Bringing Efficiency to Light℠

Final Testing and Reporting Requirements for LED-based Horticultural Lighting: Version 1.0

2018-10-03

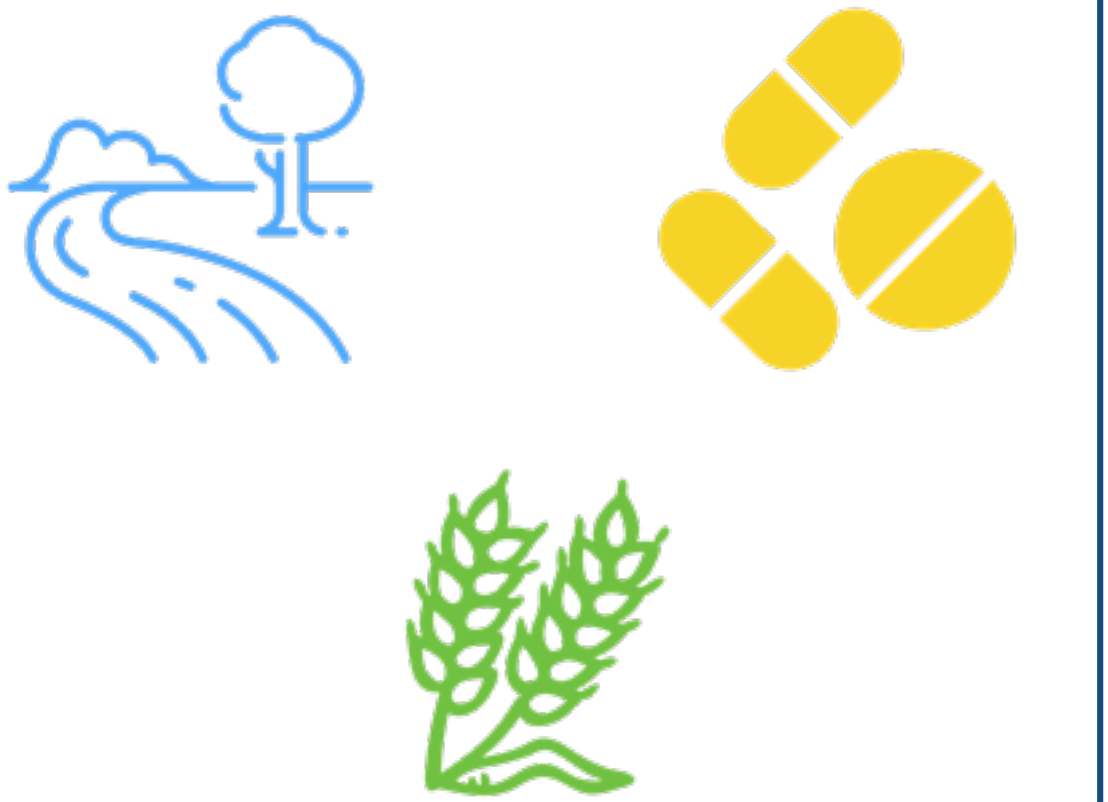
Bringing Efficiency to Light℠

- Slides will be posted on www.designlights.org after presentation
- Please use the GoToWebinar Interface (Question Pane) to ask questions during today's webinar

