



## City Survey Insights – the ‘Humble Lamppost’ – what the market wants

### INTRODUCTION

Over summer 2017 the European Innovation Partnership for Smart Cities & Communities (EIP-SCC) launched a demand side survey to understand what European Cities were thinking and doing in terms of upgrading their public street lighting assets.

Apart from being a splendid reminder about how tricky it is to do business across European countries over the summer months, the survey has delivered some fascinating insights that will help steer and mobilise the market.

First however, why the lamppost? And that’s an easy one to tackle. The “Humble Lamppost” is an excellent candidate for cities to start their smart city journey. It’s an excellent opportunity for a few reasons.

**Firstly**, compared with other choices, upgrading an already often dated city infrastructure and converting them to efficient LED luminaires (‘lights / lamps / bulbs’ to the majority of us) presents a pretty solid financial case. Indeed, 75% of Europe’s lighting poles are more than 25 years old; and still the vast majority of them – we anticipate still over 80% - use energy inefficient luminaires. It is suggested that the change to LED offers 50%+ savings potential on energy and operational costs. And given that streetlighting is around 20% of a city’s energy bill (and for some cities considerably higher) that’s well worth consideration. In big picture terms that saving could be a few billion euros across Europe. So, from a money standpoint – particularly in times of constrained public budgets – it makes good economic sense. City hall finance managers like that. And there’s a lot more financial value if cities could collaborate to get the best possible economies of scope and scale over the lifetime of the service. Another 20% plus perhaps.

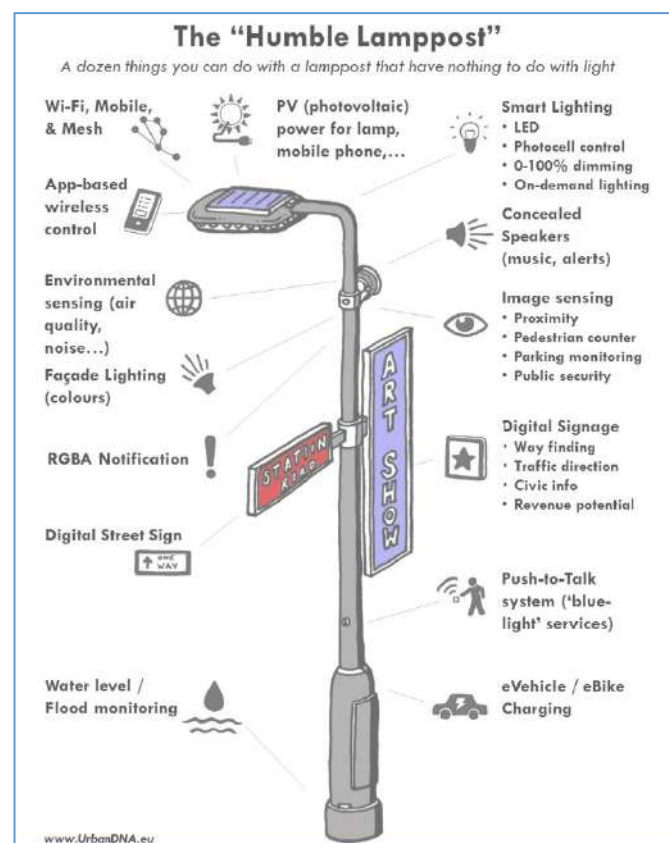


Figure 1: A dozen things to do with a Lamppost beyond light

**Secondly**, because cities need to embrace the changes that digitisation bring. And it’s hard to know where to start. It makes sense to start with something that you have more confidence in – i.e. less risk. A quick win, that offers very visible improvement (excuse the pun) to the public, to politicians, and indeed importantly to all the various city services providers (multiple public agencies and departments, as well as private sector).

And **thirdly**, because if you consider the array of lampposts in a city not as a rather dull bunch of aging concrete and steel; more as a beautifully laid out ‘mesh’ network of powered assets to be exploited to as a foundation for new city services – it opens up a whole realm of new possibilities (see figure 1). It really offers the opportunity for that rather humble asset to transform.

Industry has been pushing the benefits for a while. However, take-up has been slow, as there are multiple considerations and constraints to getting things done in cities.

That's why we sought to hear the opinion from European cities. How did cities see the opportunity? What were they planning to do about it? Who was going to pay for accessing this opportunity? How much? And what business models were preferred? Exactly what types of additional services did cities have in mind? What was blocking progress? Were cities up for collaboration to develop real scale in the market and accelerate adoption?

And to cap it off, we did it because this is already something that is underway as an initiative with the EIP-SCC. It's one of the EIP-SCC's earliest initiatives and has reaped various benefits as a result (like real support from Commissioners), and also faced a fair few challenges along the way (like making real progress in an un-funded market environment). However, we battle on with passion and persistence, and we'll get to our goal at some point – perhaps later than we'd like, however earlier if you join in.

#### *The EIP-SCC Humble Lamppost Goal*

The goal set, in 2014, is to upgrade 10 million smart lampposts across EU cities; by developing a common component-based solution that can be tailored to local needs; with smart add-ons (illustration); creating scale through demand aggregation; building investor interest and confidence (also thru' strength of LED upgrade ROI case). This initiative was championed initially by Anne-Marie Jorritsma, and has continued to gain the interest of several Commissioners and other senior / influential people – why?, because it's obvious, easily understood, very concrete, delivers clear financial returns and other potential forms of value.

## SO, WHAT DOES THE SURVEY TELL US?

Ten big messages emerge:

1. **A solid return on investment:** there is a significant opportunity to exploit the 'humble' lamppost to save energy and, *at the same time*, implement additional 'smart' services
2. **'Smart' is certainly the ambition:** 60% of EU cities want to implement wide array of additional smart services on their lampposts, most notably around connectivity and IoT-enabled features
3. **The time to act is now:** we squander €120 million each week at an EU-level through inaction, and too many of those that are implementing are accessing *only* the LED energy gains. Delay to act on the relatively-simple smart lamppost risks delay in acting on other smart solutions – a potentially nasty 'knock on' effect
4. **Boutique volumes; supermarket prices:** economies of scale require significantly greater volumes to be brought to the market, within a city, or by collaborating to aggregate demand between cities
5. **Access to finance is the big blocker for scale adoption:** yet there is no shortage of money in the market
6. **Leadership and business justification are the critical challenges:** leadership is both 'of issue' and 'not of issue' – i.e. it is city specific. So, working with those leaders that that want to act will pave the path to success. (There are, however, still some technical matters that present persistent irksome challenges)
7. **Solutions must be city-needs-led:** cities must drive the agenda, they define the need and desired outcomes
8. **Overcoming individualism:** the diversity of EU cities and their contexts, needs and wants always warrants tailoring of solutions; however that should not be used as an excuse to avoid collaborating around common approaches and solutions, and actively sharing experience
9. **Exploit the conditioned avenue to scale adoption:** the grant-financed EU smart cities 'Lighthouse' programmes, and European Innovation Partnership Marketplace provide an important route to early action
10. **Getting this smart city 'quick win' behind us is important as it builds market confidence** – of cities, of investors in cities, of Governments, and Industry – to free up space to tackle the much bigger and more challenging opportunities to transform services and outcomes in our cities.

