Integrated Systems Coordinating Committee

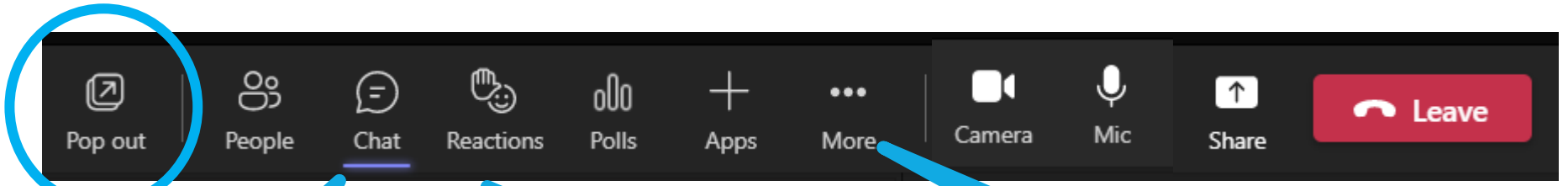
Q2 2024 Meeting

Day 1
Wednesday, May 22, 2024
12:30pm, Pacific Time




This meeting will be recorded and transcribed

Tools for Today: Engaging on Teams

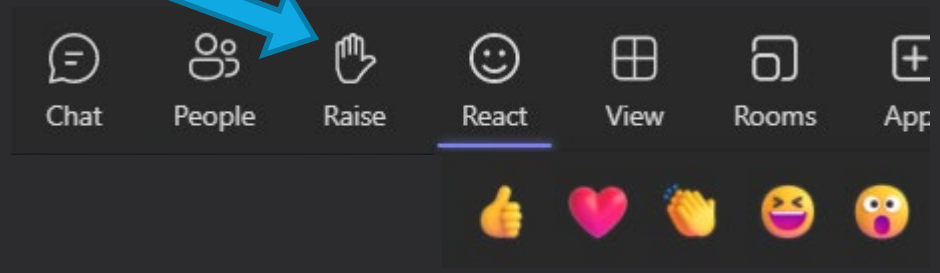


The chat is not captured in the recording.

Do you have any accessibility challenges with this technology today?

Comments/Questions?

Please raise your virtual hand or chime in Chat & reactions also welcome



"…" More includes:

- ✓ Settings: mic & video
- ✓ Background effects

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Heads up:

“Spotlighting” Speakers

Collective Role – Working Together

- Share your organization's activities
- Come prepared to actively participate
- Be transparent
- Identify any potential conflicts/challenges
- Flag any potential opportunities to leverage
- Be present in the conversation and stay flexible

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AGENDA

(All Times Pacific)

12:30 -1:00 pm (30 mins)	**Welcome, Agenda, Packet Review & Introductions**
1:00- 1:45 pm (45 mins)	**Regional Priority Topic** • **Extended Motor Products – Pumps 101**
1:45 – 1:55 pm	***BREAK***
1:55-3:15 pm (80 mins)	**Regional Roundtable**
3:15 – 3:25 pm	***BREAK***
3:25 – 3:45 pm (20 mins)	**Coordinating Committee Assessment**
3:45 – 3:55 pm (10 mins)	**Recap, Next Steps, Adjourn**

Introductions

- **Name**
- **Organization**
- ***And…***

xx

Packet Review & Informational Updates

- Tier 1: Agenda Items
  - ✓ *Extended Motor Products (XMP) Pumps 101 (pg. 5)*
  - ✓ *Coordinating Committee Assessment (pg. 6-7)*
  - ✓ *Luminaire Level Lighting Control Takeaway from LLLC Projects (pg. 8)*
  - ✓ *Q3 Regional Priority Topic Check In – Efficient Fans 101 (pg. 9)*
- Program Activity Reports
  - ✓ *High-Performance HVAC (pg. 12-15)*
  - ✓ *Luminaire Level Lighting Control (pg. 16-21)*
  - ✓ *Extended Motor Products Pumps & Circulators (pg. 22-25)*
  - ✓ *Efficient Fans (pg. 26-29)*
  - ✓ *Better Bricks (pg. 30-33)*
- Tier 3: Additional Resources *(links on pg. 3)*

  Committee materials (charters & recent meeting resources, functional newsletters (Market Research & Eval, Emerg Tech, Codes + Standards + New Construction)

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Pumps 101

Warren Fish

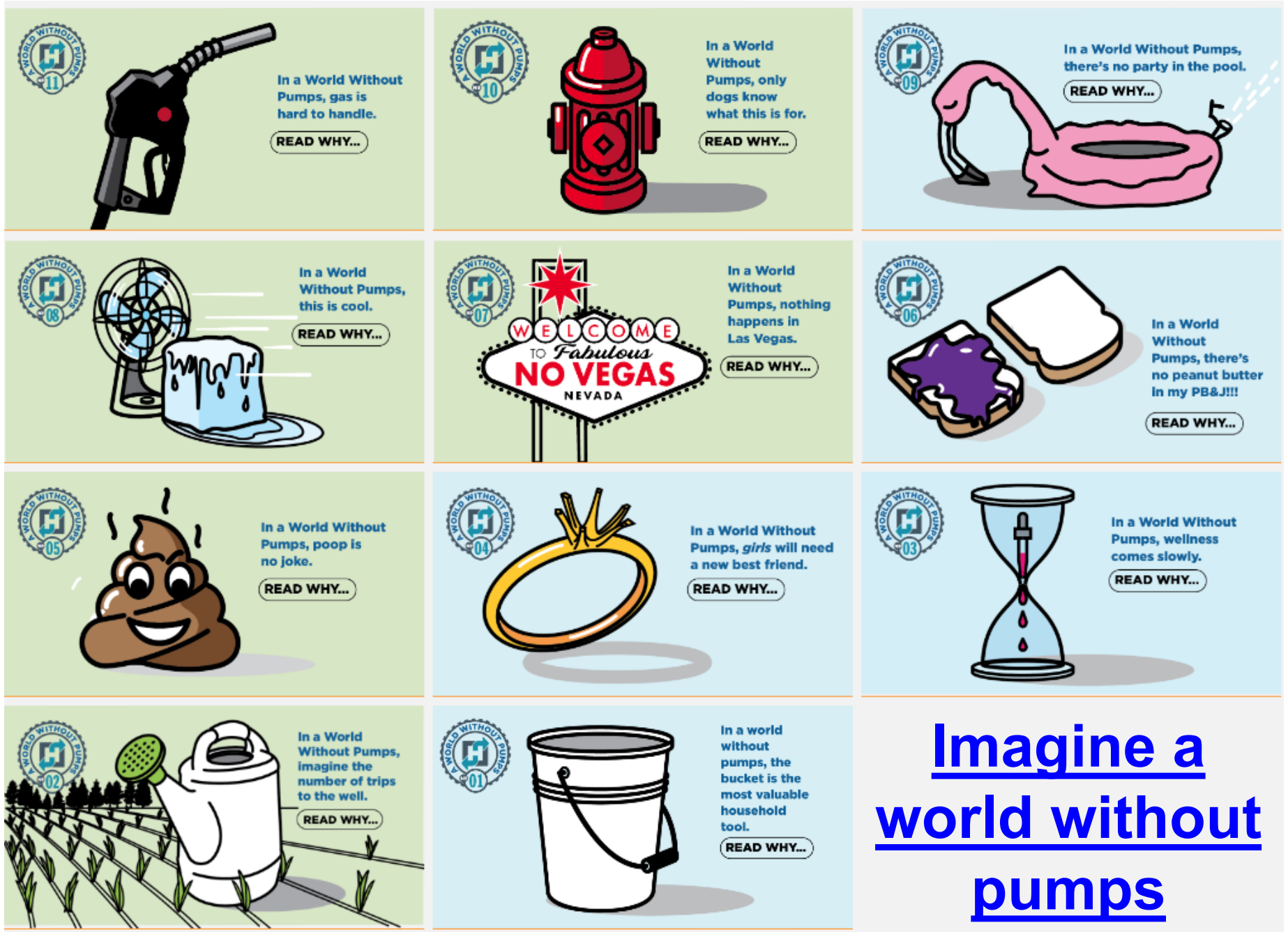
Program Manager, NEEA

Integrated Systems Coordinating Committee (ISCC)
May 22nd, 2024

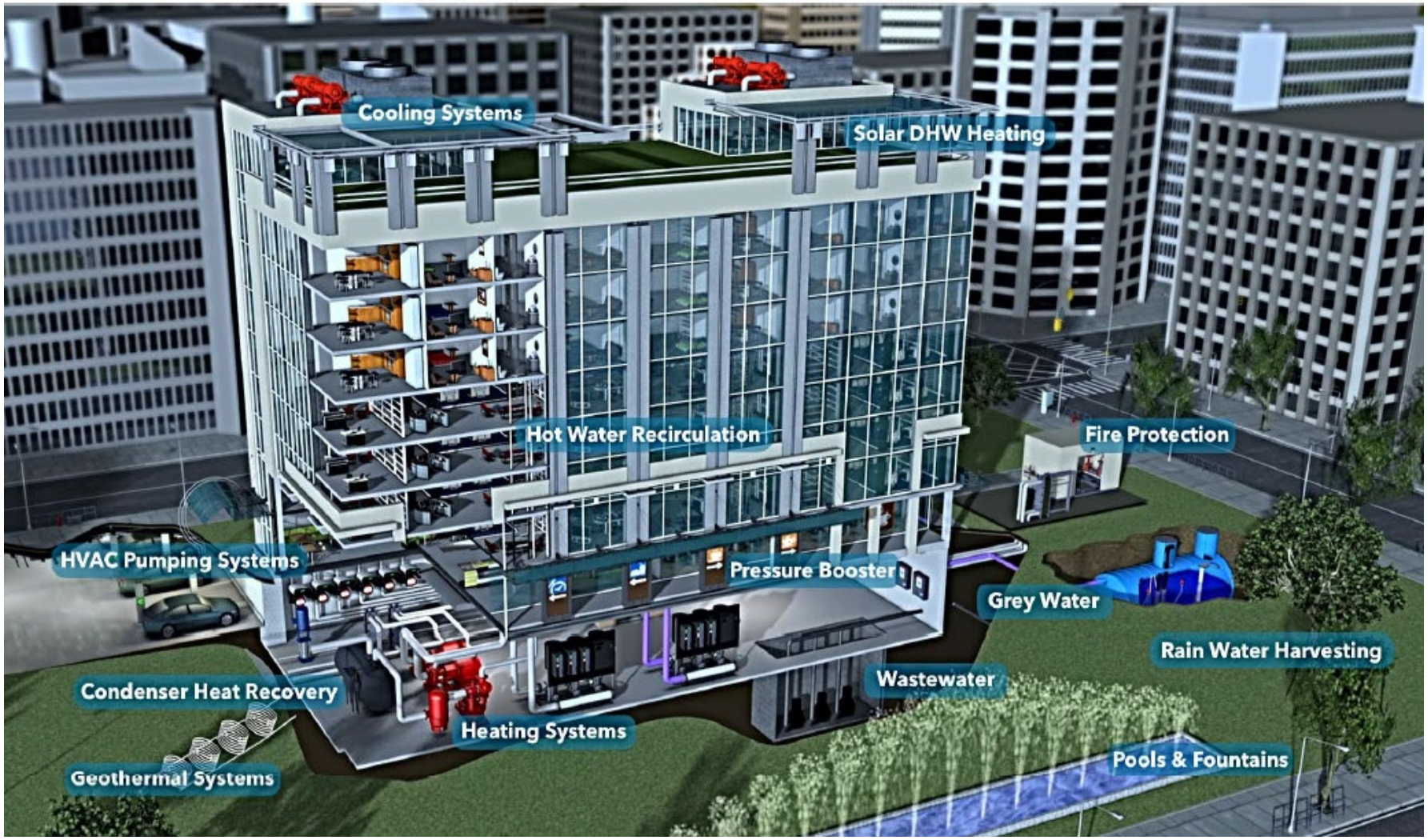
CLASSIFICATION LEVEL: PUBLIC

Agenda

1. Pump Basics
2. Pump Efficiency and Energy Ratings
3. Smart Pumps
4. Discussion



Commercial Buildings



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Municipal Water

13

Industrial Applications

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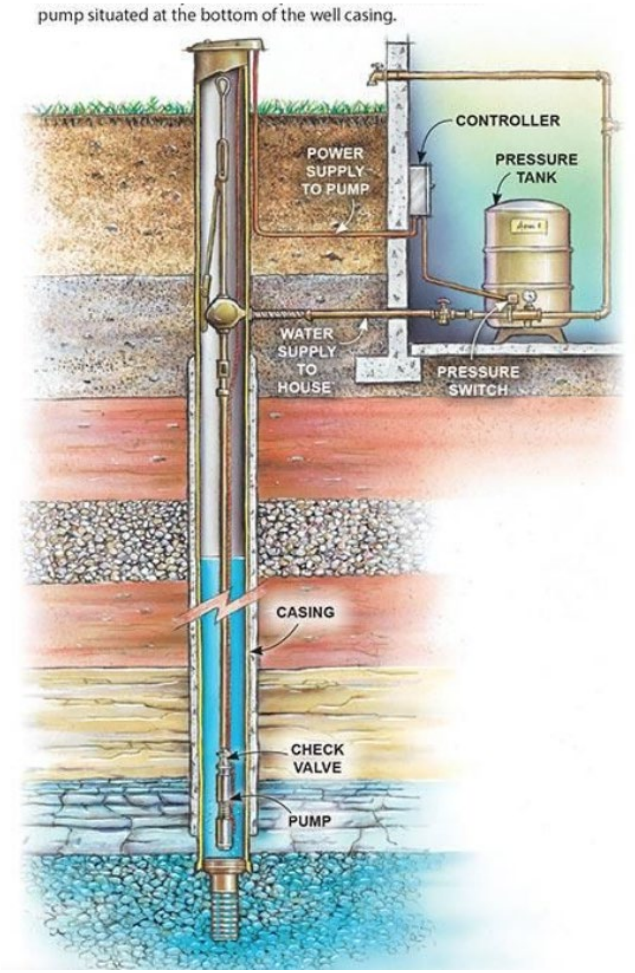
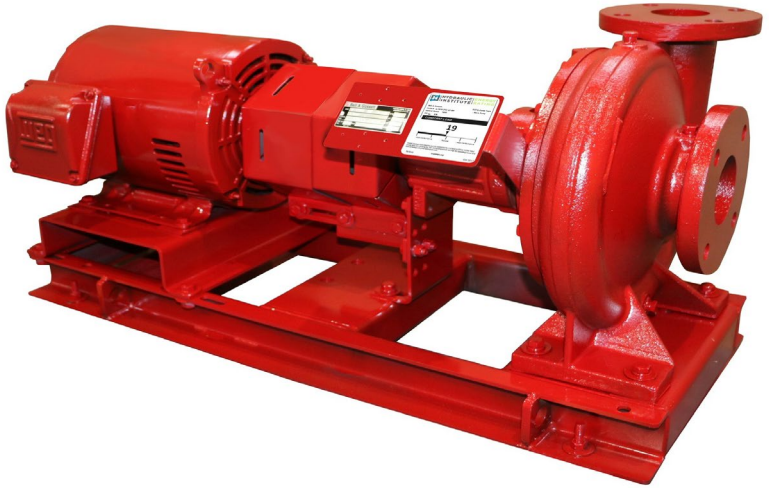
Agriculture Irrigation



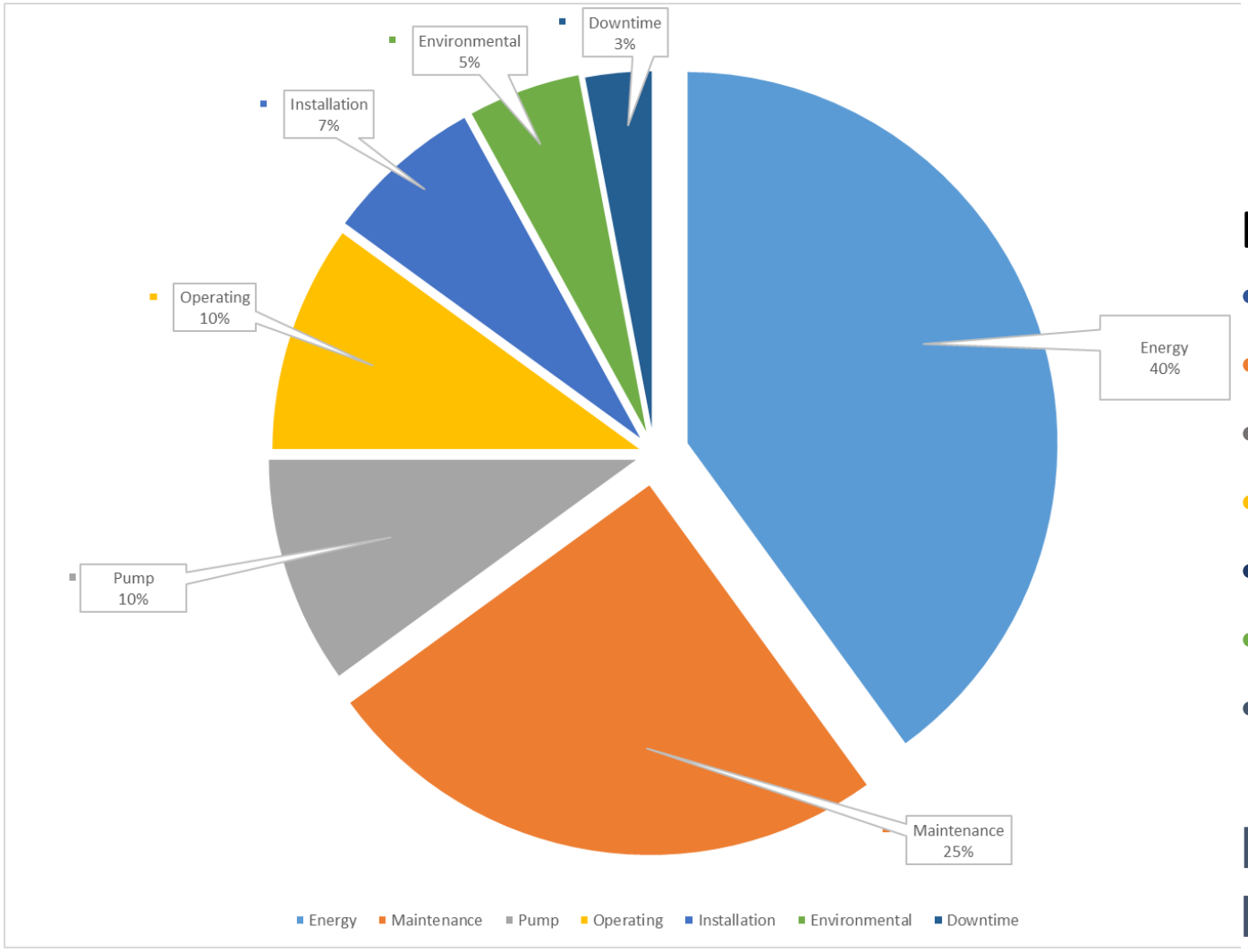
What Do Clean Water Pumps Look Like?



