



Ventilation and infiltration measurements in the Effinergie label. Approach to quality issues and implications for compliance



Collective Effinergie



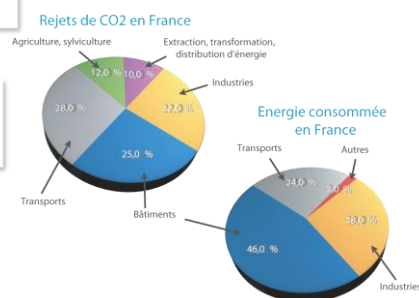
Context



An economic and environmental issue for the building sector

A lack of definition for low consumption building in France, like others European countries

Local initiatives to go beyond thermal regulation of 2005



Stakeholders from different origins but complementary gathered around the necessity to develop **energy efficiency in the building sector**



The Association



A creation in March, 2006

A strong network of 70 corporations



A territorial base

Almost all the Regions of France (20), a department, an urban area and a city



The strength of Effinergie

Be able to gathered a large group of members and experts about new building construction and refurbishment :

- *Technical and research center*
- *Associations*
- *Banks*
- *Industrials*
- *Syndicates and professional federations*
- *Training centers*
- *Architects and engineering consultants*



Our Objectives



Our Objectives

To develop a dynamics for energetic efficiency in new and refurbishment building sector in order to generalize positive energy building



Our actions

- *Develop building references and tools*
- *Unite all the actors of the sector*
- *Ensure coordination between governmental authorities and regional initiatives*
- *Show the technical-economic feasibility of low energy buildings*



Nos actions



Network of exchange and sharing

Animation of a network of exchange and sharing experiences to ensure a local dynamics and respect the objectives of the Grenelle



Labels

Development of references for labels about energy performance building by a commission of experts and in accordance with the Ministry.



Educational tools

Creation and diffusion of tools : guides, teaching aids, Observatory of low consumption buildings, catalogue of projects, documents database , ...



A network of exchange and sharing



Animation of a group gathering all the local authorities, members of Effinergie



Member of the Technical Commissions of the Ministry



Animation of the Inter-clusters network



Vice-Président of France GBC



Member of the Green Building Plan Comitee



The labels



Labels in agreement with the EP- Regulation – Same calculation methods (Tb-CE, Tb-BCE et Tb-CE ex)



The energy is counted in kWh of primary energy per square meter of the reference surface per year.



Uses taken into account :

- Heating,
- DHW,
- Heating and ventilation auxiliaries,
- Cooling,
- Lighting.



Others uses are taken into account in the label BEPOS-Effinergie.



Les labels...



... For new buildings

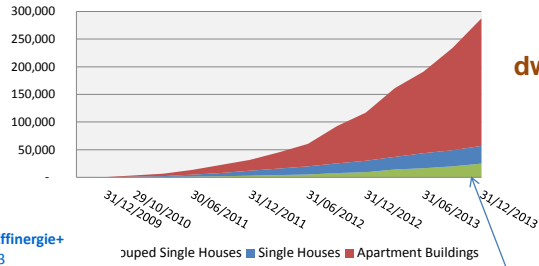


Educational tools



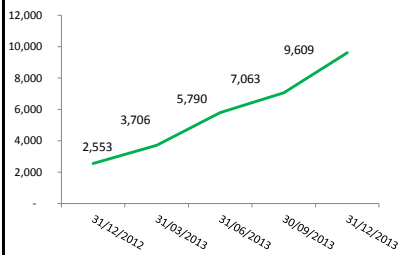
Observatory BBC

Dwellings certified BBC-Effinergie
Evolution and tendency from 2008 to 2013



300 000 dwellings

Dwellings on demand for the label Effinergie+
Tendency from 2012 to 2013



60% of new dwellings in France



Les labels...