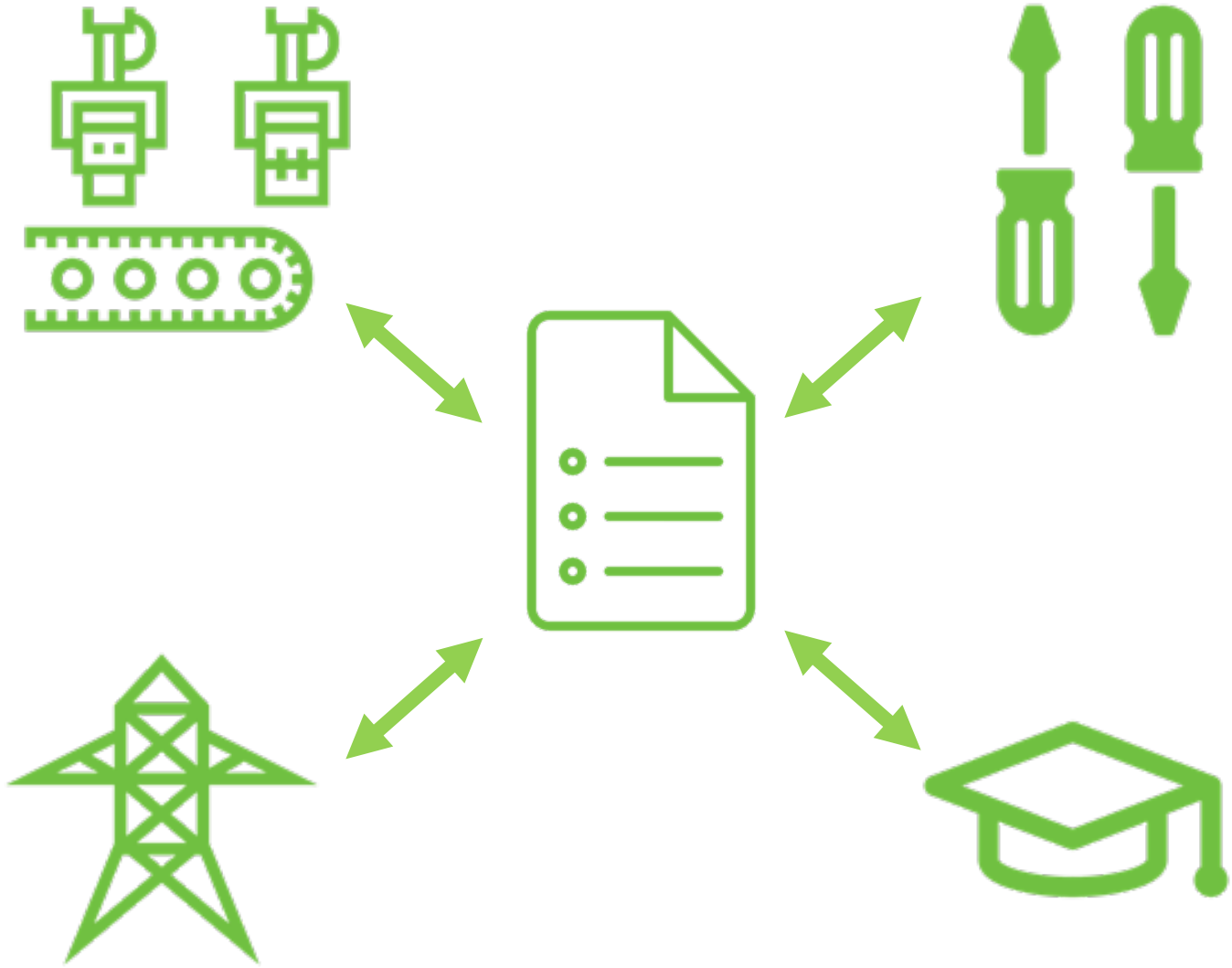
Agenda

- Welcome
- Review of DLC & Its Development
- Review Requirements
- Timelines
- Supplemental information

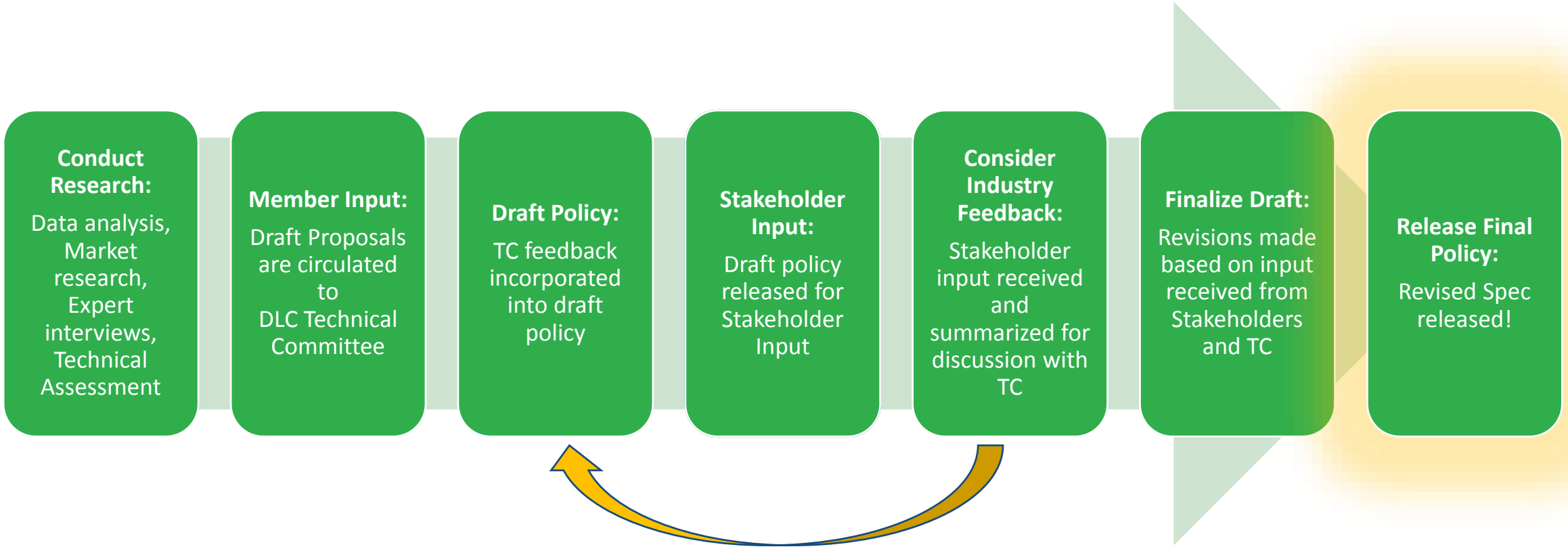
Why Horticultural Lighting?