Pumps & Energy

- Industrial and commercial three-phase **motor systems** greater than or equal to 1 horsepower (hp) consume ~1,079 terawatt-hours (TWh)/year,
  - **Motor systems = 29 percent** of the total US electric grid load
  - **$166 billion**/year in total electricity costs
- 246 aMW Technical Potential in the 2021 **Power Plan** for pumps
- 30 to 55 aMW of 20-year savings potential in the current program scope **NEEA ACE Model** for XMP (eXtended Motor Products)

Life Cycle Cost of Typical Pumping System



Energy & Maintenance is 65% of Life Cycle Cost

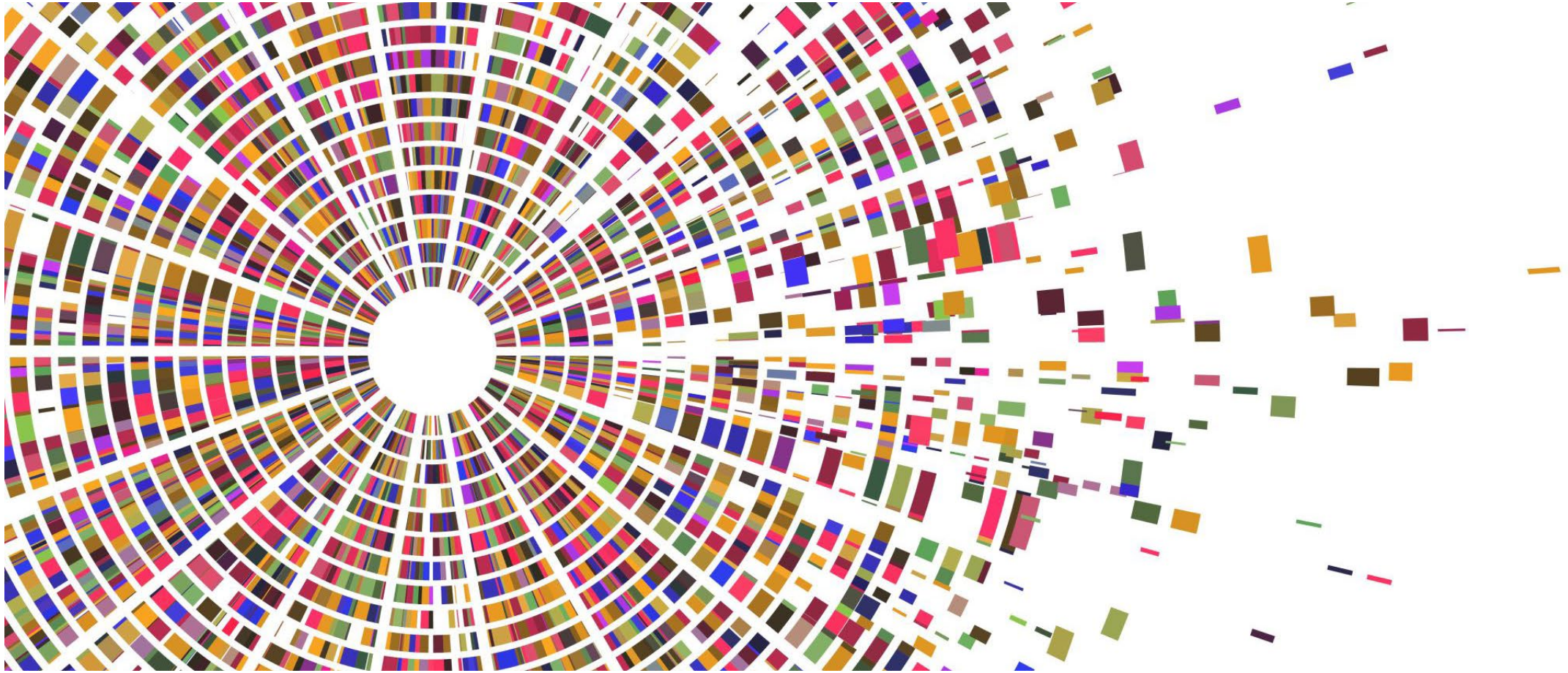
Elements of the LCC

- Energy – 40 %
- Maintenance – 25%
- Initial Purchase – 10%
- Operating – 10%
- Installation & Commissioning – 7%
- Environmental cost - 5%
- Downtime, Loss of Production – 3%

Focusing on initial cost misses the big picture

Recap

Pump Energy Efficiency



Pumps have multiple pathways to be efficient

Hydraulic Efficiency

- Better pump design allows for more efficient fluid conveyance
- Less room for improvement

Motor Efficiency

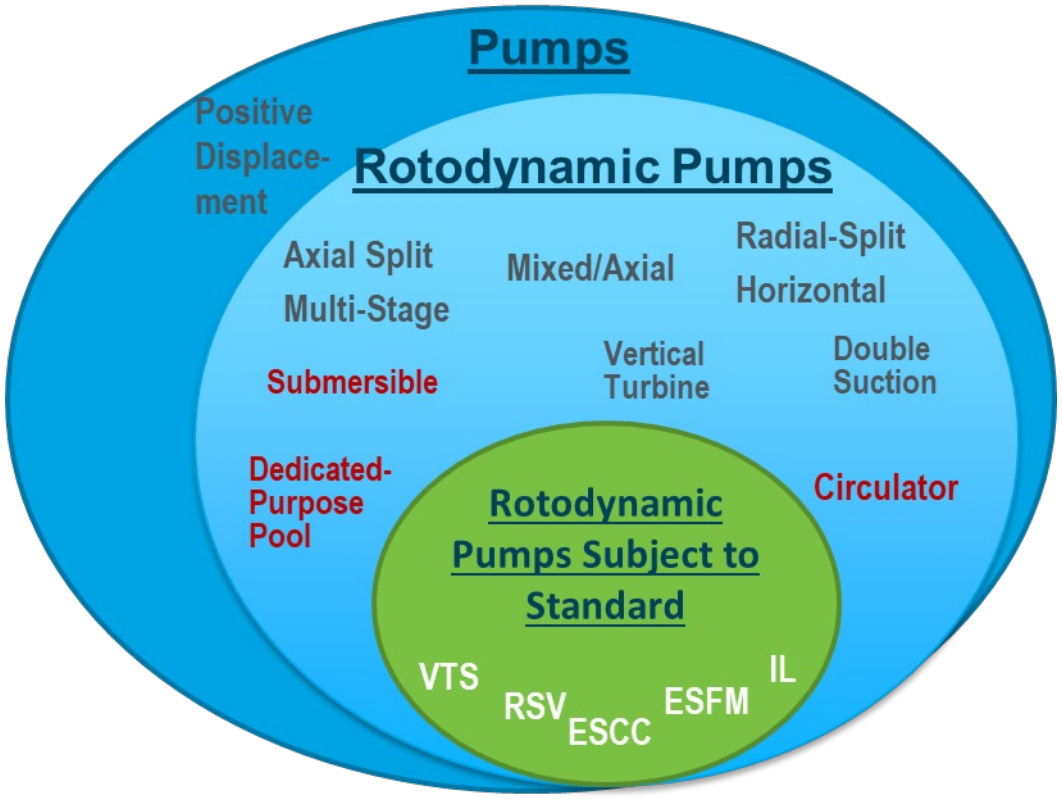
- Efficient motors reduce energy loss
- What about an Electronically Commutated Motor (ECM)?

Variable Frequency Drive

- Slows pump speed to meet load
- Smart pumps do not need sensors adjust to changing load
- Biggest savings opportunity

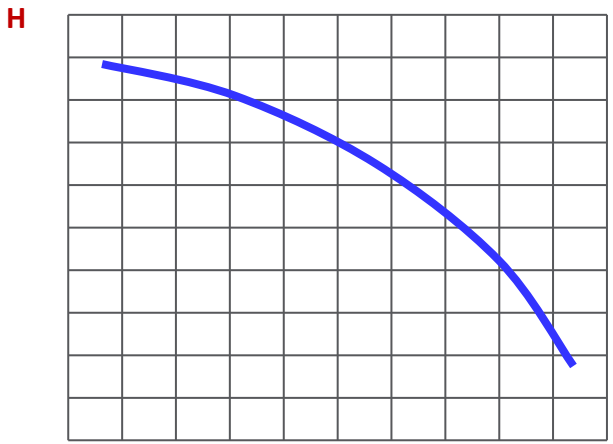
Federal Standard – Commercial and Industrial Pumps

- Effective January 27, 2020
- The “general pump” energy conservation standards and test procedure covers (in green):
  - 5 specific pump styles:
    - End-suction close-coupled (ESCC)
    - End-suction frame mounted/own bearings (ESFM)
    - In-line (IL)
    - Radially split, multi-stage, vertical, in-line, diffuser casing (RSV)
    - Submersible turbine (ST) pumps
  - “Clean water pumps,” except fire pumps, self-priming pumps, prime-assist pumps, magnet driven pumps, nuclear pumps, and MIL SPEC pumps; and
  - Meet several other flow, head, temperature, speed, and bowl diameter characteristics.
  - Size range of 1 to 200 HP
  - NEEA’s focus is pumps from fractional HP to 50 HP

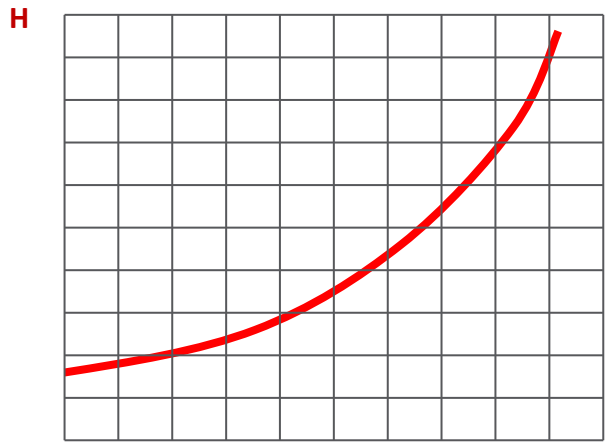


The RTF measure scope is the same as the federal standard.

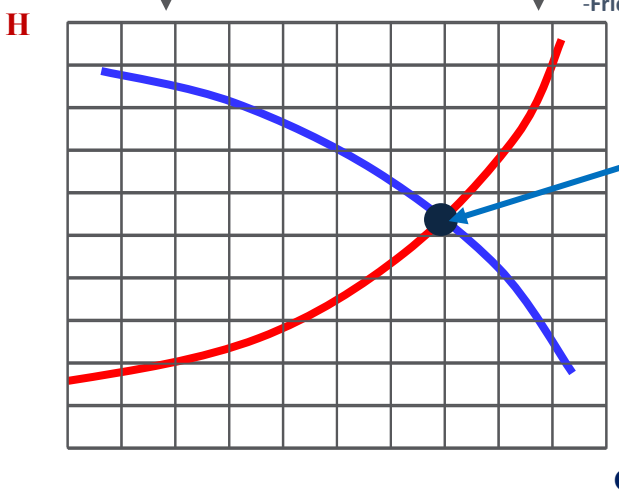
Pump and System Curves



Pump Curve
-Speed
-Impeller Dia.



System Curve
-Static Head
-Friction

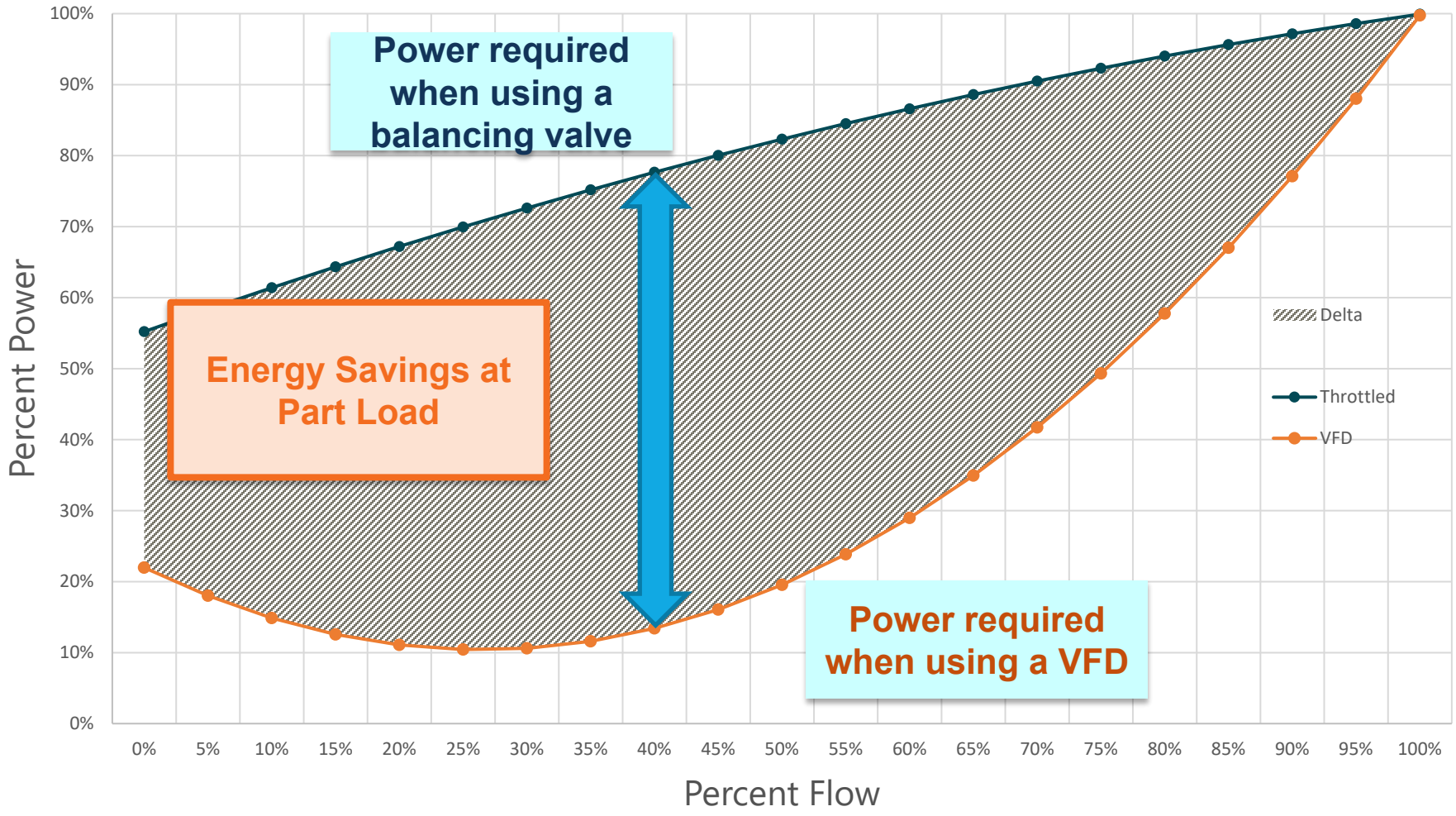


H = Head
Q = Flow
● = operating point

For fixed speed pumps, the operating point is located at the intersection of the pump and system curves.

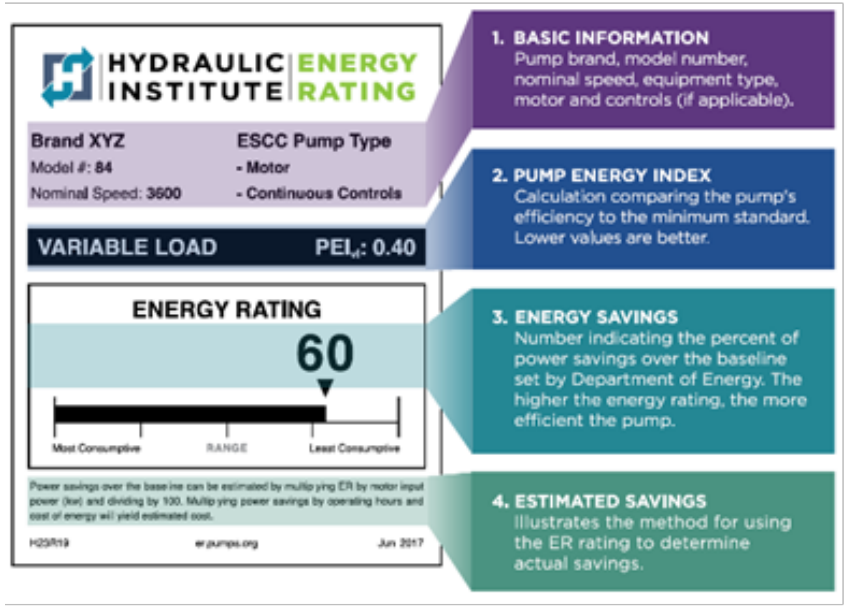
Speed Control is More Efficient than Valves

