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EIP-SCC
European Innovation Partnership
on Smart Cities and Communities

Exploiting the 'humble lamp post'
a kick start to smart city

A guide for city leaders

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1. Introduction – a new lease of life for an old asset?

1.1 The headline

Cities can multi-purpose their city-wide public lighting stock to do hugely more than just deliver light; and should do so in combination with upgrades to LED lighting that saves substantial costs. Altogether, a relatively-rapid low-risk affordable and very-visible smart city quick win. This short document offers thoughts on how as a city leader can light the way.

1.2 Who should read this document?

This Leadership Guide is principally for leaders and decision makers in European cities, from small to large – political and executive; also for industry captains that serve cities; utility, and city financiers.

It is a joint undertaking by one of the nine EC-funded smart city 'Lighthouse' programmes, in conjunction with the European Innovation Partnership for Smart Cities & Communities (EIP-SCC). The leadership guide is complemented by a more detailed Management Framework that supports officers in a city as they evaluate options and pull together business case and implementation plans.

This document is intended to stimulate ideas, provoke debate, and set a foundation for action.

It offers thoughts on how existing and new city assets (the 'humble lamppost') can be exploited to deliver far more than just light – to offer a wide range of services to cities and society.

The current trend to replace old lamps to modern LED is good, however that only is losing out on the chances to prove that smart cities is real and value adding. This points to how leaders of cities can demonstrate relatively swift new forms of value.

To capture this opportunity leaders must help break traditional thinking and break down sector and functional silos. Hard to do. Essential to start, because it is the future. And the 'humble lamppost' provides a less risky route to doing so. This deliberately short document tells you why you should organise your city for action, and how you should go about it. It offers the case for action.
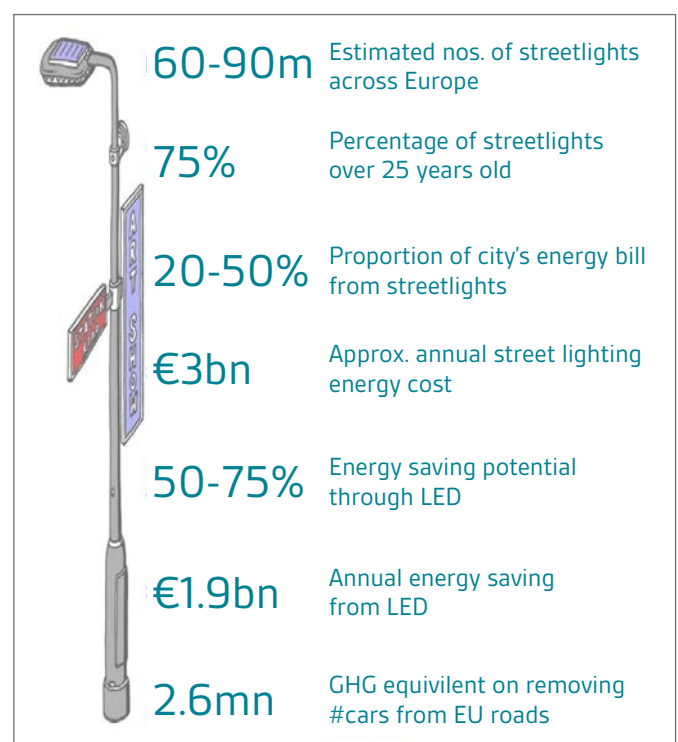
Be curious. Read on.

1.3 Rethinking the role of the 'humble lamp post'

There are somewhere between 60 & 90 million street lights in Europe, and 75% of them are more than 25 years old. A very small percentage of them presently use modern low energy (LED) lamps, although the conversion to LED is a recent and clear trend – to save substantial energy and operating costs.

A city that only looks to cost savings is losing out on the real potential. One of the clever bits about smart cities is the ability to interconnect infrastructures so that they can serve multiple purposes. And the neat thing about most cities is that their lamp posts offer just that opportunity.

Cities can benefit from a wealth of other features and services alongside more reliable and adaptable lighting that bring very tangible new forms of value.

60-90m	Estimated nos. of streetlights across Europe
75%	Percentage of streetlights over 25 years old
20-50%	Proportion of city's energy bill from streetlights
€3bn	Approx. annual street lighting energy cost
50-75%	Energy saving potential through LED
€1.9bn	Annual energy saving from LED
2.6mn	GHG equivilent on removing #cars from EU roads

The European Partnership (the EIP-SCC), promotes the 'humble lamppost' initiative is one of the few very tangible and understandable initiatives and it is receiving growing attention. It seeks to deliver significant tangible impact by implementing common solutions, at scale, by stimulating collaborating amongst stakeholders – and as a result, help speed market uptake.

