



neOCampus

An academic vision of innovation



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<http://www.irit.fr/neocampus>

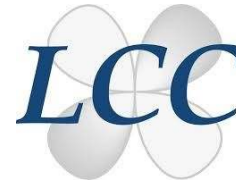
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neOCampus operation

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- **A sustainable campus**
 - Improve quality of life
 - Reduce ecological impact
 - Reduce cost (fluids)

- **11 laboratories of *Université Paul Sabatier* (for now)**
 - Multi/Inter-disciplinaire
 - Social Science
 - Computer Science
 - Material
 - Ecology
 - Energy
 - ...



An utopic vision of Smart-Grids

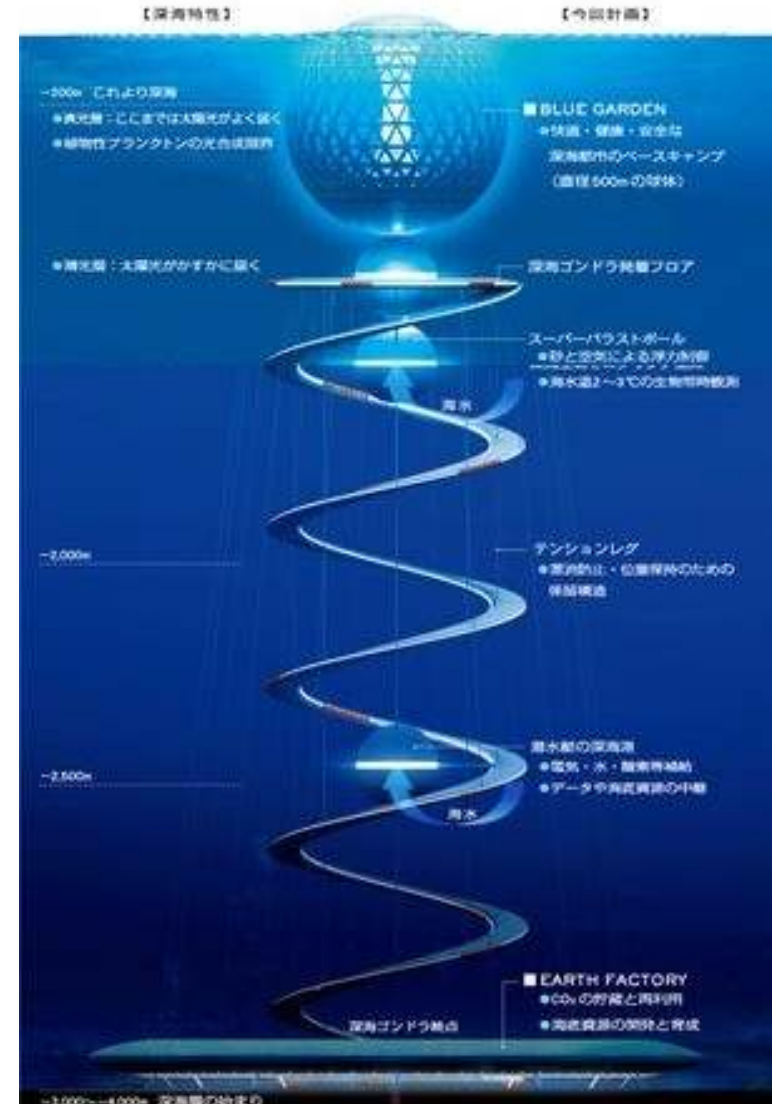
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- Cooperative management of electricity
 - Distributed production
 - Smart Consumers
 - Cooperation of autonomous systems



