



WHITE PAPER

Smart Street Lighting as a Smart City Platform

Applications and Connectivity Best Practices

Published 2Q 2017

Commissioned by Echelon

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Section 1

EXECUTIVE SUMMARY

1.1 From Street Lighting to Smart City Platforms

Ever since London's Pall Mall became the first street in the world to be illuminated with gaslights in 1807, street lighting has become fundamental to our urban experience. Today, street lighting is once again a focus for urban innovation as lighting networks become a platform for a range of smart city applications.

Replacing a legacy street lighting system with LEDs can reduce a municipality's energy bill by half. Integrating those lights with networking and intelligent controls can provide a further 30% in savings—and provide a platform for current and future smart city applications that can enhance public safety, traffic management, health, comfort, and more.

1.2 Connecting the City

City planners and leaders are embracing smart, connected lighting upgrades—and are confronting an array of connectivity choices that may (or may not) enable the city to achieve its goals. These choices range from low cost ultra-narrowband options to higher cost, high capacity broadband.

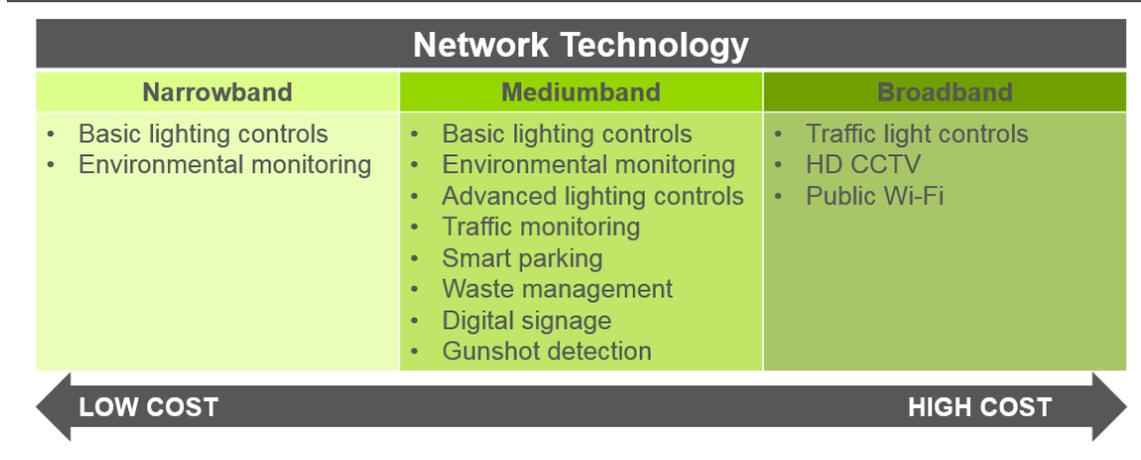
For city managers, this abundance of choice can be confusing. Not only do upfront and ongoing operating costs have to be weighed when evaluating smart street lighting, but longer-term goals and future needs must also be considered. Planning ahead can significantly reduce lifetime costs.

Navigant Research analyzed a dozen connectivity technologies and their suitability as a smart street lighting/city platform. Characteristics of each technology, including cost, reliability, security, data latency, power requirements, bandwidth, and technological maturity, were weighed against the requirements for 10 smart city applications.

Figure 1.1 shows that mediumband solutions prove to be both reasonably affordable and technically suitable for the largest number of potentially desirable applications. In contrast, narrow and high bandwidth solutions were found to be optimal for a smaller number of applications, with tradeoffs around cost. For example, narrowband networks are cost-effective but limited in terms of future uses; broadband networks, while highly functional, are more expensive.

There is no single answer to the question of which is the best street lighting network for a given city. The challenge for municipalities is to balance short-, medium-, and long-term requirements against the costs and benefits of different network options. Does the proposed network have the bandwidth, flexibility, and functionality to meet current and anticipated needs at an affordable cost? This paper provides a framework for municipal leaders to answer that question for their cities.

Figure 1.1 Technology/Application Suitability Map



(Source: Navigant Research)

In this paper, 10 smart city applications and their networking requirements are described; a dozen network technology options are also explained in some detail. Navigant Research performed a quantitative analysis of network attributes and application requirements, summarizing the study results in a heatmap that illustrates which technologies are best suited for each smart city application. Details are included in Section 3 of this paper.

1.3 Study Findings

Key takeaways of the study include:

- Mediumband networking solutions occupy the sweet spot, balancing cost and support for the largest number of high value smart city applications.
- Installation of networking and controls simultaneously with LED deployments will reduce overall costs, increase the efficiency and functionality of street lighting and provide a platform for future smart city applications.
- The right smart street lighting platform can help cities deal with issues such as crime and antisocial behavior, pedestrian and driver safety, and city revitalization projects.
- Cities need to outline long-term goals and priorities before selecting a smart street lighting network. They should also recognize that the right solution may combine more than one technology for different applications; for example, medium band for most applications and dedicated fiber or Pt2Mpt for security cameras.
- In a world that depends on ubiquitous access to power and connectivity, the street lighting network is a valuable asset. In addition to improving the efficiency and value of city services, that network can also become a source of new revenue for the city.