



Stakeholder MEETING

2017

NEBs All Around Us

NEBs Are Everywhere!

- They're the "bonus" that comes along with an energy-efficiency project
 - Reduced relamping labor
- But the variety is exploding!
 - How should we describe them?
 - Who should we be talking to?
 - Who is benefiting? Who is paying?



Panelists



Alex Do

Acuity Brands



**Carol
Jones**

Enlightened



**Daniel
Petrillo**

Digital Lumens



**Jeff
Schlegel**

*EE Regulatory
Expert*



Will Walker

Eaton



Expanding Lighting Benefits to Organization Mission Objectives

DesignLights Consortium Stakeholder Meeting
July 2017

Alex Do
Sr. Product Marketing Manager, Acuity Brands



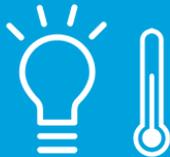
 **AcuityBrands.**

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\$3

UTILITY
Cost per ft²



\$30

RENT
Cost per ft²



\$300

EMPLOYEE
Cost per ft²



\$3000

BUSINESS
Revenue per ft²



Property Managers: Efficient Real Estate

Sensors: required for energy codes, useful for ...

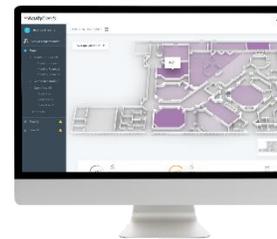
- Integration with other systems:
Optimize HVAC with sensor-based setback
- Efficiency of real estate utilization:
Allocation of office, conference, break areas



Motion Sensor



BACnet Controller



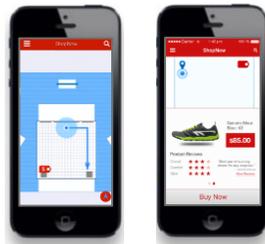
Analytics Application



Merchandising: Connecting to Customers



LED with Positioning Technology



Cloud Positioning Services



BACnet Controller

Educators: Dynamic Environments



“We change them quite a bit. The kids love doing it ... If they feel in control, they will focus more and get it done.”

-Jenna Jones, Fifth Grade Teacher



“Jenna’s students scored 16 points higher than they scored on the fourth grade math STAAR last year.”

-Lisa Williams, Principal



Thank You!



NEBs of Networked Lighting Utilizing Wireless Infrastructure

The Story of Frank and Sally

- Frank and Sally work for a manufacturer of medical products.
- Frank is the head of maintenance.
- Sally is a manufacturing engineer.
- Both Sally and Frank are running into issues but there is no budget to solve them.
- There *is*, however, budget for a lighting project...
- ... so Frank and Sally come up with a plan.
- Thanks to DLC's sweet NLC QPL, a rebate program allowed them to go with a networked lighting solution.
- The following details how this solved Frank and Sally's problems even though they only had budget for lighting, they are in different departments, and their problems are not energy related.



Meet Frank and Sally.

How Frank Utilized the Lighting Network

- A major part of Frank's job is maintaining his emergency lighting solution and staying compliant, which he could address in four different ways:
 - After Hours Testing
 - Awkward hours
 - Working Hours Testing
 - Time consuming
 - Third Party Testing
 - Expensive
 - No Testing
 - Risky
- Frank's Non Energy Benefit: An *emergency lighting solution that automates battery tests and generates reports and diagnostics.*



Frank deals with significant cost for emergency lighting compliance.

How Sally Utilized the Lighting Network

- Sally needs to measure temperature and humidity at various points in her facility for three main reasons:
 - Quality Assurance/Audit Trail
 - Time Consuming
 - Yield Issues
 - Costly
 - High value product is vulnerable
 - Risky
- Sally's Non Energy Benefit:
Wireless temperature, and humidity sensors automatically send data, reports, and alerts



Sally Needs to Better Understand Environmental Factors

Conclusion

- Energy projects are often budgeted and eligible for rebates.
- Networked lighting opens up possibilities across departments for little to no additional cost.
- Benefits employees across departments even without an obvious ROI



Lighting Network Infrastructure Offers NEBs!



Value-Stacking with NLC

William Walker

Changing Needs in Industrial Sales

- Quality Lighting is a pre-requisite for consideration
- Energy Savings are becoming a standard requirement
- Business enablement is the new differentiator
- Uncovering all relevant decision-makers is the key to NLC



Case Study #1

- Industrial-manufacturing Site in the NW
- Business Requirements
 - Energy Savings
 - Lighting & HVAC
 - Integration with other systems
- Future-Proofing
 - A system for future needs
 - An immediate need?! *‘Do we need to procure more sqft?’*



Case Study #2

- Industrial-Manufacturing site in the NW
- Competitive bid for lighting equipment to drive energy savings
- Provided supplemental bid including NLC
 - Customer attempted solutions in the past...
 - Lighting system provides reliable coverage to meet the demands of the business
 - Asset Tracking / Real Time Location Services
 - 500+ Assets including forklifts, cranes, and more
 - Heat-mapping for congestion control



EATON

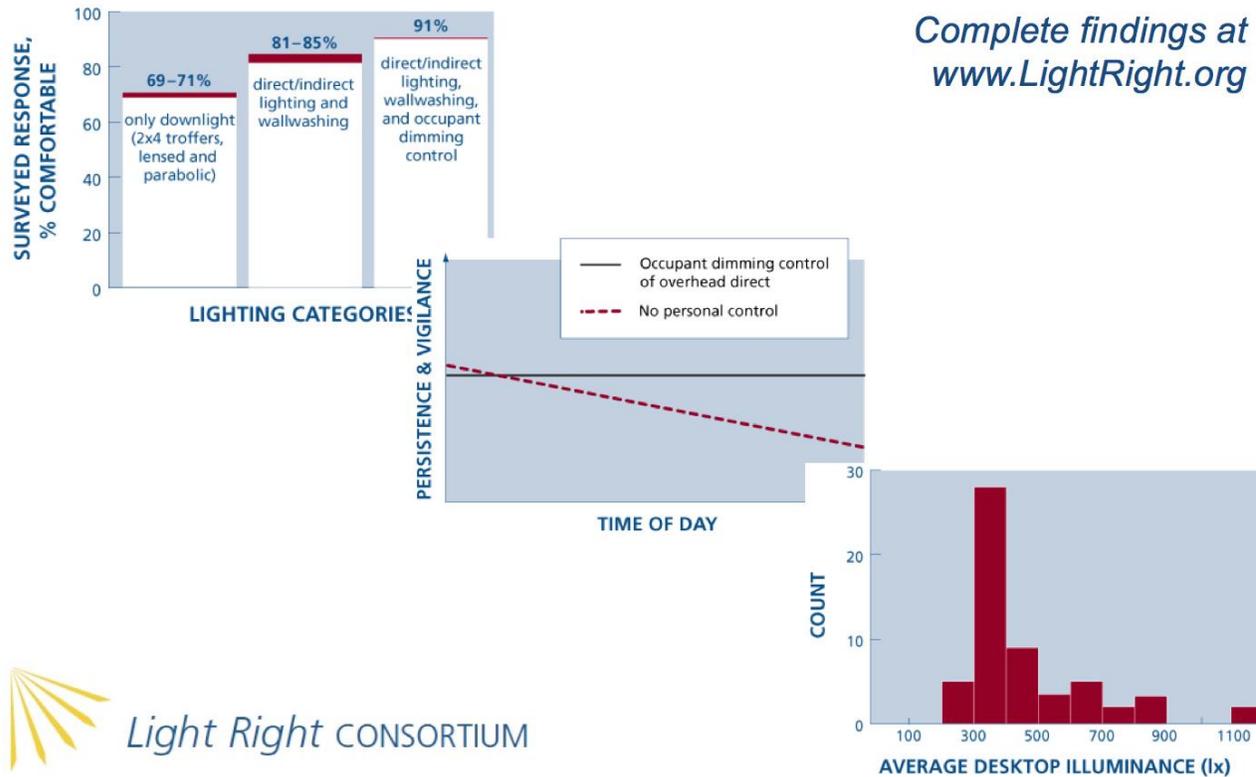
Powering Business Worldwide

The logo for 'enlightened' is written in a lowercase, sans-serif font. The letters are white with a red outline, and the 'e's have a circular cutout in the center.

