



Energy performance of railway facilities

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SNCB-Holding

Energy Efficiency Days 2009



The issue

- Energy consumption for non-traction purposes accounts for around 20% of the overall energy consumption of railway
- More than **80%** of this energy is **related to “comfort equipment” in buildings** (stations, offices, workshops etc.)
- High diversity and often poor quality of data
- Reorganization of railway makes collecting and comparing difficult
- Mix with energy consumption of “third parties” (e.g. shops in stations) is an additional complication
- Sector wide reduction targets are not possible if we do not agree on common KPI.

EPB -EU

Directive 2002/91/EU of 16 December 2002 on the Energy Performance of Buildings

“ The objective of this Directive is to promote the improvement of the energy performance of buildings, taking into account outdoor climatic and local conditions, as well as indoor climate requirements and cost-effectiveness.”

- general framework for a methodology
- minimum requirements on the energy performance of new buildings and existing buildings subject to major innovation
- regular inspection of boilers and of air-conditioning systems
- assessment of the heating installation

EPB -EU

Directive 2002/91/EU of 16 December 2002 **on the Energy Performance of Buildings**

The methodologies have been (or will be) set on a national or regional level

Although the application of the EPB rules is not trivial for stations or industrial buildings such as railway workshops this legislation is an important incentive to set new company rules and moreover:

“ Public authority buildings and buildings frequently visited by the public should set an example by taking environmental and energy considerations into account and therefore should be subject to energy certification on a regular basis “

Other non traction energy consumption

- Heating of switches
- Signalling equipment
- Communication and information equipment
- Lightning of sidings
- Cleaning platforms of rolling stock, car washes
- ...

The boundaries

- Purchased Energy: electricity, heating oil, gas, etc. and used for the railway system
- Not included
 - Energy to build the railway infrastructure
 - Energy to produce or deliver the railway components (rails, sleepers, trains, spare parts, etc...)
 - Energy used in shops in stations
 - Energy consumed by personnel to come to work
 - ...

