

How to finance smart urban lighting investments

There are many options, but the most important strategy is to assess your city's procuring capabilities and break free from budget-deficit inaction and siloed administration approaches.

Models of governance for the municipal procurement of innovative energy demand reduction technologies

► In-house procurement:

Complete control over the process, the city bears all risk.

► Municipal Utility Companies (MUCO), relational contracts:

Partial or complete ownership over the third party, typically a municipal energy company, risk partially transferred.

► Energy Utility Company (EUCO), long-term contract:

Ownership is exceptional, no performance targets.

► Energy Service Companies (ESCO), long term performance contracts:

No municipal ownership; risk-sharing and responsibilities detailed in contract, guaranteed savings performance.


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Key performance indicators of smart urban lighting project finance

1 PAYBACK TIME

(investment / yearly savings in energy and maintenance)

2 NET PRESENT VALUE

(NPV = discounted value of all project cashflows)

3 BENEFIT COST RATIO

(BCR = total discounted benefits / total discounted costs),
for judging the cost-effectiveness

The economic evaluation of sustainability investments under deep uncertainty strongly depends on the real policy options and their implementation order. Under evolving requirements to mitigate climate change and adapt our cities to it, most transition paths could still result in negative NPV or low BCR, and still be informative for decision making.¹

See next page for more information ►

● How many of your city's streetlights are metered?

To measure and verify current situations and future projects, and fully use the argument of savings in economic planning, cities need a metered-consumption contract with their utilities company (instead of the traditional deemed-consumption or lump-sum payment).



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● Systemic long-term risks of externalising basic urban infrastructure services to the technology industry

When considering your finance strategy for urban smart lighting, also remember that urban sustainability researchers have pointed out that if the only underlying principle in a smart city strategy is to expand the market for technology

products and services, the results might actually leave parts of the city and its population unaccounted for, making the municipality less resilient in the face of future climate and social risks.²

● Financing sustainable investments: from more market-based procurement to re-municipalisation of energy services

Recent research³ and previous EU projects⁴ argue that if a city lacks appropriate in-house governance capabilities to procure and implement large-scale innovative projects, market-based solutions can accelerate the diffusion of smart urban lighting. The most market-based option is a performance-based contract with a private energy service company, which finances the project. On the opposite side of the financial strategies spectrum, there is in-house capacity building and re-municipalisation of energy savings, as Hamburg, one of the LUCIA pilot cities, recently did.⁵



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References:

1 Babovic, Filip and Ane Mijic. Economic Evaluation of Adaptation Pathways for an Urban Drainage System Experiencing Deep Uncertainty. *Water*. 14 March 2019.

2 Viitanen, Jenni and Richard Kingston. Smart cities and green growth: outsourcing democratic and environmental resilience to the global technology sector. *Environment and Planning A* 2014, vol. 46.

3 Friedemann Polzin et al. Modes of governance for municipal energy efficiency services – The case of LED street lighting in Germany. *Journal of Cleaner Energy Production* 139 (2016).

4 EU Streetlight EPC (energy performance contracting) Project 2014–2017.

5 About the Hamburg reference in 2013 see for example: <https://www.worldfuturecouncil.org/energy-remunicipalisation-hamburg-buys-back-energy-grids/>

See also: Revenues might come from solar energy production or fees from third parties using the smart network. About the real estate economics approach to decentralised photovoltaic energy and the argument for net metering, see Jussi Vimpari: Estimating the diffusion of rooftop PVs: A real estate economics perspective, *Energy* 172 (2019).