Schiltigheim, France
Energy performance contract
for 64 social dwellings

Detailed project presentation

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Content

1 Main features of the contract

On 8 July 2011, ICF Nord-Est signed with SPIE the first energy performance contract with third-party investment in social housing in France.

The Schiltigheim contract consists of several aspects:

- Refurbishment works for the classic comfort upgrading of the dwellings and common areas
- Energy renovation with massive investments on the building shell to achieve a guaranteed level of energy performance
- Energy performance guarantee for the buildings for 19 years, through an operation and maintenance contract
- Financing of energy renovations, which are progressively repaid by ICF on condition of achieving the guaranteed energy performance

The energy performance before (estimated) and after works (guaranteed) are the following (the decomposition is indicative, the guarantee is global for heating, domestic hot water and ventilation, and for all dwellings):

Energy consumption (kWh primary energy / m² gross area)	**Guaranteed performance**	**Initial audit**	**Estimated savings**
Heating (electric)	86,0	165,0	-48%
DHW	30,1	65,0	-54%
MCV	10,0	9,5	+5%
Total consumer guarantee	**126,1**	**239,5**	-47%
Lighting (outside of guarantee)	7,8	7,8	0%
Equivalent in TH-C-E ex (legal calculation tool for renovations)	**133,9**	**247,3**	-46%

Under current regulations, the Schiltigheim EPC is not, strictly speaking, a mechanism in which the repayment of energy investments is based on energy savings. The EPC enables to outsource investments that are subject to a deferred payment by the housing company, together with penalties for non-achievement of energy performance. The energy savings recouped from tenants by the housing company finance only a small proportion of the investments.

The Schiltigheim EPC is the result of a study conducted for two years by ICF group to define the content and modalities of EPC's in social housing and to implement it on a pilot site. It is a practical example illustrating the reflection carried out at national and European level, and shows the legal and economic feasibility of alternative financing for energy renovation of social housing.

Like any prototype, this first contract needs to be greatly improved, which can only be done through the replication of such EPC projects. ICF has published two documents[1] (available only in French so far) designed to facilitate the spread of EPC's in social housing:

- A guide to the implementation of EPC's in social housing
- 19 propositions of legal evolutions to facilitate the implementation of EPC's.

[1] In the frame of a funding by the Intelligent Energy Europe programme (FRESH project, www.fresh-project.eu) and by ADEME, the French Agency for Energy and Environment.

2 Signatories

ICF Nord-Est

ICF Nord-Est, a subsidiary of ICF and the SNCF, has a housing stock of nearly 20 000 apartments in the north and east of France.

The ICF Group, with nearly 100,000 homes in France, including 80% social housing, is the third biggest housing company in France. The housing stock consumes an average of 195 kWh / m².a and greenhouse gas emissions account for 0.05% of French annual emissions.

The ICF Group is engaged since 2007 in an energy strategy for its housing stock which aims to divide by 4 emissions of greenhouse gases by 2050 and to renovate by 2020 all dwellings labelled E, F and G by the Energy Performance Certificate, i.e. 23% of the stock.

The implementation of the Schiltigheim EPC is part of this strategy and aims to explore new ways of financing to meet the massive investment required for the energy renovation of existing housing.

The project was carried out by ICF Nord-Est with technical assistance from the Department of Real Estate (ICF Group) and Azan Lawyers, Best Energies for the technical and energy aspects, and ICE (Burgeap Group) for the financial part (ICE is also the coordinator of the FRESH project).

SPIE Est

European leader in electrical engineering, mechanical and climate, energy and communications systems, SPIE enhances the quality of life by assisting communities and businesses in the design, implementation, operation and maintenance of more energy efficient and environment-friendly facilities.

The organization of SPIE is characterized by regional branches and specialties, forming a local network of some 400 local offices. Each subsidiary operates in one geographical area suitable for its markets.

SPIE Est employs 2000 people, a turnover in 2010 of 268 M €. SPIE East occupies the eastern regions of France, through 32 locations.