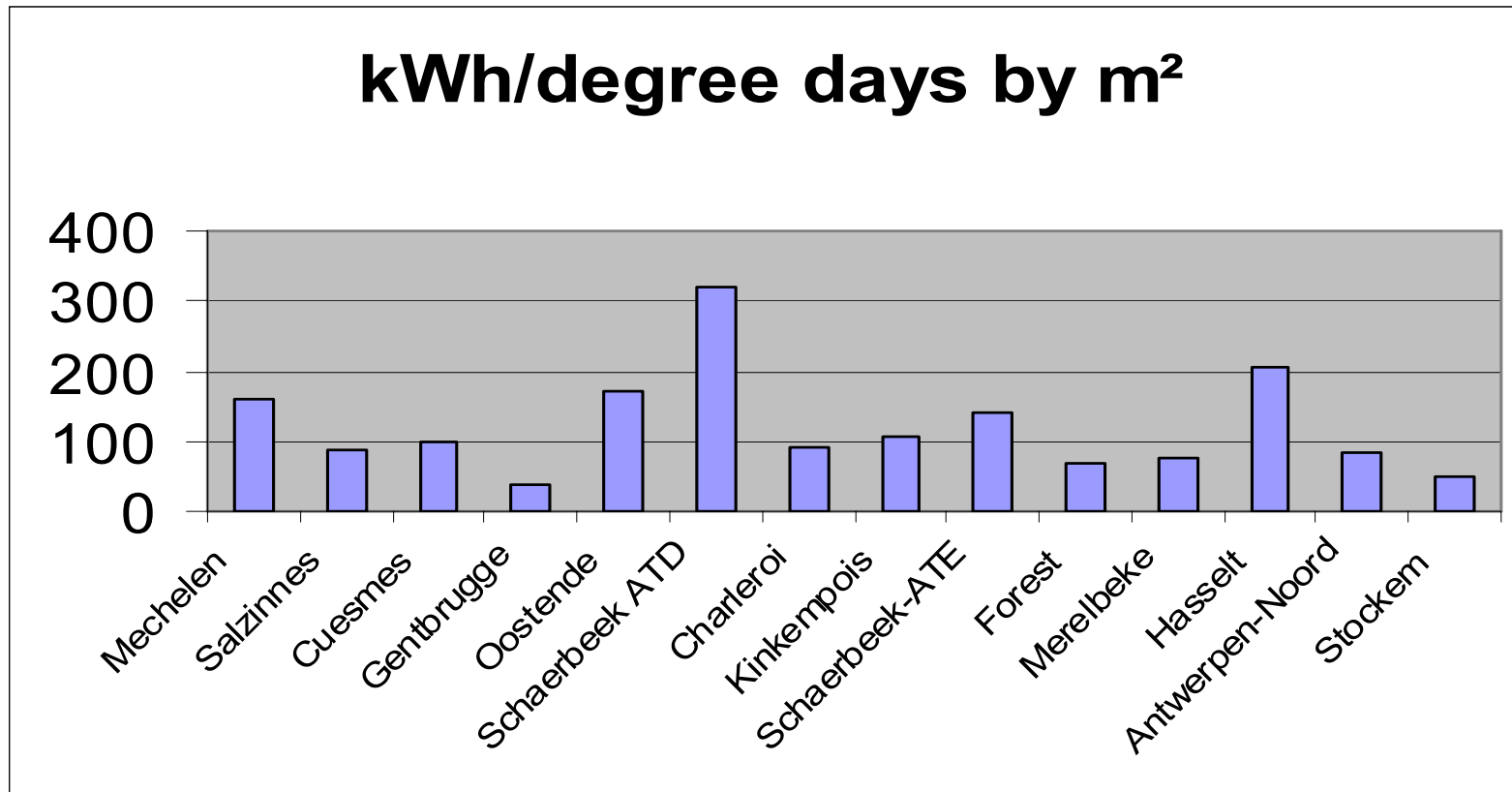
Split by type of utilization

	Type of utilization	Description: energy consumed for or CO ₂ emission related to	Denominator to calculate a local KPI	Denominator to calculate a company level KPI
1	Services to transport customers in stations	Lighting of platforms, stations halls, Elevators, escalators, Heating, cooling, Ticket machines, Information devices Maintenance	Number of daily passenger getting in the train from this station	Number of total pass./year
2	Technical facilities for train operation	Signalling equipment, Signalling boxes, dispatching centres, heating of switches, lighting of sidings, communication equipment, ... Car fleet		Number of trains paths/year (trainkm)

Energy consumption by type of utilization

	Type of utilization	Description: energy consumed for or CO ₂ emission related to	denominator to calculate a local KPI	denominator to calculate a company level KPI
3	Maintenance facilities rolling stock	Maintenance workshop of rolling stock, Cleaning platforms Car and truck fleet of RU	m² of building (correction factor for working hours)	m² of buildings
4	Offices	Offices Related car fleet	m² of building or number of employees working in this building.	m² of building or total number of employees
5	Maintenance railway infrastructure	Workshops and maintenance facilities of IM, traction for infrastructure maintenance rolling stock and machinery Car and truck fleet of IM		km of railway track

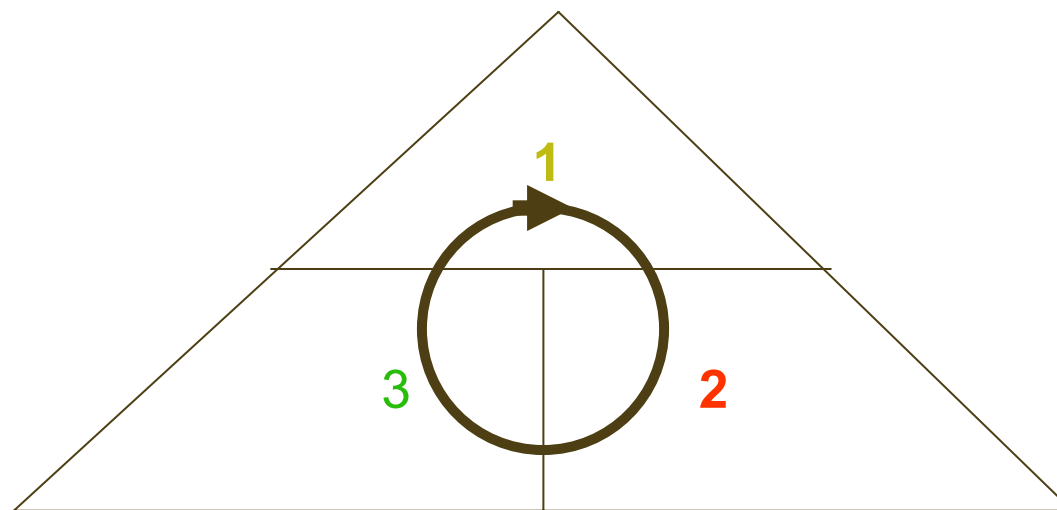
Heating oil and natural gas consumption



14 most important rolling stock maintenance facilities of SNCB, representing 90% of rolling stock workshops consumptions

