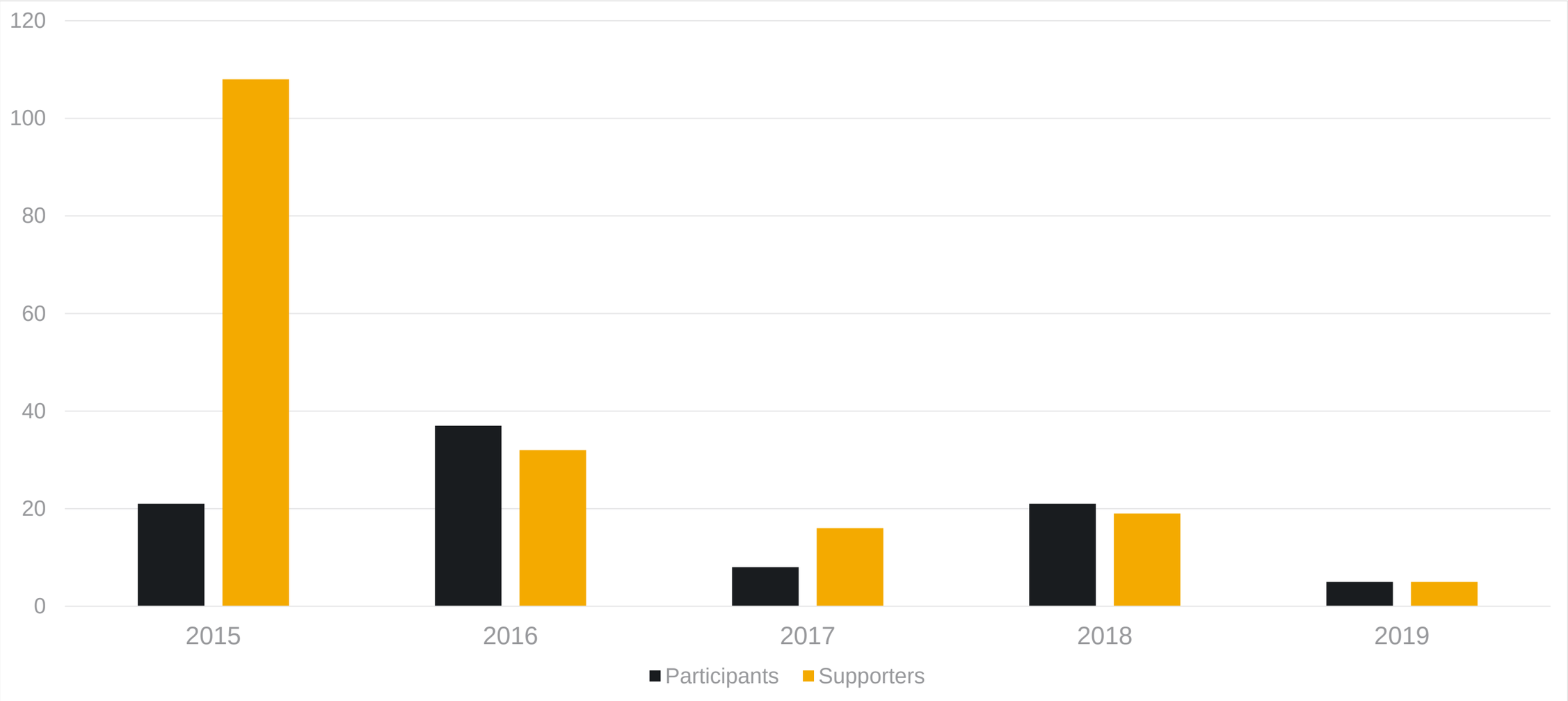
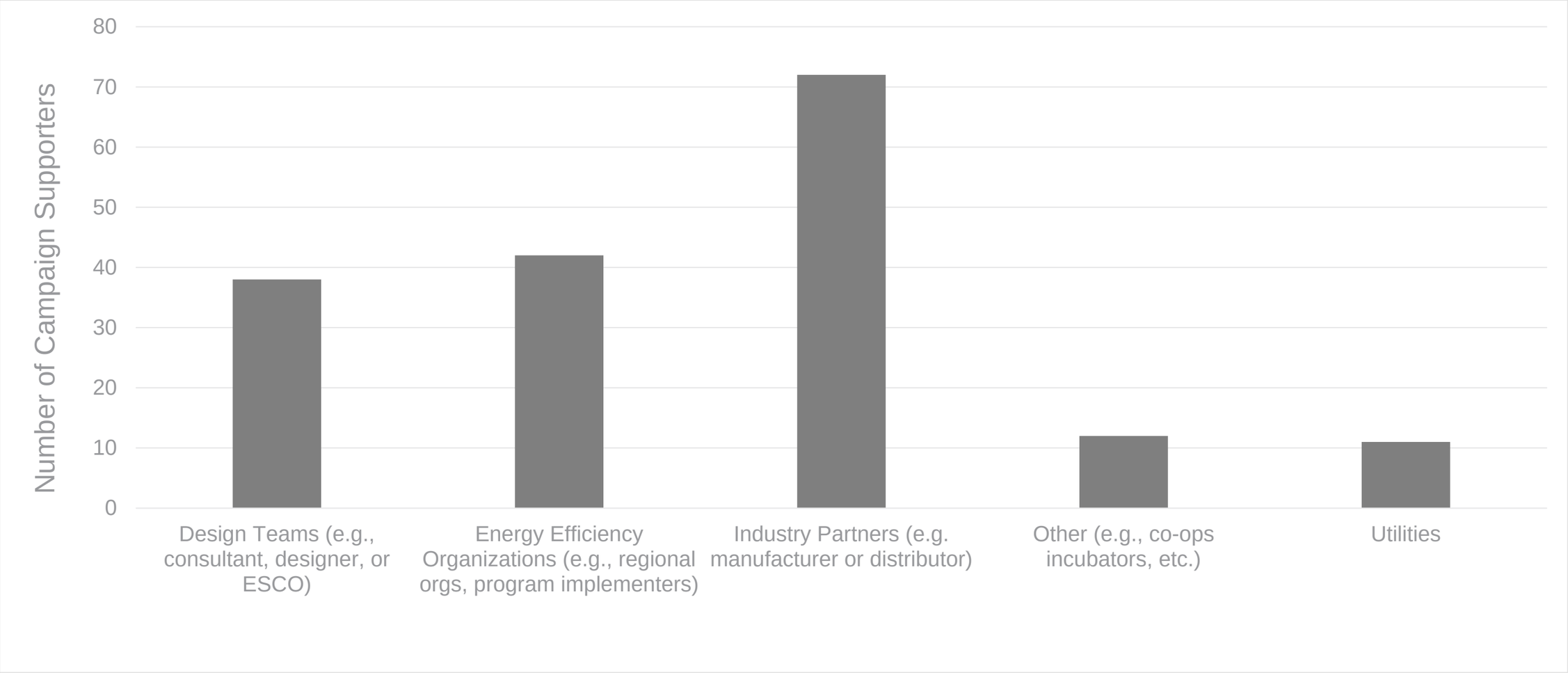
Similar DOE Campaigns – Past and Present