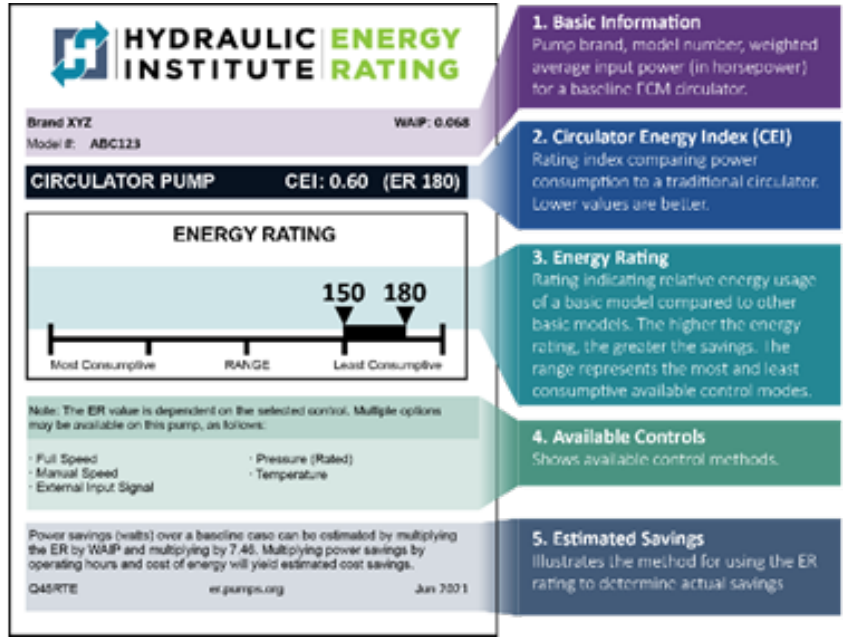
At 75% flow, 43% input power reduction



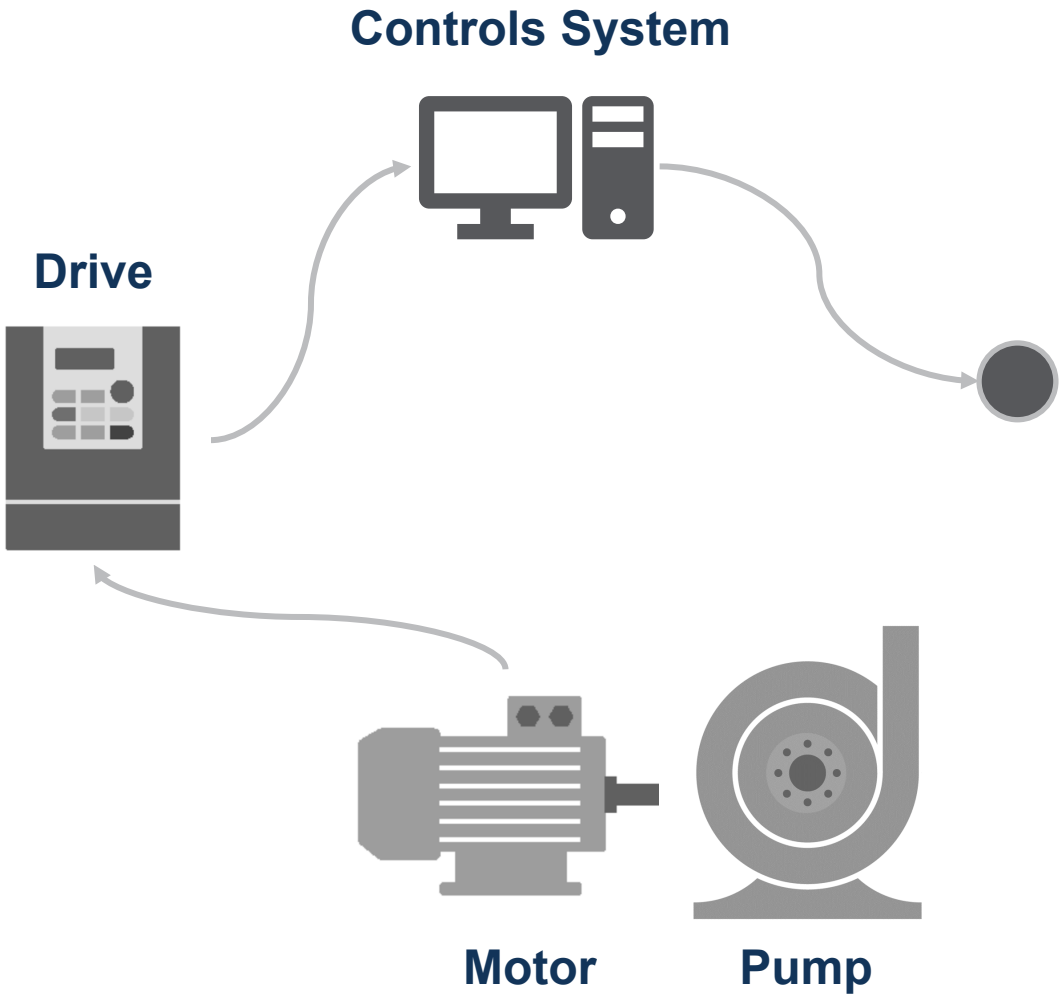
Energy Rating (ER) Label

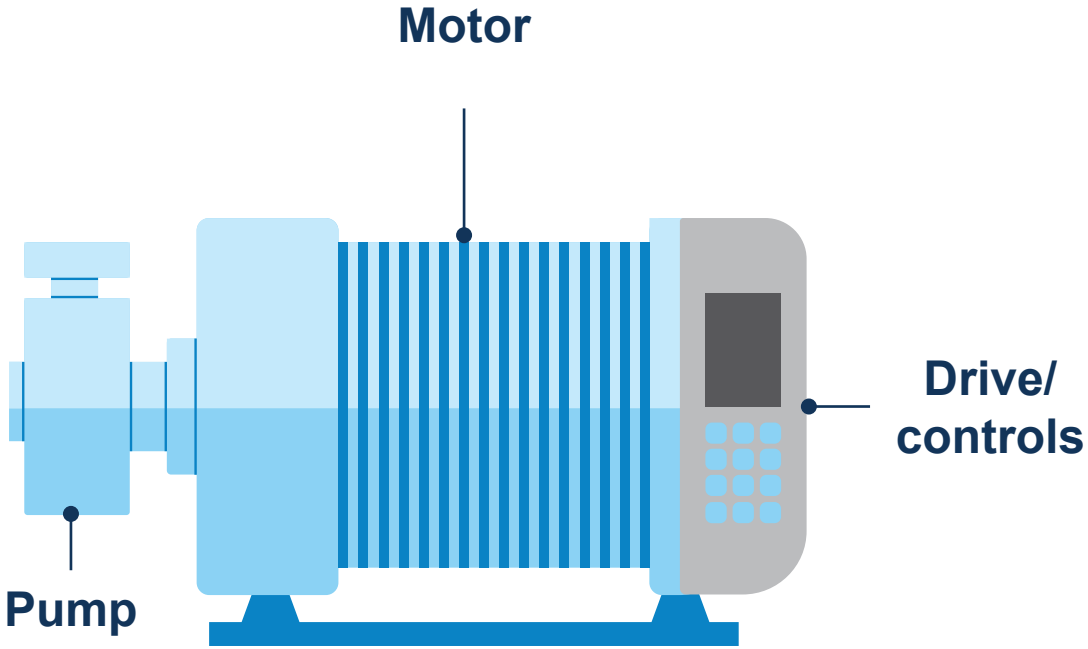
- ER Label = comparison tool similar to ENERGY STAR
- Efficiency % savings above baseline
- Use to estimate savings
- Choose pumps with higher ER values
- Found on pumps & circulators



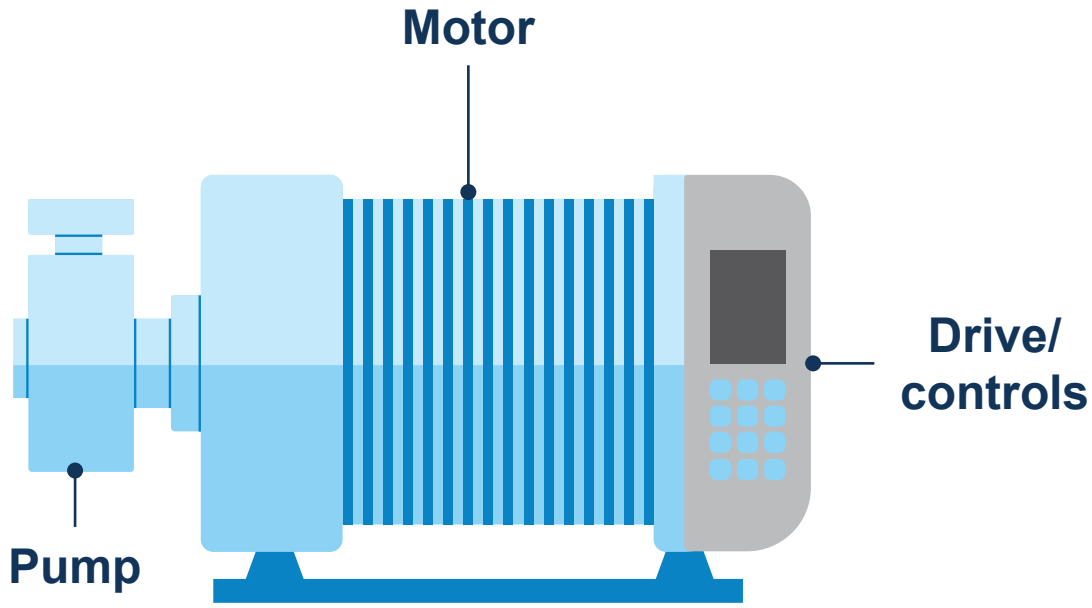


Pump + VFD vs Smart Pump





What makes a Smart Pump so smart?



- Integrated variable speed controls
- Mapped performance curve for optimum efficiency
- Allows the pump to automatically optimize to the required load
- Aka “Sensorless” or “self-sensing”
- Includes flow “measurement”

Availability

Sizes	Fractional up to several hundred hp
Pump type	• In-line • End-suction • Horizontal and vertical multi-stage
Configuration	• Single • Duplex • Multi-pump skids
Motor types	• Induction • ECM (electronically commutated motor) • Synchronous reluctance

Grundfos:
Hydro MPC HVAC

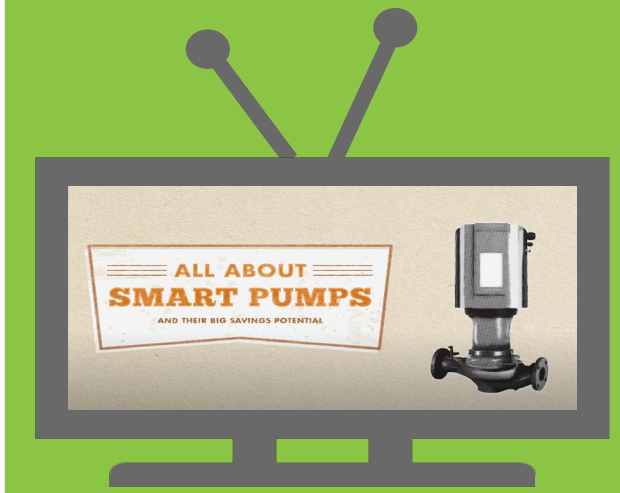
Taco:
Self-sensing

Armstrong:
Design Envelope

B&G:
e-1510

Smart Pumps: more than VFD

- Pump-specific performance maps allow the pump to self-optimize
- Integrated VFD programmed with pump-specific control algorithms
- Doesn’t require downstream sensors
- Doesn’t require a controls contractor
- Adaptive control capabilities
- “Fewer cooks in the kitchen” = more likely to succeed
- Electronic balancing saves set-up time



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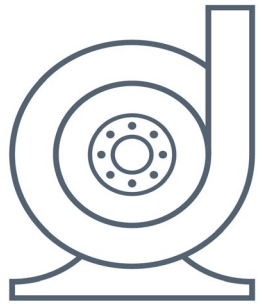
Installation Benefits for Smart Pumps

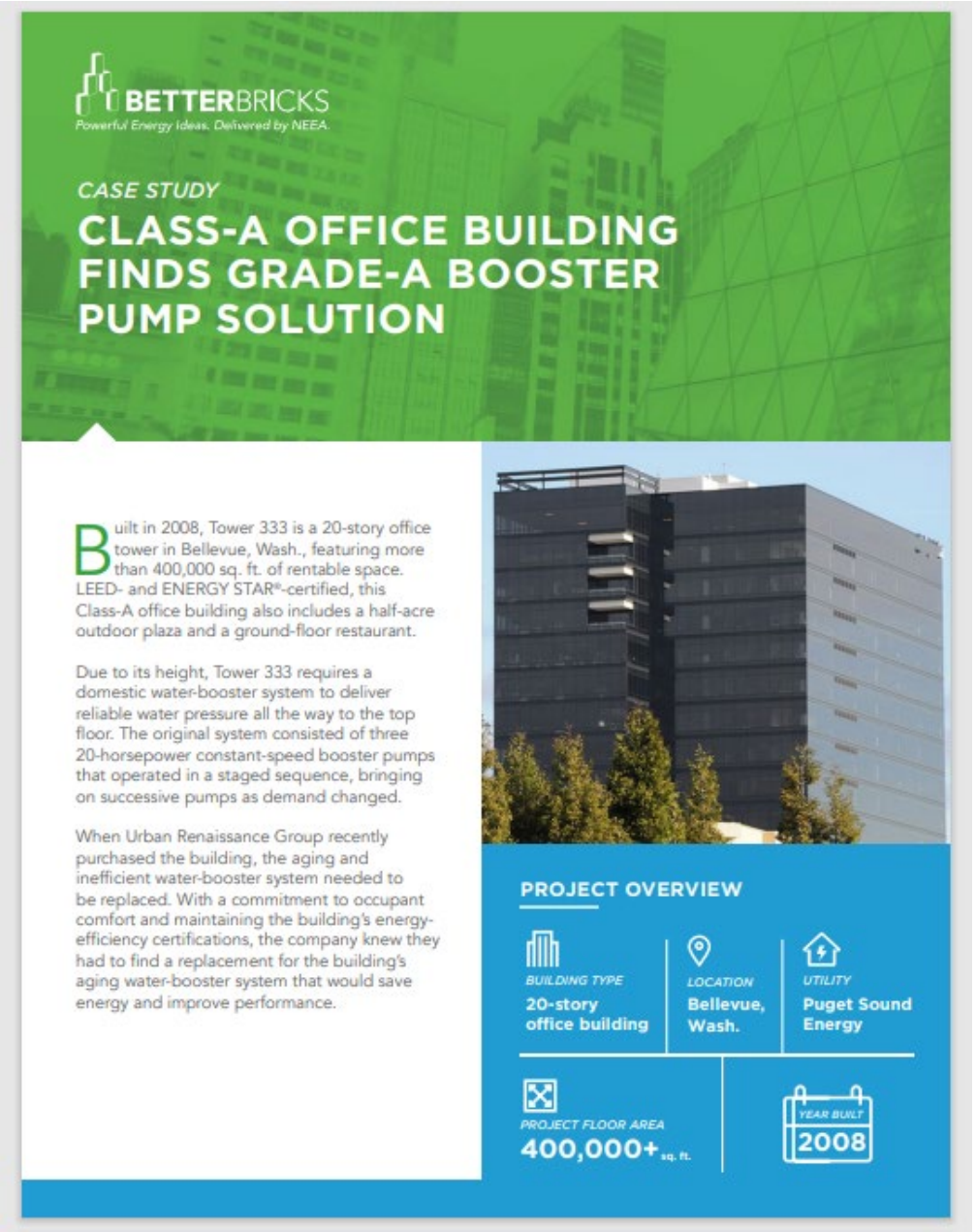
Installation Step	Benefits
Mechanical Installation	•Integrated motor does not require separate installation •**Aligning the motor and pump shaft can be time consuming**
Electrical Installation	•**You don't have to install or wire the VFD** •Reduces wall space requirements, conduit, etc
Programming	•Pressure sensors not required (for simple applications) •**Control logic is much simpler – most smart pumps arrive pre-programmed for head and flow requirements** •Smart pumps can easily be reprogrammed to actual system curve
Commissioning and Balancing	•**Smart pumps are programed with self-balancing capabilities**



Barriers to Efficiency

- Lack of awareness/acceptance of the benefits of the most efficient option
- Lack of differentiation
- Like-for-like replacement & lowest first cost

Case Study



https://betterbricks.com/case-studies/class-a-office-building-finds-grade-a-booster-pump-solution

Case Study

NOISY, POORLY CONTROLLED AND OVERSIZED CONSTANT-SPEED PUMPS

Urban Renaissance Group's chief facilities engineer, Kidron Cobb, encountered a variety of issues caused by the original booster pumps, including:

- **Noise**: The basement-located pumps were so loud, they continually interrupted occupants of the conference room above.
- **Waste**: The flow of water was controlled by throttling valves, a common but wasteful control strategy in which the pumps always operate at full speed, rather than operating in proportion to demand.
- **Maintenance demands**: Due to their size and constant speed, the system created a pressure surge—also known as a water hammer—throughout the facility's piping whenever a pump was shut down. This water hammer effect caused frequent maintenance demands to replace the failed system components and rebuild the pumps.

SMART PUMPS REDUCE NOISE, WASTE AND MAINTENANCE NEEDS

After doing some research and consulting with Hurley Engineering, Cobb found his answer: a Grundfos HYDRO MPC-E smart-pump booster skid. Featuring four 5-horsepower Grundfos CRE pumps, the new skid is powered by highly efficient electronically commutated motors (ECMs). These variable-speed ECMs readily allow the system to meet fluctuating demand and, as a result, save energy.

The new smart-pump booster skid includes integrated sensors and smart controls that are performance-mapped to the specific operating characteristics of the pumps. The smart controls constantly analyze demand to determine when the pumps should turn on, and at what speed. The booster pumps no longer slam on and off, which eliminates noisy disturbances and prevents damage to plumbing components. And since smart pumps don't use throttling valves, this solution also saves energy improves system reliability, and reduces unnecessary pressure in the system.

Smart Pumps

More than just a drive, smart pumps feature advanced software and integrated, performance-mapped controls that operate the pump at peak efficiency without requiring pressure sensors in the system. On multi-pump systems, the software will run the most efficient combination of pumps to meet the load. And since the controls are built directly on the pump, installation costs are lower than those of a wall-mounted drive.

Existing System:

- *(3) 20-horsepower single-speed booster pumps*

New System:

- *(4) 5-horsepower variable-speed booster pumps*
- *Highly efficient ECMs*
- *Smart pump integrated controls*
- *Pumps can operate in lead/lag or staged*
- *Controls will duty-cycle all four pumps to wear equally*

Case Study: Smart Circulators Provide Convenience and Savings for Bellwether Housing

Seattle City Light

BEFORE

Four DHW Recirculation Loops served by a single speed circulator with an inefficient motor pulling 88 watts continuously 24 hours a day 7 days a week

AFTER

All four circulators were replaced with smart circulators equipped with ECMs and Advanced Speed controls, resulting in a 90% decrease in power consumption. Additional savings occur from the reduced demand placed on water heaters and boilers

MORE INFO

Unique Opportunities

- Federal Standards (pumps & circulators) – new metrics + Energy Rating label
- Leverage Point: Midstream
  - Pump suppliers – 8 participating reps
  - Specifiers, pump decision makers, demand side
- New technology – Smart Pumps
  - Non-energy benefits (install faster/cheaper; self-sensing; auto-balancing; connect to a smart phone)
- RTF measures

Resources

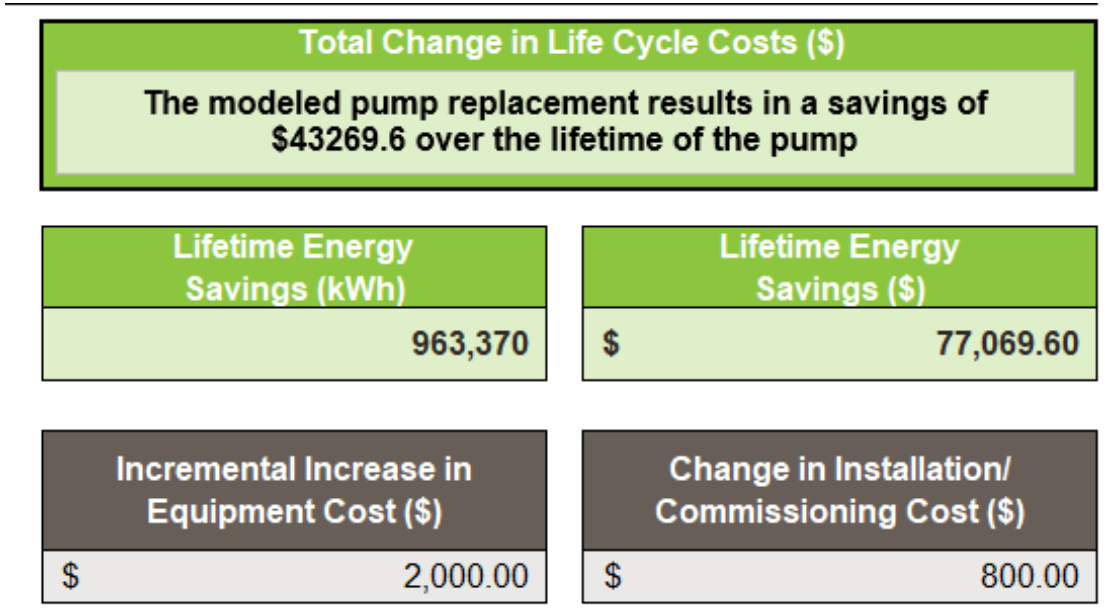
HYDRAULIC INSTITUTE

BETTERBRICKS
Powerful Energy Ideas. Delivered by NEEA.

- Trainings
- Webinars (Live & On-Demand)
- Pump Savings Calculator
- Circulator Savings Calculator
- Pump System Assessment Professional (PSAP) Certification
- Motor & VFD Courses
- Videos
- Smart Pump Fact Sheets
- Engineering Data Library
- https://betterbricks.com/solutions/pumps-motors

Hydraulic Institute Lifecycle Cost Calculator

- **Calculate total cost of ownership and compare between models**
- **Accounts for variables such as:**
  - Speed control
  - Efficiency
  - Equipment cost and installation
  - Maintenance
  - Other costs



Total Change in Life Cycle Costs ($)
The modeled pump replacement results in a savings of $43269.6 over the lifetime of the pump

Lifetime Energy Savings (kWh)	Lifetime Energy Savings ($)
963,370	$ 77,069.60

Incremental Increase in Equipment Cost ($)	Change in Installation/ Commissioning Cost ($)
$ 2,000.00	$ 800.00

Extended Motor Products (XMP) Program at a Glance

*The XMP program is influencing the pump market with **equipment incentives, bonuses, and program support** for **market outreach and education.***

XMP Program

Energy Efficient Motor-Driven Products

- **Scope:**
  - Pumps and Circulators
    - Cleanwater
    - Fractional to 50 HP
- **NEEA's XMP Activities:**
  - Midstream/Upstream market influence
  - Reducing market barriers
  - Developed efficiency labeling (with industry groups)
  - Marketing, education, and awareness building
  - Demonstrating all the benefits of Smart Pumps

2023 XMP Program Highlights

65 distributor outreach events.

