Du Bâtiment intelligent à la Ville intelligente

Eric L'Helguen

Paris, 21 Mars 2012

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Quand le Bâtiment devient intelligent…

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GREEN OFFICE® : un concept original

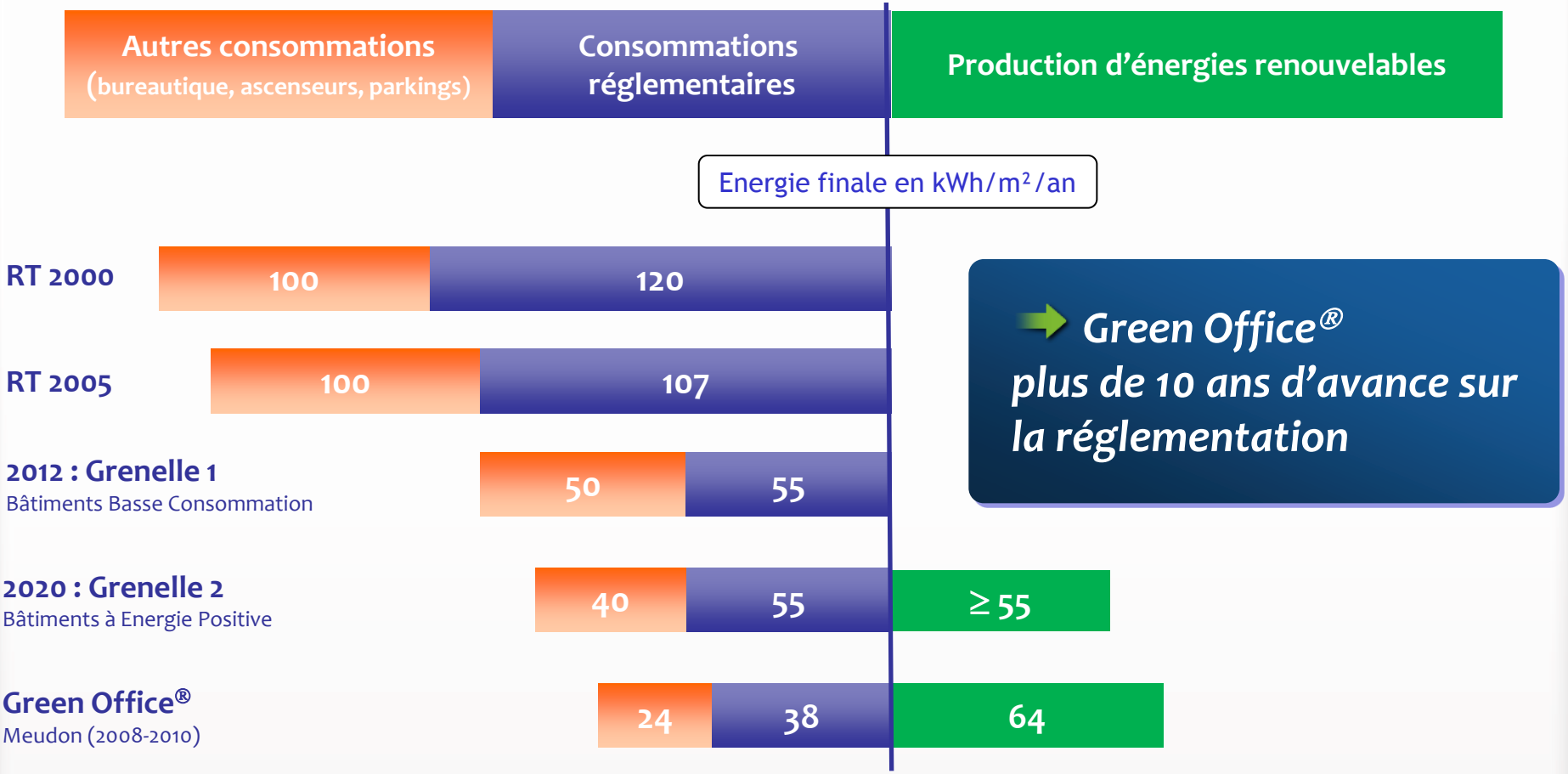
- *Réduire fortement les consommations*
- *Produire de l'énergie renouvelable sur site*
- *Assurer une éco-exploitation du bâtiment*