## TO THE DETAIL

### *Aussies do their homework!*

For an EU survey, Australia may well be an odd place to start. However, there’s an important learning, and we suspect it goes beyond just the fact that Aussies do what they’re asked (indeed, do they?!). After launching the survey in Europe, the initial (and rather few) responses showed that there were some really interesting findings, we put a great deal of time and attention to increase the volume of responses so that we could draw out some country-specific market comparisons. That involved multiple pan-EU communications, engaging national city associations, city networks, exploiting personal relationships and the rest. Half way through that, an email popped up from Australia about what a network of cities and industry were up to there on street lighting, more technical, and less on the ‘smart’ agenda, however certainly worth engaging with. So we did, and they launched the survey in Australia. In only a few weeks, they had nearly 30 responses – in a country of 24 million people. It took Europe 4 months to get just over 100 responses, in a region with 500 million people. Why? Well alongside all those reasons you might think of, is one we feel is significant. Australia has just launched a national smart city strategy, and backed it up with some national stimulus grants, to the tune of \$50 million. The fact that it was launched by the Prime Minister – with a whole-of-Government perspective – is also important when one is dealing with cross-cutting topics like smart cities. The impetus clearly stimulates the market. It happened in India, in the US, and in Canada only recently.

And to an extent this seems to be borne out when you dig into Europe, where five countries (figure 2) were more active in their engagement with the survey. The countries with a strategy on smart cities (albeit several are now rather well worn) were, generally speaking, more responsive, and one in particular – The Netherlands – had a national smart city strategy also launched by their Prime Minister. Spain highlights this advantage too, with its long-standing commitment to smart cities. What is clear then is that sustained top-level championing can pay off handsomely. However, that effect doesn’t last forever – indeed it can wear thin fast. More on Australian comparisons to come; and indeed, some EU country comparisons too.

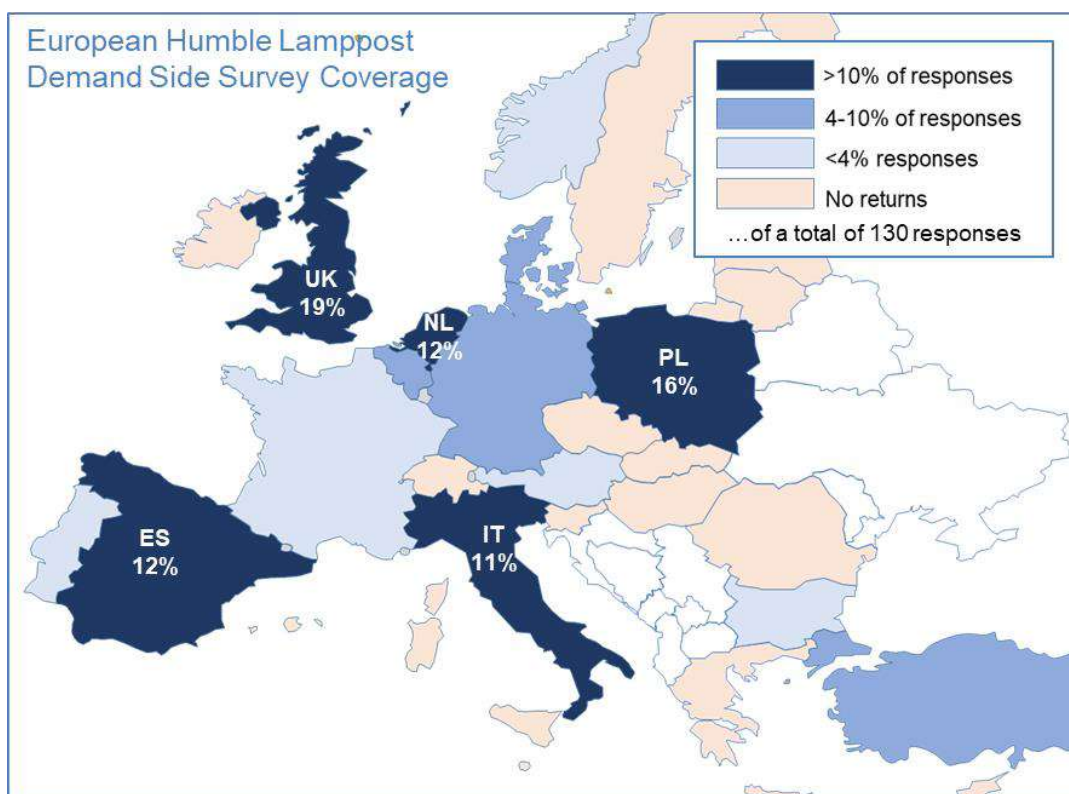


Figure 2 EU Humble Lamppost Survey Response

### Who's Doing What: How advanced are cities in the process?

The number of street lights in Europe is somewhere between 60 and 90 million. And we noted that 75% of them are more than 25 years old. A single digit percentage of them have been upgraded to LED, and LED offers 50%+ energy and operations savings, with payback in little more than a handful of years. That would appear to be, on the face of it, a pretty compelling reason to act. Does the data suggest that, however?

#### We asked cities where they were in the process.

Over past years the sense in the market has been one of thinking, small-scale pilots, and limited scale action. Where there have been notable exceptions, these have been projects focused on LED upgrade to access financial savings, rather than projects that consider the lamppost as a multi-purpose asset. Even considering these projects, the LED upgrade percentage across Europe is still in small percentage numbers.

However, we appear to see a shift in market interest. Across the whole of Europe, the statistics suggest almost half of respondents are in some form of action (figure 3), be that piloting or in some pre-commitment project stage. There is still a significant portion (around a third) that are not past the starting blocks. And a modest portion that are committed (i.e. in or past procurement).

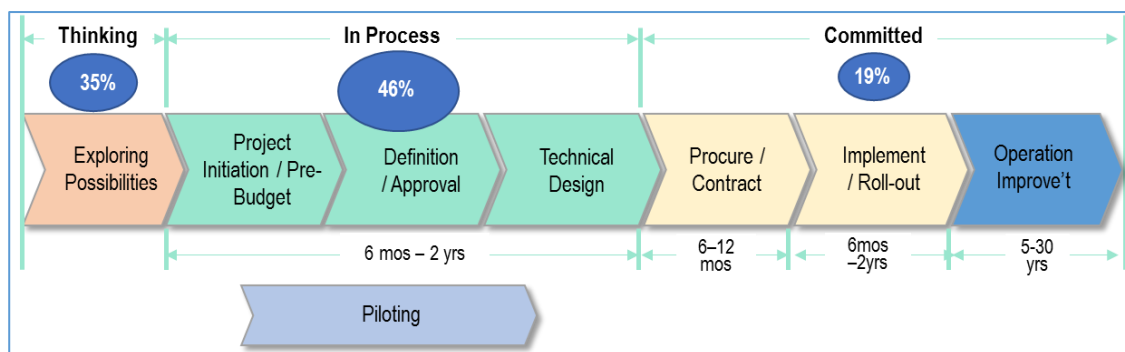


Figure 3 Where in the Project Value Chain are Respondents

Here we cannot neglect those that did not engage with the survey, of which hypothetically a higher percentage are likely to be not even 'exploring the possibilities'. They are likely not in action. And these numbers could still be quite high.

