Lighting Controls Summit

Welcome to Atlanta!

Hosted by: Georgia Power

Bringing Efficiency to Light™

The DesignLights Consortium® (DLC) is a non-profit organization dedicated to accelerating the widespread adoption of high-performing commercial lighting solutions. The DLC promotes high-quality, energy-efficient lighting products in collaboration with utilities and energy efficiency program members, manufacturers, lighting designers, and federal, state, and local entities. Through these partnerships, the DLC establishes product quality specifications, facilitates thought leadership, and provides information, education, tools and technical expertise.

A New Future for Lighting Controls

But first... the past. What's your perception of Advanced Lighting Controls?
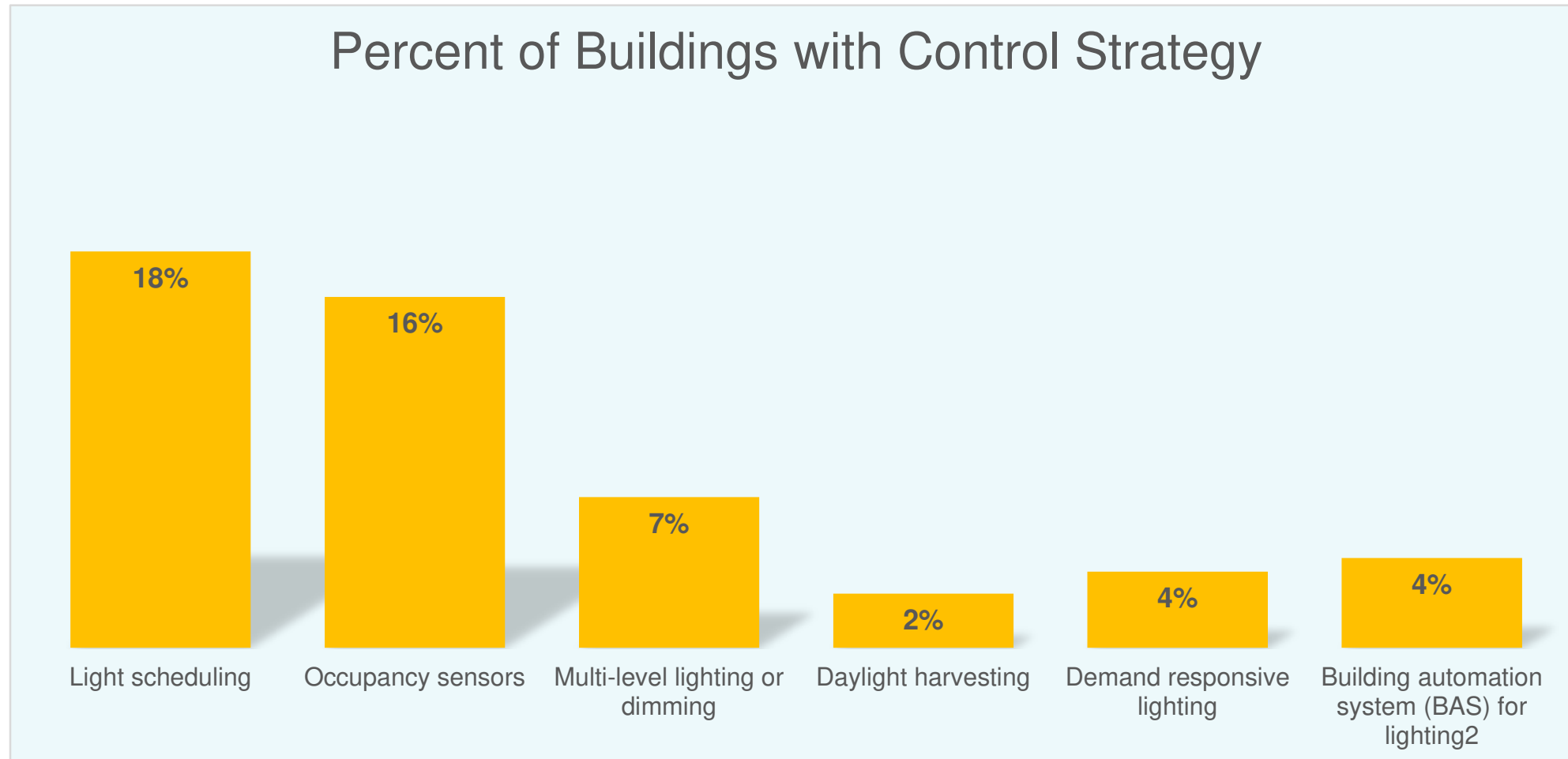

Designers

Contractors

Facility Managers

Building Occupants

Advanced Lighting Controls have not been widely adopted

Percent of Buildings with Control Strategy

Control Strategy	Percent
Light scheduling	18%
Occupancy sensors	16%
Multi-level lighting or dimming	7%
Daylight harvesting	2%
Demand responsive lighting	4%
Building automation system (BAS) for lighting2	4%

Source: 2012 Commercial Buildings Energy Consumption Survey, US Energy Information Administration

Barriers to Adoption

- Poor past experiences

- Unfamiliar with technology

- Too complex

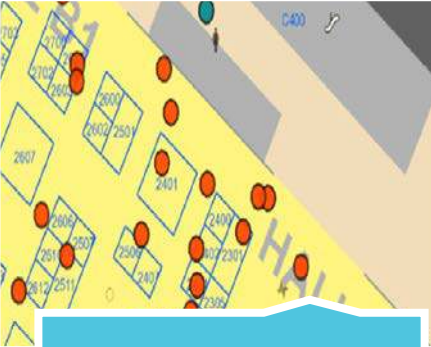- Not standardized
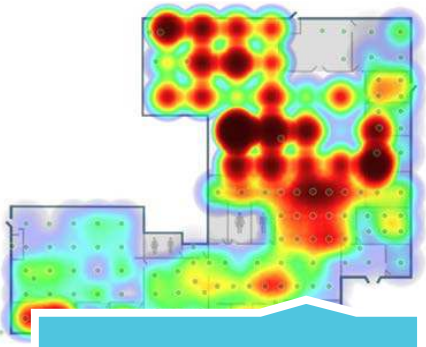
- High costs

- Weak value proposition

The Good News

- Technology is changing and improving…FAST!

- Systems designed from the ground up to reduce complexity and cost

- Easier (and less costly) to install, commission, use than ever before

- New system capabilities that provide new value to customers

New Capabilities that go beyond Energy
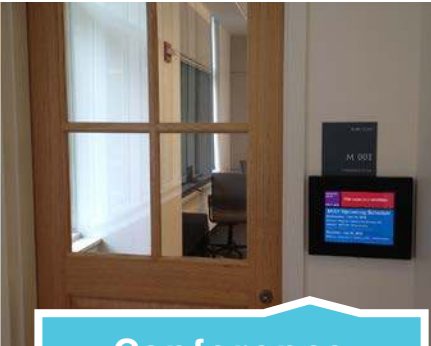

Asset Tracking

Space Utilization

Indoor Positioning

Diagnose and Report

Conference Room Scheduling

Security

Energy Tracking

Integrate with BMS/ HVAC

DLC Lighting Controls Platform

Demonstration Projects in Partnership with US DOE

Networked Lighting Control QPL

Training Programs for Designers and Installers

Advanced Control Savings Calculator

Lighting Control Savings Database

New Rebates and Incentive Models

Goal: Accelerate Adoption

Meeting Objectives

1. Collect and discuss lighting industry input on DLC's Networked Lighting Controls Technical Requirements and QPL

2. Identify possible solutions and next steps to address key industry challenges and opportunities

3. Identify ways we can work together to accelerate adoption

Agenda Review

- 7:30-8:00 – Breakfast

- 8:00-8:45 – Welcome and Introduction

- 8:45-12:30 – Small Group Brainstorms

- 12:30-1:20 – Lunch

- 1:20-2:50 – Technical Requirements Update w/ real-time polling

- 3:00-4:00 – Efficiency Programs Panel

- 4:00-4:15 – Wrap-up and Adjourn

Meeting Ground Rules

• One speaker at a time

• Raise hand to speak – a mic will be provided to you

• Share your unique perspective

• Participate 100%

• Try to avoid rabbit-holes and off-topic tangents

• Emphasis of meeting is gathering input

• Most importantly: keep it positive and have fun!

Small Group Brainstorms

Small Group Brainstorms

- Each table is assigned a topic

- Each attendee contributes to 2 out of 8 topics

- Find your first table

- 25 minutes on your first topic

- 10 minutes to find a new table

- 25 minutes on your second topic

- Take a 20 min break

- Report outs by facilitators

Facilitators

- One at each table

- Collects your input into PowerPoint Template

- Following the brainstorms, presents input to full audience with opportunity for Q&A
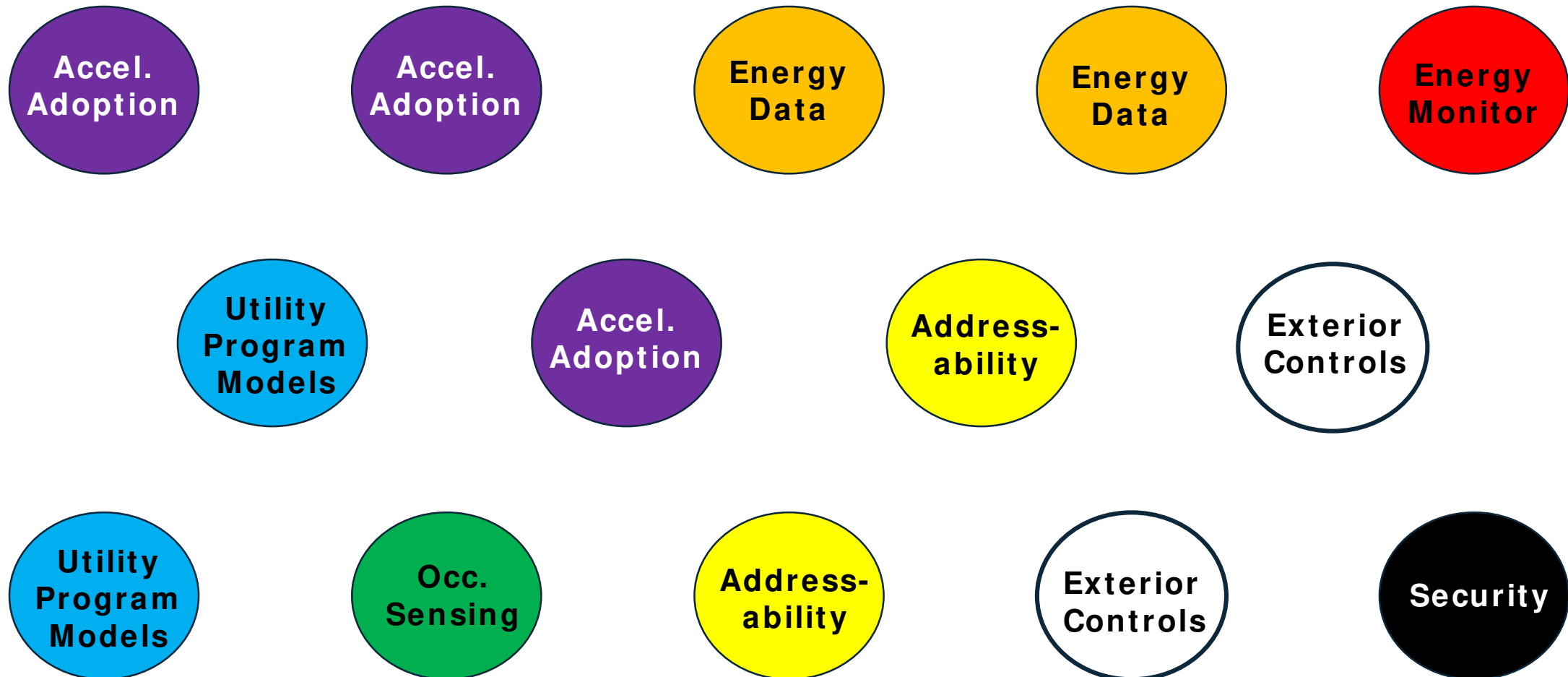
Topic List

Implementation

- **Addressability**
- **Energy Data**
- **Occupancy Sensing**
- **Utility Program Models**
- **Accelerating Adoption**

Technical Requirements

- **Energy Monitoring**
- **Exterior Controls**
- **Security**

Tables and Topics

- Table tents for the 8 topics are color-coded

- 1 topic has 3 tables; 6 topics have 2 tables; 2 topics have 1 table

Accelerating Adoption

Background

- Networked controls adoption continues to accelerate relatively slowly

- Several barriers – lack of knowledge, complexity, lack of standardization, availability, uncertainty of benefits – slow adoption.

Assignment

For each of the 5 listed barriers, brainstorm 1-2 high impact activities manufacturers and/or energy efficiency programs can do individually or in partnership to address the barrier and accelerate adoption.

Addressability – Where should it be required?

Background

- DLC requires NLC systems to have the capability to provide individual luminaire and device addressability but does not specify where individual addressability must be installed on a project.

- Efficiency Programs may develop requirements for where individual addressability is required on a project

Assignment

Answer the following questions:

- Should efficiency programs require individual luminaire addressability anywhere on a project? Or should they leave it to the specifier/contractor to decide?

- If required, where would it make sense?

Critique the Proposal Listed in Handout

Occupancy Sensing – Where should it be required?

Background

- DLC requires NLC systems to have occupancy sensing capability but does not specify where it must be installed on a project.

- Efficiency Programs are likely to develop requirements for where occupancy sensing is required on a project

Assignment

Answer the following question:

- In what types of spaces/rooms/applications are there concerns that occupancy sensing should not be required?

Critique this Proposal:

- Occupancy Sensing is require in all rooms of a project unless there is a documented safety/security risk or is not technically feasible.

Energy Data – Unlocking the Potential

Background

- If simplified, standardized, and scaled, Energy Data has significant potential benefits to the market

- Energy Data is currently not used effectively, often trapped in hard to access "silo".

Assignment

Brainstorm up to 5 ideas or things needed to unlock the full potential of lighting system Energy Data.

For each idea, list:

- Description

- Possible next step or how to move forward

- Who can or should work on it

Utility Program Models

Background

- Many DLC Member utilities are actively developing or considering new program models and rebates for networked lighting controls.

- Traditional custom program models have not been effective at driving significant adoption

Assignment

Answer the following questions:

- What types of rebate structures would be most effective?

- Mid-stream rebates paid to distributor for networked controls?

- What if networked controls were required to receive *any* lighting rebates?

Energy Monitoring

Background

- Energy Monitoring capability of networked controls has significant potential benefits

- DLC has proposed in draft V2.0 requirements that systems must have energy monitoring capability

Assignment

Answer the following questions:

- What would be the positive benefits of DLC requiring systems to have energy monitoring capability?

- What would be the negative consequences?

- If it's too early, what are the conditions or characteristics that would make it the right time to require this?

Exterior Lighting Controls

Background

- Exterior networked controls are not included in the current V1.0 requirements.

- DLC has proposed new requirements for exterior networked lighting controls in draft V2.0

Assignment

- Complete the table on the following slide.

- For each "X", explain why

Should any of the following proposed required capabilities not be a required capability for the application?