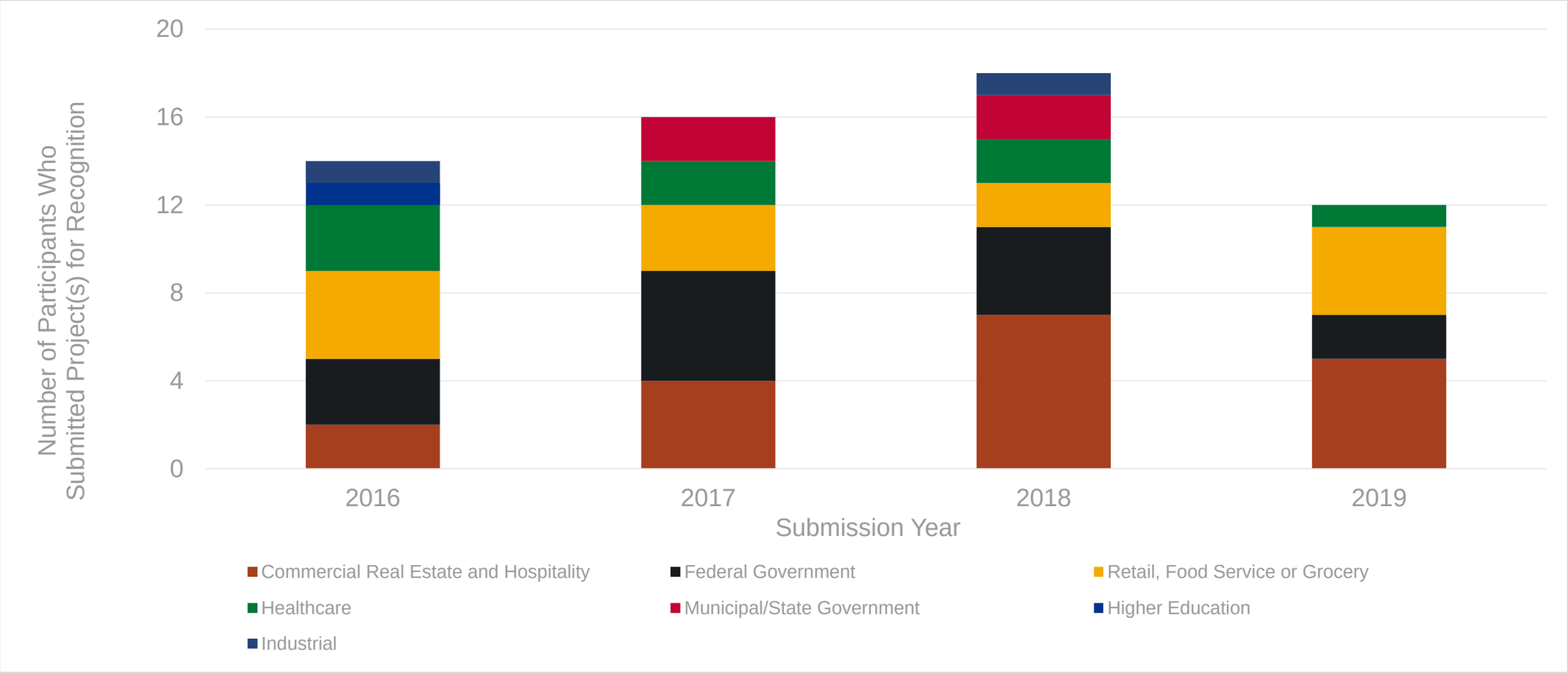
Interior Lighting Campaign: Participants and Supporters