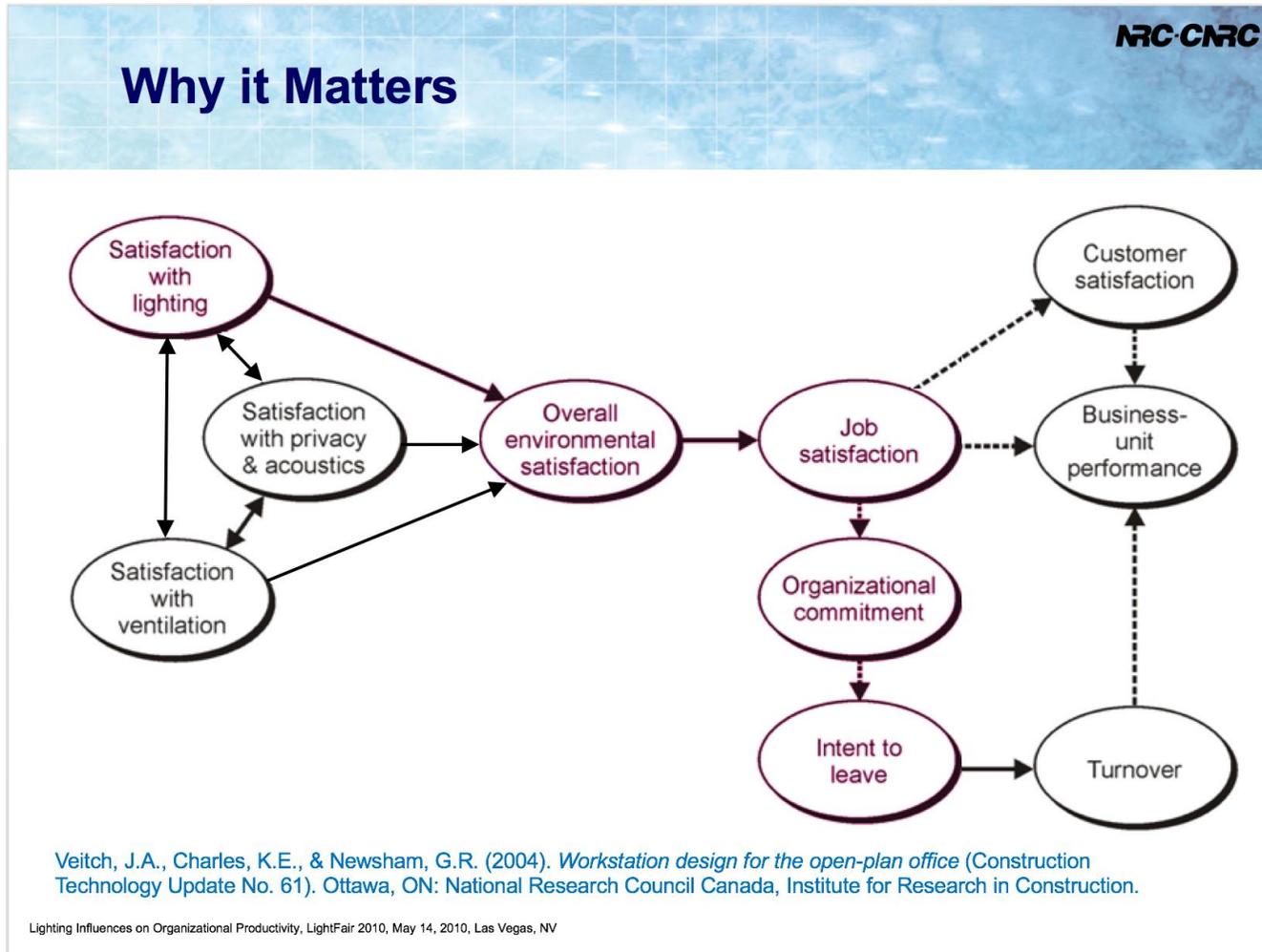
DLC Stakeholder Mtg, Portland, OR
Carol Jones, Senior Director Lighting Relations

NEBs. Been there, done that.

Research behind Best Practices



NEBs. Been there, done that.



CABA™

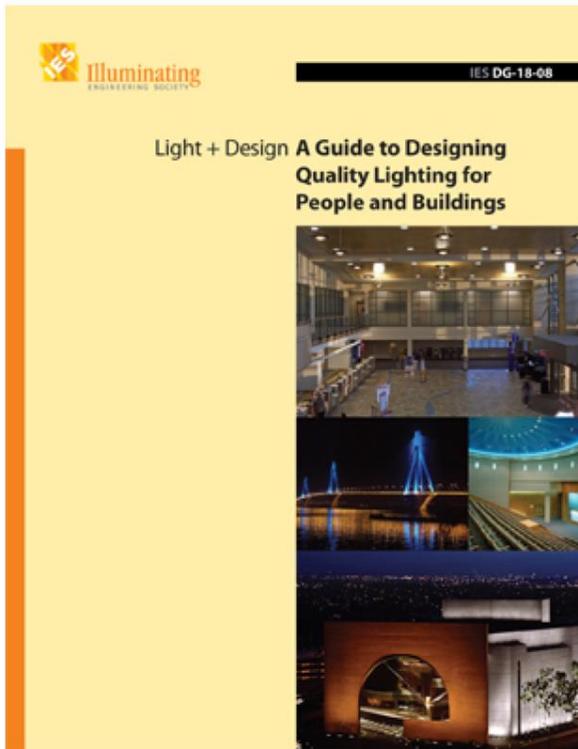
**Improving Organizational Productivity
with Building Automation Systems**

BOUTIQUE MULTI-CLIENT RESEARCH PROJECT

CABA AND THE FOLLOWING CABA MEMBERS FUNDED THIS RESEARCH:

NEBs. Been there, done that.

Impact of Light Right Consortium Research



New Item:

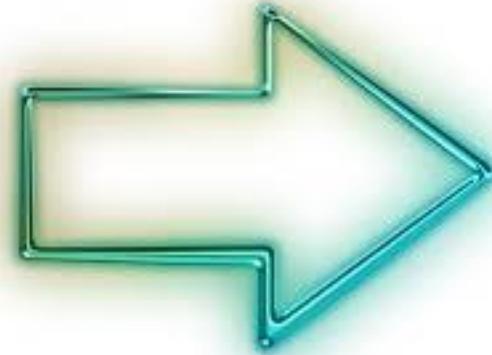
“Light + Design: A Guide to Designing Quality Lighting for People and Buildings”

Product ID: DG-18-08

The purpose of Light + Design is to introduce lighting professionals to the principles of quality lighting design. These principles, related to visual performance, energy and economics, and aesthetics, can aid designers in providing high-quality lighting for a wide range of interior and exterior lighting projects.

www.iesna.org

News flash: The world does not spin around energy.



