LEDucation
Trade Show and Conference

Designers Lighting Forum

Maintaining Lighting Designs: Beyond the Punch List

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Learning Objectives

At the end of this course, participants will be able to:

1. Assess the real-world feasibility of replacing the components of currently available lighting products.
2. Evaluate the tradeoffs of integrated LED products compared to products with replaceable LED components.
3. Apply lessons from real-world projects and conversations with clients and facility mangers to inform design and manufacturing decisions.
4. Understand current activities in the lighting industry and in adjacent industries that are successfully encouraging the use of replaceable components.

Menti: Who are You and Why are You Here?

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Who are YOU?

- Academia, Research, Student
- Designer
- Distributor
- Manufacturer
- Mfr Sales Rep
- Other

Why are YOU Here?

0
Cost, Complexity to Maintain

0
Quality, Lifetime Concerns

0
Waste, Trash Concerns

0
To Share my Thoughts

0
To Listen and Learn

0
Oops, In the Wrong Room

Agenda

- The Current Days of LEDs
- Trends
- Lifetime
- Barriers to Replaceability/Serviceability
- Path Forward Together

This is NOT a new problem!

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The Current Days of LED

Offices – *Then*

The Current Days of LED

Offices – *NOW*

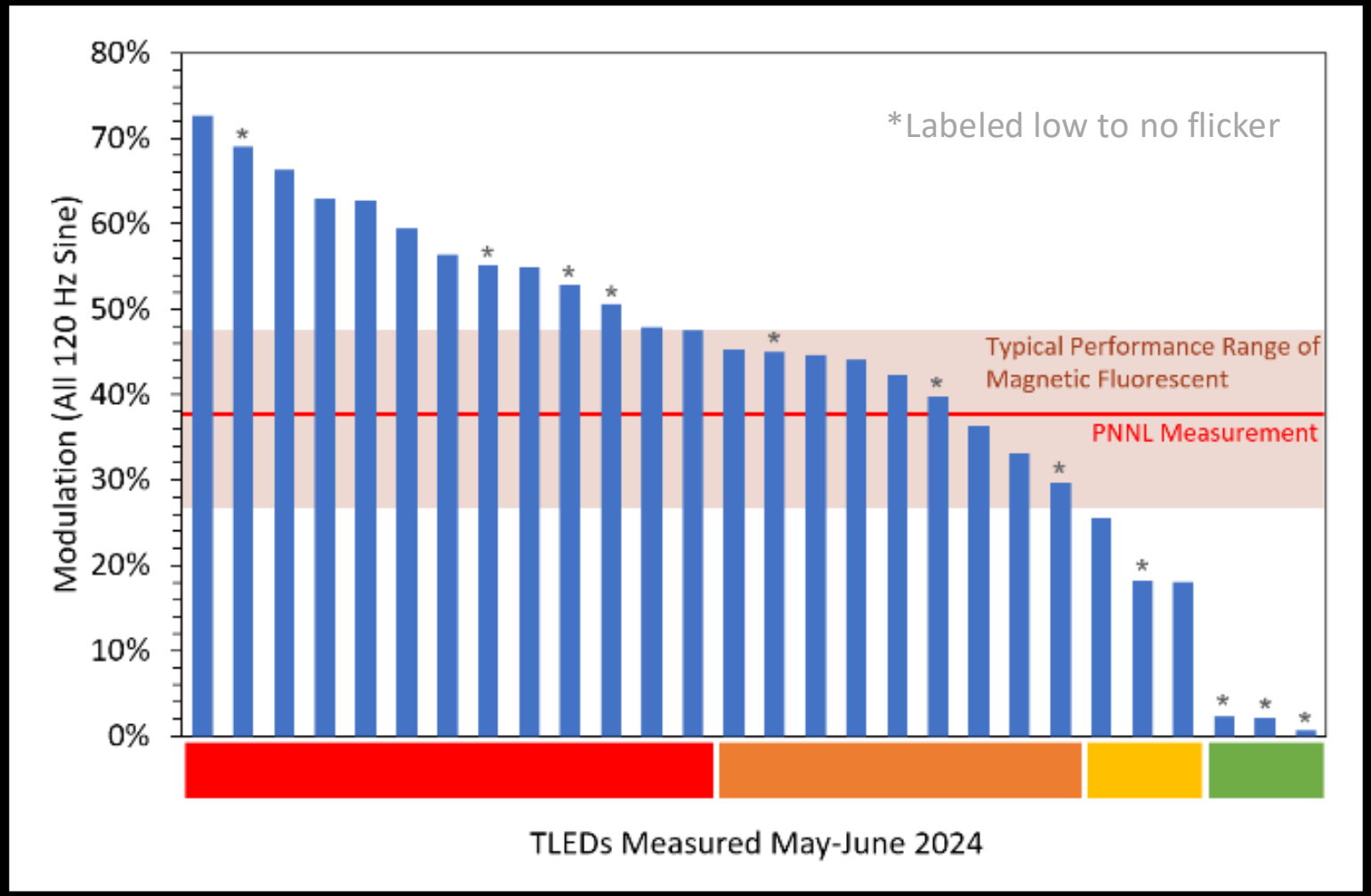
The Current Days of LED

Schools

- 47% of the 30 school districts did not have an electrician on staff
- 57% installed integrated LEDs
- 50% installed Type B TLEDs
- Legislation in 10 states banning fluorescent

The Current Days of LED

Schools



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Is sustainability an integral part of your business?

The Current Days of LED

Uplights – *Then*

The Current Days of LED

Uplights – *NOW*

The Current Days of LED

Municipal

- How will these be maintained?

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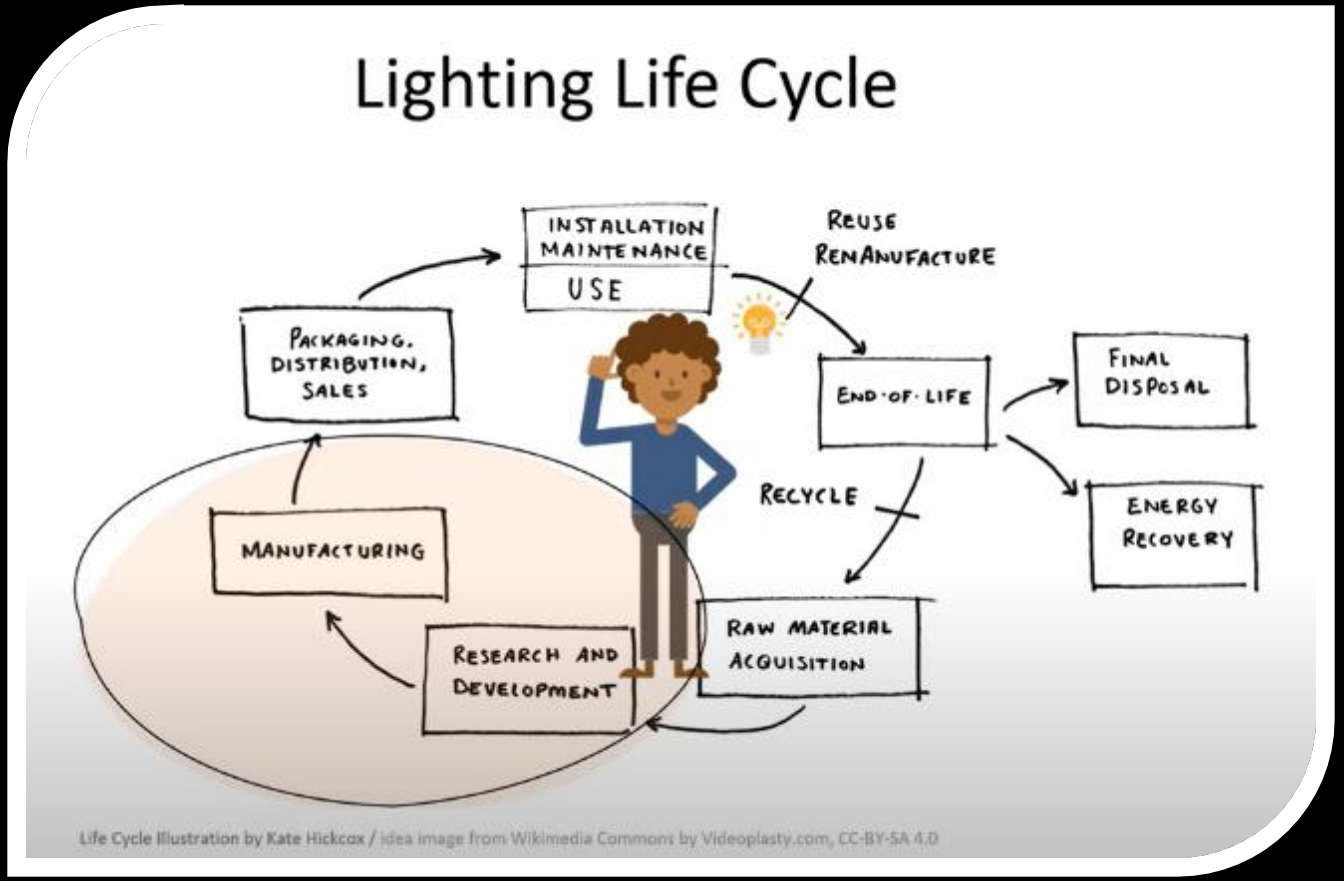
Critical Applications

