

## DIAGNOSIS & ECOCONCEPTION OF TERTIARY ACTIVITY

### Improving the sustainability of buildings and the creation of a simulation software – a case study in Montpellier

Montpellier Supagro & Ecole Des Mines d'Alès  
[Elsa group members – [www.elsa-lca.org](http://www.elsa-lca.org)]



## The idea

- Demonstration of ecotechnologies ....
  - What about us?
- Tertiary activity :
  - impacts and ways of improvement
- 2 main stages
  - Housing => environmental renovation
  - Traveling => use of video conference

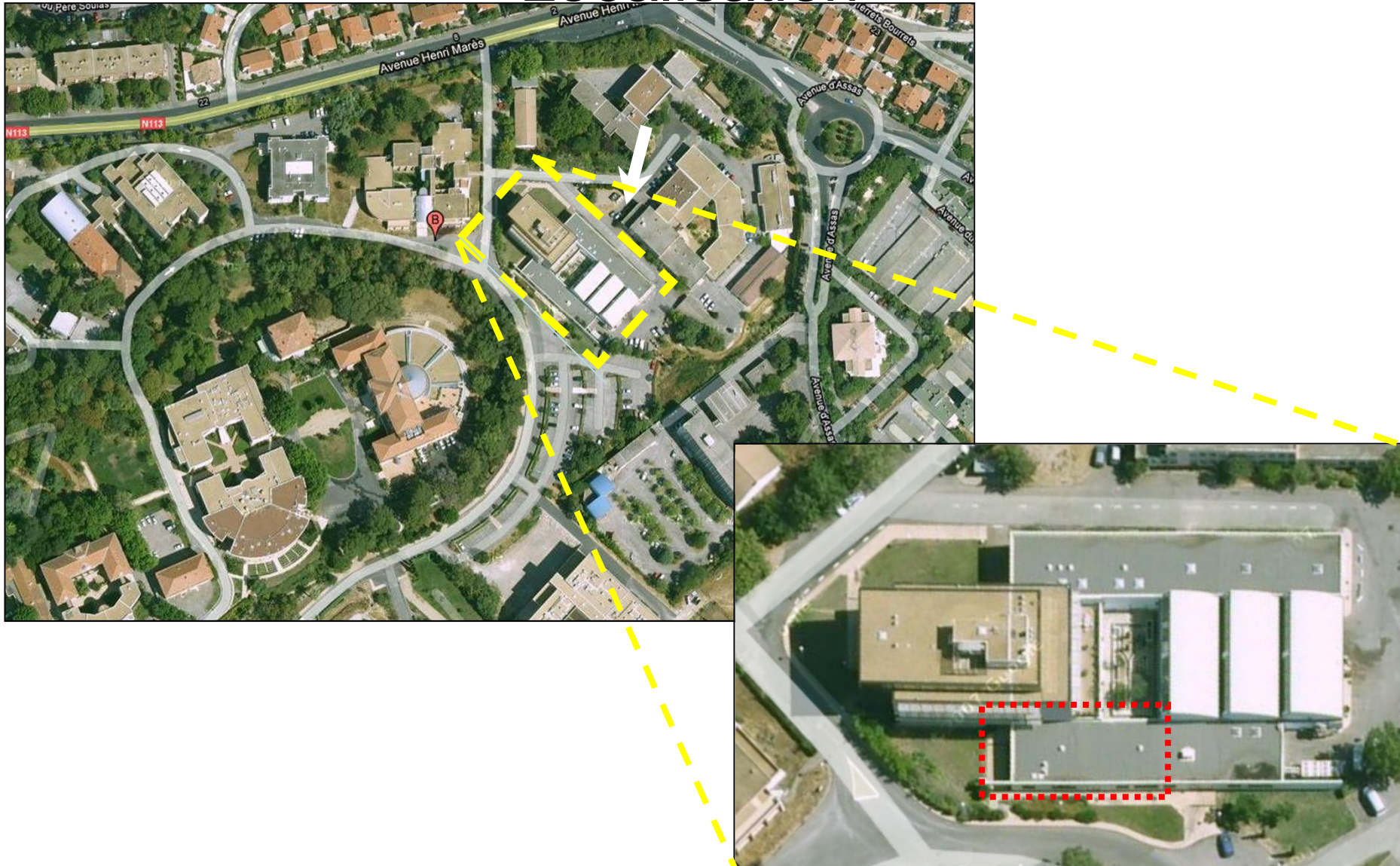
# Plan

Demonstrator	Simulator
On Montpellier Supagro Campus, a real situation with Elsa team members	On line, developed by Ecole des Mines d'Alès and subcontractor
Building + traveling	Tool linked to demonstrator
Diagnostic : before - after	
Eco conception	Solutions description + Impact simulation
Realisation : environmental renovation	
Monitoring	Dashboard

