

Smart Lighting Feasibility Study

■ Public Lighting Group

Webinar

22 NOVEMBER 2017

ARUP

PLG

Agenda

Background

What is Smart Lighting?

What is this study about?

Feasibility Study Outcomes

Costs

Benefits

Considerations

Risks

Recommendations

Questions (15 mins)

As messages

Background



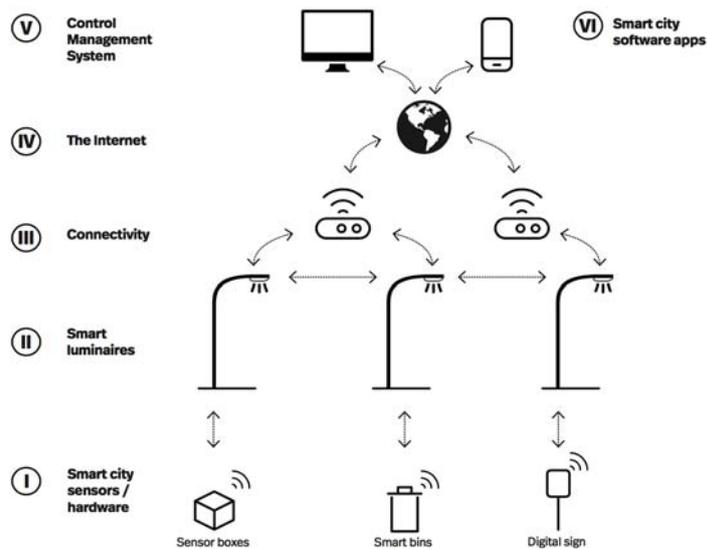
What is Smart Lighting?

- 'Smart Lighting' describes LED lighting which has the ability to be controlled by a Central Management System (CMS).
- These systems provide operators with intelligent and flexible lighting control, individual control to street lights, dimming, and asset management.
- Many smart lighting products have inbuilt connectivity that can help connect other Smart City uses and products to the Internet.
- For example, a smart parking system can connect to the Internet via a smart lighting system to send data back to council officers or to car park users.

Stages of Smart Lighting

 Level 1	 Level 2	 Level 3	 Level 4
Traditional Lighting	LED	Smart Lighting	Smart Lighting with Smart City Connectivity
<p>Generally, traditional sodium lighting, mercury vapour or fluorescent.</p>	<p>Replacement of LED's creates notable energy savings, changes in lighting profile, compared to sodium lighting.</p> <p>These efficiencies and advantages are well understood, and are not the focus of this study.</p>	<p>Connecting lighting (generally LED lights) to each other and to the Internet to enable operational efficiencies for lighting owners. Incorporates a lighting Control Management System (CMS).</p>	<p>Connectivity can also be used to provide network connection for other smart city uses and products (e.g. smart parking).</p> <p>Street lighting can be an enabler of these sensors/hardware, due to cities being conveniently scattered with light poles, attachment locations and a reliable power supply.</p>

What is Smart Lighting?