**IoT
Use
Cases**

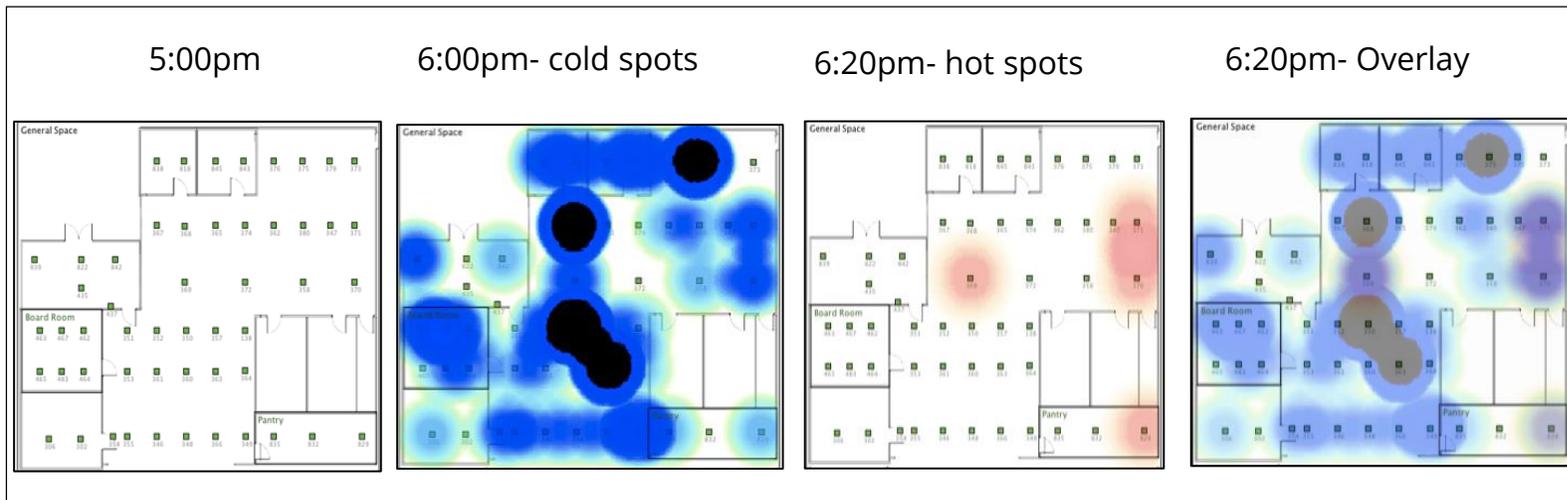
Value Propositions

Bringing Commercial Real Estate into the Internet of Things.



HVAC Application

Fault Detection - Temperature heat maps of hot and cold spots can detect simultaneous heating and cooling of the building and insulation leaks



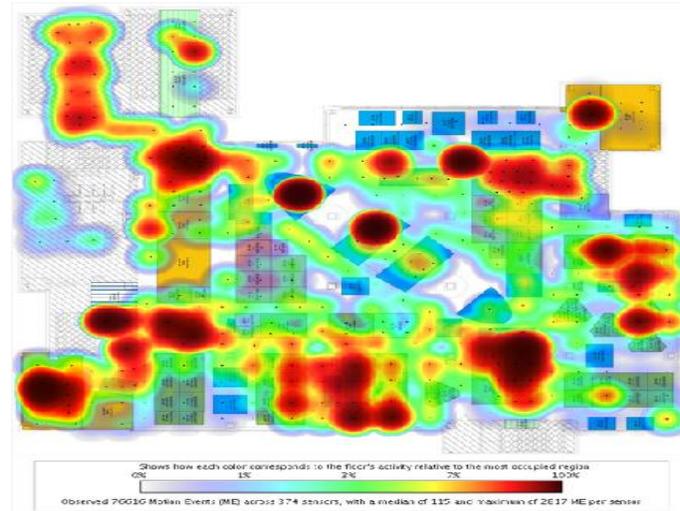
Helps save >25% building HVAC energy costs by utilizing current and historical occupancy data

Demand Based Occupancy Controls – integrating real time occupancy information with the buildings BMS to actively adjust set back zones

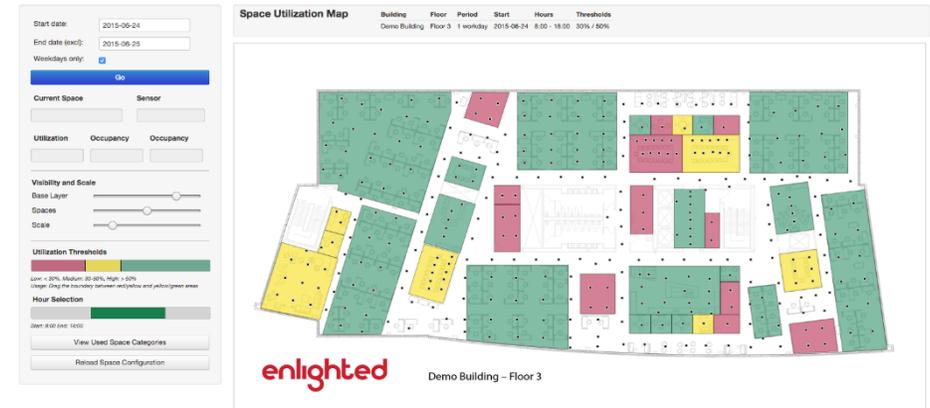
Space Utilization

Heat Maps

Relative utilization of a floor over a selected period

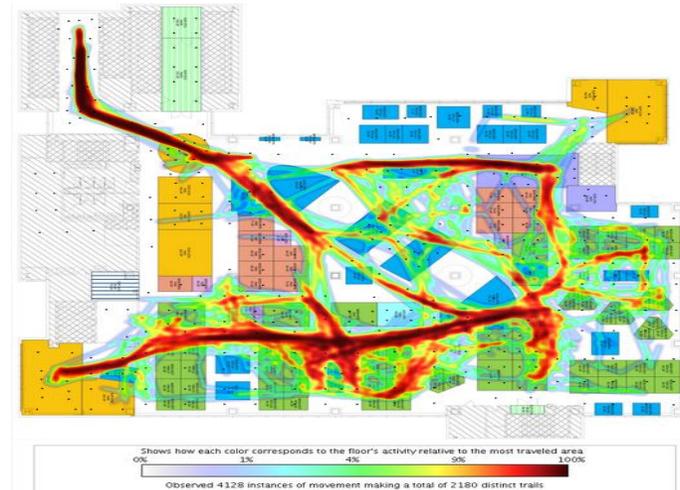


Space Usage



Motion Trails

Motion patterns of a floor over a selected period



Indoor Positioning and Conference



Indoor Positioning Application

- 2nd FLOOR ROOMS**
- 1 - Bounce House
 - 2 - Bumper Cars
 - 3 - Carousel
 - 4 - Ferris Wheel
 - 5 - Fun House
 - 6 - Gravitron
 - 7 - Haunted Mansion
 - 8 - Kamikaze
 - 9 - Log Ride
 - 10 - Ring Toss
 - 11 - Roller Coaster
 - 12 - Scrambler
 - 13 - Skee Ball
 - 14 - Steeplechase
 - 15 - Tea Cups
 - 16 - Tilt-a-Whirl
 - 17 - Zipper
- VC Room
+ Webinar