DLC Makes Tools, Stakeholders Use Them



Stakeholder Input Is Critical



What is the Project Plan/Timeline?

July 2017	• DLC stakeholder meeting sessions
August 8, 2017	• ASABE S640 published
Late Fall 2017	• DLC specification development begun
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Final requirements

So, what's the spec?

LED Horticultural Fixture

So, what's the spec?

- PAR, as defined by ASABE ES-311 S640, is the foundation of this specification
- It is *not* the global solution for all plant needs!
  - But good luck trying to grow plants without it
- Our judgements focus on balancing the tension between:
  - What is the most PAR-efficacious way to produce light for the plants with SSL sources, relative to incumbent sources?
  - What is a reasonable amount of efficacy headroom to leave for ex-PAR (280-400, 700-800 nm) 'light recipes' and crop diversity?

So, what's the spec?

Parameter/Attribute/Metric	Requirement	Requirement Type	Method of Measurement/Evaluation
Photosynthetic Photon Flux (PPF), (µmol/s)	n/a	Reported	(LM-79-08) 400-700nm range, with 400-500nm, 500-600nm, and 600-700nm bins reported alongside the total
Far Red Photon Flux (PF_{FR}), (µmol/s)	n/a	Reported	(LM-79-08) 700-800nm range
Spectral Quantum Distribution (SQD) (µmol/s/nm)	n/a	Reported	(LM-79-08) 400-800nm range
Photosynthetic Photon Intensity Distribution (PPID) (µmol/s/sr)	n/a	Reported	(LM-79-08) 400-700nm range

So, what's the spec?

Parameter/Attribute/Metric	Requirement	Requirement Type	Method of Measurement/Evaluation
Photosynthetic Photon Efficacy (PPE), (µmol/J)	≥1.9 µmol/J, with -5% tolerance	Required/Threshold	(LM-79-08) 400-700nm range
Photosynthetic Photon Flux Maintenance, PFM_P	Q_{90} ≥36,000h	Required/Threshold	(LM-80-15 / TM-21 or LM-84 / TM-28) 400-700nm range
Far Red Photon Flux Maintenance, PFM_{FR}	Report time to Q_{90}	Reported	(LM-80-15 / TM-21 or LM-84 / TM-28) 700-800nm range

So, what's the spec?

Parameter/Attribute/Metric	Requirement	Requirement Type	Method of Measurement/Evaluation
Warranty	5 years	Required/Threshold	Legal Warranty Terms & Conditions
Driver Lifetime	≥50,000 hours	Required/Threshold	Driver Technical Specification Sheet, Fixture Technical Specification Sheet, and In-Situ Temperature Measurement Test (ISTMT)
Fan Lifetime	≥50,000 hours	Required/Threshold	Fan Technical Specification Sheet, Fixture Technical Specification Sheet
Power Factor	≥0.9	Required/Threshold	Electrical testing per LM-79-08

So, what's the spec?