Healthcare

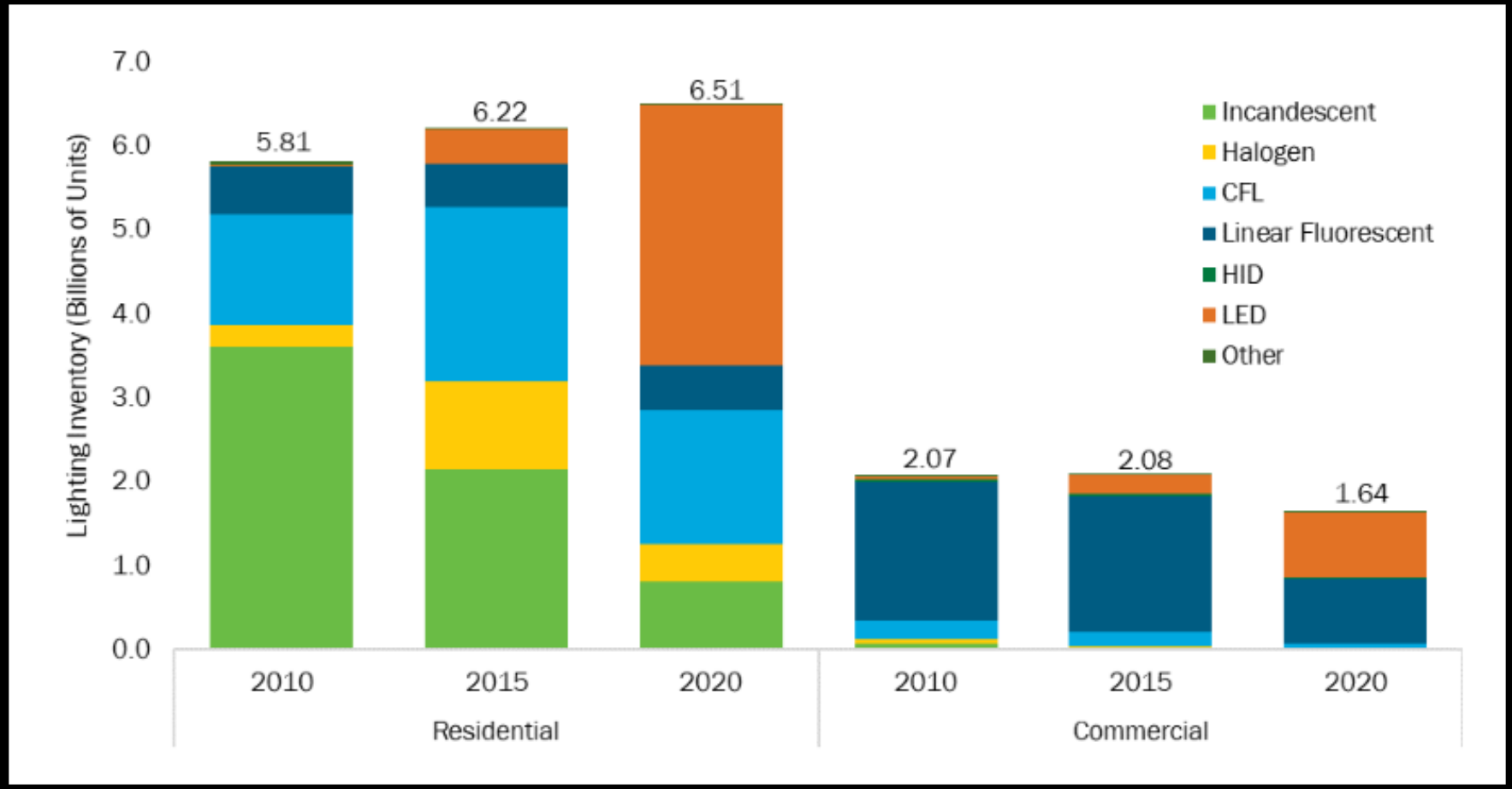
Wait, What is Sustainability?

- Energy Efficiency
- Circularity
- Embodied Carbon
- Operating Carbon
- Maintainability



LED Adoption

A brief history



Comparison of Lighting Inventories by Sector and Technology Type

Source: 2020 US Lighting Market Characterization (Published April 2024 by DOE SSL Program)
https://www.energy.gov/sites/default/files/2024-08/ssl-lmc2020_apr24.pdf

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The Early Days of LED

Next Generation Luminaires

Right to Repair

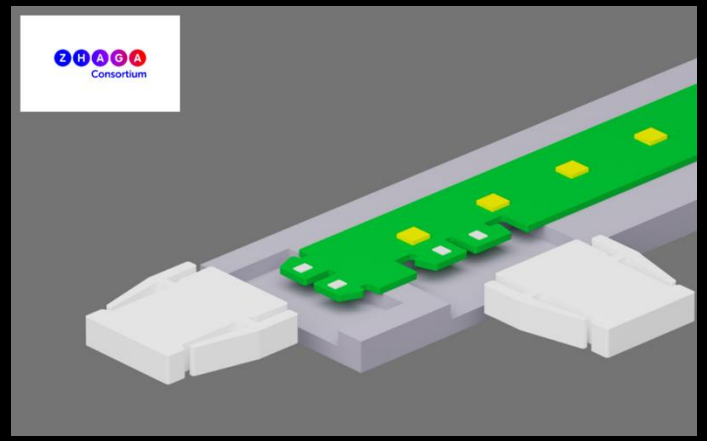
US and Europe

- Phones
- Tractors
- Light
- and more!