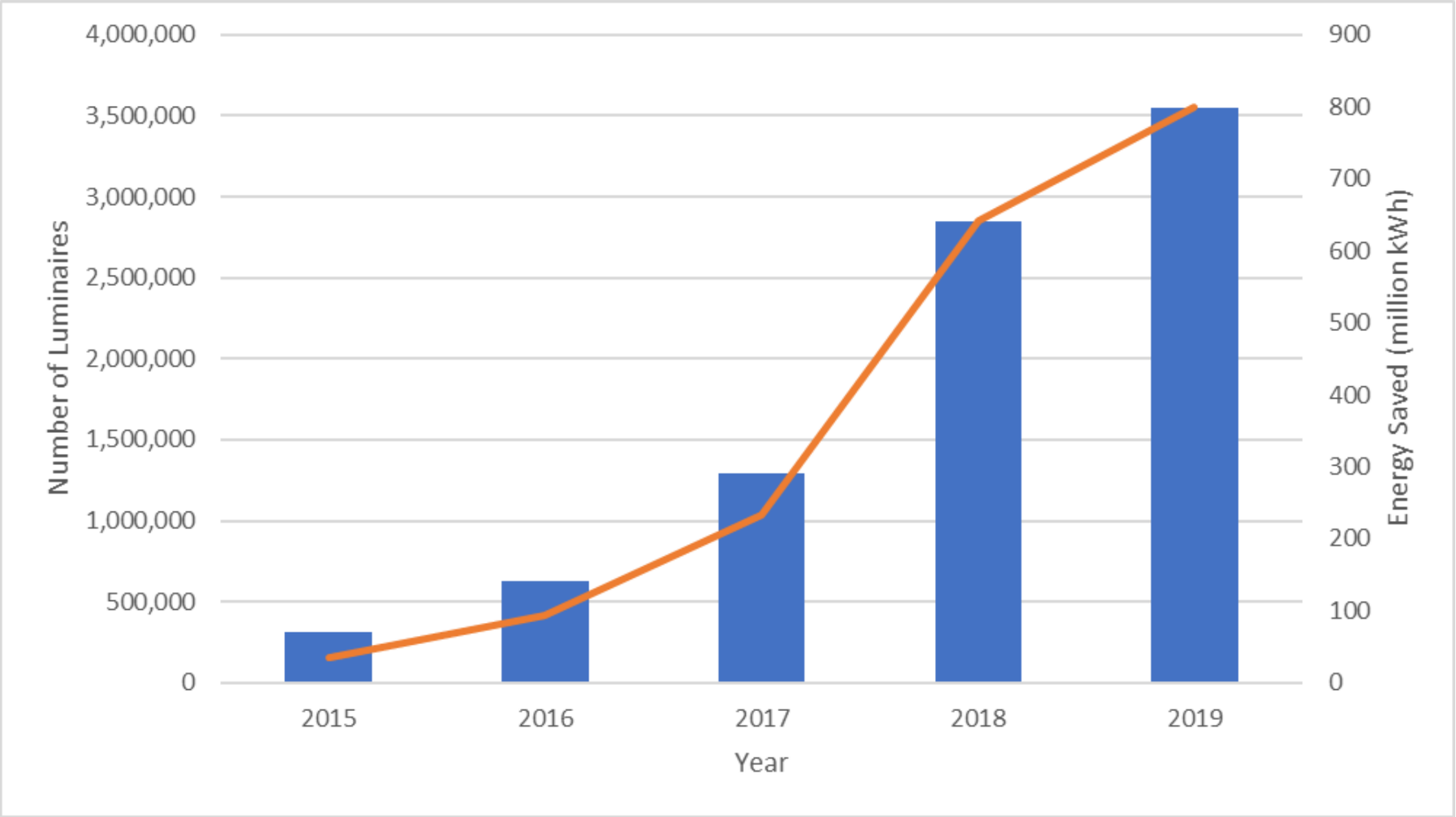
Interior Lighting Campaign: Supporters



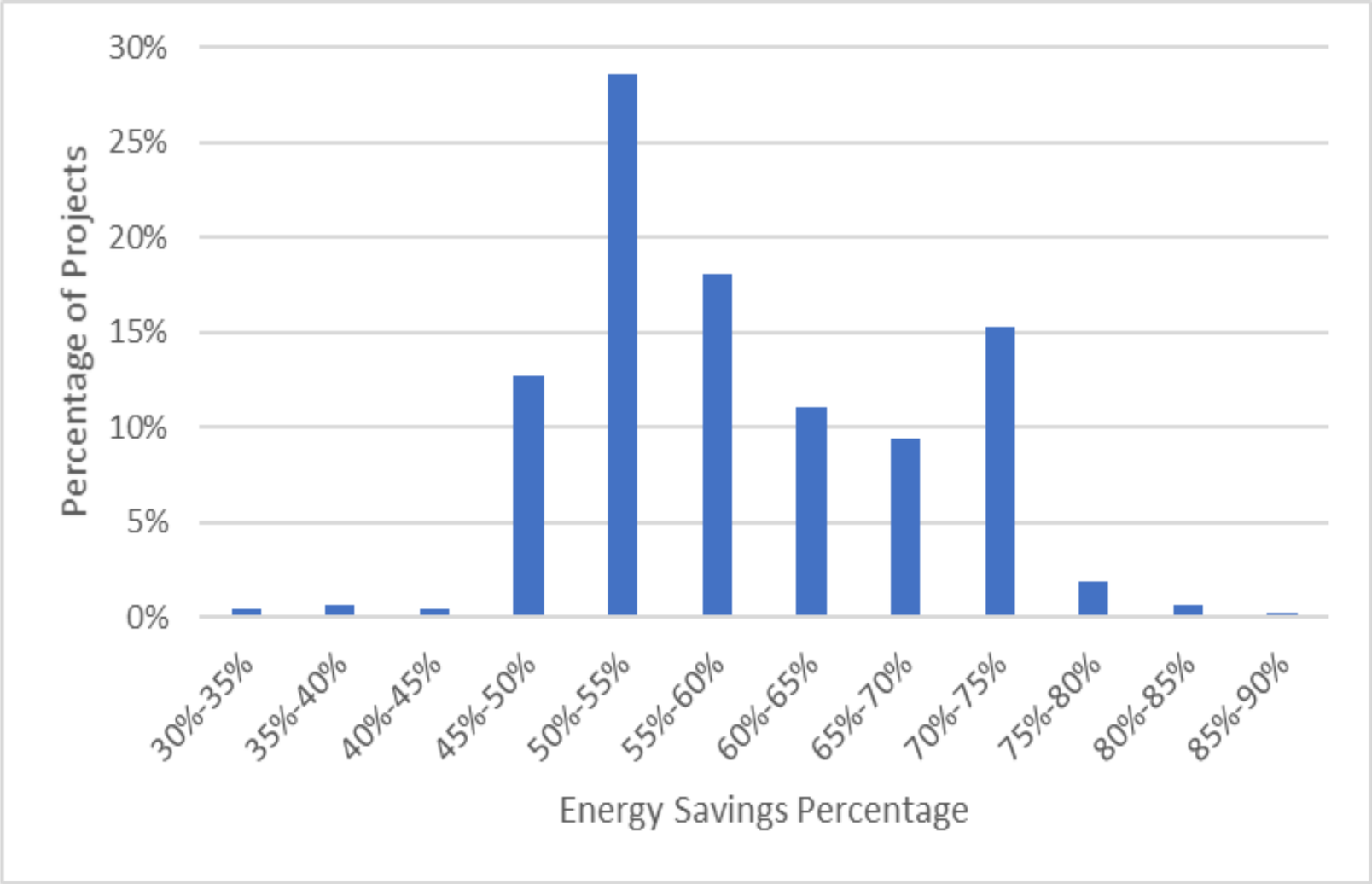
Interior Lighting Campaign: Submissions by year and category



Interior Lighting Campaign: Cumulative Luminaires and Savings



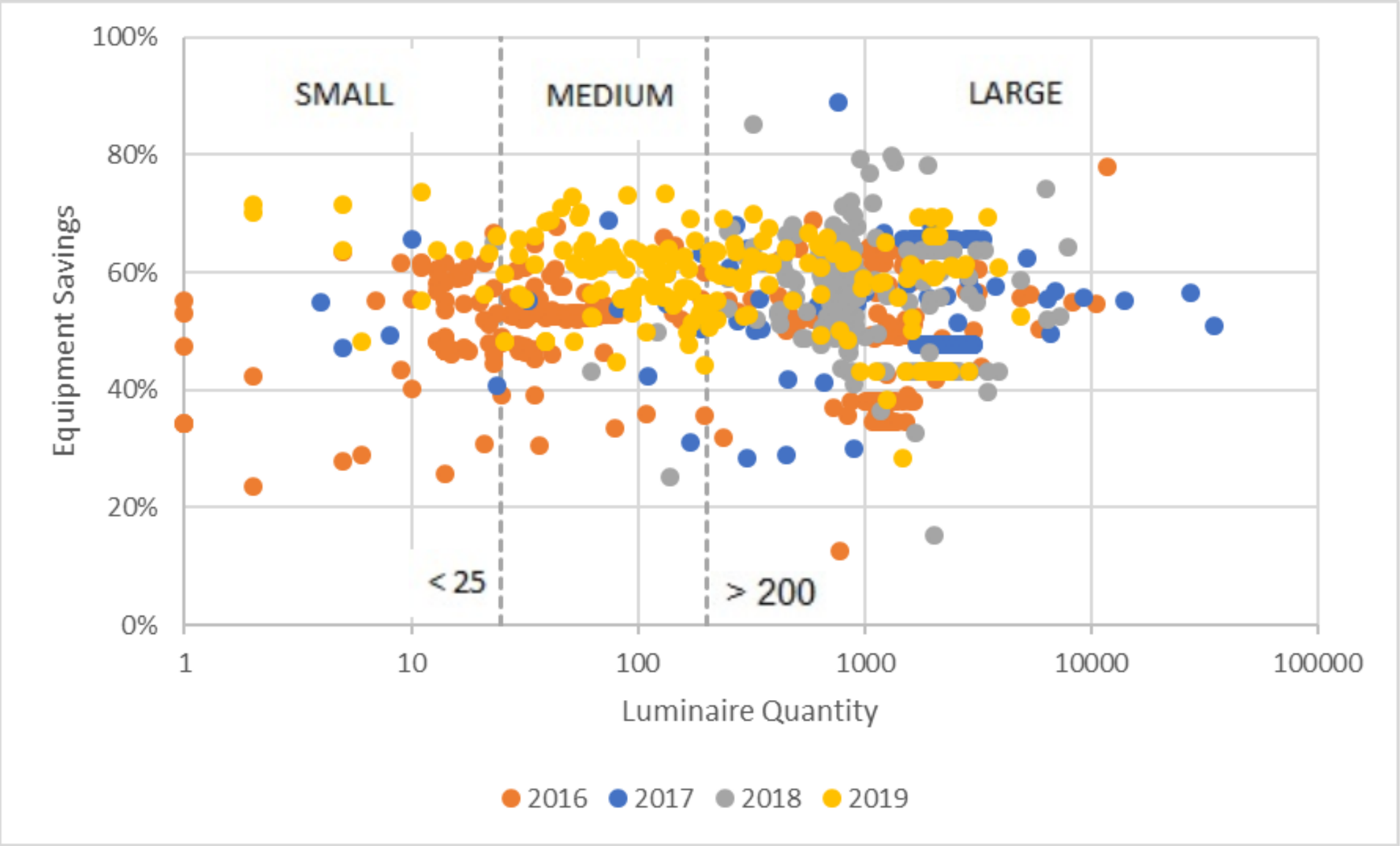
Interior Lighting Campaign: Total Energy Savings