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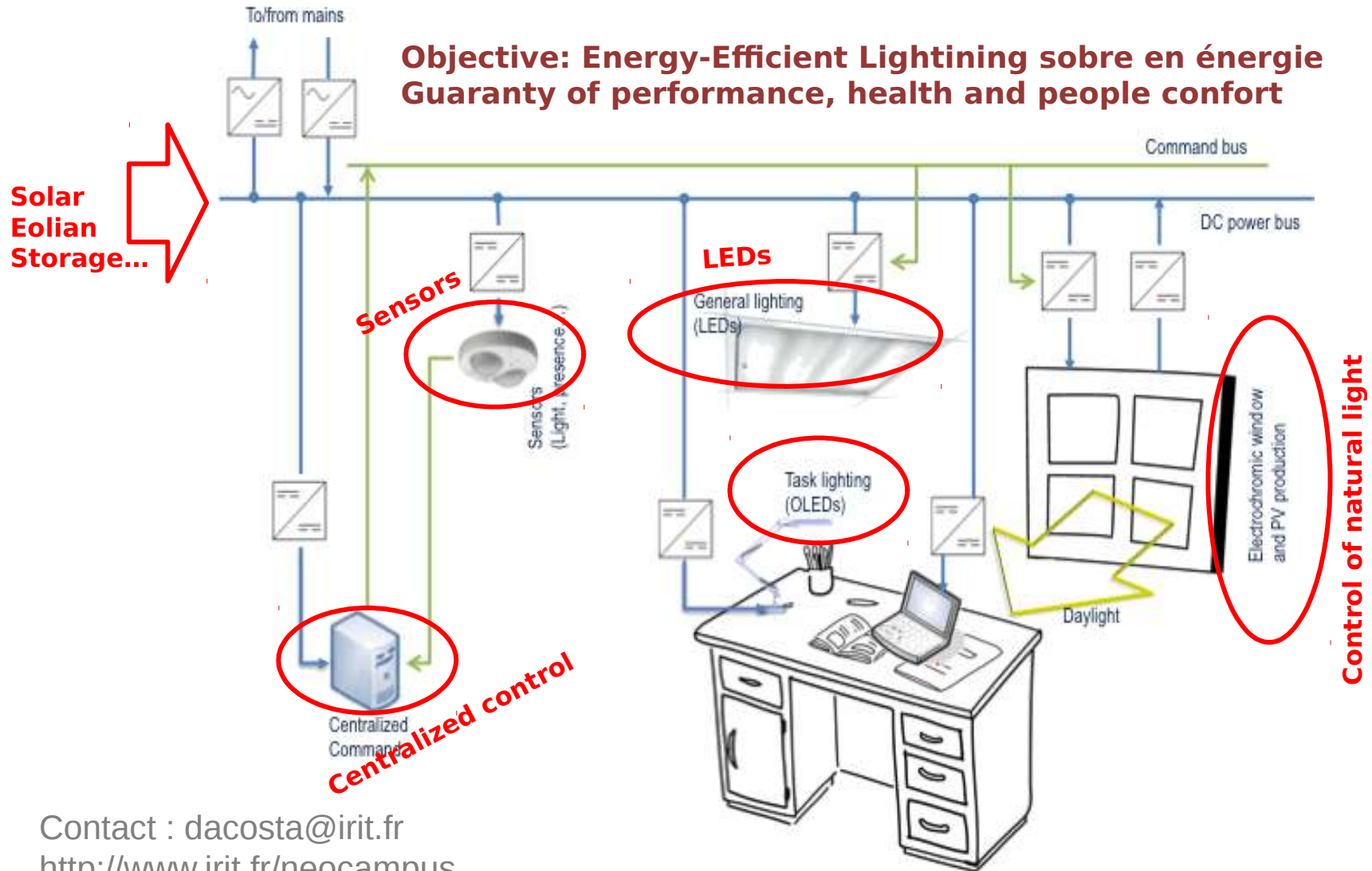
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Example : Smart-Lighting

