USE OF ECONOMIC INSTRUMENTS FOR SUSTAINABLE CONSTRUCTION AND CHALLENGES FOR 2010 IN PARIS REGION

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Abstract

Purpose of the paper will be to stress the economic results of two forecasting surveys conducted by ARENE " HQE** challenges for 2010 in the Ile-de-France Region" and "use of economic instruments in accelerating the diffusion of sustainable construction".

1/ «HQE Challenges 2010 in the Region Ile-de-France » :
This survey presents the overall reduction in environmental impacts, the economic benefits on energy, waste, water and greenhouse gas emission as well as the job creation that would result from individual eco-building initiatives spreading in the period leading up to 2010.
As regards methodology, the survey firstly calculated energy and water consumption and maintenance costs per 11 major sectors of buildings for 1999. Secondly, we have estimated the consolidated impacts for the region in 2010 using a will-driven scenario.

2/ "Use of economic instruments in accelerating the diffusion of sustainable construction"
- present American and European cases of economic incentives beyond direct funding or subsidies directed toward building owners, developer or occupants like tax abatements, specialized investment fund, preferential credit conditions, improved mortgage conditions… or directed toward construction companies or architects with lower insurance premium, lower VAT on ecological materials…
- the findings show to the contracting authorities the different arguments of economic gains resulting from sustainable construction using such instruments, instead of providing classical subsidy programs. A return of experience concerning the frequency of application and number of countries involved as well as the length of use such instruments in the building sector is also available.
- the instruments involve the development of new partnerships between private and public players like loan co-bonus, public funds with private participation, or external energy contracting, as the ones currently in thought by the region Ile-de-France to reinforce market drivers to contribute to the emergence of an eco-region with widespread sustainable construction.
Furthermore, the paper will mention in figures some direct economical benefits to the tenant or the user of a sustainable building and the indirect benefits for the local community with job creation, cutting back of public health spending, improvement of the local environment.

1. Introduction

The "HQE" (High Environmental Quality) approach focuses within 14 targets on criteria for reducing consumption of natural resources and the discharge of pollutants (eco-construction and eco-management) as well as for enhancing the comfort and the health conditions of buildings. It concerns especially the design and the construction phases both of refurbishment and of new building projects.

To promote this approach among public authorities (departmental (county) councils, communes (municipalities), social housing backers) or private contracting authorities (banks, enterprises, developers), the ARENE proposes innovative tools in the field of technical assistance, networking and education of key players.

1. HQE challenges for 2010 in the Ile-de-France Region

The aim of that survey was to present the overall reduction in environmental impacts, the economic benefits on energy, waste, water, and greenhouse gas emission, and the job creation that would result from individual eco-building initiatives spreading in the period leading up to 2010.

For this purpose, 11 sectors (individual housing, social housing, private collective housing, offices, secondary schools, primary and nursery schools, health, gymnasiums, swimming pools, canteens) and 7 environmental themes energy, water, maintenance, building site, noise and comfort, materials were examined both for new building and for refurbishment.

Two development scenarios:
- an approach driven by strong political will: 100 % of the new construction or refurbishment operations between 1999 and 2010; and
- a more gradual "going with the flow" approach taking account of the commitments already made, and of the growing awareness of the players, with the following hypotheses:
  - 100% of the new and refurbished "lycées" (high schools/sixth form colleges) by 2006;
  - 70 to 80% of new or refurbished secondary schools and indoor swimming pools, and of new primary and infant/nursery schools by 2010;
  - 20% to 40% of new or refurbished sports establishments and social housing, and of refurbished primary and infant/nursery schools by 2010; and
  - 3 to 15% for new or refurbished offices, individual and collective private housing, healthcare establishments, and canteens by 2010.

As regards methodology, the survey firstly calculated energy and water consumption, and maintenance costs per major sector of buildings for 1999 in the Ile-de-France Region.

Secondly, working hypotheses were adopted concerning the unit consumption and spending for a building of the eco-building (HQE) type, compared with a conventional reference building.

