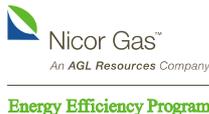

ENERGY EFFICIENCY EXPO

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Best Options for Energy Efficient Roadway Lighting

Richard H. Wyton, MIES AEE
Corporate Lighting Consultant
Affiliate of the IALD
Steiner Electric Company

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Provider: Energy Center of Wisconsin

Provider number: G175

Title: Best Options for Energy Efficient Roadway Lighting

Course number: COM360

Speaker(s): Richard Wyton





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Best Options for Energy Efficient Roadway Lighting

by Energy Center of Wisconsin

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Approval date: 07/30/2013

Course ID: 0090010131

Approved for:

1

General CE hours

X

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This is where it all started



Next major advancement – LPS



Long Linear Tube



To Fluorescent Tube



“Rapid and widespread changes in the world’s human population, coupled with unprecedented levels of consumption present profound challenges to human health and wellbeing, and the natural environment...”

The Royal Society; People and the Planet, April 2012



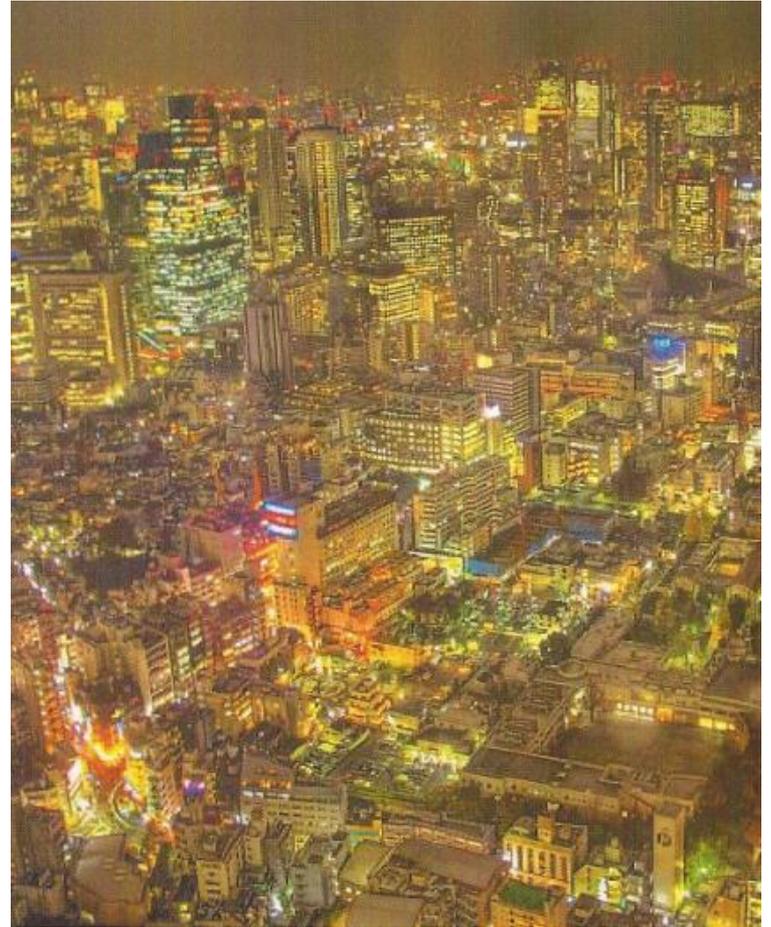
Lighting Industry to Focus on Smart City Development

- ▶ Lighting could contribute even more than today to health, wellbeing and ecological sustainability.
- ▶ Open-standard lighting technology, hardware and software architecture is enabling condition for Smart City integration.
- ▶ Revised policy, legislation and recommendations for lighting applications allow interoperability, interaction and context-driven adaptability.