#### This still leaves considerable scope to influence how the market may yet be shaped.

Europe is significantly ahead of the game in comparison with Australia where 56% are still 'thinking' (figure 4).

The picture across Europe of course is not uniform. Of those four countries that are 'out of the starting blocks' (i.e. with less than 20% of their cities still exploring opportunities), which includes UK, NL, ES, & IT, they are appreciably more progressed (see figure 5 overleaf); for instance, in comparison to PL, where 50% of the cities are still 'thinking'.

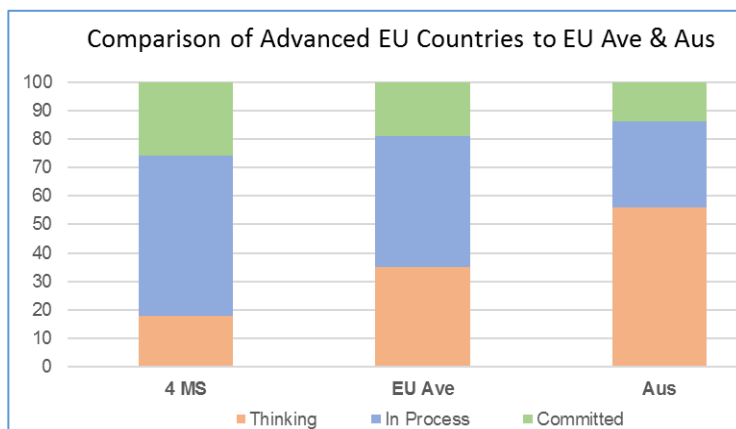


Figure 4 Comparison of Advanced EU MS, EU Ave, and Aus

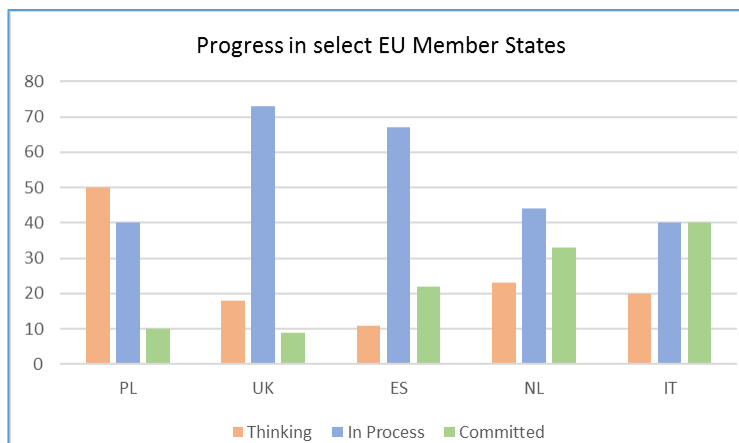


Figure 5 Implementation progress for high response EU MS

Things will however still take time to come to market. It takes several years for a city to go through the process of generating awareness, exploration of needs and opportunities, internal alignment, capacity building, making the case, taking decisions, accessing finance and exploring business model options – basically getting ready to act. Indeed, the average public sector organisation takes four to five years to go through that process.

The **big opportunity in the market is**

**therefore very clear: to help accelerate cities through the pre-procurement stages.** The work of the EIP-SCC focuses on this, by developing methods and tools to help speed analysis, bring confidence in decisions, save cities time and money in not having to develop all the capacities required. So too the EIP commitment of the Smart Cities Council, which was to develop a decision support tool to address the business justification; a ‘smart lighting 101’ guide, and initiatives to engage the market.

*“If we can’t implement something as simple as the humble lamppost along the lines of the EIP ambitions, then what will happen when we tackle something difficult?!”*

*Annemarie Jorritsma, Initial EIP Humble Lamppost Initiative Champion*

### Are EU cities getting the best value for money?

**There is much more potential to be had: acting at pace; collaborating on needs and specifications; aggregating demand; and implementing ‘smart’.**

City operating budgets, which some cities rely upon for improvement, are constrained and result in sub-optimal purchase volumes that don’t deliver economies of scope and scale. Even cities that tackle projects in larger volumes can lose out on the advantages of economies of scale. The potential from demand aggregation to get better pricing, access better loan terms from investors, and increase overall life-cycle value, is very real.

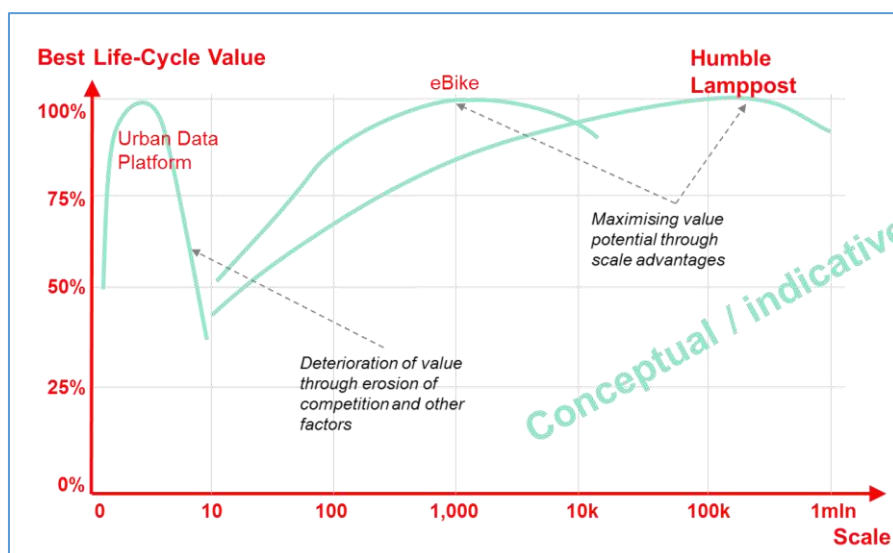


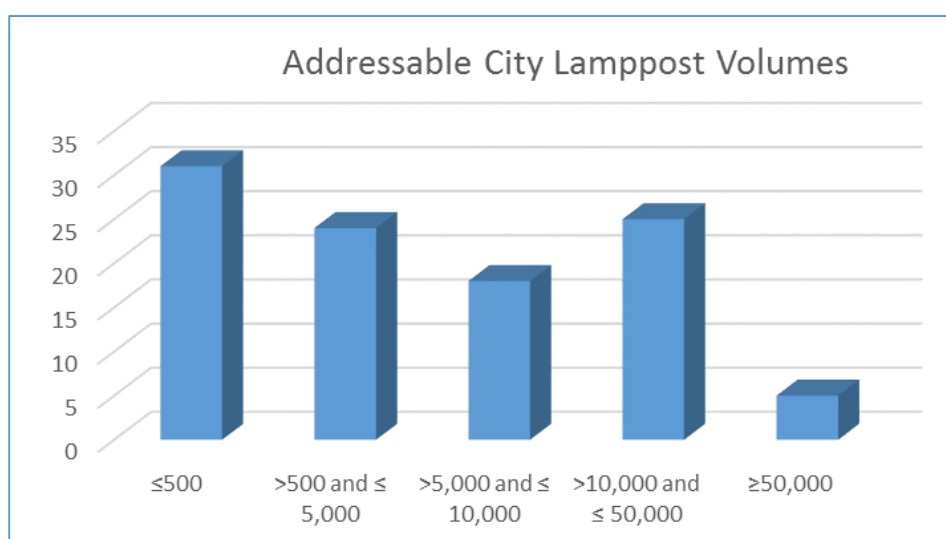
Figure 6 Optimisation of Value through Scale Advantage