... For refurbishment



The certification



	New buildings E+nergie, E!nergie+, BEPOS- E!nergie	Refurbishment BBC E!nergie Rénovation, E!nergie Rénovation
Individual houses	 	
Gathered houses		
Apartment buildings		
Tertiary Buildings		



Educational tools



Observatory BBC - www.observatoirebbc.org



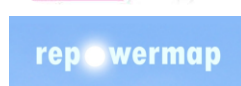
Project research by cities



Project research by technologies or level of performance



Indicators research about low consumption buildings



Educational tools



The guides



Succeed a project of low consumption building



Succeed a project of low consumption refurbishment



Methodological guide for instrumentation



Training

Promotion through an agreement by Effinergie



The label Effinergie+

effinergie⁺⁺⁺

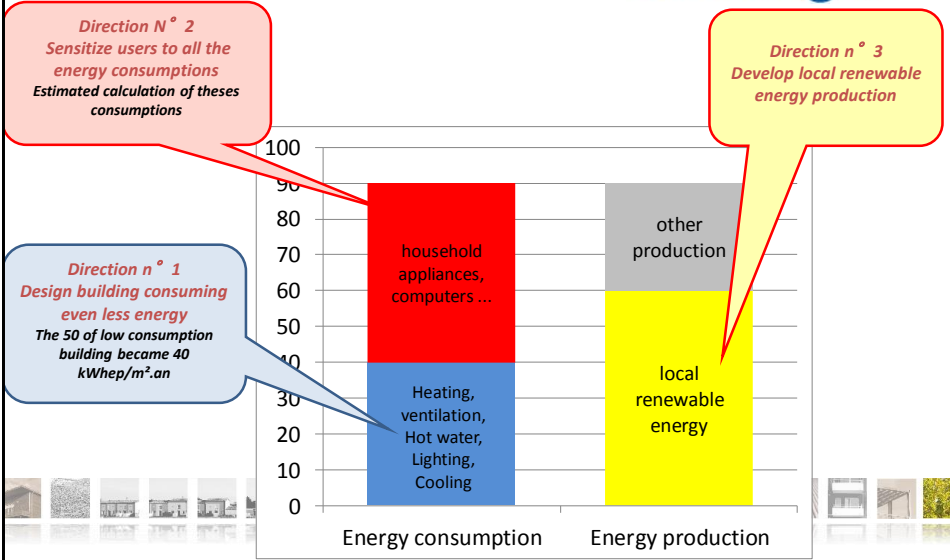


Label Effinergie+



Trois directions taken for this new label

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Label Effinergie+



Energy performance indicators

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Improve the building envelope working on the bio-climatic needs

$$Bbio_{max} \leq 0,8 * Bbio_{max RT}$$



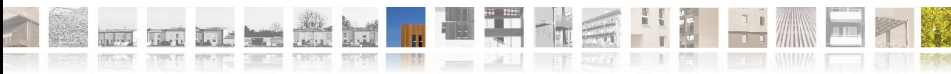
Improve the building energy efficiency on the 5 reglementary uses