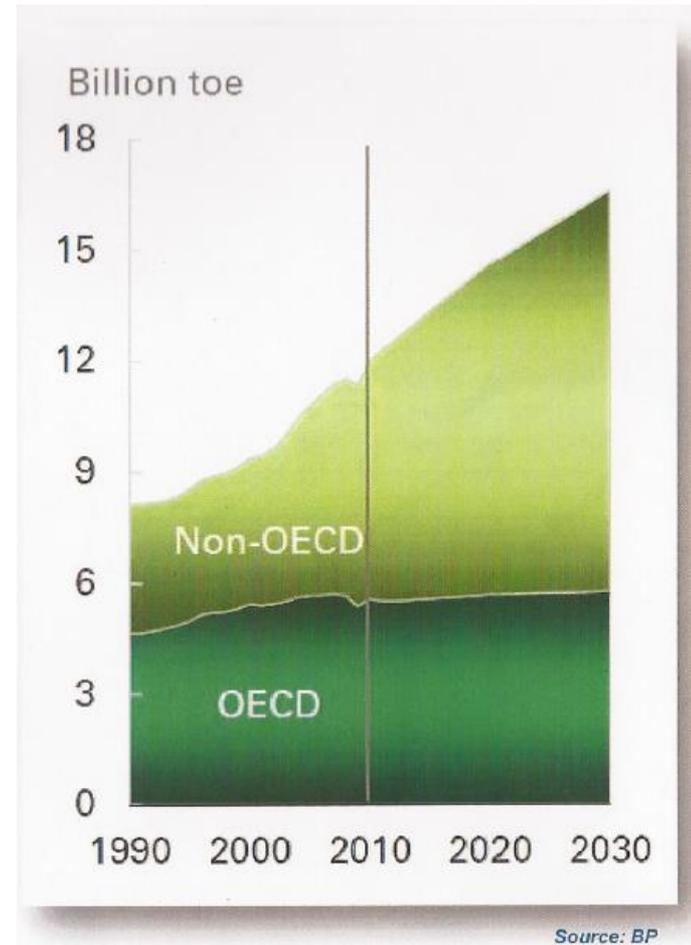
Spectacular Urbanization in the Next Decades

- ▶ In 2050 close to 7 billion people are projected to live in cities.
- ▶ Developing countries will build, expand or renovate cities to accommodate an additional one-million people every 5 days.
- ▶ Half of the world population, now living in cities, generate more than 80 percent of our global GDP, and consequently the majority of carbon emissions.
- ▶ To maintain and improve our standards of health and wellbeing, we need breakthrough innovation to build, operate and maintain our cities.



Investments in Smart City Technology to Accelerate

- ▶ World energy consumption is projected to grow with a spectacular 40% between now and 2030.
- ▶ Cities will expand substantially and need radical architectural and infrastructural changes to ensure long term livability.
- ▶ Forward-thinking cities are taking action now; at least 3,000 smart city projects and pilots are underway around the world.



The City Becomes Strategic Space

- ▶ New cities will be built and existing ones will be retrofitted to create economic development and improve the lives of citizens.
- ▶ Initial focus will shift from deployment of broadband infrastructures to green-field IP-based service applications.
- ▶ Smart cities technology is an \$8.1 billion market today while the market will grow to almost five times that size in the next 5 years.
- ▶ Major ICT and utility companies will drive and dominate new urban business models, enabling customized, on-demand services,



