U.S. DEPARTMENT OF ENERGY | Energy Efficiency & Renewable Energy

Illuminating Thoughts on Nighttime Design: Technology opportunities, and more…

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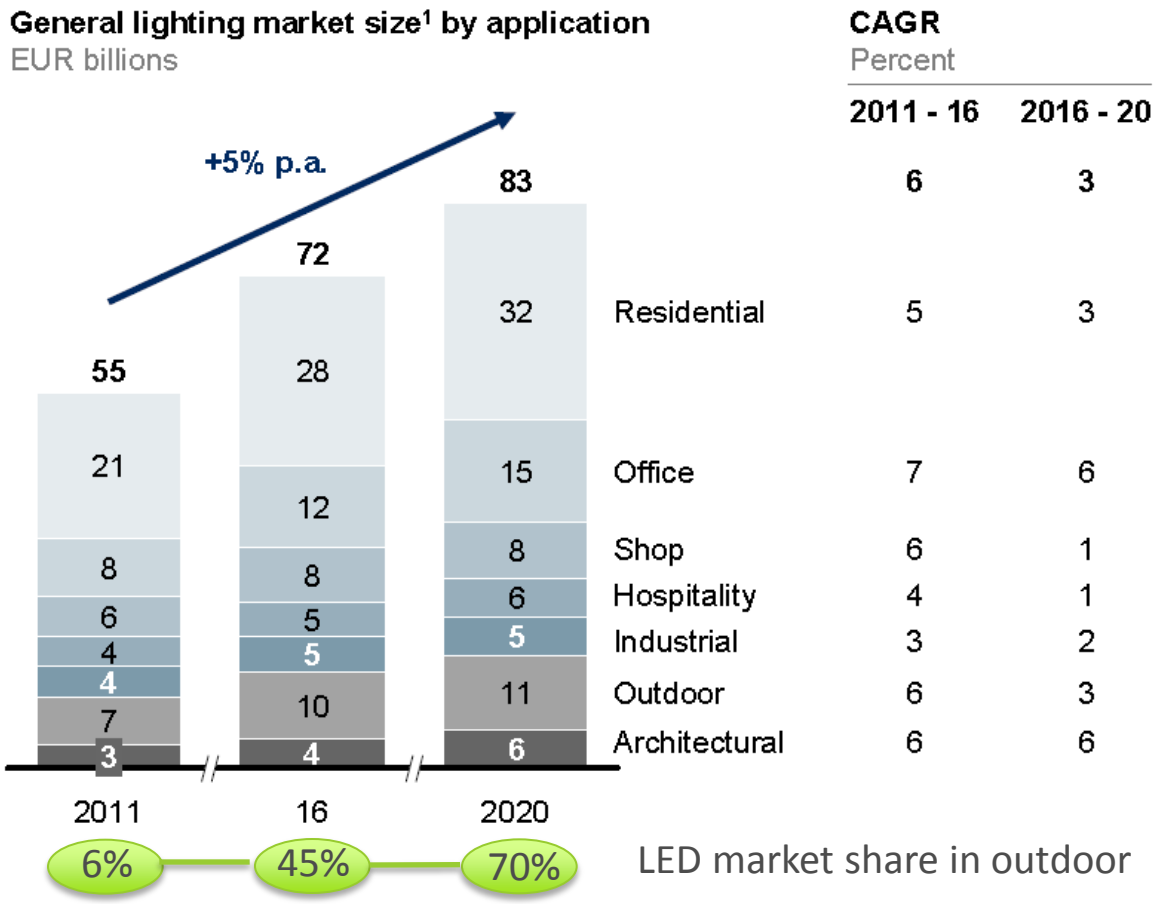
LED Technology is changing outdoor lighting