The Role of Smart Lighting



Power

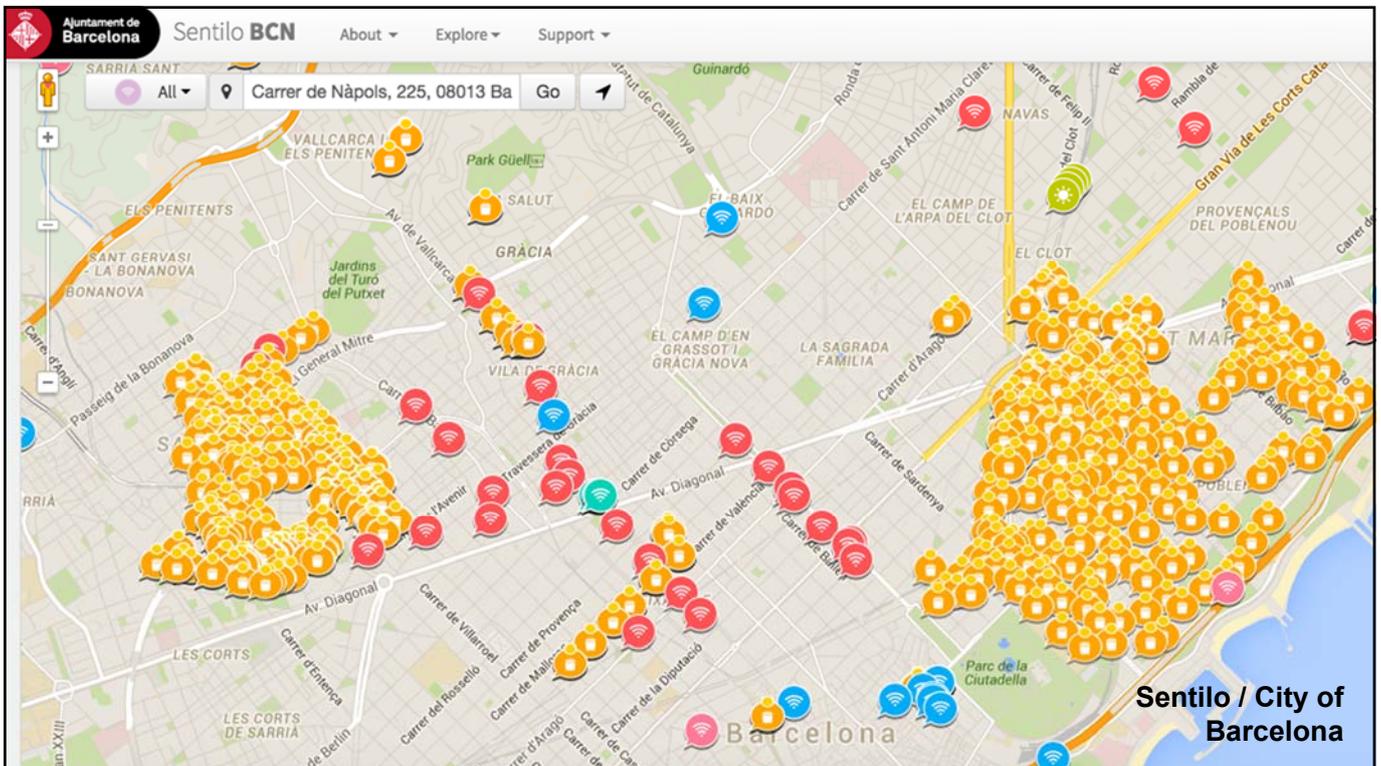
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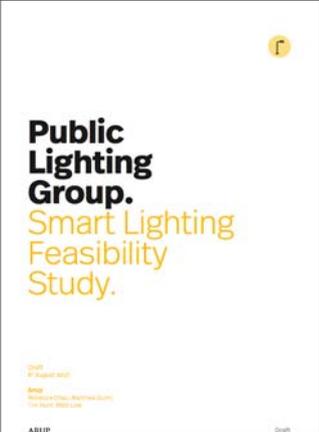
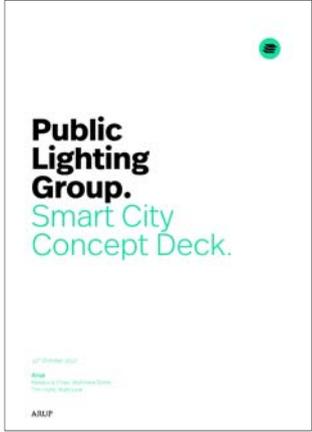
Connectivity