- Unoccupied
- Occupancy Status Unavailable
- Occupied



Conference Room Reservation

Asset Tracking

Next wave of Technology Enabled Value Props

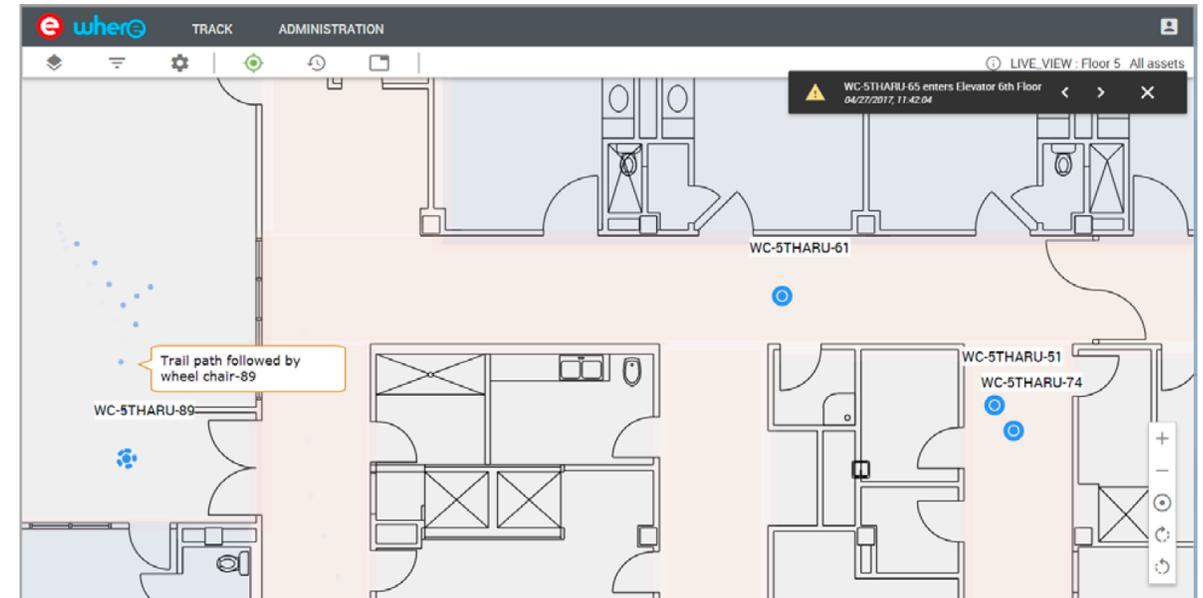
- BLE or LiFi enabled sensors
- Sensors placed throughout the building at every light fixture

BLE Asset Tags to track locations.

Software Platform for: Asset Search, Motion Trails, APIs for integration with other systems

Tablet, Mobile, Desktop Clients

Use cases: high value assets (e.g. medical equipment)



The Value of Decisions: Monetization



'Nurses in US hospitals spend 1 hr/day looking for equipment'



'Distribution center workers walk 15 miles during a regular workday'

'How do customers engage in a store before they reach the POS'



'How do new office concepts impact cost of space and workforce productivity?'



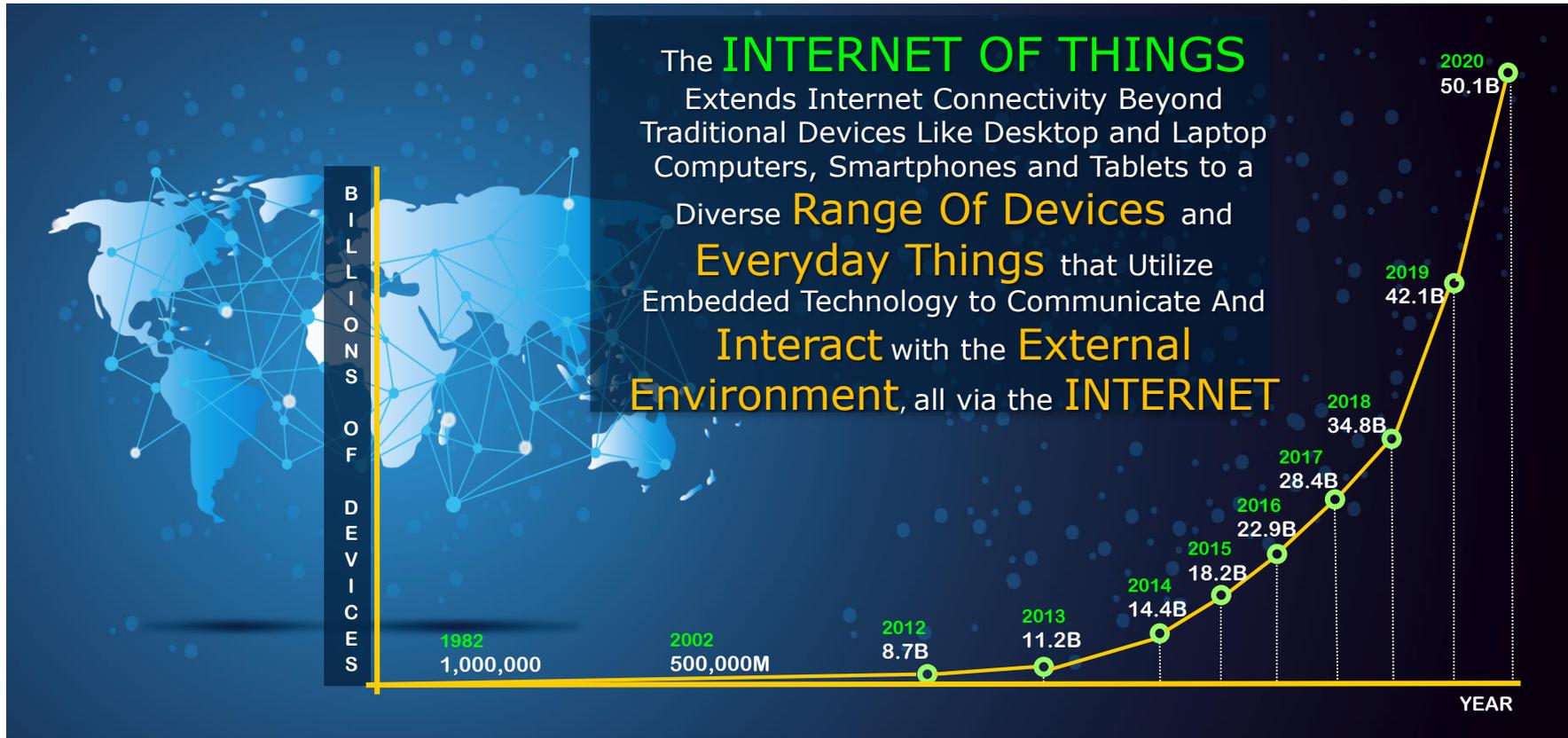
'How do people navigate through an airport terminal and how do I price retail space based on traffic value?'



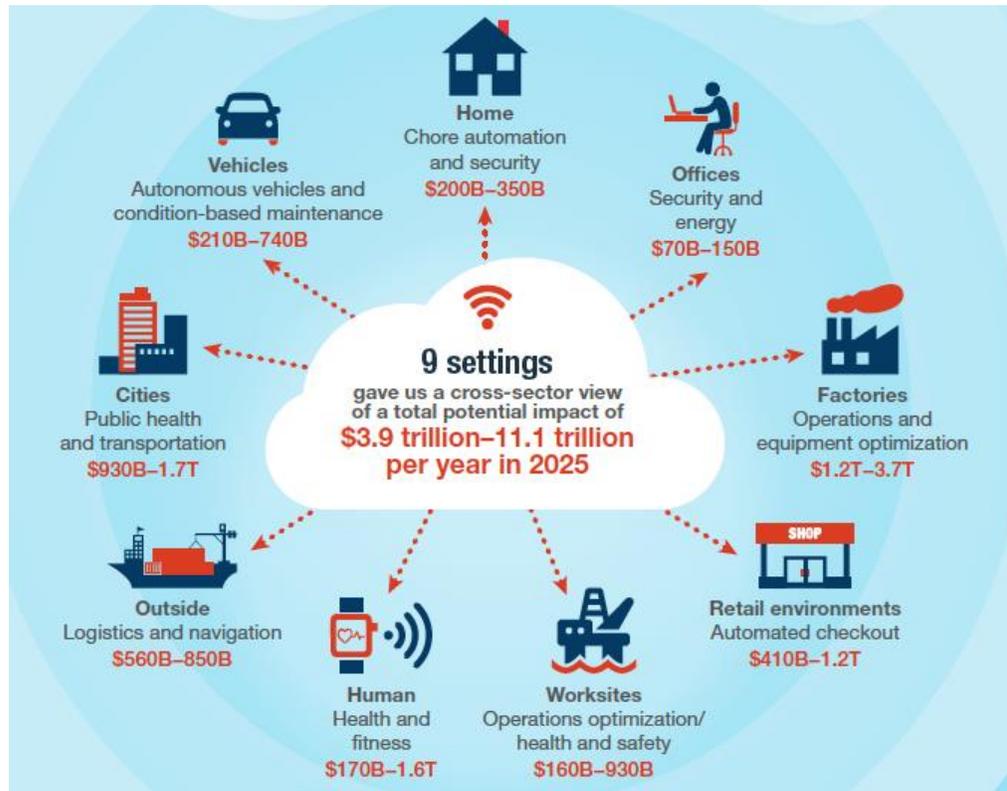
'There are 120.000 lighting fixtures in the maintenance facilities of a high-speed company'