Exterior Controls

	Smart City	Street (mixed)	Roadways (highways)	Parking / Exterior	Building Accent
Occupancy / Traffic sensing	X				
Daylight Harvesting / Photocell control					
Task Tuning / High-End Trim					
Scheduling					
Zoning					
Energy Monitoring					
Local Processing / Distributed Intelligence					

Security

Background

- System security is fundamentally important to networked controls adoption

- Security standards that DLC can reference are likely 1-3 years away

Assignment

Answer the following questions:

- Should DLC address security?

- Are there things DLC could do in the interim to address this important topic until standards are developed?

- Are there aspects or characteristics of system security DLC could report on the QPL? If so, what?

Tables and Topics

- Table tents for the 8 topics are color-coded
- 1 topic has 3 tables; 6 topics have 2 tables; 2 topics have 1 table

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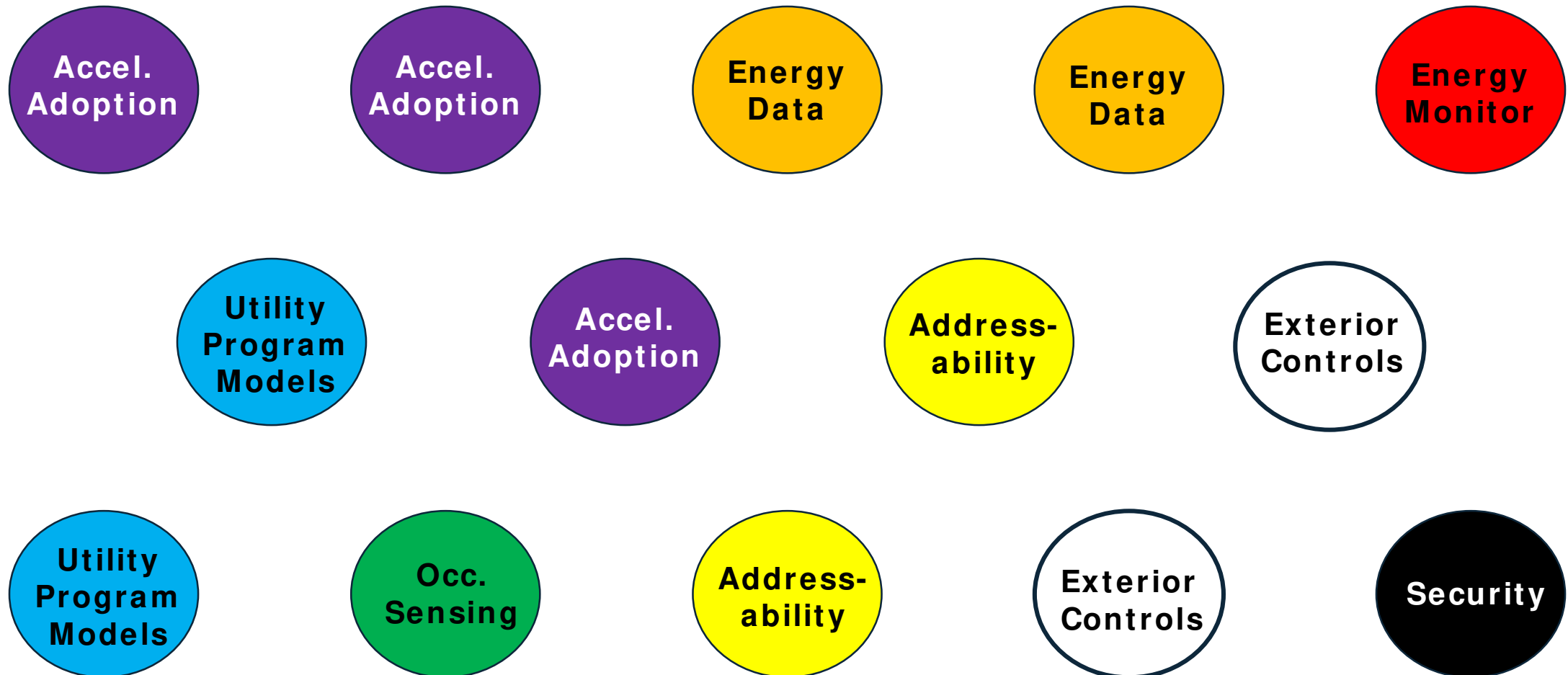
Small Group Brainstorms – Group 2

Security	Energy Data	Utility Program Models	Exterior Controls
	Michelle Keller	Mike Mozingo	
	Gary Andrews	Guival Mercedat	
		Lauren Morlino	
		Chris Wolgamott	
		Kyle Kichura	
		Erich Loch	
Addressability	**Accelerating Adoption**	**Occupancy Sensing**	**Energy Monitoring**
Edward Bartholomew	Don Becker	Nicholas Moshage	Michael Doucette
	Yoelit Hiebert	Kyle Hemmi	Aaron Kwiatkowski
	Pauravi Shah	Ryan Esthus	
	Jerry Wright		

Accelerating Adoption – Table 1

Background

- Networked controls adoption continues to accelerate relatively slowly

- Several barriers – lack of knowledge, complexity, lack of standardization, availability, uncertainty of benefits – slow adoption.

Assignment

For each of the 5 listed barriers, brainstorm 1-2 high impact activities manufacturers and/or energy efficiency programs can do individually or in partnership to address the barrier and accelerate adoption.

What high impact activities can manufacturers &/or efficiency programs undertake to address: Lack of Knowledge

Accel. Adoption

- More effective ongoing training that supports dynamic, fast moving topics (online, evolving)
  - Start with designers and installers will follow
  - Align with ASHRAE revisions
  - DLC collaboration with IES, IALD, NAESCO

- Training from Manufacturers and third parties like DLC

What high impact activities can manufacturers &/ or efficiency programs undetake to address: Lack of Knowledge

- Utilities lean on manufacturers for training
  - Contractors, distributors focus
  - Manufacturers are willing to come to region and train – utility can host
  - Expose to real product solutions

- Quick short videos followed by deep dives with practical solutions (webinar, face to face)
  - Specific to manufacturers

What high impact activities can manufacturers &/ or efficiency programs undertake to address: Complexity

- Standardization to minimize complexity in space type design

- Education of supply chain
  - All systems different – manufacturers key
  - Lost in translation in supply chain – utilities need easy way to translate to customers

Accel. Adoption

What high impact activities can manufacturers &/ or efficiency programs undertake to address: Complexity

Accel. Adoption

- Solve interoperability problem
  - Phase 1 was proprietary
  - Focus on data models - NEMA
  - Communication standard
  - Integrated controls help

- Training for trade ally network helps

What high impact activities can manufacturers &/ or efficiency programs undertake to address: Lack of Standardization

Accel. Adoption

- Design standards by space areas
  - Be careful not too many customer requirements
  - Code standards

- Standard communication protocols
  - Very challenging – may not happen

What high impact activities can manufacturers &/or efficiency programs undertake to address: Lack of Standardization

- Let market will drive it - interoperability
  - Manufacturers need some differentiation
  - Use existing communications standards rather than invent
  - BACNET

- DLC collaborate with standards organizations - ASHRAE
  - Down the road – avoid sameness now
  - Focus on interoperability

What high impact activities can manufacturers &/or efficiency programs undertake to address: Availability

- May not need stocking for distributors
  - Moving too fast
  - Market determines what is stocked
  - Too many product options

- Faster lead time commitments from manufacturers

Accel. Adoption

What high impact activities can manufacturers &/ or efficiency programs undertake to address: Availability

- Integrated solutions will help with lead times
  - Can potentially be stocked more easily

- Not practical to address now
  - Comes after education
  - Market Driven

What high impact activities can manufacturers &/or efficiency programs undertake to address: **Uncertainty of Benefits**

Accel. Adoption

- Standardize range of savings
  - Calculators
  - Benchmark by strategy type and space type (DLC)
  - Case studies
  - Uncertainty – plan low

What high impact activities can manufacturers &/ or efficiency programs undertake to address: Uncertainty of Benefits

Accel. Adoption

- Manufacturers share project info and case studies with utilities
  - Sales staff still resistant to share
  - Seeing early adopters
  - DLC data project will help

- One pagers to explain why do controls
  - Manufacturer and utility collaboration
  - Differentiate leasing vs owning

Accelerating Adoption – Table 2

Background

- Networked controls adoption continues to accelerate relatively slowly

- Several barriers – lack of knowledge, complexity, lack of standardization, availability, uncertainty of benefits – slow adoption.

Assignment

For each of the 5 listed barriers, brainstorm 1-2 high impact activities manufacturers and/or energy efficiency programs can do individually or in partnership to address the barrier and accelerate adoption.

What high impact activities can manufacturers &/or efficiency programs undertake to address: Lack of Knowledge

Accel. Adoption

- Training: how to conduct physical installations for installers

- Resource manual for product selection, design and install

- Standards for settings based on building/applications/space type/zones
  - Developed by manufacturer, include into project costs

What high impact activities can manufacturers &/ or efficiency programs undertake to address: Lack of Knowledge

- Manufacturers need to do the training

- Basic knowledge training programs for functionality – not a consumer market: burden is on the agents to build knowledge and awareness

  – Turn over of contractor and end user is a huge barrier

- DLC to do more promotion of the technology

Accel. Adoption

What high impact activities can manufacturers &/ or efficiency programs undertake to address: Complexity

Accel. Adoption

- Engage commissioning bodies

- Menu of options: decision making guidance for product selection

- Training on benefits for installers as well as installation techniques

- End users waiting to hear from utility on project costs

What high impact activities can manufacturers &/or efficiency programs undertake to address: Complexity

- Utility incentive programs that are simple! Too much paperwork and analysis and no one partiicpates

What high impact activities can manufacturers &/or efficiency programs undertake to address: Lack of Standardization

Accel. Adoption

- Resources for designers and installers

- Standardized communication protocol systems
  - Can the efficiency administrators support a common system?

What high impact activities can manufacturers &/ or efficiency programs undertake to address: Lack of Standardization

- Don't let standards affect price: software is the cost, API is expensive

- Manufacturers need to work on interoperability

- Don't standardize so that we limit ourselves with bandwidth for future stacks

- Data reporting to drive benefit quantification

What high impact activities can manufacturers &/or efficiency programs undertake to address: Availability

- Capability for control system to add-on after install
  - Plug and play

Distributors can stock system and modules are available

Accel.
Adoption

What high impact activities can manufacturers &/ or efficiency programs undertake to address: Availability

- Interior systems are easy to get

- Exterior are custom

What high impact activities can manufacturers &/ or efficiency programs undertake to address: Uncertainty of Benefits

Accel. Adoption

- End user communication – bottom line benefits for productivity, beyond facilities management

- Non energy benefits need to be included in the discussion with ee programs as well as manufacturers

- More quantification non energy data

What high impact activities can manufacturers &/ or efficiency programs undertake to address: Uncertainty of Benefits

Accel. Adoption

- Sustainability

- Productivity benefits

- Space utilization - needs to be adaptable

- Cost is driving factor for benefits

- More data collection from projects – standard data format

Parking Lot

Accel. Adoption

- Interoperability!

**Accel.
Adoption**

Parking Lot

- Interoperability isn't going to happen

Accelerating Adoption – Table 3

Background

- Networked controls adoption continues to accelerate relatively slowly

- Several barriers – lack of knowledge, complexity, lack of standardization, availability, uncertainty of benefits – slow adoption.

Assignment

For each of the 5 listed barriers, brainstorm 1-2 high impact activities manufacturers and/or energy efficiency programs can do individually or in partnership to address the barrier and accelerate adoption.

What high impact activities can manufacturers &/ or efficiency programs undertake to address: Lack of Knowledge

- Information changing hands too many times – information is getting lost and misinterpreted
    - Solution: Good documentation that can be easily understood
    - Manufacturer suggestions to help installers and trainings by manufacturers
    - User guides and best practices
    - standardized documentation
    - Collaborate with utilities to get information into trade allies hands

- DLC partner with Industry Group to do trainings and substantiate curriculum
    - Offer at LFI (short term) or online (long term)
    - Partner with utilities
    - Industry groups: IES, AEE, Lighting Controls Association

Accel. Adoption

What high impact activities can manufacturers &/ or efficiency programs undertake to address: Lack of Knowledge

Accel. Adoption

- Manufacturers on QPL need to develop trainings for contractors and customers
  - Basic templates for systems and installation approaches
  - Break down according to business size and class; tailor it to utility customers

- Manufacturers and utility partnerships
  - Include 'reported' capability for installation support and training

What high impact activities can manufacturers &/ or efficiency programs undertake to address: Complexity

- Level of 'Yes' on Controls QPL needs to be better understood – what are variances?

  – Would make it easier to select appropriate controls system

- Online videos of demonstrations and How-To's

What high impact activities can manufacturers &/or efficiency programs undertake to address: Complexity

- Complexity VS complication
  - Interface should be simple but capability should be complex

What high impact activities can manufacturers &/ or efficiency programs undertake to address: Lack of Standardization

- Interoperability through API will address lack of Standardization
  - Maintain competitive edge while accelerating adoption

- API should be compatible with 3 major languages

What high impact activities can manufacturers &/ or efficiency programs undertake to address: Lack of Standardization

Accel. Adoption

- Standardized Output
  - Concentrate more on front-end functionality standardization
  - Focus on and identifying what is needed

What high impact activities can manufacturers &/ or efficiency programs undertake to address: Availability

Accel. Adoption

- Will always have customized solution

- Luminaire level controls are easier to stock and should be
  – Utilities to work with manufacturers to identify pre-set control levels

- Encourage large orders from big customers
  – Larger incentives

What high impact activities can manufacturers &/ or efficiency programs undertake to address: Availability

Accel. Adoption

- QPL too exclusive?
  - Decide whether QPL is after high volume or exclusive to those who meet strict specs and can pay the application fee

What high impact activities can manufacturers &/ or efficiency programs undertake to address: Uncertainty of Benefits

Accel. Adoption

- Quantify NEBs
  - Encourage customers to track these measures

- Demonstration projects: look into NEBs

What high impact activities can manufacturers &/ or efficiency programs undertake to address: Uncertainty of Benefits

Accel. Adoption

- Manufacturers to educate market on what NEBs are
  - Identify all benefits and underpin with energy piece

- Manufacturers and utilities to work together
  - Co-sponsored programs
  - Honesty is collaboration – how to make the pie bigger for everyone?

Utility Program Models – Table 1

Background

- Many DLC Member utilities are actively developing or considering new program models and rebates for networked lighting controls.

- Traditional custom program models have not been effective at driving significant adoption

Assignment

Answer the following questions:

- What types of rebate structures would be most effective?

- Mid-stream rebates paid to distributor for networked controls?

- What if networked controls were required to receive *any* lighting rebates?