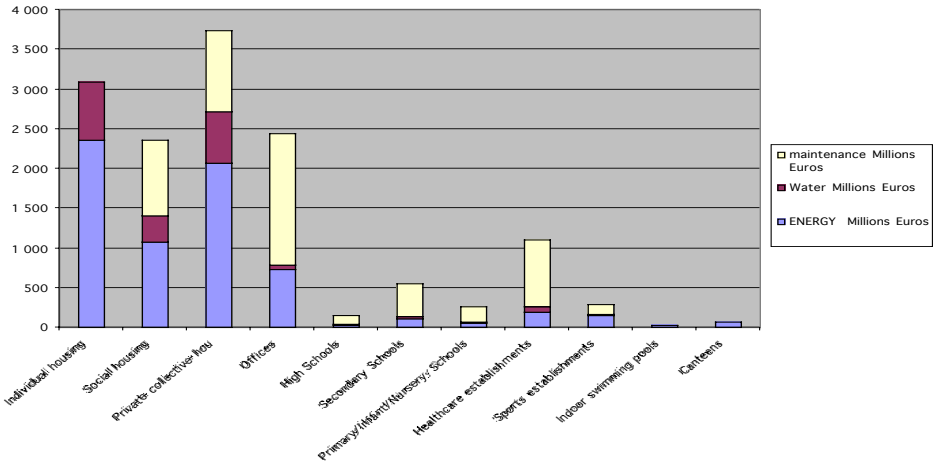
Using this database, the survey was then able to explore two types of results:
- the total cost of an HQE operation with the cost per metric ton of carbon avoided, as calculated for each standard building of each of the sectors; and
- the consolidated impacts of generalising the HQE approach throughout Ile-de-France in 2010 in terms of overall savings in energy, in water, and in site management…

The impacts of HQE (eco-building) for the Ile-de-France Region in 2010 using the will-driven scenario
- 30% energy savings in the residential and tertiary sectors;
- 40% of the target for reduction of national greenhouse gas emissions, converted to regional level, i.e. 1.6 million tons of carbon avoided;
- 16% drinking water savings for the sectors surveyed (100 million cubic metres per year);
- a saving of 228 euros per year and per capita on the operating costs and maintenance costs for the buildings of the 11 sectors in the survey, i.e. as much as the annual budget of the Regional Council of Ile-de-France;
- savings on building waste management through sorting and selective demolition;
- greater use of recyclable materials and of renewable raw materials, such as wood;
- a reduction in the noise levels in housing, with 60,000 fewer people complaining about noise;
- a reduction in occupational accidents on building sites through quality approaches;
- 40,000 direct or indirect jobs generated for the building work and the infrastructure and fittings work, the average extra cost of HQE investment being 49 euros per square metre built or refurbished;
- average savings (net of depreciation) of 2.3 to 4.6 euros per year and per square metre built or refurbished; and
- overall, net savings (5% updated) of 8.2 billion euros over 15 years for an HQE investment for the period 2001-2010 of 17.5 billion euros.

The gradual “going with the flow” approach would make it possible to achieve only 10% of these potential savings. The largest percentage savings can be expected from teaching establishments, but in terms of volume, housing is the most promising sector for overall savings.

In all, the operating or usage savings for a building can reach 6.1 to 9.15 euros per square metre built or refurbished per year.
Such savings represent, for example, 8 to 10% of the cost of a social (subsidised low-rent) dwelling (rent + service charges): HQE could offer its occupants one month's holiday from rent per year!

Regional spending in millions euros by sectors



The results of the survey show the importance of global potential savings generated by HQE. In complement of the usual policy measures concerning regulations or information tools, the level of needed subsidies to cover the first over-prices of investments for more environmental friendly building appears like a wrong question.
This is the reason why the ARENE has investigated the interest and importance to use other economic instruments as only the usual public subsidies programs.

2. Economic instruments for sustainable construction

Even if they are much more superior to the costs, the economic benefits of sustainable building usually don't motivate enough the decision-makers. One reason of this, is that the contracting authorities when they don't occupy themselves the premises or the dwellings recoup only a small part of the direct economic benefits. The occupants receive a bigger part of the direct benefits through the gains on operating costs. Secondly, the decision-makers don't get any profit of the global benefits for the local community.

To get round this difficulty, several economic and financial instruments could be set up in France or in others countries. Today the most current approaches are coming from the public authorities with fiscal tools and subsidies.

For this purpose, a study was commissioned by the Paris Region Environmental Agency to gather information about possible uses of economic and financial instruments in accelerating the diffusion of sustainable construction

It was prepared by the research and consulting firm RDI- Recherche Développement International (www.rdi_consultant.com), on the basis of a questionnaire survey submitted to selected experts, primarily based in Europe and North America in mid June 2003.