→ *Prendre 10 ans d'avance sur 2020*

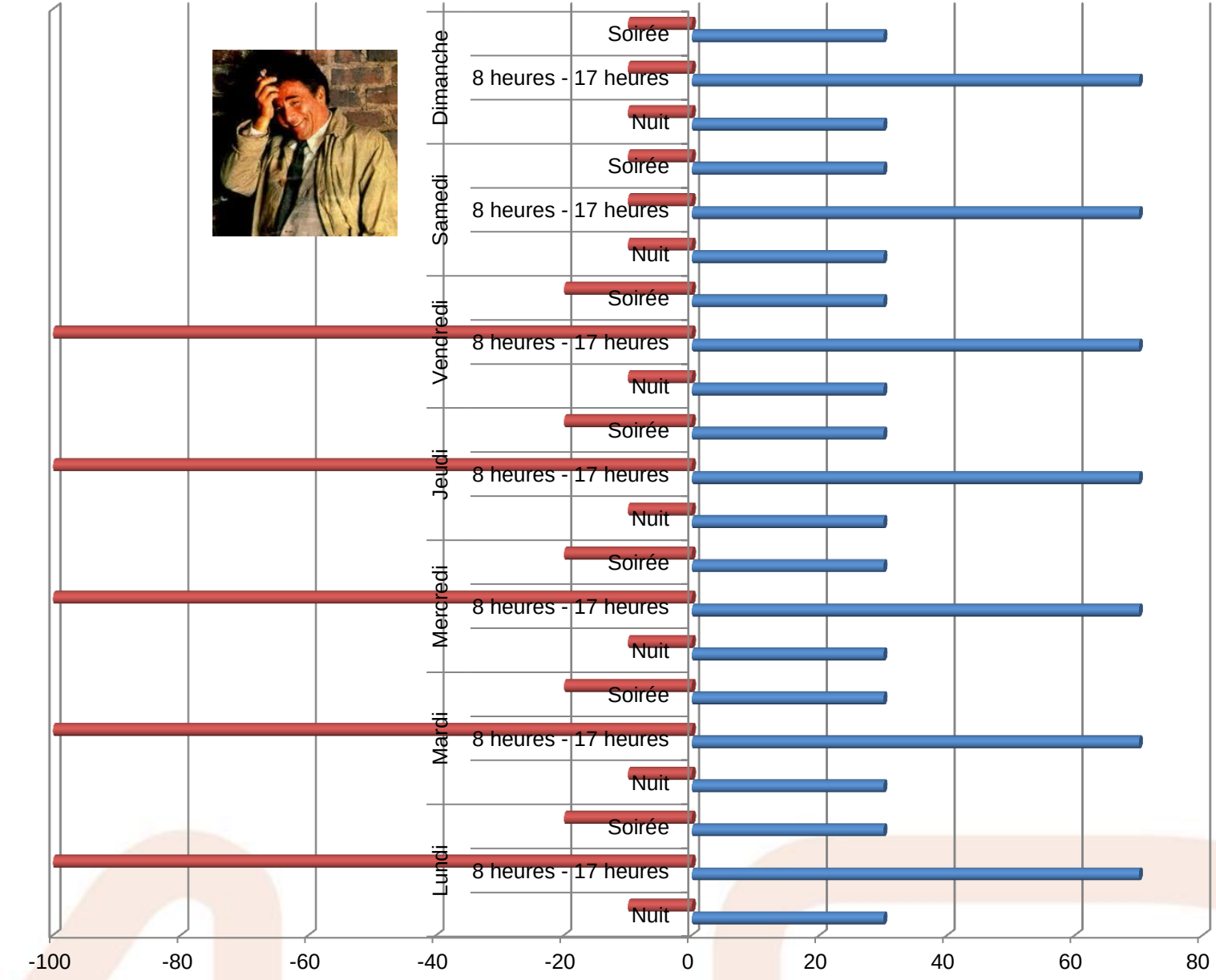
- *Maintien des critères de standards internationaux*
- *Un niveau de loyer + charges compatibles avec le marché*
- *Respect du confort des occupants*