What types of incentive or rebate structures would be most effective?
($/SF, Per controlled fixture? Per Control Strategy? Per Watt Saved?, etc)

Utility Program Models

- If enough $$, custom can work

- Savings are often specific to application space
  - Templates for design parameters for spaces for deemed savings necessary to inform the incentive (need data)
  - Tier incentive to get savings from simpler systems
  - Capture complexity of systems (reporting capability for proven savings) through custom

- $/ft2 makes it easier for contractors and designers to predict incentives
  - take advantage of reporting capability to pay incentive bonus
  - Some mfg found this administratively burdensome
  - Customer during first year of usage can dial in extra savings when system is in place, improve operational systems

- LPD approach with designer can help justify project, may not get savings later from project (savings on the table)
  - Some utilities like this approach to get away from prescriptive, use code as baseline, less chance of over lighting
  - Retrofit projects may not have to meet code (under %)

- One utility program using 12-18cents/kwh saved, 3 strategies must be implemented, take 2 weeks data after install. Require reporting
  - Energy savings and incentive goes up if more strategies, can identify patterns, can break down strategies
  - Need dedicated staff/larger businesses or provide support to optimize system performance over time

- At system level can pay incentive based on strategies, need to build up data base of savings per strategy

Where should the rebates be applied? Would mid-stream rebates to distributor be effective for networked controls?
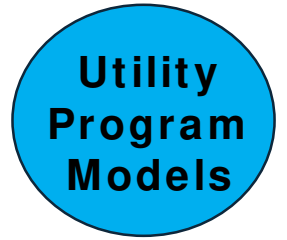
Utility Program Models

- Utilities - too early for midstream
  - Does not capture application info, savings from strategies implemented

- Need training first - Contractor and distributors do not have the education yet to ensure sold appropriately
  - Don't know how to sell them, not able to explain systems to the owner
  - Don't know how to install them correctly
  - Need contractor certification specific to ALC/NLC

- Manufacturers need to help develop training programs for their systems for contractor level

What would be the implications if, overnight, utilities were to require networked controls to receive any rebates?

Utility Program Models

- Not enough knowledge, push back from manufacturers, more established programs might work, others would likely drop off in sales

- Utilities hesitant to walk away from savings to drive just this tech
  - Not sure utilities have enough market force to drive into all projects (especially small projects)
    - Need tiers to reach all markets

- New construction makes sense, but not retrofit
  - Do it right the first time, get the controls in place
  - Require compatibility with BMS, HVAC
  - May help sell systems on additional benefits
  - Existing infrastructure to difficult to implement

Parking Lot

- Place to put anything that came up that didn't fit into structured questions

What types of incentive or rebate structures would be most effective?

($/SF, Per controlled fixture? Per Control Strategy? Per Watt Saved?, etc)

Utility Program Models

- $/ft model working well with rep agents, because they can use it easier to predict $, communicate easier,

- Manufacturers – requested Tiers to push from multiple directions
  - Spec/nc market (engineering, designers) end user gets incentive through project design
  - Retrofit market (largest market)– DI program, midstream/luminaire, enable mandatory features with $/unit at luminaire level
    - Drive stocking decisions with prescriptive, but customer may not recognize that incentive was given
    - Does this enable? TA need training to enable driving adoption and implement strategies within system through install and commission (they also get a rebate)
    - M&V could be concern, so bonus for continued reported savings, end user could implement continued plan if they have business model for this.
  - Layered approach to provide incentives at different levels of market, drive down cost at distributor to get initial savings, 2 market forces
    - Incentive for purchase
    - Additional incentive for driving additional savings from install, commission, programming

- Concern: Prescriptive not ensured savings if strategies not enabled
  - Incentivize initial purchase, then bonus for installed savings captured through reporting

- Helps to have assistance with energy advisor behalf of customer unable to optimize

Where should the rebates be applied? Would mid-stream rebates to distributor be effective for networked controls?
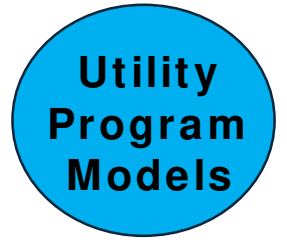
Utility Program Models

- Will drive the market because distribution is looking to provide lowest cost to their contractor
  - Focus on reducing wattage, but don't know how to improve long term investment
  - Align market to sell these products
  - Simplest way to get them stocked, but no guarantee implementation of control strategies
    - Gets enabled tech in place, creates business model to optimize
      - How to convince regulators that this potential savings exist

- Challenges for utility
  - Don't think we are at the point that distributors understand what they are selling yet
  - Luminaire level is not going to get strategies implemented (optimize)

What would be the implications if, overnight, utilities were to require networked controls to receive any rebates?

Utility Program Models

- Manufacturers in favor -will provide for both scenarios

  – Product will sell if incentives high enough

    ▪ May be less effective in smaller markets

- Economies of scale improves cost effectiveness

  – Cost structure will come down if widely adopted

- Needs to be based on application/ project size (20,000 ft2)

  – New construction (code is baseline) add controls to beat code

  – Premier level incentives for driving project

    ▪ Meet minimums, tier for better savings.

Parking Lot

Utility
Program
Models

- Place to put anything that came up that didn't fit into structured questions

Utility Program Models – Table 2

Background

- Many DLC Member utilities are actively developing or considering new program models and rebates for networked lighting controls.

- Traditional custom program models have not been effective at driving significant adoption

Assignment

Answer the following questions:

- What types of rebate structures would be most effective?

- Mid-stream rebates paid to distributor for networked controls?

- What if networked controls were required to receive *any* lighting rebates?

What types of incentive or rebate structures would be most effective?
($/SF, Per controlled fixture? Per Control Strategy? Per Watt Saved?, etc)

Utility Program Models

- $/sf most effective for marketplace; projects sold on ROI, and this is simplest approach.

- Per control strategy leaves door open to gaming.

- $/sf will push market to integrated controls approach.

- $/sf encourages good design practice.

- Incentive has to be relatively competitive with fixture incentive levels.

- $/sf has insufficient data for budget modeling.

- $/sf okay for NC, but confusing to itemize for retrofit /MR.

- "Per sensor" is 'palatable' but could allow gaming.

Where should the rebates be applied? Would mid-stream rebates to distributor be effective for networked controls?

Utility Program Models

- Mid stream could work with integrated troffers

- Mid stream could work as a supplement to broader incentive offerings.

- Mid stream may ignore commissioning.

- Direct install could advance adoption if done correctly.

- Distributors won't front $$ for mid stream (high cost item)
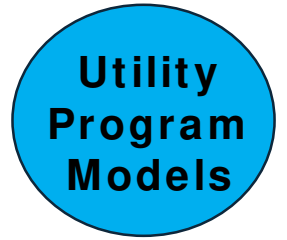
- Complex labor for Dist to collect utility req'd data.

- Mid-Stream can create confusion in service delivery overlap.
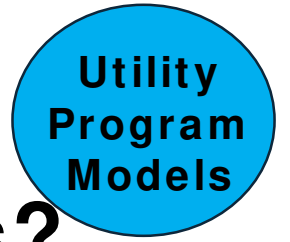
What would be the implications if, overnight, utilities were to require networked controls to receive any rebates?

Utility Program Models

- Utilities would suffer opportunity loss.

- Market needs incentives as a vehicle.

- Utilities need to support DLC NLC QPL.

- Utilities are driving force for retrofit/MR.

- Non-Ltg/Energy benefit systems not dependent on incentives.

- NC first (most obvious) acceptance of NLC.

Energy Data – Unlocking the Potential – Table 1

Background

- If simplified, standardized, and scaled, Energy Data has significant potential benefits to the market

- Energy Data is currently not used effectively, often trapped in hard to access "silo".

Assignment

Brainstorm up to 5 ideas or things needed to unlock the full potential of lighting system Energy Data.

For each idea, list:

- Description

- Possible next step or how to move forward

- Who can or should work on it

What is needed? How can it be addressed? Who can work on it?

Energy Data
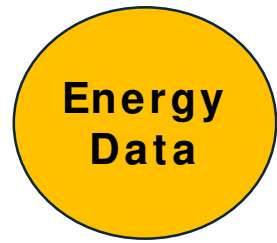
- A new standard for accuracy between utility revenue grade and existing practice is critical.

- DLC / Utilities could provide a data specification that clarifies how manufacturers should collect data

  - Accuracy (+/- X%) or a metering requirement

  - What data from fixtures what time period (frequency and duration), where (granularity of measurement) and how savings are achieved

  - To kick start reporting, utilities can provide additional incentives for energy monitoring

  - Corroborated by metering data (if possible)
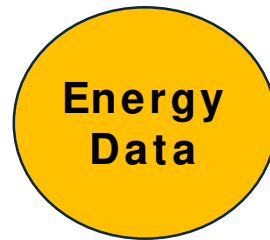
What is needed? How can it be addressed? Who can work on it?

Energy Data

- Evolve the Energy Data Specification Over Time
  - Develop a standardized process for incorporating new requirements (such as line monitoring vs. load)
    - Process should start with reporting requirements which moves into required over time, enabling manufacturers time to integrate.
    - Ex: Auto industry had a 2020 regulation for back-up cameras.

- Standardizing Data Access Agreements
  - DLC / Utilities can standardize how utilities / stakeholders use the data, what level of granularity stakeholders like utilities.
 -

What is needed? How can it be addressed? Who can work on it?

Energy Data
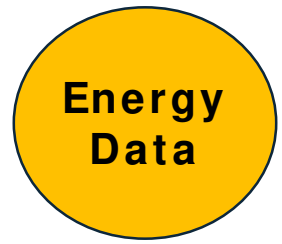
- Standardizing Baseline:
  - Key Challenge is understanding pre-installation behavior.
  - Methods:
    - In areas without occupancy, utilizing the times where breakers are switched.
    - Using newly gathered occupancy rates to baseline based on previous timeouts.

 - Guidelines from utilities / DLC on baselining would be helpful to standardize
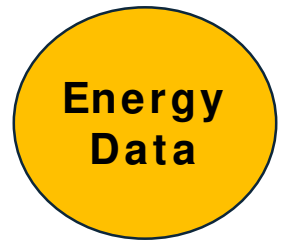
What is needed? How can it be addressed? Who can work on it?

• Basing utility incentive payments on actual project performance

    – Payment structures and one over time based on actual performance

    – Incentive programs that incorporate previous project performance data to structure programs
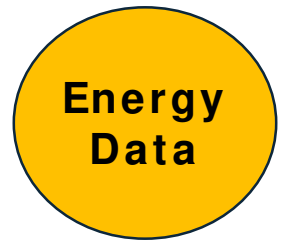
What is needed? How can it be addressed? Who can work on it?

Energy Data

- Utilizing energy data and heat maps with machine learning to align energy use with occupancy.

- What is needed: more research on this capability and demonstration.
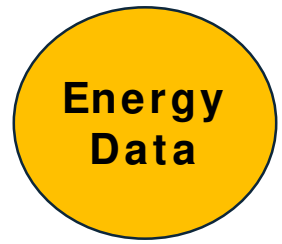
Parking Lot

Energy Data

- Place to put anything that came up that didn't fit into structured questions

- Who owns this data?

# Energy Data – Unlocking the Potential – Table 2

Background

- If simplified, standardized, and scaled, Energy Data has significant potential benefits to the market

- Energy Data is currently not used effectively, often trapped in hard to access "silo".

Assignment

Brainstorm up to 5 ideas or things needed to unlock the full potential of lighting system Energy Data.

For each idea, list:

- Description

- Possible next step or how to move forward

- Who can or should work on it

What is needed? How can it be addressed? Who can work on it?

Energy Data
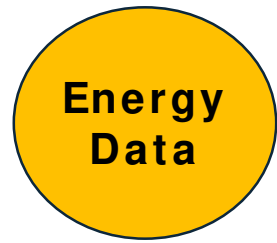
- WHAT
  - Standardization of data model and means of accessing it.

- HOW
  - Standards work, perhaps using existing models (CBECS, Green Button, HPXML, ?)
  - Define minimum common data model (resolution, space types, time resolution, access latency)

- WHO
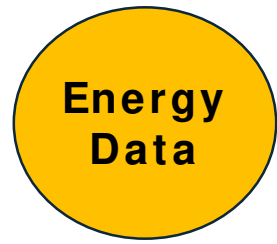 - Industry, standards bodies, utilities

What is needed? How can it be addressed? Who can work on it?

Energy Data
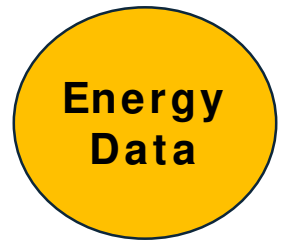
- WHAT
  - Security and privacy concerns must be addressed

- HOW
  - Security standards need to be developed
  - Anonymization rules need to be set

- WHO
  - Industry, standards bodies, utilities

What is needed? How can it be addressed? Who can work on it?

Energy Data
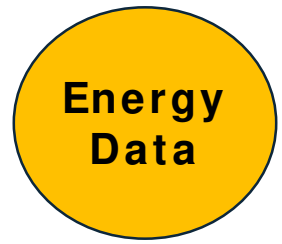
- WHAT
  - Incentives for sharing the data

- HOW
  - Add carrots
    - "Here's how your facility's lighting data compares to an anonymous set of peers."
    - 80 / 20 incentives for pre- and post-install, if data access is provided
  - Look to city-based building benchmarking efforts as examples

- WHO
  - Industry, standards bodies, utilities

What is needed? How can it be addressed? Who can work on it?

Energy Data

- WHAT
  - Who owns the data, and who gets to access it?

- HOW
  - Develop data governance norms
    - Fully owned?
    - Operating lease?
    - Landlord-tenant?

- WHO
  - Industry, standards bodies, utilities

Addressability – Where should it be required? – Table 1

Background

- DLC requires NLC systems to have the capability to provide individual luminaire and device addressability but does not specify where individual addressability must be installed on a project.

- Efficiency Programs may develop requirements for where individual addressability is required on a project

Assignment

Answer the following questions:

- Should efficiency programs require individual luminaire addressability anywhere on a project? Or should they leave it to the specifier/contractor to decide?

- If required, where would it make sense?

Critique the Proposal Listed in Handout

Should addressability be required anywhere on a project? Or should it be left to specifier/contractor to decide?

Address-ability

- Yes, need to future proof. If every light is addressable may not use today but tomorrow. Owner may change what building or room use. Cost of controls is coming down so will not be so much of an issue soon. Easy to address code. May want to address NEBs like life safety lighting or occupancy tracking. Would simplify installation for contractors, they often mix up fixtures.

- New Construction Projects yes, retrofits no.

- No, it is too expensive, especially for retrofits, labor costs are high. The high payback will prevent project from occurring and slow market transformation. Could have two Tiers, one where you address all fixtures and another where there is some flexibility. some areas don't make sense like private offices that have smart wall switches or task lights that can do the same thing as smart fixtures, Pandoras box if mixed if partially addressable. 100% would be easy. Will be complicated to calculate energy savings. Lighting designer may want a wall wash all lit for aesthetic purposes.

DLC

If required, where would make sense?

Address-ability

- Building types and space types, warehouses and office spaces better for addressability, Office linear fixtures

- If for non lighting purposes like safety or new technologies like LED modules or heat sensing can tell where a person is so then addressability would make sense.

- New construction.

Does not make sense

- Restaurants, not have stringent codes not required. On/off, dimming. Depends upon business.

- In a multiple stall bathroom not make sense. Function will remain the same.

Critique this Proposal:

Address-ability

Required on all fixtures/ applications except for:

- Spaces designed for single occupancy
- Accent or decorative lighting including downlights and track lights that are in addition to general illumination in a space
- Corridors, linear runs with no more than 3 fixtures per zone

Comments:

- This is a good proposal but would add spaces: utility spaces, closets, maybe bathrooms. Depends upon how many hours per year. If operating 40 hours a year not cost effective.

- Certain space types like schools,

- New construction or regut should be required

- Corridors need to future proof.