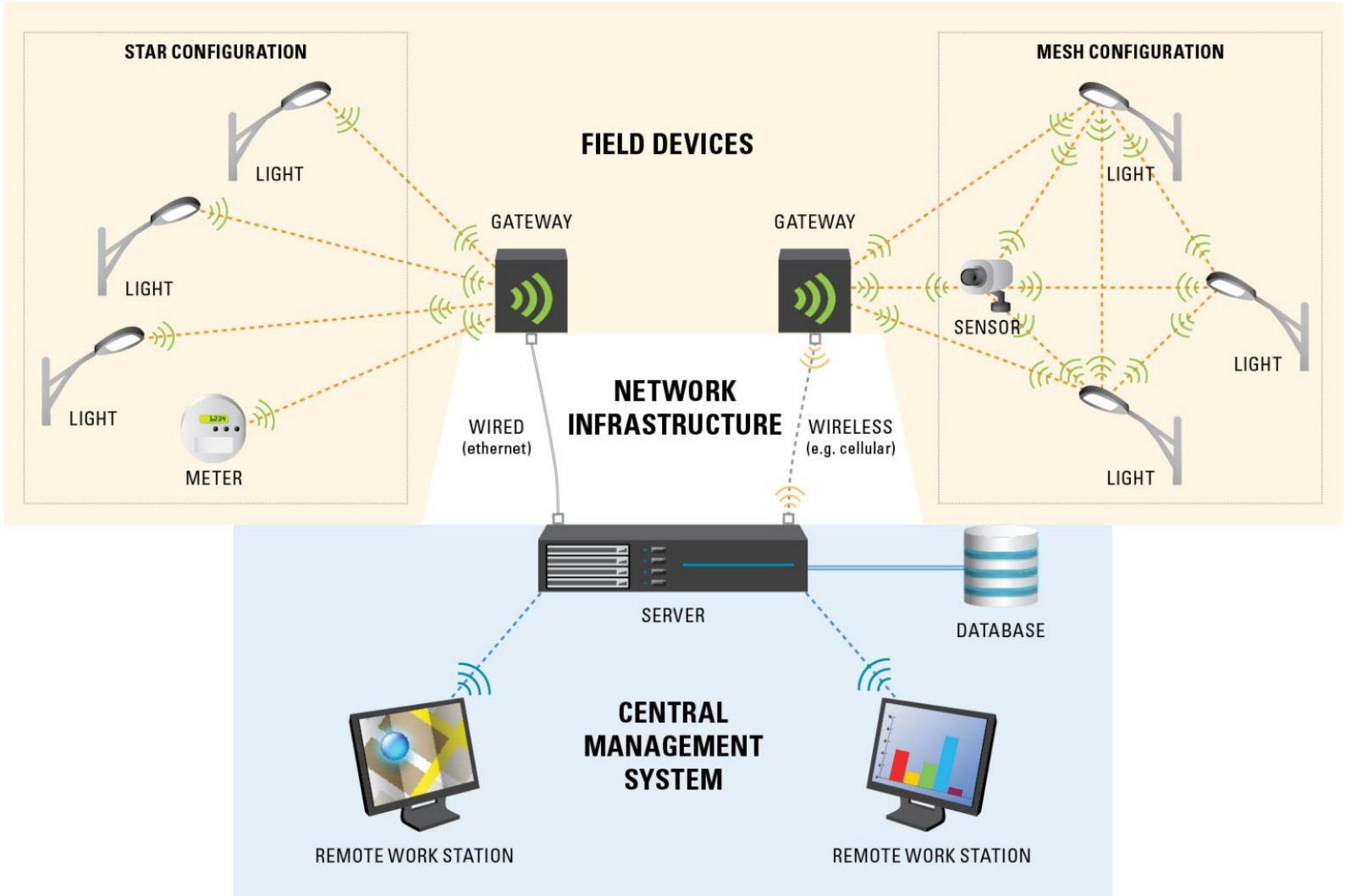


LED market share in outdoor

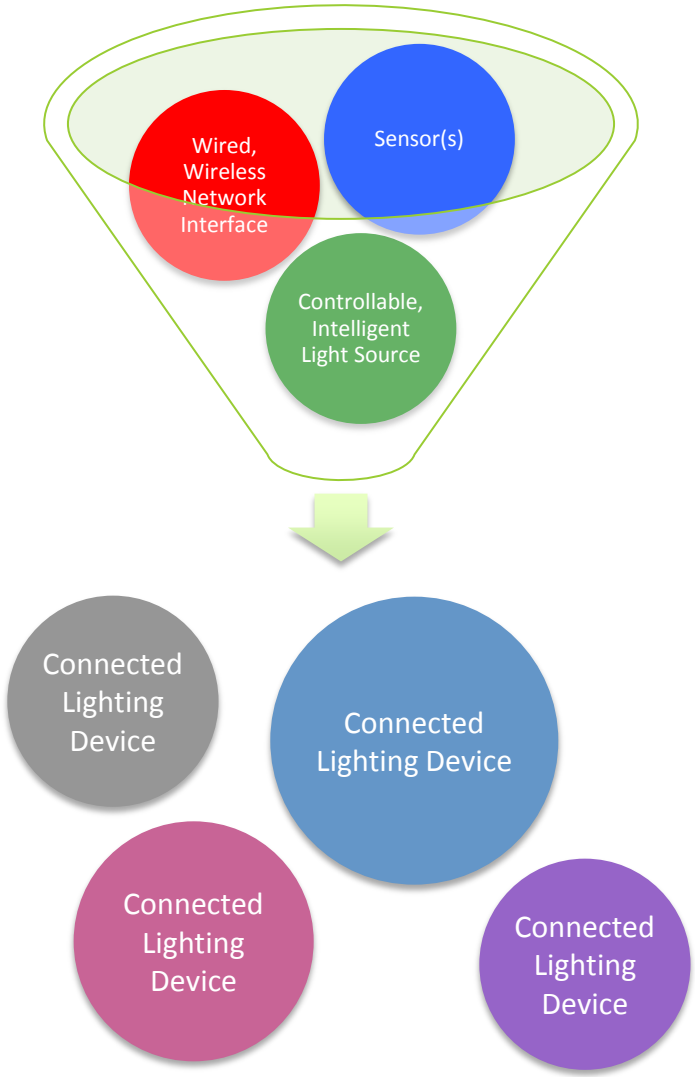
http://www.mckinsey.com/~/media/mckinsey/dotcom/client_service/automotive and assembly/lighting_the_way_perspectives_on_global_lighting_market_2012.ashx