→ *Une nouvelle génération d'immeubles*

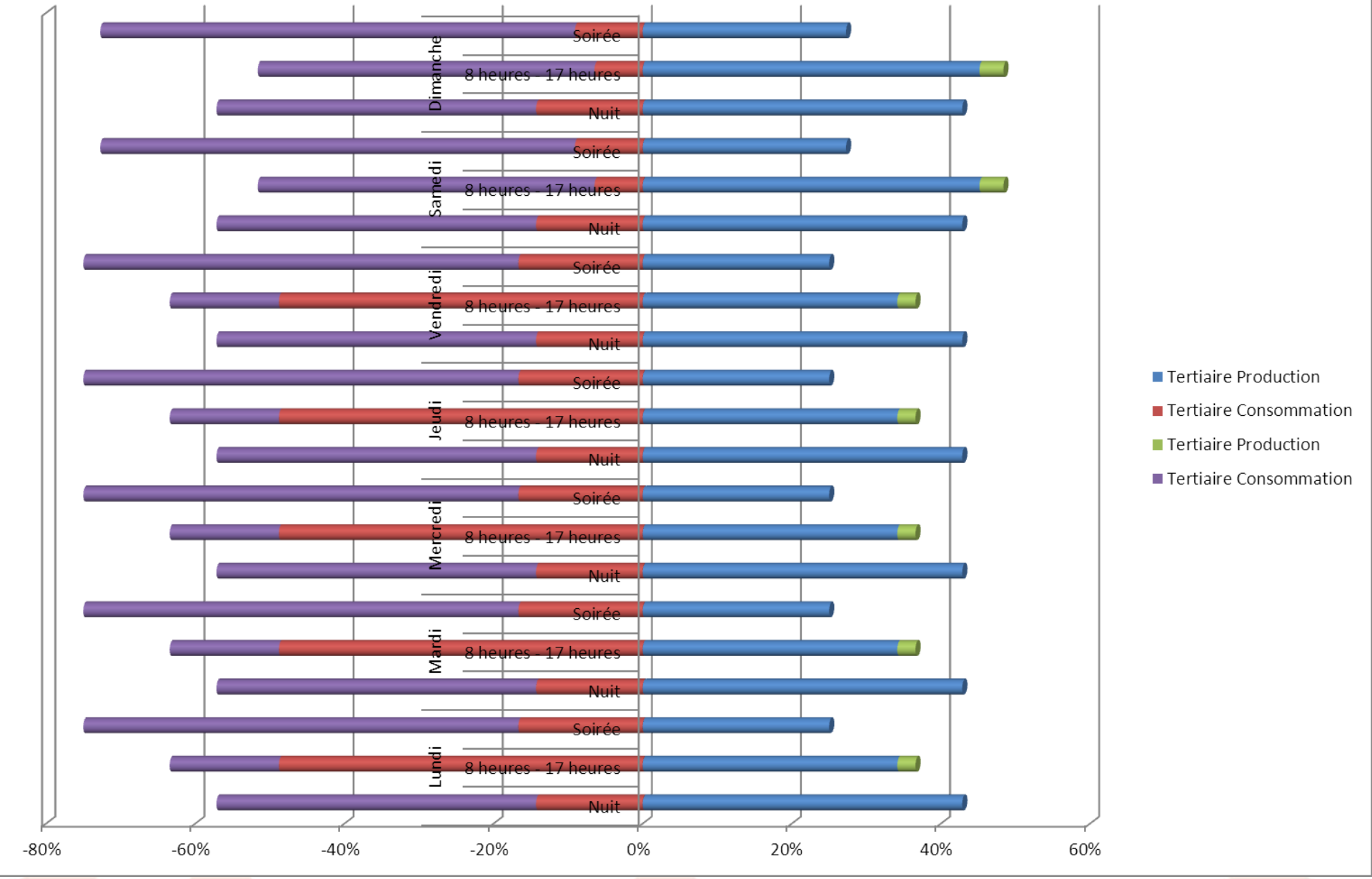
GREEN OFFICE® : un concept original



Green Office®
plus de 10 ans d'avance sur la réglementation



La solitude du bâtiment intelligent….



Le bâtiment intelligent dans la Ville

Une nouvelle dimension…
La Ville intelligente

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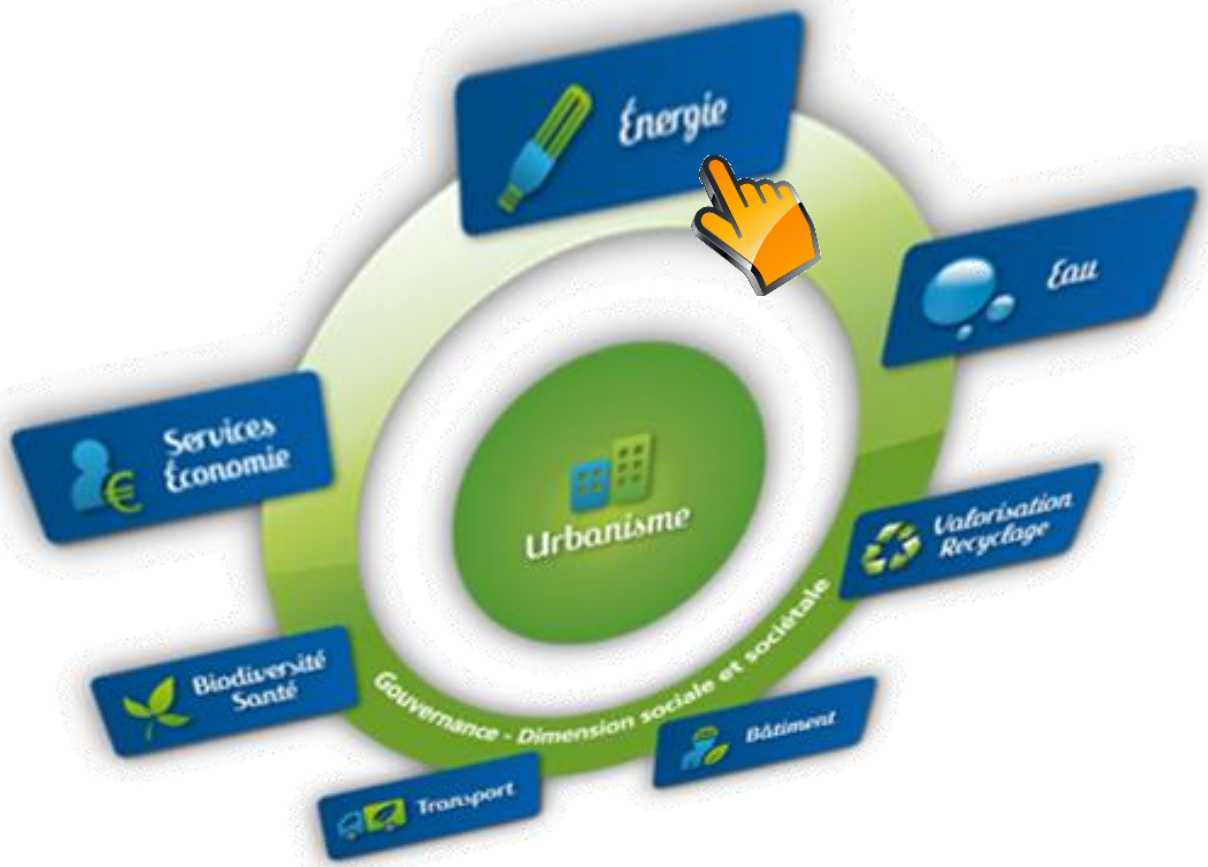
Les enjeux énergétiques