TRIAS ENERGETICA

Reduce energy demand



Use of renewable energy sources

Energy efficient devices

Priorities

Proces-Power-People

- 😊 😐 1. Energy accounting and reporting
- 😊 2. Energy efficiency awareness campaign
- 😊 3. Enhanced Energy performance of new facilities (-20% to -50%)

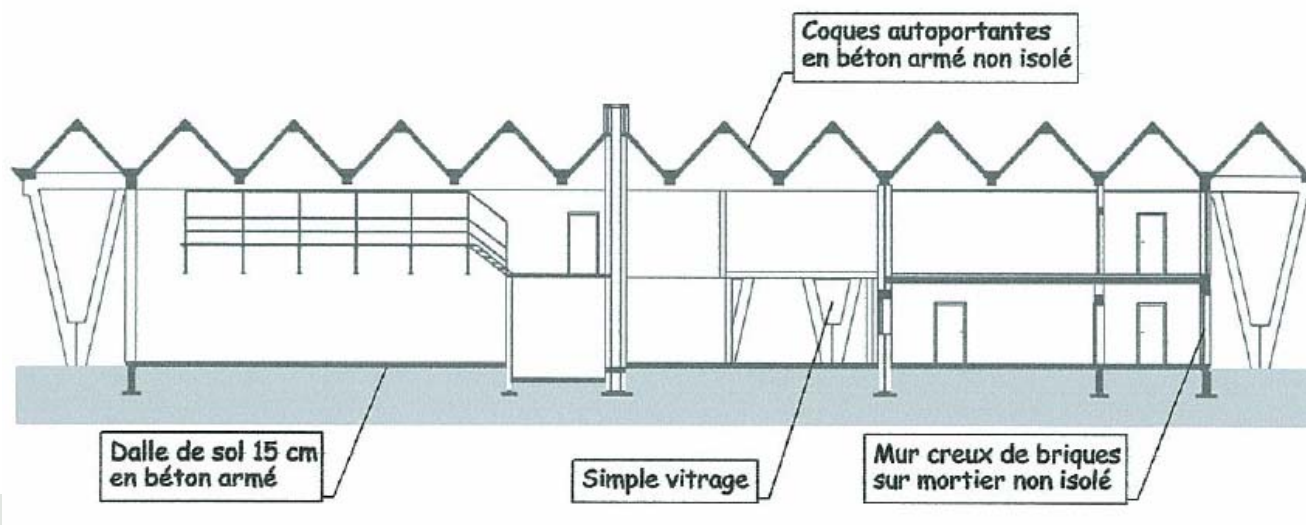
- 😐 4. Reduce the number of existing facilities (buildings)
- 😐 5. Stop the proliferation of active cooling systems
- 😊 6. Inspection and renewal of boilers and air-conditioning systems
- 😊 7. Relighting projects, enhance EE of switch heating

Example

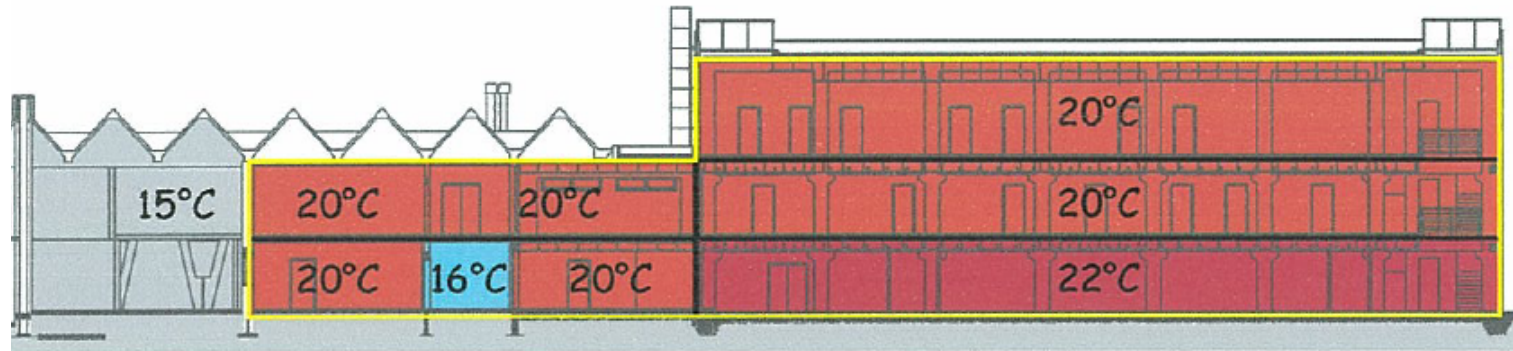
Jemelle: existing center for the maintenance of the catenary installations