Outdoor lighting control: past

Outdoor lighting control: present and future



Outdoor lighting devices: future

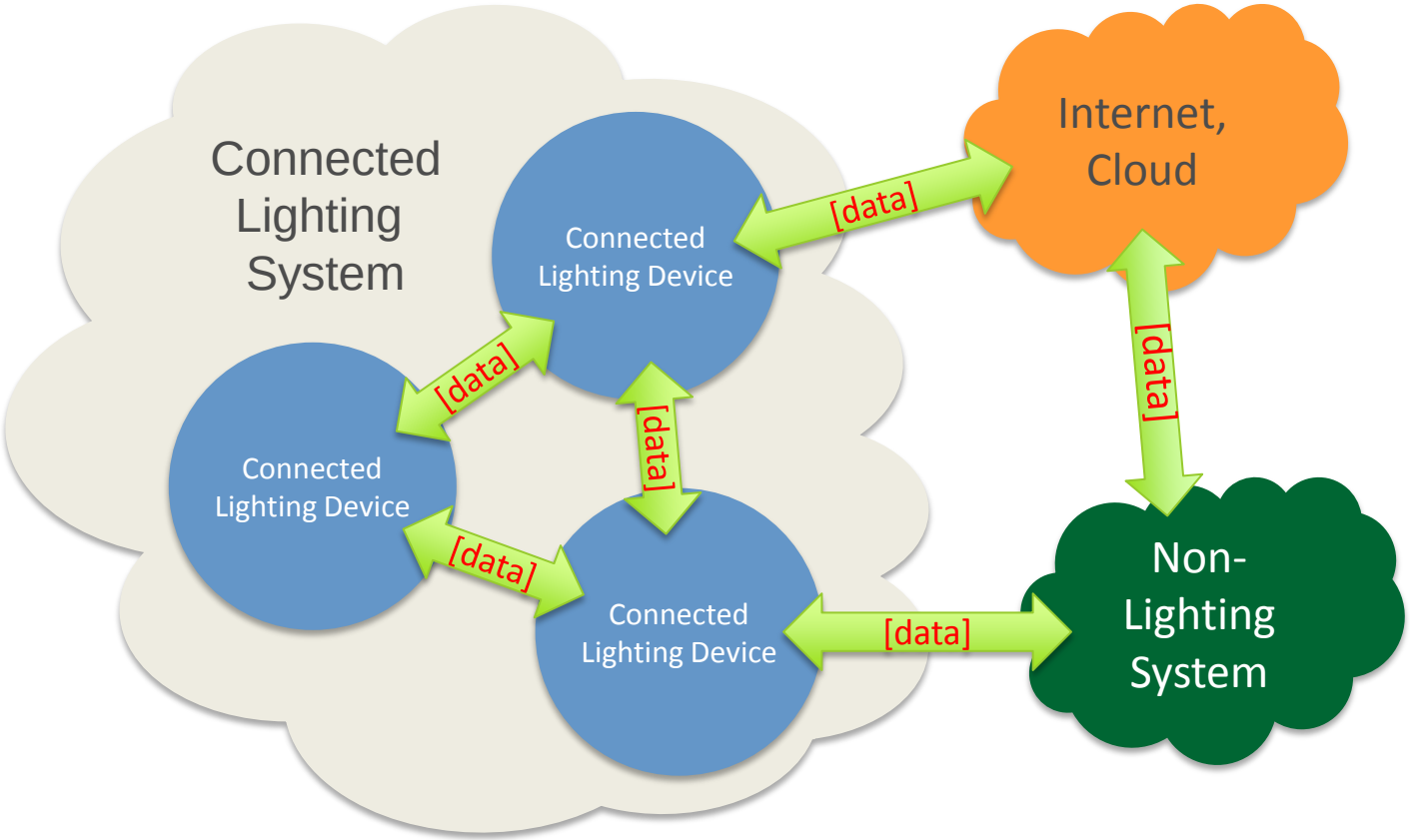


- LED technology is the catalyst
  - Efficacy, Energy/Cost Savings
  - Electronic Platform
- Controllable: light output, CCT, chromaticity, SPD?
- Intelligent: integral data processor, memory, algorithms
- Network interface: wired, wireless, interoperability, standards
- Sensors: ambient light, traffic, occupancy, environmental, video, audio, air quality, radiation

Outdoor lighting systems: future

Opportunity

Enabling intelligent lighting devices with the right type and amount of data can result in reduced energy consumption and improved lighting performance