Addressability – Where should it be required? – Table 2

Background

- DLC requires NLC systems to have the capability to provide individual luminaire and device addressability but does not specify where individual addressability must be installed on a project.

- Efficiency Programs may develop requirements for where individual addressability is required on a project

Assignment

Answer the following questions:

- Should efficiency programs require individual luminaire addressability anywhere on a project? Or should they leave it to the specifier/contractor to decide?

- If required, where would it make sense?

Critique the Proposal Listed in Handout

Should addressability be required anywhere on a project? Or should it be left to specifier/contractor to decide?

- Open office should be. Maybe troffers, ambient lighting in large open spaces for general illumination.
  - Not Wall washers, (not providing general illumination.
  - Row of downlights. Row of car dealer lights, etc, some zones not needed.
  -

If required, where would make sense?

Address-ability

- Maybe X watts per address.
  - Put out for comment, what numbers? 100W? 40W? Etc?

- Or N% of luminaires in a project are addressable
  - But maybe a building is 905 private office

- Concern about program exceptions: heavy workload

Critique this Proposal:

Address-ability

Required on all fixtures/applications except for:
- Spaces designed for single occupancy
- Accent or decorative lighting including downlights and track lights that are in addition to general illumination in a space
- Corridors, linear runs with no more than 3 fixtures per zone

Comments:

- List of exceptions could go on forever, a page of them. How to boil down a lighting design degree to a sentence?

- Example of zones: private office, one piece of art, one restroom (not single occupancy)

Critique Proposal

Address-ability

Parking Lot

Address-ability

• Place to put anything that came up that didn't fit into structured questions

Occupancy Sensing – Where should it be required?

Background

- DLC requires NLC systems to have occupancy sensing capability but does not specify where it must be installed on a project.

- Efficiency Programs are likely to develop requirements for where occupancy sensing is required on a project

Assignment

Answer the following question:

- In what types of spaces/rooms/applications are there concerns that occupancy sensing should not be required?
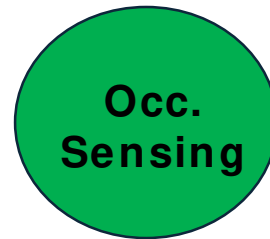
Critique this Proposal:

- Occupancy Sensing is require in all rooms of a project unless there is a documented safety/security risk or is not technically feasible.

In what types of rooms/ spaces are there concerns Occupancy Sensing should not be required?

Occ. Sensing
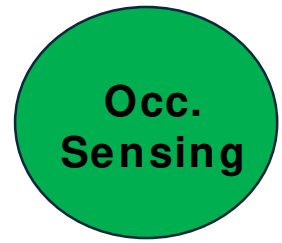
- Areas where there is concern for safety(labs, manufacturing, egress safety, etc.)

- Some sensitive areas could dim versus full shutoff

- Areas where occupancy sensing are in conflict with other safety requirements.
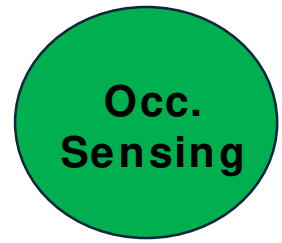
- Higher Ceiling areas

Occ. Sensing

Critique this Proposal:

Required on all fixtures/ applications unless there is a documented safety/ security risk or is technically not feasible.

Comments:

- High bays and high ceilings (>40') can be problematic

- Driver/ballast lag can be an issue in high traffic (foot traffic, forklifts, etc.

- Improper sensor placement can handicap true capability of controls.

- Integrated controls may be preferable to external controls

- Standby power limit requirements <1W can be an issue

- Commissioning is key

Occ. Sensing

Critique Proposal:

- In utilities code compliance, not incentivized. So as code becomes more progressive, occupancy sensors to achieve higher savings by adjusting timeout and dimming levels

- Some issues with high bay (industrial and warehouse),

In what types of rooms/spaces are there concerns Occupancy Sensing should not be required?

Occ. Sensing
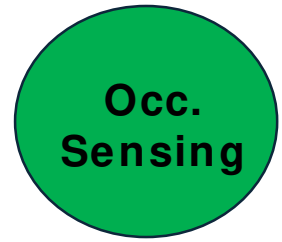
- Laboratories

- Manufacturing Areas

- Shop and Science Classrooms

- Emergency controls

- Hazardous area locations and occupancy sensing
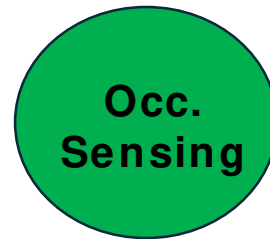
Occ. Sensing

Critique this Proposal:

Required on all fixtures/ applications unless there is a documented safety/ security risk or is technically not feasible.

Comments Continued:

- Economic feasibility should be considered

- Referencing ASHRAE 90.1 as a starting point

- Specificity is important to ensure desired outcome
  - Appropriate sensor for application

Energy Monitoring

Background

- Energy Monitoring capability of networked controls has significant potential benefits

- DLC has proposed in draft V2.0 requirements that systems must have energy monitoring capability

Assignment

Answer the following questions:

- What would be the positive benefits of DLC requiring systems to have energy monitoring capability?

- What would be the negative consequences?

- If it's too early, what are the conditions or characteristics that would make it the right time to require this?

Participants

Group 1

- Michael Poplawski, PNNL (Facilitator)
- Yoelit Hiebert, Leidos
- Joe Bokelman, Eaton
- Jeremy Yon, Current by GE
- Pekka Hakkarainen, Lutron
- Sree Venkit, Philips Lighting
- Jonathan Vollers, Cree
- Stefan Bernards, Nedap Light Controls
- Marc Gallo, MaxLite

Group 2

- Michael Poplawski, PNNL (Facilitator)
- Tanya Hernandez, Acuity Brands
- Aaron Kwiatkowski, Consumers Energy
- Deborah Stanescu, ICF
- Rick Leinen, Leviton
- Ashok Shah, Ecoled
- Scott Ziegenfus, Hubbell
- Raul Shira, Philips Lighting
- Michael Doucette, United Illuminating
- Gina Schrader, NextEnergy

Should DLC require systems to have Energy Monitoring capability? What would be the positive benefits and negative consequences?

Energy Monitor

- Yes: 3, No: 4, Abstain: 1

- Positive: (note, not addressing use cases here); requirement might accelerate implementation, which would allow the industry to learn more about some of the unknowns (e.g. value of data, required accuracy) through experience, which might be faster than waiting for industry working groups to define needs and/or specify performance requirements

- Negative: Too wide of variation of accuracy in product implementation, which could lead to false conclusions; need standards to verify accuracy claims; adds cost for unknown, unproven value

- Other: Level of reporting granularity not specified; suggestion that some programs might provide a bonus for this capability

- Question: will all networked lighting systems have this capability at some point in the future? Yes: 8

If it's too early, what would be the right conditions and characteristics to require this?

Energy Monitor

- Industry accuracy test method and performance requirement/classifications

- Maybe a longer transition time, to give manufacturers time to build the capability in to products that don't currently have it (June 2018?)

Energy
Monitor

Parking Lot

- Place to put anything that came up that didn't fit into structured questions

Should DLC require systems to have Energy Monitoring capability? What would be the positive benefits and negative consequences?

Energy Monitor

- Yes:6 No:3

- Positive: (note, not addressing use cases here); accelerating product implementation would reduce cost faster

- Negative: Too wide of variation of accuracy in product implementation, which could lead to false conclusions; need standards to verify accuracy claims; could inhibit deployment of small systems which would not make use of energy data; adds cost (material->0 and/or design, re-design) for unknown, unproven value

- Other: Level of reporting granularity not specified; suggest that individual programs could require this capability, filtering QPL to those reporting this capabiltiy

If it's too early, what would be the right conditions and characteristics to require this?

Energy
Monitor

- Industry accuracy test method and performance requirement/classifications

- Additional QPL categories, so that the requirement might, for example, only apply to:
  – New construction, and not retrofit
  – Whole buildings or large installations, and not small installations

Energy Monitor

Parking Lot

- Place to put anything that came up that didn't fit into structured questions

Exterior Lighting Controls

Background

- Exterior networked controls are not included in the current V1.0 requirements.

- DLC has proposed in draft V2.0 new requirements for exterior networked lighting controls

Assignment

- Complete the table on the following slide.

- For each "X", explain why

Should any of the following proposed required capabilities not be a required system capability for the application?

Exterior Controls

	Smart City	Street (mixed)	Roadways (highways)	Parking / Exterior	Building Accent
Occupancy / Traffic sensing		Premature	Premature		X
Daylight Harvesting / Photocell control					
Task Tuning / High-End Trim			X		
Scheduling					
Zoning					
Energy Monitoring		Premature	Premature	Premature	Premature
Local Processing / Distributed Intelligence		Premature	Premature	Premature	Premature

Should any of the following proposed required capabilities not be a required system capability for the application?

Exterior Controls

	Smart City	Street (mixed)	Roadways (highways)	Parking / Exterior	Building Accent
Occupancy / Traffic sensing					
Daylight Harvesting / Photocell control					
Task Tuning / High-End Trim	X	X	X	X	X
Scheduling		safety	safety		
Zoning					
Energy Monitoring	Reported	Reported	Reported	Reported	Reported
Local Processing / Distributed Intelligence	Both	Both	Both	X	X

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Why a particular capability should not be a required system capability?

Exterior Controls

- Group 1: Daylight harvesting inappropriate across the board – implies dimming

- Group 2: Task tuning/high-end trim – overlighting not an issue outdoor

Parking Lot

- Should regional/national code be the baseline?
  - e.g. Title 24 in CA

- Add: pathway lighting to application
  - Separate automobile from pedestrian

- Smart City needs definition

- Add category: building management, with requirements

- Clearer definition for accent

Exterior Controls

Parking Lot

- Place to put anything that came up that didn't fit into structured questions

- Occupancy should have setback %

- Clarity: local processing/distributed intelligence
  - AND or OR relationships? Definition?

Security

Background

- System security is fundamentally important to networked controls adoption

- Security standards that DLC can reference are likely 1-3 years away

Assignment

Answer the following questions:

- Should DLC address security?

- Are there things DLC could do in the interim to address this important topic until standards are developed?

- Are there aspects or characteristics of system security DLC could report on the QPL? If so, what?

Should DLC Address Security?

Security

- I don't know how they can. Too many levels, layers, how do you report how current standards are? Device specific, what layer.

- Architecture maybe, say what you have, report out

- Difficult without commonality, cart before the horse, need best practices

- How do you compare, outside of DLC area, unmanageable

- Different level of security? Software or hardware? Evaluation

- Start with awareness? Don't know now or how to report when existing systems you have to integrate to.

- So many different ways, if everyone

Don't do anything yet! Complicated! Yes, needs to happen!

Are there things DLC could/ should do in interim while we wait for standards?

Security

- Require mfrs to provide architecture, or what they are following, It could fill the gap.

- Require a whitepaper, format,

- Describe each link at each level but templateized

- Dispel misconceptions to get customer and IT comfortable

- Include IT in conversations

- Actor specific conversations (who cares)

- Need it simple, Security isn't simple yet, not quite there

Mfr Whitepaper of approach
Dispel Misconceptions
Simplify

Are there aspects or characteristics of system security DLC could~~~~~e QPL? If so, what?

- For each link/layer Mfr could report
- Compare to existing
- Communicate t
- Commissioning b~~~~~eally still big)

- Maybe a trigger down the road UL2900 (or something else) allows specifiers to check the box.

Security

Report at each layer
Best Practices
Training

BONUS!

Trigger on IT
adopted guidance

Parking Lot

Security

- Place to put anything that came up that didn't fit into structured questions

Security

Should DLC Address Security?

- Hands off

- Should be addressed, key thing is if it gets hacked!!! CFL's what a big problem, slowed LED's, this needs to be addressed

- A report of what your security level should be in the QPL so yes

- What about liability? ..if they had a spec? They should point to so...

- Very complex, stay away from developing your own!

- How do you point to just something? Too much change righ...

- Just report what Mfr reports

- Could still be liability

- Who's job it is to make the system secure?

Hands Off!
Too Complicated
Risk, Risk, Risk
Report what Mfrs do

Are there things DLC could/ should do in interim while we wait for standards?

Security

- How to remove the risk off TA, utility, etc.

- Is there a services related opportunity? For TA's

- Levels of risk (Mfr specifies how they will meet) report

- Customer education! About network security (TA) (Bui

- If you supply knowledge you have risk,

- Just be Reported

How to remove Risk?
Training
Report Levels of Risk!

Are there aspects or characteristics of system security DLC could report on the QPL? If so, what?

Security

- Not yet! Not right now short term don't do anything

- Zone risk and report

- Raise level of awareness –education, report

- Mfr's could drop out if Reporting.

- Report generally but not specifically (call

No, Not yet
Yes, Risk Zones/Lvl
Mfrs could drop out
General Report –
not specific

Parking Lot

Security

- Place to put anything that came up that didn't fit into structured questions

NLC Technical Requirements Update

Get ready to vote!

Type URL into browser on Smartphone

-or-

Use QR Code Reader

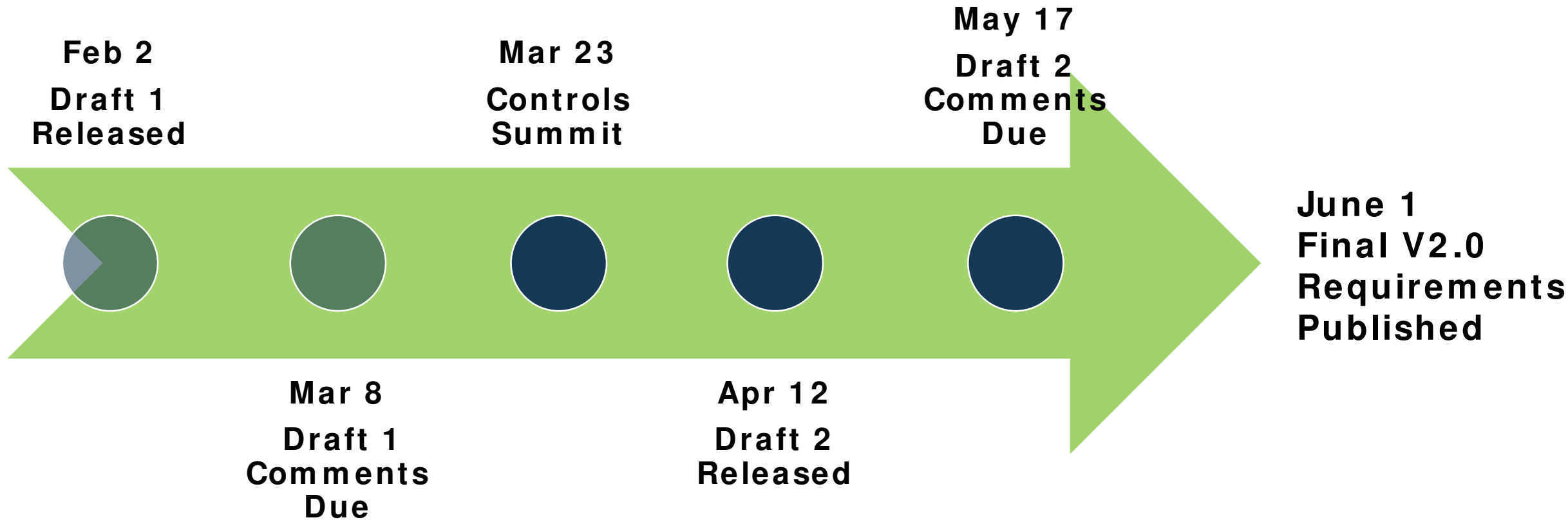http://etc.ch/KoBs

Networked Controls Revision Cycle

Specification Revised Annually every June 1

Revision process begins every February to allow time for stakeholder input

One Year Grace Period

2017 Revision Timeline

Feb 2
Draft 1
Released

Mar 23
Controls
Summit

May 17
Draft 2
Comments
Due

June 1
Final V2.0
Requirements
Published

Mar 8
Draft 1
Comments
Due

Apr 12
Draft 2
Released

Summary of Proposed Required and Reported System Capabilities – Interior

'Required' Interior System Capabilities

- *Networking of Luminaires and Devices*
- *Occupancy Sensing*
- *Daylight Harvesting / Photocell Control*
- *Task Tuning / High End Trim*
- *Zoning*
- *Luminaire and Device Addressability*
- *Continuous Dimming*
- *Localized Processing / Distributed Intelligence*
- *Scheduling*
- *Energy Monitoring*
- *[DC & PoE only] Wiring & Power Supplies*