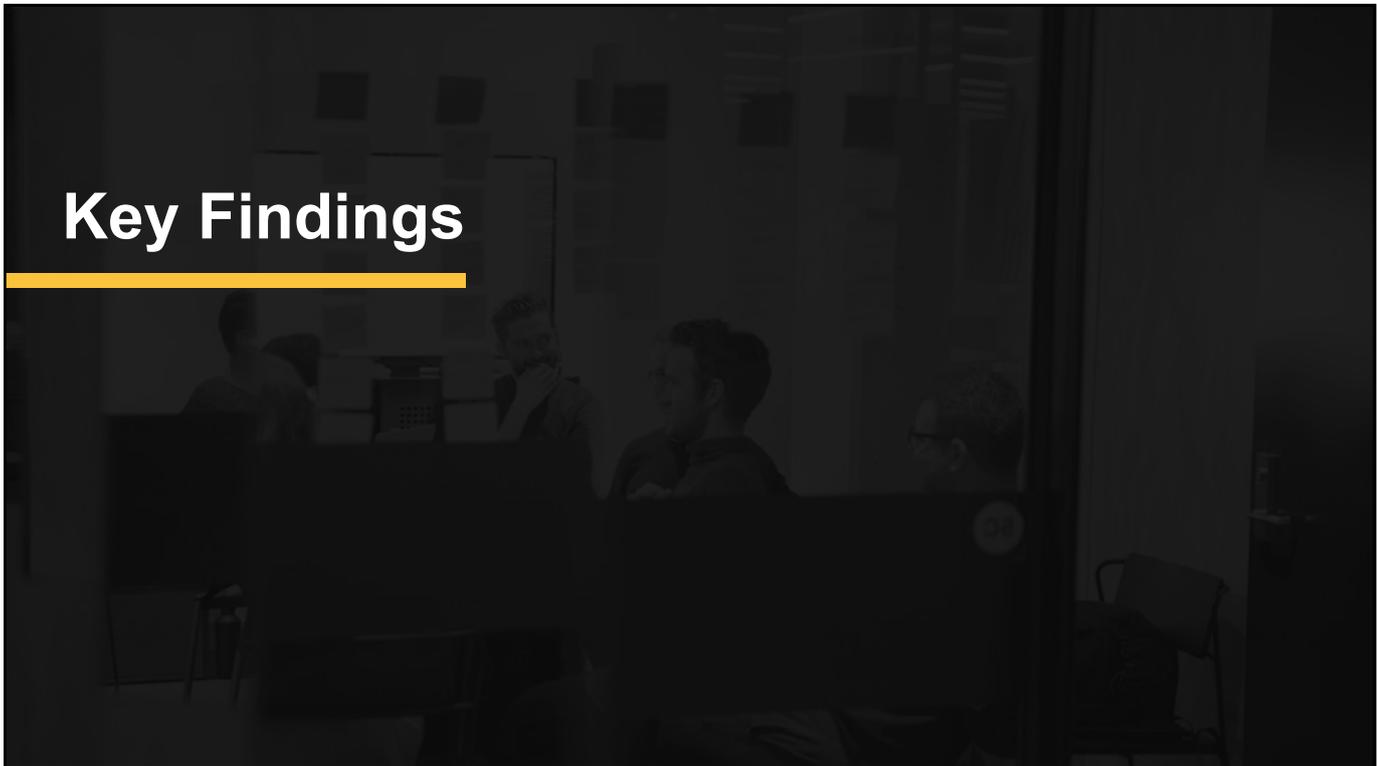
Chicago Array of Things



Study Deliverables

 <p>Public Lighting Group. Smart Lighting Feasibility Study.</p> <p>ARUP</p>	 <p>Public Lighting Group. On-Street Community Participation. Mini Business Case</p> <p>ARUP</p>	 <p>Public Lighting Group. Smart Parking Spaces. Mini Business Case</p> <p>ARUP</p>	 <p>Public Lighting Group. Smart City Concept Deck.</p> <p>ARUP</p>
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Key Findings



Smart Lighting Benefits

Energy efficiencies associated with smart lighting controls

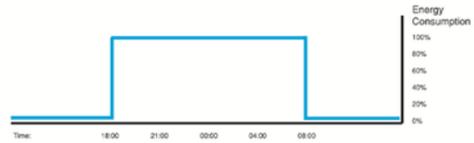
Operational efficiencies associated with smart lighting controls

Environmental benefits as a result of lower greenhouse gas emissions

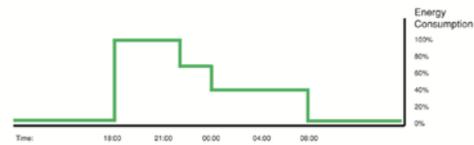
Public safety benefits associated with more responsive lighting levels

Enabling Smart City use cases and products

LED lighting (without smart controls) energy consumption profile



LED lighting (with smart controls) energy consumption profile



Smart Lighting Benefits

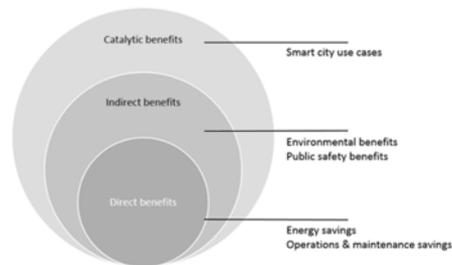
Energy efficiencies associated with smart lighting controls