# The Demonstrator

- Most important part achieved (building)
- Extra delays
  - Temporary results
  - Monitoring
  - Last study still running
  - Open day 19th of june
  - Extension until october 2013

# Localisation



# Localisation



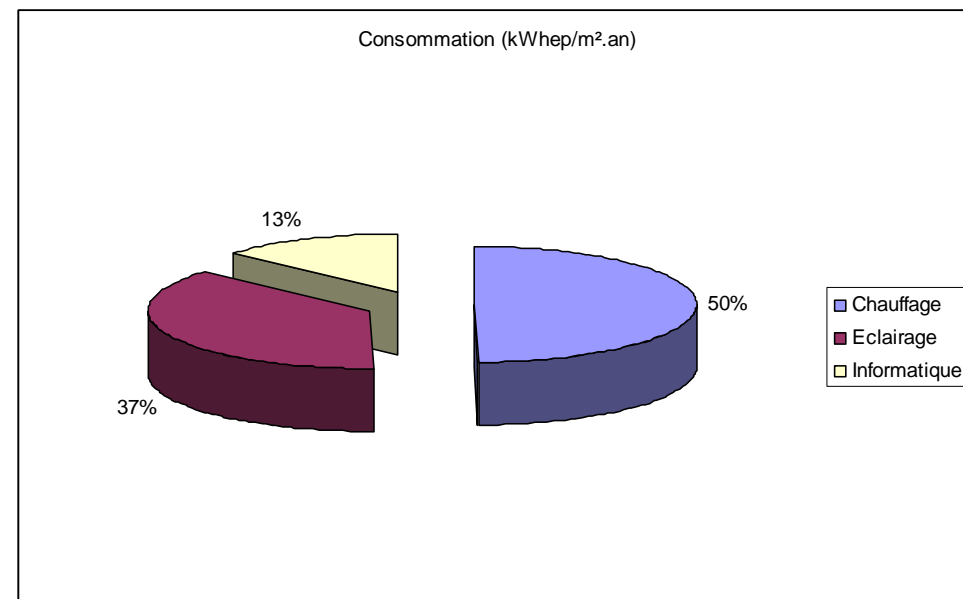






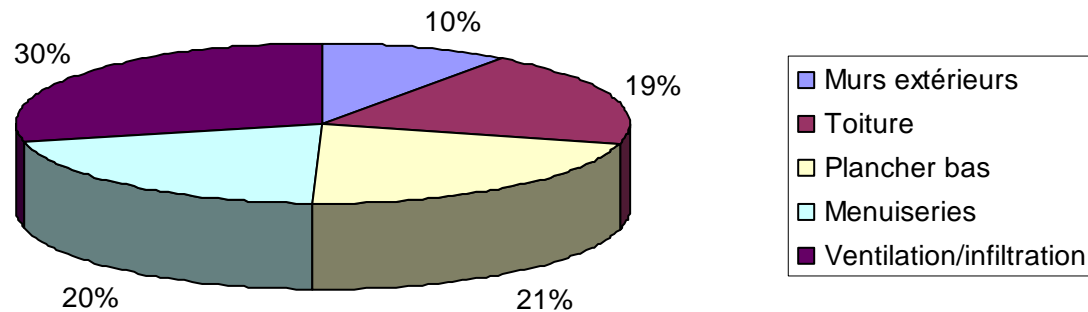
# Building diagnostic

- Previous Campus study (French regulation : 'Perenoud' software)
- SCET internal calculation spreadsheets
  - 50% heating / 50% lights + computers
- Public building ≠ Housing
  - Public building  
Way of improvement through equipment >> heating system
- Budget constraints
  - 100 K euro
- Heavy infrastructures (insulation, heater...) have to be considered globally
  - ➔ Improvement through equipments : lights, windows...