Some 70 contributions from 12 countries (Belgium, Canada, Denmark, Finland, France, Germany, the Netherlands, Norway, Sweden, Switzerland, the United Kingdom, the United States) provided relevant information.

Economic and financial instruments considered are either already in use or being studied for possible future application.

2.1 Classification of instruments in 10 categories with examples

2.1.1 Preferential credit conditions for sustainable buildings

- Improved mortgage conditions (e.g. "energy-efficient mortgages"; mortgages extending this rationale to other sustainable building features)
- Financial assistance for social housing awarded under specific sustainable conditions.

In Canada, Green Mortgage proposes reduced interest rate mortgage for homes built or upgraded to energy-efficient Green Home standard. (eg : Yukon Housing Corporation, Caisse Desjardins)
In France, the Banque Populaire du Haut Rhin has created the Prévair: preferential green loans offered on the basis of a list of sustainable building criteria
The German Kreditanstalt für Wiederaufbau KfW has a CO2 Reduction Programme as well as a CO2 Building Rehabilitation Programme; OekoGeno (ex Oekobank) proposes also: preferential green loans
Most of the 24 County Banks in Switzerland offer green mortgages or energy – efficient mortgages.
In United States, HUD's Energy-Efficient Mortgages Program enables the financing of adding energy-efficiency features costs) ;
In United Kingdom, the Ecology Building Society, is a mutual organization founded in1981, who grants mortgages for ecological renovations, energy efficient housing, etc

2.1.2 Reimbursement rebates and investment aid offered by water or energy utilities, equipment suppliers, etc

- Free water or energy audits
- Rebates or "Cash-back" schemes (e.g. for the purchase of water or energy efficient appliances, insulation materials, etc)
- Credit solutions offered for customers investments (e.g.: adapted leasing)
- Internal performance contracting

In Belgium Electrabel (Suez Group) offers subsidies and paybacks to customers installing solar heaters
In France the Energy service companies (ESCO) bundle lease offer to finance customers energy savings investments with energy management service offer
In Germany municipal enterprises in Germany (Stadtwerke) offer solutions to customers for financing energy – efficiency or water – saving investments. At the same time, several big municipalities like Stuttgart, Berlin has developed energy performance contracting between several departments within the city administration
In United States, several US electric utilities offer free energy audits relates on thermal in salutation material and reduced interest loans for insulation work. (e.g.: Seattle, Portland)

2.1.3 Preferential insurance conditions for sustainable buildings; new insurance products

- Lower insurance premium for sustainable building owners or occupants, for professional liability
- Insurance covering the predicted performance of Green buildings (e.g.: "energy-savings insurance", "indoor air quality insurance", etc)

In United States, Hanover Insurance Company: 10 % credit on homeowner property insurance premiums to energy – efficient homes); insurers in Massachusetts have offered 10 % discounts to people who take a free 6 h course in weatherization, home repair, etc; a one-time credit of 10 % offered on Professional Liability policies to architects and engineers who receive training in building commissioning; the Building Air Quality Alliance and the Clair Odell Group have developed an IAQ risk assessment protocol and an IAQ insurance policy ; Willis Corroon is developing a new type of IAQ policy (bundling insurance with audits and guidelines)

2.1.4 Setting up specialized funds for sustainable construction

- Investment funds
- Guarantee funds

In Canada, the "Energy efficiency fund" has been launched in 2000 by Quebec energy utility to help finance energy efficient social housing, individual houses and commercial buildings.
In Germany, Kreditanstalt für Wiederaufbau KfW: financial funds for energy – efficient buildings
In Netherlands, trio des Bank has a special fund for social and environmental projects
In Switzerland, Geneva County "Energy policy fund" offers reduced interest loans and guaranties to builders of energy – efficient individual houses and apartments buildings
In United States, the Green Building Loan Fund (CL Fund) assist building owners with the implementation of green building practices; the Kresge Foundation also offers financing for green buildings
In United Kingdom Aston Reinvestment Trust, a social investment fund makes loans to housing organization based in Birmingham

2.1.5 Fiscal bonus for the construction or renovation of Green buildings
- Tax abatement (e.g.: property tax, income tax, business tax, etc)
- Tax credits for specific investments; lower VAT on ecological materials
- Exemption or reduction on specific tax or charge (e.g.: for solid waste or wastewater)

In Belgium, tax credits offered by the Belgian federal government for 7 energy efficiency measures in building
In France, 15 % income tax credit for households investing in solar heaters, thermal insulation material; property tax credit considered for social housing (based on green building criteria)
In United States, New York State Green Building Tax Credit Legislation.
In United Kingdom, Lower VAT rate for energy efficient construction materials.