'Reported' Interior System Capabilities

- *Type of User Interface*
- *Luminaire-Level Control (non-integrated)*
- *Luminaire Level Control (integrated)*
- *Personal Control*
- *Load Shedding (DR)*
- *Plug Load Control*
- *BMS/EMS/HVAC Integration*
- *Device Monitoring / Remote Diagnostics*
- *Operational and Standby-Power*
- *Emergency Lighting*
- *Inrush Current*
- *Security*
- *Interoperability / API*
- *Color Changing / Tuning*
- *Commissioning Party*

Summary of Proposed Required and Reported System Capabilities – Exterior

'Required' Exterior System Capabilities

- *Networking of Luminaires and Devices*
- *Occupancy / Traffic Sensing*
- *Daylight Harvesting / Photocell Control*
- *Task Tuning / High End Trim*
- *Zoning*
- *Luminaire and Device Addressability*
- *Continuous Dimming*
- *Localized Processing / Distributed Intelligence*
- *Scheduling*
- *Energy Monitoring*
- *Device Monitoring / Remote Diagnostics*
- *[DC & PoE only] Wiring & Power Supplies*

'Reported' Exterior System Capabilities

- *Type of User Interface*
- *Luminaire-Level Control (non-integrated)*
- *Luminaire Level Control (integrated)*
- *Personal Control*
- *Load Shedding (DR)*
- *Plug Load Control*
- *BMS/EMS/HVAC Integration*
- *Operational and Standby-Power*
- *Emergency Lighting*
- *Inrush Current*
- *Security*
- *Interoperability / API*
- *Color Changing / Tuning*
- *Commissioning Party*

Comment Summary

- 235 unique and useful comments from:
  - 12 Manufacturers
    - Large and Small,
    - Controls only and Conglomerates
  - 2 Trade Associations: NEMA and TALQ
  - 2 Members: Hydro Quebec and NEEA

- Thoughtful, generally positive tone

Major Changes – Technical Requirements V2.0

- Detailed discussion on each topic, followed by real-time polling

Topic	Proposal
Exterior Lighting Controls	DLC proposed new requirements for Exterior Networked Lighting Controls.
Localized Processing / Distributed Intelligence	DLC proposed to make this a "Required" rather than "Reported" capability.
Scheduling	DLC proposed to make this a "Required" rather than "Reported" capability.
Energy Monitoring	DLC proposed to make this a "Required" rather than "Reported" capability.

Minor Changes – Technical Requirements V2.0

Proposed Change	Summary, Next Step(s)
New DC and PoE Wiring and Power Supply Requirements	DC and PoE proposal being handled through SSL Policy Stakeholder Input Process. DLC may propose changes to DC and PoE requirements in Draft 2.
Mandatory 5-year system warranty – no option to purchase	11 / 3 / 1 pro / con / neutral. DLC will be discussing comments with energy efficiency program / utility members and individual manufacturers.
High-End Trim / Task Tuning clarification	General agreement from commenters. Some concern with confusion of terms. HET sets a ceiling light level at time of startup, TT is dynamic and ongoing, could be implemented by a dimmer. Task Tuning Lumen depreciation compensation features will not be classified as TT / HET. DLC will propose specific language in Draft 2.

Minor Changes – Technical Requirements V2.0

Proposed Change	Summary, Next Step(s)
Revise Luminaire Level Lighting Controls (LLC) language to require that systems are specifically intended for sensor-per-luminaire architecture.	Many comments around how do you prove intent? Some comments that if system can do it, DLC should allow it. DLC will propose specific language in Draft 2.
Revise Personal Control language to require that systems are purposefully designed to provide personal control by an individual user of the light fixture(s) in their specific task area.	Many comments around how do you prove "intent" or "purposefully designed"? Some comments that if system can do it, DLC should allow it. DLC will propose more specific language in Draft 2.

Minor Changes – Technical Requirements V2.0

Proposed Change	Summary, Next Step(s)
Emergency Lighting "Reported" elements expanded to report specific type(s) of emergency lighting a system can interface with.	General agreement, but clarification required on what data will be collected and displayed on the QPL. Some caution that this is complicated.
Inrush current (NEMA 410) added to "Reported"	General agreement. Comment that UL already requires this. Questions of what components need to comply with NEMA 410 and which version? Concern about testing costs. DLC will research further and consider changes for Draft 2.
Interoperability / API added to "Reported"	General agreement from commenters, with clarification required on what data will be collected or displayed. DLC will propose specific language in Draft 2

Minor Changes – Technical Requirements V2.0

Proposed Change	Summary, Next Step(s)
Color tuning added to "Reported"	General agreement from commenters. DLC will propose more specific language in Draft 2.
Commissioning Party added to "Reported"	General agreement from commenters with concept. Concern about language and definitions. Difference between "Commissioning" and "System Start-up"? DLC should report the level-of-effort for two stages: basic system operation, and full system configuration. DLC will continue discussions with Stakeholders to clarify and propose revisions in Draft 2.
Commercial availability	DLC does not provide a method to qualify systems that may be custom-built for a specific customer (e.g. national account) but will not be available to general public. DLC is discussing internally how to address.

Minor Changes – Technical Requirements V2.0

Proposed Change	Summary, Next Step(s)
Remote Diagnostics required for Exterior	Comments split between for and against. Comment that this is key ROI driver and should be required. Several comments that it must be more precisely defined. Comments that this does not provide value in some exterior applications. DLC will consider comments and may propose specific language in Draft 2.
Security	Most comments against DLC addressing security at this time. 1) There are no industry standards in place yet. Apples to apples comparisons of security not possible until these exist. Wait for standards. 2) Reporting security info on publicly available list is against company policy and provides clues to attackers. DLC will continue to discuss with stakeholders and may or may not propose something in Draft 2.

Topic 1: Exterior Lighting

What we proposed:

Proposed Change in NLC Technical Requirements	Explanation by DLC
Add exterior lighting control systems.	Exterior lighting provides a large opportunity for energy savings from networked lighting controls. DLC Member utilities are seeking DLC's assistance to include exterior systems in their energy efficiency programs. DLC has proposed new requirements for exterior control systems. DLC has received some feedback that the scope of the requirements should exclude smart city systems. DLC seeks comments on this proposed addition of exterior lighting, the proposed exterior requirements, and whether smart city or any other applications should be excluded, and why.

Topic 1: Exterior Lighting

Clarifications on Proposal:

- DLC is not proposing that interior systems must meet exterior requirements.

- Systems on QPL will be listed as Interior, Exterior, or Both.

- Systems only need to meet requirements for which they are listed.

'Required' Exterior System Capabilities
• *Networking of Luminaires and Devices* • *Occupancy Sensing* • *Daylight Harvesting / Photocell Control* • *Task Tuning / High End Trim* • *Zoning* • *Luminaire and Device Addressability* • *Continuous Dimming* • *Localized Processing / Distributed Intelligence* • *Scheduling* • *Energy Monitoring* • *Device Monitoring / Remote Diagnostics* • *[DC & PoE only] Wiring & Power Supplies*

Topic 1: Exterior Lighting

Clarifications on Proposal:

- DLC is not proposing to develop non-lighting requirements for Smart-City applications.

- Rather, DLC is proposing that systems for Smart City applications would be subject to the same requirements as other exterior control systems.

'Required' Exterior System Capabilities
• *Networking of Luminaires and Devices* • *Occupancy Sensing* • *Daylight Harvesting / Photocell Control* • *Task Tuning / High End Trim* • *Zoning* • *Luminaire and Device Addressability* • *Continuous Dimming* • *Localized Processing / Distributed Intelligence* • *Scheduling* • *Energy Monitoring* • *Device Monitoring / Remote Diagnostics* • *[DC & PoE only] Wiring & Power Supplies*

Topic 1: Exterior Lighting

Comment Summary:

- Unanimous support for DLC covering this product category

- There are several different types of exterior applications. Should the requirements be applied to all? Or should they differ by application?

- Bringing DLC requirements to Smart City applications could hamper further development or innovation.

'Required' Exterior System Capabilities
• *Networking of Luminaires and Devices*
• *Occupancy Sensing*
• *Daylight Harvesting / Photocell Control*
• *Task Tuning / High End Trim*
• *Zoning*
• *Luminaire and Device Addressability*
• *Continuous Dimming*
• *Localized Processing / Distributed Intelligence*
• *Scheduling*
• *Energy Monitoring*
• *Device Monitoring / Remote Diagnostics*
• *[DC & PoE only] Wiring & Power Supplies*

Topic 1: Exterior Lighting

Key Questions or Issues:

- Do exterior applications exist where a networked system would not offer these capabilities?

- How would applying these requirements to Smart City hamper innovation? Specifically?

'Required' Exterior System Capabilities
• *Networking of Luminaires and Devices* • *Occupancy / Traffic Sensing* • *Daylight Harvesting / Photocell Control* • *Task Tuning / High End Trim* • *Zoning* • *Luminaire and Device Addressability* • *Continuous Dimming* • *Localized Processing / Distributed Intelligence* • *Scheduling* • *Energy Monitoring* • *Device Monitoring / Remote Diagnostics*

Topic 1: Exterior Lighting

Should DLC add Exterior Lighting systems to the NLCS QPL?

– Yes – global spec

– Yes – application-specific requirements are needed, though

– No

- [Poll Link](#)

- [Poll Results](#)

http://etc.ch/KoBs

Topic 1: Exterior Lighting

Should Smart City lighting systems be excluded in some manner?

- Yes
- No

- [Poll Link]

- [Poll Results]

http://etc.ch/KoBs

Topic 2: Localized Processing / Distributed Intelligence

What we proposed

Proposed Change in NLC Technical Requirements	Explanation by DLC
Move "Localized Processing / Distributed Intelligence" from Reported to Required, and update the definition of which functions must persist: occupancy, daylight harvest, task tuning, local manual switching	To support improved user acceptance and persistence of energy savings, basic lighting control functionality should persist when network communication with a gateway or server is temporarily lost. DLC seeks comments on which functions should persist.

Topic 2: Localized Processing / Distributed Intelligence

Comment Summary

- 4 Support, 10 Opposed

- Needs more definition

- Forces an architecture that may stifle or eliminate some system types such as DALI and POE

- Increases system cost by pushing more processing out to edge devices

- Seems to presume that gateway and network failures are common. We have not seen it, where is the data?

- DLC should instead require fail-safe operation such as 100%-on in event of system failure

Topic 2: Localized Processing / Distributed Intelligence

Key Questions or Issues

- Utilities want more reliable, resilient systems where the systems they provide rebates for persist over time.

- Studies have shown many lighting control installations utilities have provided rebates for do not perform over time.

- If the measures persisted longer, utilities can claim more savings and offer higher rebates.

- There is a perception that intermediate device failures (gateways, cloud connections) may contribute to this. Is this true? Is there data?

Topic 2: Localized Processing / Distributed Intelligence

- Should DLC Require LP / DI on the NLCS QPL?
  - Yes
  - Yes, but needs more definition of what LP / DI is
  - No, but add more information to the Reported section to aid system selection
  - No, maintain as-is

- Poll Link

- Poll Results

http://etc.ch/KoBs

Topic 3: Scheduling

What we proposed

Proposed Change in NLC Technical Requirements	Explanation by DLC
Move "Scheduling" from Reported to Required	Scheduling control is an important system capability for some interior applications where occupancy control cannot be used. For example, maintenance and security sometimes require light in unoccupied spaces; special events sometimes require different system settings. It is also important for exterior applications.

Topic 3: Scheduling

Comment Summary

- 4 Support, 4 Against

- This should have been required from the start

- The definition should be more precisely defined

- There are many applications for which scheduling would never be needed and networked systems designed for those applications should not require scheduling. (i.e. systems designed to provide occupancy control everywhere)

- Requiring this drives a certain system architecture because it requires a reliable time signal typically only available by a central gateway, server, or internet connection. May push out some room-based networked systems.

Topic 3: Scheduling

Key Questions or Issues

- What are applications or use cases in which Scheduling capability would be unnecessary?

- What are the architecture impacts of adding Scheduling to the Required feature set? Does this force a certain architecture?

Topic 3: Scheduling

- Should DLC Require Scheduling on the NLCS QPL?
  - Yes
  - Yes, but needs more definition of what Scheduling is
  - Yes for Interior, No for Exterior
  - No for Interior, Yes for Exterior
  - No, it should be left as a Reported item

- [Poll Link](#)

- [Poll Results](#)

http://etc.ch/KoBs

Topic 4: Energy Monitoring

What we proposed

Proposed Change in NLC Technical Requirements	Explanation by DLC
Move "Energy Monitoring" from Reported to Required, and update the definition.	Most networked lighting control systems available now include some form of energy monitoring. Energy monitoring capability enables the potential to reduce the cost and complexity of verifying and managing the energy performance of lighting and other building systems. The capability also enables additional business models and new ways of providing incentives by utilities. It supports the lighting-as-a-service business model that can provide significant benefits to networked lighting control system adoption and deployment. It should be noted that the technical requirements propose to require systems to have this capability, but not that it must be deployed on every project.

Topic 4: Energy Monitoring

Comment Summary

- 6 Support, 5 Against

- DLC should not require until there are standards for accuracy, precision, methods, etc.

- There are multiple methods being used, and without standards, there is large latitude in how to meet this proposed requirement, and subjectivity as to the acceptability of the solution. DLC should leave reported for now.

- Do not require of all systems, but create a "Premium" tier for systems that have this

Topic 4: Energy Monitoring

Key Questions or Issues

- How important is it to have standards in place before DLC requires Energy Monitoring in NLCS?

  – If important, how can the industry speed the completion and adoption of these standards?

- How do market needs differ for interior / exterior? For example, should this be required for exterior but not interior?

- Should DLC develop a "Premium" Tier for systems that include advanced features such as Energy Monitoring?