# Building diagnostic (detailed)

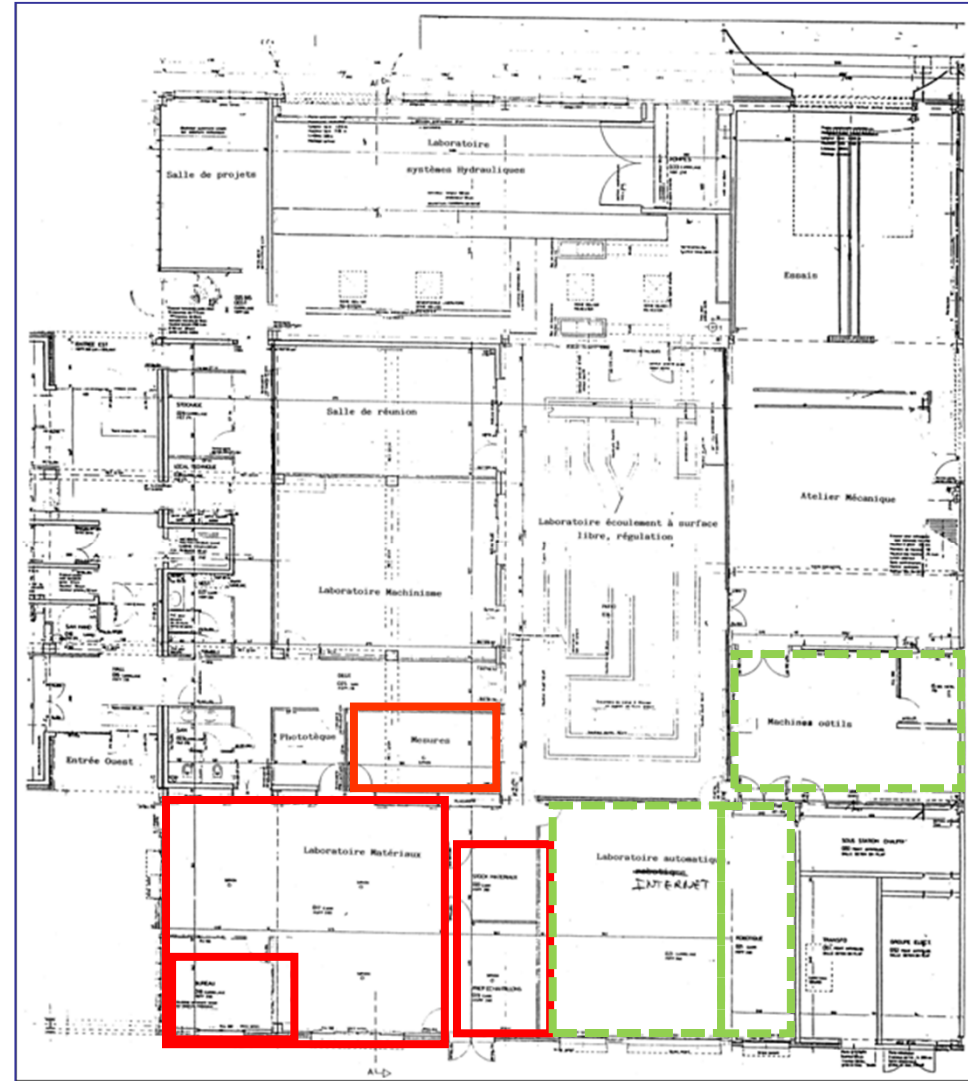
Répartition des déperditions



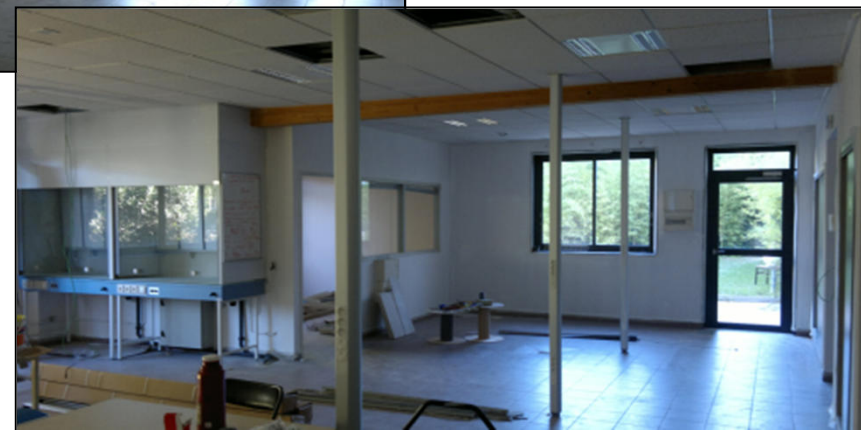
Heat losses :	Way of improvements?
-Wall	Expensive...
-Roof	Very high cost...
-Floor	Problem with access regulation
-Windows	Not enough money...
-Ventilation	Unaffordable...