A Look at Europe

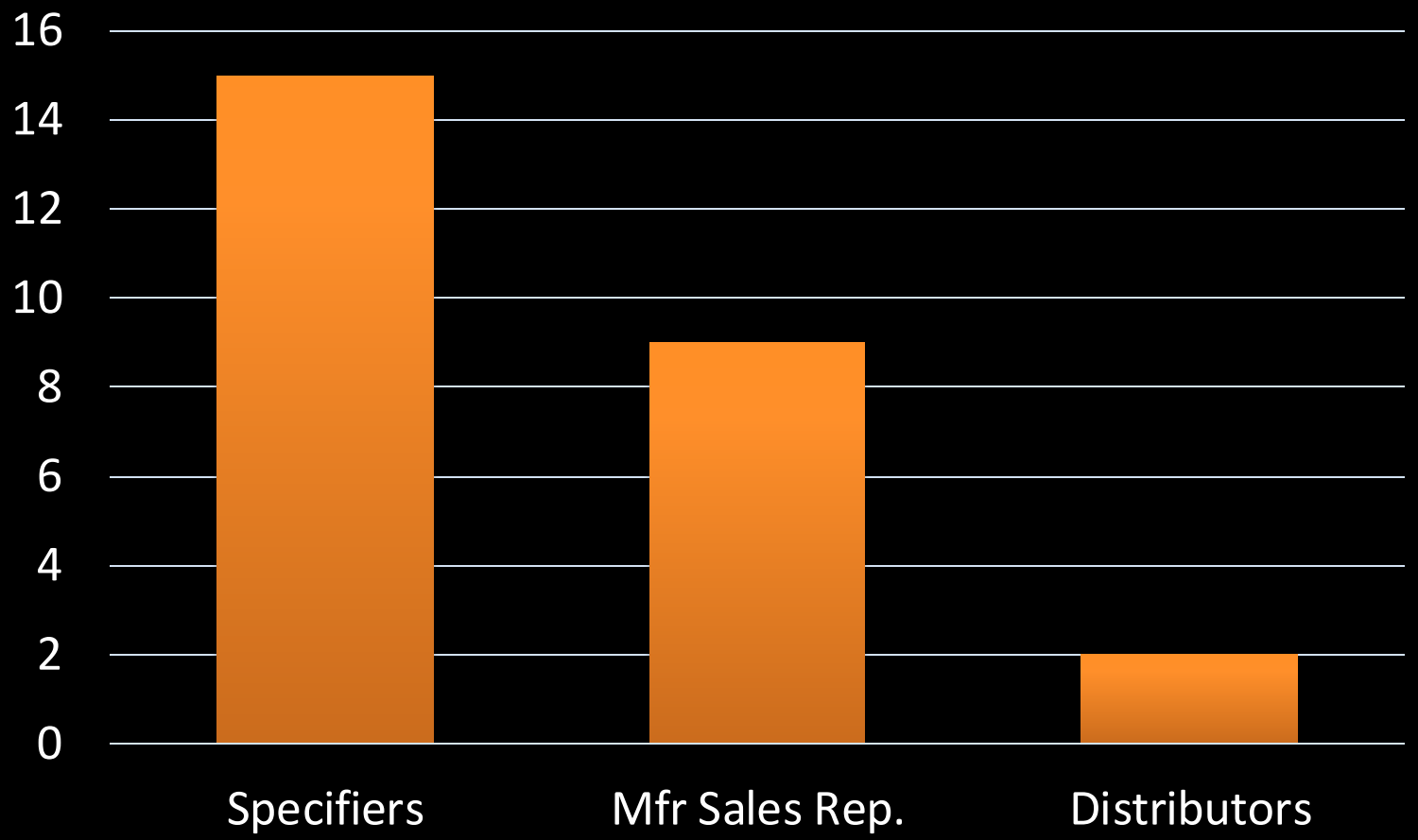
Zhaga

- Launched in 2010
- Misson: Standardize the interfaces of components of LED luminaires
- Interface specifications known as Books



Who do you listen to when trying to determine market demands?

Manufacturer Responses



Other Mentions

- End user
- Installation teams
- Electrical contractor
- European trends
- Lighting integrators

*Multiple answers allowed

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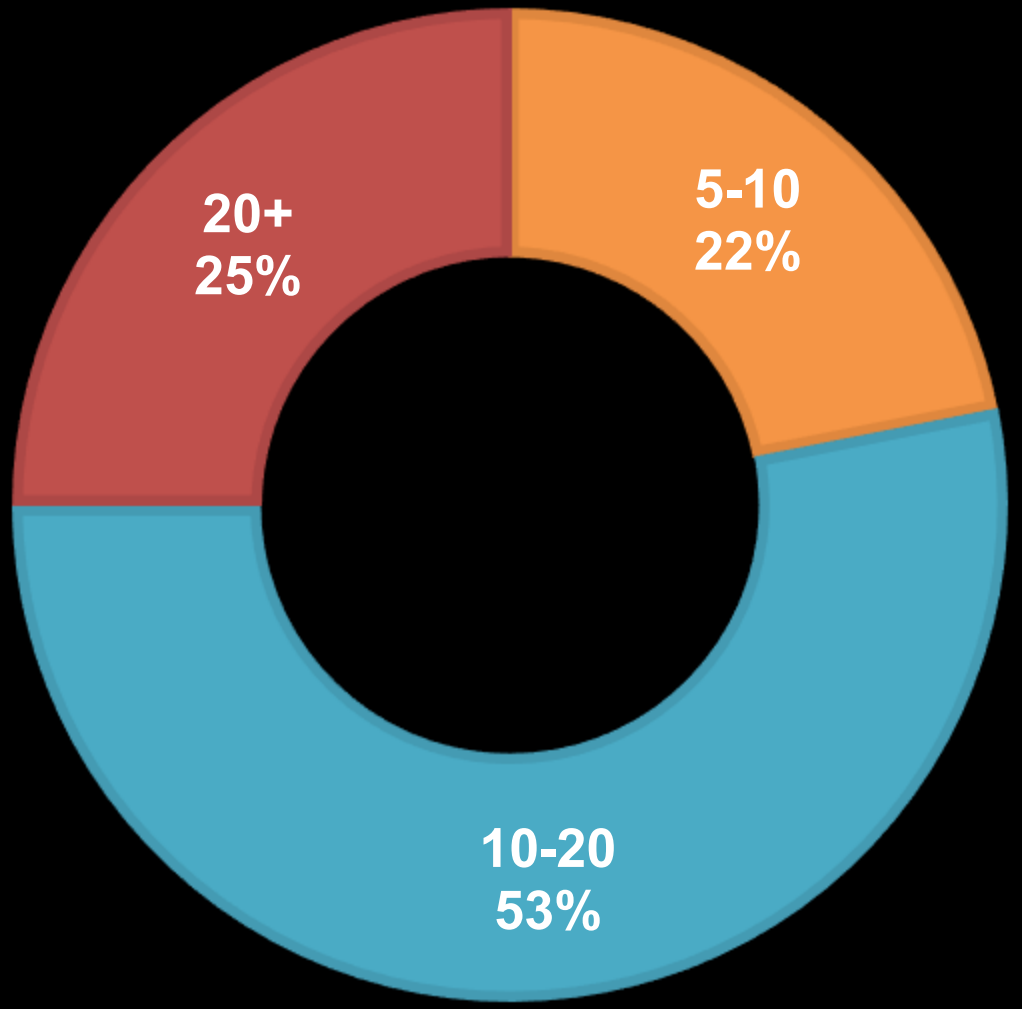
Specifiers: What lifetime range do you typically expect from the luminaires you specify?

What do you see as the life of your fixtures in terms of functional obsolescence? *(in years)*

Manufacturer Responses



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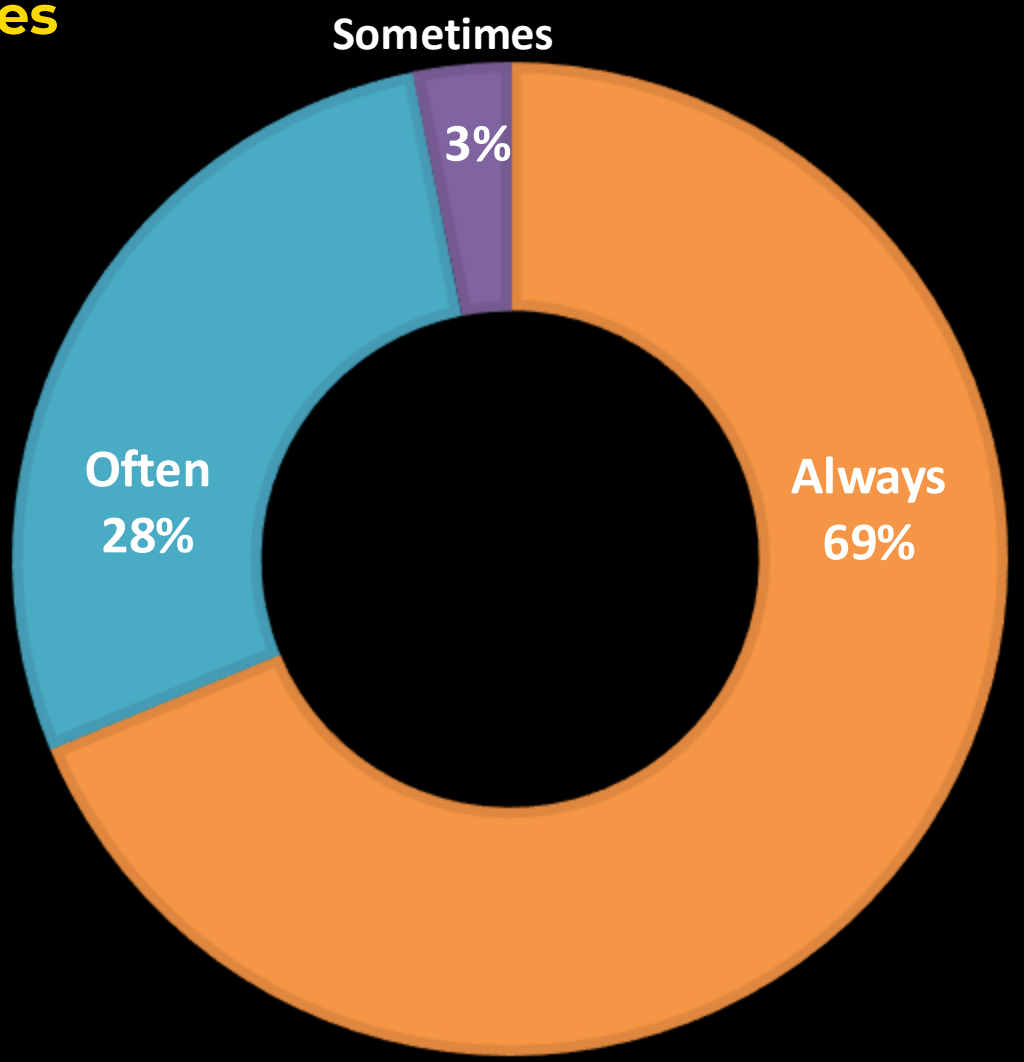
When designing new luminaires, how often do you think of maintenance?