2.1.6 Heavier fiscal burden on non- sustainable construction
- Tax on virgin building material extraction
- Tax on water or energy consumption

In Denmark, tax on virgin building material extraction.
In Netherlands, « Regulatory Energy Tax » - REB on households; landfill tax
In Sweden, tax on virgin building material extraction; carbon dioxide tax on households
In United States, "Deposit and refund" program to encourage the recovery of construction & demolition debris (San Jose); EPA penalties against companies failing to control erosion and manage storm water at construction sites.
In United Kingdom, tax on virgin building material extraction

2.1.7 Grants, subsidies
- Grants for professionals (e.g.: incentive for training in sustainable construction practice)
- Subsidies to building owners (e.g.: to help obtain sustainable construction-related certification)
- Competition for social housing construction subsidies based on sustainability criteria

In Canada, Commercial Building Incentive Program; Subsidies for training and R-2000 certification.
In France, grants and subsidies for investments in energy efficiency and renewable energy (new and existing buildings)
In Netherlands, financial help for green buildings; CO2 reduction programs
In United Kingdom, financial help for training social housing corporation personnel to become qualified Eco-homer Assessors
In United States, the State of Massachusetts offers subsidies for LEED certified buildings; the City of Seattle provides financial help to pay for consulting

2.1.8 Developers awarded added density allocations (density bonus) for sustainable buildings; accelerated building permit processing for sustainable construction

In Switzerland, density bonus applied in the County of Vaud (Lausanne), being discussed by the Parliament of Geneva.
In United States, density bonus applied in Arlington County – Virginia, under study in Seattle and Santa Monica; accelerated building permit process established in several US cities.

2.1.9 Business rating indexes stipulating specific sustainable building management criteria - among criteria used to assess the sustainable performance of firms

In Finland, a rating system is developed for construction and real estate firms.
In Germany, the OEKOM rating agency asks companies one global question: "have they established environmental guidelines for facility management?"
In Switzerland, Crédit Suisse integrates building environmental and energy management data on building management in its "Energy and materials" report.

2.1.10 Trade of CO2 – Certificates

In Germany, some preliminary discussion by the Gesamtverband der Wohnungswirtschaft
United States New Jersey, Michigan and Texas have an open market emission-trading program.

In United Kingdom, some preliminary discussion on a system involving energy distributors rather than building owners; the Department for Environment Food and Rural Affairs considers a system of tradable permits for construction & demolition waste following the recent “Consultation on the landfill allowance-trading scheme”.

2.2 Return of experience available per instrument type and their effectiveness

The following table summarizes return of experience available per instrument type, combining a "level of application" indicator (frequency of application and number of countries where applied) and a "length of use" indicator.

Level of application in the building sector	Length of use in the building sector		
	First applications in the 1980’s or earlier years	First applications in the 1990’s or early 2000’s	Still under study
Multiple applications in several countries*	Grants, subsidies Fiscal bonus (energy-related) Reimbursement, rebates, etc by utilities or suppliers Energy efficiency mortgages Specialized funds (energy aspects)		
Intermediate application level**	New insurance products (energy-savings insurance) Heavier fiscal burden on non-sustainable construction	Specialized funds for sustainable construction Fiscal bonus (non-energy-aspects) Improved mortgage conditions (non energy-aspects)	
Limited application***	Preferential insurance conditions	Density bonus Accelerated building permit processing	
Not applied yet			Financial assistance for social housing under conditions New insurance products (indoor air quality) Trade CO2 -Certificates Improved business rating indexes

* Applied in most countries surveyed; several hundreds or thousands cases
** Intermediate situation; only a few countries concerned
*** Only a few cases identified (in 1or 2 countries).

According to our contacts, only a limited number of evaluation studies are available to assess the impact of economic and financial instruments on the construction sector (e.g.: Faesy, 2000, from Vermont Energy Investment Corporation with the assessment of the energy efficient mortgages or Mills, 2002, from Lawrence Berkeley National Laboratory for insurance loss prevention through sustainable technologies and practices). The assessment of the KfW-programme to CO2 reduction has demonstrated the financial incentives of the credits grants for the refurbishment of private homes. It contributes also to restrain unemployment in the building sector.