The EIP ambition is bold – **to upgrade 10 million lamp posts across EU cities.** Something that is much needed. Indeed, if we fail at this, what befalls us when we tackle more complex smart city initiatives?!

The savings case from LED upgrade offers an attractive return on investment which can build confidence in the city and investment community to act. And returns improve further through collaboration and aggregation of demand amongst cities – common approach, common design, potentially joint buying: brings better deals.

The additional cost for 'smart' features is also modest in the context of an overall LED upgrade programme. And for the more progressive cities, the additional smart services open up scope to consider novel financing and business models, as well as potential new revenue opportunities.

Benefits

Society
• Better experience
• Safer society
• Pride in community
• Lower taxes?

Cities
• Efficiencies
• Speed to value
• Image
• Confidence

Industry
• Reduced sales cost
• New market
• Revenue/profit
• Brand
• Export potential

EIP-SCC goal is to upgrade 10 million lamp posts in EU cities through…

Developing a component-based common solution that can scale

2. Main section – Assessing the opportunities

Like many new ideas, there are some things that can be done to help speed success, and measures to take to reduce risk. It's worth being aware of what is available in this regard.
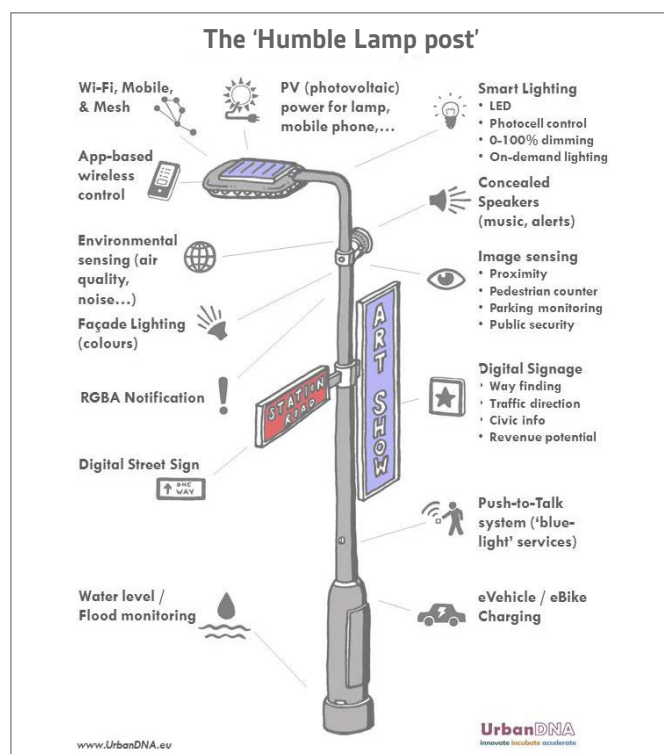
2.1   The art of the possible

There are many lamppost-based possibilities that include optimising the core role the lamppost plays – that of offering light and safety – and a host of other services. The "dozen things you can do with a 'humble lamppost' that has nothing to do with light" (see illustration, covering a variety of 'use cases').

Such additional services include: offering a (potentially free) public Wi-Fi network; providing the powered foundations for a mesh network of (IoT) sensors across the city; helping drivers find a parking place; improving public safety; supporting environmental monitoring (air quality, waste, flooding). They can be a place for electronic street signage, public information and advertising (revenue); be the home of sensors that help direct visually impaired people; a powered web of electric vehicle (car, bike) charging points; or even pedestrian-flow monitors that can help keep the high street a vibrant place. Or looking more to the future, how connected and automated vehicles could move in a streamlined and safe fashion around your city.

Indeed, a city's lamppost estate should be considered more as a regularly-spaced network of elevated posts with power

throughout the city that can help transform the efficiency and effectiveness of a range of city services, rather than just poles to hang lightbulbs on.

The 'Humble Lamp post'

Wi-Fi, Mobile, & Mesh

PV (photovoltaic) power for lamp, mobile phone,…

App-based wireless control

Environmental sensing (air quality, noise…)

Façade Lighting (colours)

RGBA Notification

Digital Street Sign

Water level / Flood monitoring

Smart Lighting
• LED
• Photocell control
• 0-100% dimming
• On-demand lighting

Concealed Speakers (music, alerts)

Image sensing
• Proximity
• Pedestrian counter
• Parking monitoring
• Public security

Digital Signage
• Way finding
• Traffic direction
• Civic info
• Revenue potential

Push-to-Talk system ('blue-light' services)

eVehicle / eBike Charging

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Innovate incubate accelerate

2.2 Leadership choice on where to start

With all that choice, where does one start? City leaders can help ensure a strategic view on potential value by setting the context for action. By ensuring actions serve the most important needs of the public?