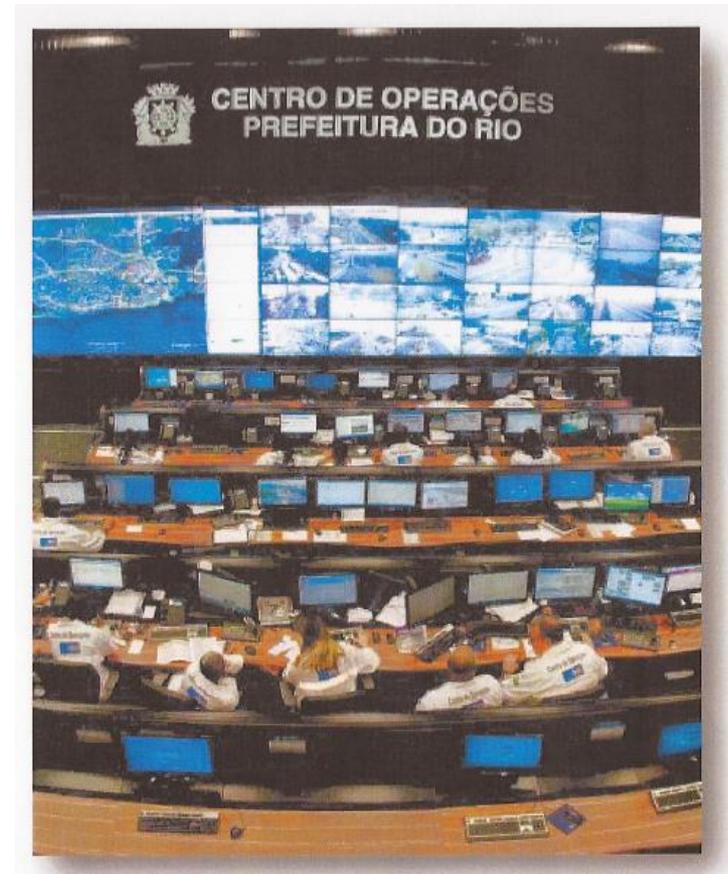
Internet of Things entering the urban community

- ▶ Ubiquitous wireless connectivity is a core condition for ICT-based efficiency improvements.
- ▶ WiFi, 4G/LTE, RF and WiMAX are the recognized candidates for universal municipal wireless networks.
- ▶ A Tremendous inroad of internet-connected devices drives and increase of urban data traffic with more than 30% per year.



Open Urban Network Infrastructure to be conditional

- ▶ Dedicated networks for specific public service applications are inefficient, causing redundancy and precarious situations.
- ▶ Local communities seek to migrate as many public services as possible to an integrated ecosystem.
- ▶ Seventy percent of all Small Grid Communication in the US are not using open wireless systems.
- ▶ IP-enabled devices and public services are explicitly expected to adapt to these standards.



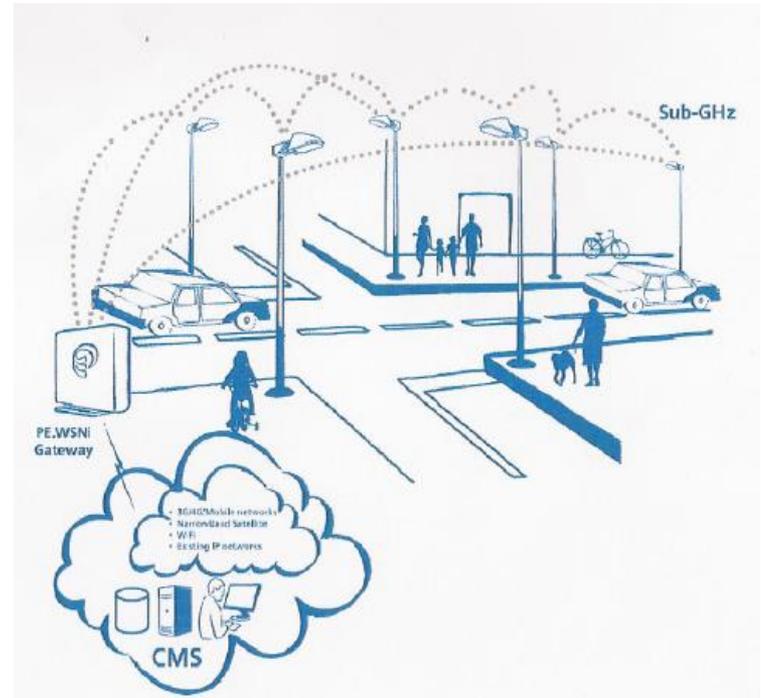
Incremental saving opportunities of streetlights.