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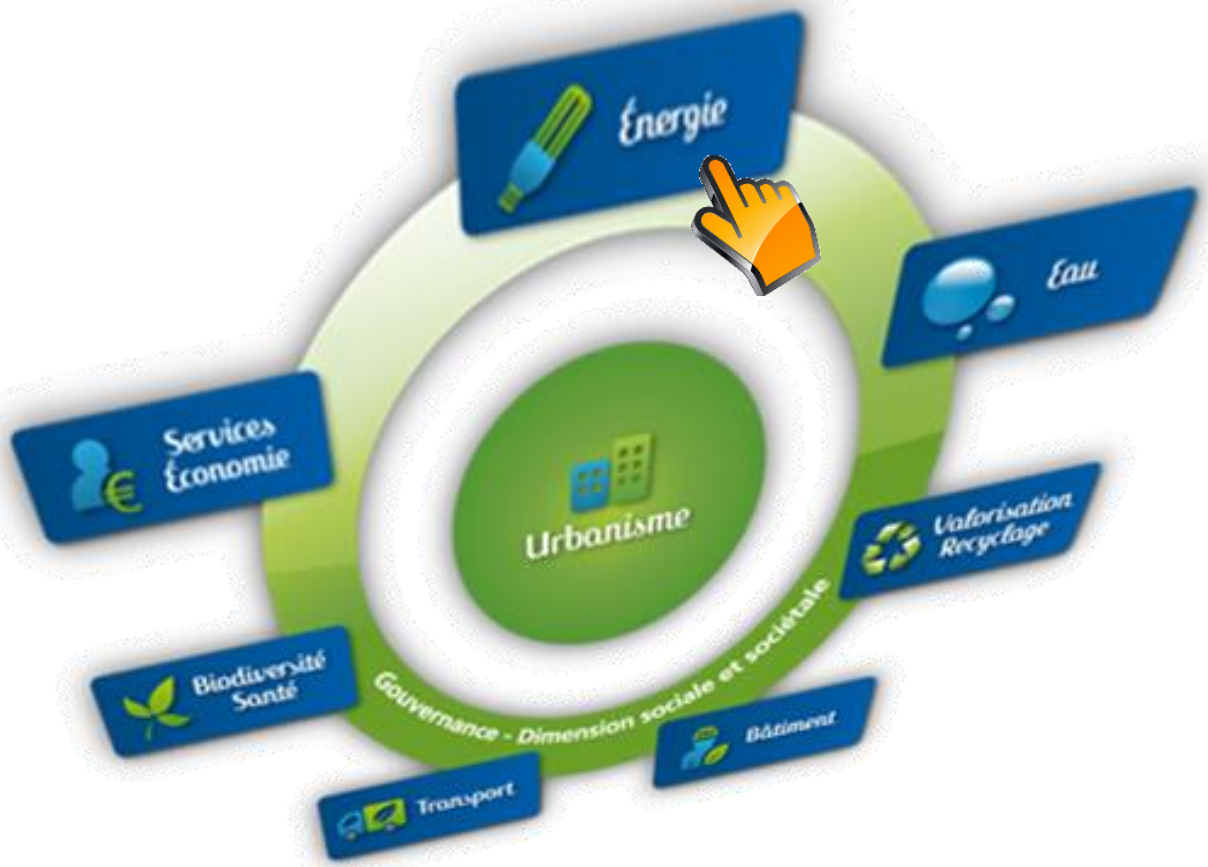