=> No major loss

# Situation



 Offices       Class rooms

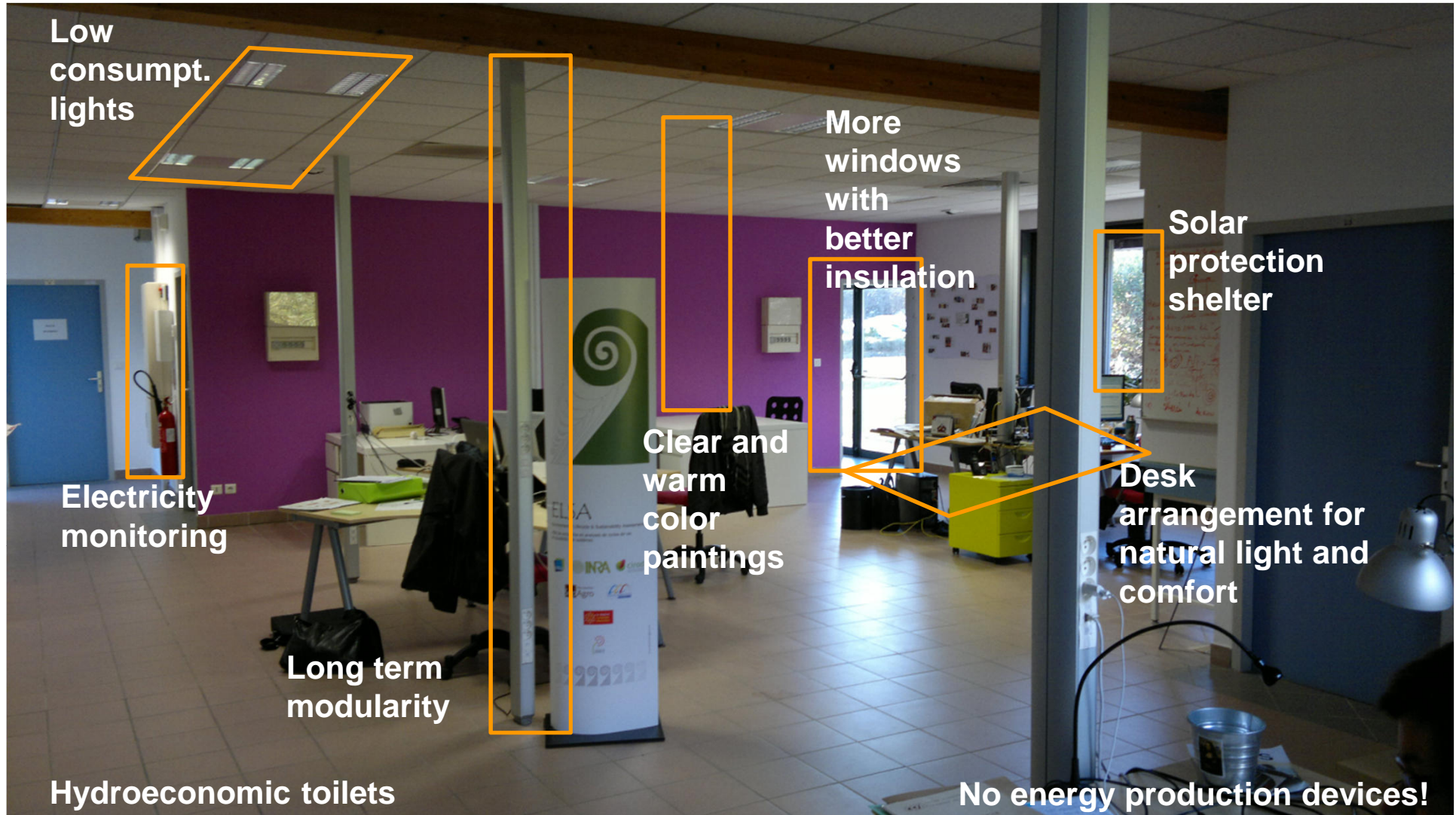








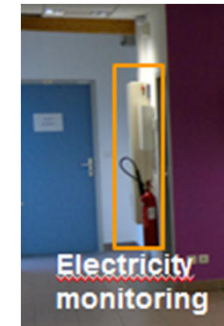
# Environmental features





# Monitoring

- Electric local meter : lights + equipment (computer)
- KNIX bus : able to collect information for any equipment
- ...waiting for supervision software!
- Temporary daily manually collected



UtilisationPerimetreEcotechSudoe

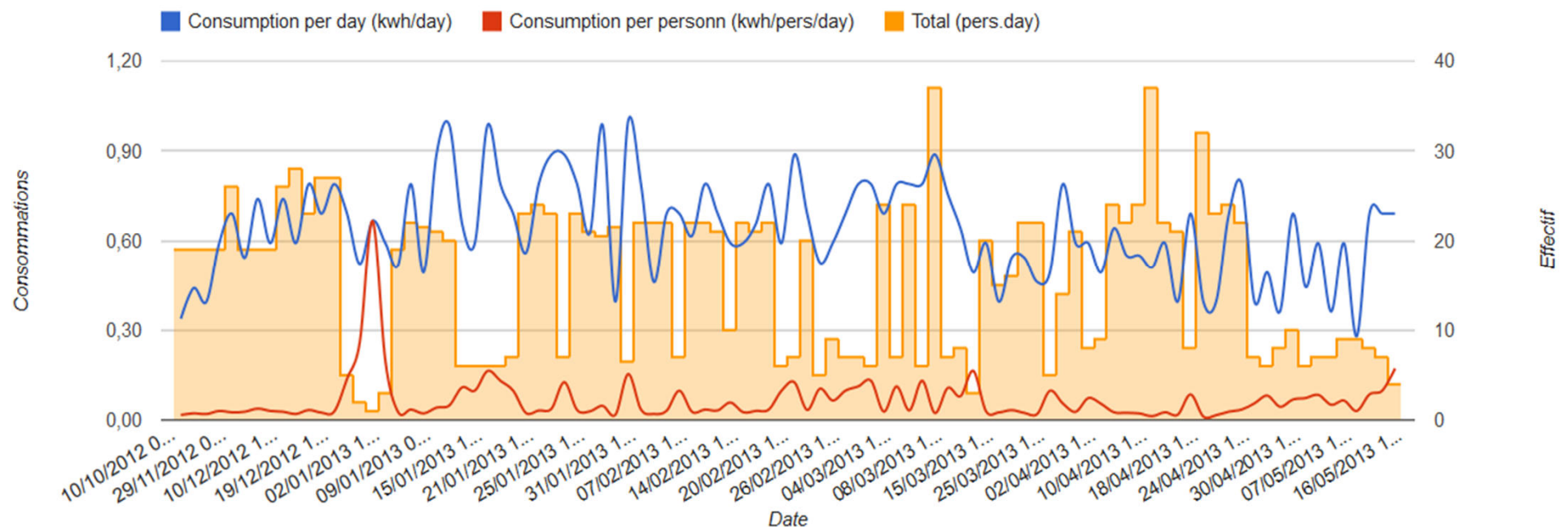
Fichier Édition Affichage Insertion Format Données Outils Formulaire Aide Dernière modification il y a 2 jours par Elsa LCA

Date	Time	Date & Time	Month	Year	Meter (kwh)	Consumtion (kwh)	Delay (day)	Consumption per day (kwh/day)	Elsa (pers.day)	Internet (pers.day)	Pitot room (pers.day)	Total (pers.day)	Consumption per personn (kwh/pers/day)
10/10/2012	07:00:00	10/10/2012 07:00:00	10	2012	0								
13/11/2012	13:00:00	13/11/2012 13:00:00	11	2012	11,3	11,30	33,46	0,34	4	15		19	0,02
26/11/2012	14:21:00	26/11/2012 14:21:00	11	2012	17,1	5,80	13,18	0,44	4	15		19	0,02
27/11/2012	09:40:00	27/11/2012 09:40:00	11	2012	17,5	0,40	1,01	0,39	4	15		19	0,02
29/11/2012	09:23:00	29/11/2012 09:23:00	11	2012	18,7	1,20	2,03	0,50	4	15		19	0,03

