Model Lighting Code

Critical Elements

Maricopa Association of Governments

Dark Sky Stakeholders Meeting

7 April 2009

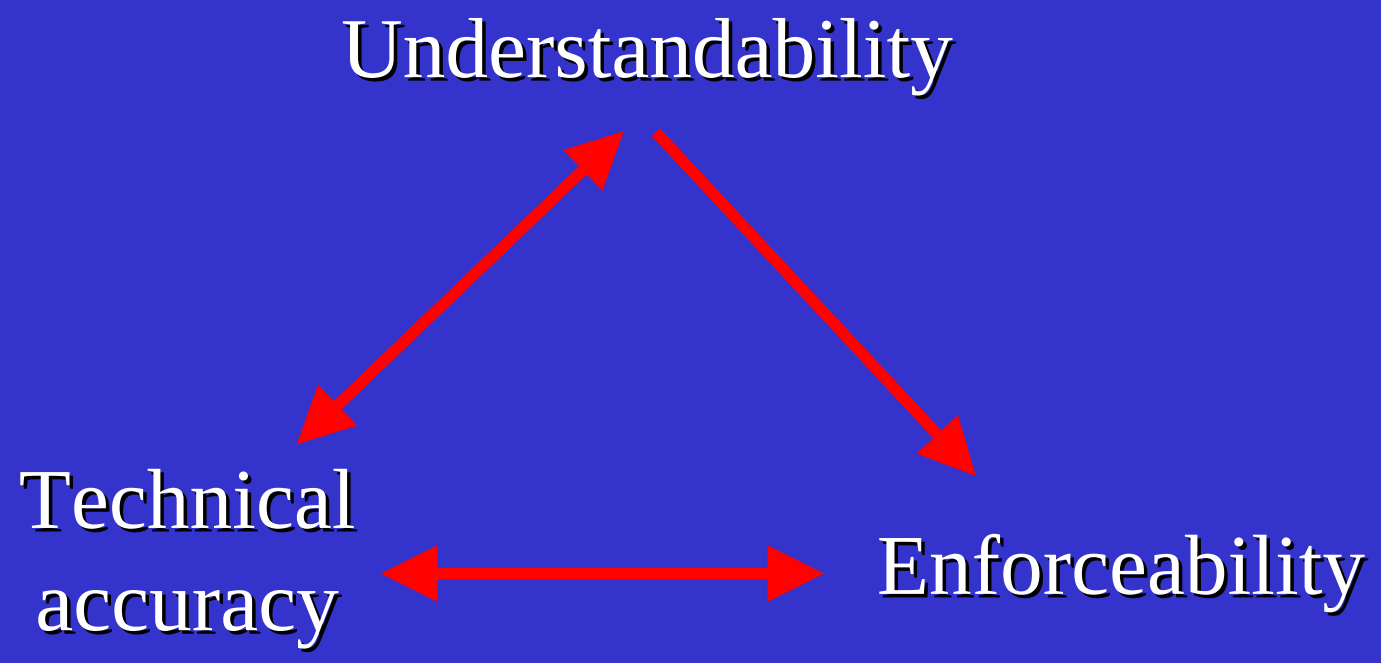
Model Lighting Code - *Critical Elements*

Foundation #1 We must be aware of who uses the lighting code:

Lighting designers
Builders
Electricians
Architects
Planners
Codes enforcement staff

Model Lighting Code - *Critical Elements*

Foundation #2: To accomplish its goals, a lighting code must work!