Particularly for solutions where there is clear scope to implement common solutions for shared opportunities – like smart lampposts. In such cases, cities can access the investment work done by other cities to save themselves cost and time. Figure 6 provides an indicative view on the sorts of scale that might deliver optimal value for the lamppost and a few other solutions for comparative purposes.

This potential is not lost in the EIP-SCC initiative as it seeks to **capture common designs, and work with standardisation bodies to develop common guidance and specifications** that cities can use with confidence, industry can design to with confidence, and financiers can invest in with confidence.

**We asked cities what sort of volumes they had in mind.** The biggest majority is addressing small volumes – less than 500 poles – which will not deliver best value (figure 7). However, 70% of these, when one digs into the responses, are exploring the possibilities or piloting, so their objectives are perhaps not about best value; more about learning. 30% of the bigger volumes (>10,000) are interestingly also from amongst the group that are exploring the possibilities, so these perhaps have the opportunity to take actions to generate real economies of scale. More than half of EU cities are addressing volumes below 5,000 lampposts, so will not access scale advantages. This is a rosier picture than Australia where 75% are addressing below 5,000, and 60% below 500 (again most likely a piloting desire).

**Few however are looking at volumes that access real scale, where there is scope to significantly influence the market. And that is where the scope for collaboration exists.**



*Our opportunity is clearly to aggregate the sorts of volumes where cities can steer the market and achieve economies of scope and scale*

Figure 7 Planned Volumes of Lampposts

### **“No More Pilots!”**

This was the view from a city leader of an advanced city a few years back. The sentiment behind it at the time was solid. Pilots tend to lead to multiple ideas that tend not to fit together in the big picture sense for a city. “We risk building Frankenstein!” was the stated opinion. Although that is indeed a real risk, there is another very good reason to ‘ban pilots’ when one considers smart lampposts. Pilots are meant for new ideas that can fail. The market readiness of smart lampposts is high – it’s proven. And even if there are uncertainties, so much can be learned from other cities that are busy working on this. **The issue is we are not capturing that learning in a sufficiently structured way, and sharing it to help make better decisions.**

It is time for the agenda to be about seeking scale solutions, given the technical solution is well advanced. And real scale comes through collaboration and demand aggregation. That way there is real value for all actors in the market. And it enables us to get the ‘easy’ initiatives behind us, and helps the market concentrate on other big value potential areas: building retrofit, transport, wellbeing, public security, waste and recycling, and the like.

We should think of ‘cities as a platform’ for influence and action. Uber, AirBnB, Google, and others do.

### What's blocking scale adoption?

We explored what the barriers were to scale & accelerated adoption of large volumes (above 10,000). The response was interesting, and clear (figure 8): Access to Money. After that, was a structural constraint which came from several (smaller) cities that just couldn't produce the volumes. And the third niggler was about justifying the return on investment – though that was a much smaller concern.

#### Money however is not in short supply.

It may well be constrained in city budgets, or perhaps more likely prioritised for spending on other infrastructure and services. It may well be constrained in national coffers. However, it is most certainly available in the market. The challenge is to provide a compelling case to access it. Investors too often see cities as “too small, too slow, and too risky”, so changing perceptions is an important step to take.

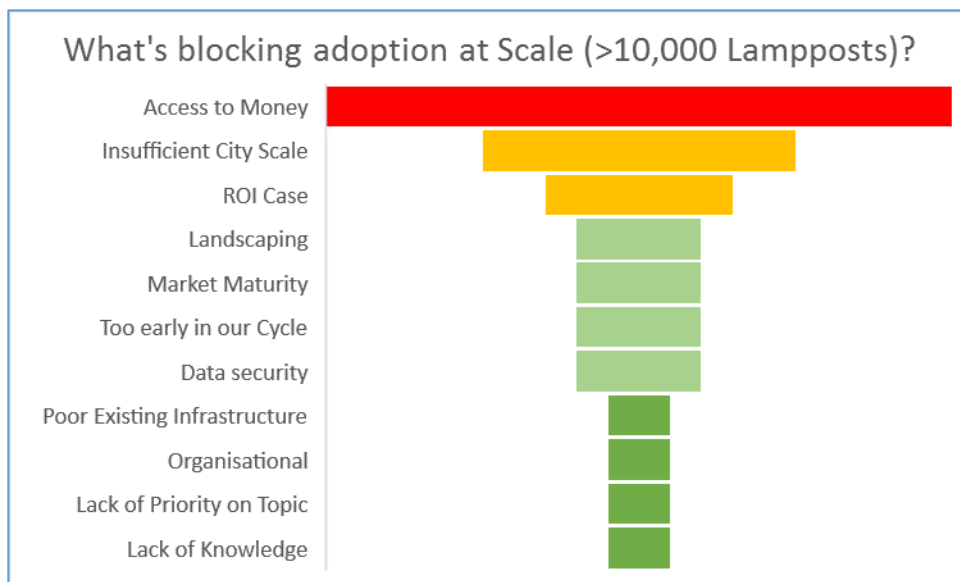


Figure 8 Blockers to Cities Acting at Real Scale

LED upgrades can present a compelling investment case. Add to that some additional services and there is scope for additional funding streams.

The opportunity to aggregate demand is very clearly one that exists. This can address the challenge of cities being too small in scale, and indeed done well it can build the confidence of investors, and interest from the supply market to bring innovations. The big question is whether there is an appetite to do so. Cities are not renowned for collaborating, yet their common goal is to deliver public value (as opposed to private industry which is principally to deliver shareholder value) so collaboration to achieve rapid public value would seem to be a fair motive to embrace. And in times of growingly constrained public budgets there is a jolly good reason to do so.

### Potential to exploit the EU Smart City Lighthouse Programmes

The investment of the European Commission in the growing number of Smart Cities & Communities (SCC01) ‘Lighthouse’ programmes presents a clear and important market opportunity through collaboration. These, of which there are now a dozen programmes, generally have three implementing cities and three plus cities that will replicate the solutions developed. This market stimulus investment from the Commission is complemented by city co-investment. A preliminary analysis of seven of these programmes and a handful of the solutions that are planned indicates that a significant number of the cities (13) do intend to do something on smart lampposts, however at this stage the budget position is only declared from 3 of these. There are positive indications however that the stimulus is working. Figure 9 includes three solution areas that show (blue) the EC investment; (green) the city co-investment, and (orange) the anticipated scale-up potential. So, EC seed finance might indeed be stimulating market action. What is needed however is to mobilise real scale.