Topic 4: Energy Monitoring

- Should DLC Require Energy Monitoring on the NLCS QPL?
  - Yes, immediately
  - Yes, in the future when standards are in place
  - Yes, but only as a "Premium" Tier
  - No, it should be left as a Reported item
- Poll Link
- Poll Results

http://etc.ch/KoBs

Efficiency Programs Panel

Networked Lighting QPL – Who's using it?*

Specialized Rebates/Promotions for DLC Qualified NLCs in first half 2017	Considering Similar Support in later 2017 or 2018
• ConEd (NY) • Eversource (MA) • WI Focus on Energy (WI) • BGE (MD) • SMECO (MD) • National Grid (MA, NY, RI) • NYSERDA (NY) • Efficiency Vermont (VT) • PG&E (CA) • Energy Trust (OR)	• Eversource (CT) • Consumers Energy (MI) • Efficiency Nova Scotia (CA) • DTE Energy (MI) • Idaho Power (ID) • IESO CA (Ontario, Can) • NEEA (ID, OR, MT, WA) • Seattle City Light (WA) • SCE (CA) • AEP Ohio (OH)

* Based on Survey Responses from ~60% of DLC Members in July 2016 and Jan 2017. DLC will provide more complete update at DLC Stakeholder Meeting in July 2017.

- Energy Code-Based Incentive for High-Efficiency Equipment with an Optimized Lighting Design:

  - New Construction & Major Renovation Projects

  - **Retrofit** Projects

- Performance Lighting– Requires COMcheck or similar PLTC Worksheet

Watts Allowed Per sq. ft

Performance Lighting + Tiered Controls -Opportunity

- ❖ MA & RI Large Commercial Comprehensive Lighting Projects
- ❖ Incentivizes code-based best practices for retrofit & new construction projects and includes good, better, best controls
- ❖ Simpler calculations based on watts per square foot.
- ❖ Deep energy savings requires Lighting Redesign of existing spaces, beyond one-for-one fixture replacement
- ❖ Deemed savings based on simple $ per Watt saved >10% of code LPD & controls kWh savings based on building/space type
- ❖ Supports Market Transformation by encouraging all lighting projects to go beyond code as standard practice and include controls
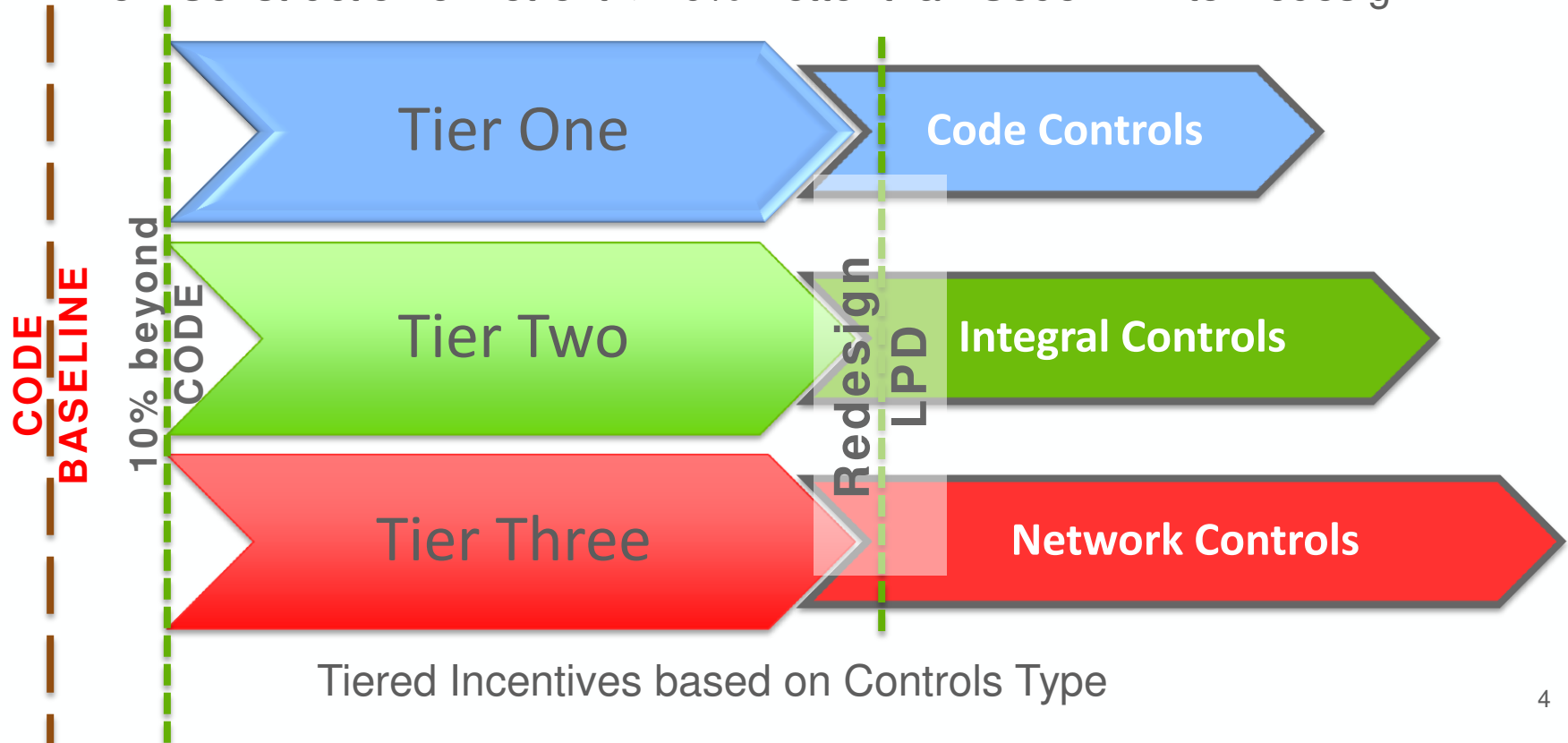
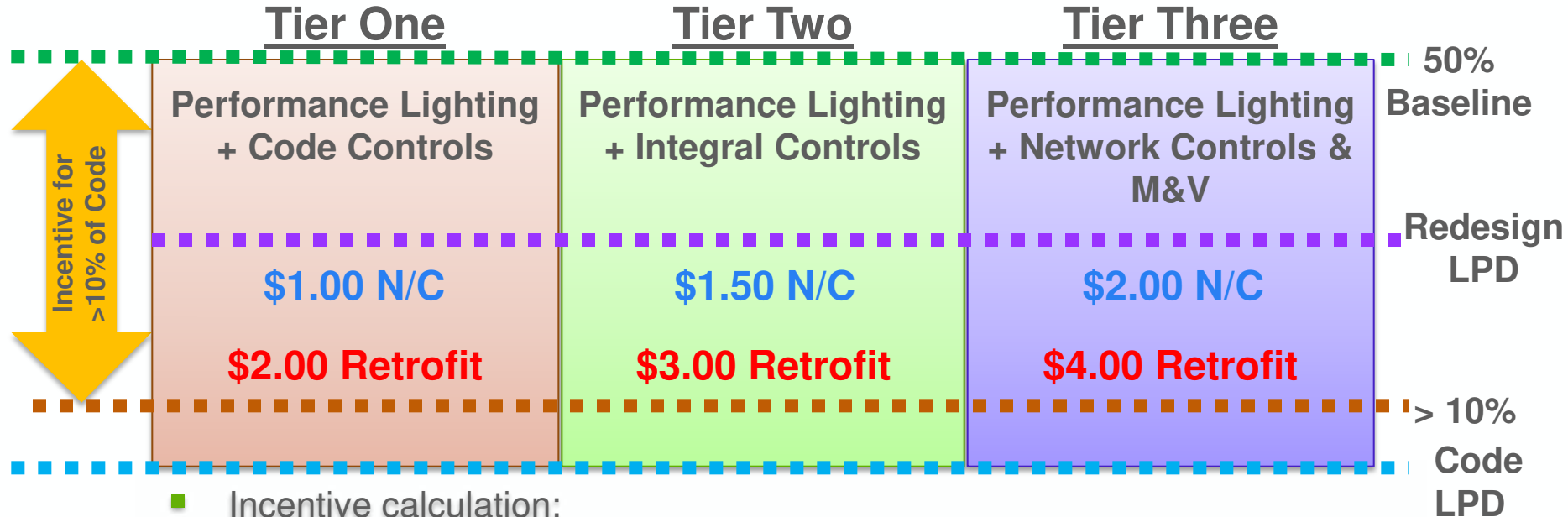Performance Lighting + Tiered Controls -Basic Concept

New Construction & Retrofit: >10% Better than Code LPD to Redesign LPD

CODE BASELINE

10% beyond CODE

Redesign LPD

Tier One — Code Controls

Tier Two — Integral Controls

Tier Three — Network Controls

Tiered Incentives based on Controls Type

Interior Projects
Performance Lighting + Tiered Controls

Tier One   **Tier Two**   **Tier Three**

	50% Baseline
Performance Lighting + Code Controls	Performance Lighting + Integral Controls	Performance Lighting + Network Controls & M&V
	Redesign LPD
$1.00 N/C	$1.50 N/C	$2.00 N/C
$2.00 Retrofit	$3.00 Retrofit	$4.00 Retrofit
	> 10%
	Code LPD

Incentive for >10% of Code

- Incentive calculation:
  Tier $ x Total Watt saved (10% >Code LPD x Area – Design LPD x Area).
- Majority >80% of lighting (LPD) must be controlled
- Code exempt lighting must be approved by Program Admin for incentives

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Tier One:
IECC 2015 Code Required Lighting Controls

| Required System Capabilities	Reported System Capabilities
Networking of Luminaires and Devices	User Interface
Occupancy Sensing*	Luminaire-Level Control (non-integrated)
Daylight Harvesting*	Luminaire Level Control (integrated)
High End Trim	Localized Processing / Distributed Intelligence
Zoning	**Scheduling***
Luminaire and Device Addressability	Personal Control
Continuous Dimming	Load Shedding (DR)
	Plug Load Control
	BMS/EMS/HVAC Integration
	Energy Monitoring
(Grayed text capabilities are not required.)	Device Monitoring / Remote Diagnostics
	Operational and Standby-Power

Tier Two:
Integral Lighting Controls

Required System Capabilities	Reported System Capabilities
Networking of Luminaires and Devices	**User Interface**
Occupancy Sensing	Luminaire-Level Control (non-integrated)
Daylight Harvesting	**Luminaire Level Control (integrated)**
High End Trim	**Localized Processing / Distributed Intelligence**
Zoning	**Scheduling**
Luminaire and Device Addressability	Personal Control
Continuous Dimming	Load Shedding (DR)
	Plug Load Control
	BMS/EMS/HVAC Integration
	Energy Monitoring
	Device Monitoring / Remote Diagnostics
	Operational and Standby-Power

Tier Three:
Network Lighting Controls

Required System Capabilities	Reported System Capabilities
Networking of Luminaires and Devices	**User Interface**
Occupancy Sensing	**Luminaire-Level Control (non-integrated)**
Daylight Harvesting	**Luminaire Level Control (integrated)**
High End Trim	**Localized Processing / Distributed Intelligence**
Zoning	**Scheduling**
Luminaire and Device Addressability	**Personal Control**
Continuous Dimming	**Load Shedding (DR)**
	Plug Load Control
	BMS/EMS/HVAC Integration
	Energy Monitoring
	Device Monitoring / Remote Diagnostics
	Operational and Standby-Power

Interior Case Study
School -Retrofit

Area	Code LPD	Design LPD	Tier One: $2.00	Tier Two: $3.00	Tier Three: $4.00
75,000	0.78	0.55	**$22,800.00**	**$34,200.00**	**$45,600.00**
		LDi Incentive:	**$4,560.00**	**$6,840.00**	**$9,120.00**
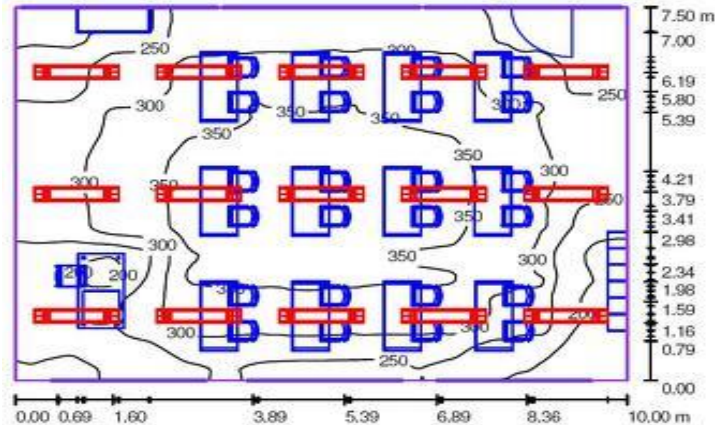
Exterior Projects
Performance Lighting + Tiered Controls

Space Type or Application	Project Type	Tier One: Code Controls	Tier Two: Integral Controls	Tier Three: Network Controls
Watts per Sq. Ft. (e.g. Uncovered Parking)	**New Construction**	**$0.50** per W Saved	**$1.00** per W Saved	**$1.50** per W Saved
	Retrofit	**$1.00** per W Saved	**$2.00** per W Saved	**$3.00** per W Saved

- Retrofit & N/C Performance Lighting >10% better than MA Code.

- Majority >80% of exterior lighting (LPD) must be controlled

- Code exempt exterior lighting must be approved by Program Admin for incentives

- Code exempt lighting, wattage trade-offs, and supplemental watt allowances must be approved by Program Administrator.

- Projects may adjust light levels based on designated Lighting Zone FC requirements.

- Network Controls Tier Three requires 30 days reported kWh saved and 6 months M&V

Tiered Controls Capabilities
Exterior Lighting Controls

Tier One: Code Controls	Tier Two: Integral Controls	Tier Three: Network Controls
Scheduled On/Off (Astronomical timer)	Scheduled On/Off (Astronomical timer)	Scheduled On/Off (Astronomical timer)
Photocell Dusk to Dawn Sensor	Photocell Dusk to Dawn Sensor	Photocell Dusk to Dawn Sensor
Bi-Level Scheduled Dimming (100% to <30% or OFF)	Bi-Level Scheduled Dimming (100% to <30% or OFF)	Bi-Level Scheduled Dimming (100% to <30% or OFF)
	Occupancy Sensor Bi-Level (100% to <20%)	Occupancy Sensor Bi-Level (100% to 40%)
		Task Tuning (Reduce lighting by >20%)
		Network Lighting (Grouping by zone or function)
		Addressable Lighting (Fixture dimming and diagnostics)
		Energy Monitoring (Per fixture, per grouping for M&V)

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Prescriptive Luminaire Level Lighting Controls:

- One incentive for compatible LED fixtures +
  One incentive for integral sensors/processors

	Standard	Premium
LED Troffer	$65	$75
Integral Sensors/Processor	$30	
Integral Sensors	$20	

- Controls must be DLC CALC qualified and meet required LLLC capabilities (Tier Two)

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Network Lighting Controls-NLC 3.0

Network Lighting Controls only for Retrofit Projects :

- $**0.25** per sq. ft. (Interior)

- Tier Three* (Network)- Controls must be DLC CALC qualified and meet required capabilities,

- Projects existing lighting must be >15% better than code LPD.