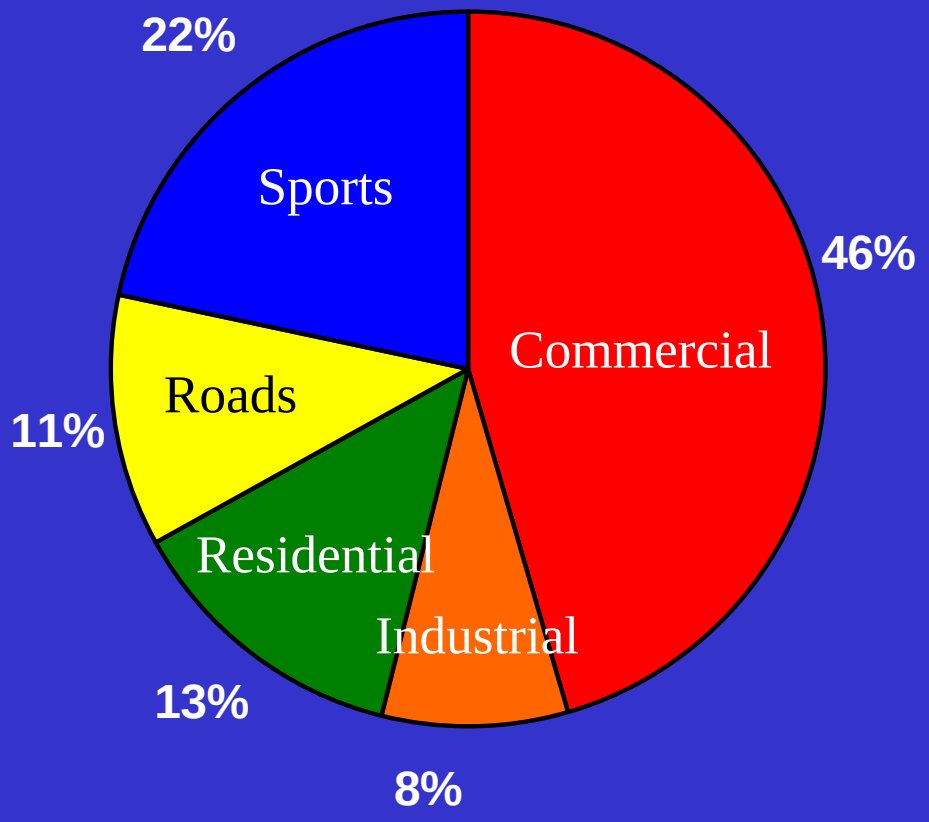


Model Lighting Code - *Critical Elements*

Foundation #3: Enforceability must be followed up with enforcement!

Model Lighting Code - *Critical Elements*

Foundation #4: We must be aware of where light pollution comes from



Model Lighting Code - *Critical Elements*

1. Shielding
2. Lighting amounts
3. Lamp types
4. “Special” lighting uses
5. Roadway lighting
6. Signs

Model Lighting Code - *Critical Elements*

1. Shielding

Issues:

- training to recognize
- energy fine tuning

Model Lighting Code - *Critical Elements*

2. Lighting amounts

~100 footcandles

~10 footcandles

Model Lighting Code - *Critical Elements*

3. Lighting amounts

- Foot-candles
- Lux

candela

Initial Lumens

Small target visibility

Discomfort glare

Maintained illuminance

Maintained lumens

Uniformity ratio

Nits

Disability glare

Model Lighting Code - *Critical Elements*

3. Lighting amounts

- Initial Lumens

Model Lighting Code - *Critical Elements*

3. Lighting amounts

High Intensity Discharge Lamps

Bulb	Base	LET	OP	Watts	MOL	LCL	Order Code	Description	ANSI Ballast Type	Case Qty.	CBCP	Rated Life (hours)	Lumens Initial	Lumens Mean	Color Temp. K	CRI	Additional Information	Foot-notes	Warning
PULSEARC® MULTI-VAPOR® METAL HALIDE LAMPS (CONTINUED)																			
400 WATTS (CONTINUED)																			
ED37	Mog	S	VBU	400	11.5	7	45664	MVR400/VBU/HO/PA	M135 or M155	6		20000	41000	31000	4000	65	Clear	43	121
							45665	MVR400C/VBU/HO/PA	M135 or M155	6		20000	40000	30000	3700	70	Coated	43	121
							12642	MVR400/VBU/XHO/PA	M135 or M155	6		20000	44000	33000	4000	65	Clear	43	121
							12644	MVR400/C/VBU/XHO/PA	M135 or M155	6		20000	42000	31500	3700	70	Coated	43	121
		E	V	400	11.5	7	46632	MVR400VBD/XHO/PA	M135 or M155	6		20000	44000	35200	4000	65			
	EX39	O	VBU	400	11.5	7	46273	MPR400/VBU/XHO/PA	M135 or M155	6		20000	42000	29500	4000	65	Clear, protected	43	120
							46274	MPR400/C/VBUXHO/PA	M135 or M155	6		20000	40000	28000	3700	70	Coated, protected	43	120