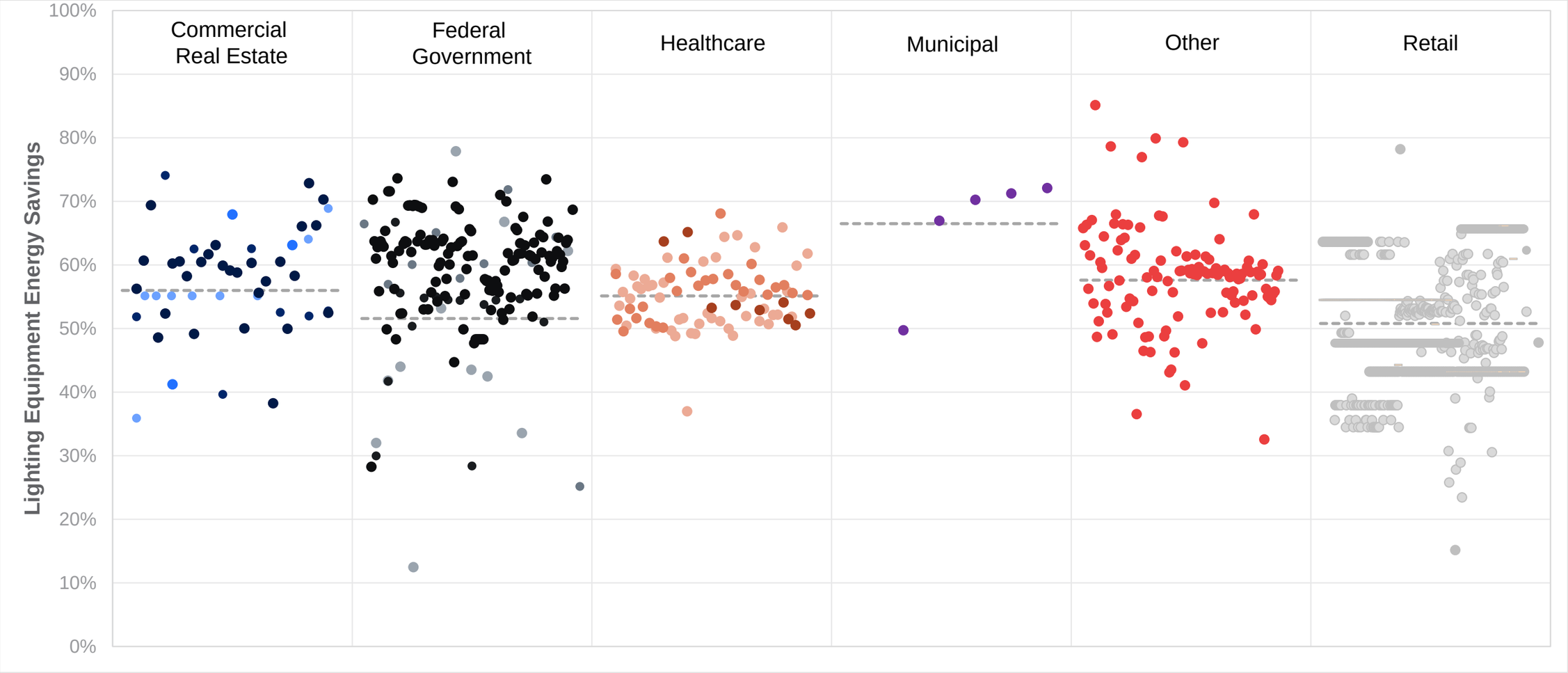
Interior Lighting Campaign: Equipment-Only Energy Savings Examples

- U.S. Army Reserve – 88th Division
  - 63% medium project
  - 72% large project
- Target
  - 44% compared to new construction
- Cleveland Clinic
  - 55% compared to existing fluorescent

Interior Lighting Campaign:
Energy Savings by Project Size for Retrofit Projects



Interior Lighting Campaign: Equipment Energy Savings by Sector



Color indicates different sectors
Different shades within a sector indicates different years

