Sustainable and Nearly Zero Energy-Building Strategy in Brussels

USA, March 2013

Joke « Yoka » DOCKX
Sub-Division « Promotion of sustainable buildings »
Brussels Environment
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*Situation of the Brussels Region

*Build foundations
   A match between demand and supply
   Exemplary Buildings
   Commitment of Public Authorities

*And next …

*Conclusion
Situation of the Brussels Region

• 162 km² - 62.5 square miles

• 1.1 millions People (+13% 2001-2010 and expected + 25% by 2060)

• 630,000 workers (+8% 2001-2010)

• 75% of energy consumption by buildings

• Old building stock

• Very low renewable energy potential (3%)

• Large regional competences: environment, energy, mobility, urbanism, housing, …

• Ambitious policy: Reduce 30% of Greenhouse gas emissions by 2025
Policies to which the Brussels Region is subjected

European goals:

- Energy Independance and protection of air qualité, health and climate
- Vision for 2020 - 2050

Means: European Directives (Commission, 27 Member States, Parliament)

- Energy efficiency: products, construction, refurbishment, technical installations
- Renewables
- CO₂: emission trading systems & flexibility mechanisms
- Obligation of results

Brussels’ objectif: resilience

- Sign up in a long term perspective:
  
  undertake realistic actions today that will still be valid in a «sustainable tomorrow»

**building, population, transport, economy**
Brussels’ situation some years ago

- 2001: worst student of Europe
- 2015: first passive regulation in Europe
Near Zero Energy Building strategy: a success story started from scratch in 2004

Evolution of energy consumption and greenhouse gas emissions in Brussels – at constant climate- between 1990 and 2011

- Energy Consumption
  - 1990 - 2010: +4%
  - 1990 - 2004: +15%
  - 2004 - 2010: -10%

- GHG Emissions
  - 1990 - 2010: -7%
  - 1990 - 2004: +9%
  - 2004 - 2011: -11%

-18% per inhabitant
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Brussels’ Strategie: Progress step by step

- **What’s the market capable of?**
  - Capitalize and train building sector
  - Define ambition: -30% GHG

- **What do consumers want to do?**
  - Experiences
  - Services
  - Financial aid

- **Strong stimulation of the demand**
  - 2004 - 2014

- **Stimulation of Front-runners**
  - 2007 - 2025

- **Structured approach for consumers and professionals**
Stimulate DEMAND

Support Financially
- Energy Allowances

Guide & Sustain
- Professionals: Facilitators…
- Individuals: House of Sust. Building
- PLAGE programme

Increase, Promote Examples
- Exemplary Buildings Programme
- Public Authorities set the example

Improve Knowledge & know-how

Train to excellence
- Designers’ training

Stimulate training sectors
- Qualifying training for: Workers, Students, Unemployed

Adapt technical framework
- Belgian Certification System (Ref.B)
- Technical Guide, Supports & Training

Adapt LEGAL framework
- EPB Legislation / COBRACE
- PassiveHouse Standard is the norm
- Sustainable Building Certification

Improve SUPPLY

Stimulate Companies
- Awareness
- Clustering - Cluster EcoBuild
- ProActive Lobbying
- Alliance Employment-Environment
- GreenBizz (start-up)
- Social Economy

Partners: Cluster EcoBuild
- CDR Constr.

Brussels Environment’s projects → a match between demand & supply
Energy & sustainable buildings

Ambitious energy policy:
- stimulation of demand
- control of good conception
- experiences on life-size scale

Energy is the driver but also approach of sustainability

1st Call for projects “Exemplary Buildings”
From building to neighbourhood

Government declaration

Commitment of public authorities: obligation Passif 2010
Alliance Employment – Environment – Sustainable Construction

From exemplarity to common use

Belgian assessment method for sustainable buildings: voluntary approach

1st January– every new building passive, heavy refurbishment low energy

Passif invites itself as a realistic standard in Exemplary Buildings

Announcing passive standard for 2015

Decree of 5 May 2011

Negociation and agreement with the sector
Financial support

Energy grants

Insulation: roof, windows, walls, floor & ventilation
Heating: boiler replacement & regulation
Renewable energy: Solar T & PV, biomass, Wind, HeatPumps & geothermal
Audits and feasibility studies

Budget 2013: 19 million € – 24,7 Mio $
Budget 2012: 18,500 grants - 17,5 mio € – 22, 75 Mio $

98% requests from households

Top 5 (in €) – 77% of budget:
Super-Insulating glazing
Roof Insulation
Wall Insulation
Heating boiler replacement
Solar thermal boiler
Financial support

- Exemplary Buildings subsidies
- Brussels Green Loan

We’re working on:

- Cost/benefit sharing between owners and tenants
  - Look at total occupation cost (rent + energy bill)
- Third party financing—ESCOs
OPENING SOON…

Energy houses for citizens
VOUS VOULEZ RÉDUIRE VOTRE FACTURE ÉNERGÉTIQUE ?