By determining if you wish to collect and sell people location data – within the public sector, or by engaging and supporting (local) SMEs. By setting the risk context (lead, or follow, and on what); and by clarifying if the city will be more focused on innovation, money savers, or sustainability & community.

A case can be made at various points on the spectrum (illustration), however the city will need some guidance on where priorities lie – the relative safety of light only, or the market innovations of data trading.
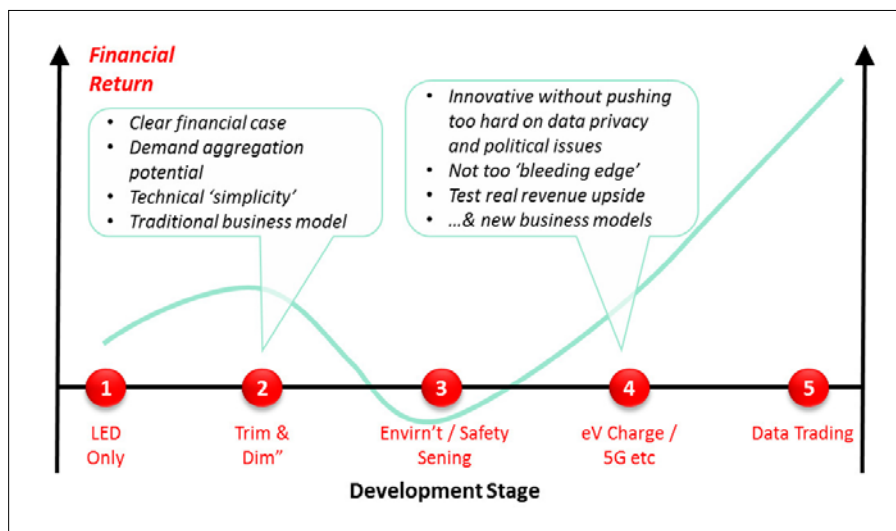
2.3 The need for an integrated approach

Multiple city public departments and agencies will be involved in the more progressive smart lighting initiatives. Several industry sectors also – importantly, ones that may not naturally.

The reality at present is clear: each city that seeks to buy new or upgrade old has to tackle the task in isolation. That requires building and using scarce expertise, lengthy design and procurement cycles, and managing city-specific projects. This is unlikely to be optimal.

Leadership is needed to help overcome the barriers of collaboration *locally between departments* (lighting, roads, health, etc. – all of whom could stand to benefit); *between cities* typically locally; and *between city-clusters* on an international basis. As well as between public sector, industry, and potential financiers – all of whom view the opportunity from very different perspectives.

On a positive note, this sort of collaboration is already apparent between the automotive manufacturers (that support electric vehicles), technology providers, lamp and pole manufacturers. Are they, however, fully au fait with demand side requirements, or is there more that cities can do to support this?

We must shift the balance from industry-led, technology-centric discussions, to those that are based on how cities can use technology and data to deliver better services and a better society.

"If we can't implement something as simple as the Humble Lamp post along the lines of the EIP ambitions, then what will happen when we tackle something difficult?"

3. Moving to action – exploiting the management framework

3.1 A toolkit for success

A new Management Framework, "Component-based Smart Lamppost", provides the first capture by cities of how best to go about things – from the very first inklings of an idea, through to proving value and sharing operational experiences.

It offers a principle-based approach, based on a pragmatic project lifecycle based logic, supported by more than a dozen practical tools that can support and give confidence to the person responsible for a humble lamppost initiative and steer them through the process. It does not result in a one-size-fits-all solution, rather helps inform a city of what options exist so that they can tailor the right solution to the various communities needs within their city.
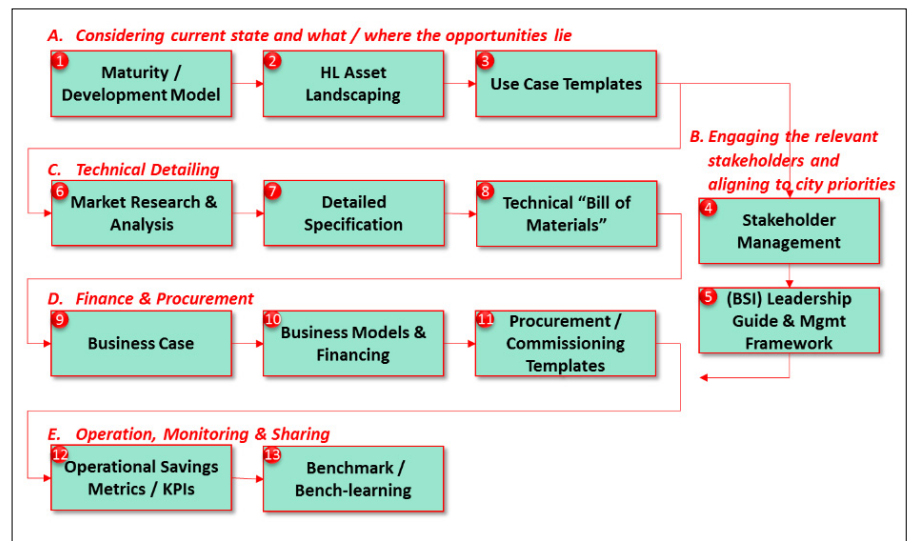
The initial set of tools available in the Management Framework will continue to be improved and include (ref illustration):