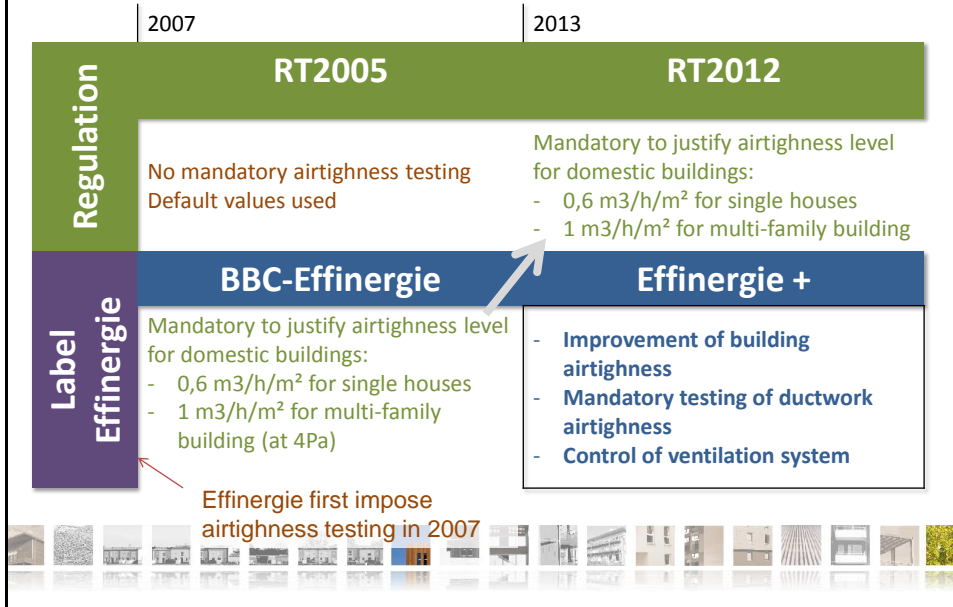
Housing, , school, crèche, hospital: $Cep_{project} \leq 0,8 * Cep_{max}$



Offices and other tertiary uses: $Cep_{project} \leq 0,6 * Cep_{max}$



Airtightness in Effinergie labels



Label Effinergie+



Airtightness requirements

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Improve building airtightness by reinforcing the required level



0,8 m³ / h.m² for a apartment building in the case of a measurement by sampling



Obligation to measure non-domestic buildings under 3 000 m².



0,4 m³ / h.m² for single houses or training workers for individual housing.

Improve the ventilation efficiency and air quality by measuring the network air tightness.



The ventilation network air tightness has to be at least class A.



Mandatory for all building except non domestic buildings over 3000 m².



This class of airtightness is used in the EP-calculation.



Label Effinergie


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 *Why imposing control of airtightness?*

 *The building airtightness*

 *Hypothesis on the airtightness value was used in the EP-calculation.*

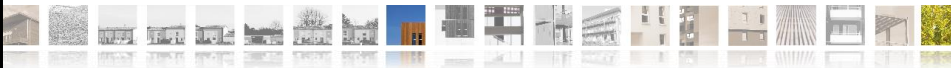
 *But never checked and not always respected*

 *The low consumption building label was the ideal tool to improve building airtightness :*

 *Voluntary approach*

 *Certified by a third part*

 *A small amount of projects (at the beginning)*




Label Effinergie+


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 *Why imposing control of airtightness?*

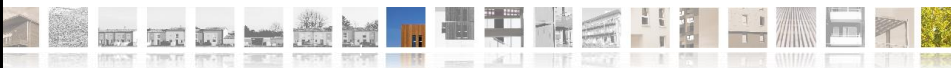
 *The airtightness control - History*

 *All the recent evolutions of the regulation have gone from a requirement of means to a requirement of results.*

 *This initial aim to work on airtightness was to go to a measurement proof and an obligation of results instead of a calculation proof and an obligation of means.*

 *For example, in the previous thermal regulation, ventilation network airtightness could be justified on Classe A using duct equipments classified on Classe C.*

 *This is no longer possible and to prove airtightness, it's necessary to do a measurement of the network.*



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Control of the building airtightness


These measurements has to be done by qualified operator

 *These operator has to follow a authorized training program*

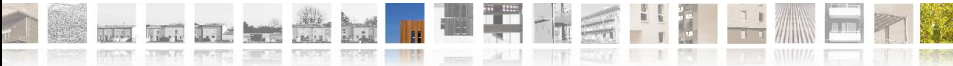
 *They have to justify a certain amount of tests.*

 *They need to apply for the qualification to a certified organism.*

 *And they need to fill a database.*

 *The building airtightness measurement is done following the standard EN 13 829 and its Application Guide P50-784 – specific to the french context.*

 *This Application guide was written based on a primary works used to improve the quality measurement.*



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Control of the building airtightness