Information counter

Visit at home (quick scan)

Free small measures (radiator reflector, pipe insulation, ...)

Advisor for refurbishment and financial aspects

Differentiated Target groups (tenant, owner, co-owner)
• Energy Management of large building stocks
• reduce consumption and infuse the energy reflex
• Up to 25% energy savings without important investments

Budget:
6 millions € / 7,8 Mio $ - support to partners (2006 – 2014)
2 millions €/ 2,6 Mio $ - High level Energy Advisor (2006 – 2014)
80,000 €/year – 104,000$/year – Annual Energy Manager Training
more than 1.380 buildings (4,5 millions m² - 48 Mio ft²) of which 2 millions m²/ 21 Mio ft² were put in PLAGE Action Plan

annual final energy consumption of 429 GWh fuel and 100,5 GWh electricity.

For the 4 PLAGE action Plan calls ended, the annual global mean results are:

-14% (-10 to -18%) for fuel consumption and CO2;
stabilisation (-4% to +1%) for electricity consumption;
4,25 millions € / 5,5 Mio $ saved;
35 Energy Managers engaged.
Best result of -30% of fuel consumption
P.L.A.G.E. in five steps …

STEP 1 : to appoint an Energy Manager
STEP 2 : to make an energy cadaster
STEP 3 : to establish an action Plan
STEP 4 : to implement the action program
STEP 5 : to monitor the actions and communicate the results
Call for projects: EXEMPLARY BUILDINGS

Stimulate DEMAND
Support Financially

Increase, Promote Examples
Exemplary Buildings Programme
Requiring QUALITY
Proof of feasibility of ambitious targets with the exemplary buildings

- Call for projects to stimulate construction, refurbishment and extension of “sustainable” buildings in Brussels

- 4 criteria: Energy, Environment, profitability + reproducibility, architecture and urban integration

  193 buildings – 522.000 m² / 5.6 million ft² - all building types

  > **change in way of conception and construction**
  > 285.000 m² / 3,1 million ft² Passif (new)

- Monitoring on building site by expert
  Monitoring of consumptions during 5 years

- Promotion of winning projects

**Brussels goes Passive in 2015!**
Exemplary buildings – Evaluation criteria

*ENERGY
High performances
  = minimum energy demand
Near Zero Energy Buildings

*ECO CONSTRUCTION
Minimum environmental negative impact

*PROFITABILITY & REPRODUCTIBILITY
Reasonable solutions

*ARCHITECTURAL QUALITY
Patrimonial respect
Visibility
Exemplary buildings - Regional Grants and support

*FINANCIAL
100€/m² or +- 12$/ft²
→ 28,5 Mio € / 37Mio $ over 5 years
Investment budget:
  677 Mio € / 880 Mio $

*TECHNICAL SUPPORT
quality control

*PROMOTIONAL
publications, website, …
Exemplary buildings – Results

193 projects selected in 5 calls for projects

Floor areas of constructed or refurbished buildings = 5.6 million ft²
39% in refurbishment

41% of Exemplary Buildings come from public authorities
53% are Passive House buildings

Current status:

Finished: 62 projects – 1.3 Mio ft²
under construction: 45 – 1.2 Mio ft²
in design process: 73
Cancelled: 13
Exemplary buildings – **Results** - Selected projects
Office building of Elia (Energy Transport Network)

Brussels Parliament

private housing
Does it work?

Total consumption of 14 families before and after their moving to passive building
It works! If you keep in mind:

- Choice and dimensioning of installations:
  - Heating system: individual vs. collectif, relaunch after absence, easy control by inhabitant
  - choice of fuel: if electricity → bill
  - Ventilation system: individual vs. collectif, maintenance
- wiring: parabola, cable television, phone, …
- Understanding of inhabitants
- …
No panic on the Construction sites

Airtightness > 95% successful construction!

Over 90% didn’t get specific training
Commitment of the public authorities

Since 2010:

Contrats Quartiers Durables 130.000 ft²/year (120 housing units)
8 collective facilities

SDRB 580.000 ft² (P) + 270.000ft² after 2014
285.000ft² (P) urban industry

SLRB 2,5 Mio ft² (P, VLE, LE)

Bruxelles Environnement 180.000 ft² (P)

MRBC 480.000 ft²

Local authorities stimulating effect

Also boosting the private sector!

→ In Brussels there will be much more than 5,4 Mio ft² of Passive House buildings built by 2015!
Major studies to gather necessary knowhow


2008 – applicability of passive concept in the Brussels’ context

2011 – definition of passive criteria for tertiary sector

2012 – Successful passivehouse skyscrapers
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Exemplary buildings

6th Call for projects
“Exemplary Buildings 2013”

Launched February 19, 2013
Application deadline: June 27, 2013
Jury: 11-13th September, 2013
Budget: 5 million € - 6,5 Mio $
And next ...