- Data published on line on Simulator
- Improvments :
  - More specific meter (one for each categories)

# Monitoring

- Temporary results : last study focusing on elcetric consumption still running (For Open day 19th of june)



- Permanent basic comsumption
- No correlation

# Monitoring : first study conclusions

- Comparison :
  - Monitored data
  - Simulated scenario with environmental features
  - Simulated scenario without environmental features
- Meter has to be checked : monitored consumption 10 times lower than simulated
- Assesment of part of lights/ part of computer
- See you in 2 weeks...

# Schedule

- **Spring 2011:** Internal meetings for planification
- **End of Spring and Summer 2011:** An energy study and identification of environmental solution by consultants [SCET](#)
- **Autumn 2011 to Spring 2012:** Internal (eco) design by Patrimonial and Architecture Campus Service
- **Summer 2012:** Workbuilding
- **Autumn 2012:** Moving and start of monitoring
- **Spring 2013:** Second study on definitive building
- **Summer 2013:** Video producing & Open day : 19th of june
- **Autumn 2013:** Extension until october due to extra delay
  - More than 2 years – 2 times our expectations...  
100 000 euro budget

# Sudoe Context

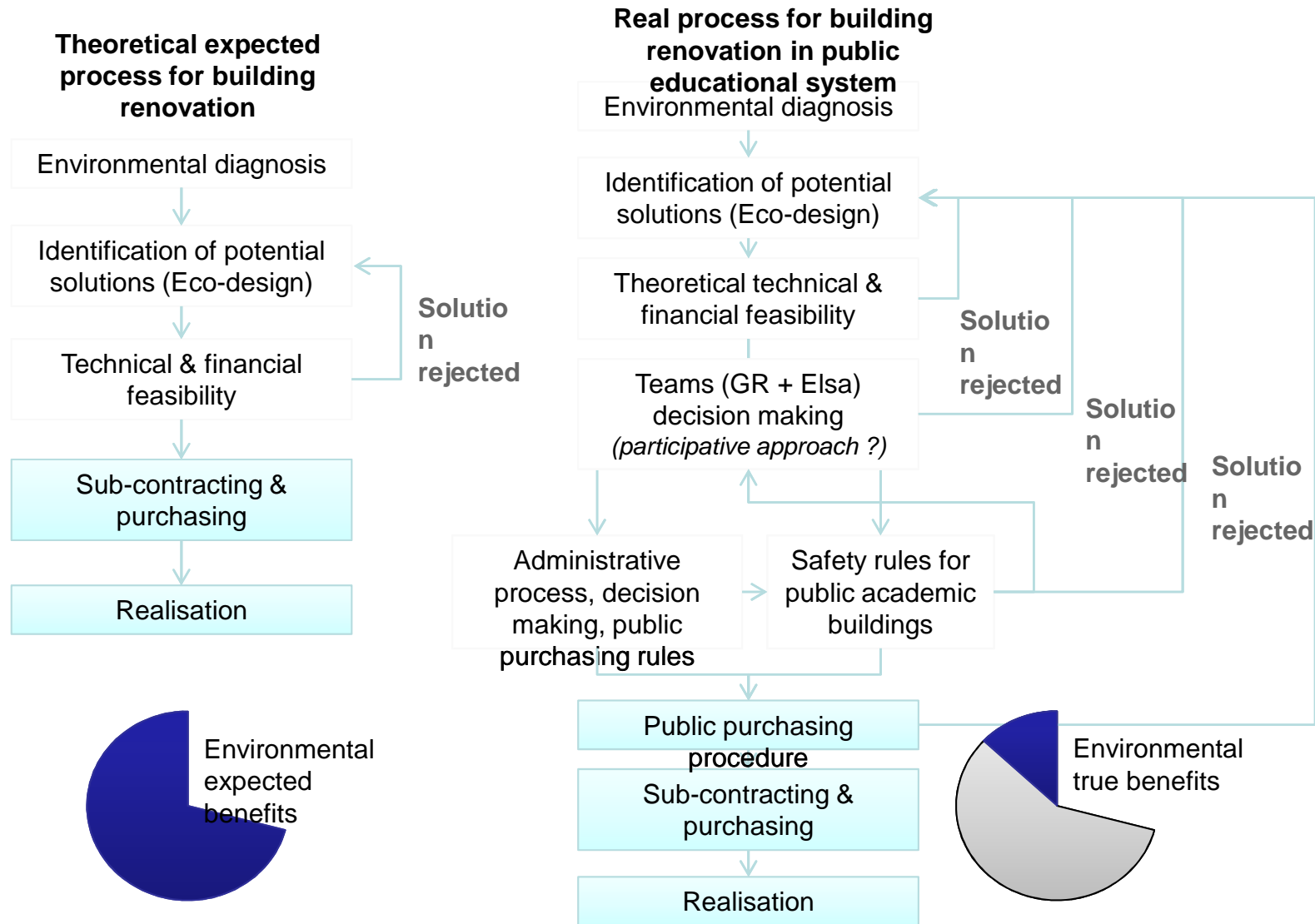
- Meetings in spring 2013 between the three countries partners
- Demonstrator
  - Available for visits and education
  - Follow online the monitoring through the Simulator web site
- Demonstrator environmental features are available and relevant for the all Sudoe area
- Reglementation and construction sectors are similar
  - Environmental Declaration System based on LCA studies already running or starting in the 3 countries
  - Data provided through Simulator are FDES, Ecoinvent based
  - LCADB could provide data in the future

