



Stakeholder MEETING

2017

Digging Deeper: Horticultural Lighting

Presenters



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DLC

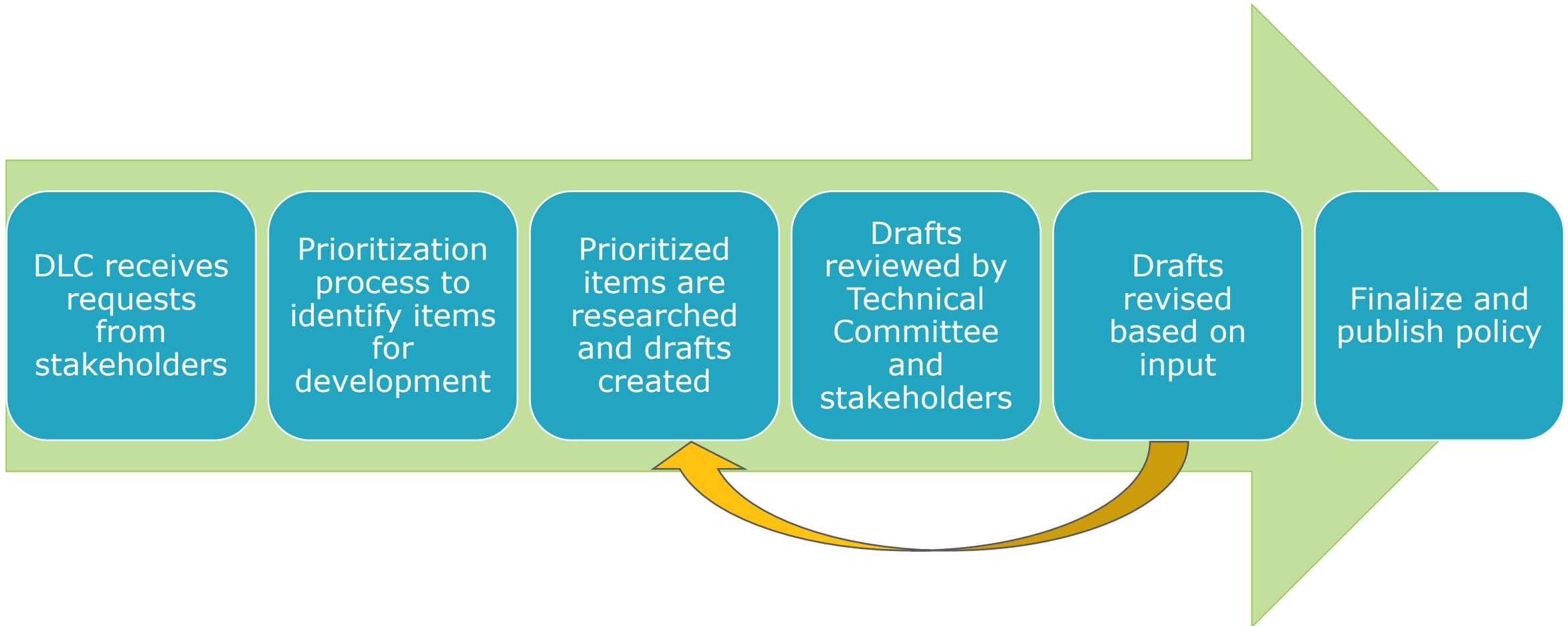


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Agenda

- Stakeholder Input Process
- Hort Lighting Scope and Timeline
- Background
- Spec Development Needs
- Discussion

Stakeholder Input Process

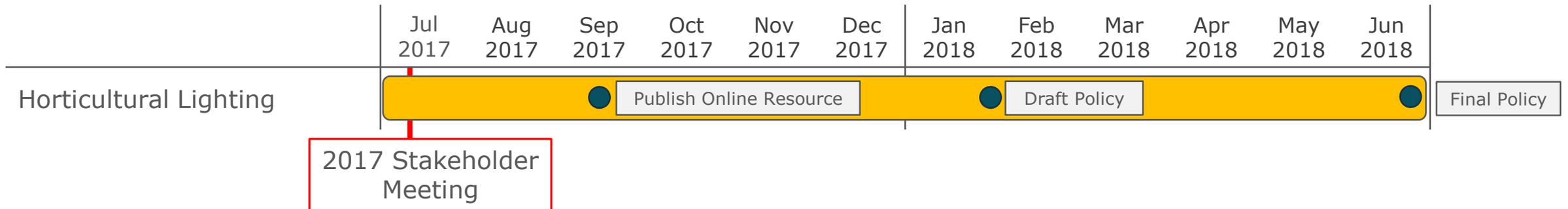


Horticultural Lighting

Problem Statement

Horticultural lighting is the fastest growing electric load for DLC-member utilities. Manufacturers and utilities would like to see DLC address this topic, but industry-accepted standards, metrics, and best practices do not yet exist.