4,124 MWh annual energy savings, enough to power over **343 NW homes**.

1,378 qualified pumps.

6,293 qualified circulators.

Reached **522** individuals involved with specifying or installing HVAC pumps.

$612,722 paid in pump incentives and bonuses.

$50,540 in support of training, marketing, and outreach.

Local Utility Activities

- Education, awareness building, and regional coordination
- Custom project incentive opportunities
- System optimization beyond equipment upgrades
- RTF UES measure set for pumps (proven status)
- Adding a drive, even for constant load systems

Key Takeaways

- NEEA is working on multiple fronts to transform the market for pumps
- The XMP program gathers useful market data to support analysis of the pump market
- NEEA has identified Smart Pumps as an important market transformation opportunity

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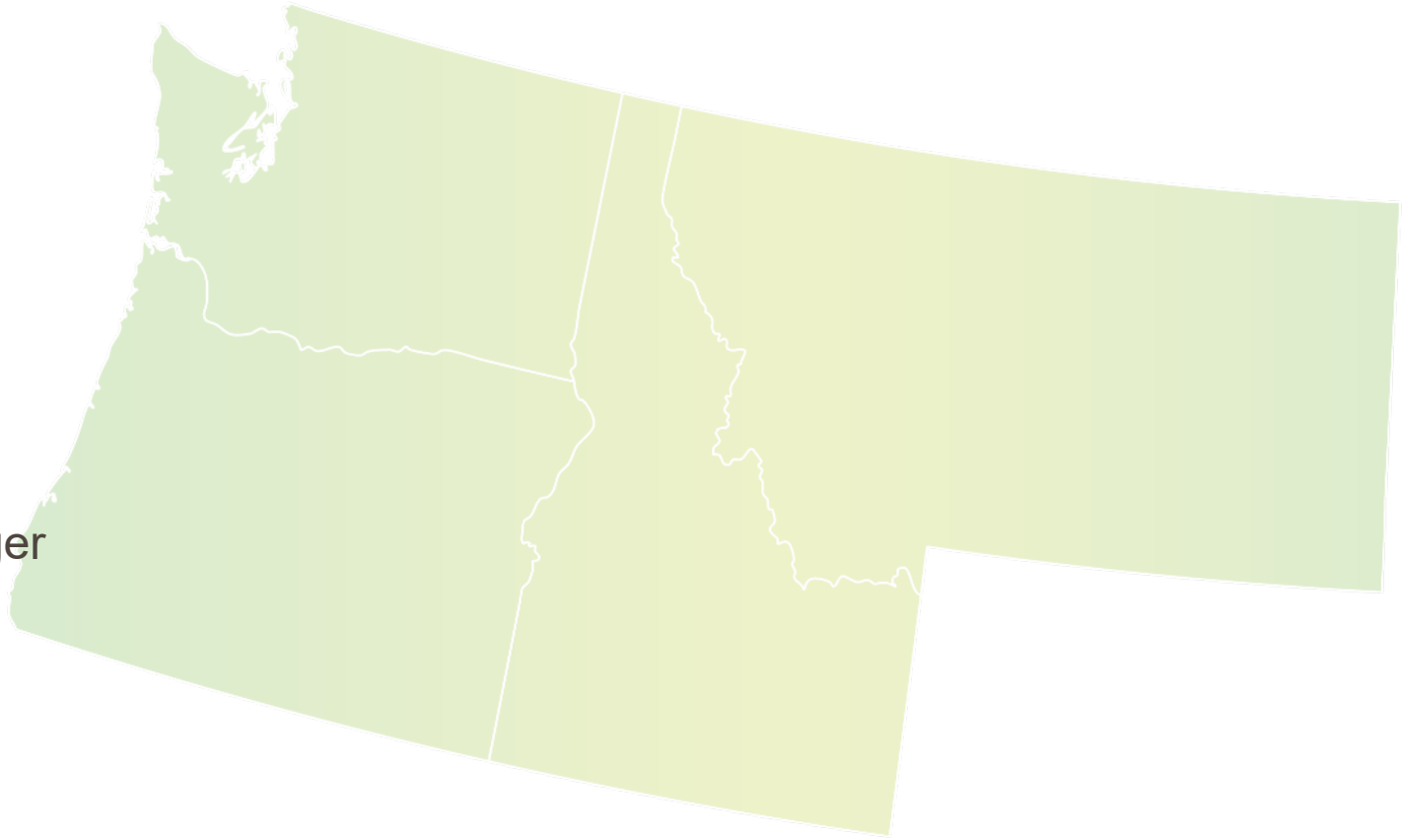
Discussion

Thank You!



Warren Fish, NEEA Program Manager
wfish@neea.org

(Reference Slides for Pumps 101)

Circulator Pumps & Energy Savings

How Does a Circulator Save Energy?

- Efficient circulator options are prevalent in the market

EFFICIENT MOTORS

Application: HVAC and DHW

Efficient Electronically Commutated Motors (EC Motors or ECMs) require less power to do the same work, saving ~20% compared to traditional induction motors. They do not change the circulator's speed or operating hours

SPEED CONTROL

Application: HVAC

HVAC systems are designed for peak load days, but rarely require the full heating capacity. Advanced speed controls match the circulator's rotation to the load, reducing the motor power consumption significantly. A 25% reduction in rotating speed reduces power draw by more than **50%.**

REDUCE OPERATING TIME

Application: DHW

Like turning off a light when you leave a room, occupants don't need hot water available at the tap 24/7. Automatic controls limit operating time, saving energy both in the motor and at the water heater.

DHW Circulator Run-Hours Controls

Efficient DHW circulators have motor savings AND water heater savings

- **Savings Mechanisms**
  - Motor savings – reduced motor runtime
  - Water heater savings – less cold water returning to the tank

Residential DHW Operating Hours

Control Type	Run Hours per Year
None	8,760
On Demand	60
Temperature	3,900
Timer or Learning	4,380
Baseline	6,258

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Pumps RTF Measures

RTF Pump & Circulator Measures

Pumps

- Proven status
- Four sectors
  - Commercial
  - Industrial
  - Municipal
  - Agriculture
- Any application
- Constant speed or variable speed

Circulators

- Planning status
- Two sectors
  - Residential
  - Commercial
- Two applications
  - Hydronic heating (HH)
  - Domestic hot water (DHW)
- Efficiency cases
  - Speed control (in HH)
  - Run-hour control (in DHW)

Regional Technical Forum

RTF Pump Measures

Baseline and Efficient Speed Type

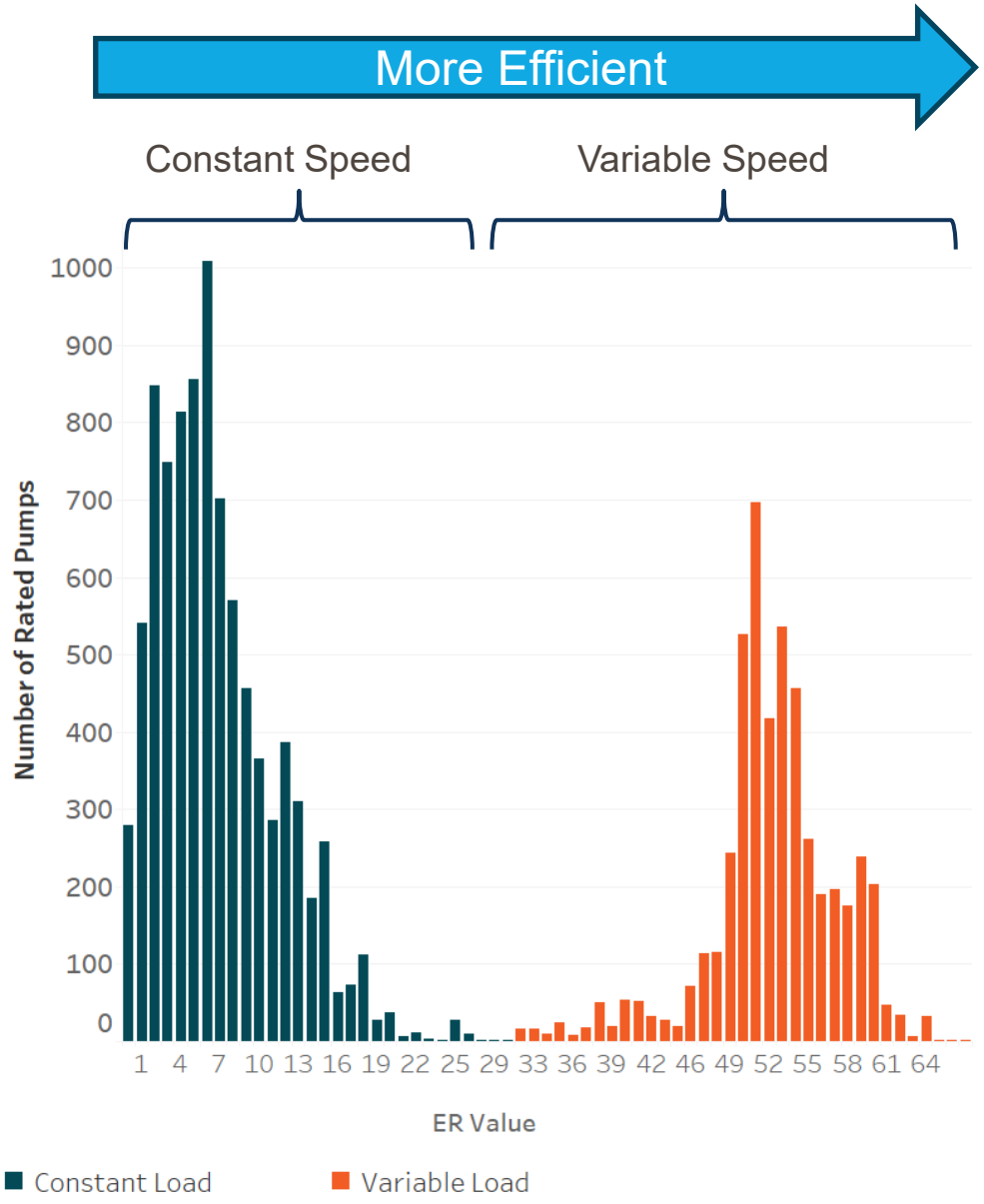
- CL → CL Drive not required, or unknown
- VL → VL Drive required by code or replacement

PEI Value

- Includes a range above the current practice baseline
- Equates to ER

Pump specs

- Class, speed of rotation, motor size, speed control, and efficiency rating above federal standard



RTF Measure Circulator Savings

Savings for smallest (1/40 HP) residential circulators

Application	Control	Water Heater Type	Savings (kwh/yr)
DHW Recirculation	On Demand	Electric Resistance	2,458
		Heat Pump Water Heater	1,163
		Gas	227
	Timer or Learning	Electric Resistance	947
		Heat Pump Water Heater	488
		Gas	151
	Temperature	Electric Resistance	475
		Heat Pump Water Heater	294
		Gas	157
Hydronic Heating	ECM w/ no speed controls	N/A	59
	ECM with speed controls	N/A	81

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Thank you!

Break!

Please return at 1:55pm PDT

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Committee Roundtable

Roundtable Focus

(NEEA PMs & ISCC members first)

- *Highlights since February*
- *Programmatic updates*
- *Organizational updates*

Please aim for 3-5 min max, thanks!

Break!

Please return at 3:25pm PDT

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Coordinating Committee (CC) Assessment

Alisyn Maggiora

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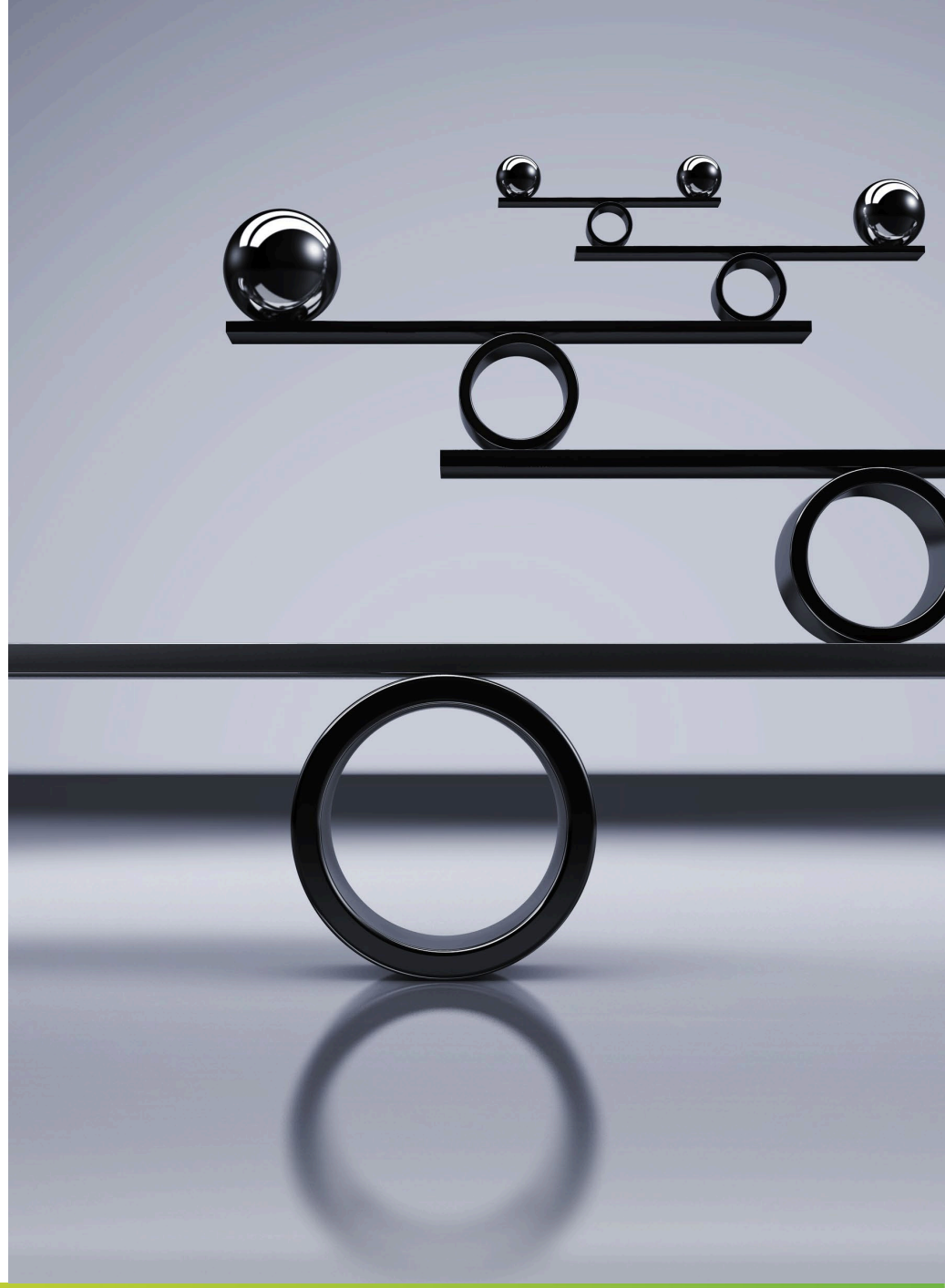
Sr. Stakeholder Relations Manager

NEEA



Memo: pg. 6-7

Coordinating Committee Assessment

Topic Agenda

1. *Ask of you Today*
2. *Context*
3. *Proposal Review*
4. *Next Steps*
5. *Poll & Discussion (initial feedback)*

 |

Ask of You Today

- Consider the proposed changes
- Offer initial feedback via poll and live discussion

Next Step

- Confirm your feedback w/ Anouksha (1:1s, email) by Aug 1

 |

CONTEXT:

Coordinating Committee (CC) Assessment

- **Focus areas:**
  - Structure, content flexibility, # of meetings
- **Goals:**
  - Identify areas for improvement and support transition to Cycle 7 (2025-29)
  - Ensure regional value delivery and effective resource allocation.
- **Next Steps:**
  - Q2: Scenario review, input gathering w/ CCs
  - Q3: Review w/ RPAC, confirm w/ CCs

Stakeholder Survey: *What we heard Re: CC improvements*

- Reduce meeting frequency
- Increase agenda flexibility
- At least 1 hybrid meeting/year
- Packet materials & notes
- Utility / sector alignment

Proposal

Continuous Improvement Efforts

Recent Improvements (2024):

Program Swap

- Pumps & Fans → ISCC
- Adv HPs & Windows → PCC

Increase Agenda Flexibility

- Regional Priority Topic check-in every quarter
- Dedicated ad-hoc topic time

Proposed Improvements (2025+):

Rename Committees w/ Sector

- Residential Coordinating Committee
- Commercial & Industrial “ “

3 Meetings a year

- Q1 & Q4: 2 half-day meetings (1 hybrid)
- Q2: 1 half-day webinar with program focused breakouts

Proposed changes in ***red font + highlight***

Proposed Schedule & Agendas

Q1 (Feb / Mar) ***Hybrid***	Q2 (May / June) Virtual	Q4 (Nov / Dec) Virtual
2-Half-Days: Agenda Day 1	**1-Half-Day Agenda**	**2-Half-Days: Agenda Day 1**
Welcome & Introductions	Welcome, Housekeeping, & Introductions	Welcome, Housekeeping, & Introductions
Regional Priority Topic	Break	Regional Priority Topic
Break	Regional Roundtable Updates	Break
Regional Priority Topic	Break	Round Table Updates
Break	Q4 Regional Topic check in	Break
	1 hour breakout sessions for program-specific coordination needs, ad-hoc topics, or regional/utility related topics	
2-Half-Days: Agenda Day 2		**2-Half-Days: Agenda Day 2**
Welcome & Housekeeping		Welcome
Regional Priority Topic		Ad hoc topic time
Break		Break
Round Table Updates		Annual planning
Ad hoc topic time		

Residential Coordinating Committee (RCC)
Commercial & Industrial Coordinating Committee (CICC)

The Takeaways:

- Lighten the load and increase flexibility
  - 3 meetings/year (summer break)
  - Incorporate “breakouts”
  - Balance convening w/ regional coordination

CC Assessment Next Steps

Time	Task
May/June	Discuss assessment insights and share proposed improvements with coordinating committees
June/July	Internal recommendation review/feedback; CC members discuss w/ Anouksha in 1:1s
August 22	Present proposal to RPAC for consultation and feedback
August/September	Share RPAC feedback; confirm final adjustments w/ coordinating committees
November/December	Share final proposed changes to implement in 2025 with RPAC

POLL

Select option 1 –OR– option 2

Select 3 as well if you'd like to discuss

1. Keep as is – 4 mtgs/year
2. Incorporate proposed improvements
   - 3 meetings / year
   - more flexibility in agenda
   - program-specific, simultaneous breakouts
3. Please contact me to discuss

Have other ideas for the group to consider?
- Pipe up
- Share in the chat
- Discuss 1:1

 |

Discussion

Thoughts?

Questions?

Ideas?

Thank you ISCC!