Interior Lighting Campaign: Lighting + Controls Energy Savings Examples

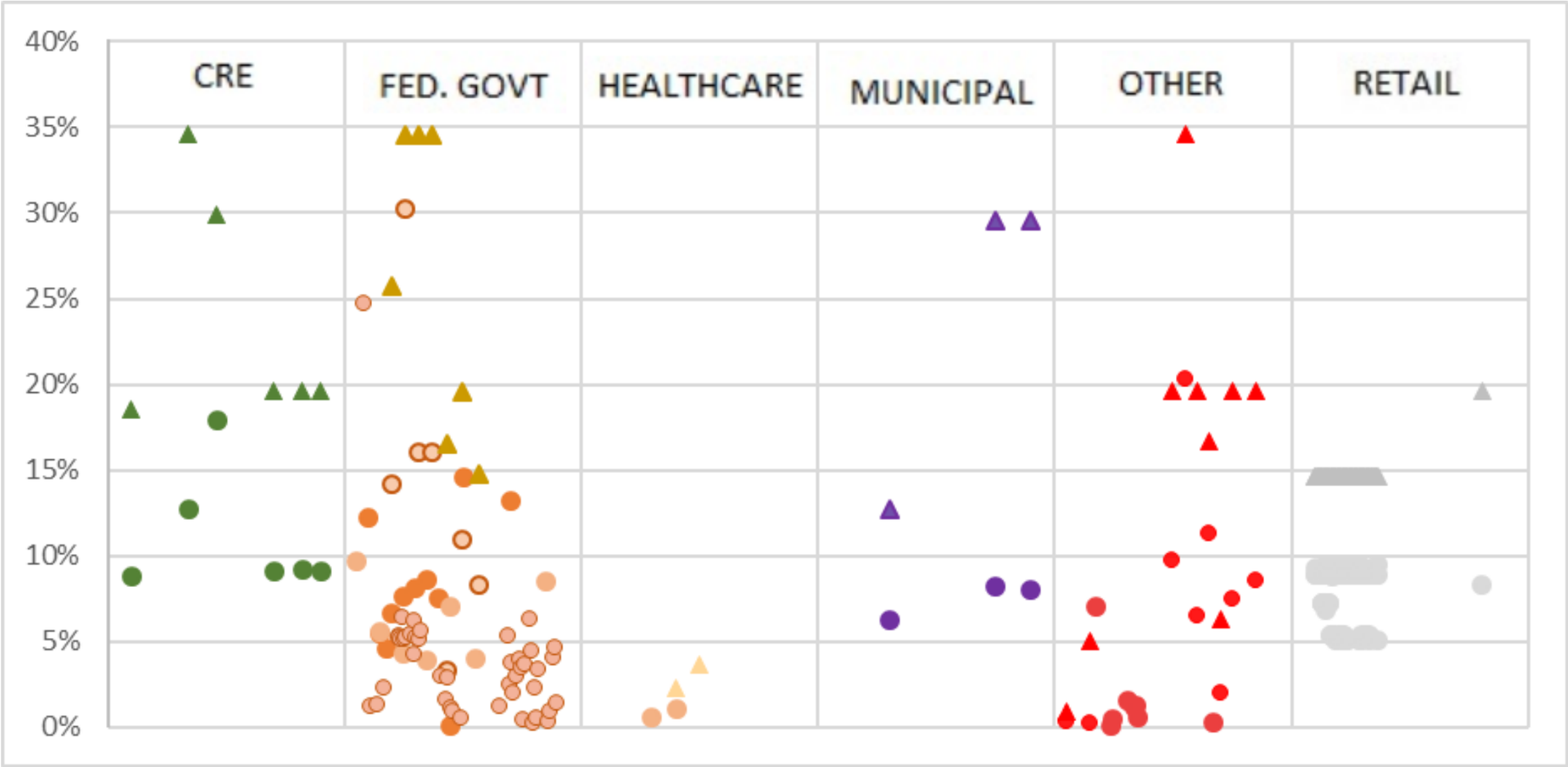
Northern Arizona University

- 46% compared to new construction

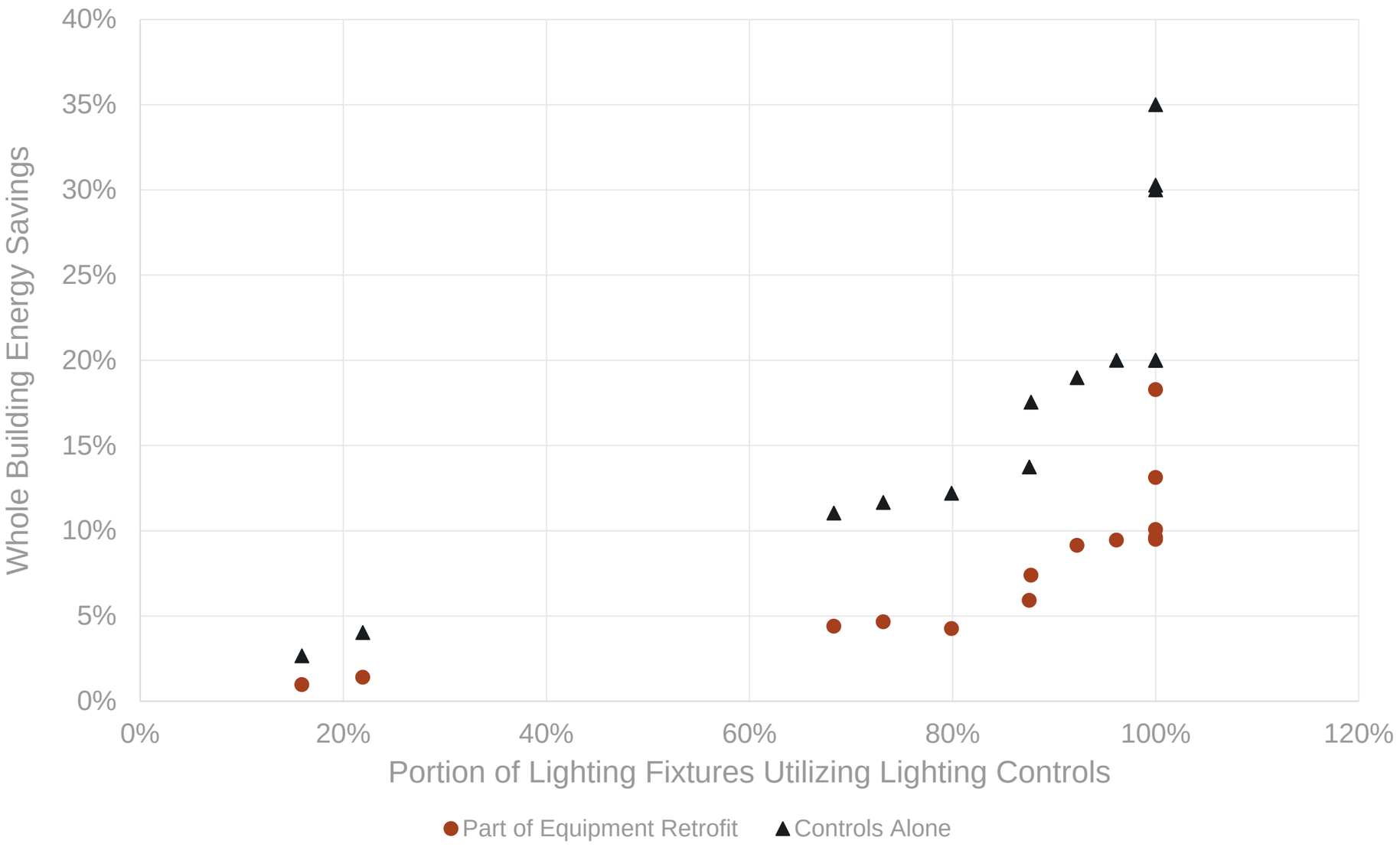
GSA – Rodgers Building

- 77% saved via retrofit with lighting and controls

Interior Lighting Campaign: Lighting Controls Savings by Sector

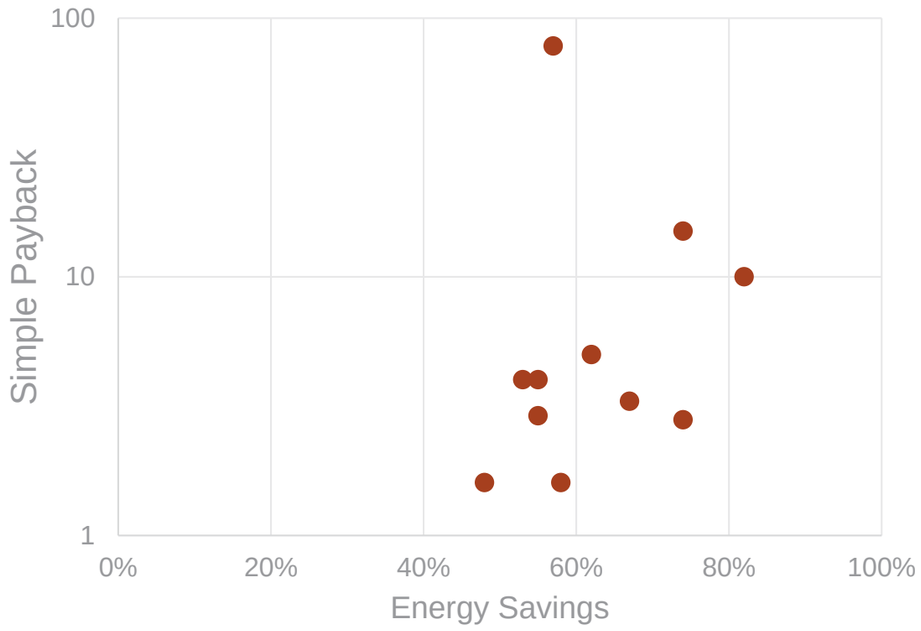


Interior Lighting Campaign:
Lighting Controls and Whole Project Energy Savings

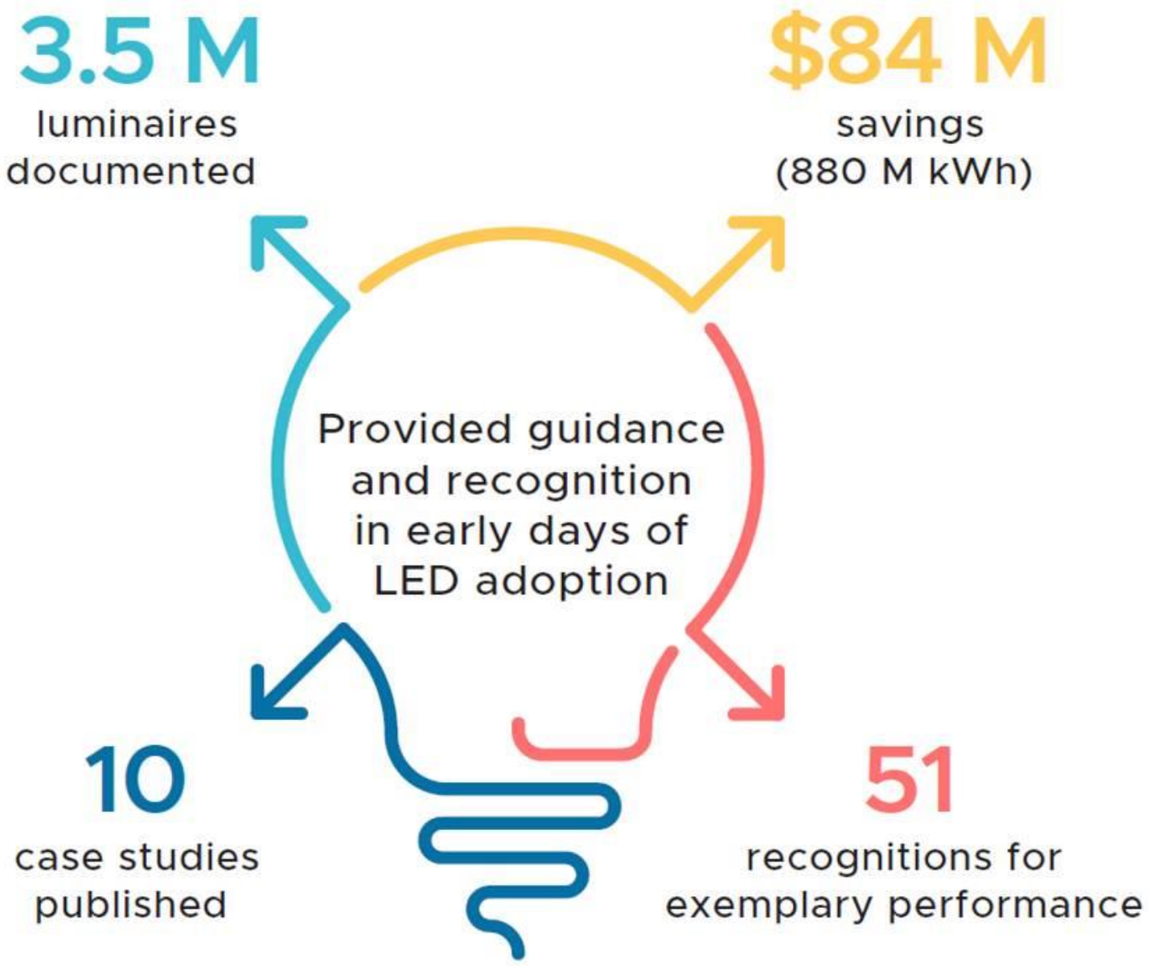


Interior Lighting Campaign: Cost Effectiveness

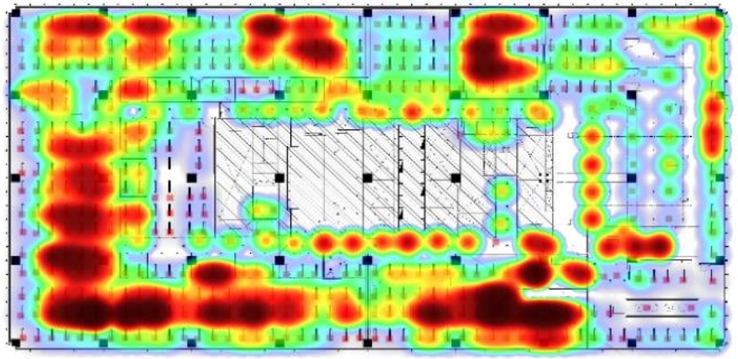
Sector Type	Total Energy Savings	SPB (years)	Number of Luminaires