An important message emerging from the ongoing work of these programmes validates that **the smart lamppost is clearly a good “quick win” to take action on.**

Figure 10 below shows a mapping considering the various measures from these programmes against potential scale advantage, and potential for standardisation.

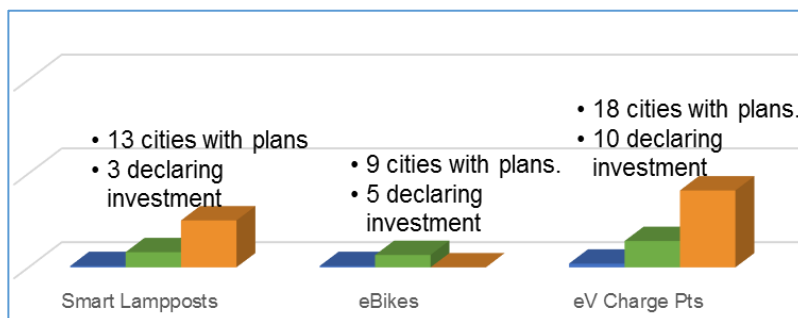


Figure 9 Inventory of a few Measures and Scale Up Potential

The upper right includes the ‘priority A’ measures of which the smart lamppost is one of the key selected measures to advance.

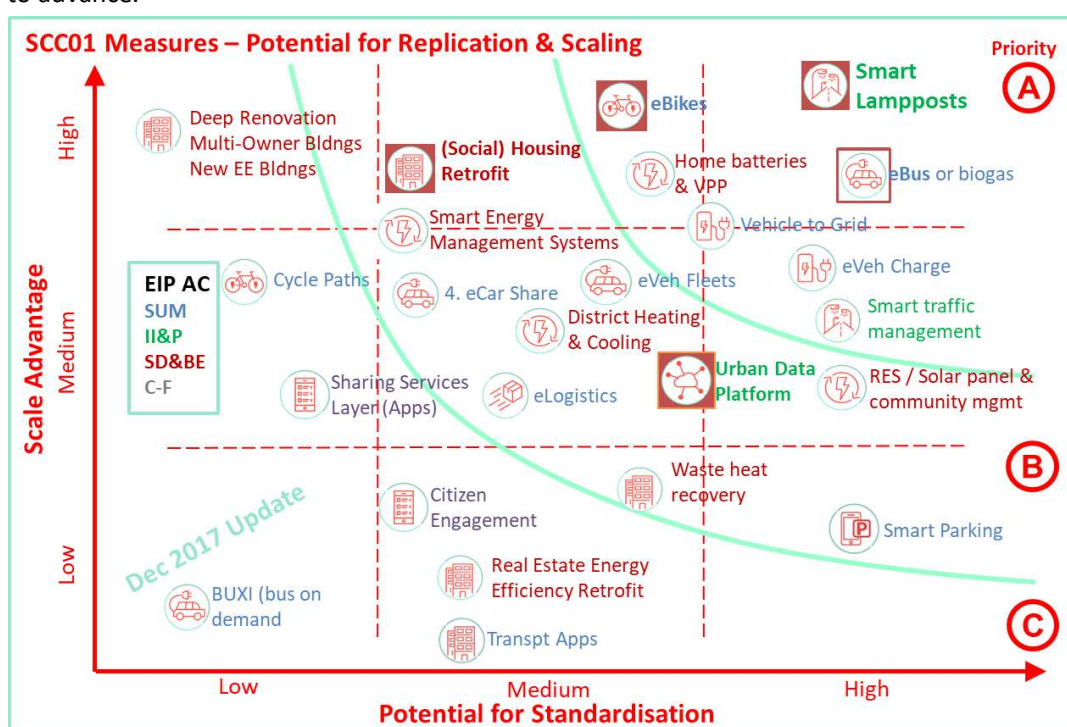


Figure 10 SCC01 'Lighthouse' Programme Collaboration Potential for Specific Measures

### The nature of the challenges

We asked respondents to rate ten challenges from 1 (no issue) to 5 (critical). The views are intriguing (figure 11 overleaf). These covered in broad terms: people, financial, and technical related criteria:

- Engaging city **leadership**
- **Silos**: Internal engagement across service departments
- **Business Case** and justification
- **Business Models and Financing**
- **Procurement**
- City-specific **operational constraints** (eg. power availability, ownership, contract conditions)
- Knowing **Societal** desires and what use cases to select
- Smart Lamppost **Technical** detailing
- **Cyber security**
- Knowing what is the **art of the possible**

When it boils down to critical challenges, **things financial are clearly the key concern** (justification, and constructing business models and accessing finance). These are followed by leadership, and breaking the ‘silos’. Interestingly, leadership is both a ‘top 3 concern’ when critical, and also not seen as of issue. So, when it gets in the way, it sure does! Best then to get leadership engaged and on board early.

**There still remains some irksome technical challenges** (rated 3): technical detailing, cyber security, and understanding which use cases to service. The flavours of business justification, and business models and financing however are perhaps not surprisingly all lurking at the upper end of the concern scale.

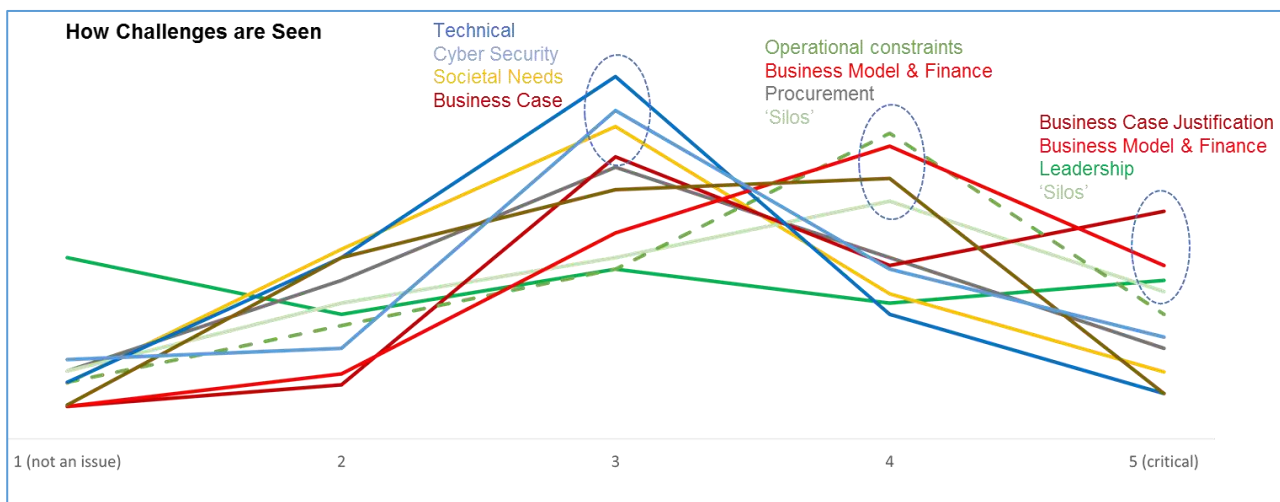


Figure 11 Challenges to adoption of smart lampposts

**Europe wants Smart Lampposts, not just LED upgrade – however the time to act is now!**

**60% of European cities plan to implement smart lampposts rather than just go for LED upgrades** (figure 12). Procurement activity in the market over the past few years has worryingly not seemed to follow this trend. Cities have been able to justify LED through energy savings, however the ability to justify smart services seems to have evaded many projects. Of the 40% that want only LED upgrades, just short of half of them are ‘past the post’ as regards their decision making, and most are already in procurement.