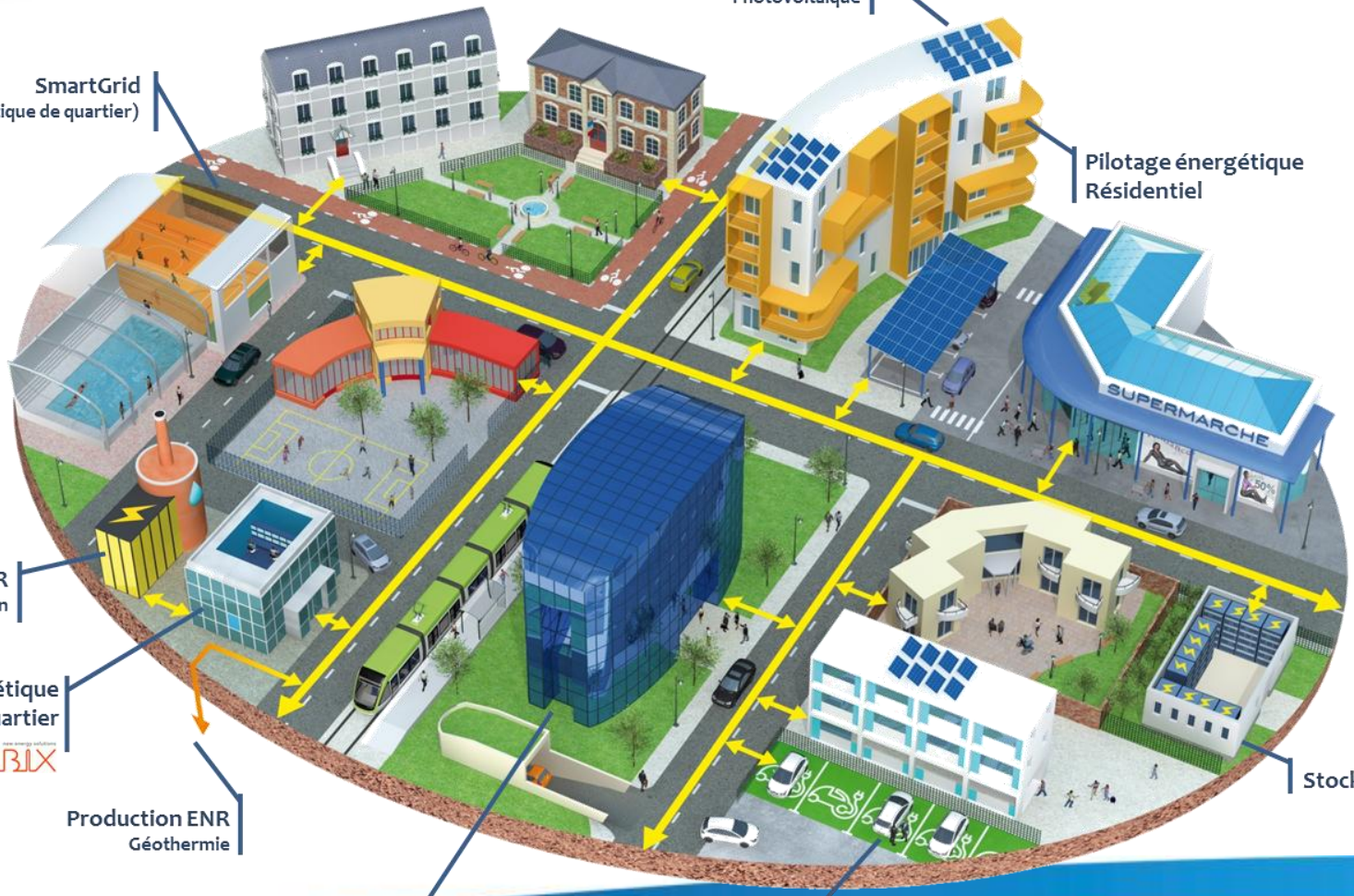
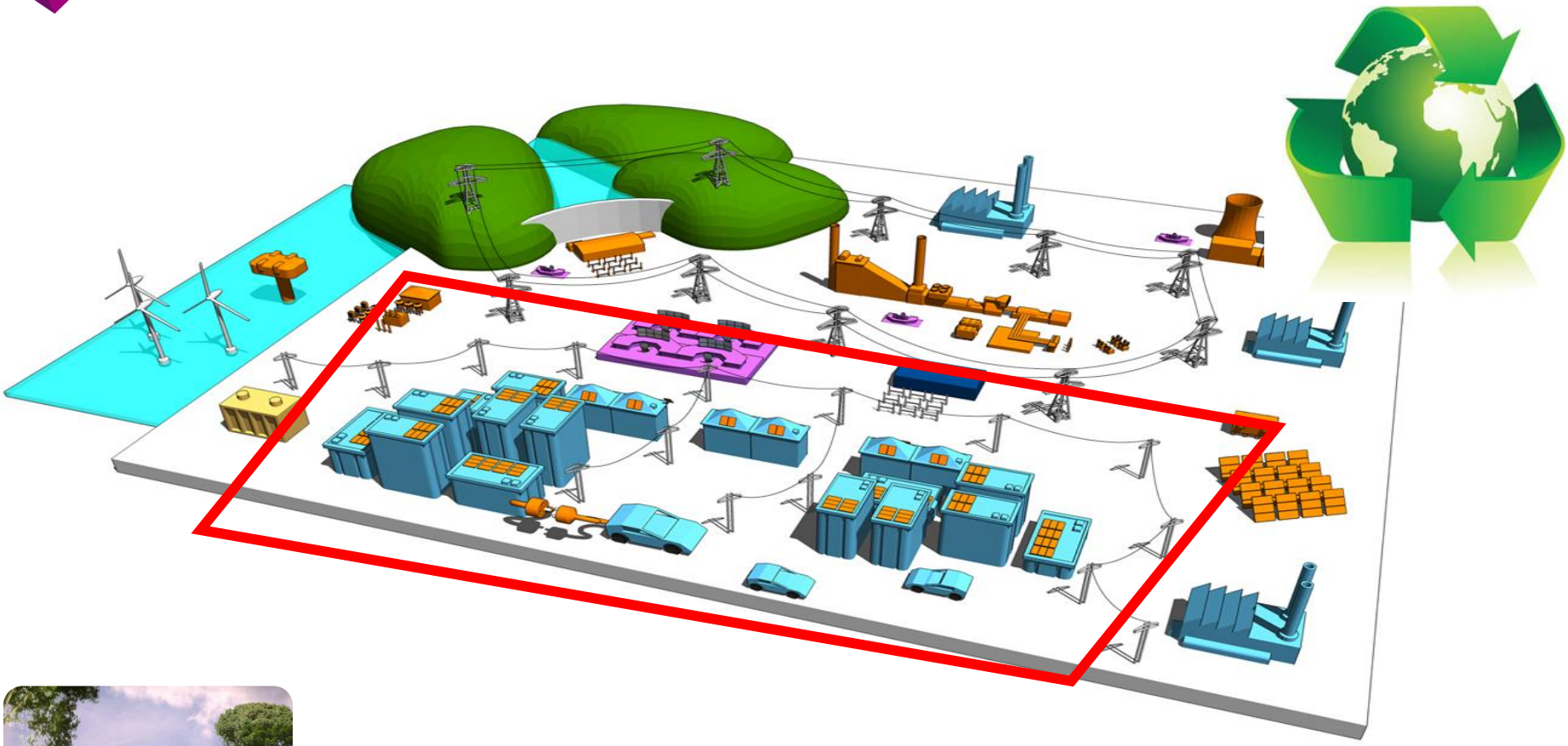