Retail (IoT sensors)	48%	1.6	1,928
Retail	53%	4.0	57
Commercial Real Estate	55%	2.9	35
Healthcare	55%	4.0	14,701
Federal Government (IoT sensors)	57%	78	1,507
Healthcare	58%	1.6	3,785
Federal Government	62%	5	424
Healthcare	67%	3.3	2,994
Commercial Real Estate	74%	2.8	60
Federal Government	74%	15	40
Federal Government	82%	10	11,802



Interior Lighting Campaign Summary

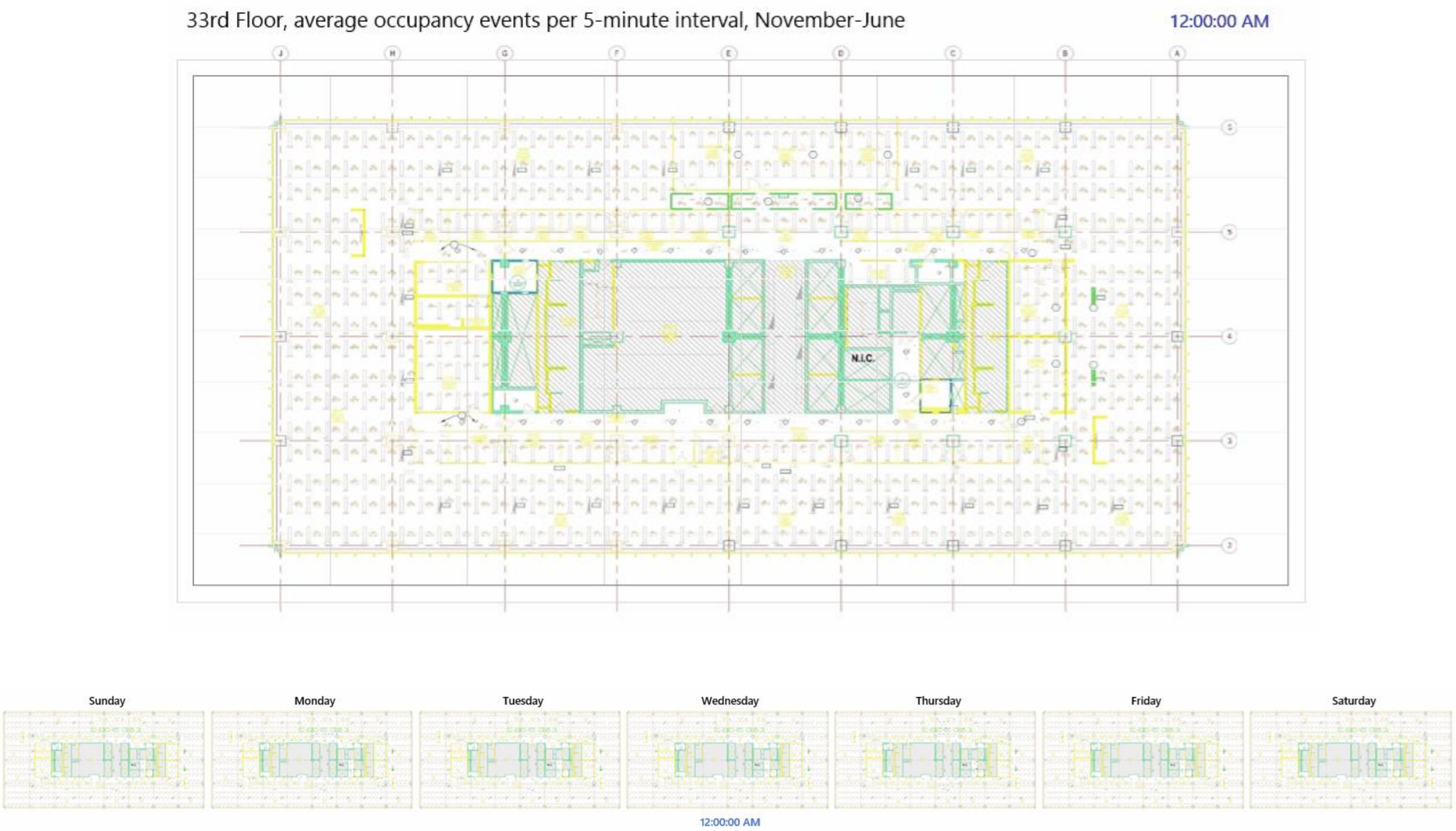


Future – going beyond lighting



- GSA facility – Exemplary Sector Recognition
  - Integral daylight and occupancy sensor in LED retrofit kit
  - Occupancy (or presence) detected and informs HVAC system
  - Aides with space utilization