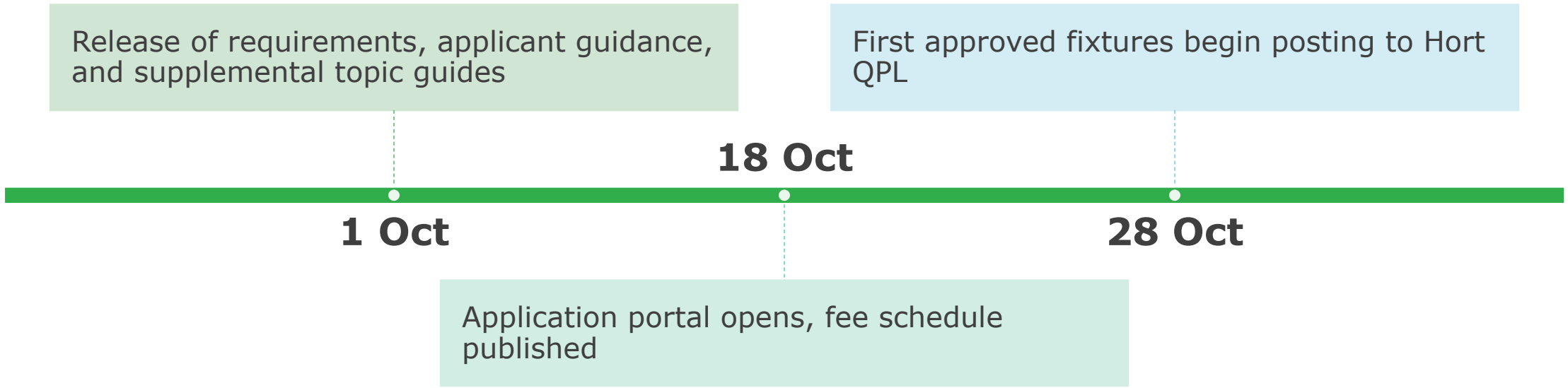
Parameter/Attribute/Metric	Requirement	Requirement Type	Method of Measurement/Evaluation
Total Harmonic Distortion, current	≤20%	Required/Threshold	Electrical testing per LM-79-08
Safety Certification	Appropriate Horticultural Lighting designation by OSHA NRTL or SCC-recognized body	Required/Threshold	Per safety certification body

So, what's the spec?

Parameter/Attribute/Metric	Requirement Requirement Type Method of Measurement/Evaluation
Power Mode	AC line-voltage is the only approved means of powering fixtures. Future revisions may open this up to more modes, especially as we gain experience with DC / PoE in the general SSL category.
Spectrally tunable	Test in the most consumptive single mode, then with isolated channels (CH1 = Max, all others = Min, etc). Spectral quantum distribution will be displayed in table on QPL. Special considerations exist for extrapolating flux maintenance of each channel; please refer to requirements document.

Timelines

Short-Term Timeline

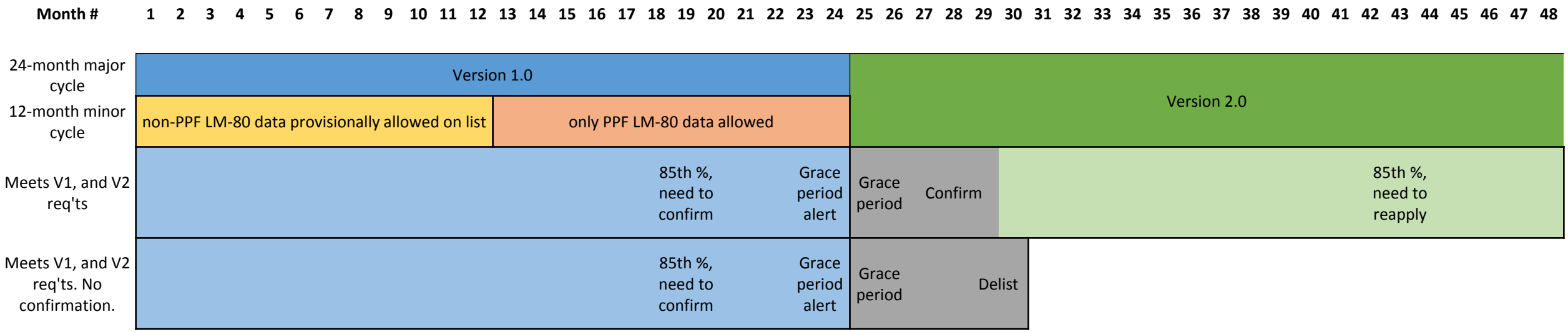


We expect a significant application review backlog from already-available products, and are staffing to address this as quickly as possible. As the application queue stabilizes, we will begin publishing expected timeframes for applicants.