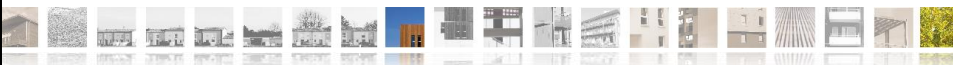
The success of the qualification process

 *It positively improved measurement quality,*

 *It gave credit to the approach,*

 *Perform a building airtightness test by a qualified tester is now required by the French regulation for all new residential buildings.*

 *More than 800 testers qualified*



Label Effinergie+



Control of the ventilation ductwork airtightness

effinergie+

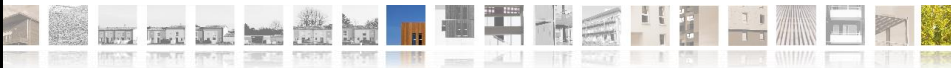
With airtight buildings, we need airtight ventilation network ...

We noted that airtight building presents more risks to pathologies if the ventilation doesn't work correctly.

As the building airtightness, the ventilation network airtightness is never measured but favorable hypothesis was used in the calculation method.

Moreover, campaigns of control of ventilation systems show real defaults in almost every dwellings.

To avoid a generalization of pathologies and continue to improve building energy performance, we decided to generalize ventilation network airtightness. And visual control of ventilation systems



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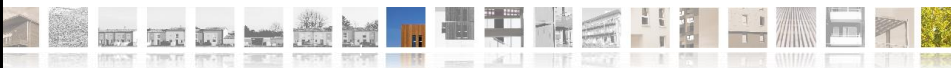
Control of the ventilation ductwork airtightness

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Measurement is done following the norms EN 1507, EN 12 237, EN 12 599, EN 13403, and especially the documentary booklet FD E51-767.

Specific authorized training already exist

Specific qualification is coming...



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Control of the ventilation system

The ventilation network airflow

 *Initially, the label included also obligation of airflow measurement.*

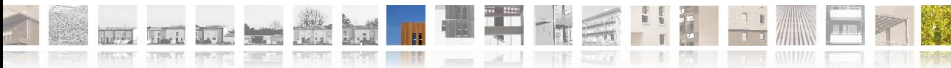
 *Abandon because of*

 *Standards EN 12599, NF X 10-112, NF EN 16 211 didn't fit with our purpose*

 *Need of a non destructive intervention : operator responsibility can't be engaged.*

 *the lack of standards to measure pressures for hygroadjustable airvent.*

 *New project to develop the right protocol ? **To be continued...***



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Visual control of the ventilation system

 *Standards didn't match our purpose.*

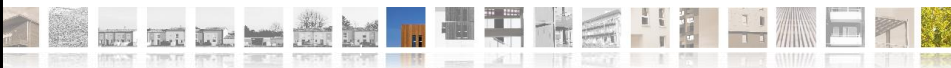
 *Writing a protocol files completing standards based on several existing protocols:*

 *Diagvent method (used to do an audit on a existing ventilation system)*

 *Or the protocol used by the government to control the application of Building Rules.*

 *In 2014, start of a project to test the reliability of this method.*

 *The final purpose is to transcript this protocol into a standard*





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Conclusions

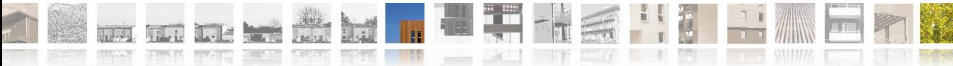
 *All the results show an impressive improvement of building airtightness.*

 *Besides, professionals shows no animosity to this evolution because they learn new skills, learn to work in teams and because they can participate at their scale to the global warming prevention.*

 *Feedbacks from certified buildings showed that it's possible and cost effective. This two results were key factors to convince all the professionals to go further.*

 *We observe the same acceptance for ventilation network airtightness requirements :*

No one can be against works quality improvement....



Association Effinergie



Build and refurbish better to protect environment...

Questions ?...