Model Lighting Code - *Critical Elements*

3. Lighting amounts

High Intensity Discharge Lamps

Bulb	Base	LET	OP	Watts	MOL	LCL	Order Code	Description	ANSI Ballast Type	Case Qty.	CBCP	Rated Life (hours)	Lumens Initial	Lumens Mean	Color Temp. K	CRI	Additional Information	Foot-notes	Warning
PULSEARC® MULTI-VAPOR® METAL HALIDE LAMPS (CONTINUED)																			
400 WATTS (CONTINUED)																			
ED37	Mog	S	VBU	400	11.5	7	45664	MVR400/VBU/HO/PA	M135 or M155	6		20000	41000	31000	4000	65	Clear	43	121
							45665	MVR400C/VBU/HO/PA	M135 or M155	6		20000	40000	30000	3700	70	Coated	43	121
							12642	MVR400/VBU/XHO/PA	M135 or M155	6		20000	44000	33000	4000	65	Clear	43	121
							12644	MVR400/C/VBU/XHO/PA	M135 or M155	6		20000	42000	31500	3700	70	Coated	43	121
		E	V	400	11.5	7	46632	MVR400VBD/XHO/PA	M135 or M155	6		20000	44000	35200	4000	65			
	EX39	O	VBU	400	11.5	7	46273	MPR400/VBU/XHO/PA	M135 or M155	6		20000	42000	29500	4000	65	Clear, protected	43	120
							46274	MPR400/C/VBUXHO/PA	M135 or M155	6		20000	40000	28000	3700	70	Coated, protected	43	120

Model Lighting Code - *Critical Elements*

2. Lighting amounts

Issues:

- unfamiliarity
- corporate “standards”

Model Lighting Code - *Critical Elements*

3. Lighting amounts

Initial Lumens / acre lighting codes.

- Coconino County (1989): 25,000 – 100,000
- Flagstaff (1989): 25,000 – 100,000
- Cottonwood (1999): 100,000
- Yavapai County (2002): 100,000
- Sedona (2000): 100,000
- Tucson (2005): 12,500 – 200,000 (450,000)
- Homer Glen, IL (2007) – 100,000
- …

Model Lighting Code - *Critical Elements*

3. Lamp Types

Issues:

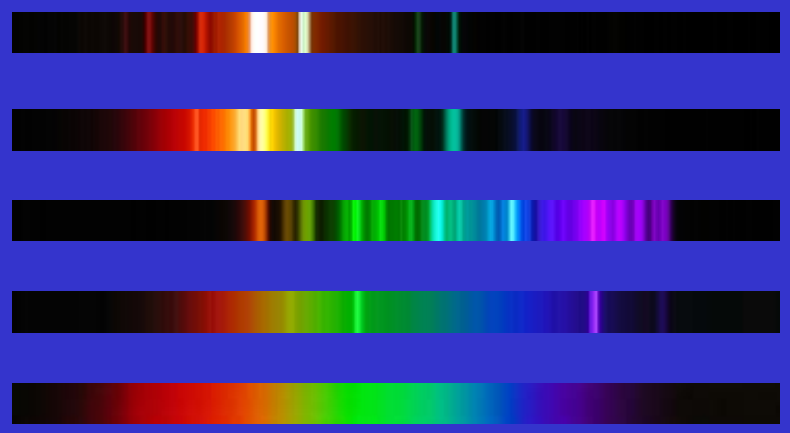
• white/bluish sources are becoming more popular (including in car headlights…)

• color recognition (LPS)

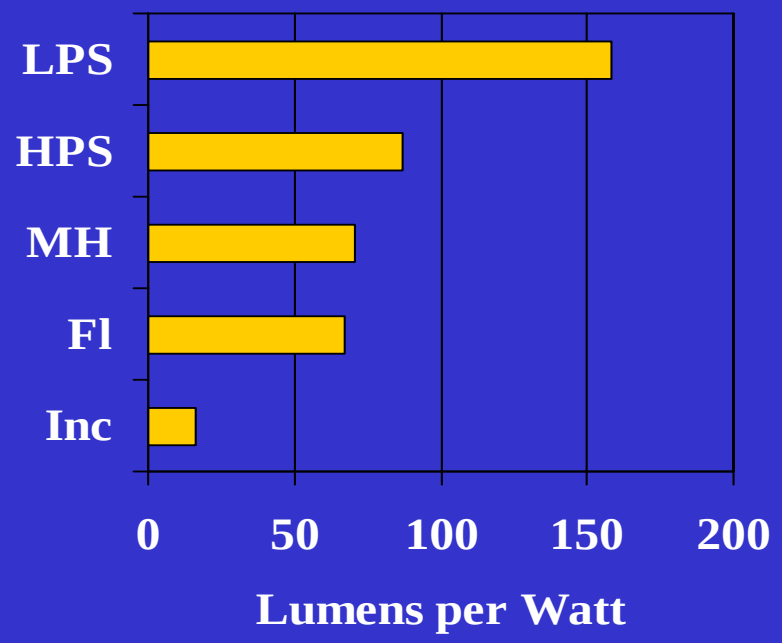
Model Lighting Code - *Critical Elements*

3. Lamp Types

Lamp Spectrum



Lamp Efficiency



Model Lighting Code - *Critical Elements*

4. “Special” lighting uses

Sports Fields

Service station canopies

Auto dealers

Billboards?