Operational efficiencies associated with smart lighting controls

Environmental benefits as a result of lower greenhouse gas emissions

Public safety benefits associated with more responsive lighting levels

Enabling Smart City use cases and products



Smart Case Studies

Title/Source	Change	Description	Financial Costs	Financial Payback Period	Other Benefits
Aurich	Level 1 to 3	Installation of CityTouch CMS	Unknown	Unknown	0.14 tonnes of CO2 saved per light annually
Silver Spring Report (supplier commissioned)	Level 1 to 2	LED replacement only	Unknown	8 years	Unknown
Silver Spring Report (supplier commissioned)	Level 1 to 4	LED replacement with connected lighting	20% more expensive compared to normal LED replacement over lifetime (but higher benefits as well)	6 years	Additional financial savings driven by operational savings as well as increased energy savings from dimming and reduced nightly burn time enabled by the network.
Greater Geelong City Council	Level 1 to 4	Rollout of smart lighting in Ocean Grove shopping area	Unknown	Unknown	Public Wi-Fi, public USB charging points - helping to activate Ocean Grove shopping area
San Diego	Level 1 to 4	Installation of LED luminaires, with connectivity and lighting control system (using GE LightGrid), associated smart city applications	Unknown	13 years	Dimming schedules to reduce light use
Dublin City Council	Level 1 to 3	Installation of LEDs with connected lighting	Unknown	8.6 years	7% energy saving compared to normal LED installation
Dublin City Council	Level 1 to 4	Installation of LEDs with connected lighting and connectivity for smart city uses	Unknown	9.1 years	7% energy saving compared to normal LED installation
Adelaide (Pirie St)	Level 1 to 3	Installation of LED luminaires in pedestrian area with dimming feature, pedestrian sensors	Unknown	Unknown	15% energy savings reported