Manufacturer Responses



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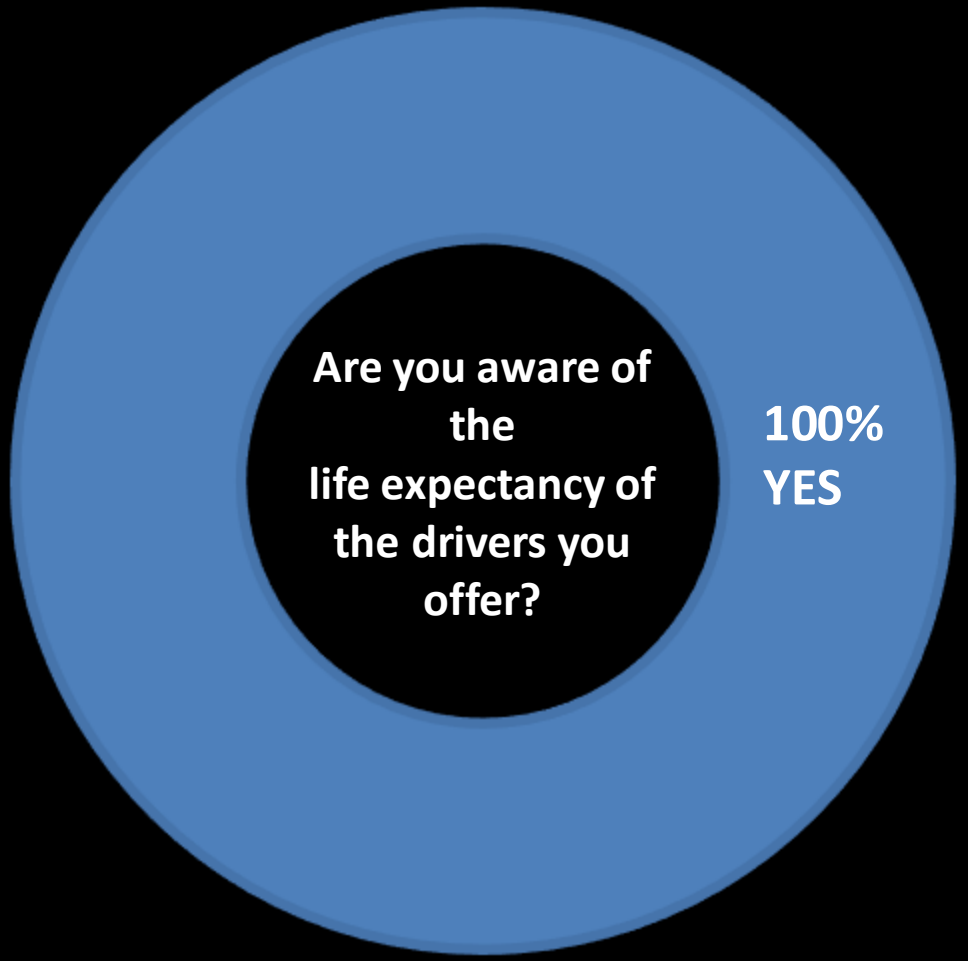
In your experience, are the luminaire and driver life TYPICALLY the same time frame?

- Yes
- No
- I think so?
- I don't know...

Specifiers: What percentage of the product you specify do you consider standard?

Driver Lifetime Discussion

Driver is the New Light Bulb



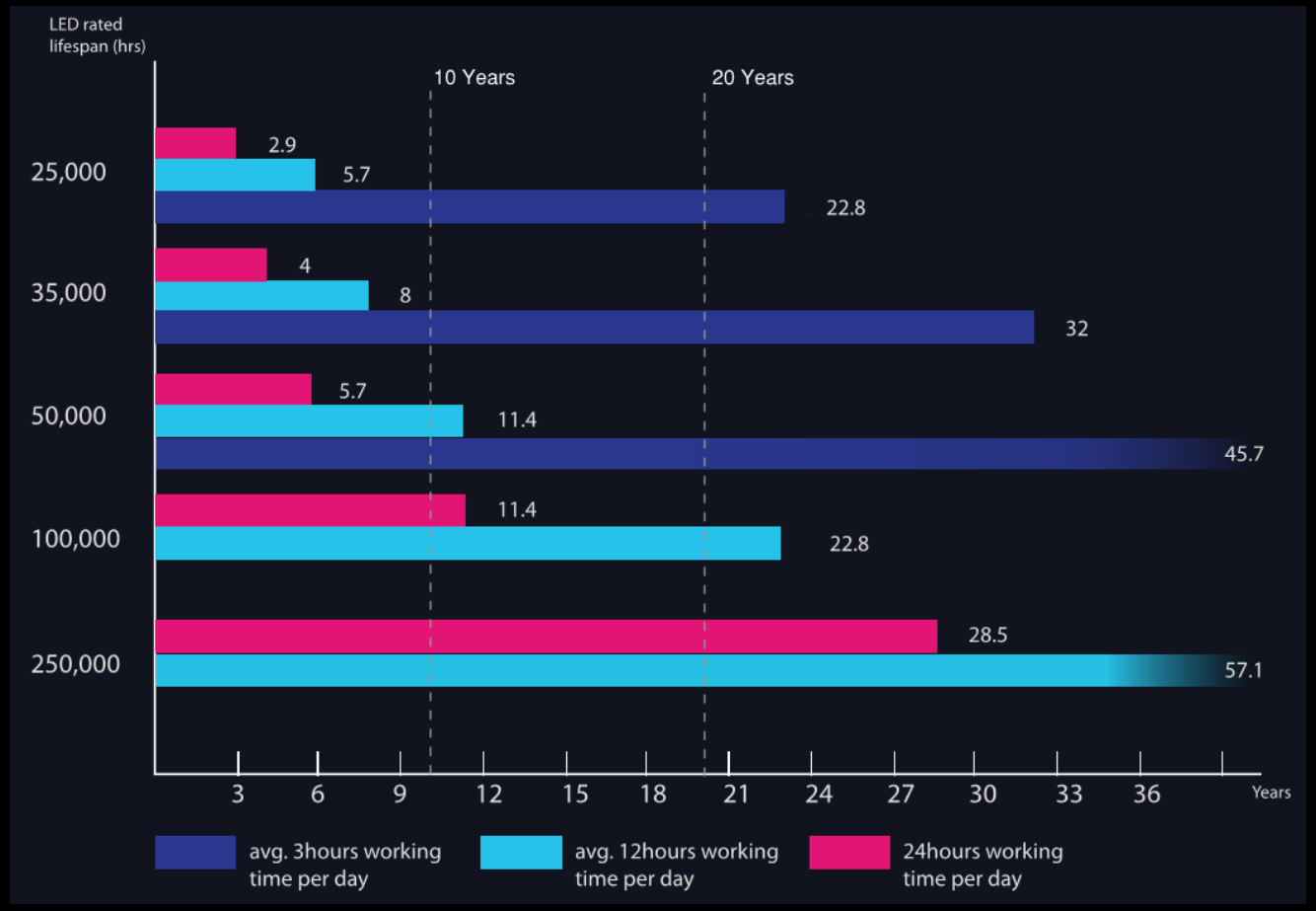
- If the L70 is 50,000 hrs, what is the life of driver?

- Listing the life of the driver on the spec sheet, under normal conditions
- What are the factors that shorten driver life? Heat
- How about some helpful hints on elongating the driver life?

Driver Lifetime Discussion

Driver is the New Light Bulb

- Manufacturers used to differentiate by lamp quality, now its by driver quality?