- ▶ Over 25 million streetlights in the US consume 40% of the city's electricity use, equal to 2 million households each year with CO₂ emissions equal to 2.6 million cars.
- ▶ Changing all US outdoor lighting to LEDs could prevent the emission of as much as 90 million metric tons of CO₂.
- ▶ The average streetlight fixture in the US is more than 25 years old, many need replacement now.
- ▶ Integration in smart urban ecosystems is an evident prospect for public lighting.



Statistics reveal the need for breakthrough progress

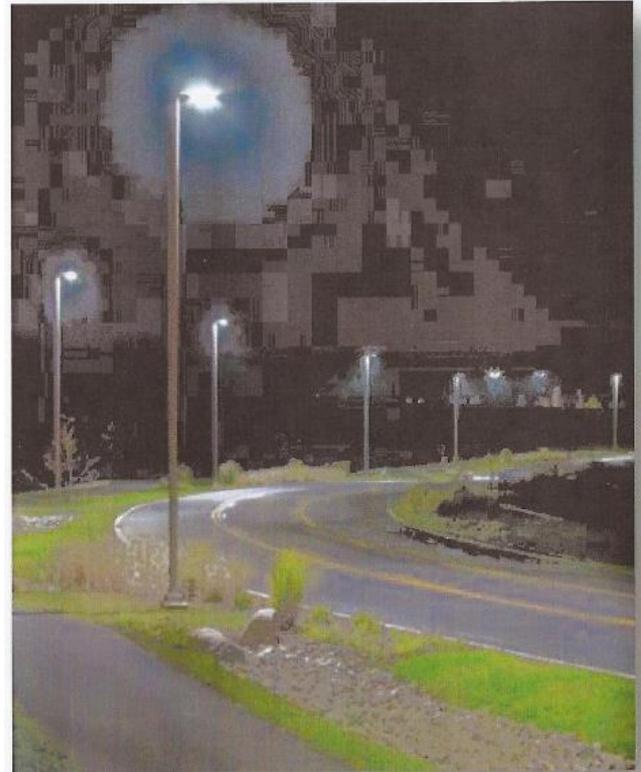
- ▶ CO₂ emissions rebounded to a record high in 2012 and energy efficiency of global economy worsened for a 2nd straight year.
- ▶ Although switching to LED lighting alone resulted in 50–70% energy savings, it is not sufficient to meet global targets for savings and sustainability.
- ▶ Adaptive and interoperable lighting is essential to bring cost and performance improvement to a next level of significance.
- ▶ Enabling LEDs to dynamically change lighting levels in response to local conditions, the total system energy savings can easily reach up to 80%.



Source: Paradox Engineering

Smart city networks to be the stipulated infrastructure

- ▶ Less than 1% of all our road and street lights is part of a remote controlled network.
- ▶ Available lighting (control) systems are based on proprietary communication protocols, complex to install and very expensive.
- ▶ Lighting systems and products architecture needs to be compliant with fast evolving Smart city ICT standards.
- ▶ Street lighting platforms allowing straightforward integration in available municipal broadband networks will soon be a market condition.



Interoperability as a need and a consequence

- ▶ Lighting devices will need to interact seamlessly with other city core systems and adjust in any situation.
- ▶ Leverage and aggregation of available (sensor) data of all interconnected systems will bring efficiency improvements to the next level.
- ▶ Early experiments and pilots have been vital to build experience and insight with new forms of interoperability.
- ▶ Standards are introduced to enable interoperability of remote-controlled lighting (e.g. TALQ) or even interaction of lighting with other 'application verticals' (e.g. NTCIP / ELMS).



Source: Accenture

Concerns about lifetime and maintenance have been around for a long time.

Credit: Ford Motor Company



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