- RE Footprint Densification/ZNE
- Wayfinding/Indoor Positioning
- Conference Room Reservation
- Security
- Used based Insurance
- Risk Reduction/Insurance Asset Management
- Predictive Maintenance
- Operations Optimization
- Supply Chain Optimization
- Healthcare monitoring
- Retail wayfinding
- Retail Point of Sale

The scale of IoT



Market Sizing

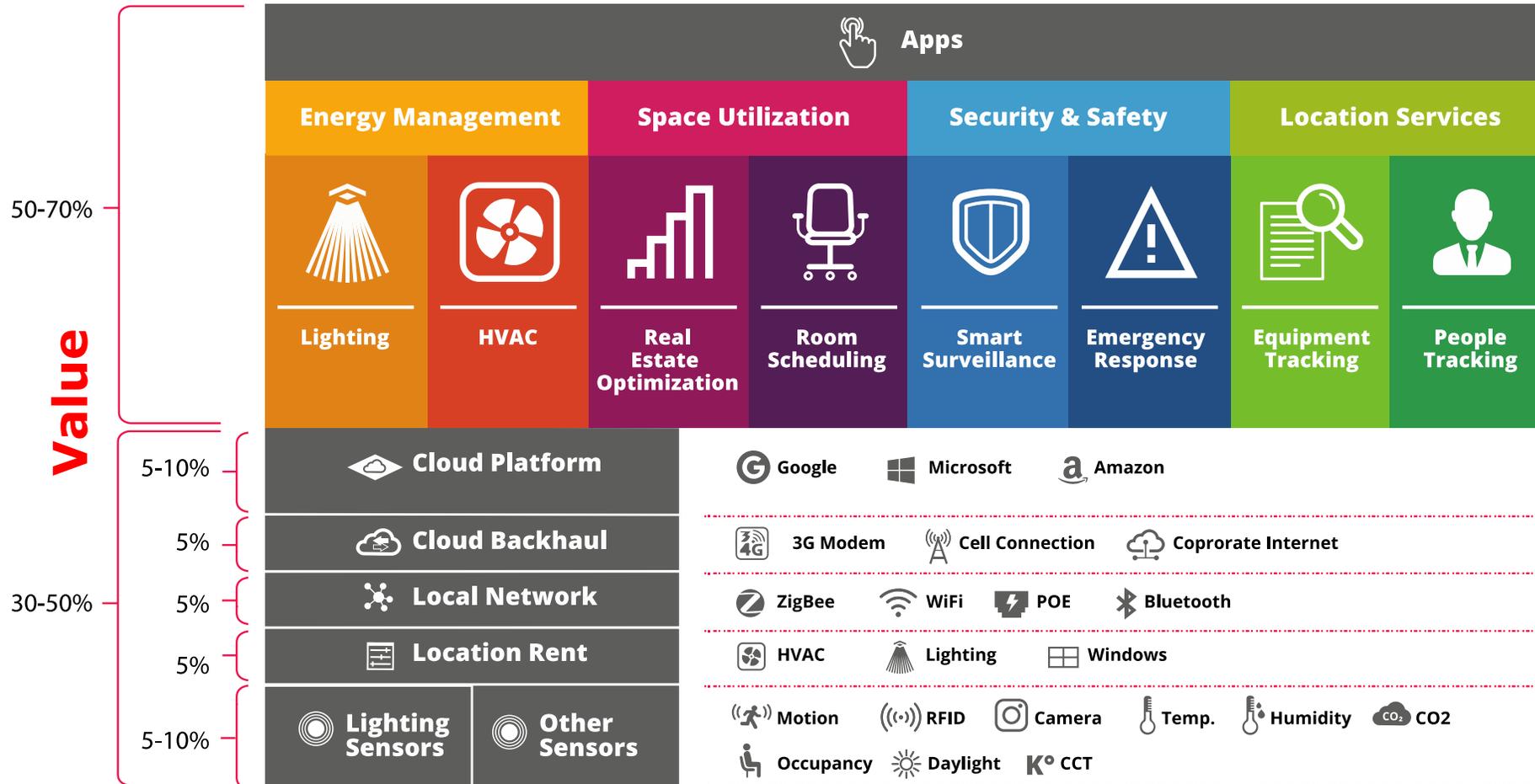


The Internet of Things: Mapping the Value, Beyond the Hype. McKinsey Global Institute. June 2015.

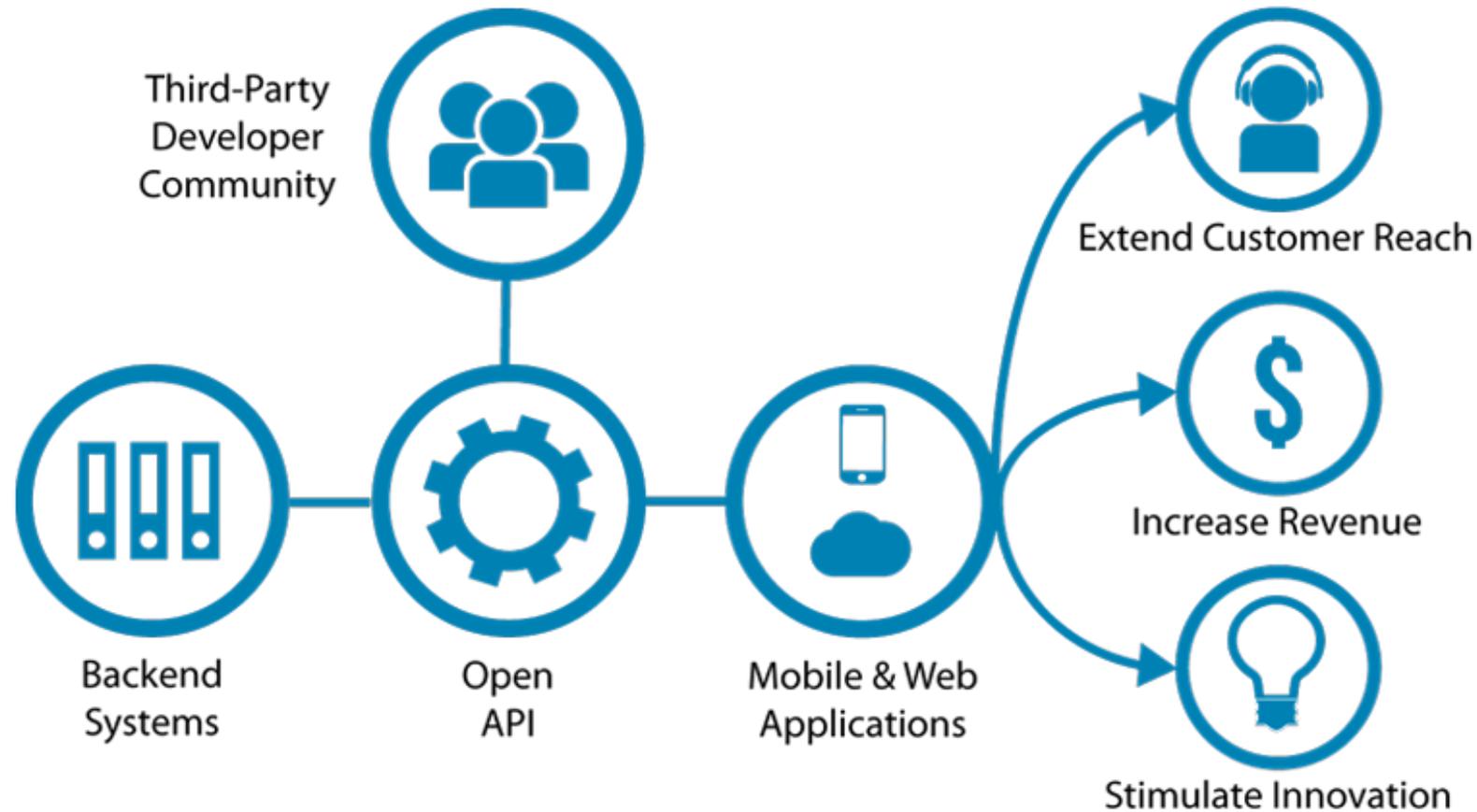
"Applications are far-reaching, leading to some staggering forecasts. Tech giant Cisco predicts 50 billion devices will be connected by 2020, while Intel has predicted 200 billion. McKinsey forecasts the global market value of the IIoT will reach \$70-\$105 billion in office buildings, \$410 billion to \$1.2 trillion in retail buildings, \$1.2-\$3.7 trillion in industrial buildings, and \$930 billion to \$1.7 trillion in cities in 2025."