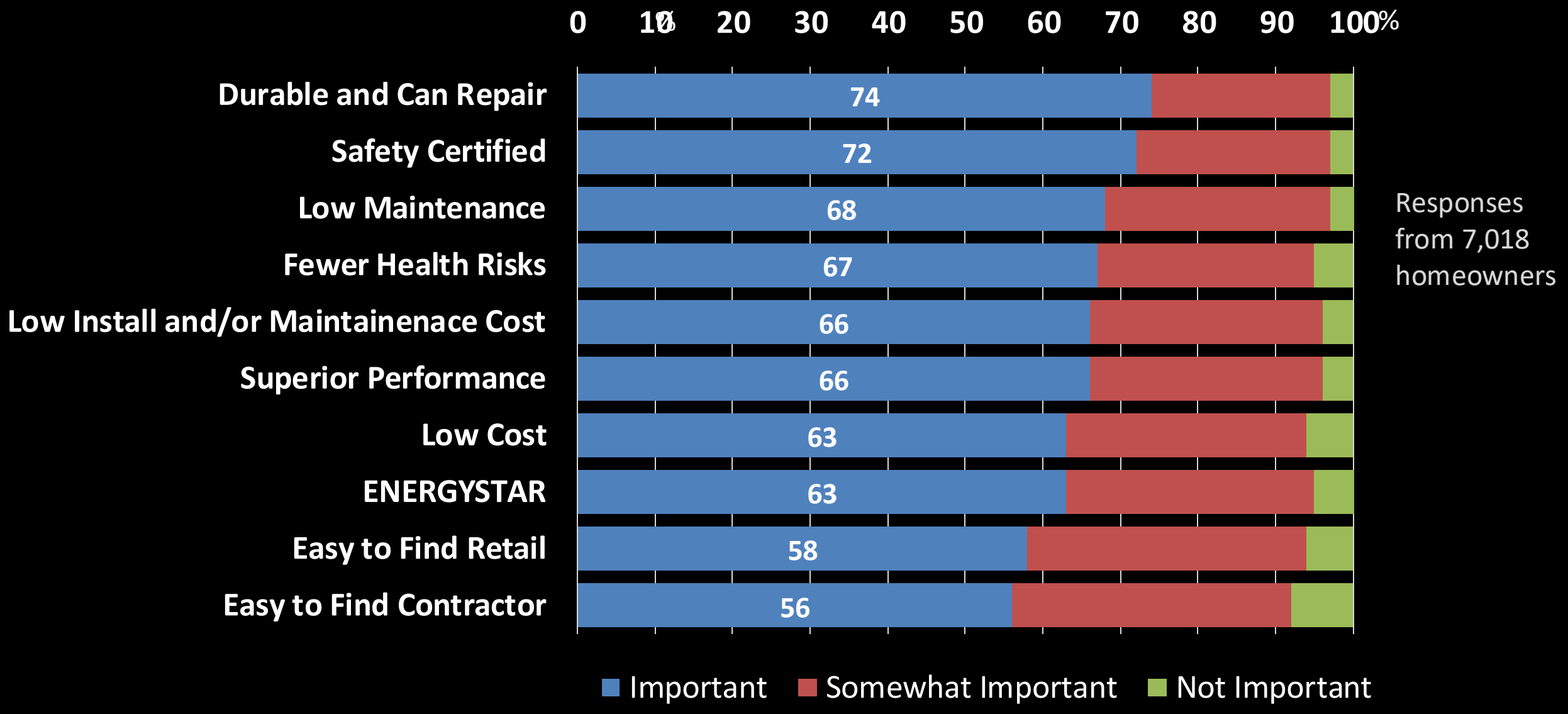


Mentimeter

What percentage of the products installed in your home are integrated LED products?

For Homeowners

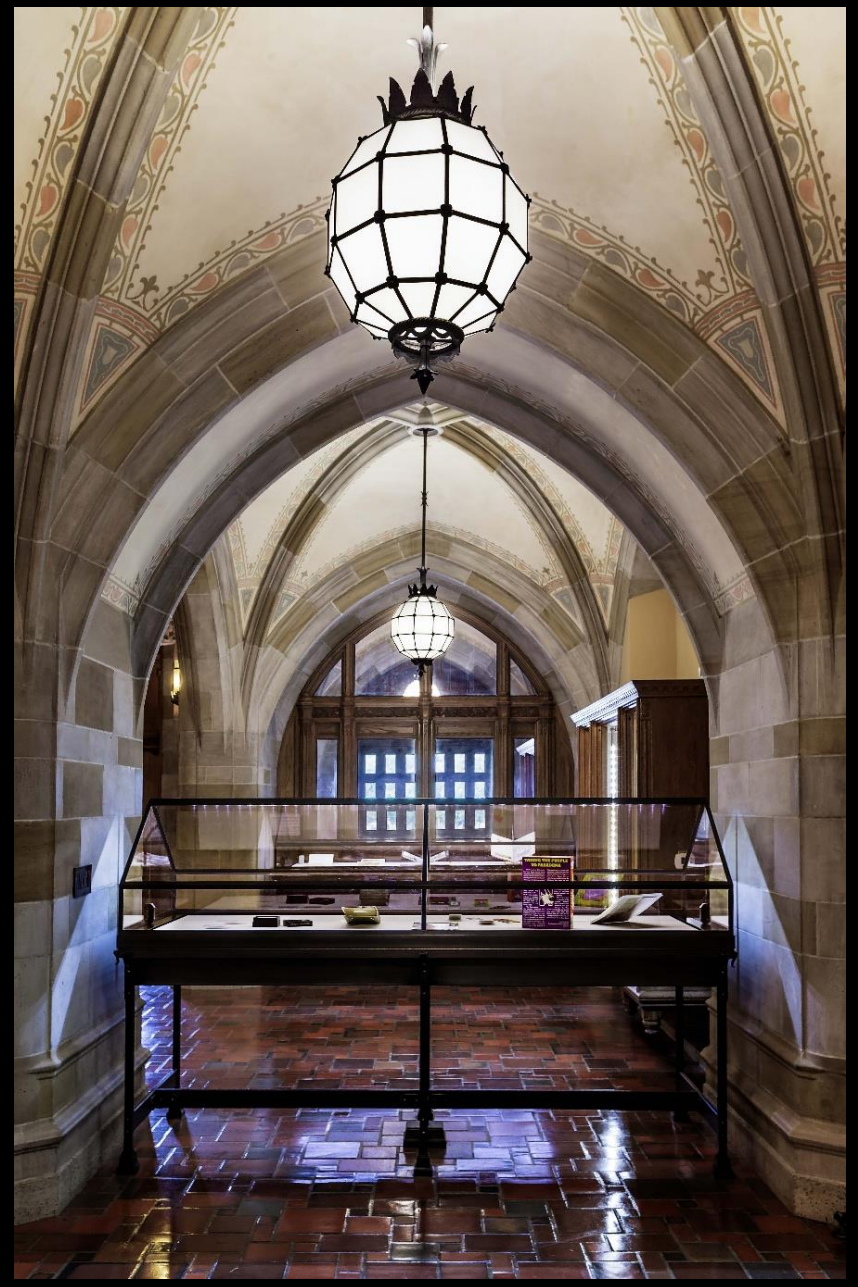
How important are the following factors when buying home appliances and tech?



