Key enablers for the future of Smart Cities

Alfonso D’Andretta
Philips Lighting
May 29, 2014
Our world is undergoing remarkable changes

Urbanization
New challenges are arising as our cities grow at an unprecedented speed.

Surging demand for energy and resources
There are rising concerns over price, availability and environmental impact.

Cities want to establish identity
Inter-city competition for people and business is on the rise.

Growing connectivity
There are huge new opportunities to improve urban life through intelligent, highly efficient solutions enabled by ICT.
Smart Cities in Europe

• Energy efficiency has a high priority for EU

• Energy performance contracts (EPCs) executed by Energy service companies (ESCOs) become enablers for upgrading the lighting infrastructure, while decreasing risks and guaranteeing financial returns

• Under an EPC, the ESCO implements a project and uses cost savings to repay the project cost

• EPC is an important facilitator enabling the European Union to achieve its climate and energy objectives

• Already in 2007 yearly ESCO market sizes in different EU countries varied between EUR 5 mln and EUR 2 bln
Example of ESCO Financial Model
Using energy savings to pay for the investment

1.1 Budget of the contract

<table>
<thead>
<tr>
<th>Lighting costs of the Municipality</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity costs:</td>
<td>1,000,000 €/year</td>
</tr>
<tr>
<td>Maintenance costs:</td>
<td>500,000 €/year</td>
</tr>
<tr>
<td>Maximum budget of the contract:</td>
<td>1,500,000 €/year</td>
</tr>
</tbody>
</table>

60% savings on electricity and maintenance:

900,000 EUR/year can be used to repay the new system without extra investment

1.2 Contract period:

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Execution:</td>
<td>2 years</td>
</tr>
<tr>
<td>Return of the investment:</td>
<td>6 years</td>
</tr>
<tr>
<td>Risks security and profit:</td>
<td>2 years</td>
</tr>
<tr>
<td>Contract time:</td>
<td>10 years</td>
</tr>
</tbody>
</table>
Increasing customer confidence in ESCOs

Key enablers for upgrading the public lighting infrastructure

- Mature and technically advanced solutions
- Solid legal and regulatory framework
- Established financial schemes and infrastructure
Case Study: ESCO market in Spain

• One of the first ESCO markets: First ESCO established in 1986

• Recently Spain has suffered financial difficulties: Construction projects have ceased

• The government is taking firm measures to counter impact of the economic downturn and many cities are tendering out public lighting under the ESCO model

• In 2012: Spanish ESCO market is valued at around EUR 900 mln (growth in 2013 of approx. 10-12%)
Palencia Outdoor Lighting Retrofit Project

- Street lighting infrastructure in Palencia was very inefficient and expensive

*Traditional high pressure sodium and mercury vapor lamps*

- Massive replacement of luminaires in an urban area that had more than 11,000 lighting points was not financially feasible

- Maintenance of a network of obsolete and inefficient luminaires could represent an unnecessary drain on power consumption, leading to an avoidable economic and environmental impact

- Phase 1 of the roll out: Upgrade of 3,189 of the total 11,000 lighting points in and around the city via an ESCO model (first half of 2013)
Enabling Intelligent City Infrastructure in Palencia

• Reliable LED technology with a proven track record, which is suitable for the region and for each application

• Moving from ‘conventional’ to ‘smart’ lighting networks

Conventional lighting
• Physical inspection
• Maps and files in paper
• Lighting levels not customized or different
• Measurements based on estimations

Intelligent lighting
• Remote monitoring
• Asset management
• Tailored dimming and scene setting
• Measurements and invoicing based on real time

• Long-term maintenance agreement to guarantee seamless operations
INFORMACIÓN SOBRE CALENDARIO DE PALENCIA (ESE)

FORMAS DE ATENUACIÓN

Nombre: Estándar
Comentario: Las luces están encendidas entre el anochecer y el amanecer.

Las luces están encendidas sólo durante la noche:
- Encendido: 0 min después de (días) Anochecer
- Apagado: 0 min después de (días) Amanecer

Puntos de Conmutación:

<table>
<thead>
<tr>
<th>Tiempo</th>
<th>Valor (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>22:45</td>
<td>70</td>
</tr>
<tr>
<td>23:00</td>
<td>50</td>
</tr>
</tbody>
</table>
Palencia has benefited from becoming a Smart City through an ESCO model

- Energy consumption decreased from 3,035,027 kWh/year to 715,585 kWh/year
- The budget allocated for street lighting and the maintenance relating to the new lighting points is reduced to a minimum
- The ESCO will maintain the entire lighting infrastructure during 12 years, guaranteeing its performance
Besides achieving financial returns...

... Livability in Palencia significantly increased for the citizens and visitors
... The quality of light has substantially increased, creating a safer and more comfortable environment for the people
... The Municipality gained insights into performance of the system and received control over its lighting infrastructure

Before

After
We believe that efforts to build Smart Cities will fail...

... If at the environmental axis we do not lead by example
  • Reducing the CO2 emissions
  • Setting the way forward to the rest of the citizens
  • Promoting the well-being of the populations involved

... If we do not take the advantage to differentiate the city
  • To attract more tourism
  • That the tourism wants to stay longer
  • Citizens are more proud of their city
  • More national and international visibility
  • That brings events to the city
Feel proud of your city
Which key success factors shall we focus on to transform Dubai into a Smart City?

- Mature and technically advanced solutions
- Solid legal and regulatory framework
- Established financial schemes and infrastructure