

Oakland spends \$3.5 million a year on energy and several hundred thousand dollars on maintenance for about 36,000 street lights

#### Issues:

- Aesthetics affecting quality of life
- Crime
- Reducing emissions
- Managing generation resources
- Cost and finding capital for retrofits
- Jobs

#### New Technologies are Creating Opportunities

- LEDs
- Induction for Street Lighting
- Electronic Ballasts, including HPS and MH
- Two way communication to addressable luminaires
- Dimming controls
- Better photocells
- Miniaturized metering

#### New Technologies are Creating Opportunities

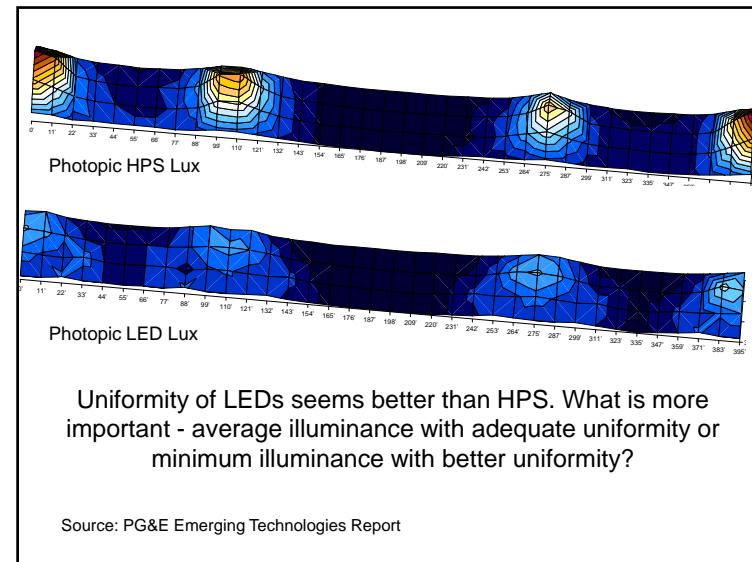
LEDs	More useful light/ Watt?
Induction	Like LED w/ less glare
Electronic Ballasts	12% more efficient
2 –Way Comm.	Diagnostics & refinement
Dimming	Refinement & late night
Better photocells	Lumen maintenance
Metering	Cost recovery thru savings

Colors look better with broad spectrum light compared to HPS

100 Watt HPS Lamp (121 Watts)      77 Watts LED 36% less energy

...and the systems seem to be more efficient!

Photos: Tyson Cook of Energy Solutions from PG&E Emerging Technologies Report



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## Quality Considerations Before Using the New Technology

- Do people feel safe on the street at night?
- Does lighting support police needs?
- Do potential criminals feel vulnerable?
- Does lighting support good quality of life?
- What are lighting quality factors that show up as demands for more light?

Watt for Watt, broad spectrum light seems more effective than monochrome light from HPS, but how do we decide what's best and engineer around it with confidence?

- How can we evaluate the performance without presuming the outcome?
- What is the relative effectiveness of bluer light compared to HPS?
- What research is needed and how can funding be acquired?
- Can light be too blue? Are there effective glare standards?
- How can the research results be disseminated to guide street lighting professional?

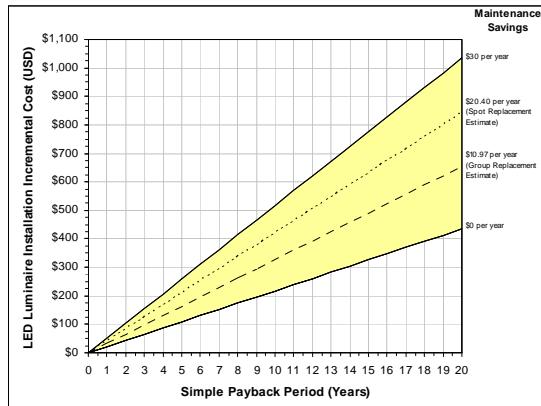
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Bruce Kinzey 3/24/2008

Careful of words like "feel." By definition very subjective and thus highly variable across demographics. Also, feeling safe doesn't necessarily translate to being safe and in fact may backfire.

Bruce Kinzey, 3/24/2008

## Cost-Effectiveness Target Plot



Source: PG&E Emerging Technologies Report

### Future vision:

- High quality systems that minimize over-lighting
- Wireless addressability
- Lumen maintenance
- Dimming into and out of civil twilight
- Late night dimming
- Police and resident override by mobile phone
- Premium efficiency components