Lighting History

Always have been able to re-lamp until now

- **Pros & Cons**
- **Die sooner?**
- **Can’t dim as low**
- **But…** *replaceable!!!*



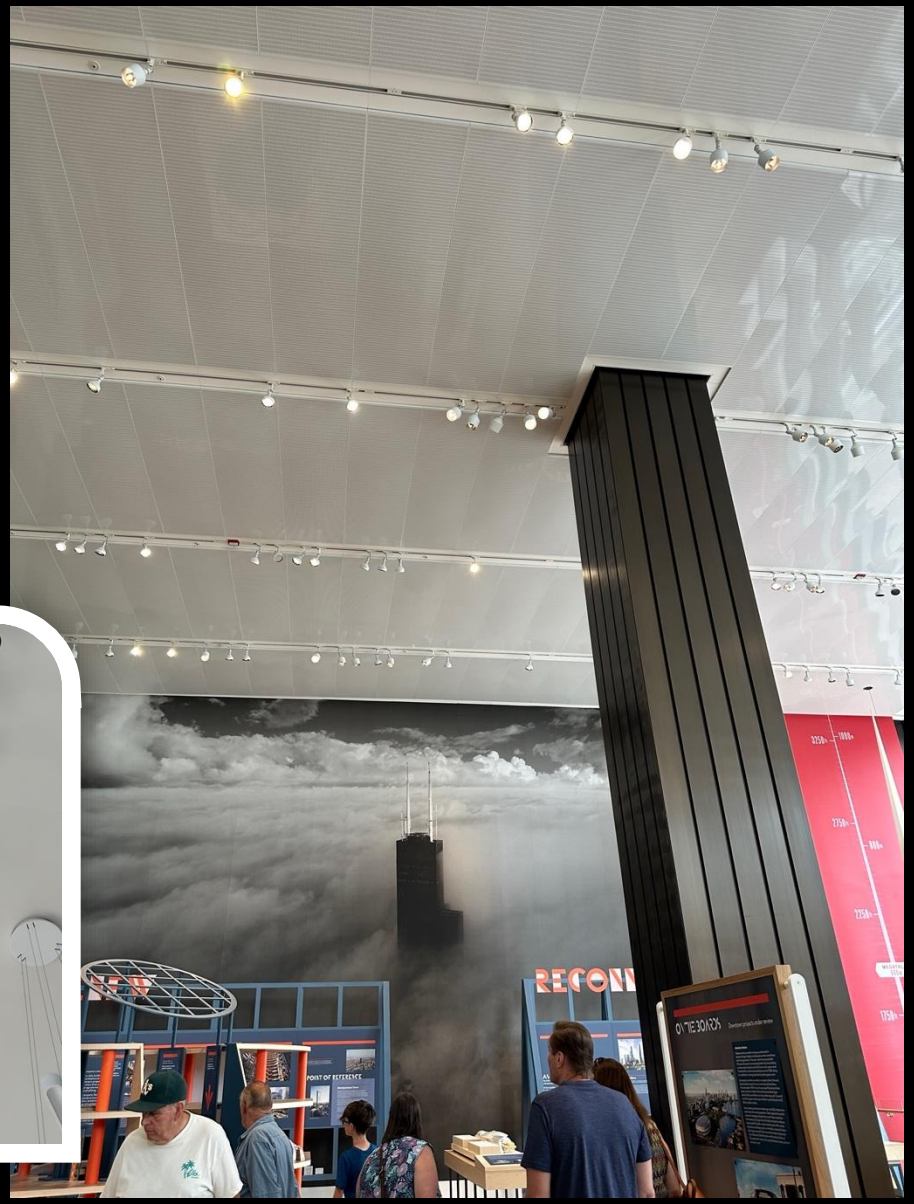
Lighting History

Always have been able to re-lamp until now

The Current Days of LED

Museums

- 7 Years installation
- Individually addressable heads
- Failures disengaged controllability
- Had to PAY to turn off lighting because lighting controls were



Retrofit Lamps

Necessity is the Mother of Invention!

Features

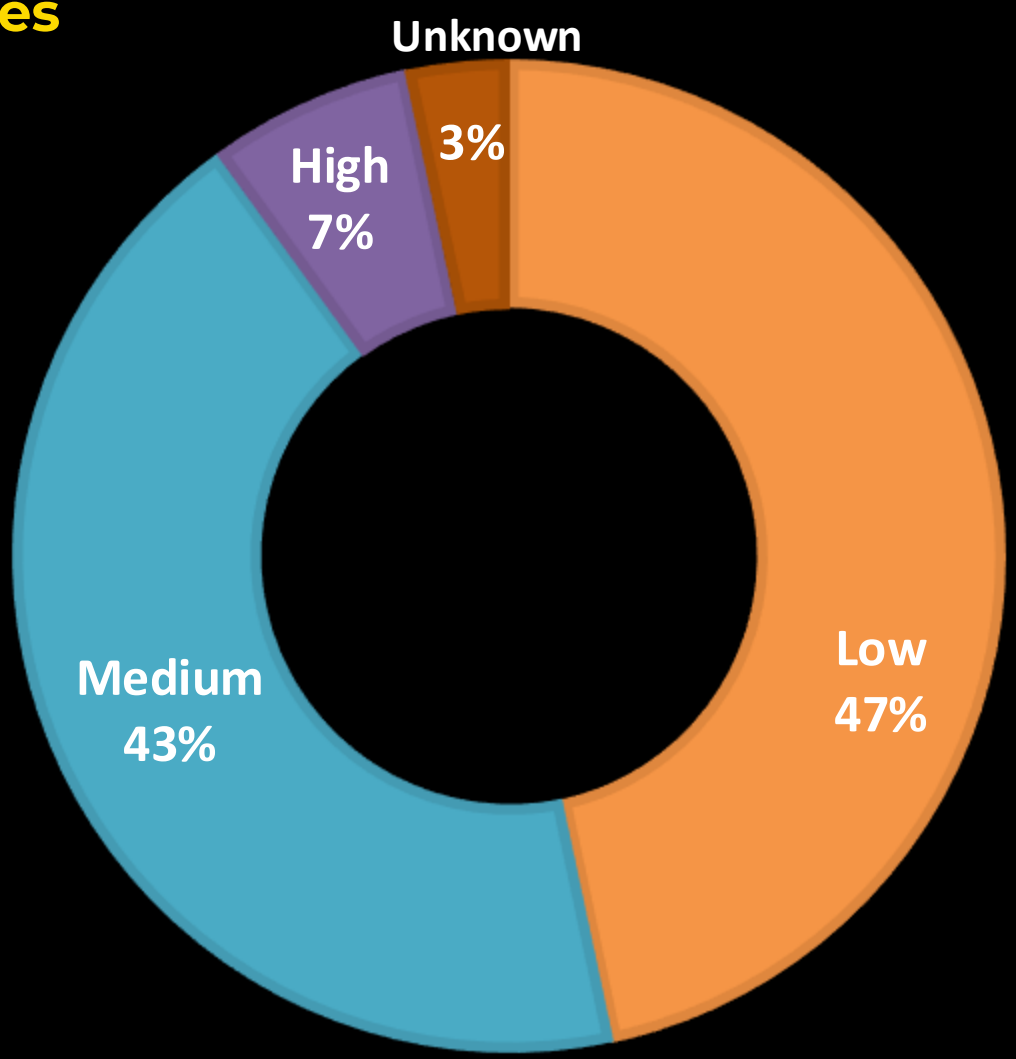
- Light source are replaceable LED bulbs
- Supports standard medium-base bulbs
- Uniformly lit lens/even light distribution
- Ultimate flexibility, maximum control of colours & brightness
- Economical with minimal manufacturing costs
- ECO Friendly eliminating harmful wasteful parts
- Interoperable with building management systems, smart systems, Wi-Fi, Blue tooth, etc.

  Thermal protected

Approval

What is the current market demand for replaceable components?