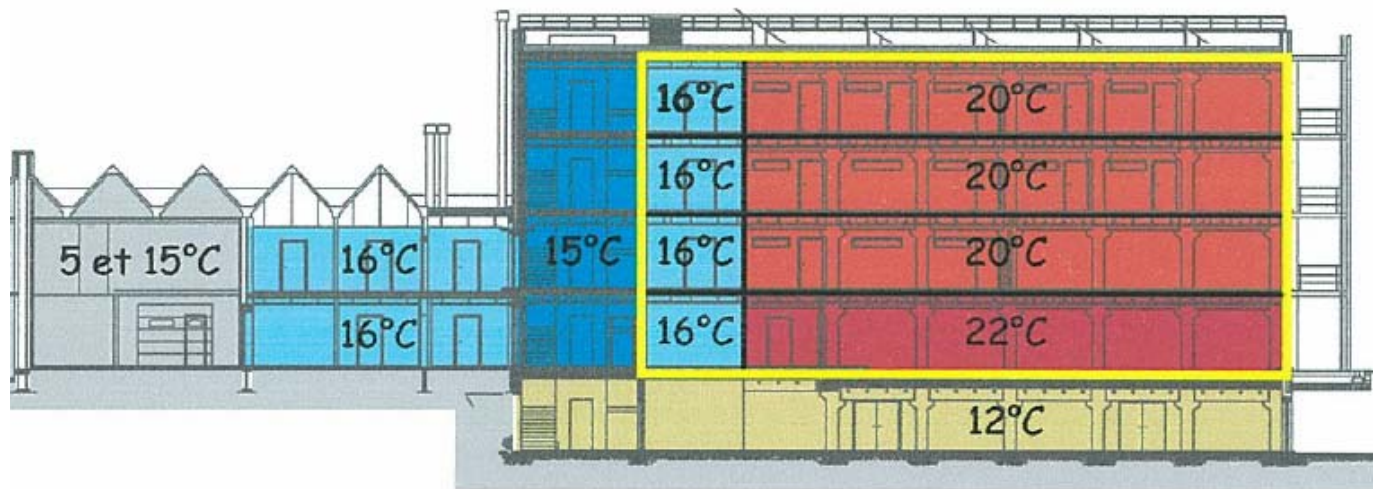
1973
K190



Planned extension to accommodate the CLI Jemelle

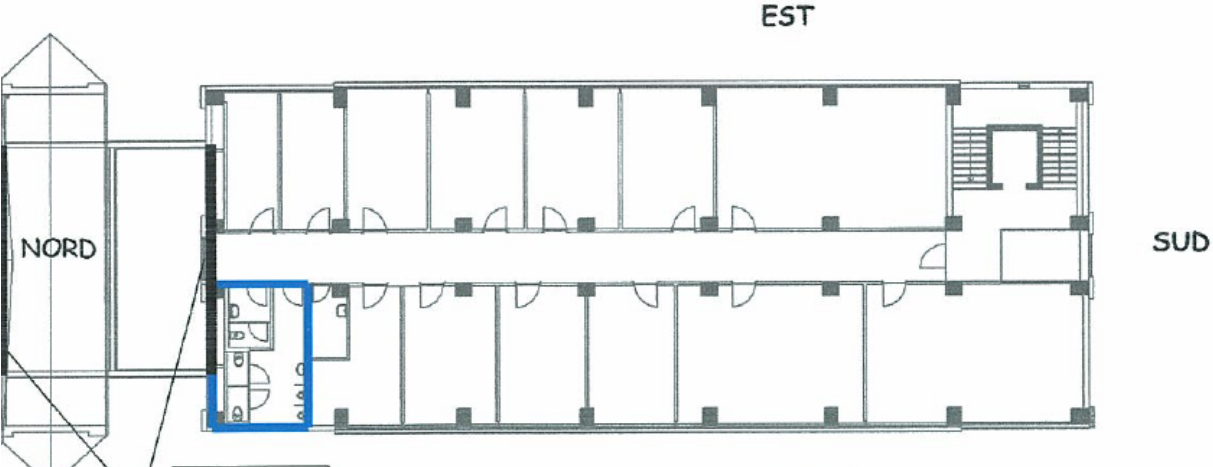


design 2006

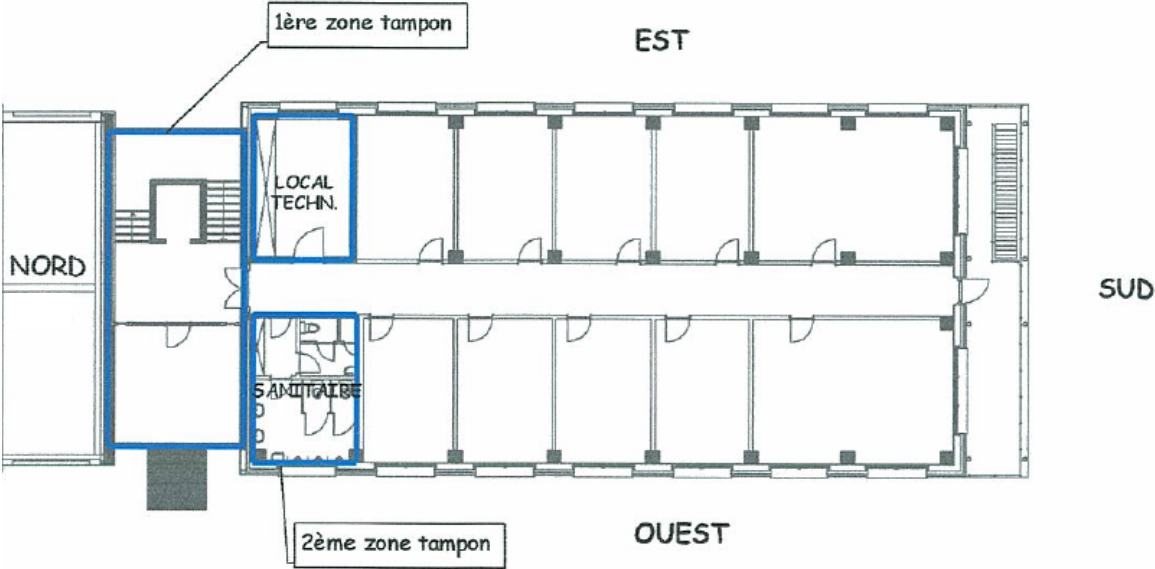


design 2008