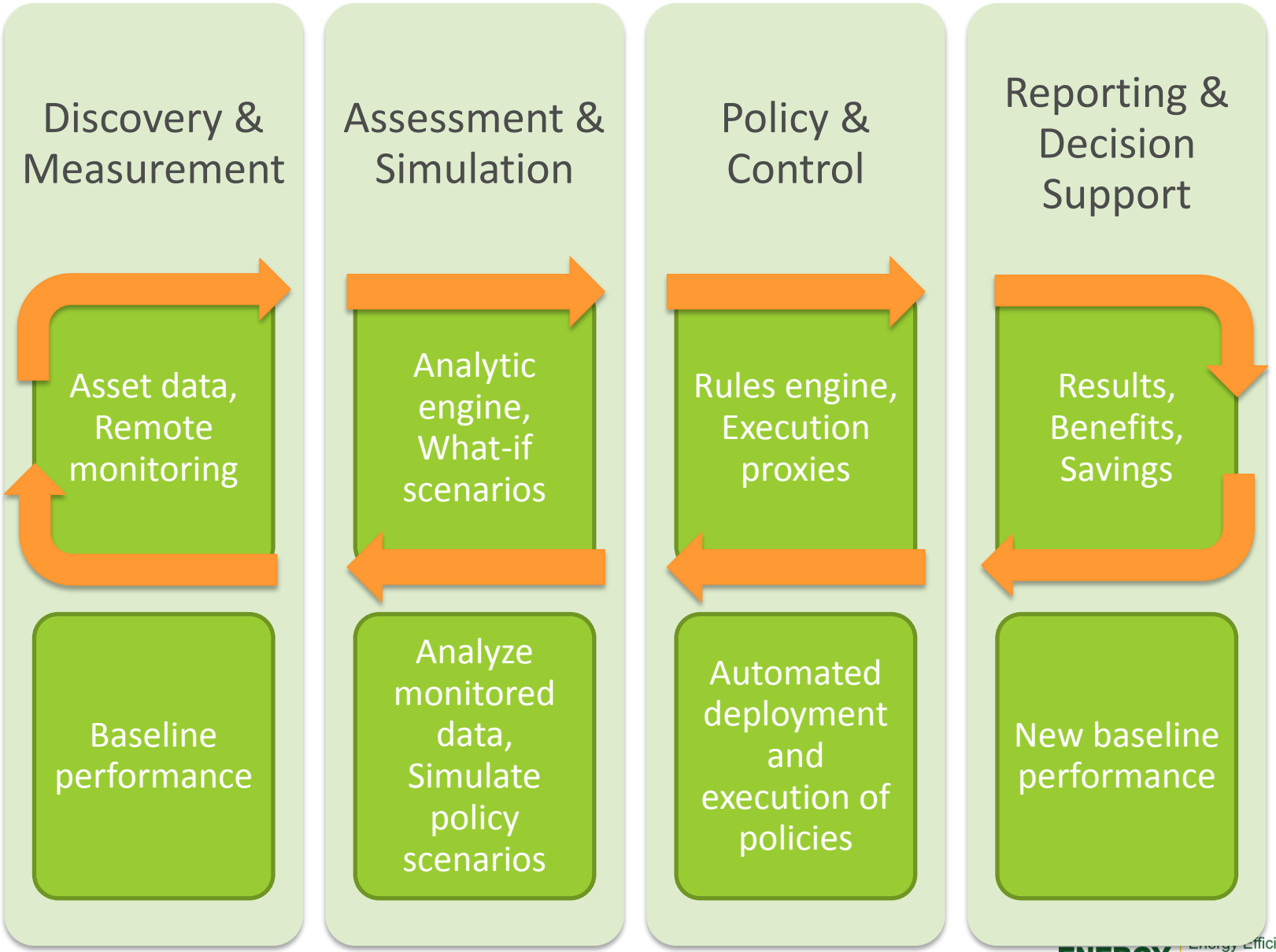


The collected data may enable other revenue streams that compete with lighting and energy performance.

Threat

Connected lighting systems: a growing list of other benefits

Data-driven performance (e.g. energy) management

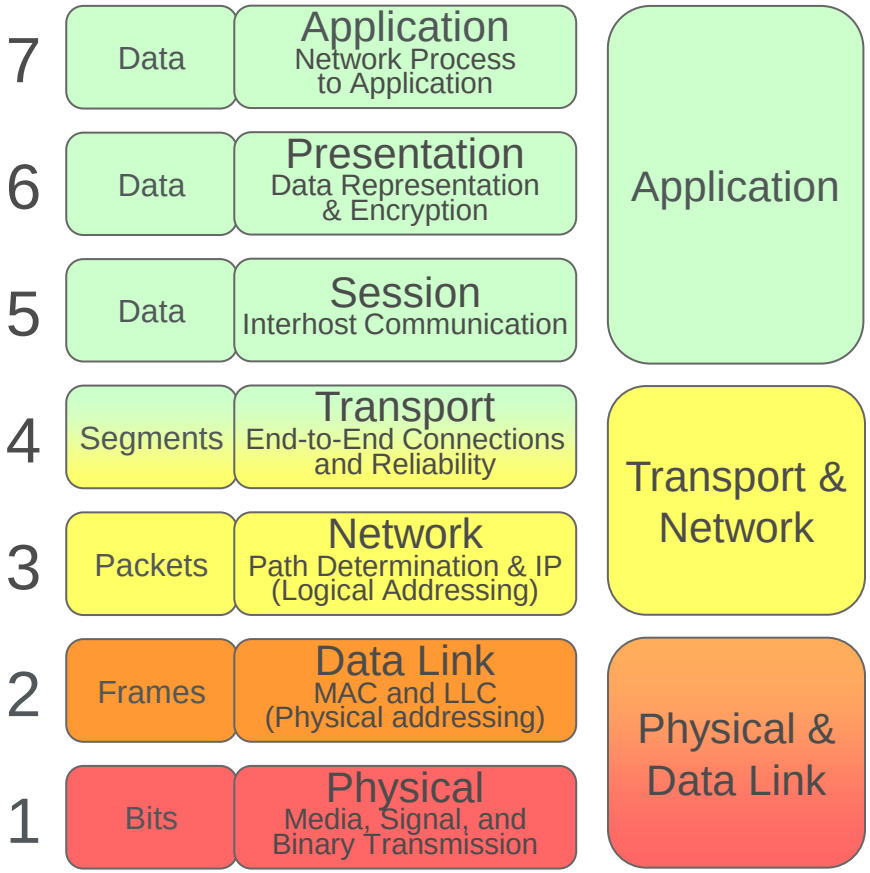


Key technology considerations

- Cost, value propositions, justification
- Adaptive lighting (intensity and spectrum?)
- Available data producers (i.e. sensors)
- Data accuracy
- (Big) data storage, transport, analytics
- Cybersecurity
- Data privacy
- Right now: Interoperability
  - Today: mostly achieve via Application Programming Interfaces (APIs)
  - The near future: must be specified. “Must be interoperable with my asset management system” is not good enough
  - Eventually: one or more ecosystems where things “just work”

Interoperability and standards

Interoperability: The capability of two or more devices, applications, networks, or systems to reliably and securely exchange and readily use data with a commonly shared meaning.



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Food for thought

- Transition from justification by energy savings to justification to other features and benefits
- Quantification, monetization of many features and benefits still unproven at present; right now some still need to be justified by energy savings
- How much energy savings can be realized?
  - More than before; limited by adaptive lighting guidance, viability
  - Monetization limited by utility tariffs
  - Self-energy reporting facilitates verification, management
- How to establish value of other features and benefits?
  - Early adopters
  - Does value translate, scale?
- How do we learn how to use (big) data?

Big data in practice