Alisyn Maggiora
amaggiora@neea.org

AGENDA

(All Times Pacific)

12:30 -1:00 pm (30 mins)	**Welcome, Agenda, Packet Review & Introductions**
1:00- 1:45 pm (45 mins)	**Regional Priority Topic** • **Extended Motor Products – Pumps 101**
1:45 – 1:55 pm	***BREAK***
1:55-3:15 pm (80 mins)	**Regional Roundtable**
3:15 – 3:25 pm	***BREAK***
3:25 – 3:45 pm (20 mins)	**Coordinating Committee Assessment**
3:45 – 3:55 pm (10 mins)	**Recap, Next Steps, Adjourn**

Action Items | Any Final Qs?

- Action Items

See you tomorrow ISCC!

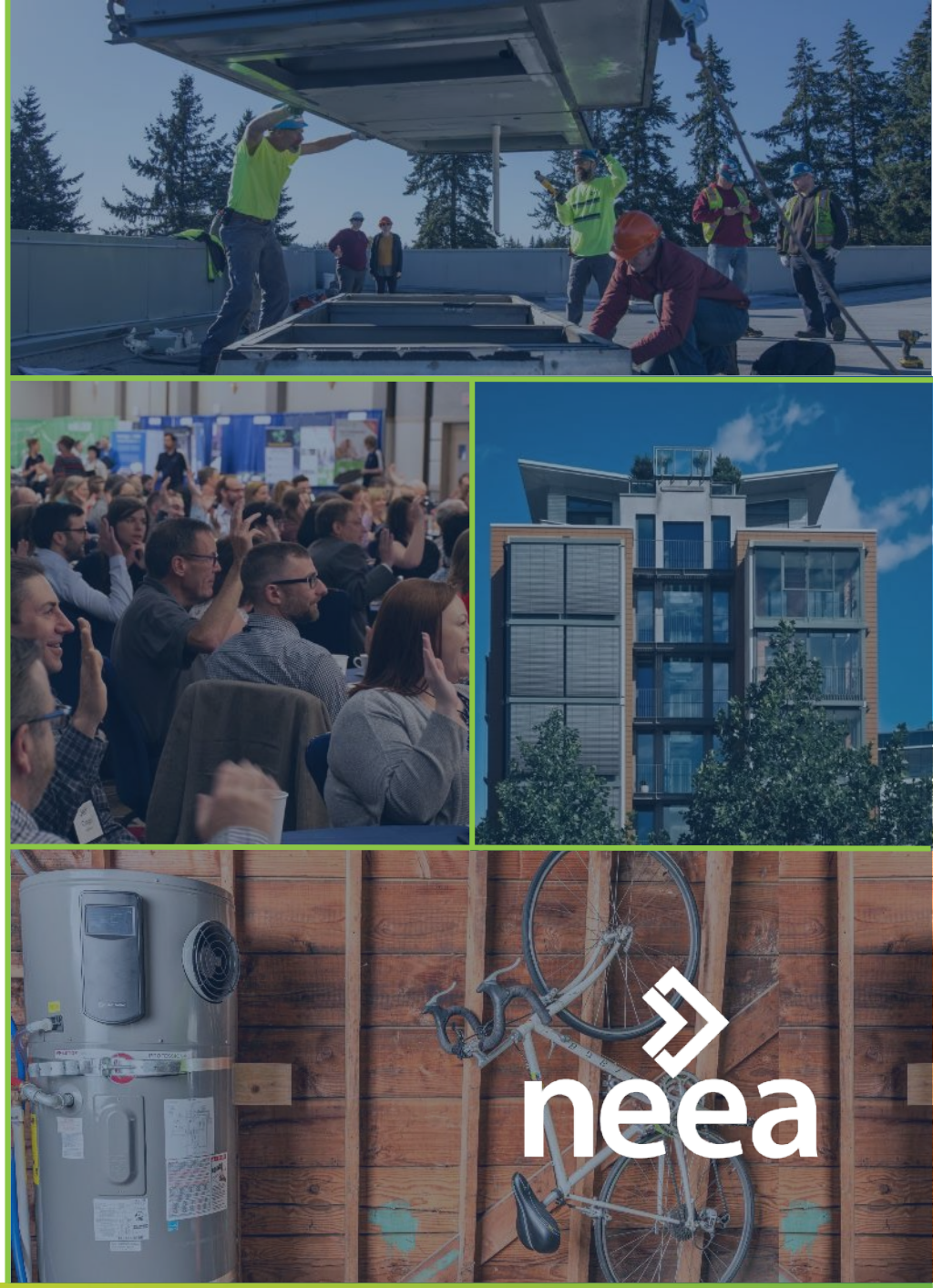
May 23, 2024
9:30 AM

neea

Integrated Systems Coordinating Committee

Q2 2024 Meeting

Day 2
Thursday, May 23, 2024
9:30am, Pacific Time



This meeting will be recorded and transcribed

WELCOME Back!

 |

AGENDA

(All Times Pacific)

9:30-9:45 am (15 mins)	**Welcome**
9:45- 11:15 am (90 mins)	**Regional Priority Topic** • **Luminaire Level Lighting Control- Takeaways from LLLC Projects**
11:15-11:25 am	***BREAK***
11:25– 11:35 am (10 mins)	**Q2 Topic Check In**
11:35-11:50 am (15 mins)	**Housekeeping**
11:50– 12:00 pm (10 mins)	**Recap, Next Steps, Adjourn**

Luminaire Level Lighting Control (LLLC)

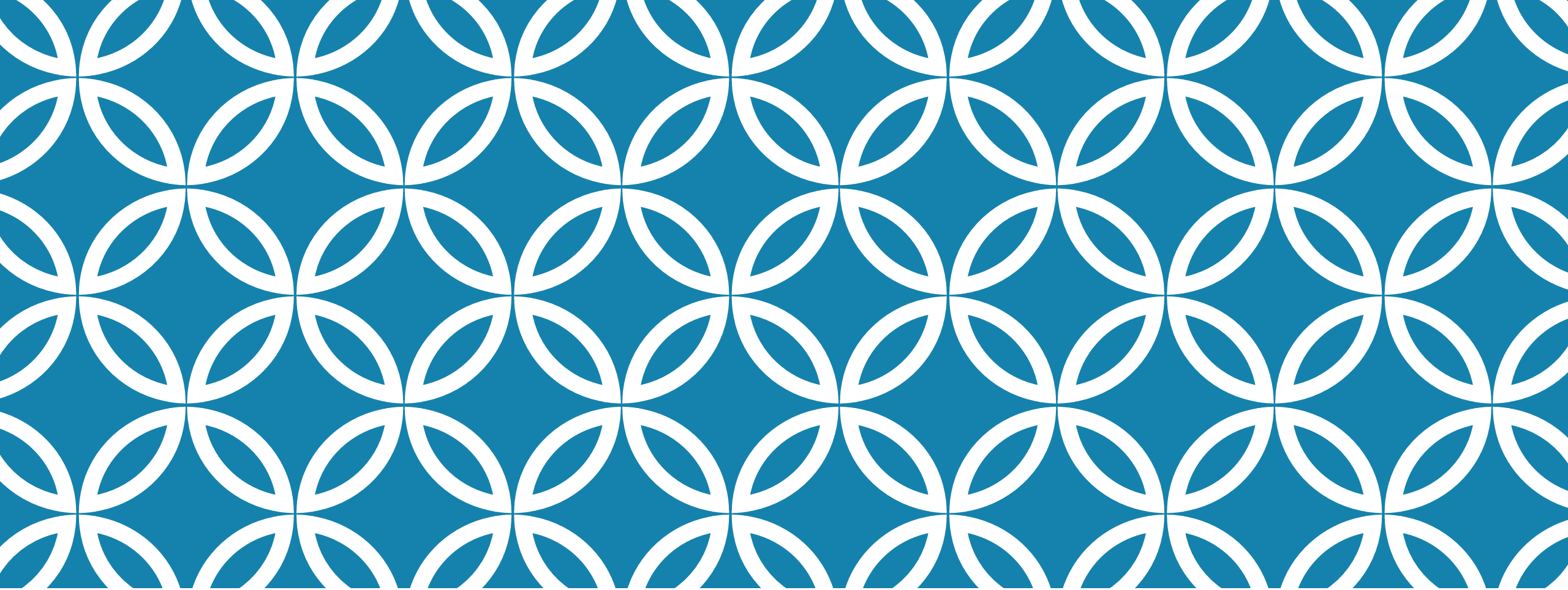
ISCC Committee Members

Julie Banerjee (Tacoma Power)

Andrew Pultorak (Puget Sound Energy)

Eric Mullendore (Bonneville Power Administration)

TACOMA POWER



INSIGHTS GLEANED FROM TACOMA POWER LLLC PROJECT DATA

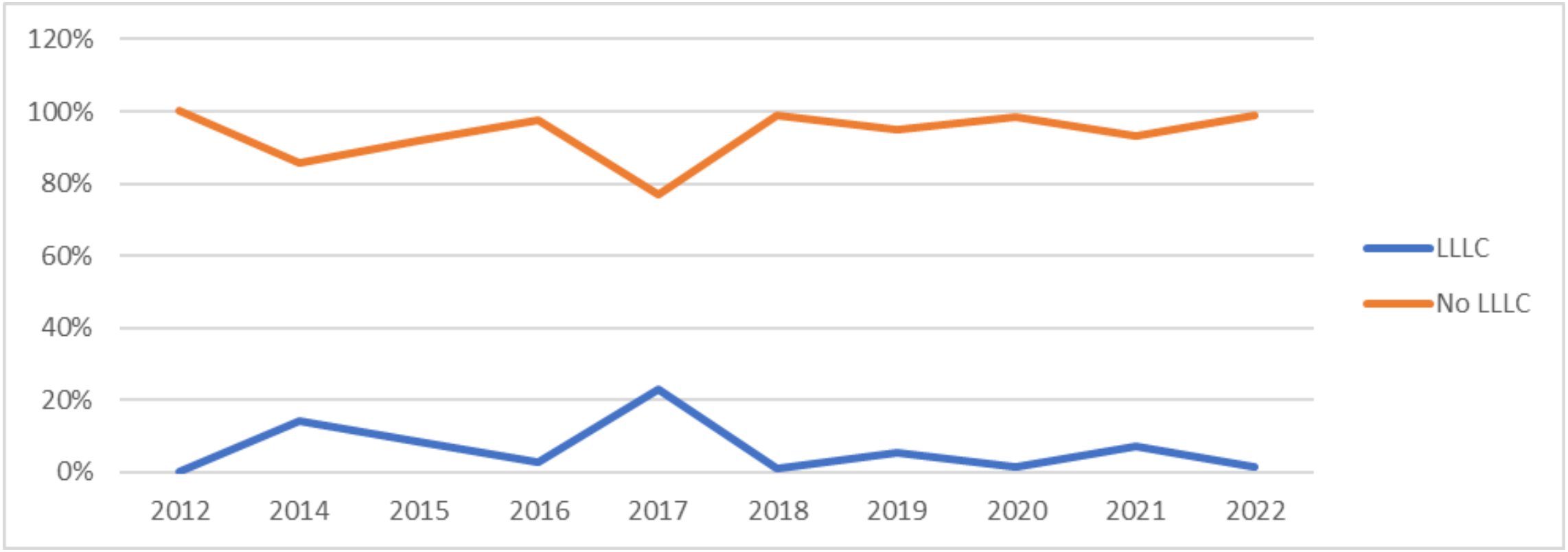
BACKGROUND AND CAVEATS

- Tacoma Power uses the BPA lighting calculator for calculations.
  - Calculator also defines savings by source, building type, and control type.
  - LLLC is *not* an explicit control type identified within calculator. Therefore, presence of LLLC must be inferred from other data within calculator.
- Control types and definitions evolved over time, which introduces noise and inconsistencies in year-to-year comparisons.
- 2017 included a large set of projects from Joint Base Lewis McChord, which has a strong effect in results given its large size (quantity, savings, incentives).
  - In select cases, these projects were removed or axes were truncated to aid visualization of data.

METHODOLOGY

- Tacoma Power extracted lighting calculator data (aprx. 10.2k rows) via inhouse tool
  - Each row represents a fixed quantity of lights and controls installed
- Data uploaded to data lake to permit efficient querying
- Calculator dose not natively identify LLLCs. Therefore, LLLC presence was inferred via the following logic:
  - If Installed (1) Ctrl Qty ≈ fixture quantity OR (2) controls = networked controls, then assume fixture is LLLC *unless*
    (1) Installed measure = LED tube OR (2) installation location = restroom OR (3) installed controls did not produce savings
  - Method attempts to generally identify presence of LLLC, but lack of explicit LLLC data flag will likely result in some inference errors
- After coding, data pivoted and analyzed via different data extract attributes
- Mapped data performed via Tableau

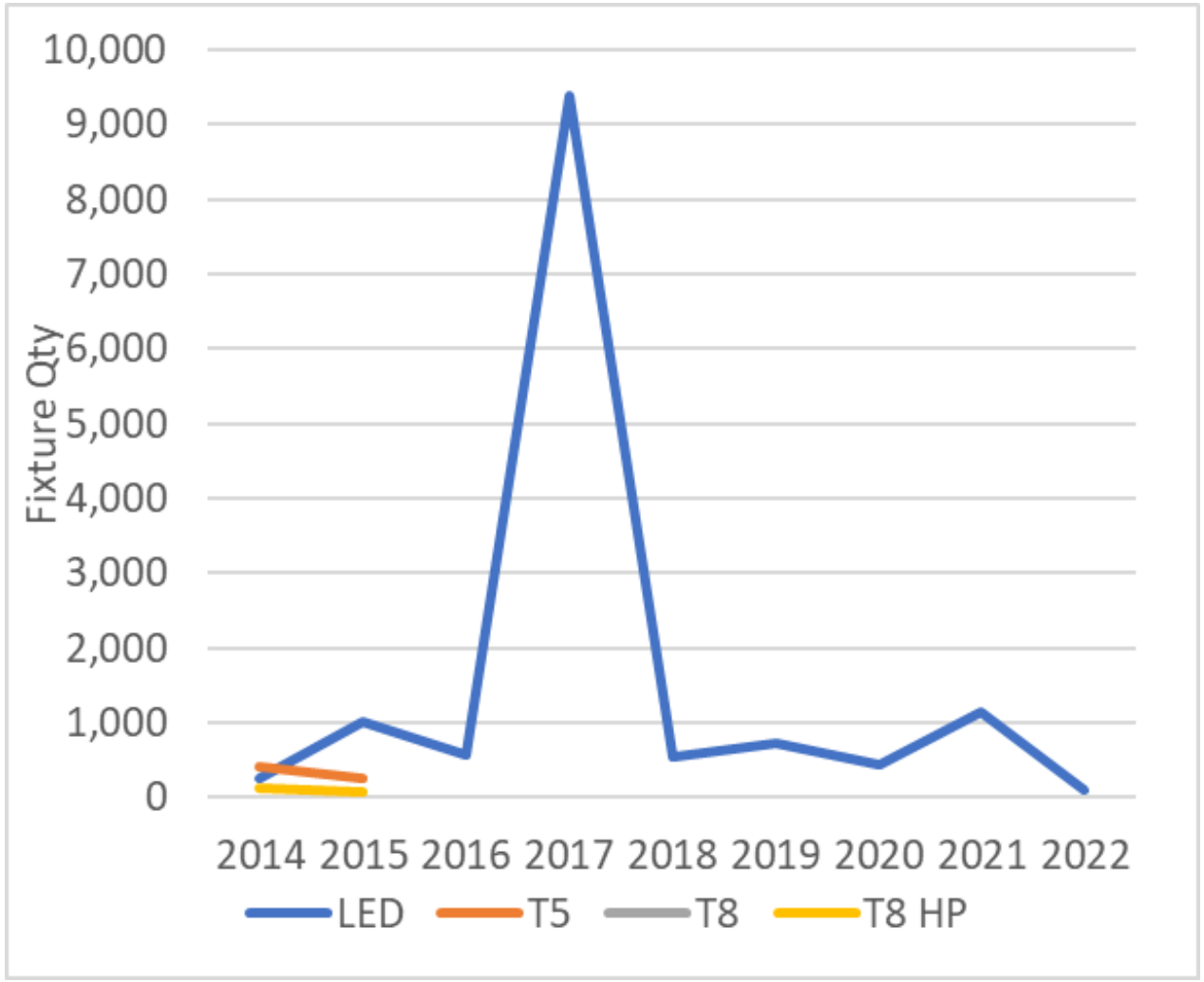
PERCENT OF LLLC FIXTURE INSTALLATION - LLLC TRENDS VARY ANNUALLY BUT ARE GENERALLY LOW



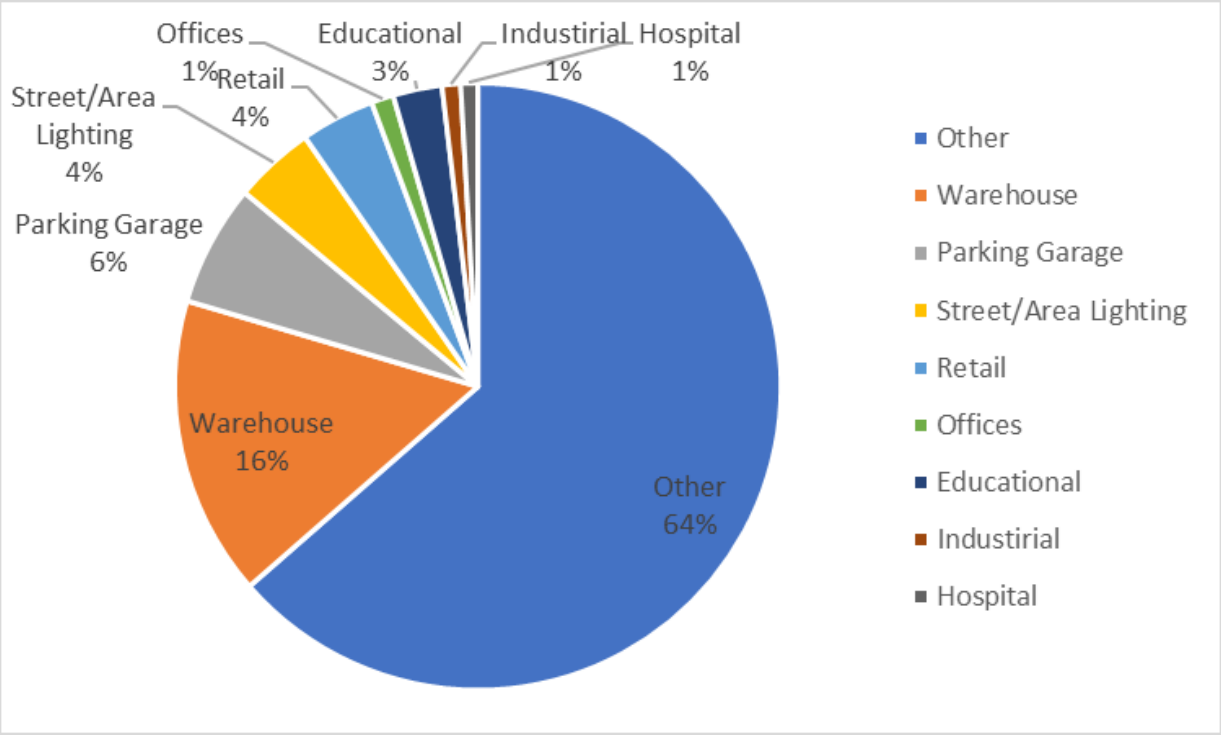
- 2017 featured one very large project at JBML
- Average percent of LLLC installation is 8%