Electrical Contractor Magazine, Lighting and the Internet of Things. By Craig DiLouie. June 2016.

Digitalization of Lighting... and everything else



Interoperability and Extensibility



“Manufacturers certainly won’t create all of the solutions,” Brown* says. “Apple and the iPhone is a great example of this—if we can show what’s possible, we can inspire others to invent their own applications. Partnerships between manufacturers and tech companies are key to making intelligent lighting environments an open platform for innovation.”

**Jason Brown, Manager of Strategic Solutions, Current, powered by GE.*

HOW can we be part of the future?



- Think... CUSTOMER
- Think... APPS
- Be... CREATIVE

Future Proof

Product life cycles

- Tech Industry – change phones, laptops every 2 years
- Building Industry – Buildings designed to last 25 years
- Lighting Industry – 10+ year life

IoT for Buildings

- Firmware / Software must be secure and fully upgradeable
- Device firmware must have headroom
- No single point of failure
- Interoperability via protocols, API's



IoT Ready Alliance

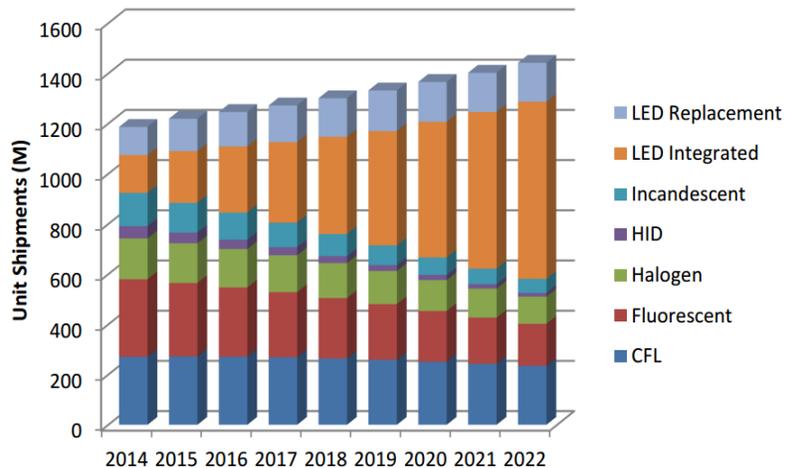
- **Two buying centers with different needs**
 - Facility Managers: focused on code and compliance
 - CIO/Operations/IT: focused on specific IoT applications
- **IoT is in its infancy**
 - Evolving standards and technologies make customers fear adoption of any given solution
- **A single building has luminaires from different manufacturers**
 - any solution had to be across the industry, and not specific to a single manufacturer
- **Customers are investing in infrastructure for 15+ years with LED upgrades and want future-proof luminaires from different manufacturers that can be upgraded easily**