Improved design in order to take more notice of the orientation

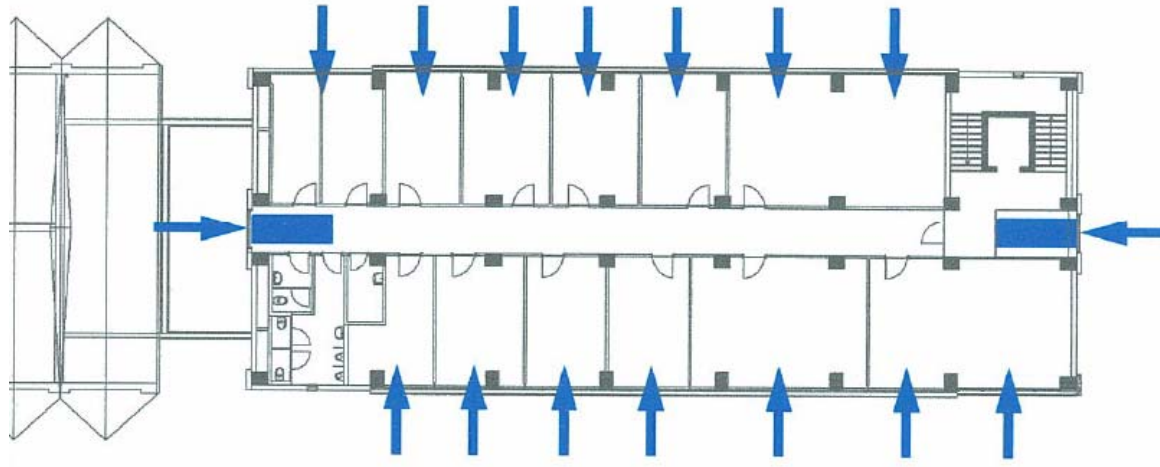


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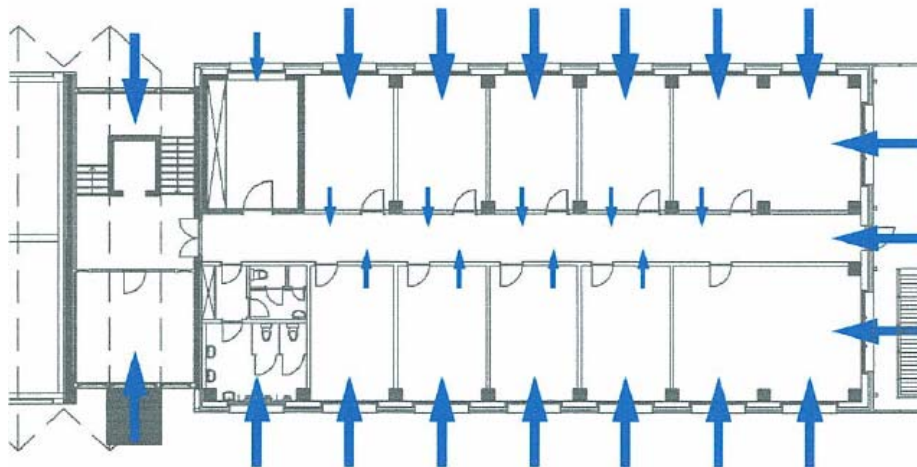