Model Lighting Code - *Critical Elements*

4. “Special” lighting uses

Issues:

- Sports: corporate and sports association “standards”

Model Lighting Code - *Critical Elements*

5. Roadway lighting

Issues:

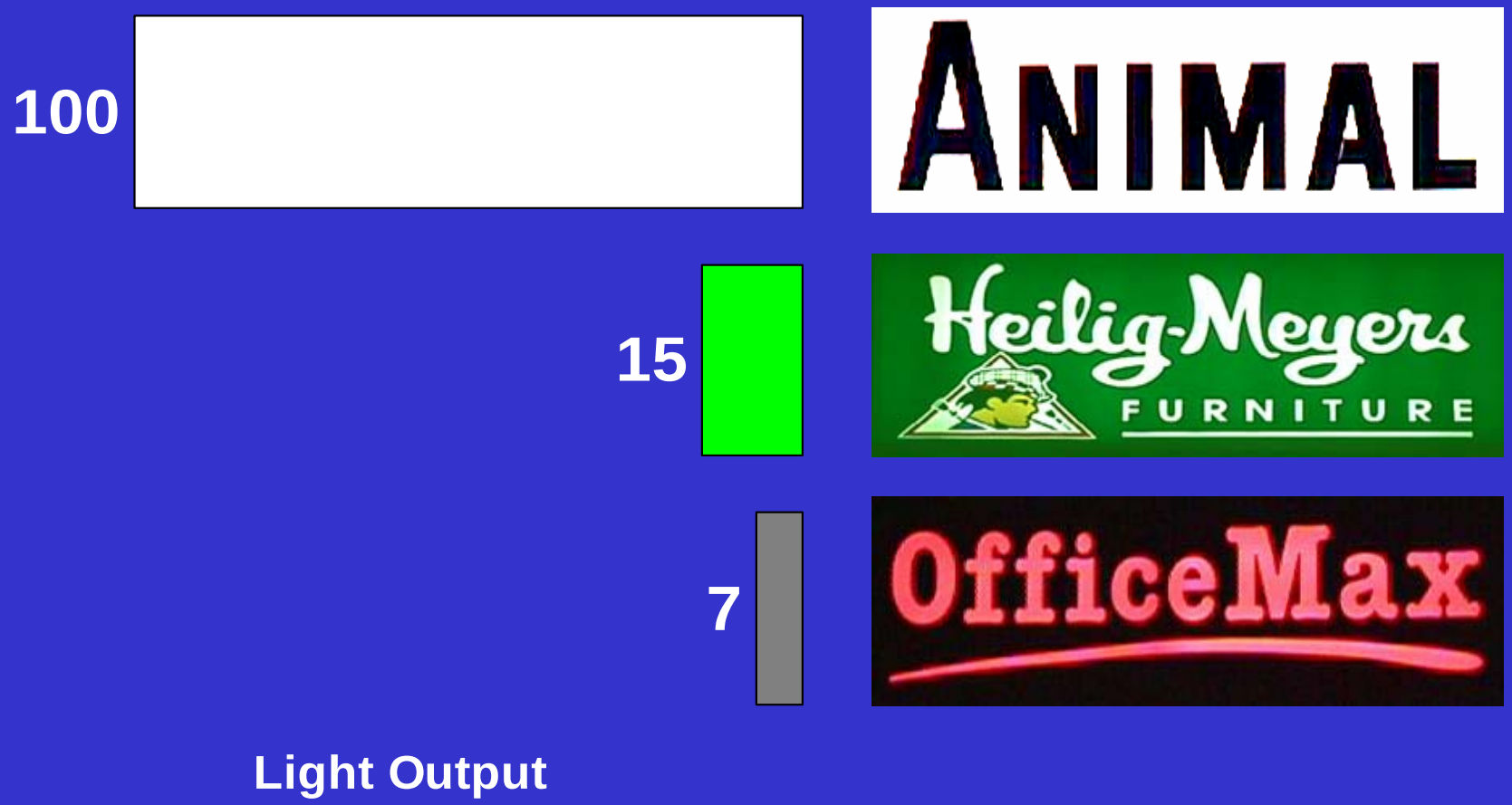
- lighting system ownership
- professional design usually involved

Model Lighting Code - *Critical Elements*

6. Signs

Model Lighting Code - *Critical Elements*

6. Signs



Model Lighting Code - *Critical Elements*

6. Signs – corporate “standards”

Model Lighting Code - *Critical Elements*

6. Signs

Issues:

- corporate “standards”
- LED billboards: enforceability
- corporate resistance