Smart Lighting Considerations

- Ownership
- Lighting Standards
- Regulatory Context
- Alternative Options

The Role of Smart Lighting



Power

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Connectivity

Alternate Connectivity
Directional Wifi

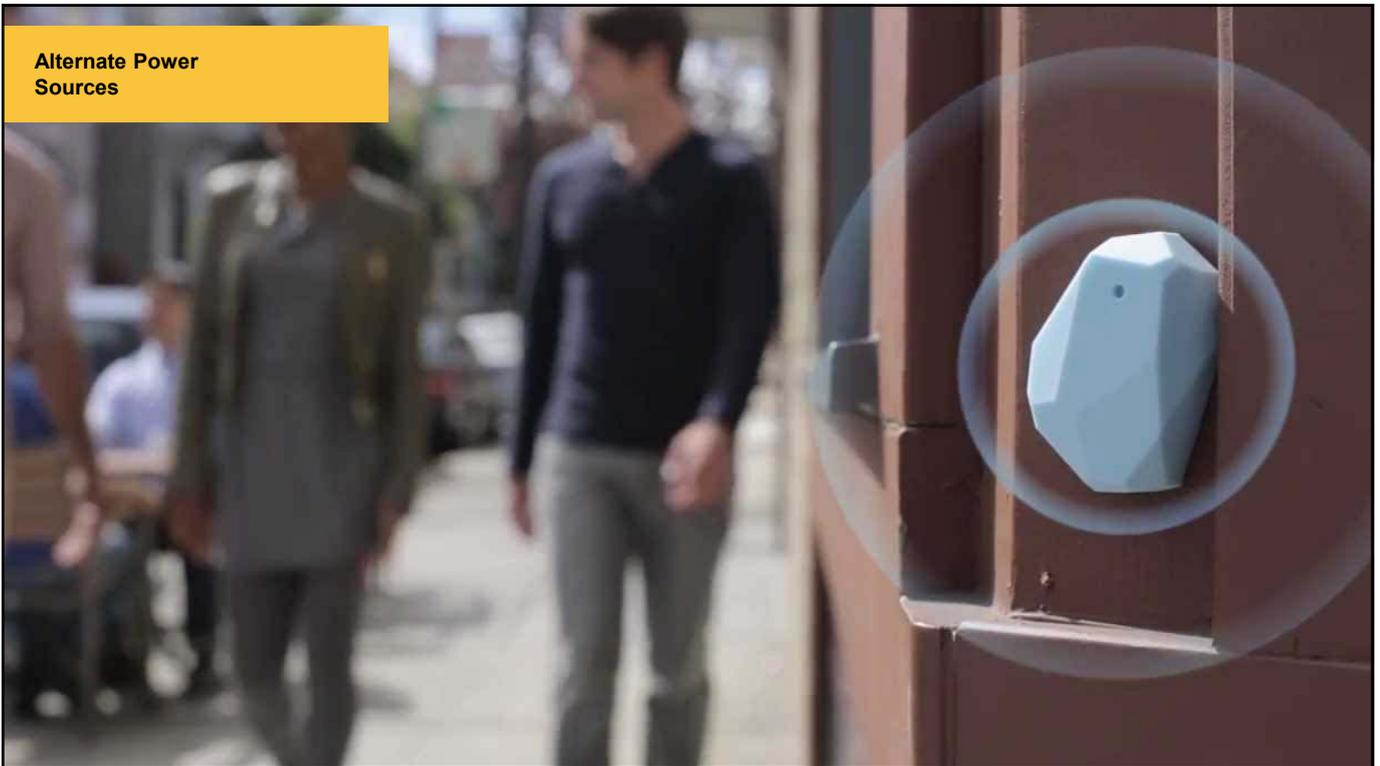




Alternate Power Sources



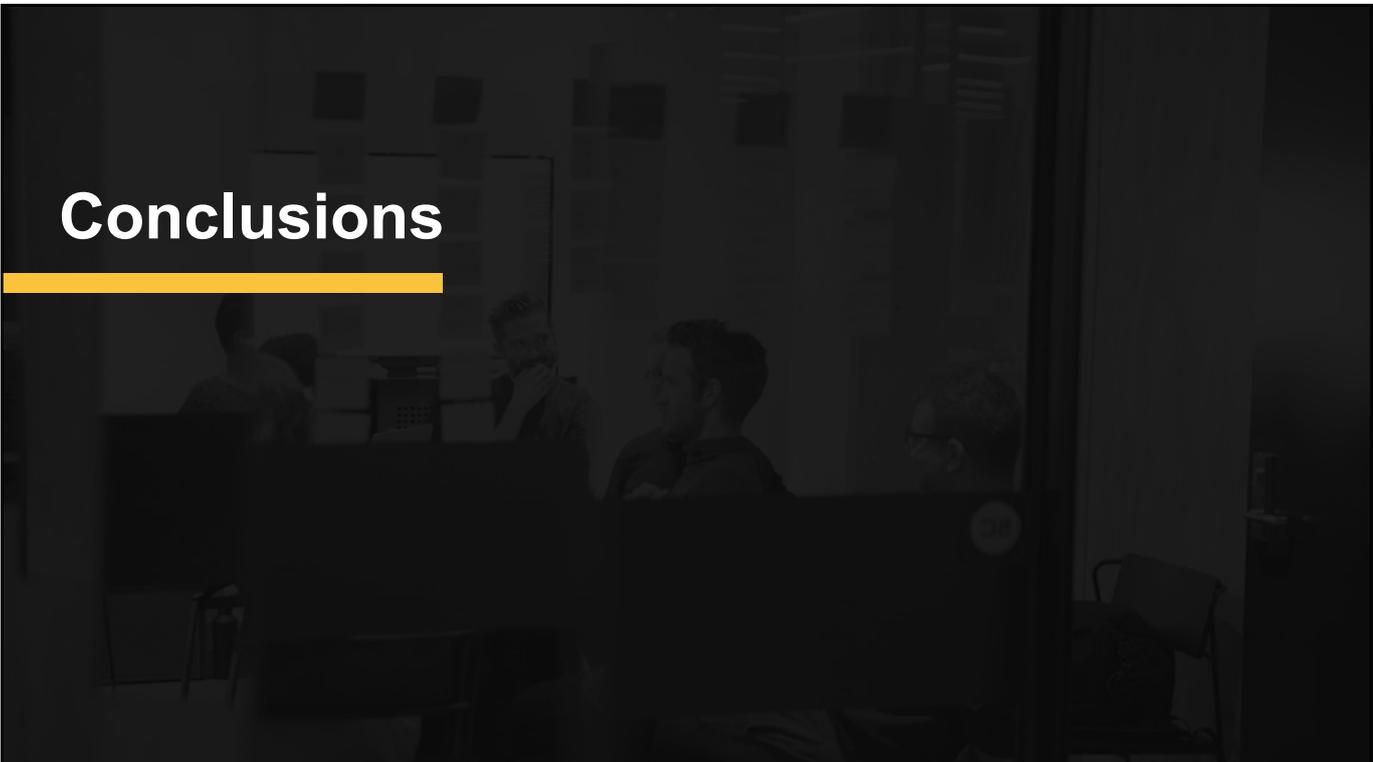
Alternate Power Sources



Smart Lighting Risks

- DNSPs- Benefit Capture
- Vendor Lock-In
- Data Management
- Funding
- Resourcing
- Benefits Realisation
- Technical Specifications for Smart City Uses
- Alternate Networks

Conclusions



Key Conclusions

- DNSP Challenges
- Limited Smart City Use Cases
- Pilots – Activity Centres
- Wider Rollouts

Recommendation - Pilot