2017 Performance Lighting + Tiered Controls

Code-Based Incentive Program for Retrofit & New Construction Lighting Projects

Presenter:

Edward Bartholomew, LC, LEED AP, IES

Commercial Lighting Program Manager

mass save

Energy Efficiency Programs Panel:
The CLEAResult Experience

Kyle Hemmi, Senior Engineer, Core Engineering

CLEAResult®

CLEAResult Overview

SUPPORTIVE

2,700+
current employees

30,000+
contractor partners

SOPHISTICATED

900+
active programs

10M+
calls handled annually

SECURE

50M+
incentives processed annually

$350M+
rebates processed annually

PROVEN

4,000+
GWh saved annually

65M+
therms saved annually

CLEAResult®

CLEAResult in the NLC Space

- **CLEAResult Small Business NLC Program (Greater Chicago)**
  - Targeting 400-450 Projects; >13 GWh savings
  - > 90% DLC-qualified NLC-enabled systems
  - Calculated $/kWh; $400 NLC Highbay; $100 NLC Troffer

- **PG&E Advanced Lighting Control System (ALCS) Tool Trial**
  - Facilitating ~15 projects to evaluate the ALCS Calculation Tool
  - Additional incentives to facilitate pilot goals

- **250+ Commercial & Industrial Programs; 95+ Unique Clients**
  - Actively establishing/exploring NLC-specific offerings
  - Promoting higher incentive levels for NLCs

Commercial Lighting Outlook:
What will happen to my 100 GWh Portfolio?
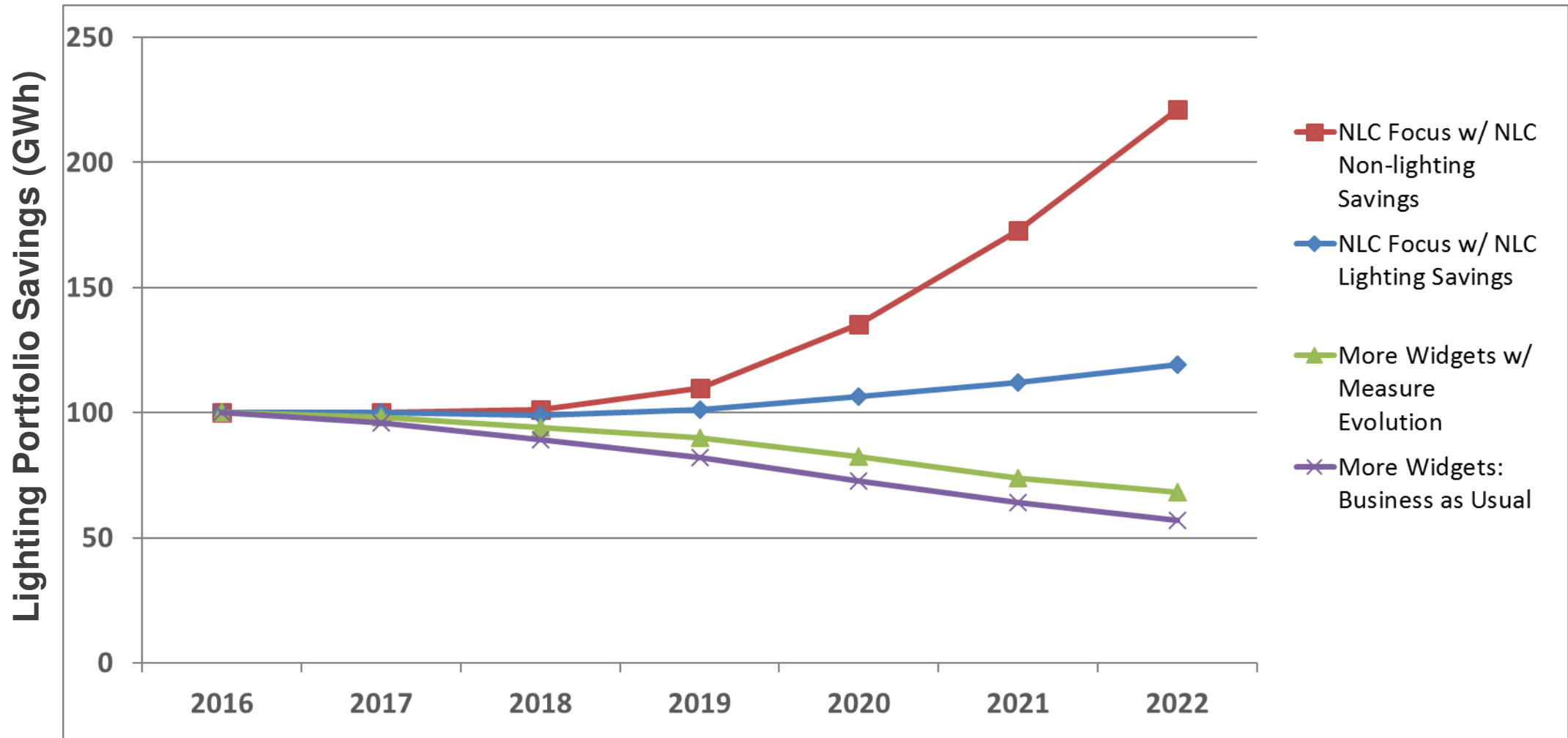
Lighting Supply Chain Simplified ☺
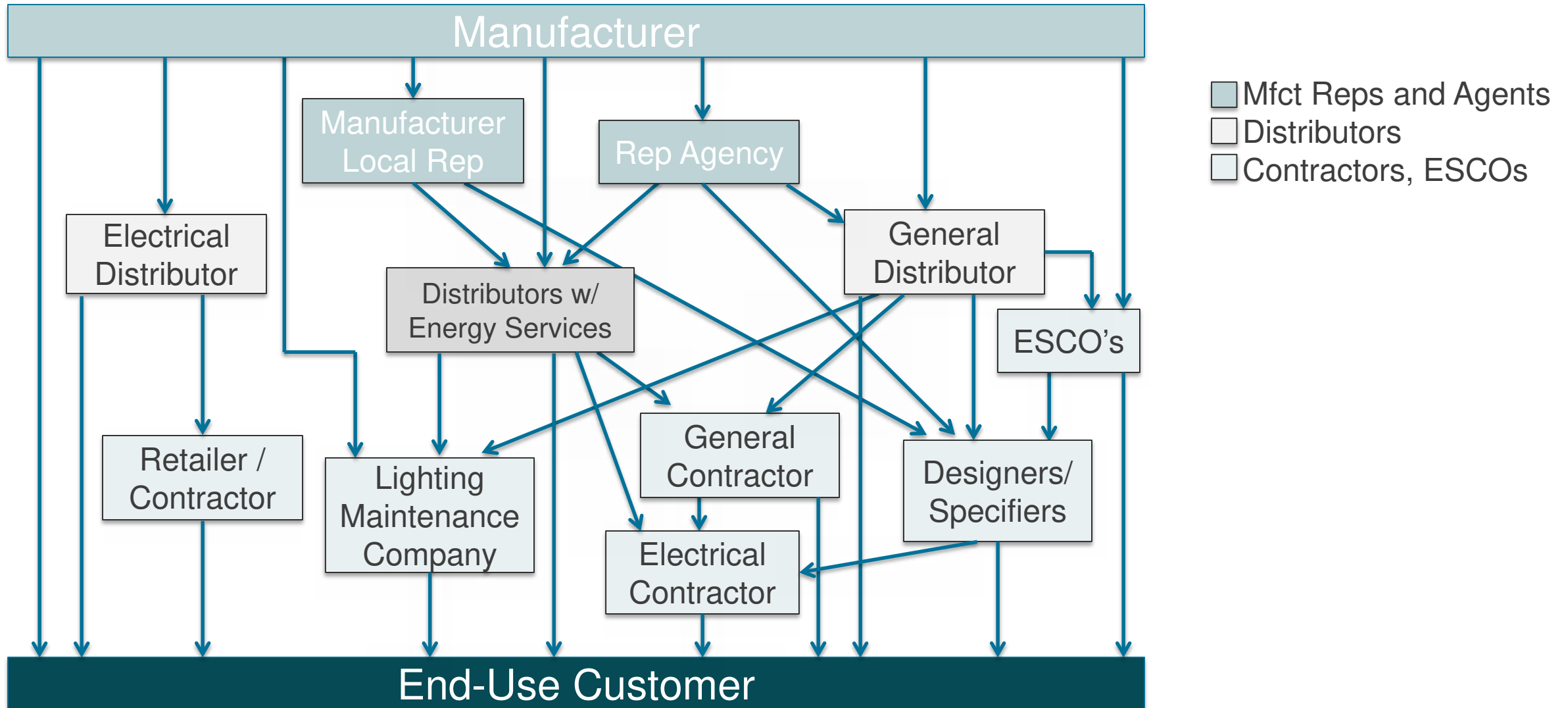
Program Lighting Supply Chain: A Streamlined Approach

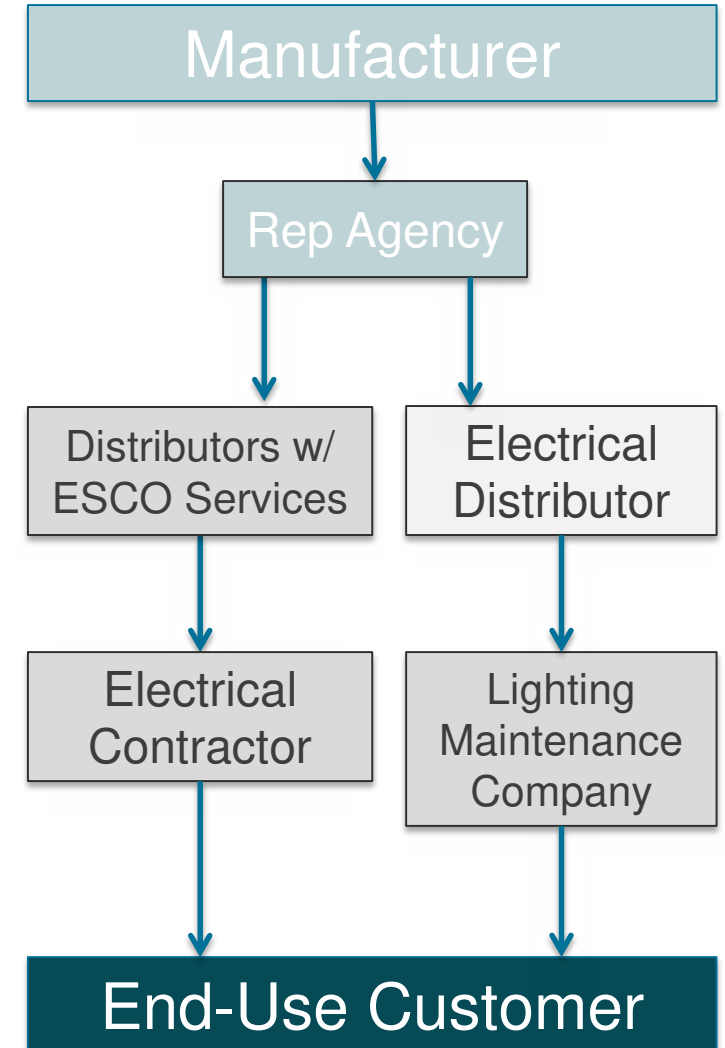**RFQ Process to select manufacturer teams ensures**
- Capability and Support - Training
- Scale
- Performance/Quality Assurance
- Right Products

Dedicated manufacturer funding ensures
- Sales and Technical Support/Focus
- Time to complete sales cycle
- Accountability

Hand-picked distributors and contractors ensures
- Controls foundation and experience
- Experience and relationships

Manufacturer
→ Rep Agency
→ Distributors w/ ESCO Services
→ Electrical Distributor
→ Electrical Contractor
→ Lighting Maintenance Company
→ End-Use Customer

Key Program Attributes

- RFQ process to select partners
- Limited subset of manufacturers and trades
- Dedicated funding
- Allied supply chain and contractor partners
- Extensive internal and external training
- Required DLC QPL listing
- Installation and Commissioning Requirements

Lessons Learned

- Market/product is moving target
- Advantageous, difficult process to manage and scale
- Good idea; requires solid planning
- More of a romance…not everlasting love
- Great idea, don't underestimate importance and magnitude
- Great idea now; struggle in 2016
- Absolutely critical, ongoing challenge w/ complexities

Installation and Commissioning Requirements

CLEAResult

Advanced Lighting Controls (ALC) Program

_Requirements for Installation and Commissioning_

V1.7

3/3/17

The initial light output of each fixture be limited to 80% or less to facilitate lumen maintenance control and task tuning.

- Absolutely necessary
- Contractors don't like rules and often don't read them
- Specifying and holding requirements difficult – one size does not fit all
- Verifying control strategies is tough – technology will help going forward
- Everyone has an opinion – often different

Needed from Manufacturers and Supply Chain

- Product, Inventory and Timely/Competitive Pricing
- Product Performance Stability
- Better Rollout and Product Transition
- Collateral and Supporting Technical and Design Documentation
- More Intensive Training
- Marketing and Technical Support Bandwidth
  - Tighter coordination w/ Supply Chain Partners
- Medium to Long-term Vision
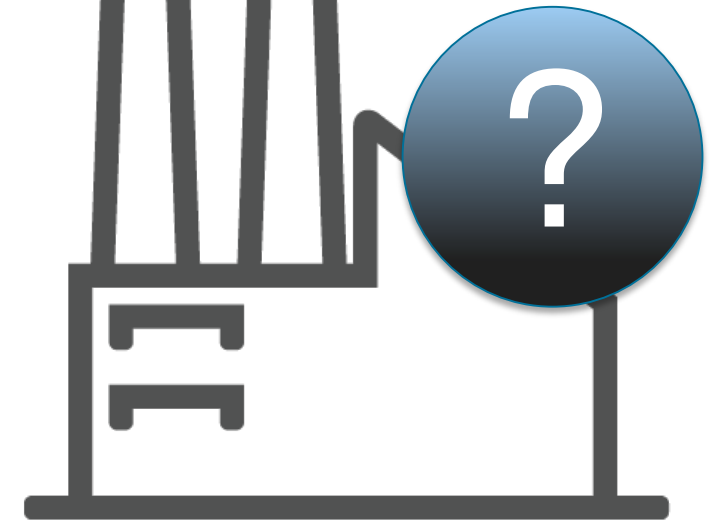
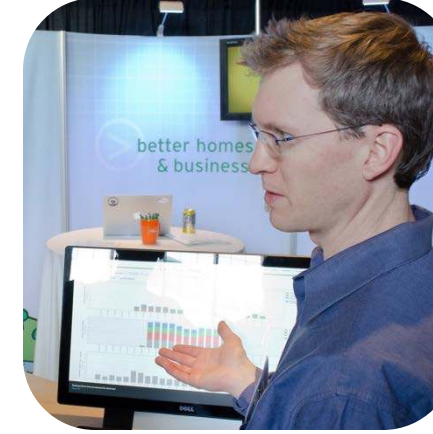# Questions

Kyle Hemmi

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CLEAResult®

Who We Are

- Founded in 2000

- Statewide energy efficiency utility

- Administered by VEIC, under appointment of Public Service Board

- Offices in Burlington, Barre, and Rutland
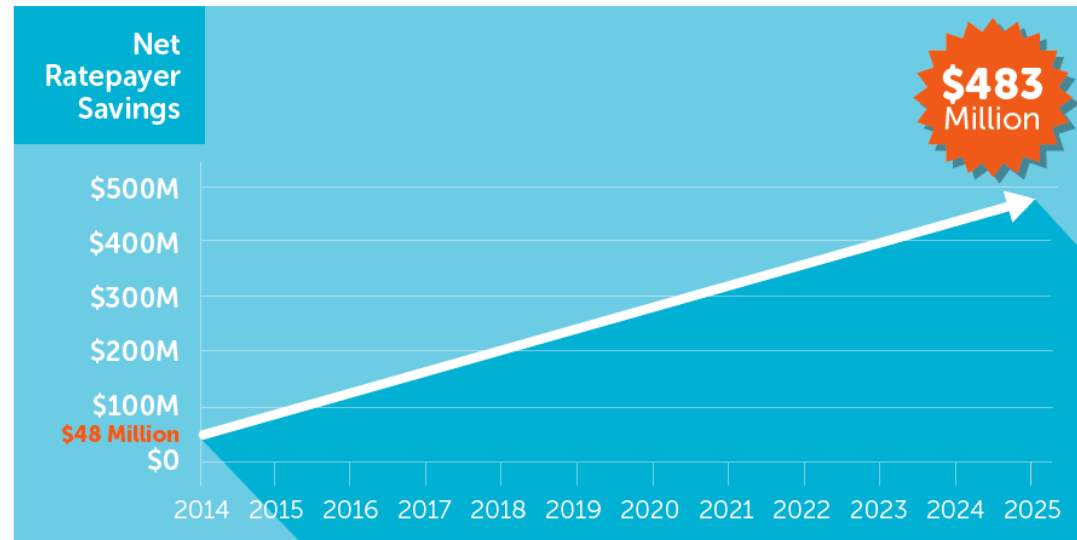

Efficiency Vermont

What We Do

- Provide sustainable energy solutions
  - Education
  - Services
  - Rebates & Financing

- Serve all Vermonters in partnership with Burlington Electric Department

- Manage a statewide network of contractors

Efficiency Vermont

Our Results

Since 2000, Delivering Savings that Grow

- Every $1 invested is yielding $2 in savings.