The expert opinions usually point that flexible economic instruments can have a positive effect of transforming the market. More than taxes or capital subsidy programmes, they offer a leverage effect on pro-active players and the running cost of administration for public bodies compared to traditional economical instruments are reduced.

2.3 Public and private players involved, current involvement levels

Both public and private players contribute to the availability of economic and financial instruments for sustainable construction. Contributions per instrument category are summarized below:

Categories of economic and financial instrument.	Proposed by public organizations or institutions	Proposed by private players
1 – Preferential credit conditions for sustainable buildings	Additional bonus is sometimes offered by public sector players	Traditional banks, “new banks”*
2 – Reimbursement, rebates and investment aid offered by water or energy utilities, equipment suppliers, etc		Energy and water distributors, energy service companies, equipment and material suppliers
3 - Preferential insurance conditions for sustainable buildings; new insurance products		Insurance companies
4 – Setting up specialized funds for sustainable construction	Public sector players sometimes offer co-funding.	
5 – Fiscal bonus for the construction or renovation of Green buildings	National (sometimes state) or local	
6 – Heavier fiscal burden on non- sustainable construction	National (sometimes state) or local	
7 – Grants, subsidies	National (sometimes state) or local	
8 – Density bonus and/or accelerated building permit processing	Local authorities	
9 – Business rating indexes including sustainable building management criteria		Business rating firms
10 – Trade of CO2 – Certificates	Public operator of trading scheme	Private operator of trading scheme

* Newly founded financial institutions, specialized in sustainable economic activities (such new players are, in Europe, often member of INAISE, a network of financial institutions working for positive social and environmental change).

One or several active public players can be identified among national, regional or local public organizations or government bodies in most responding countries.

The current situation regarding private sector players is more varied: overall involvement levels vary among player categories and between countries (following table)

Categories of private players	Involvement level	Examples of leading countries
Traditional banks	***	Switzerland, Netherlands, United States, France
“New banks”	***	Germany, Netherlands, Belgium, United Kingdom
Energy distributors	***	Germany, United States, Belgium
Water distributors	**	Germany, United States
Energy service companies (ESCO)	**	United States, France, United Kingdom
Facilities Managers	**	Netherlands, Finland, Sweden
Equipment and material suppliers	**	Most countries
Insurance companies	*	United States
Private foundations	**	United Kingdom, United States
Business rating firms	-	Sweden, Finland (methodological aspects)
Private operators of certificate trading schemes	-	United States

*** 10 or more players belonging to this category offer economic or financial instruments for sustainable

construction; ** Intermediate situation *Only a few “pioneer-type” players identified
- no player in active operation (future involvement under study).

As we see, private players are offering a raising number of instruments. Sometimes the public authorities imposes the involvement of private players for example through the law or with economical incentives promoting the regulation demands by final users asked by public regulators toward water or energy suppliers. Both public and private players could be also associated e.g. for loan co-bonus or private funds with public participations.

2.4 Outline of some economical benefits

Certain benefits, profits relating to the cost of operation, are rather easily measurable, while others can be estimated only using more complex methodologies. The studies available provide first global figures showing that the benefit are definitively higher than the costs, in particular for items like health, productivity, energy and maintenance.

The report to California’s sustainable building task force (October 2003) shows that the net present value (up-dating rate of 5% per annum) of the profits cumulated over 20 years for 33 Leeds buildings is more than ten times higher than the over-costs compared to a traditional building.

If one transposes the data estimated for the United States (“health and productivity gains from better indoor air environments”, W. Fisk, Lawrence Berkeley, National Laboratory, 2003) in the French case, the annual total layer of economies relating to the expenditure of health, thanks to a better indoor air quality could be at first approximation from 2 to 7 billion euros.

In addition the construction and the equipment of sustainable buildings can create thousands of new employment, because the sectors concerned require a higher rate of labour by ex, 12.000 people work in Germany in the field of the green roofs, and 60.000 jobs were created in 10 years for rainwater harvesting.

Conclusion

The ARENE, acting as interface between demand that has been growing strongly for the last 5 years and supply, architects, design offices, and builders, is thinking now about the contribution of economic instruments within a regional strategic development plan involving private players like bankers, insurance companies, energy providers in co-operation with the Regional Council Ile-de-France.

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