Scope and Timeline



Hort Near-Term Tasks:

- Participate in industry working groups on standards development
- Create near term position paper or guidance doc to explain market development status and product considerations
- Investigate interim solution to report product data until standards are ready

ASABE ES-311

- ASABE: American Society of Agricultural and Biological Engineers
- ES-311: Plant Growth LED Lighting Committee
- Task Force 1: Metrics
 - Past final committee ballot, awaiting ASABE approval, will be submitted to ANSI for approval
- Task Force 2: Testing
 - Under committee ballot
- Task Force 3: Performance
 - Under development

Potential Market Paradigm

1. ASABE TF3 document will lay out parameters that need to be known/considered to determine installation/lighting needs
2. Grower/Specifier will take this information to build a spec for product selection
3. DLC QPL will have verified list of products meeting minimum thresholds
 - a) Published performance data
 - b) Enable utility incentives

Elements of a DLC Spec

1. What types of products need to be covered?
2. What are the metrics?
3. Where to set the minimum thresholds?
 - a) Will products meet customer needs and save energy?
4. Is there a standardized test procedure?
 - a) Are there labs accredited to that standard?

Categorization

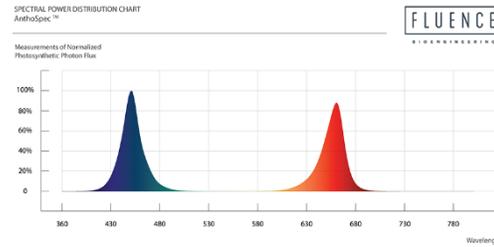
- Align with current structure?
 - Category → General Application → Primary Use Designation
- Focus on form factor?
 - Lamps
 - Luminaires
 - Intended replacement?
- Focus by application?
 - Top lighting
 - Side lighting
 - Multi-layer
 - Greenhouse?

#	Category	General Application	Requirements							Primary Use***	Distribution
			Minimum Light Output (lm)	DLC Standard			DLC Premium**				
				Minimum Efficacy (lm/W)	Minimum Warranty (years)	CCT / CRI / L ₇₀	Minimum Efficacy (lm/W)	Minimum Warranty (years)	CCT / CRI / L ₇₀		
1	Outdoor	Outdoor – Low Output	250-5,000	90	5	≤5700 / ≥65 / ≥50,000	110	5	≤5700 / ≥65 / >36,000 / ≥50,000	<ul style="list-style-type: none"> • Outdoor Pole/Arm-Mounted Area and Roadway Luminaires • Outdoor Pole/Arm-Mounted Decorative Luminaires • Outdoor Full-Cutoff Wall-Mounted Area Luminaires • Outdoor Non-Cutoff and Semi-Cutoff Wall-Mounted Area Luminaires • Bollards • Parking Garage Luminaires • Fuel Pump Canopy Luminaires • Landscape/Accent Flood and Spot Luminaires • Architectural Flood and Spot Luminaires • Stairwell and Passageway Luminaires • Specialty: _____ 	See Primary Use Zonal Lumen Density Requirements in Table 4, below
2		Outdoor – Mid Output	5,000-10,000	95			115				
3		Outdoor – High Output	10,000-30,000	100			120				
4		Outdoor – Very High Output*	≥30,000	100			120				
5	Indoor	Interior Directional	250-4,500	65	5	≤5000 / ≥80 / ≥50,000	90	5	≤5000 / ≥80 / >36,000 / ≥50,000		
6		Case Lighting	≥50 lm/ft ₂	80			125				
7		Troffer	≥1,500	100			125				
8		Linear Ambient	≥375 lm/ft ₂	105			130				
9		High Bay	≥5,000	105			130				

Spec Elements

- Currently

- Output
- Efficacy
- Distribution/Uniformity
- CCT/CRI
- Power Quality
- Lumen Maintenance
- Safety
- Warranty

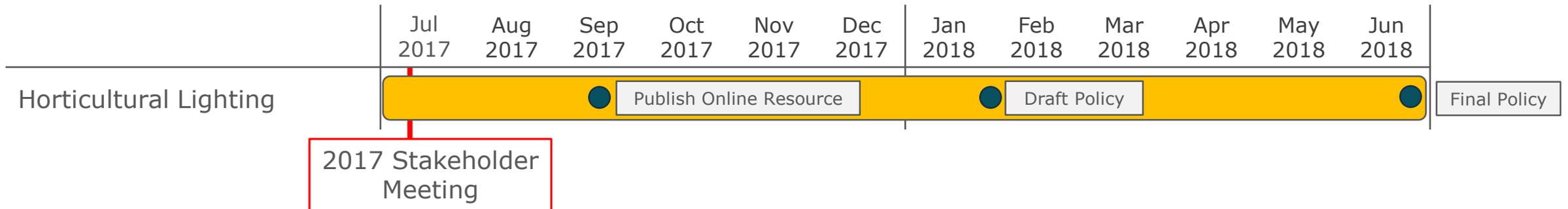


Photon flux (at 61 cm mounting height):	
Waveband (nm)	Photon flux ($\mu\text{mol}/(\text{m}^2\text{s})$)
300-399	0.7
400-499	35.1
500-599	77.9
600-699	70.4
700-799	11.2
800-900	1.3
300-900	196.6

- Horticultural?

- PPF
- $\mu\text{mol}/\text{J}$
- Uniformity?
- Spectral Distribution?
- Power Quality
- Flux Maintenance/Spectral Shift
- Safety
- Warranty
- What Else?

Revisiting Timeline



- What if standards not ready?
 - Should DLC create interim spec?
 - What should we accept for data?

Miscellaneous Questions

- How to inform utility baselines?
- Do the growers know what their plants' needs are for various stages of cultivation and different crops?
 - Product selection tool?
- How to address spectral tuning?

Thank You



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