- Vermonters' electric bills are lower (by 5% on average.)

- 90% of Vermonters have participated in energy efficiency programs.

Net Ratepayer Savings

$483 Million

$500M
$400M
$300M
$200M
$100M
$48 Million
$0

2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025

Source: Public Service Department Report to Legislative Joint Energy Committee, 1/8/16

Efficiency Vermont

Vermont Lighting Control Incentive$

Product type	Service Delivery	Incentive	Paid to...
Integrated Lighting Controls (LLCi)	Prescriptive	$60 for luminaire + $60 for dual occupancy & daylight sensor	End user
Networked Lighting Controls	Custom*	Pay for performance – pre- & post-metering	End user
Integrated Lighting Controls	Manufacturer Co-Promotion*	$10/unit from Efficiency Vermont/BED + $10/unit from manufacturer	Distributor

*DLC NLC QPL required for Networked Lighting Controls &
 Manufacturer co-promo eligibility

Efficiency Vermont

LED with Integrated Controls Co-Promotion

Updated: March 21, 2017

<u>Product Eligbility Requirements</u>
1. DesignLights Consortium (DLC) certified
2. Includes integrated controls
   Search DLC qualified products list (QPL) and select "Available with Integral Controls" filter to confirm.
3. Manufacturer listed on DLC Networked Controls QPL
4. Manufacturer and product brand listed below

Manufacturer	Brand	Model # (Listed only if select models are eligible)	Manufacturer Discount	EVT / BED Incentive
PHILIPS	EvoKit with SpaceWise Accessory		$10	$10
	EvoKit with EasySense Accessory			
CREE	CR LED Troffer Series with SmartCast® Technology	CR14-40L-ACK-CMA	$10	$10
		CR22-32L-ACK-CMA		
		CR24-40L-ACK-CMA		
	ZR LED Troffer Series with SmartCast® Technology	ZR14M-40L-35K-CMA-FD		
		ZR14M-40L-40K-CMA-FD		
		ZR22M-32L-35K-CMA-FD		
		ZR22M-32L-40K-CMA-FD		
		ZR24M-40L-35K-CMA-FD		
		ZR24M-40L-40K-CMA-FD		

Key Issues

- Commissioning
- Lack of savings data from industry
- Uptake
- Complexity in explaining to customers
- Definitions
  - Networked vs. advanced & integrated vs. fixture-mounted
- Long lead times/backorders
- Inappropriate applications

Efficiency Vermont

How can you help?

- Easier programming via app-based interface

- Customer support

- Commissioning training for contractors, distributors, & utilities

- More fixture lines with integrated sensors

Efficiency Vermont

PG&E's LED Accelerator Program

Leveraging DLC's Network Lighting Controls QPL

March 23, 2017

PRESENTED TO

DLC Summit Participants

PRESENTED BY

Pam Molsick

pmolsick@energy-solution.com

Ledaccelerator.com

ENERGY SOLUTIONS

Agenda

- Energy Solutions Overview

- LED Accelerator Incentive Program Overview

- How LEDA Leverages the DLC's QPLs

- Key Issues

- Actions to Streamline NLC Incentive Programs

Energy Solutions Overview

Implements LED Accelerator (LEDA), a 3rd party utility incentive program, on behalf of PG&E.
LEDA incentive program drives high energy efficiency impacts and focuses on transforming the top 20% of the market.

Energy Efficiency

Emerging Technologies & Accelerated Commercialization

Demand Management

Codes, Standards & Ratings

Renewables & Distributed Generation

Clean Transportation

LED Accelerator Incentive Program Overview

- **Program Type:** Downstream and custom
- **Target Sectors:** Retail and affiliated facilities

LEDA Offerings	LEDA Incentive	
	kWh Saved	kW Saved
o**Tier II**: DLC Premium Interior Fixtures AND NLCs	$0.24	$150
o**Tier II:** DLC Premium Exterior Fixtures AND NLCs		$0
o**Tier I:** Type C, 4' External Driver LED Tubes and NLCs	$0.17	$150

- **Program Requirements**
  - NLC Project Proposal
    - Controls Scope Narrative, Sequence of Operations, cut sheets, commissioning warranty, customer training plan, 1 year customer technical support
  - NLC Energy Reporting data, M&V Plan, 1 month energy monitoring pre- and post installation

- **Near Future**
  - Use utility meter data to predict baseline, NLC trending data to calculate incentive

How Does LEDA Leverage NLC QPL?

- Convenient single point of reference customers / contractors
  - Capabilities list simplifies recommendations to prospective customers
  - Saves time
  - Highly recommend remote monitoring

- Streamlines qualification process for customers, program staff and manufacturers

What Key Issues Do We Still Need To Resolve?

- Utilities need to calculate NLC savings above Codes & Standards
- NLC reporting systems all different
  - Baselines
  - Energy Saving calculation methodologies

- Differing utility M&V requirements makes it challenging for manufacturers to efficiently support

- Utilities need 3-5 years of persistent energy savings. Need to access data over time

How Can We Help Streamline Incentive Programs?

- Manufacturers
  - Add standardized space types and square footage
  - Provide drawings with fixtures and zones, print out sequence of operations
    - Utility engineers verify energy savings
    - Simplify Electrician/Commissioning QA/QC

- Utilities
  - Develop, with manufacturer and regulatory input, consistent M&V requirements and monitoring methodologies to alleviate uncertainty of benefits
  - Confirm integrity of meter interval data

- DLC:
  - Require energy monitoring data to improve utilities' ability to claim energy savings based on actual energy saved

focus on energy℠
Partnering with Wisconsin utilities

DLC Controls Summit
March 23, 2017
Networked Lighting Controls Pilot

Kyle Kichura, LC| Lighting Channel Manager

What is Focus on Energy?

- Focus on Energy is Wisconsin utilities' statewide program for energy efficiency and renewable energy

- Partnered with 108 utilities across Wisconsin to offer utility customers (business & residential) opportunities to save energy & money

- Overseen by the Public Service Commission of Wisconsin

Networked Lighting Controls (NLC)Pilot

- New pilot offering in 2017
  - Available for all Business Program customers
    - Agriculture, Schools and Government (AgSG)
    - Business Incentive Program (BIP)
    - Large Energy Users (LEU)
    - Small Business Program (SBP)

- Utilizes DesignLights Consortium's™ (DLC) new Networked Lighting Controls (NLC) Program
  - Controls QPL (16 systems as of 3/14/17)
  - Training materials
 - Unified incentive strategy - $/ft^2

NLC Pilot Incentive Offering

- $/ft^2 Incentive Design
  - $0.25/ft^2 (designed space) – lower lumen fixtures/higher fixture density applications
  - $0.125/ft^2 (designed space) – high lumen fixtures/low fixture density applications
  - 50% incentive paid upon project completion, 50% upon controls system commissioning

- Energy Monitoring Bonus (optional)
  - $0.05/ft^2 (designed space) for projects utilizing energy monitoring systems and sharing usage data with Focus on Energy

- Control incentives are in addition to fixture offerings if coupled with a fixture upgrade

- Pre-approval is required

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NLC Manufacturer Opportunity

- System Training
  - Utilizing manufacturer's reps as primary market delivery mechanism
  - Coordinate and co-promote trainings with their represented manufacturers
  - Compare systems, hands-on
  - Target contractors, distributors and specifiers
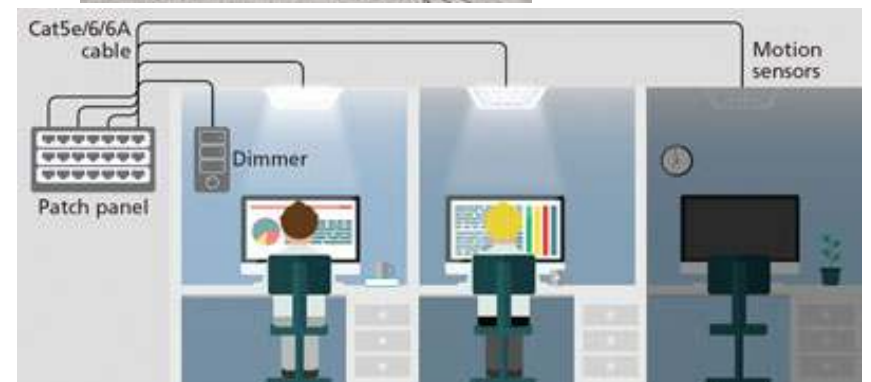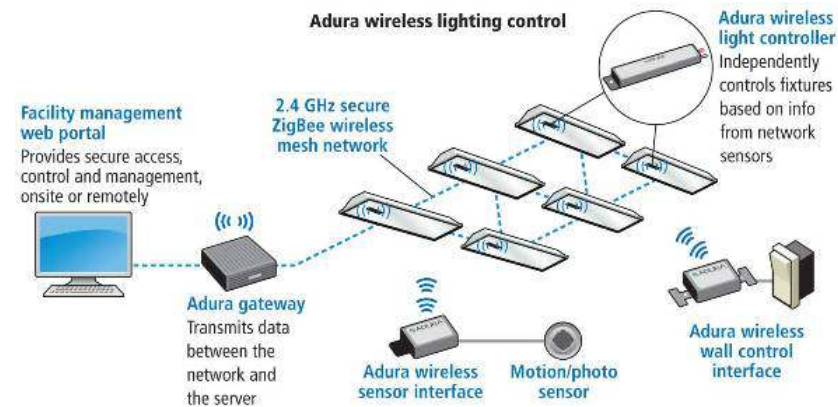
Images Courtesy of ledsmagazine.com and Philips

Questions?

Thank You!

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262.240.0672 x4113
kyle.kichura@focusonenergy.com

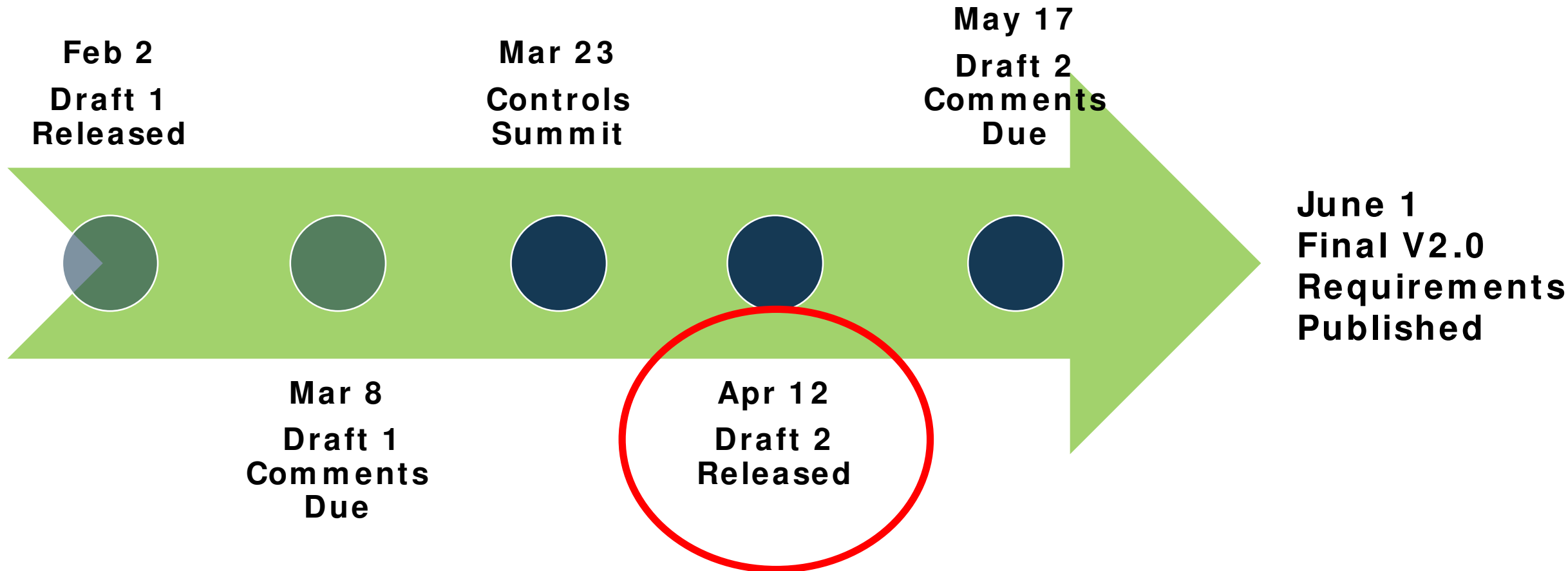focus on energy℠
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Wrap-up and Adjourn

Meeting Materials and Evaluations

Copy of Presentation and Evaluation Survey will be sent via email to all attendees next week.

Please complete the brief evaluation survey to help us improve.

2017 Revision Timeline

Feb 2
Draft 1
Released

Mar 23
Controls
Summit

May 17
Draft 2
Comments
Due

June 1
Final V2.0
Requirements
Published

Mar 8
Draft 1
Comments
Due

Apr 12
Draft 2
Released

197

You are invited!

Registration Opens End of March

Why You Should Attend

1. Help Shape the Future of SSL and NLC Technology

2. Interact with Stakeholders from across the Industry

3. Meet DLC members from across the country

4. Attend workshops and CEU courses

5. Participate in Structured Networking

6. Participate in Discussion Sessions

7. Attend Networking Receptions

**For more information & sponsorship opportunities,
visit www.designlights.org or contact Fritzi Pieper fpieper@designlights.org**

Thank you!

Hosted by: Georgia Power