Manufacturer Responses



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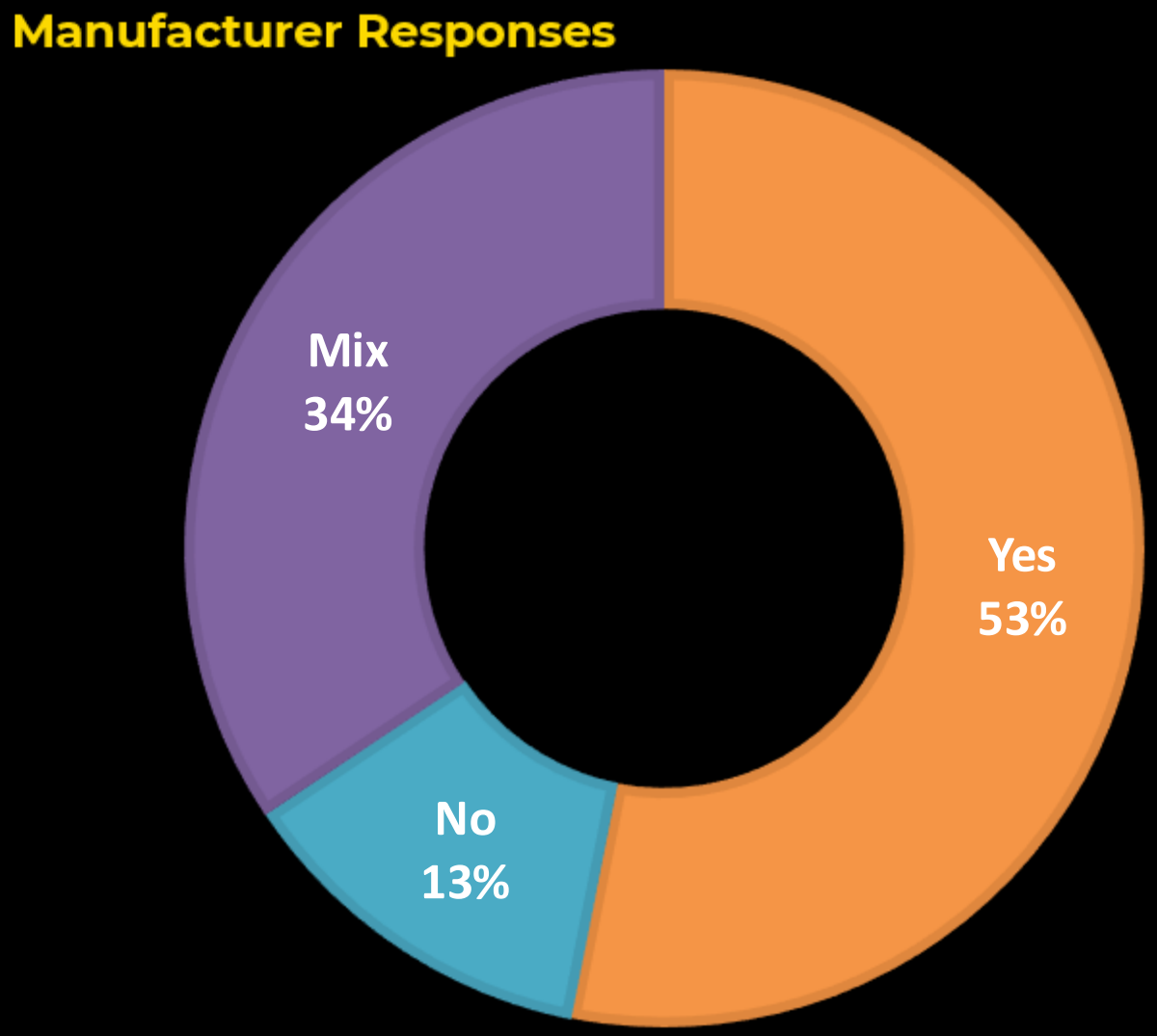
Do you design your luminaires with replaceable components? Are the components proprietary?



Comments

- Depends on the product, available technology
- Only to maintain UL

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How are Manufacturers Currently Addressing?

Component Replacement

- Ensure driver size corresponds with aperture

How are Manufacturers Currently Addressing?

Component Replacement

Providing field programmable drivers to replace failures

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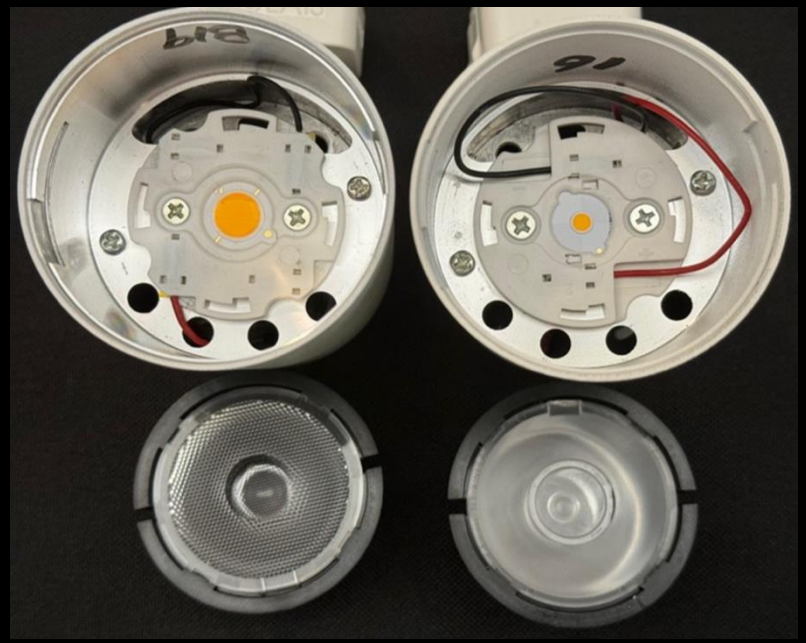
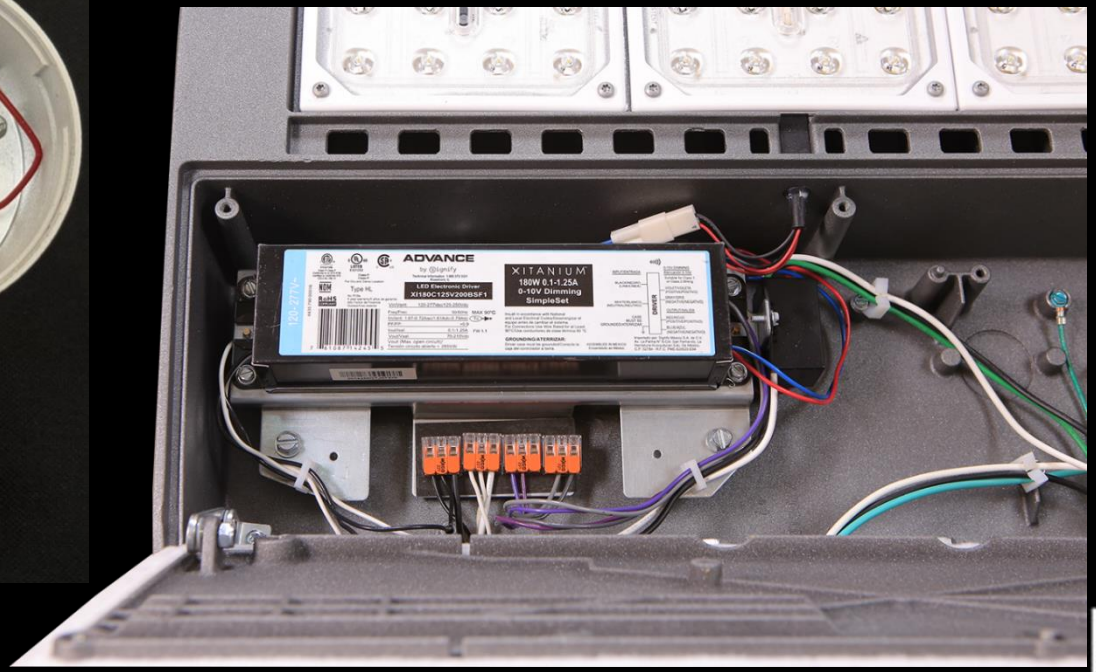
How are Manufacturers Currently Addressing?

Component Replacement

- Accessible driver trays for easy replacement
- Wiring connectors / maintenance friendly
- Replaceable light engines & boards





All Light Squares are mechanically compatible since 2012 and electrically compatible since 2017

Driver trays are easily accessed and replaced

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How are Manufacturers Currently Addressing?

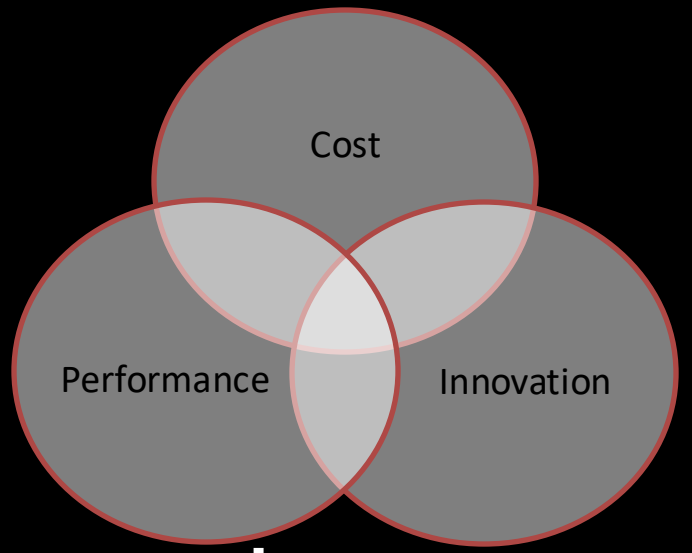
Education #RepairBeforeReplacement

Educate End Users that the power supply is most likely to fail first

- **Signs to look for:**
  - **Flickering lights**
  - **Dimming issues**
  - **Buzzing noises**
  - **Inconsistent brightness**
  - **Color shift**
- **Ensuring replacement instructions are included in project turn-over documents**
- **Providing labels on fixtures so that end users know what to order for replacement**
- **Keeping stock of old technology for 15 years or more**

What are the barriers?