So, for these cities the business case justification to *post*-install smart services becomes that much more challenging. The potential to “get a ‘free’ sensor for each dozen lampposts” is no longer an option. Someone is likely to have to climb the pole for a second time to make changes. A compelling retrofit case needs to be made – unless of course those cities have future-proofed their designs.

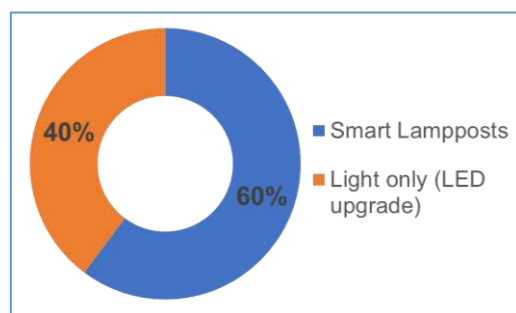


Figure 12 LED only, or Smart Lampposts?

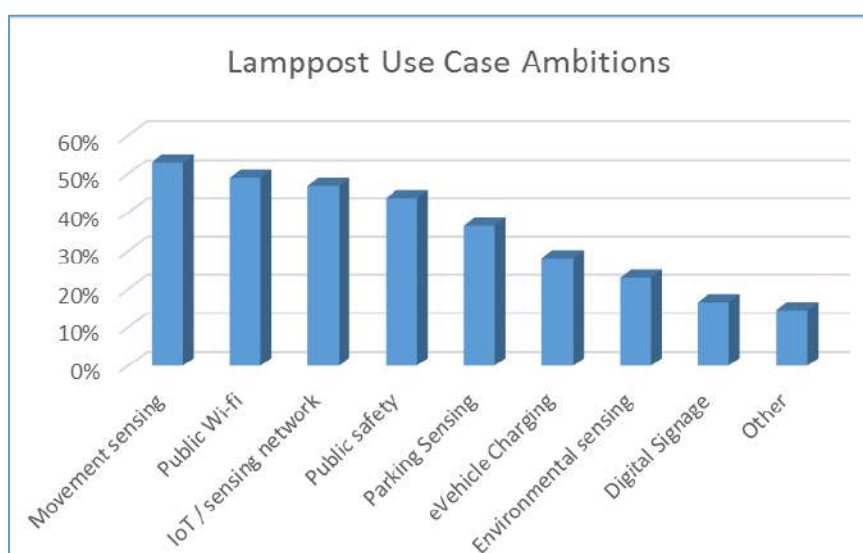
The working assumption is that the cost to retrofit ‘smart’ services will be a higher cost than doing ‘LED + smart’ together. So the clear message is that it makes much sense to do the thinking now, and figure out where to apply which types of smart services at the same time as capturing the financially attractive LED upgrade.

In contrast, 70% of Australian cities seek to implement smart services when they upgrade to LED. That might suggest that by being a bit further behind the smart city adoption curve Australia has greater ambitions to access the additional benefits of smart.

### Connectivity and IoT services are the most desired use case add-ons

There are many additional services that a lamppost network can enable, however the most important thing to remember is the core purpose of the streetlight: the obligation to provide light that improves the safety of vehicles and pedestrians. Over the years they have served many other purposes, like places to hang flower baskets, post planning notices, or relieve the dog! These days there are many more ‘smart’ functions they can provide.

**We asked cities what smart features they were most interested in.** European cities are considering a variety of additional features to augment and exploit their lamppost assets (figure 13). Connectivity and IoT-enabled services sit at the centre of the ambitions. Movement can cover a number of features, be that movement of cars (to attenuate light to suit), or the movement of people (for instance to manage crowds). This can streamline city infrastructure and services; and particularly the movement of people can offer revenue opportunities. It does introduce a vitally important consideration as regards the governance of the data associated with these functions.



The ‘other’ category includes such functions as optimising waste collection, or smart hospitality.

It is the relatively new and innovative nature of many of these features that presents challenges for lamppost infrastructure owners, notably in terms of business case justification. The function of the asset changes significantly offering considerable additional, and perhaps as yet to be developed or stabilised, value-

Figure 13 Desires Non-Light Use Cases

adding features. **As a result, there is a very real human tension between the desire to access the reliable energy savings potential of LED only, and exploiting the asset to deliver new ‘smart’ services** (table 1).

Table 1 Lamppost Purposes and Exploitation Potential

Core purpose	Augmentation thru...	Exploitation via...
<ul style="list-style-type: none"> <li>Safety of vehicles and pedestrians</li> </ul>	<ul style="list-style-type: none"> <li>Energy efficiency</li> <li>Improved safety</li> <li>Better quality places</li> </ul>	<ul style="list-style-type: none"> <li>Mesh Public WiFi Mesh network</li> <li>IoT Connectivity platform</li> <li>Connected and automated driving</li> <li>Foundation for emerging smart services</li> <li>Revenue stream</li> <li>Platform for innovation</li> <li>Proof point to build confidence for additional smart services</li> </ul>

Is a city lighting engineer incentivised to install air quality sensors that will theoretically deliver healthier residents over the long-term? How does one cover the increased maintenance costs that are incurred by adding additional equipment to a lamppost? Perhaps the most vexing question is who gets the revenue streams that may flow in from: offering Wifi, providing access to movement data to retailers, or offering advertising space, or selling power for electric vehicle charging? Are these services that cities wish to provide, or should they offer them to the market as a concession? Will this ensure the city continues to get fair value from the asset? Will it ensure society is treated appropriately as regards the use of their data?

These are all important questions that warrant being addressed. Shying away from doing so is shying away from innovating and accessing the benefits of digitisation. That is electing to stand still whilst the world moves on. It is a risk – with financial and public value loss through inaction.

Figure 14 seeks to indicate the relative value of the various use cases that were assessed, considering direct financial returns, public value gains (typically not converted into financial metrics), and relative cost of implementation. **This analysis highlights the conundrum that we face to strengthen business cases, capture and rapidly share early learning on delivered value, and use this to promote action in the field.** And at the same time informing how we best structure business models to de-risk projects and maximise value.