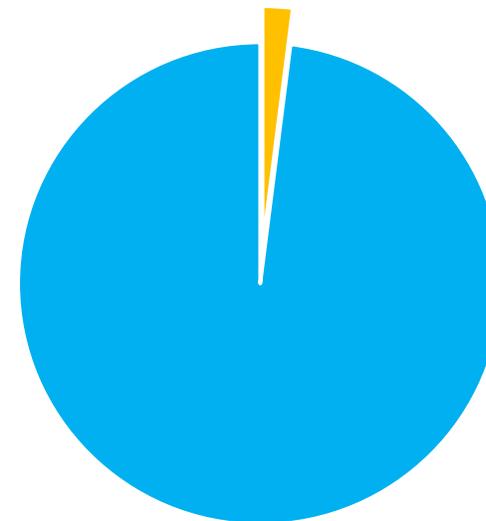
Market Factors

Rapid LED Luminaire Market Growth

Global Luminaire Unit Shipments



Limited Lighting Control Sensors Adoption



98%

of fixtures don't have advanced lighting control



**Too expensive to install sensors after luminaire installation
Need to future proof LED Lighting Infrastructure**

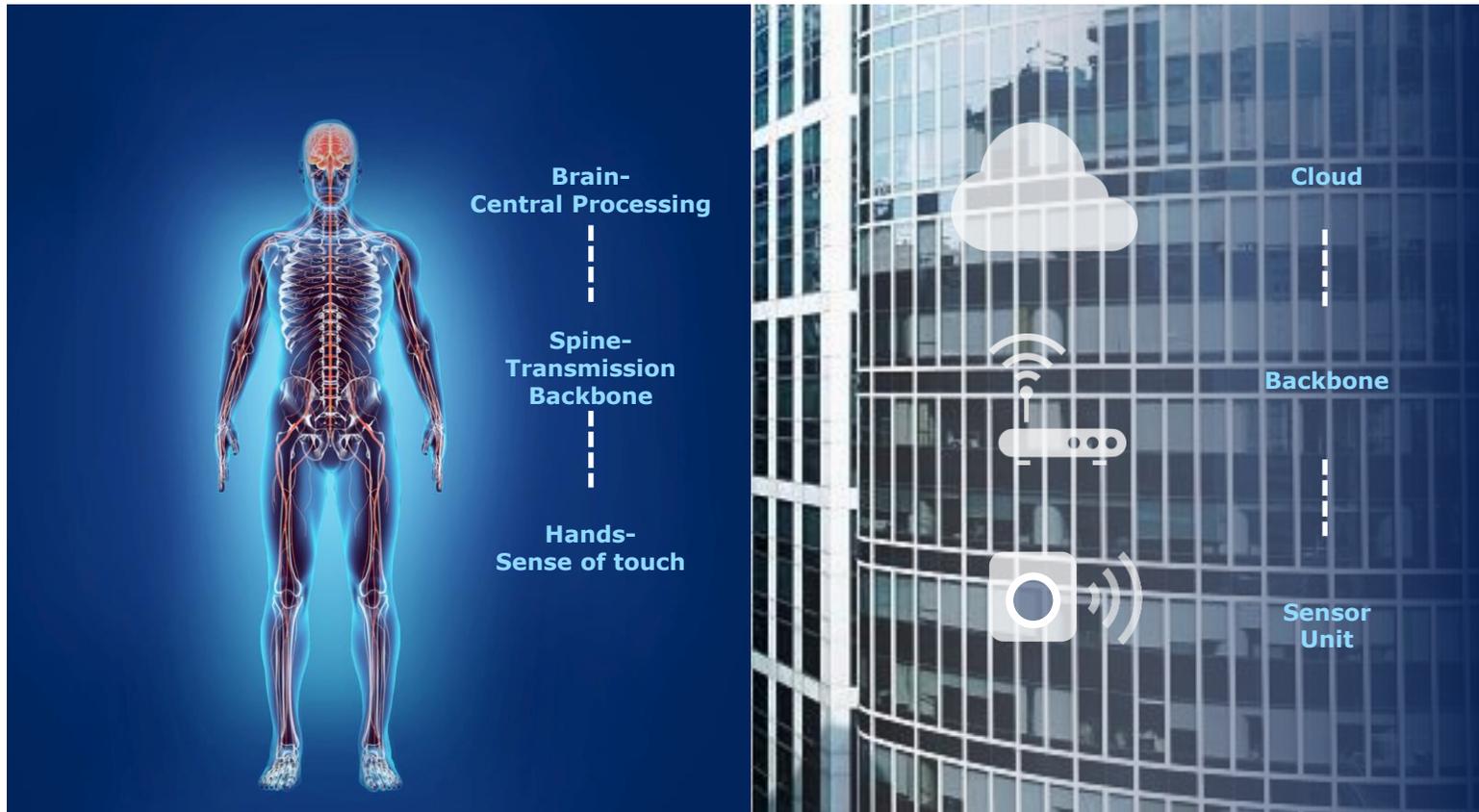
Solution: Standardized Sensor Interface

Define a sensor interface standard to make every LED fixture ready to accept standard sensors

- Add very little incremental cost to an existing fixture
- Allow facility managers to choose LED Luminaires and Lighting Controls **independent of future applications** and focus on immediate needs for cost and code compliance
- Allow lighting specifiers & A&E firms to future-proof customer infrastructure
- Make upgrading sensors in the field extremely cost effective: as simple as changing a light bulb

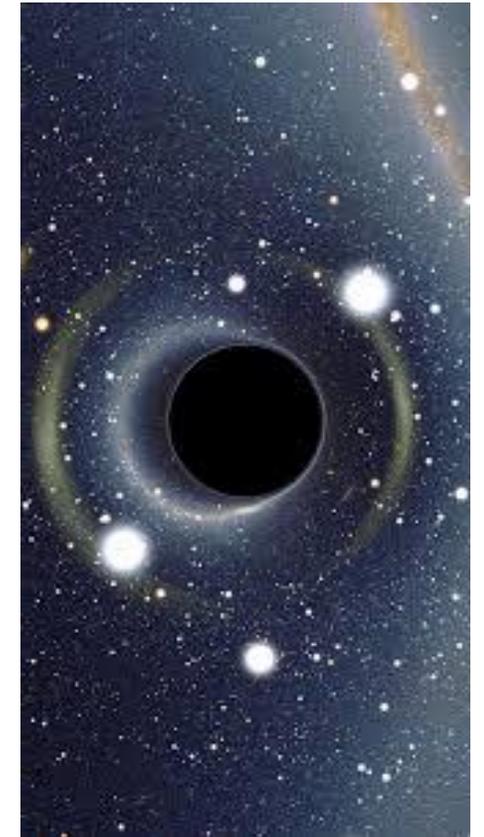


Building Sensory System



Brilliant Buildings

OR



Dark Matter



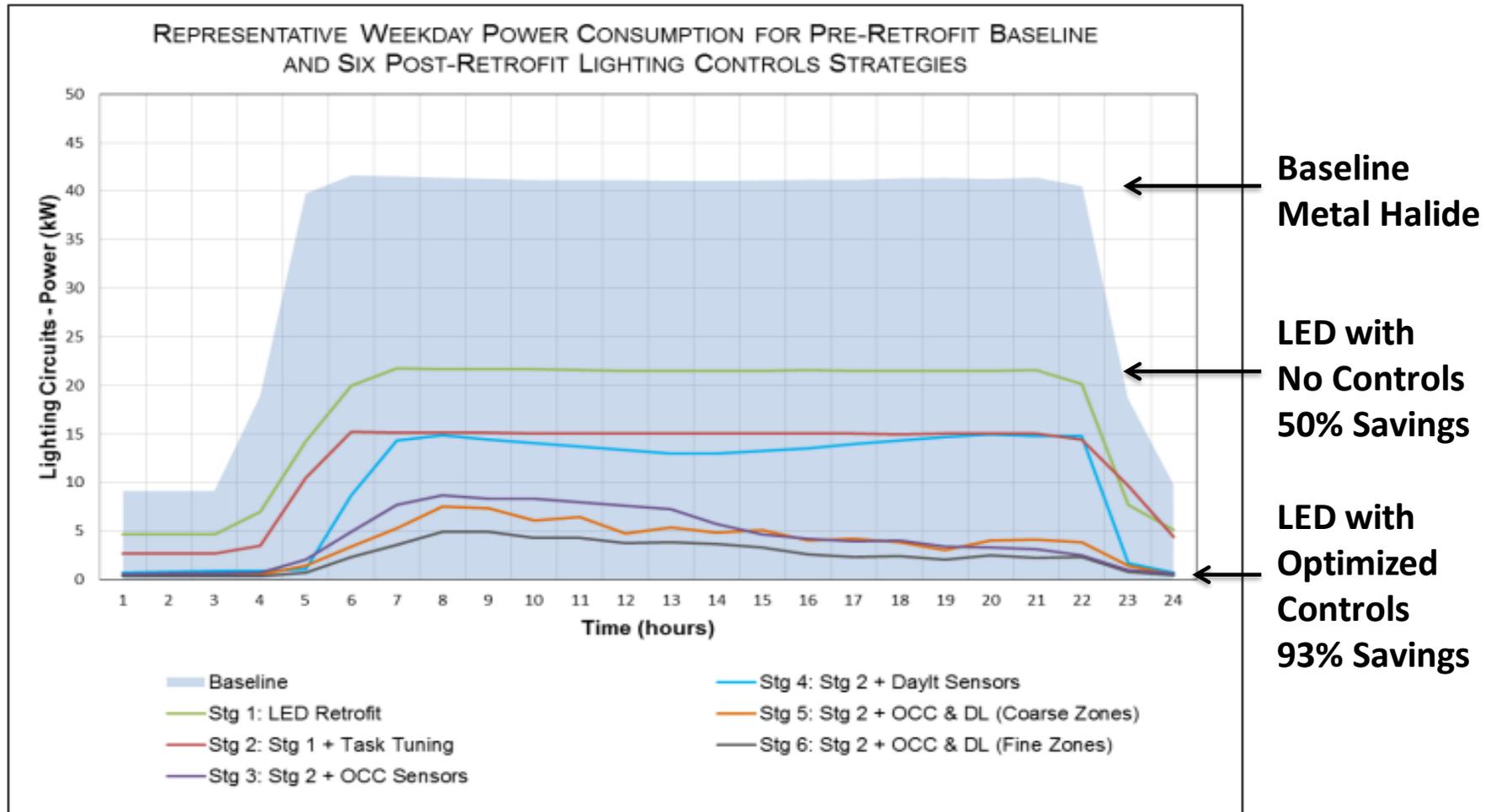
NEBS All Around Us: Focusing on Value for Customers and the Electric System