A. Considering current state and what / where the opportunities lie

1. **Maturity Model** – a 5-step frame of reference to capture current state, and desired ambition

2. **Asset Landscaping** – capturing current and planned smart lighting assets, and support applications

3. **Use Case Templates** – a description of user value from implementation of smart services

B. Engaging the relevant stakeholders and aligning to city priorities

4. **Stakeholder Management** – helping to ensure sufficient support for the initiative

5. **Leadership Guide & Management Framework** – documents that will become trusted guidelines

C. Technical detailing

6. **Market Research & Analysis** – helping guide buyers through the process

7. **Detailed Specifications** – identifying which standards and documents cities could/should use

8. **Technical "Bill of Materials"** – a swift start for a city to capture a list for their intended new system

D. Financing and procurement

9. **Business Case** – developing the financial and non-financial value case

10. **Business Model & Financing** – evaluating options and accessing financing

11. **Procurement / Commissioning Templates** – speeding and guiding cities through the process

E. Operation, monitoring and sharing

12. **Operational savings metrics / KPIs** – supporting cities in proving their value case

13. **Benchmark / bench-learning** – a structured means to share learning and seek ongoing improvements

The EIP-SCC and ongoing major EC smart city programme investments will support ongoing market convening and shared learning actions.

4. In summary: seven steps for city leadership

What could you, as a City Leader (or key stakeholder executive), do next?

Below are a few suggested items for a City Leadership action plan that can ensure your city maximizes the potential from the 'humble' lamppost.

1. **Identify if this is THE quick win that can bring to life your smart city strategy.** The public (and indeed city agencies) deserve something to hang onto, and talk about, that shows that city leadership is innovating and seeking out new ways of delivering outcomes. There are half a dozen quick win candidates, and the lamppost is perhaps one of the most prominent. If not the lamppost, what is the favoured candidate? If none exists, perhaps the city is losing out. Dig into the (very likely) multiple sources of societal wants and needs to see whether the lamppost can support the use cases that matter most.

2. **If it is the *quick* win (or even if you'd like to just check first), give someone the mandate.** This is cross functional and cross-sectoral; it will 'bump along in the long grass' unless it has legitimacy to operate on a cross-cutting basis. Find a bright networked energetic person to run with it. Get some 'sprints' in place to make clear visible progress to all.

3. **Actively support the use of the Management Framework.** There is little point in reinventing what has likely already been done elsewhere. The management framework provides a structure and process to work from. It is supported by recognised implementing cities. That provides access to experience and insight that can be exploited to de-risk, to speed up, and to maximize value. Yes, each city is unique, however that is no excuse to isolate.

4. **Seek out scale and collaboration potential.** Replacing and upgrading lighting stock at volumes that will not fully engage the supply base or industry does not deliver best economies of scale.

5. **Set a rhythm of reviews to help coach the initiative through.** Invariably the 'devil is in the detail'. Don't let this cross-cutting initiative fall by the wayside. Help lift it up when it falters. And if some minor failures occur, show that they can be used to learn from.

6. **Check-out the business model and financing options.** And help the team in making decisions about this that deliver the scale and potential that it can.

7. **Communicate about it!** As a leader, your voice is heard. Take the opportunity to actively promote what your city is doing, and pull the initiative through to evidence-based success.

Hello Lamppost – jolting society into engagement

Bristol, UK, consider itself a 'playable city'. In 2012, the city decided to use various novel means to engage society; one of which used lampposts in the centre of the city. They projected shadows of previous pedestrians from the lampposts to intrigue, playfully. They enabled people to 'talk' to lampposts via social media. Several cities have since picked up on this idea, including more recent steps in London's Olympic Park.

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