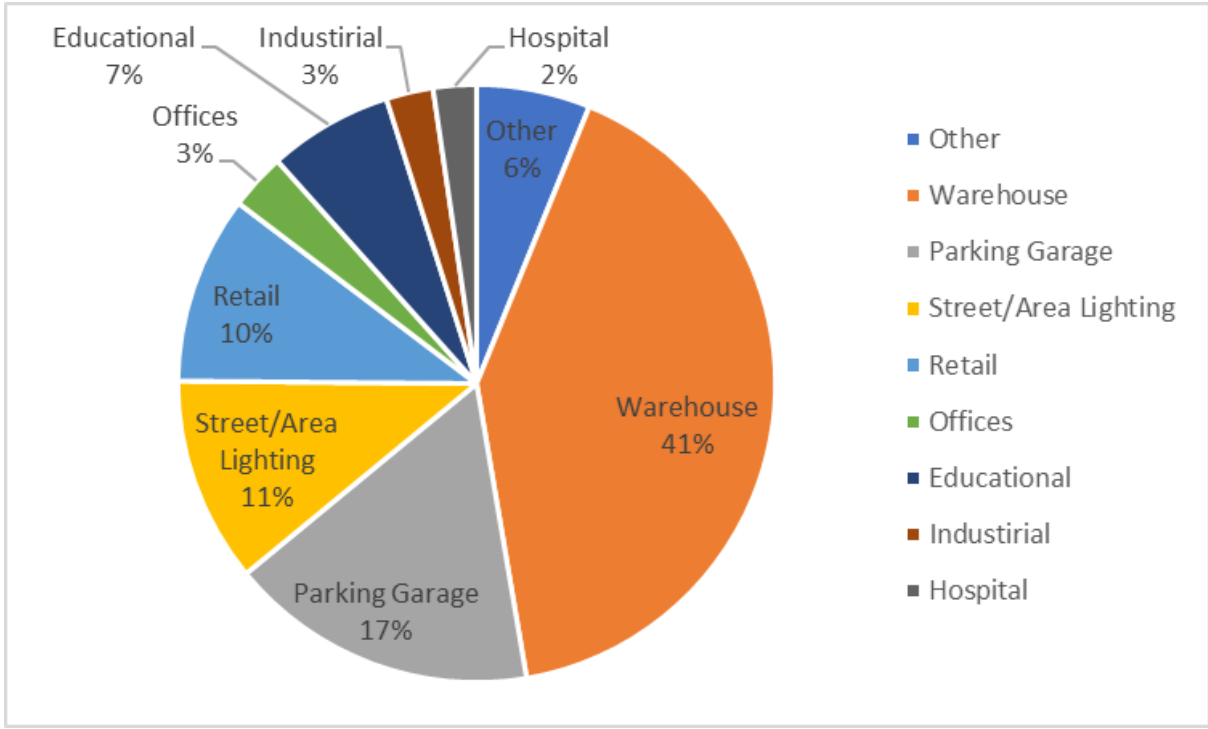
LLLC BY LIGHTING TECHNOLOGY

- Unsurprisingly, LEDs are the dominant lighting technology controlled by LLLC
- 2017 featured one very large project at JBML



LLLC BY BUILDING TYPE, WITH AND WITHOUT JBLM

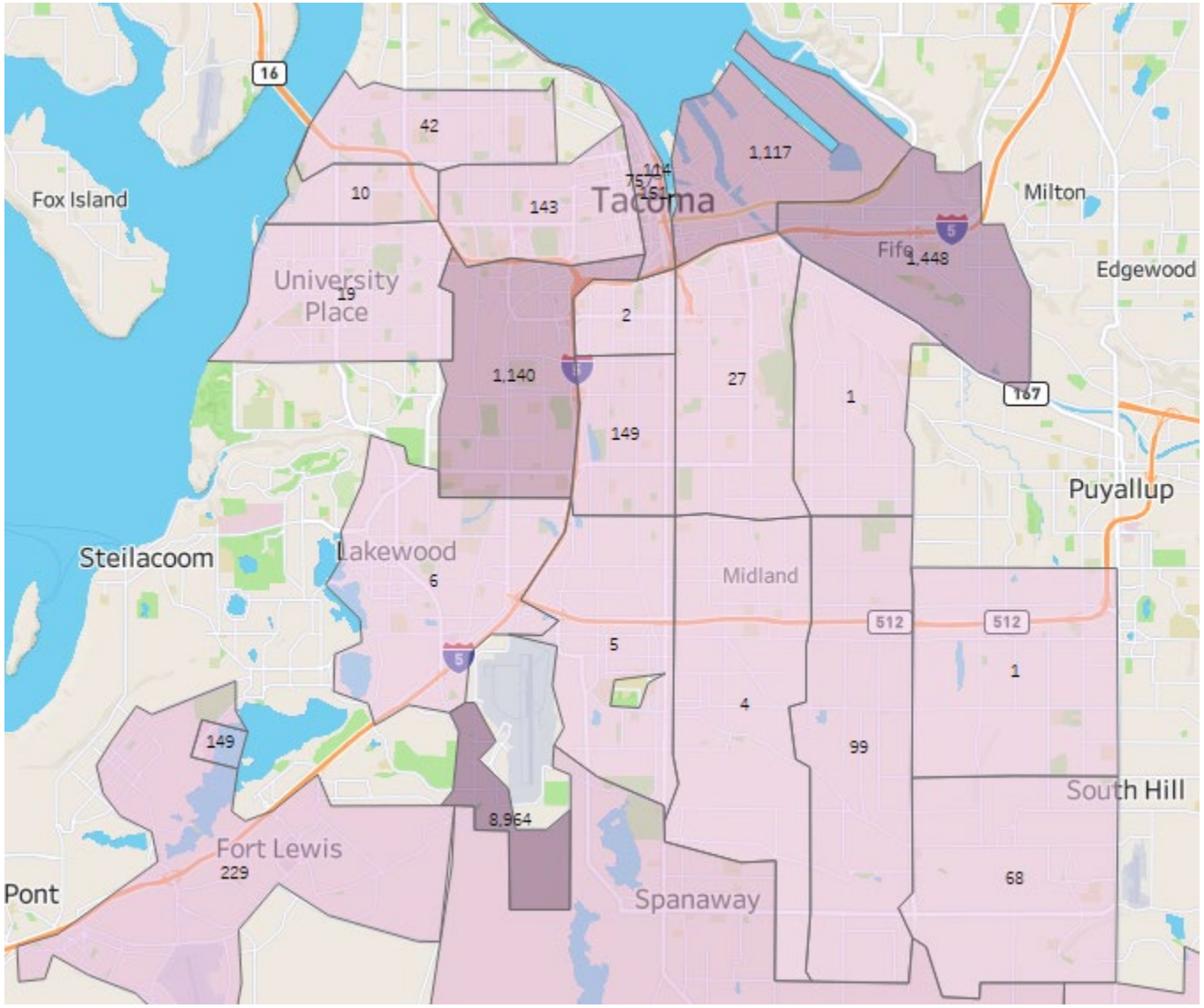




- "Other" is most common building type, though it's 95%+ JBLM.
- Without JBLM, most common are: warehouses, garages, street/area lighting, and retail. Offices, schools, and industrial are not common.

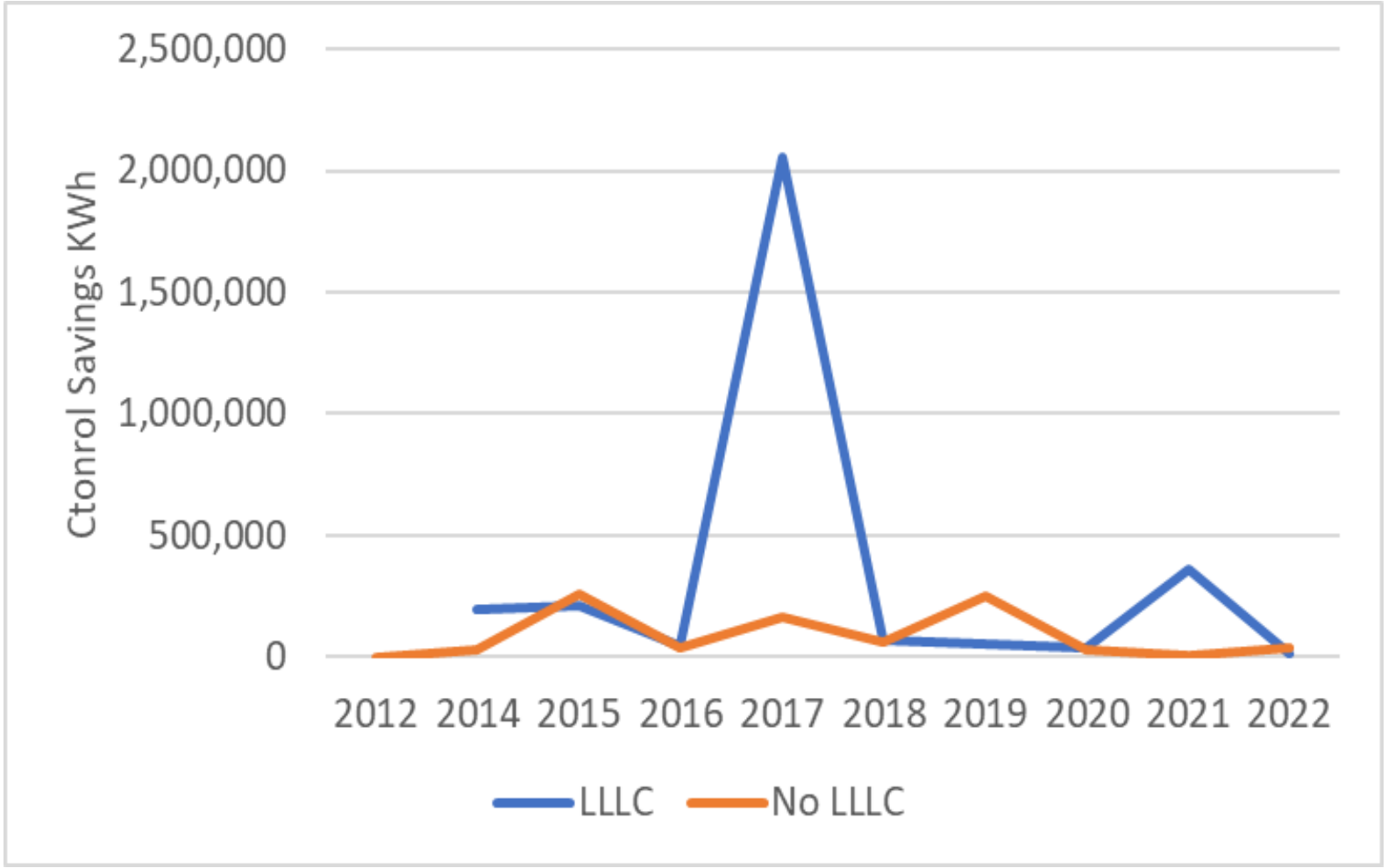
WHERE ARE LLLC INSTALLED?

- Highest concentration at JBLM
- Next highest in areas with high presence of warehouses (Port, South Tacoma)
- Then in areas with garages and area parking.



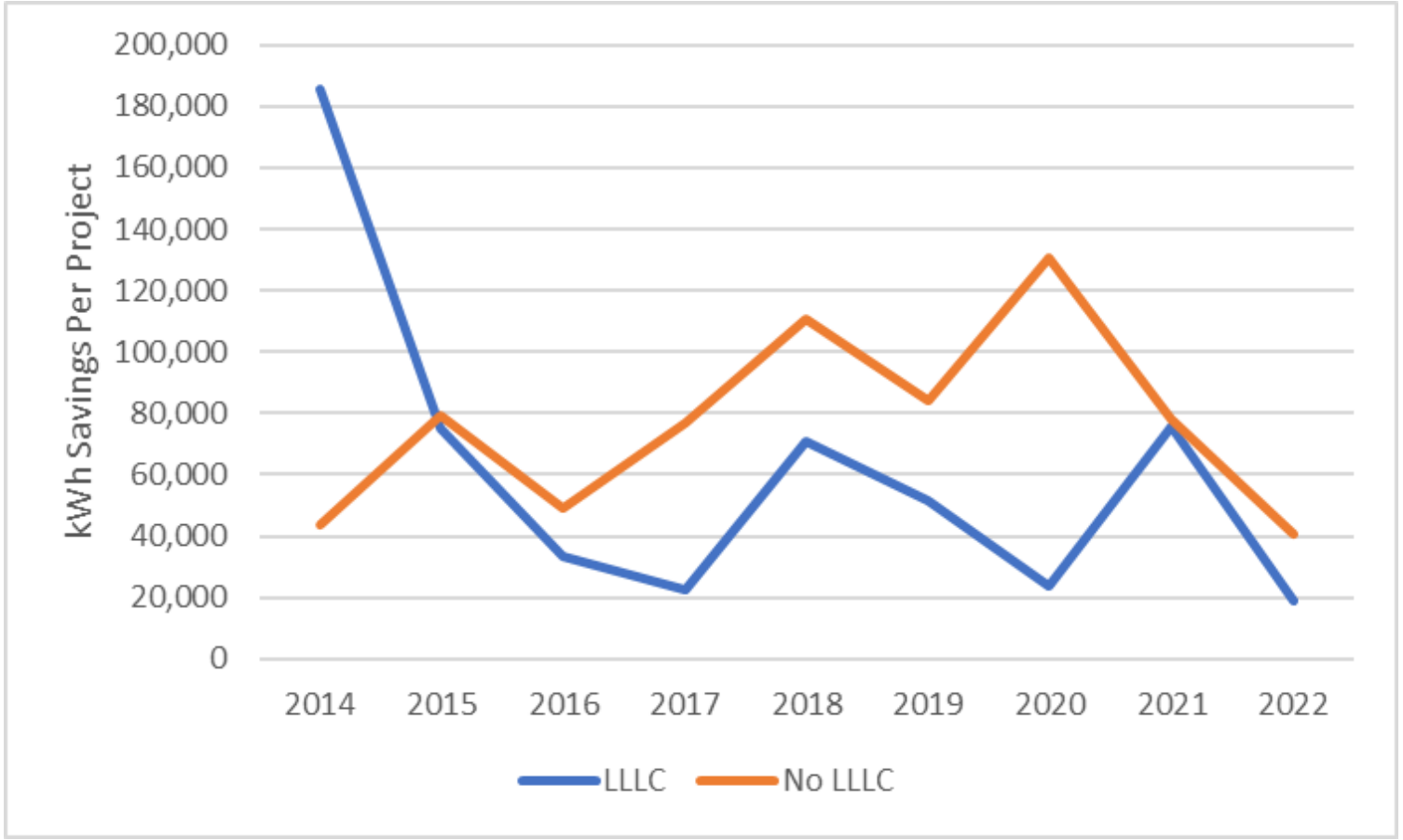
TOTAL CONTROL SAVINGS LLLC VS NON LLLC

- LLLC generally provide as much savings as non LLLC despite lower installation rates
- 2017 includes significant savings from JBLM



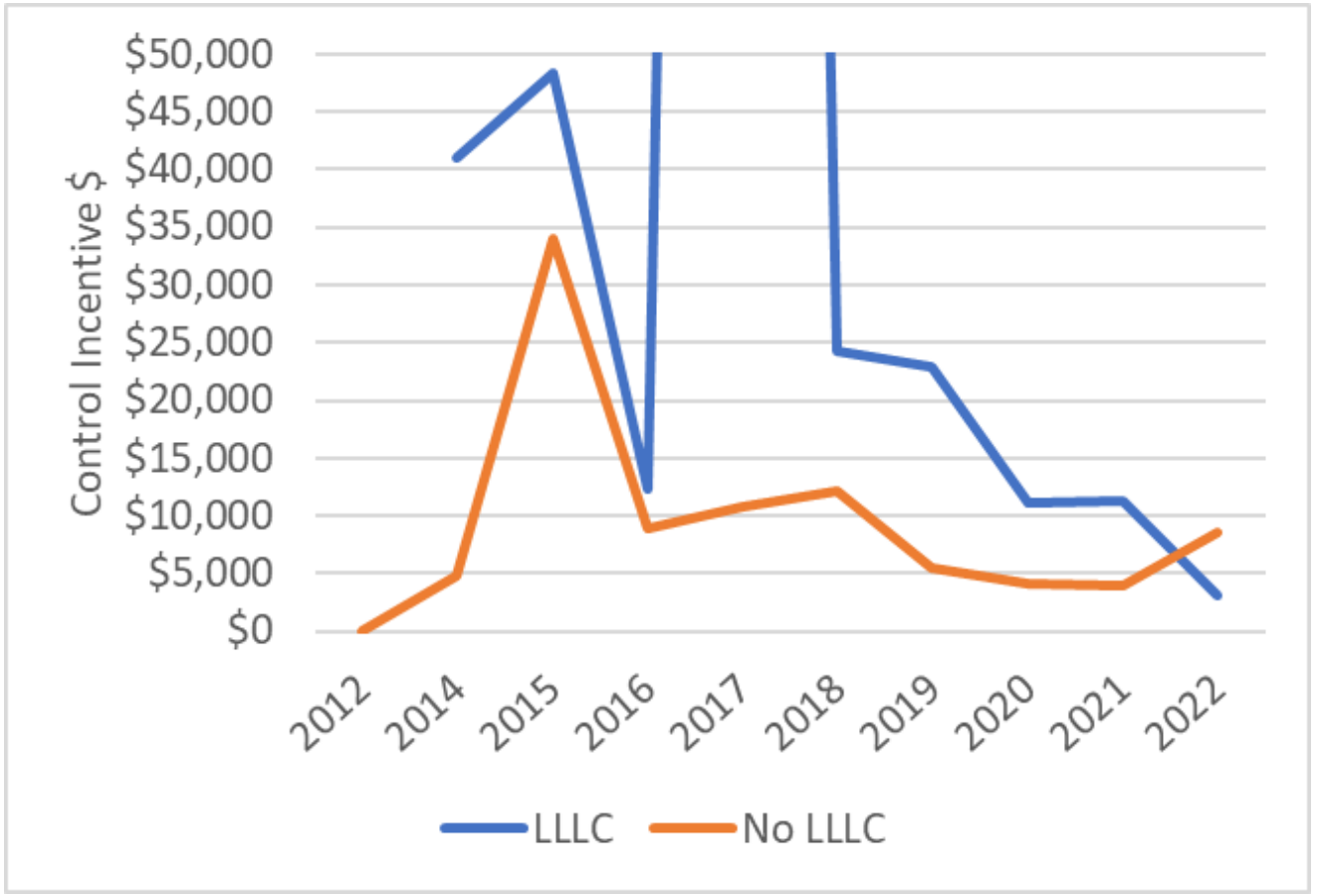
CONTROL SAVINGS PER PROJECT LLLC VS NON LLLC

- Non LLLC projects generally tend to yield more savings per project
- Both LLLC and non-LLLC savings per project tend to trend together year over year
- JBLM removed to aid data visualization