Les enjeux énergétiques



Les Composants Energie de la “Smart City”



URBAN POWER by EMBIX new energy solutions

L’enjeu Energie dans la Ville….

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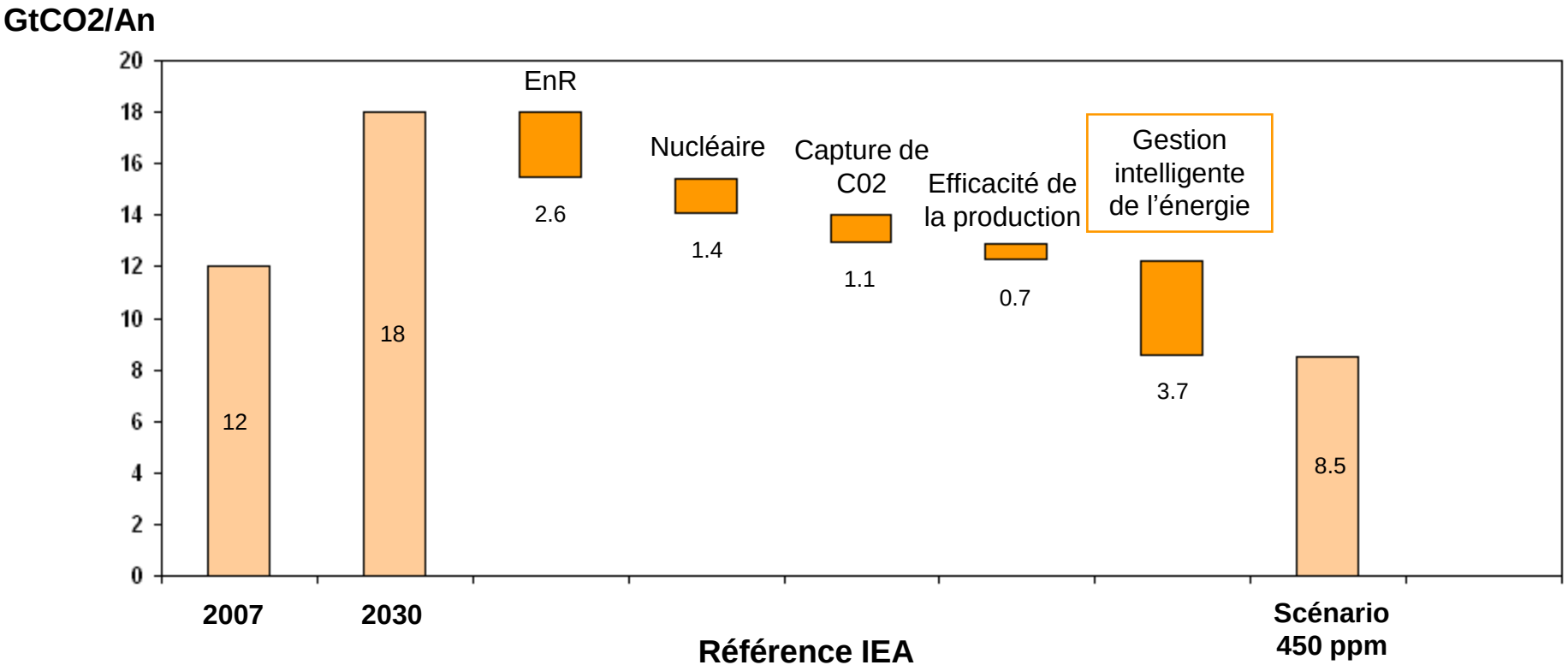
SYSTÈMES ÉNERGÉTIQUES INTELLIGENTS
ENJEU ENVIRONNEMENTAL