**Objective: Energy-Efficient Lightning sobre en énergie
Guaranty of performance, health and people confort**



Scientific challenges

- **Distributed decisions**

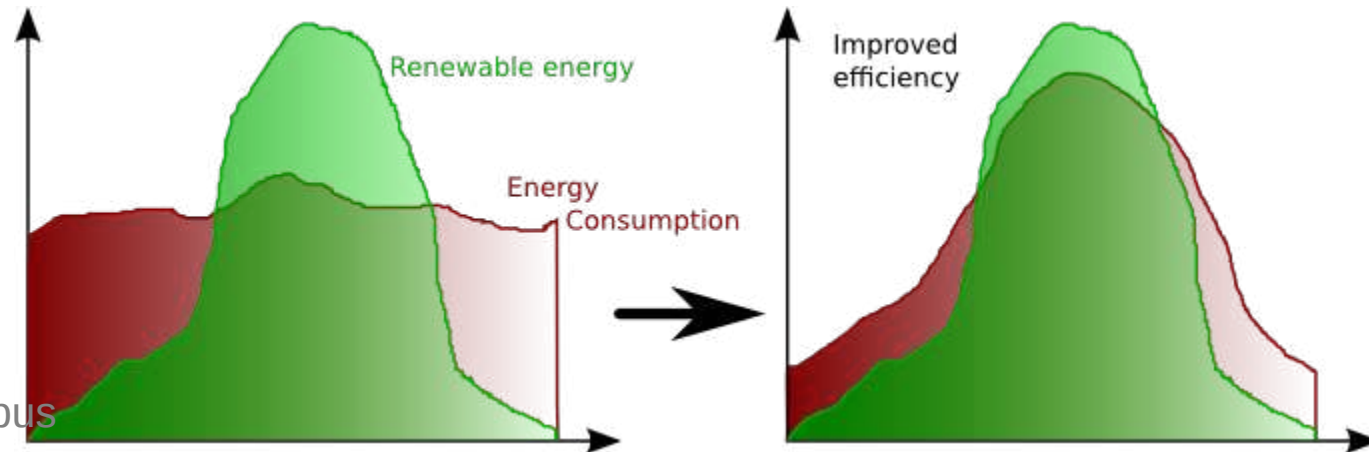
- Of producers
- Of consumers

- **Constraints of scale**

- Number of producers and consumers
- Heterogeneous infrastructure
- Number of needs
 - Producers / Consumers / Manager of infrastructure / ...

- **Objective : optimization**

- Fine grained energy management and storage
- Plasticity of consumptions
- System and hardware state



Test platforms

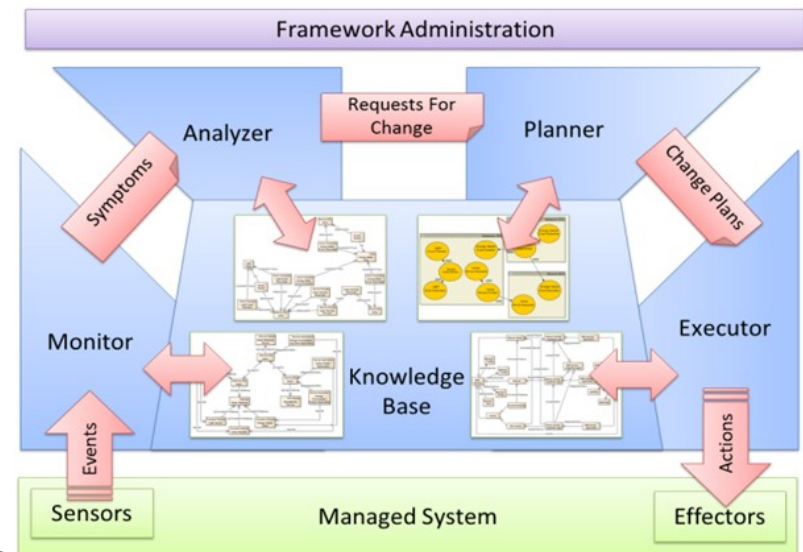


- **Production and storage of electricity**

- Storage
- Solar panels / Electricity conversion/ tests in direct current
- Canadian holes

- **Toward Smart-Grids**

- Interoperability and data storage
 - 500 000 values per day
 - Temperature, Light, Occupation, ...
 - Measures 1 to 5 min (7000 sensors)
- Autonomous management: Measure is good, react is better
 - High level models + OM2M



Scientific challenges and point of view

- **Smart sensors**

- Fine grained energy management
- Network protocol
- Sensors aware of their failures
- Sensors and effectors simulation

- **Local and global optimization**

- Multi-objective et multi-scale
- Cooperation of autonomous systems
- BigData and OpenData efforts
- At the level of participants
 - Researchers, industrial partners

- **Human at the center**

- Give information to users
- Model behaviors and learn how to improve confort

- **Data management**

- Cooperation between sources
- Interoperability
- Machine-to-Machine (M2M)
- Building models