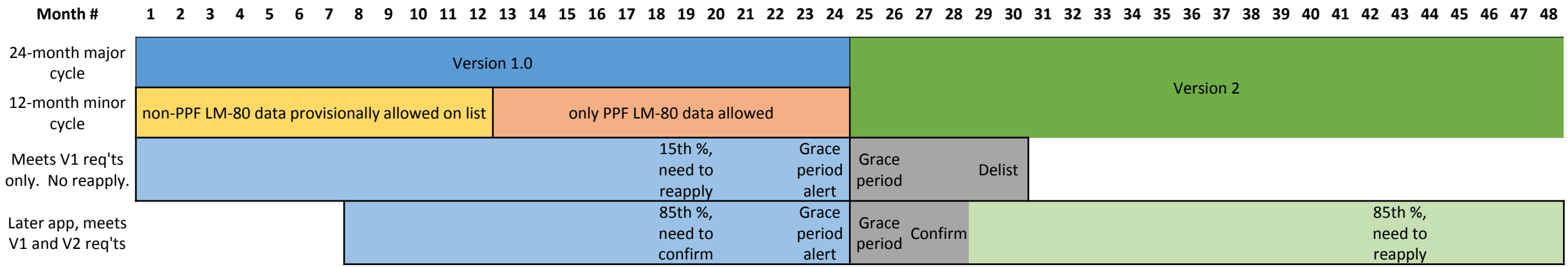
First-Year Timeline

- Non-PAR flux maintenance data will be accepted, with caveats, for all applications through **September 2019**.
  - Must explain data and conversion factors
  - Application fee will be higher, and will take longer
  - Will be listed with an asterisk (*) on the Hort QPL
  - Must update listing to PAR-based flux maintenance data, or be delisted, in **April 2020**
  - If you do not have this data for your LEDs, begin testing now!
- PPID and SQD will be submitted as static images through **September 2019**
  - Starting in **October 2019**, TM-33-based data will be required. Static images derived from this data will be posted to the Hort QPL to respect concerns of proprietary info.
  - This XML-based reporting format promises to decrease review time and increase accuracy.

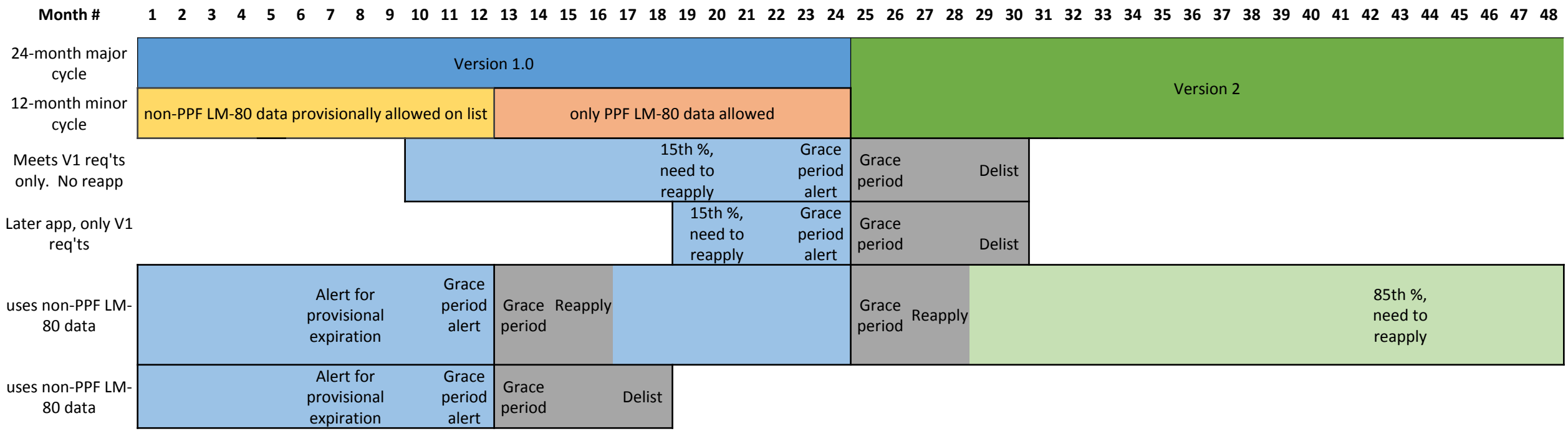
Spec Revision Cycle



Spec Revision Cycle



Spec Revision Cycle



Supplemental information

What about . . .

- LM-79-08 vs. ASABE ES-311 X642?
  - Once ES-311 X642 completes its approval by ANSI, and major test labs complete accreditation to this standard, the DLC will begin requiring test reports based on this format. Applicants will receive ample notice through our email list and website alerts.

Guides posted at designlights.org

- Supplemental Guides are posted for explaining the DLC's thoughts on
  - Units of measure
  - The necessity of whole-facility application designs
  - Challenges in UV measurement
  - Externally-supplied, actively-cooled fixtures
- An applicant guide is posted, explaining each section of the application in detail.

Summary

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Thank You!

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Thank you!