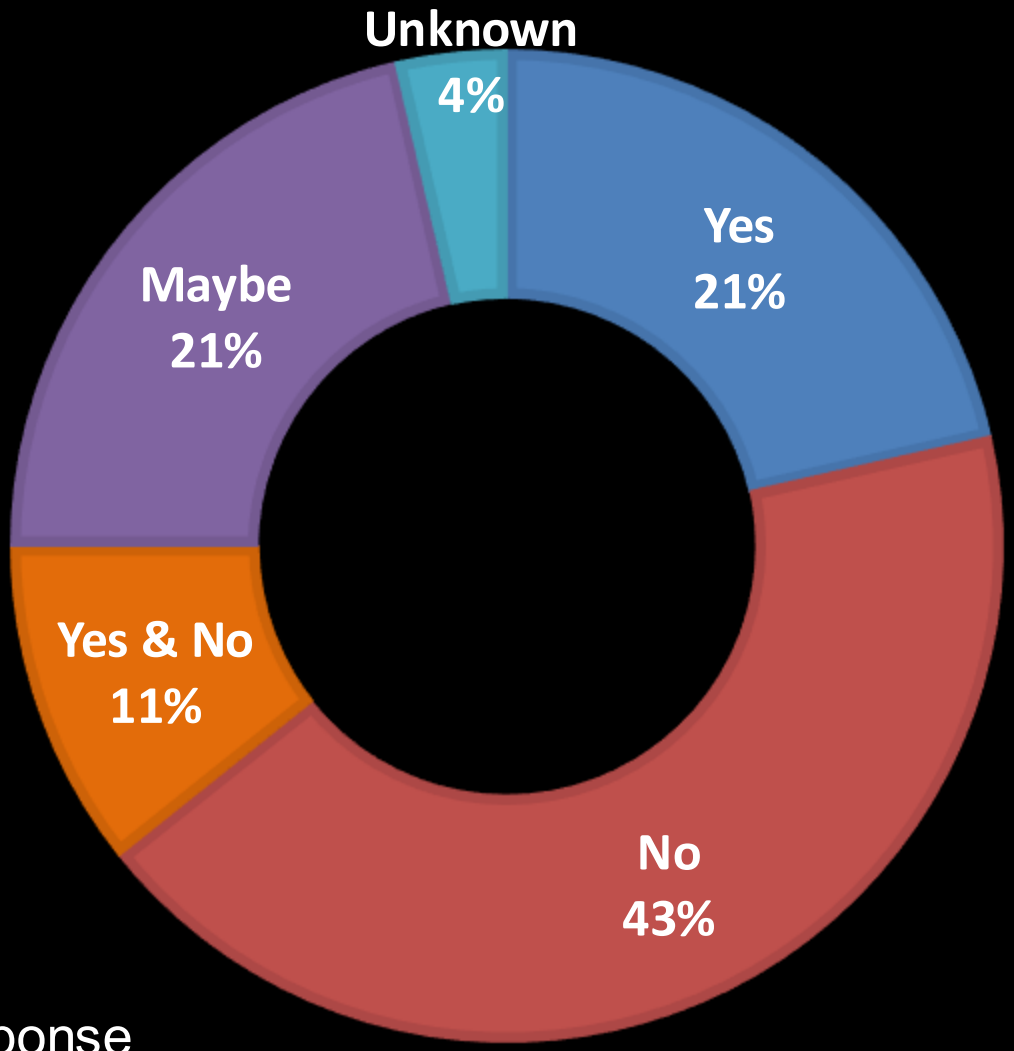
Manufacturer Responses



- Lose competitive advantage
- Demand for smaller luminaires
- Demand for custom options, unique lighting products
- Continuous technology advancement, products become obsolete
- Cost and complexity, requires parts that are more expensive that will get cut during VE process
- Current standardized components are too big, too expensive with poor performance
- Need to focus on upgradable and replaceable, not standardization

Is there enough demand to advance development and standardization of replaceable components?

Manufacturer Responses



- “Needs to be driven by voluntary standards AND specification community”
- “Discussed regularly and our manufacturer reps come to us with ideas”
- “Demand seems to be growing”
- “Manufacturers want differentiation and different functional requirements for their products”

*Open response

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What are the Next Steps, Specifiers?

- Design community must require in specifications, be willing to hold the spec
- Be selective – when / where does maintainability matter most
- When speaking with manufacturers /reps, ask for circularity options
- Educate Owners / Clients
- Require attic stock for fixtures with replaceable components

Specifiers: Do you anticipate adding maintainability to your specifications in the coming year?

What are the Next Steps, Manufacturers?

- Consider LED board upgrades as part of design process
- Current component manufacturers need to provide higher quality / longer life
- Driver location is accessible, allows for replacement
- DC/DC solutions connected to a remote front end power supply
- Standard case sizes and connection for drivers, with identification

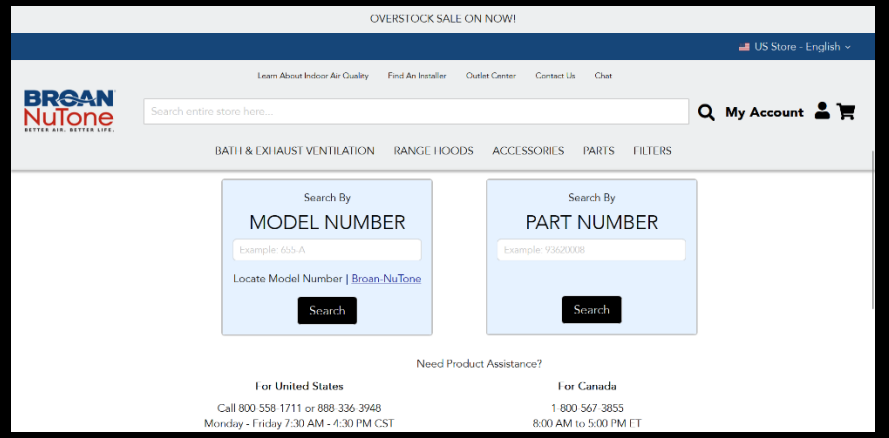
What are the Next Steps?

Manufacturer Responses

- Use of programmable Class P drivers
- Mandatory in UL and CSA standards that all components are accessible and replaceable
- Determine what components are replaced and by whom
- Maturing of specific component types with standardized connections

Some Options / Solutions

Specifier Needs



- **Life of the drivers listed on the spec sheet**
  - **Are there options for longer life**
- **Attic stock** *(mandatory maintenance components)*
- **List the part numbers on the spec sheet**
- **Provide labels, QR codes, etc. on products so end user can contact manufacturer, provide a 'website look-up' option**
- **For Standard Products –**
  - **Adapt the technology to offer standard lumen outputs & beamspreads**
    - **i.e.: If the line offers an 1100 lumen fixture, with 15°, 25°, & 40° beamspreads, then continue to offer them with the new technology**
  - **Offer easy connectors to change out Drivers, LEDs & Optics**
  - **Put conditions that increase the driver/LED life**
    - **i.e. In-ground uplights – use remote driver**
  - **Manufacturers to include best practices to limit failure points**

If I had three wishes…

Specifier Needs

Have a tab for sustainability to cover:

Declare.

Red List Free

INTERNATIONAL LIVING FUTURE INSTITUTE

RoHS COMPLIANT

M

Possible example of Maintainable fixture listing with replaceable parts

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What next steps make most sense to you?

0
Encourage Attic Stock

0
Add Replaceable to Specifications

0
Drivers with Similar Form Factors

0
More Quick Connects

0
Standardization Consortium

0
Upgradeable LED boards

How do WE improve together?

All responses to your question will be shown here

Each response can be up to 200 characters long

Turn on voting to let participants vote for their favorites

In Conclusion: It takes all of us

This is just the beginning of the conversation

- Serviceability needs to be a consideration during product development
- Design products to last longer
- OEM Plug-n-play components
- Specifiers must consider project lifetimes when during specification process; hold specs when reparability is critical
- Owners / clients should be educated on tradeoffs

This concludes The American Institute of Architects Continuing Education Systems Course

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Sutton North Room

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