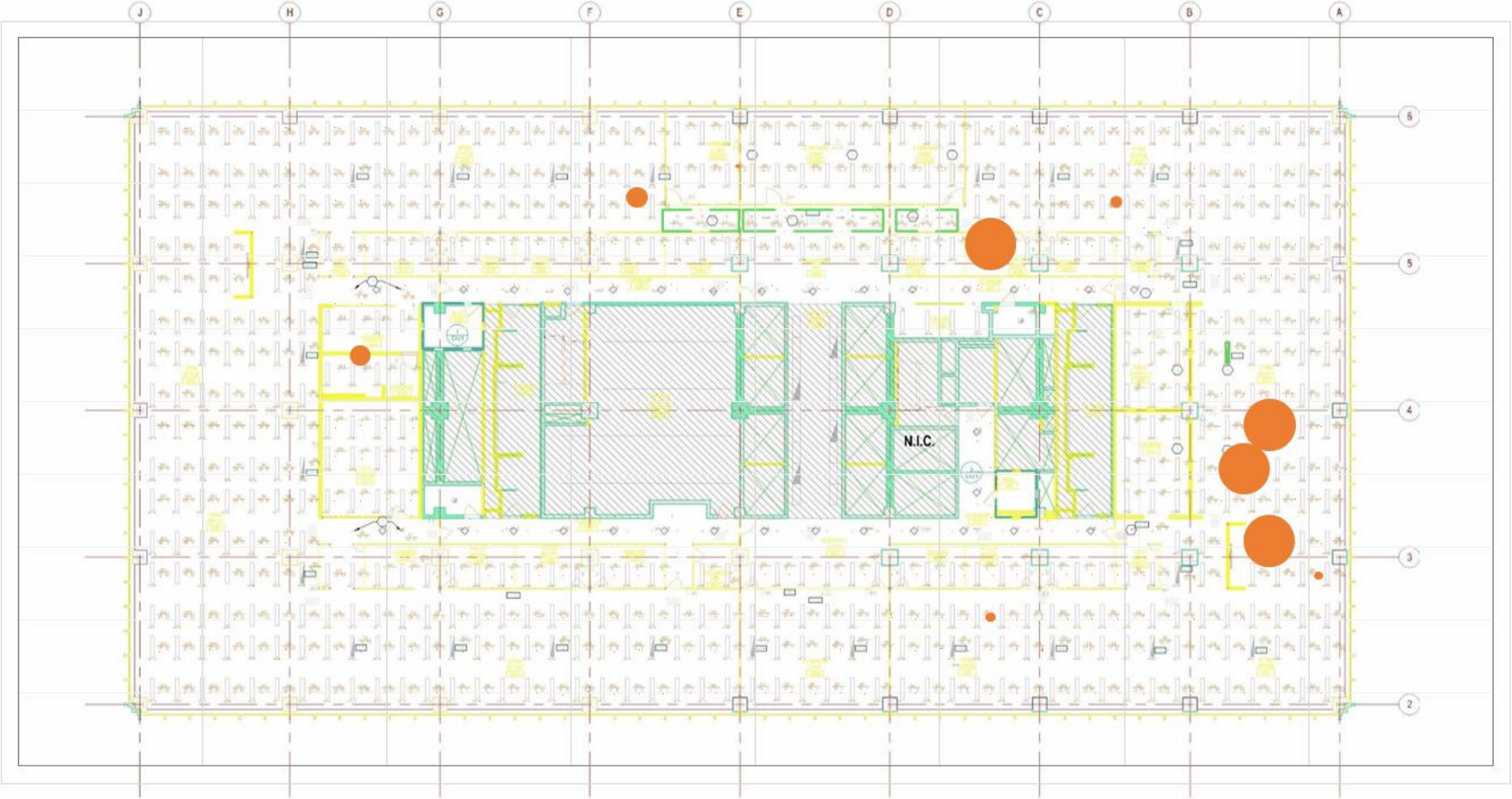
Future – going beyond lighting



Future – more detailed controls information

33rd Floor, average ambient light, November - July

5:30:00 AM



Integrated Lighting Campaign

Definitions

Oxford Learner's Dictionaries

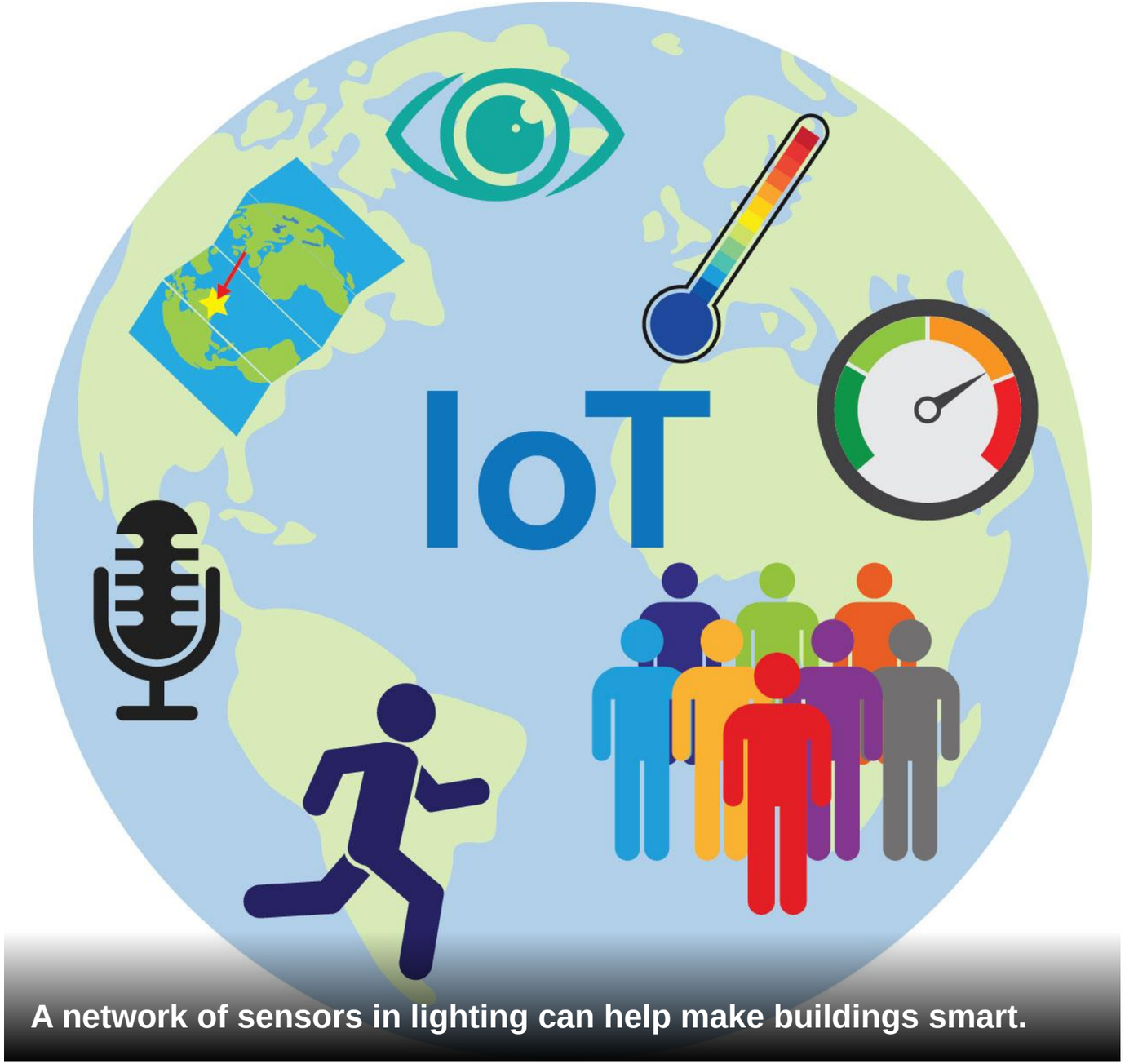
- Integrated (adjective)
  - "in which many different parts are closely connected and work successfully together"
- Lighting (noun)
  - "the use of electric lights in a place."
- Campaign (noun)
  - "a series of planned activities that are intended to achieve a particular … aim"

Our definition

- Integrated Lighting Campaign
  - A series of planned activities aiming to demonstrate the benefits of lighting and other building systems that are connected and working successfully to enable deeper energy savings and other benefits

Why INTEGRATE Lighting?

- Deeper energy savings potential
  - HVAC
  - Plug loads
- Other benefits
  - Asset tracking
  - Business intelligence
  - Customer engagement



A network of sensors in lighting can help make buildings smart.

Poll Question

Why LIGHTING?