# Final steps

- Monitoring and last study by SCET
- Open day
- User information material
  - Charte
  - Pedagogic path
    - Poster
    - Panel
    - Explanations panels and signs in the demonstrator building
  - Flyers
- Demonstrator / Building / In the future
  - Continuously used by researchers
  - Energy and CO2 savings
  - Illustration for courses and visitors

# Eco-Renovation of building in tertiary sector

## The lessons from Ecotech-Sudoe project



# Use of visio conference





# Use of video conference

- Report use of video

Date	Heure début	Heure fin	Duree	Pays distant	Ville distante	Organisme distant	Organisateur local	Nbre de participants local	Motif	Nom du projet	% Ecotech Sudoe	Observation
04/10/12	10	12	2	Espagne	Barcelona	UAB	Cyril Arnoult	1	Point recherche	Ecotech Sudo	100	
29/10/12	10	12	2	Espagne	Barcelona	UAB	Cyril Arnoult	1	Point recherche	Ecotech Sudo	100	
20/11/2012	10	12	2	Espagne	Barcelona	UAB	Cyril Arnoult	1	Point recherche	Ecotech Sudo	100	
27/11/2012	10	11	1	France	Narbonne	INRA	Cyril Arnoult	4	Point recherche	Ecotech Sudo	100	
27/11/2012	11	12	1	Espagne	Barcelona	UAB	Cyril Arnoult	1	Point recherche	Ecotech Sudo	100	
6/12/2012	13	15	2	France	Anglet	Nobatek	Cyril Arnoult	1	Point simulateur batiment	Ecotech Sudo	100	
03/12/12	10	13	3	Espagne, Po	Barcelona, Gironne, Aveiro, Narbon	UAB, UDG, UA, INR	Cyril Arnoult	1	Point recherche	Ecotech Sudo	100	
06/12/12	12	13	1	Espagne	Barcelona	UAB	Cyril Arnoult	1	Point recherche	Ecotech Sudo	100	
10/12/12	15	17	2	Espagne, Po	Barcelona, Aveiro	UAB, UA	Cyril Arnoult	2	Point recherche	Ecotech Sudo	100	
15/1/2013	11	13	2	France	Anglet	Nobatek	Cyril Arnoult	1	Point simulateur batiment	Ecotech Sudo	100	

- Then estimate avoided trips and so impact reduction
- Hypothesis
  - Infrastructures (for traveling or IT use) are not considered
  - Only energy consumption at use stage
  - From 1/3 to 2/3 of real planed and needed meetings
- Great savings and lower impacts
  - 4500 km flight; 13500km train; 600 car

# Thank you!

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