design 2008

Use more external light

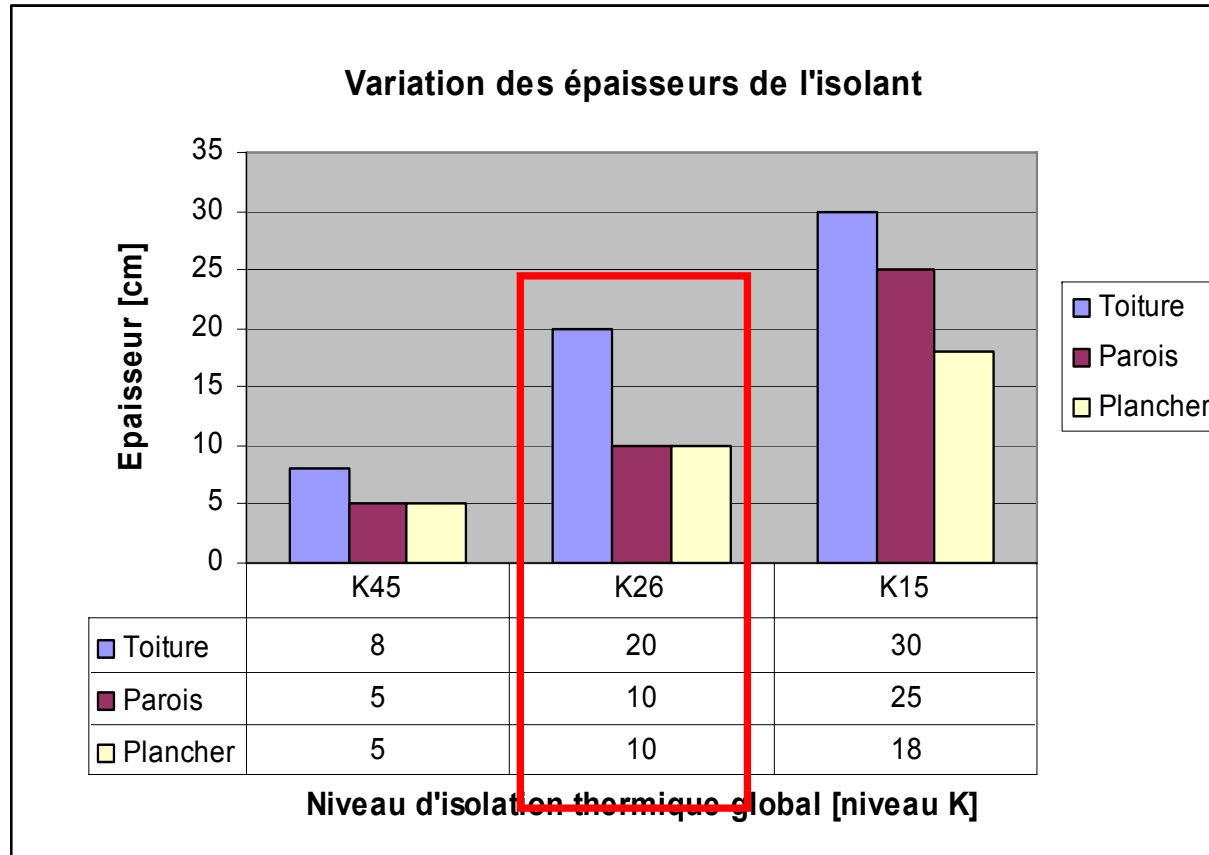


design 2006



design 2008

Better insulation



K45 = required insulation level according EPC rules

K26 = insulation level of a “low energy” building

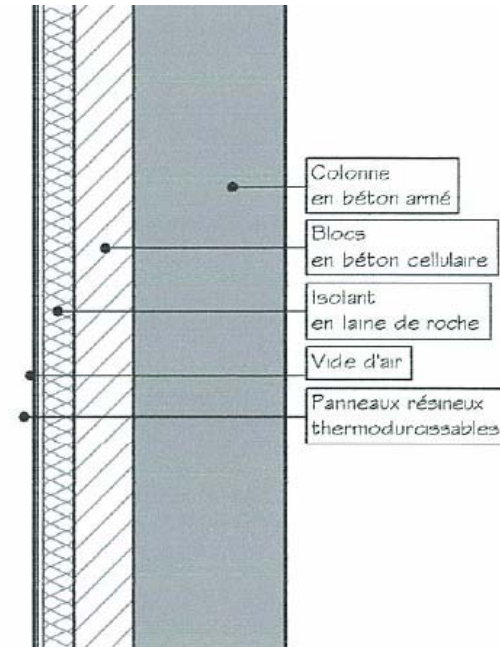
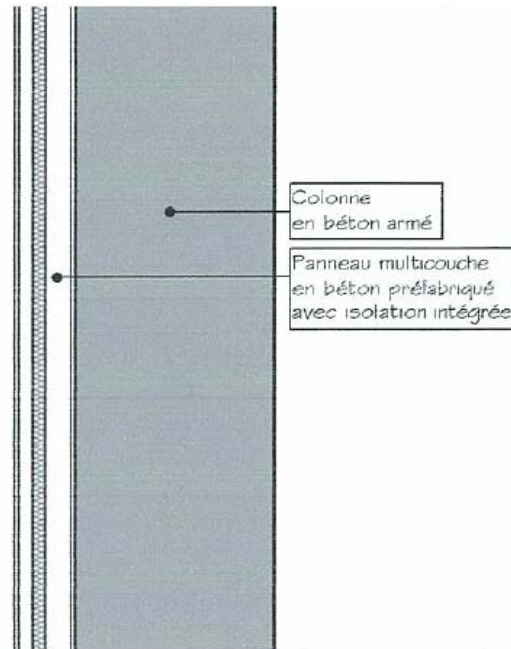
K15 = insulation level of a “passive” building