*Brussels is one of the Front runner regions
PassREG – Serpente –…
EUSEW.eu Award 2012!

*Technical feedback
*Monitoring
*Studies & Surveys
And next …

In the face of all the uncertainty about the future, is it possible to imagine a city becoming more beautiful, more practical and more economical to live in, while at the same time becoming more sustainable?

This was the challenge the Brussels-Capital Region set itself in 2007 – and its response was to launch the Batex call for projects targeting everyone wanting to build or refurbish a building in Brussels. The term “Batex” is the abbreviation for “Bâtiments exemplaires” or “exemplary buildings”, and the whole idea is to leverage each project, whether large or small, whether private or public, to spread the word about eco-construction, what it involves and how it can help transform the city, building by building.

Exemplary Buildings: Success Stories from Brussels
Bernard Deprez and Jean Cech
29,95 € | October 2012 | Soft cover with flaps | Colour illustrations
247 x 247 mm | 232 pages | ISBN en 978 2 87386 800 0 | ISBN fr 978 2 87386 798 0
ISBN NL 978 2 87386 799 7
BATEX - Influence

Mandatory for each building permit for new buildings or important refurbishment (>75% of building shell) from 2015:

- Unthinkable in 2004
- The exemplary buildings showed technical and financial feasibility
- First positif feedback of building users
- Public authorities showing the example
- **Negociared agreement with belgian building federations (construction, architects, promotor, engineers)** – 19 octobre 2012
- Brussels, pioneer, international interest
Passive will be mandatory from 2015 for housing, offices, schools.

<table>
<thead>
<tr>
<th>housing</th>
<th>offices + schools</th>
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<tr>
<td>Specific space heating demand</td>
<td>Specific space heating demand</td>
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<tr>
<td>$\leq 15 \text{ kWh/(m}^2\text{a)}$</td>
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<td>Airtightness (from 2018)</td>
<td>cooling demand</td>
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<td>0,6 Volume/h under 50 Pa</td>
<td>$\leq 15 \text{ kWh/(m}^2\text{a)}$</td>
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<td>primary energy demand</td>
<td>Airtightness (from 2018)</td>
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<td>(heating, cooling, hot water,</td>
<td>0,6 Volume/h under 50 Pa</td>
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<td>auxiliary)</td>
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<td>45 kWh/m²·Year</td>
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<td>overheating</td>
<td>primary energy demand (heating,</td>
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<td>maximum 5% of time $&gt; 25^\circ \text{C}$</td>
<td>cooling, hot water, auxiliary)</td>
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**Overriding rule**, if bad compactness or orientation

**Heavy refurbishment**: $> 75\%$ of loss surfaces and all installations are replaced

$\Rightarrow$ same requirements $\times 1,2$ (except overheating)
Training for excellence

- Energy management
- Passive and low energy concept
- Acoustics
- eco-materials
- Water
- Waste
- Territory and environment

Nearly 15,000 hours of training to professionals in 2012
Tools for professionals

SUSTAINABLE BUILDING” QUALITY LABELLING
Evaluate the environmental and energy performance of Belgian buildings with a view to international recognition

TECHNICAL GUIDE FOR SUSTAINABLE BUILDINGS
Guide for good practice and technical solutions for sustainable construction and refurbishment
What?
Stimulate transition of construction firms to sustainable construction

Why?
150,000 new inhabitants by 2020
70,000 new lodging units
Interest for building renovation works increases

How?
Unite Brussels actors that can influence supply side – over 110 participants
Identification of 44 actions

Goals?
30,000 hours of training, 2,500 new local jobs
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And would they do it again?

I would certainly start again..

I would do it again! It was long, complicated and tiring but the result is great and really comfortable to live in. It was really worth it.

We are doing it again, with the advantage of more knowledge and more available companies. I would also build the wooden frame with my own hands.

I would start all over again!

Off course, it needs to be repeated!

Probably, with more knowledge this time...

Yes, but better... Making the building more airtight isn’t that complicated, it’s just (very) long to do.

Quotes from the satisfaction survey
Conclusions – Why should YOU go passive?

- Up to 90% energy savings
- Preparing the future
- Decrease of energy dependance
- Excellent choice for social housing
- Comfort
- -75% CO₂-emissions
- Professional skills of the future
- Using proven technologies
- Cost
- Passive = concept → free choices

1. Reduce the demand for energy by avoiding waste and implementing energy-saving measures.
2. Use sustainable sources of energy instead of finite fossil fuels.
3. Produce and use fossil energy as efficiently as possible.
Questions?

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More informations:  www.bruxellesenvironnement.be/batimentsexemplaires