IEA World Energy Outlook 2009

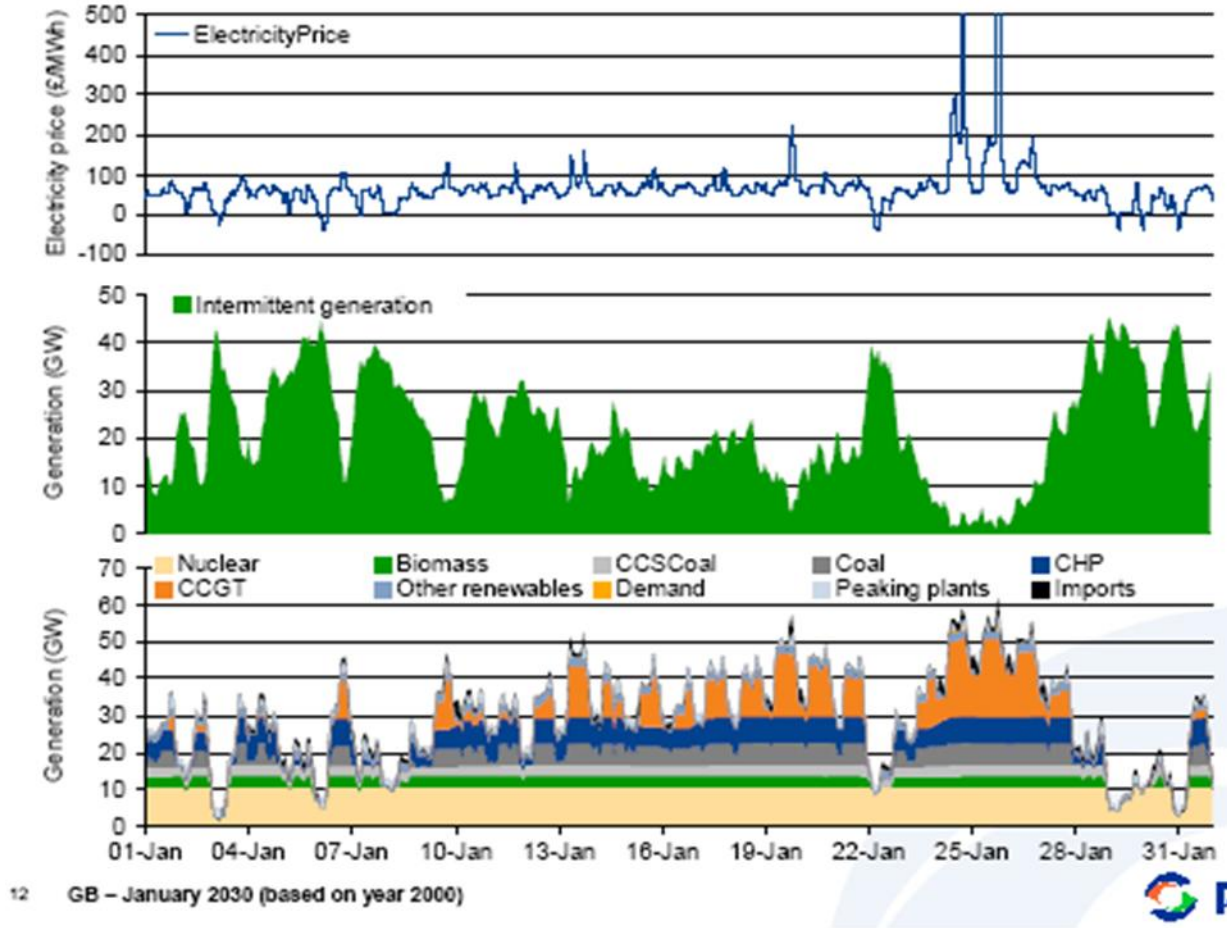


SYSTÈMES ÉNERGÉTIQUES INTELLIGENTS
ENJEU ECONOMIQUE

MW Price

WIND

Load Balance



12 GB – January 2030 (based on year 2000)

PÖYRY

EPEX 8 Février 2012: MWh à 1785 Euros

La Ville intelligente…
Les Premières Expérimentations

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Case Study: Amsterdam Aims to Achieve 40 Per cent CO_2 Emission Reduction by 2025

SMART MOBILITY

- 39 per cent commute by bicycle.
- More than 400 km of dedicated cycle route are in place.
- Electric bicycle taxis are a future trend.

- 200 charging stations will be set up by 2012.
- 10,000 EVs will be in use by 2015.
- Car sharing is being encouraged.

P+R

- Less-expensive parking slots at public transit stations to park cars and board trains.

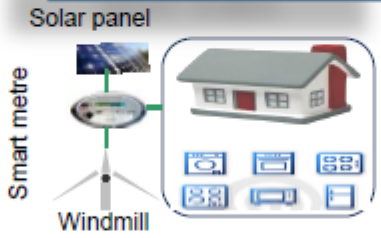
- Yearly reduction of parking spaces and increase of tariffs inside the city.
- 30 km/h speed limits on 80 per cent of the city roads - makes bicycles faster by a minimum of 50 per cent.

- 154 shore power connections to charge inland cargo vessels and river cruisers to be installed by 2012.

SMART COMMUTE to WORK

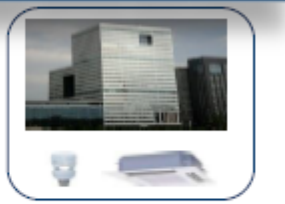
- 25 MNCs have signed a joint agreement to reduce home-to-work car miles by 10 per cent by 2012.
- Incentives/free bicycles to employees.
- Free and protected bike parks at offices to encourage the use of cycles.
- Work from home initiatives.

SMART HOMES



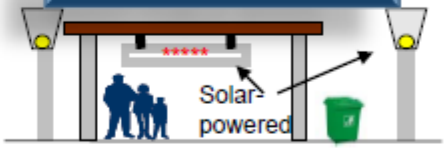
- 1,200 existing houses to adopt smart metres, energy-saving appliances and smart displays that stimulate behavioural changes in energy consumption.
- Smart grids that enable interaction between the household and the grid to help optimise energy production and distribution.
- Smart metres offer a 14 per cent reduction in energy use.
- Decentralised energy generation by roof-mounted mini windmills and solar panels.

SMART OFFICE BUILDINGS



- ITO tower, a commercial building in Amsterdam, is testing the use of various energy-saving technologies, including smart metres and energy-efficient appliances, to reduce energy consumption.
- This smart building will feature design aesthetics that absorb natural light and air from the environment.

SMART PUBLIC SPACE



- Utrechtsestraat, a popular shopping street in Amsterdam, with more than 130 shops, will feature smart metering and energy-efficient street lighting technologies.
- Tram stops will be made sustainable with solar-powered displays and billboards.
- Solar-powered garbage bins with built-in compacters will reduce the trip rates of garbage collector trucks.

Amsterdam: Driver = Réduction des Gaz à effet de serre

Substation Automation for a Self-healing Grid

- The focus of European substation automation will mainly be on the retrofit of communication networks and advanced sensors.
- Substation automation is the key area in the optimisation of T&D operations and efficiency.

Case Study: Liander N.V., The Netherlands

- Liander N.V. has begun installing innovative operating systems at significant substations in its electricity grid. Implementation is expected to be completed by 2017, at an approximate annual cost of €15 million.
- Liander N.V. is a Dutch regional grid manager transporting electricity to 2.9 million customers and gas to 2.1 million customers. It is a part of Alliander.
- The initial strategy is to digitalise the selected distribution substation where the system SASensor ® will be installed. The project aims to reduce power outages by 30 per cent (on an average). It is also looking to provide sustainable energy in the future. Voltage quality from the grid is continuously measured, which is a key process in the integration of distributed power generation.
- The initial phase of the installation is expected to be completed by 2011.

Benefits of Substation Automation

- **Grid management and reliability - the IEC61850 standard increases interoperability and offers a scalable network design**
- **Ensures worker and public safety**
- **Manages and reduces operational expenses**
- **Provides supporting infrastructure to sustain distributed power generation**

Liander N.V. : Driver = Stabilité du réseau et Energies renouvelables

Boulder, Colorado

100,000 residents
40,000 households
45,000 electric customers
23,000 AMI meters

Dora
Department of Regulatory Agencies
Office of Consumer Counsel

November 9, 2010

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Liander N.V. : Driver = Réduction de la consommation. « Price Signal »

Issy Grid…

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Le 1er réseau énergétique intelligent de quartier, aux portes de Paris