Jeff Schlegel

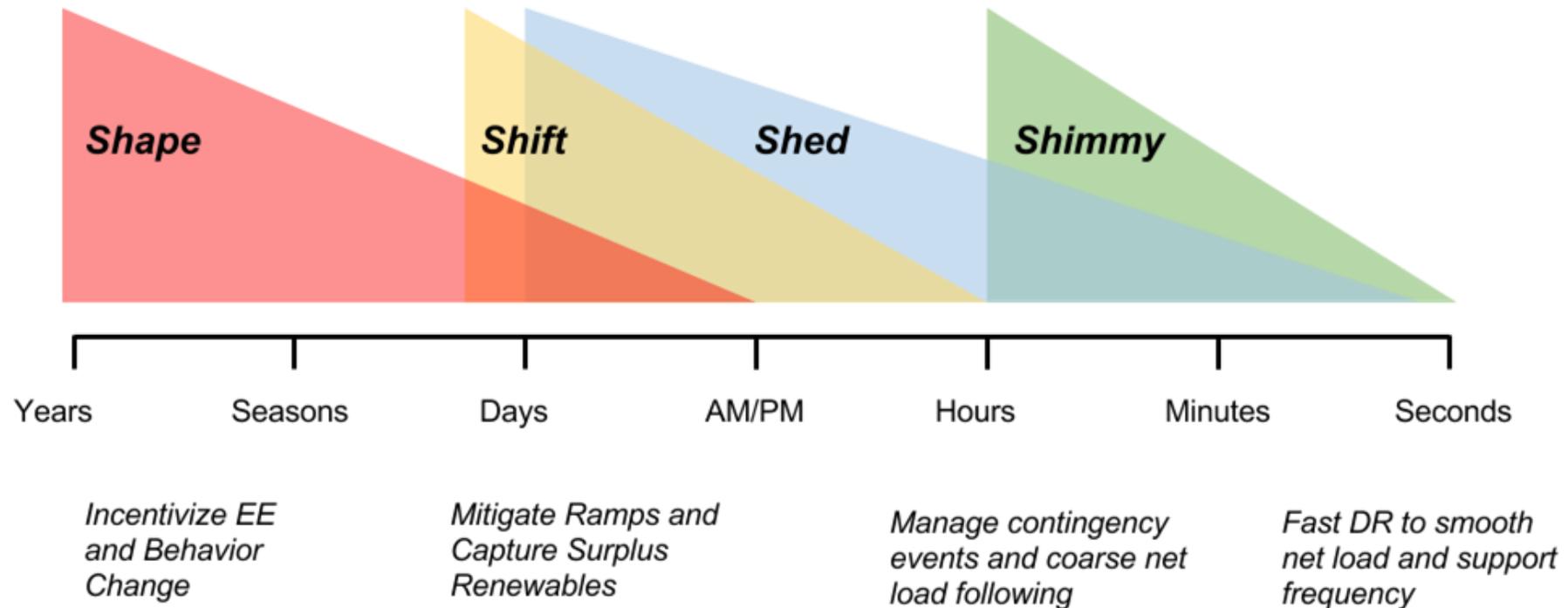
Schlegel & Associates, LLC

2017 DLC Stakeholder Meeting, Portland, OR

Maximize savings and demand reductions with advanced controls

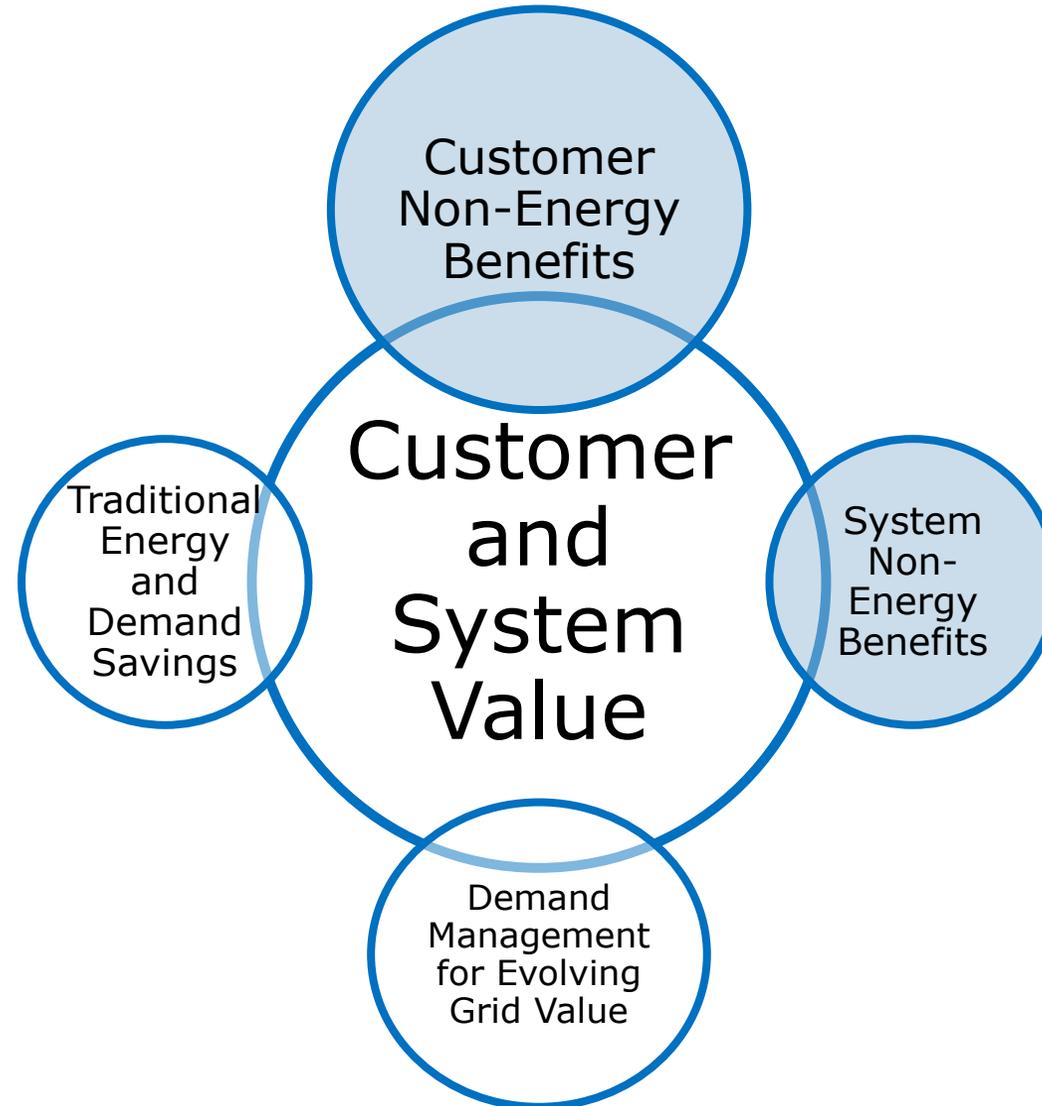


Advanced demand management to meet variety of grid needs



2025 California Demand Response Potential Study, LBNL, March 2017

Non-energy benefits are important contributors to total value



Why should I care?

- ❑ Advanced lighting control systems can have higher upfront costs, which can be a barrier to adoption
- ❑ Important to recognize the multiple values to the customer and the electric system/grid
 - To make sales to customers
 - To maximize/optimize the use of the control system
 - To promote the best investment for the system/society
- ❑ Energy efficiency/demand management programs could do more to promote ALCS and help defray first costs if broader values and NEBs are considered
 - Higher program rebates and incentives could be offered

Q&A

Conclusion

Thank you!



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