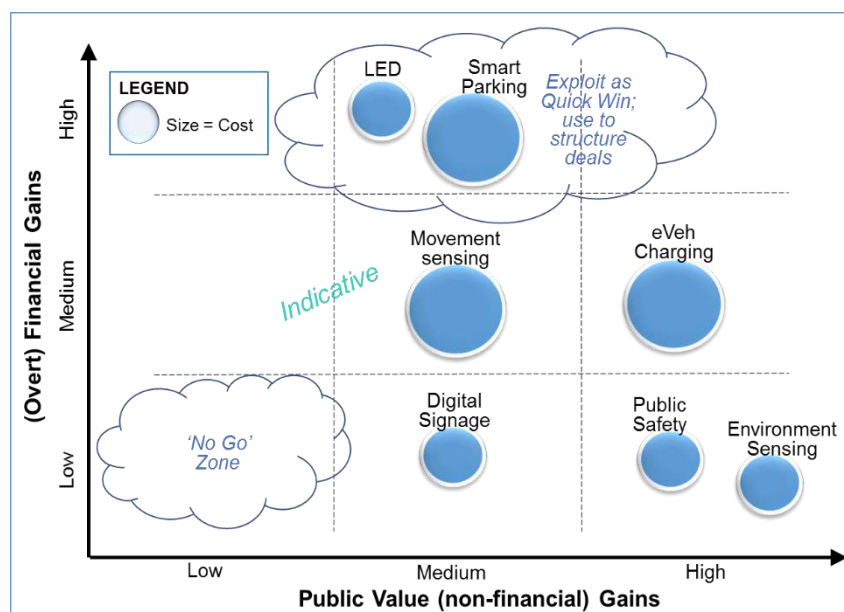


Figure 14 Indicative Value Assessment of Smart Features

### The 'irksome challenges'

So often "the Devil is in the detail". It is evident that for several cities there are technical and operational challenges that need to be resolved in order for a smart system to function satisfactorily. These tend to vary by geography, and there are a few that are more common:

- **'Asset Landscaping'**. A challenge that invariably hits every city is firstly understanding what lighting assets they own (or their service provider owns), and what state of fitness they are in. This can take considerable time to ascertain, however it is an important foundation stone, as it can be a considerable cost driver for any upgrade plan.
- **Use Case Mapping**. A city must decide what smart services that wish to put in place in which parts of their city. Pragmatically this can be done judgementally by an appropriate group of professionals. However, in some cases cities may wish to carry out further analysis or community research to inform such decisions. Examples would include if and where to put public safety equipment (cameras, or 'push-to-talk' features); or where and how many electric vehicle charging services to install. Again, these decisions are important drivers of cost and value.
- **Availability of 24-hour power – and sufficiency of that power**. In several countries and regions lampposts are served by power only at night. This can introduce technical and ownership questions. Getting the power turned on 24/7 may appear to be a technically simple task, however that may require investment from utility providers and (new) operational and contractual arrangements. At times the metering and payment of power is not carried out at a level of detail that supports some of the new services in consideration. And indeed, for some new services, like electric vehicle charging, there may be technical constraints to provide sufficient power.
- **Connectivity and data 'backhaul'**. Much promise is in the market around the possibilities that 5G will open up. In reality, a fair bit more work is required to land the discussion into commercial and operational realities. That is offers potential however is not really in question. And the increased density of equipment makes the array of lampposts in a city an ideal asset to support that connectivity. However, and whenever

5G is realised, there are many other forms of connectivity that are available (LoRa, LiFi, Zigbee and other such acronyms), and the sensible discussion is one of aligning use case needs to technical capabilities. What is inevitable is that the end solution will be a heterogeneous connectivity system.

These, and more, technical and operational challenges have been raised by cities, and though they may not be considered critical in nature, they are essential for us to address, inform and resolve.

**What are the intended Business Models?**

The predominant trend (60%) across the EU is for public sector owned and operated street lighting (figure 15). Public Private Partnerships represent just over 20%.

**So, more than 80% of business models have public sector involvement.**

This picture is significantly different across the various EU countries. Australia is also included as contrast (table 2).

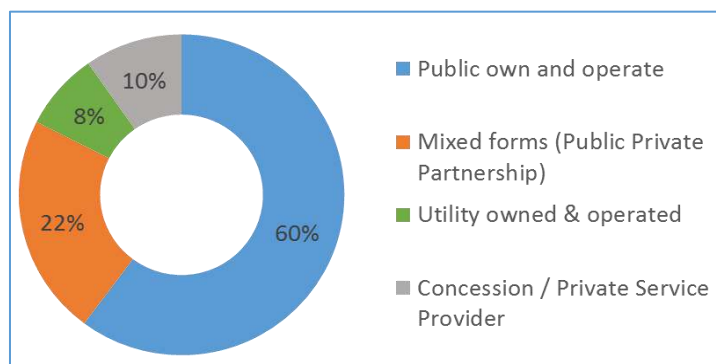
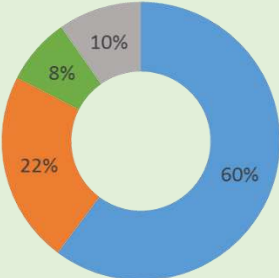


Figure 15 Anticipated Business Models (EU Average)

Table 2 Anticipated Business Models for select Countries

EU Average	Poland	Legend
		<ul style="list-style-type: none"> <li>Public own and operate</li> <li>Mixed forms (Public Private Partnership)</li> <li>Utility owned &amp; operated</li> <li>Concession / Private Service Provider</li> </ul>
United Kingdom	The Netherlands	Spain
		
Italy		Australia
	<p><b>Note:</b> Sample sizes for each country are modest, however the results are considered indicative of the market position. And certainly valid for comparative purposes.</p>	

Ownership is a major consideration in terms of the freedoms that a city can take to influence outcomes.

Private sector ownership will result in investment decisions more likely to be driven by pure financial motives. It can have the advantage of swifter decision making, simpler procurements, and more flexibility as regards choice of business model. However, important matters of ‘public value’, like air quality monitoring (public health), public safety, water levels (flood resilience), must be influenced through city hall by planning, regulation and compliance more than pure economic considerations. This presents challenges.

**Public sector ownership will provide greater influence over the use cases that are addressed, however may be constrained by other matters**, notably: access to money for scale implementations; as well as decision making, silo behaviours, procurement probity and the like.

### *How much does this all cost?*

When it boils down to it, the investor, finance director, executive or politician wants to know what he or she is signing up for.

Not all cities advised their budgets; we had 20 responses. Project budgets varied markedly, from €¼ mln to €34 million – obviously volume dependent. More alarmingly, the per pole budget range varied enormously. The **LED-only average indicates around €220 per pole**, based on fairly significant volumes of 20-35,000 lights. The **smart lamppost average was €470** based on volumes that range from 500 to 50,000 poles. However, there is no correlation between cost/pole and volumes (i.e. estimates do not necessarily reduce as volumes increase). The **range of figures was wide: €200 - €1,100 per pole**. This could be due to many factors, notably: the state of current assets (i.e. what percentage of stock needs to be replaced), and the extent of ‘smart’ ambitions. What we do know is that the ‘smart’ poles on the market are individually priced considerably higher than these average figures – around €1,500 - €6,000 (clearly very different functionalities and designs). A year ago, a straw-poll of cities indicated an **average budget number more like €1,000 per pole**. And whilst feeling one’s way around budgets and money, many cities are not that clear about how many lampposts they actually have. A rough proxy suggests that for every 6-8 residents you’ll have 1 lamppost: a handy ready-reckoner.