Better insulation

design 2006

design 2008

Outside walls



windows

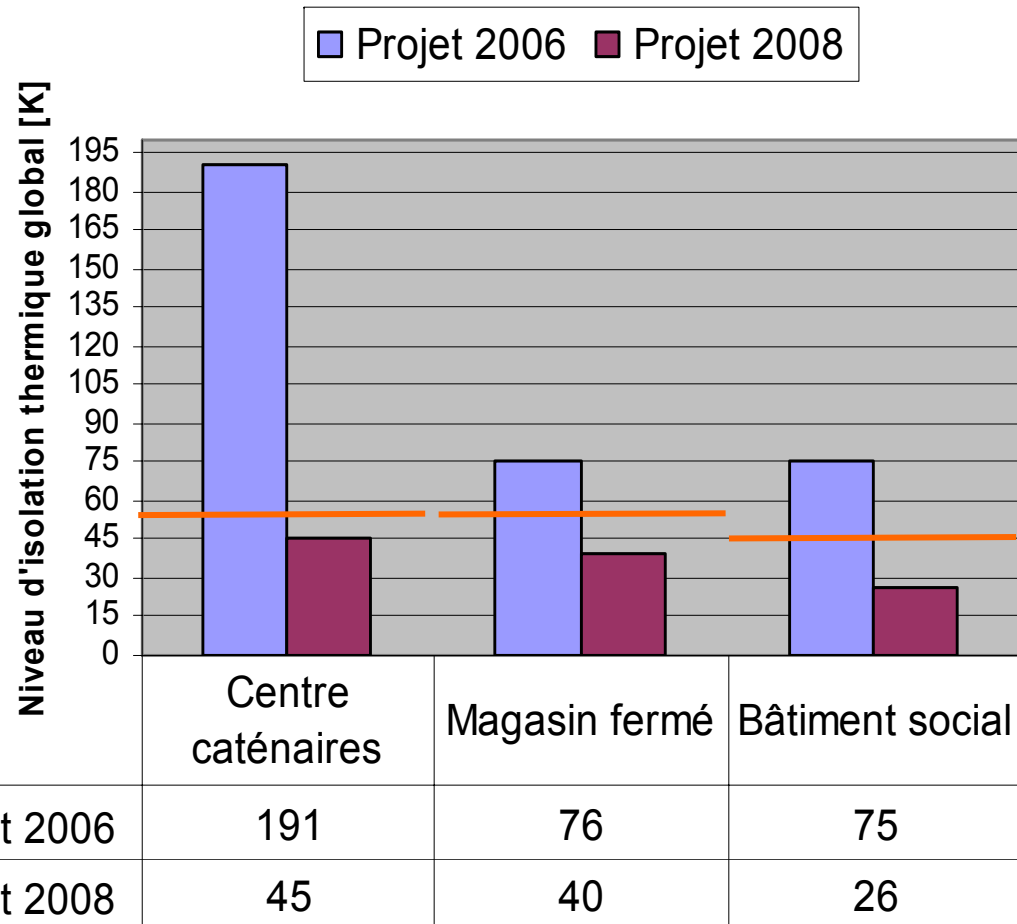


Double vitrage standard



Triple vitrage
chassis avec
coupure thermique

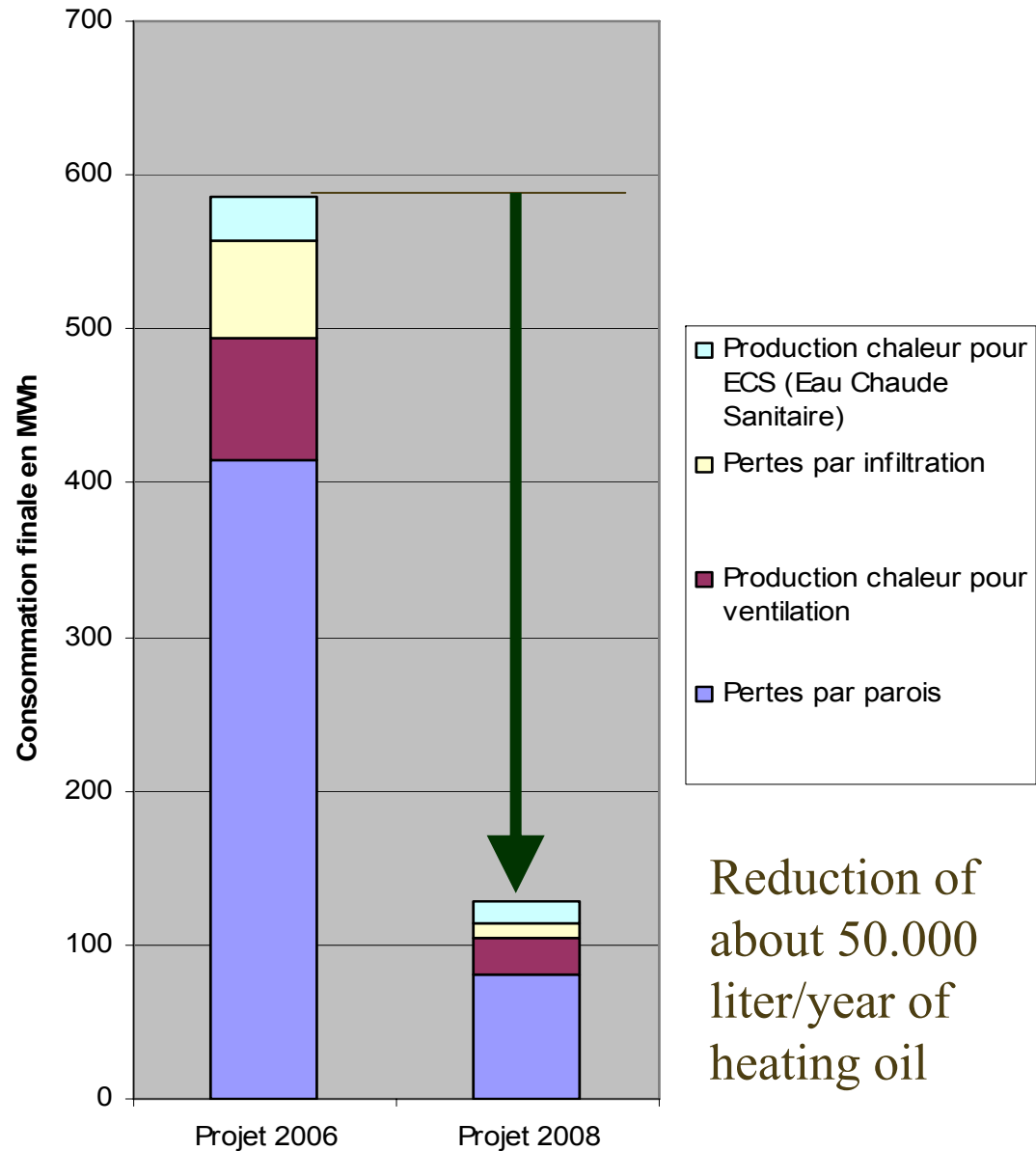
Comparaison de insulation level



— legal K level

K45 for offices
K55 for ind. buildings

Comparaison entre les deux projets suivant leurs consommations finales de vecteurs énergétiques pour la production de chaleur de l'ensemble du CLI



Reduction of
about 50.000
liter/year of
heating oil