CONTROLS INCENTIVES

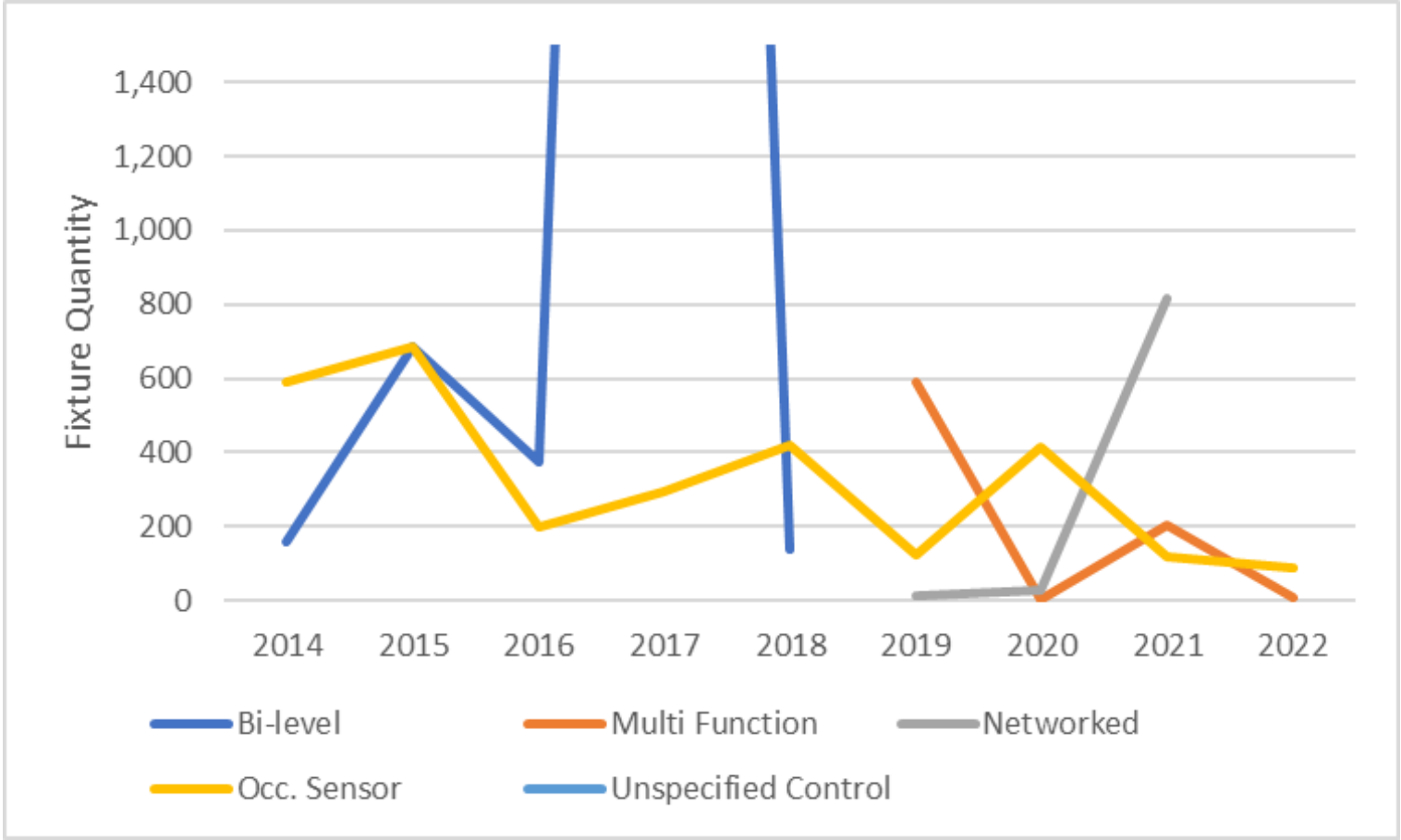
- TP generally provides more incentives per year for LLLC controls than non-LLLC controls
- Vertical axis truncated as 2017 JBLM incentives were 400k

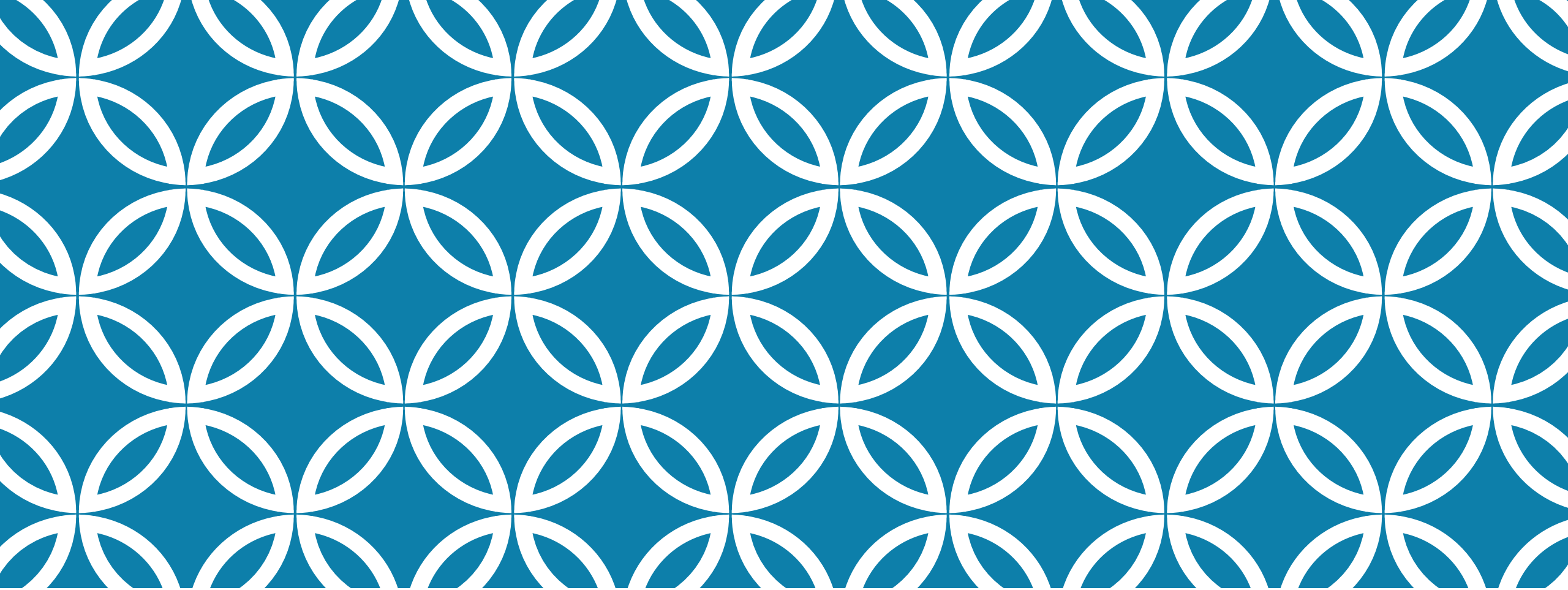


LLLC BY CONTROL TYPE

- Bi level was most common through 2018
- Occ sensors trending downward
- Networked trending upwards
- Vertical axis truncated as 2017 JBLM incentives were 400k

- Note, the calculator does not explicitly identify LLLCs. Analysis relies on inferred data, which may introduce errors. Data trends also reflect evolving control systems descriptions within calculator.





Thank you!

Julie Banerjee

JBanerjee@cityoftacoma.org

PUGET SOUND ENERGY

PSE Incentives and Luminaire Level Lighting Control (LLLC)

NEEA ISCC Committee Meeting
Q2 2024

PUGET SOUND ENERGY

How it began

PUGET SOUND ENERGY

History: LLLC incentives

2014-2015

- Researched LLLC manufacturers, costs, and installed two different systems in PSE Bothell EES Offices
  - Total 119 fixtures - Cree (Qty 57) and Philips (Qty 62)

2016

- Explored ways to offer additional incentives for LLLC fixtures and created LLLC definition to clarify qualification of additional incentives

PSE PUGET SOUND ENERGY

History: LLLC incentives

PSE LLLC definition:

An interior LED luminaire with the following integrated into each luminaire; a dimming driver, an occupancy sensor, and a daylight sensor. Each LLLC luminaire shall have installed control logic that allows configuration and re-configuration of the luminaire settings for high-end trim, daylight sensitivity and set points, and occupancy sensitivity and timeouts. The high end trim shall be no higher than 90% full power. The occupancy sensor timeout shall meet Washington State Energy Code (WSEC) requirements. Each LLLC luminaire shall have installed wireless networking capabilities to allow multiple luminaires to be grouped to share occupancy and daylight information with all other LLLC luminaires installed in the space. For open office spaces, fixtures must be controlled separately in control zones with floor areas not greater than 600 square feet. The system must have local override switching capability, as required by WSEC.

PUGET SOUND ENERGY

History: LLLC incentives

2017

- Began offering an additional $0.03 per kWh incentive for LLLC fixtures for a total of $0.20 per kWh saved (non-LLLC fixtures received $0.17 per kWh)

  Daylit spaces of only: open office, private offices and classrooms eligible

2018

- Offered a $50.00 “bonus” per LLLC fixture above the standard $0.15 per kWh incentive
  - Daylit spaces of only: open office, private offices, conference rooms, classrooms and daylit warehouses eligible

History: LLLC incentives

2019

- Increased the LLLC “bonus” from $50.00 to $75.00 per each LLLC fixture installed above the standard incentive $0.15 per kWh
  - Daylit spaces of only: Open office, private offices, conference rooms, classrooms and daylit warehouses eligible

2020

- Continued $75.00 “bonus” per LLLC fixture and increased the standard incentive to $0.175 per kWh plus additional $0.05 for LLLC
  - Daylit spaces of only: Open office, private offices, conference rooms, classrooms and daylit warehouses eligible

PSE PUGET SOUND ENERGY

History: LLLC incentives

2021

- Continued $75.00 “bonus” per LLLC fixture and increased the standard incentive to $0.25 per kWh plus additional $0.10 for LLLC
  - Daylit spaces of only: Open office, private offices, conference rooms, classrooms and daylit warehouses eligible

2022

- Continued $75.00 “bonus” per LLLC fixture and continued the standard incentive to $0.25 per kWh with continuing additional $0.10 for LLLC
  - Daylit spaces of only: Open office, private offices, conference rooms, classrooms and daylit warehouses eligible

PSE PUGET SOUND ENERGY

History: LLLC incentives

2023

- Continued $75.00 “bonus” per LLLC fixture and also offered $50.00 “bonus” for LLLC fixtures outside of daylight zone above the standard $0.25 incentive per kWh and increased incentives for LLLC fixtures an additional $0.20 per Kwh
  - All daylit spaces eligible

2024

- Increased the LLLC “bonus” from $75.00 to $100.00 and increased the standard incentive to $0.30 per kWh plus additional $0.20 for LLLC
  - All daylit spaces eligible

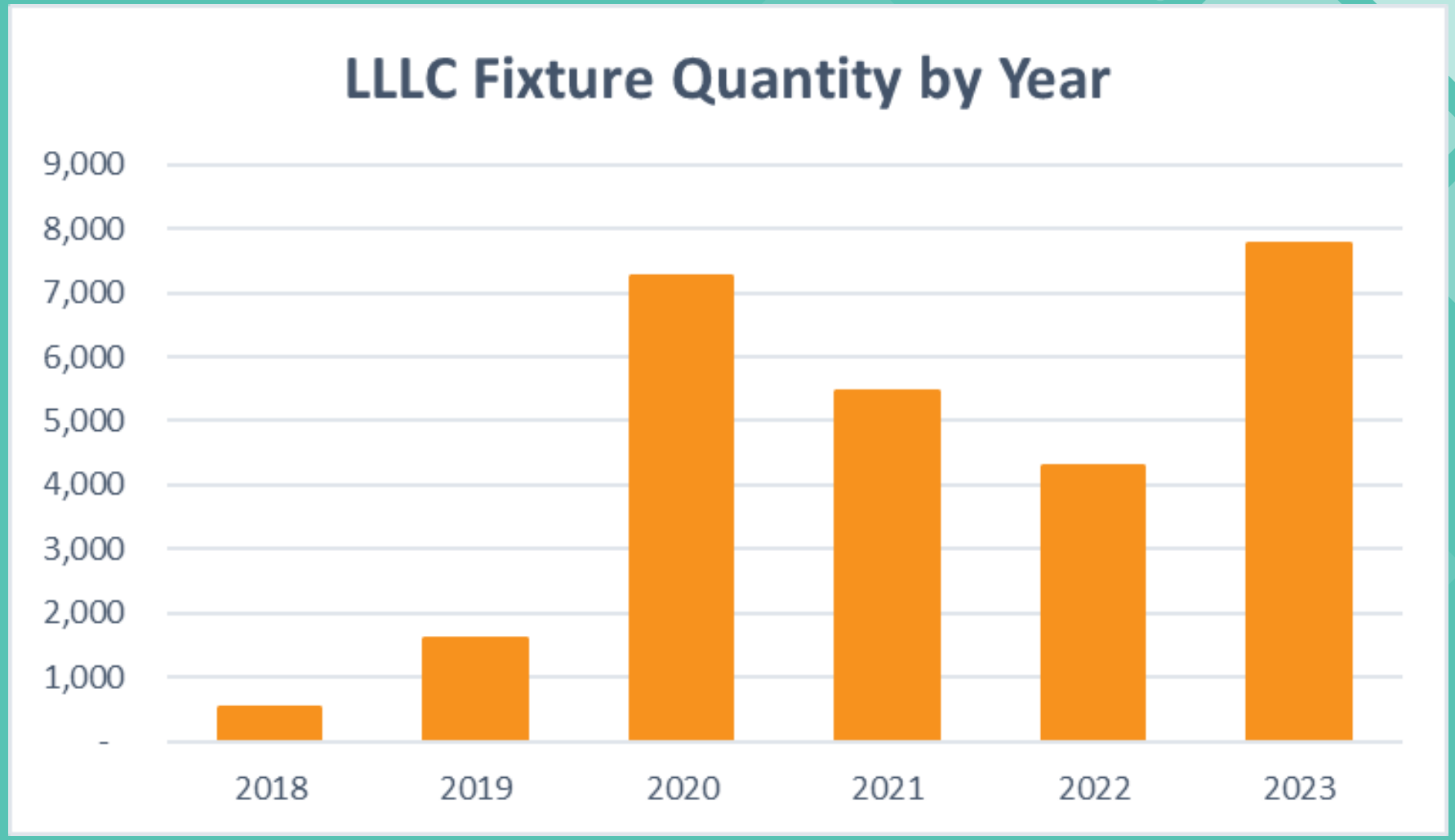
PSE PUGET SOUND ENERGY

PSE LLLC fixture statistics

Note: As of April 2024, there have been 42 LLLC projects submitted

PUGET SOUND ENERGY

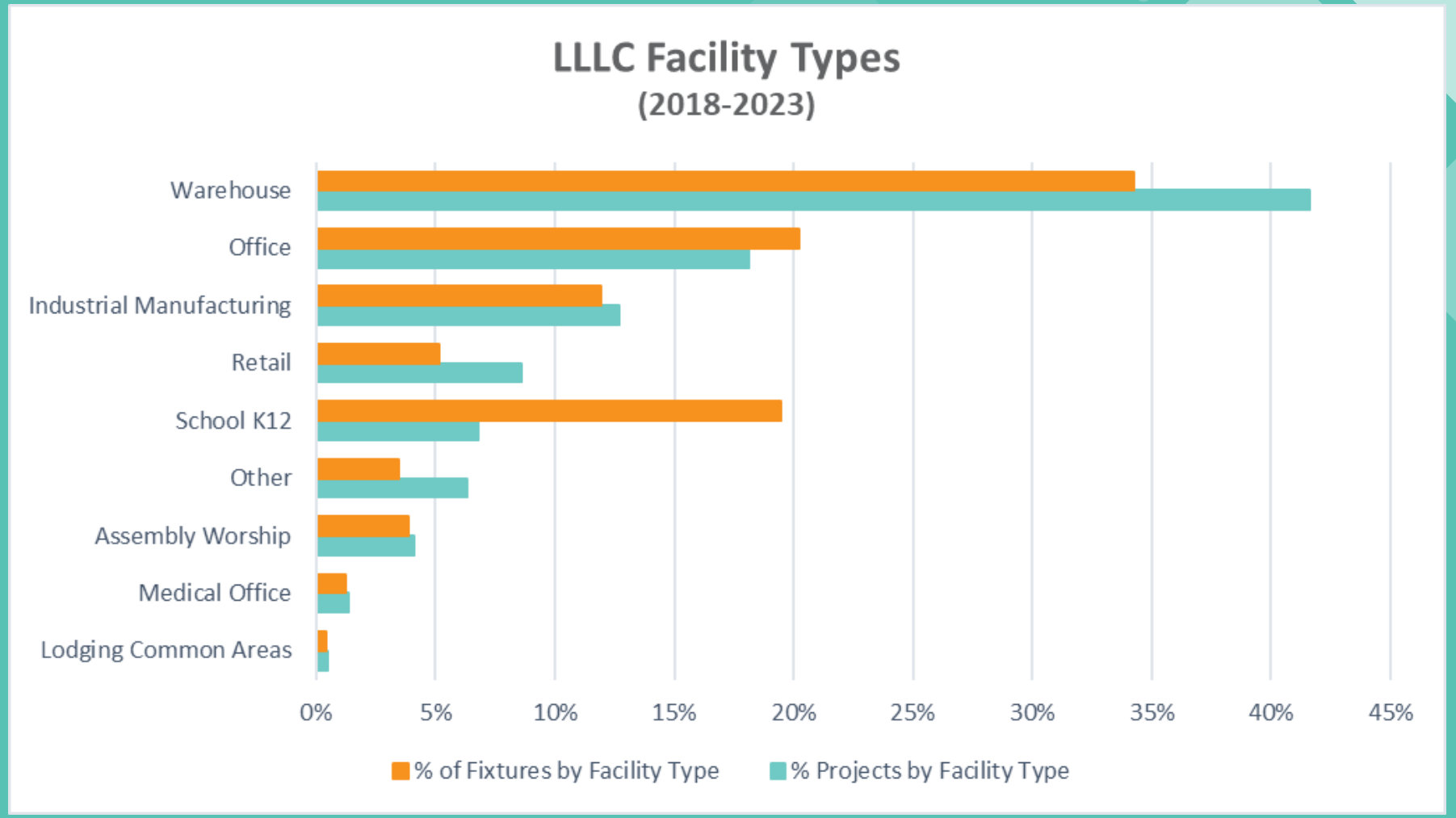
PSE LLLC fixture statistics



*2020 included 6 projects with over 400 fixtures

PUGET SOUND ENERGY

PSE LLLC Facility Types



PUGET SOUND ENERGY

Thank you….