IssyGRID
le 1er réseau de quartier intelligent

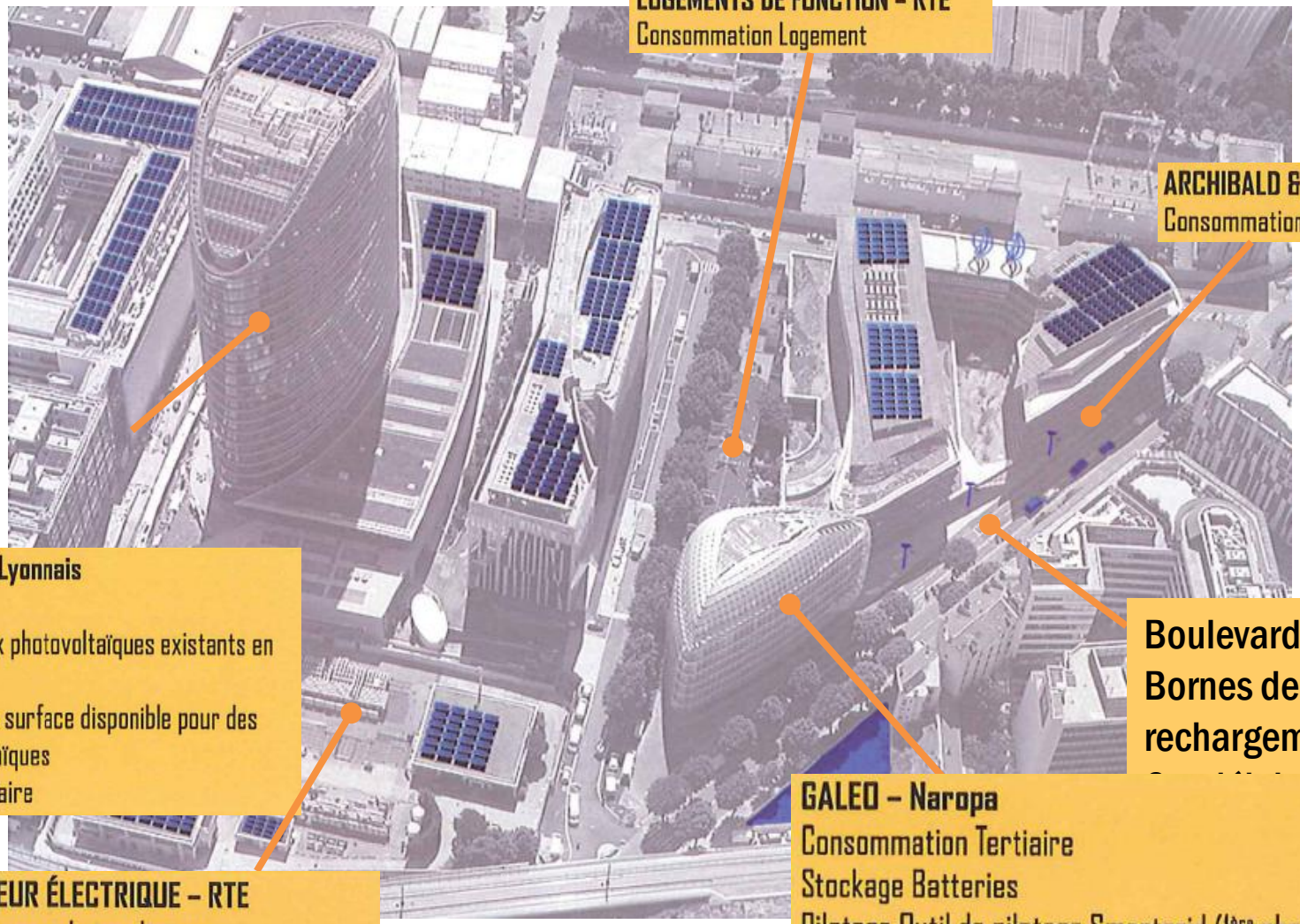
Toutes les composantes du Smartgrid à l'échelle du quartier

A terme

- ***160 000 m²*** *de bureaux*
- ***10 000*** *employés*
- ***2 000*** *logements*
- ***5 000*** *habitants*
- *Ecole*

- ***Production*** *: PV, cogénération,*
- ***Consommation*** *: résidentiel, tertiaire, commerces*
- ***Stockage*** *: batteries*
- ***Equipements publics*** *: recharge VE, éclairage.*

Issy Grid



LOGEMENTS DE FONCTION – RTE
Consommation Logement

ARCHIBALD & GOUDE - Naropa
Consommation Restaurant

SEQUANA – Docks Lyonnais
Production
300 m2 de panneaux photovoltaïques existants en toiture de la tour
Environ 2000 m2 de surface disponible pour des panneaux photovoltaïques
Consommation Tertiaire

Boulevard GALLIENI
Bornes de rechargement
ED

GALEO – Naropa
Consommation Tertiaire
Stockage Batteries
Pilotage Outil de pilotage Smartgrid (1ère phase)

TRANSFORMATEUR ÉLECTRIQUE – RTE
Production Panneaux photovoltaïques

Résidentiel

- Suivre et contrôler la consommation énergétique :
  - du logement,
  - des équipements.
- Participer au programme d'effacement.
- Gérer les fonctions du logement à distance.

Optimisation

DSO: ERDF

CSP: EDF

Production Forecast

Demand Response

Optimisation

Load Forecast

Real Time MDM

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Smart Home	Smart Building	Lighting	REs	Storage	EVs
					

Cockpit / Show-room

- Restituer l'information adaptée à la cible :
  - claire, simple, pédagogique ;
  - détaillée, exploitable par des experts.

Premières leçons

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LESSONS LEARNT…

- Nécessiter de mutualiser les services, pas de silo
- Nécessité de raisonner sur une « maille » ville par opposition à une « maille » bâtiment
- Enjeux technologiques: Renouvelables, Stockages, ICT….
- Enjeux économiques: Retour sur Investissement à confirmer
- Business Model à trouver: Quelle valeur pour quels inytervenants ?
- Aider à la décision, CONSEILLER, SUPPORTER en phase amont