Four important messages can we draw from this:

1. **Asset landscaping is vital** to indicate current state of the stock and match with use case needs to support budget preparation
2. More work is needed to understand and **stabilise costs – for regular upgrade and for smart fixtures**
3. Appropriate development of **standards and protocols** will help stabilise costs and bring greater certainty to the market
4. Market sounding to **assess scale advantage** would be helpful.

These require a combination of technical and commercial actions.

### *And where will the money come from?*

**The vast majority of financing sources involve public financing** (figure 16): 40% from the local purse, and a further and considerable 34% from EU or national/regional grants. Only 8% is presently foreseen to be from the market. And a further 18% from ‘other’ sources which, when inspected, include mostly public sources, though with a hint of blending of investors, or new financing instruments. So for the time being, the focus must be on influencing public sector financial decision makers – this has both benefits and drawbacks.

Public budgets are under intense and growing pressures. Grant financing should in theory reduce, as we shift away from using grants to stimulate action to mainstreaming these more market-ready investments. Also, as and if we shift to real scale (e.g. to access economies of scale) **there will be a need for greater volumes of money which may well mean accessing market finance.**

One might also argue that requests for larger smart lamppost investments may well drop down the political pecking order in preference for investment of public finance in schools, social services, health and wellbeing, and other public value initiatives.

As with business models there is wide variance across Europe from a strong reliance on local city finance in The Netherlands to European grant finance in Poland. This spread can be seen in the individual snap-shots below.

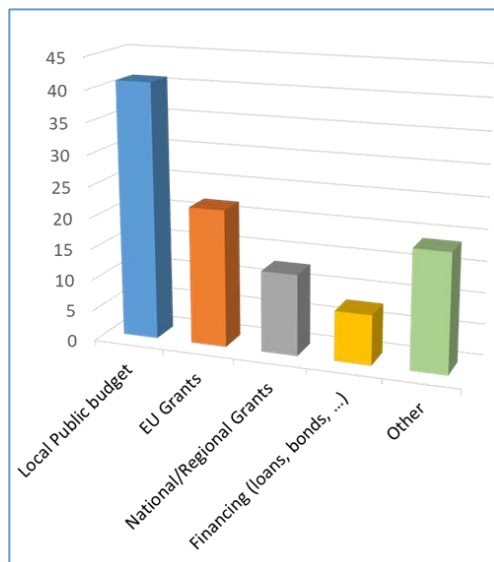
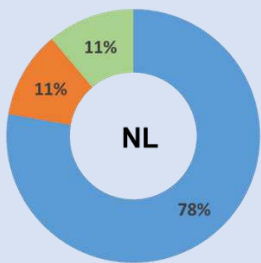
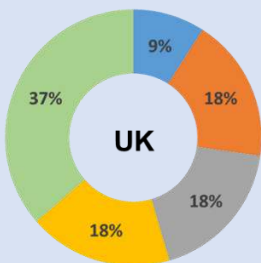
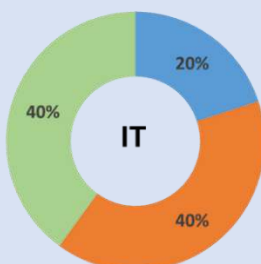
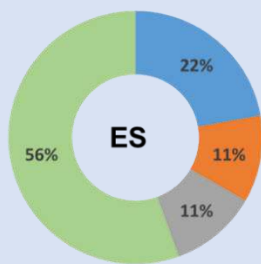
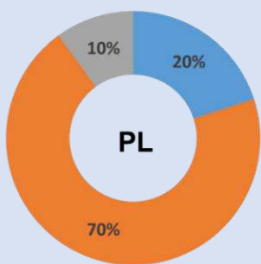


Figure 16 Financing Sources

Table 3 Financing Sources in Select EU Countries

The Netherlands	United Kingdom	Legend
 <p><b>NL</b></p>	 <p><b>UK</b></p>	<ul style="list-style-type: none"> <li>■ Local Public budget</li> <li>■ EU Grants</li> <li>■ National/Regional Grants</li> <li>■ Financing (loans, bonds, ...)</li> <li>■ Other</li> </ul>
Italy	Spain	Poland
 <p><b>IT</b></p>	 <p><b>ES</b></p>	 <p><b>PL</b></p>

*To shift adoption of the ‘Humble Lamppost’ to real scale requires the collaboration of cities around a common flexible specification, accessing money beyond only the public purse, and developing business models that incentivise market action. We must all work together to prove this – then move to the next big opportunities of urban transformation.*

## Where to Next?

**Each month Europe misses the opportunity to save €150 million through upgrading its lampposts**, and that is purely considering the energy savings from LED. Of course, Europe won't upgrade them all in one fell swoop, however that's the total opportunity cost that week-after-week we let slip if we do not act.

Delay in taking action on smart lampposts risks delay to acting on other potentially much greater value-adding smart city solutions. Cities must be bold and take action in the short term. And lampposts are considered by cities to be one of a few sensible places to start, and to learn, and to deliver new forms of value to build confidence.

Logic would suggest **it makes a great deal of sense to invest a very modest portion of that €150m** to: resolve the irksome challenges; stimulate collaboration; bring the market together; develop the component-based designs that will help cities implement flexible future-proof solutions; create easy-to-use templates to help time compress city readiness; capture guidance standards and protocols that will give confidence to the market; and offer SMEs a fair crack at the market.

The EIP-SCC Humble Lamppost initiative has persisted in its efforts to engage stakeholders in this opportunity; and it will continue to do so.

**Success requires that cities develop the appetite, and drive demand.** That has been the focus to date of the initiative. Now, as the European (and indeed worldwide) smart cities market evolves; as the EU Smart Cities Lighthouse programmes mature; and as Industry continues to develop more stable solutions, there is a palpable opportunity to take action. Business models and finance are available that can incentivise scale action. And the broader roadmap for the EU Lighthouse Programmes, and EIP-SCC Marketplace, include steps to engage investors, and then bring together specific conditioned stakeholders for a Pavilion Event that will ready the market for scale action.

Perhaps it is time to stop reflecting and start acting on Anne-Marie Jorritsma's advice: ***"If we can't implement something as simple as the humble lamppost along the lines of the EIP ambitions, then what will happen when we tackle something difficult?!"***

Over to you...

## For Follow-Up:

If you would like further general information on the [EIP-SCC](#), the [Integrated Infrastructure & Processes Action Cluster](#), or the [Humble Lamppost initiative](#), please go to the EIP-SCC Marketplace where there are a variety of further briefings.

General follow-up can be addressed to: [integratedinfrastructures@eu-smartcities.eu](mailto:integratedinfrastructures@eu-smartcities.eu)

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