Andrew Pultorak, LC, MIES

Supervisor, Business Lighting Incentives

Customer Energy Management

andrew.pultorak@pse.com

425-424-6464

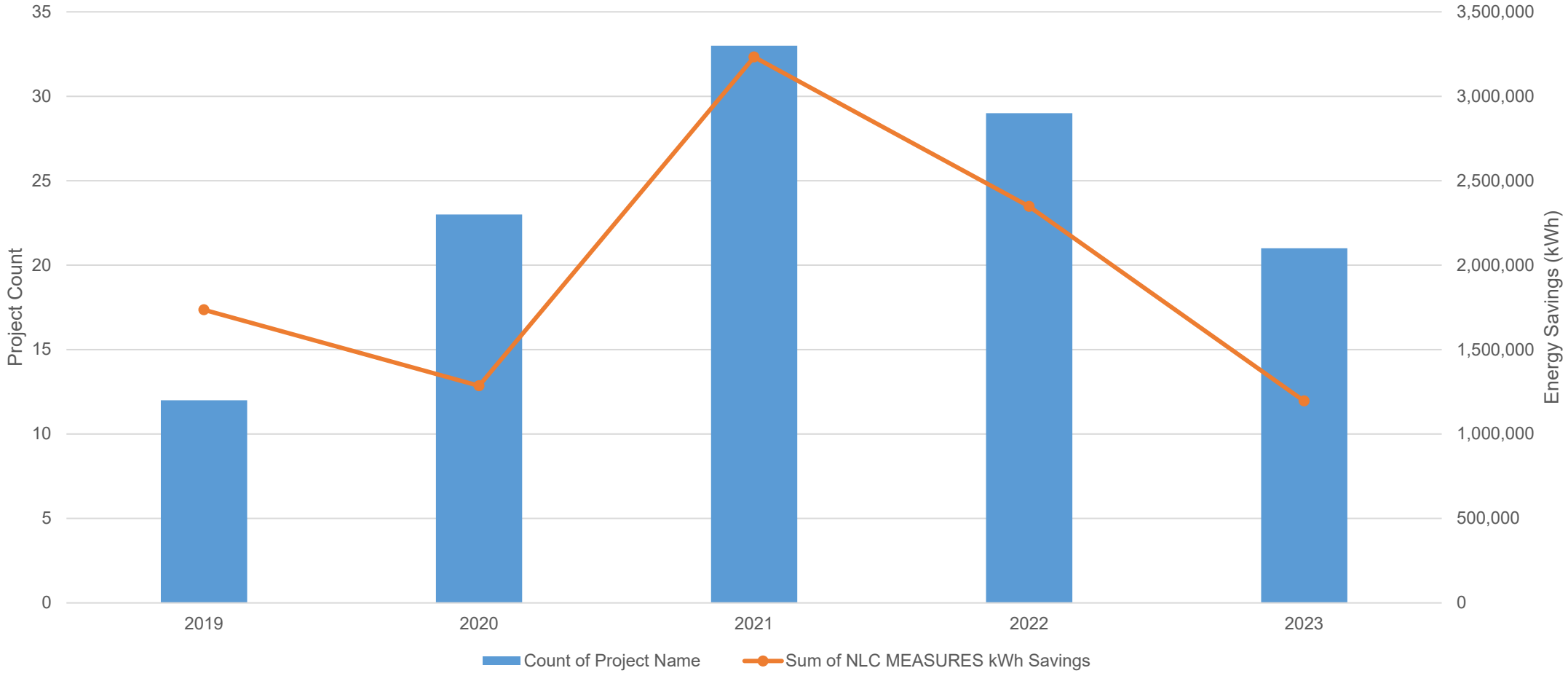
www.pse.com/businesslighting

PSE PUGET SOUND ENERGY

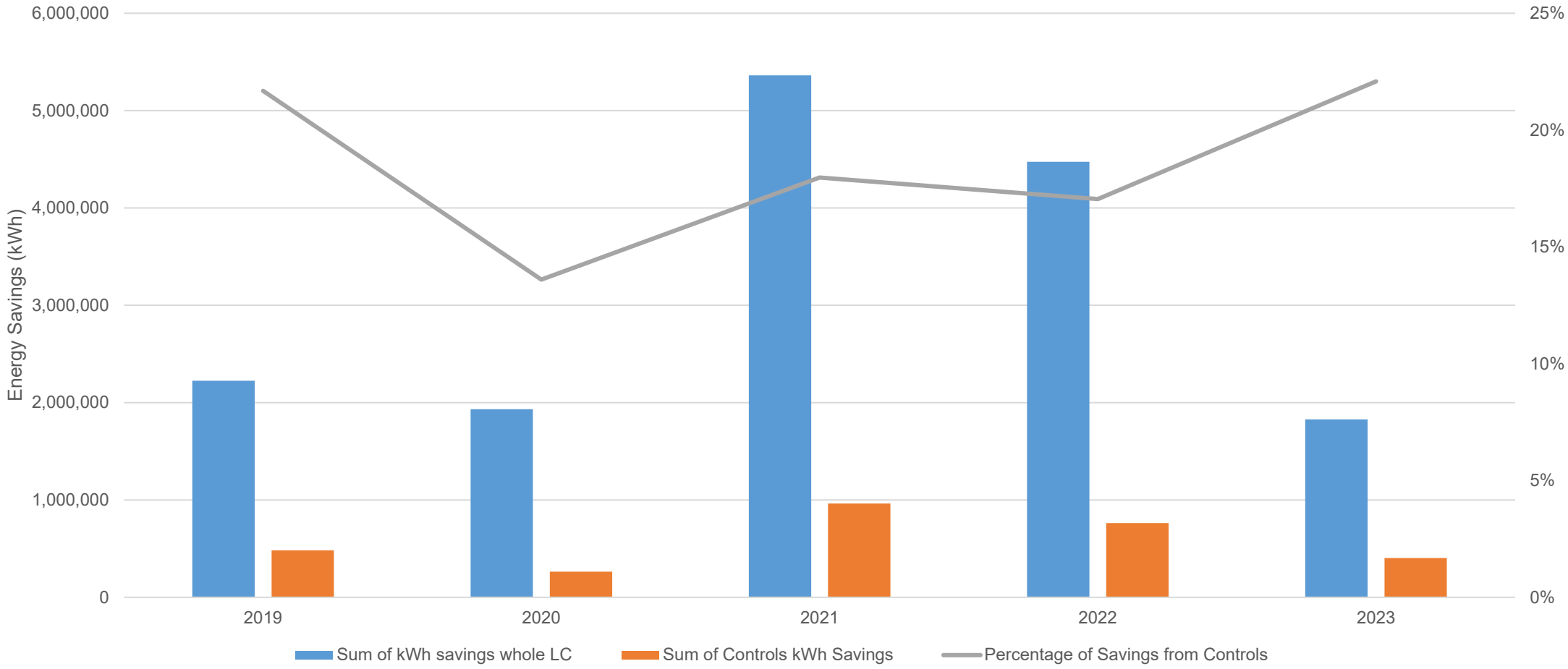
BONNEVILLE POWER ADMINISTRATION

Networked Lighting Control Analysis 2019-2023

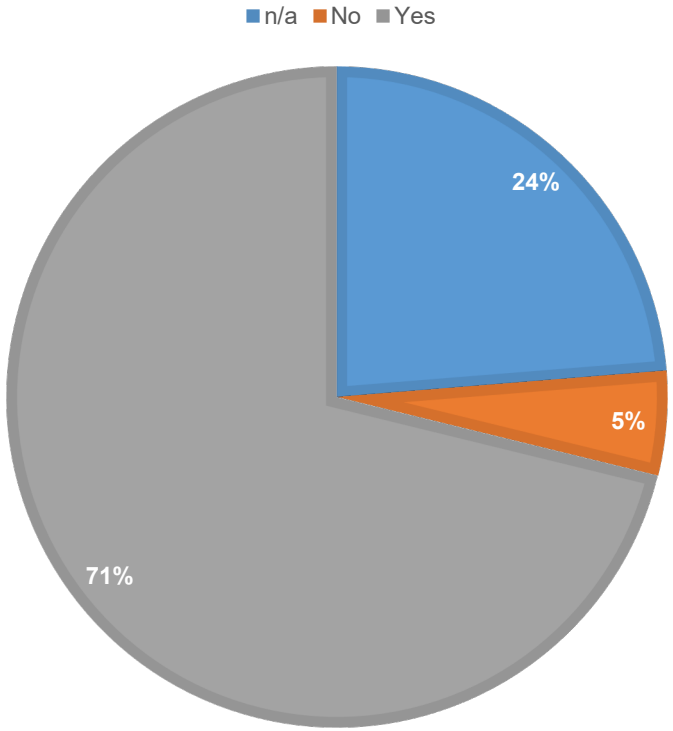
Project Count + kWh per Year

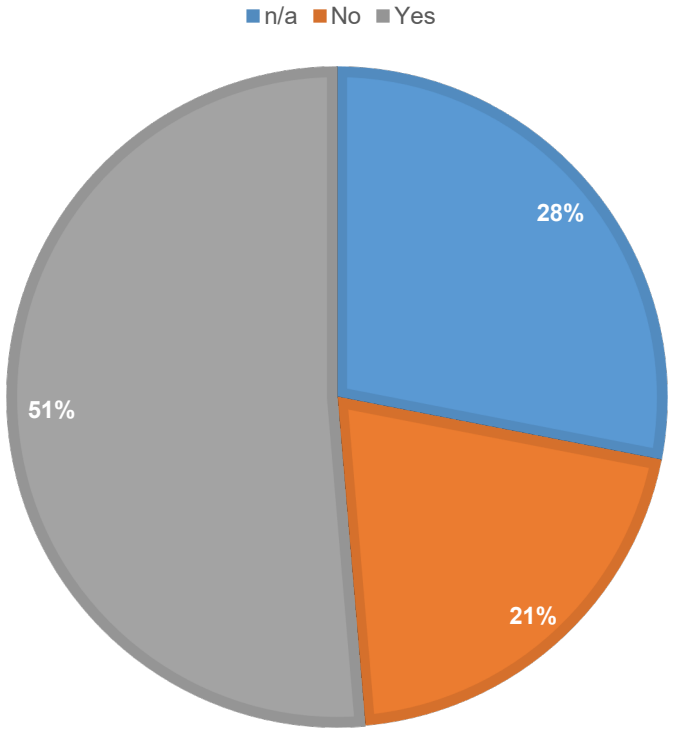


% of kWh Savings from Controls (in projects with %)

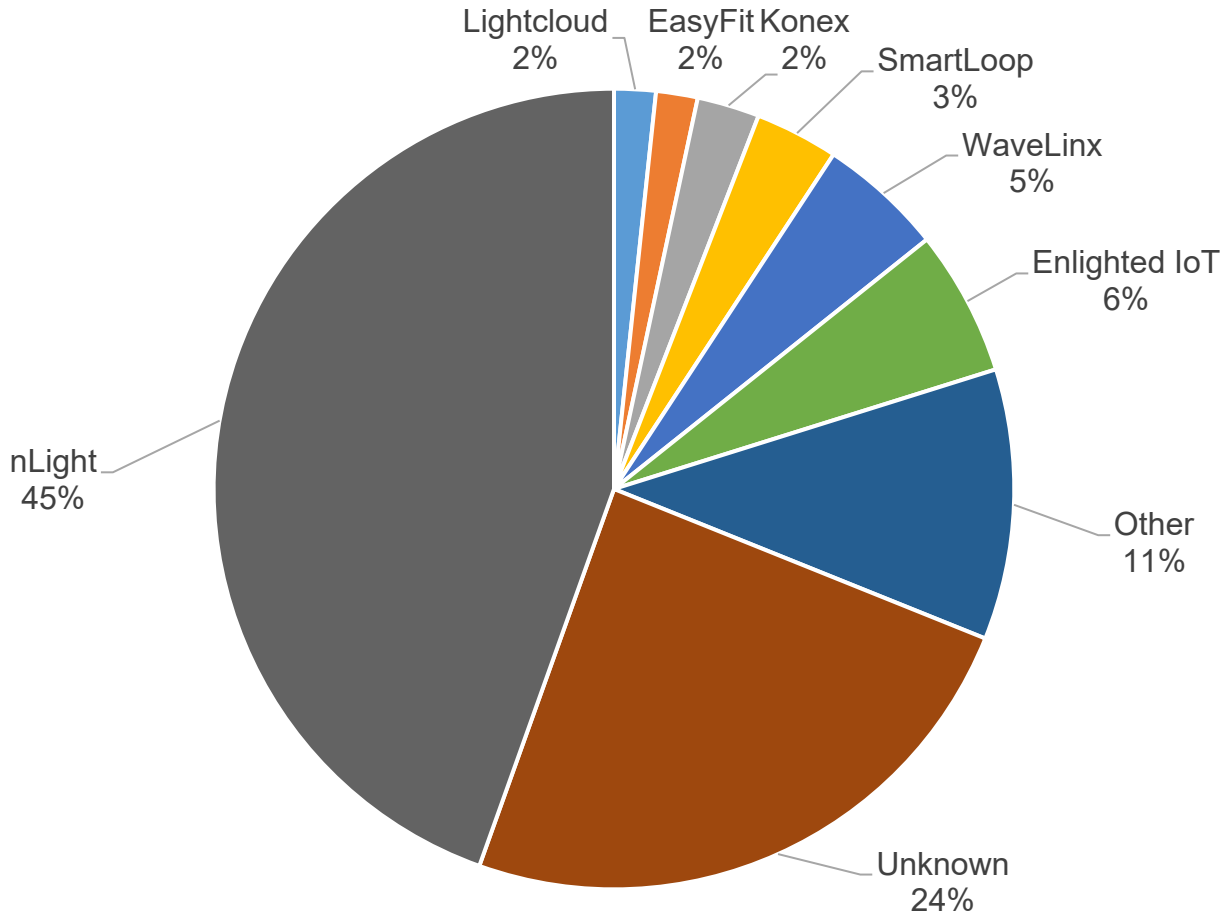


NLC vs LLLC

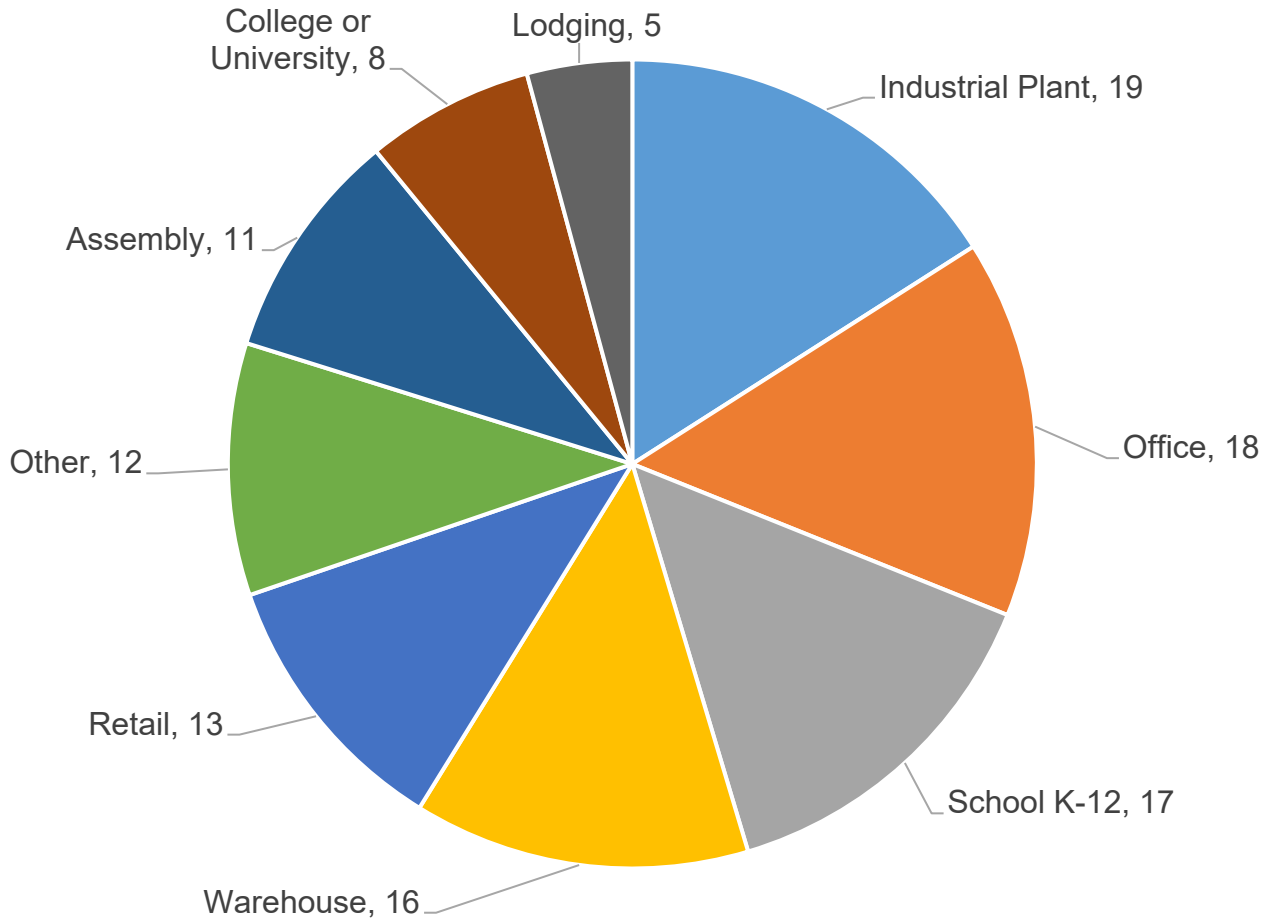

% OF NLC PROJECTS W/ LLLC CAPABILITY
n/a
No
Yes
24%
5%
71%


% OF KWH SAVINGS FROM LLLC ENABLED NLCS
n/a
No
Yes
28%
51%
21%

NLC Vendors


Lightcloud
2%
EasyFit
2%
Konex
2%
SmartLoop
3%
WaveLinx
5%
Enlighted IoT
6%
Other
11%
Unknown
24%
nLight
45%

Building Types



Thank you!

Eric Mullendore
ejmullendore@bpa.gov

QUESTIONS?

Thank you!

Julie Banerjee, JBanerjee@cityoftacoma.org
Andrew Pultorak, andrew.pultorak@pse.com
Eric Mullendore, ejmullendore@bpa.gov
Anne Curran, acurran@neea.org

Break

Please return at 11:25am PDT

 |

AGENDA

(All Times Pacific)

9:30-9:45 am (15 mins)	**Welcome**
9:45- 11:15 am (90 mins)	**Regional Priority Topic** • **Luminaire Level Lighting Control- Takeaways from LLLC Projects**
11:15-11:25 am	***BREAK***
11:25– 11:35 am (10 mins)	**Q2 Topic Check In**
11:35-11:50 am (15 mins)	**Housekeeping**
11:50– 12:00 pm (10 mins)	**Recap, Next Steps, Adjourn**

Q2 Regional Topic Check In

Efficient Fans

- Efficient Fans 101 Presentation

Any Other Relevant Topics

- Ad Hoc Topics?

AGENDA

(All Times Pacific)

9:30-9:45 am (15 mins)	**Welcome**
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11:50– 12:00 pm (10 mins)	**Recap, Next Steps, Adjourn**

Announcements & Housekeeping

Housekeeping & Looking Ahead

- RPAC Updates
- Announcements
- Upcoming NEEA Meetings

RPAC Updates

- Federal Funding Workgroup Update
- Reminder of 2024 Stakeholder Engagement Activities
- HPWH Marketing Campaign elections May 13 – all utilities plan to participate.
- NEEA Manufactured Homes program winding down – shifting to “monitoring and tracking” status in Q3.

2022 RBSA Data Reveals Northwest Energy Trends

neea.org/rbsa

2024 ISCC Meetings

Q1

- Thursday, February 29

Q2

- Wednesday, May 22
- Thursday, May 23

Q3

- Thursday, August 15

Q4

- Wednesday, November 6
- Thursday, November 7

HYBRID @ SeaTac

Upcoming NEEA Meetings

June

- June 5th - Q2 Natural Gas Advisory Committee
- June 24th & 25th – Q2 Products Coordinating Committee
- June 25th & 26th – NEEA Board Meeting
- June 27th – Regional Emerging Technology Advisory Committee

Other Upcoming Events or Announcements?

AGENDA

(All Times Pacific)

9:30-9:45 am *(15 mins)*	**Welcome**
9:45- 11:15 am *(90 mins)*	**Regional Priority Topic** • **Luminaire Level Lighting Control- Takeaways from LLLC Projects**
11:15-11:25 am	***BREAK***
11:25– 11:35 am *(10 mins)*	**Q2 Topic Check In**
11:35-11:50 am *(15 mins)*	**Housekeeping**
11:50– 12:00 pm *(10 mins)*	**Recap, Next Steps, Adjourn**


Let’s wrap it up!

Action Items | Any Final Qs?

- Action Items

Thank you ISCC!
Till we meet again…

Q3 ISCC Meeting

Thursday, August 15, 2024 (virtual)