- It is all around us (eye in the sky)
- It requires a power source (and we can leverage this)
- It already may provide some useful information (occupancy/daylight sensing)

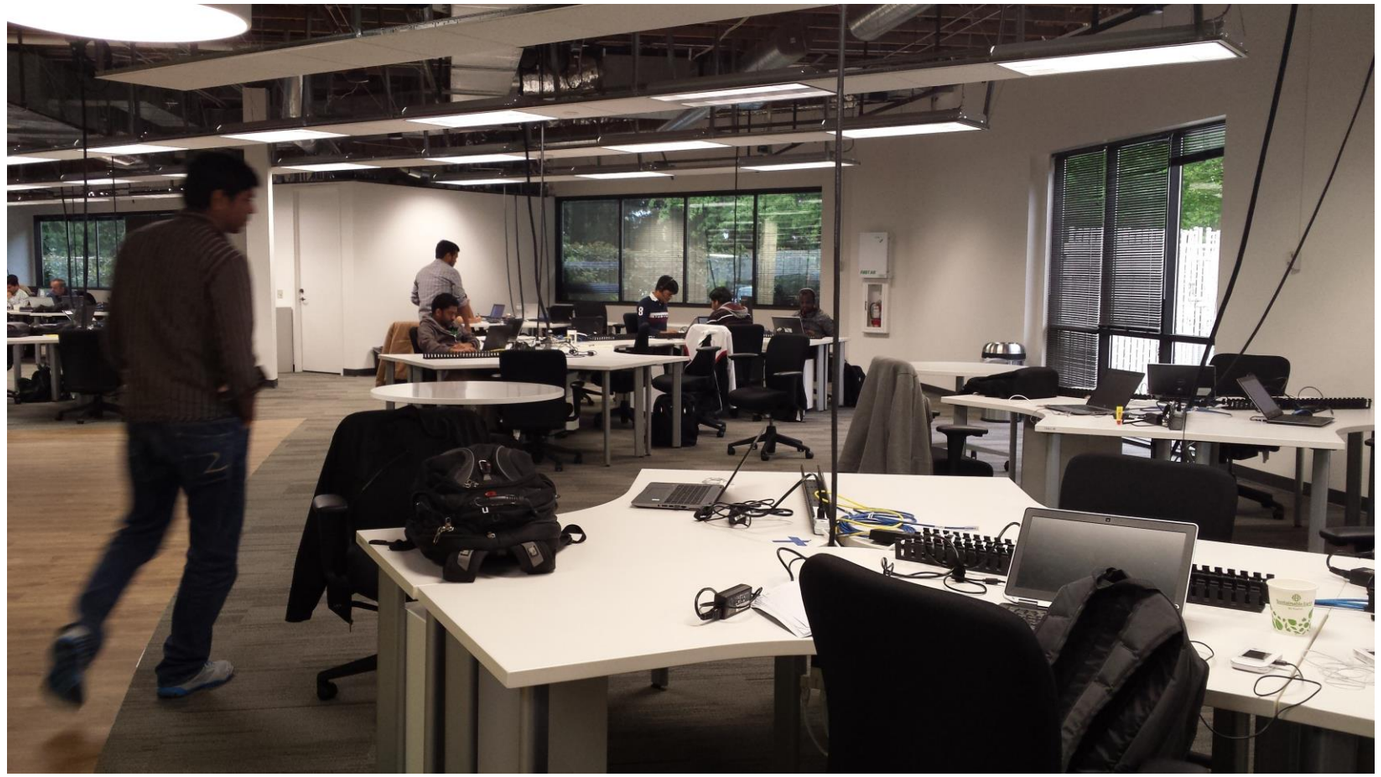
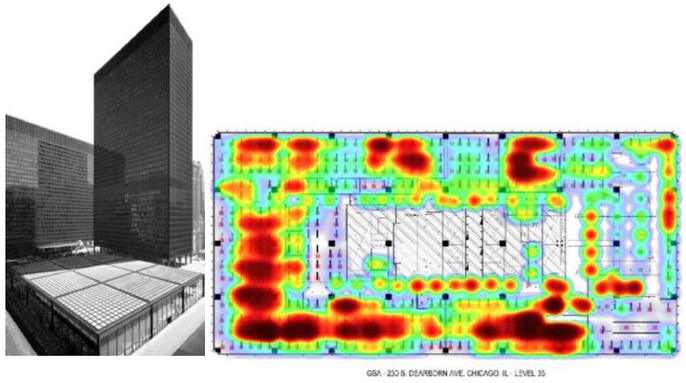


Photo by Wonderlane on Unsplash

Lighting is ubiquitous.

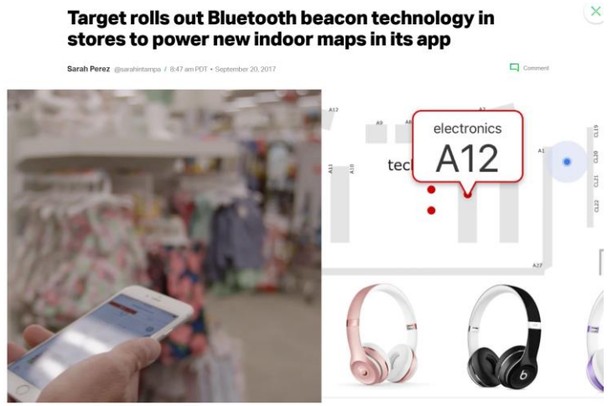
Is it just hype?

- Some claims may be optimistic about the potential, but…
- Early adopters are realizing benefits
  - Target
  - GSA



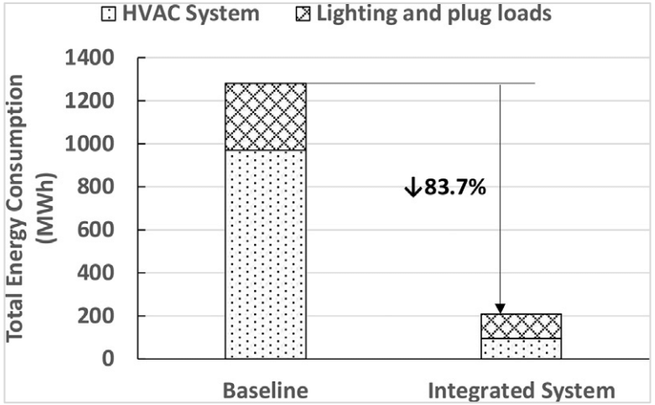
Heatmapping can provide insight about space utilization

Source: Interior Lighting Campaign



Increased revenues in retail can result from wayfinding

Source: Techcrunch.com



Laboratory research (LBNL) demonstrates value of an integrated system approach

Source: Regnier, et al, Energy and Buildings

Regnier, Cindy & Sun, Kaiyu & Hong, Tianzhen & Piette, M.. (2017). Quantifying the benefits of a building retrofit using an integrated system approach: A case study. Energy and Buildings. 159. 10.1016/j.enbuild.2017.10.090.

But can I afford it?

- Some might ask “can I afford not to?”
- Utilities are actively incentivizing or considering incentivizing
  - Custom
  - Prescriptive

Innovation is fostered by information gathered from new connections; from insights gained by journeys into other disciplines or places; from active, collegial networks and fluid, open boundaries. Innovation arises from ongoing circles of exchange, where information is not just accumulated or stored, but created. Knowledge is generated anew from connections that weren’t there before.

- Margaret J. Wheatley

2014 International Leadership Association Lifetime Achievement Award Winner

Poll Question

What the ILC will do

- Modeled after the Interior Lighting Campaign
  - Serve as a resource of information
  - Encourage and recognize successful integration projects
  - Build a body of knowledge (case studies)
  - Provide technical assistance

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How do I get in on this?

- Participants
  - Building owners
  - Building managers
- Supporters
  - Utilities
  - Energy Efficiency Organizations
  - Manufacturers
  - Design teams
- Send e-mail to integratedlighting@pnnl.gov

Completed projects

Considering lighting system

Make products for integration with lighting

Incentivize or considering incentives

Need technical assistance

Integrated Lighting Campaign – Launch Event

Thank you

integratedlighting@pnnl.gov