3 The site

The contract covers 64 units built in 1984 in Schiltigheim, a suburb of Strasbourg. Energy consumption is estimated at 247 kWh/m².a according to legal calculations for major renovations. The tables below show the original situation.

General information

Owner :	ICF Nord-Est
Address:	32 rue Léo Lagrange, 67 300 Schiltigheim
Region:	Alsace
Climate:	Continental climate (Zone H1)
Year built:	1987
No. of units:	64
Type of dwellings:	- 1 studio (29m ²) - 7 one bedroom dwellings (61m ²) - 20 three-room dwellings (76m ²) - 23 four-room dwellings (96 m²) - 11 five-room dwellings (119 m²) - 2 six rooms dwellings (124 m²)
Buildings:	3 4-storey buildings, 1 7-storey building
Living area:	5 725 m²
Gross area :	6 781 m²

Initial energy performance

Energy consumption (kWh primary energy / m² gross area)	**Initial audit**
Heating (electric)	165,0
Domestic Hot Water (DHW)	65,0
Mechanically controlled ventilation (MCV)	9,5
Lighting	7,8
Total	**247,3**

Assumptions used

Variables	**Assumptions in the audit**
Heating degree days	3012 heating degree-days to 18℃ (average value from 1950 to 1981)
Maximum internal temperature	19 °C (default)
Number of occupants	202 occupants
Annual volume of domestic hot water	2108 m3 for 202 occupants

4 Content of the contract

4.1 Works

Refurbishment and comfort works

A complete refurbishment in planned on these buildings, including the building envelope and the dwellings.

Durability of the dwellings:

- Upgrading of the electric circuits
- Replacement of all plumbing fixtures
- Replacement of soil and paint if necessary


Residentialisation, safety and customer-friendliness of the common areas:

- Creation of a counter for the local concierge
- Improved aesthetics and security of the halls of buildings
- Improved access to all buildings, the entrance of the main building will be made accessible to persons with a disability


Renovation of the facade on rue de la Gare

Renovation of the facades on the inner yard.

Energy conservation measures

Building components	Initial State	Final State
Exterior wall	Concrete of 29 cm and 21 cm (LEIGA system with 7 cm polystyrene insulation incorporated	Adding insulation glued / pegged panels of expanded polystyrene of thickness 160 mm in Th38 for common surfaces
Roofing	Interlocking tiles with interior insulation of 5 cm polystyrene	Addition of 100 mm of polyurethane insulation panels with R = 4.25 m2/W.K
Ground floor	Concrete slab (system Leiga) on cellar and parking with a thickness of 23 cm	Addition by spraying mineral wool 100 mm
High-floor under attic	Reinforced concrete with glass wool insulation of 10 cm in bulk	Replacement of existing insulation by the insulation in 2 crossed layers, each 100 mm thick
Windows	PVC double glazing 4/6/4 with non-insulated shutters	Replacement by PVC windows type T70 with Ug = 1.1 W/m2.K and Uf = 1.8 W/m2.K. Installation of one-piece rolling shutters in outside tunnel. Closing balconies with wood frames and creation of spandrels.
Landing doors	Non-insulated	Replaced with insulated doors
Thermal bridges	No specific treatment	Adding insulation glued / pegged expanded polystyrene panels 50 mm thick in Th38 for common surfaces
Air tightness of the building	No specific treatment	Improved, but no commitment (guarantee on results, not on means)
Heat production	Individual electric radiators	Replacement of existing convectors by radiant heaters and accumulators
Production of domestic hot water	Individual electric cylinders	Creation of a centralized gas production and a distribution loop.
Controlled mechanical ventilation	Simple flow, self-adjusted	Replacement of existing boxes by boxes with variable speed. Installation of hygro-sensitive air intakes (type B)

4.2 Performance guarantee

SPIE guarantees ICF Nord-Est the level of energy consumption shown below, which is called the "target":

Concerned uses	Annual value
Heating, DHW and auxiliaries	434 MWh final energy
DHW volume	2108 m3

Conditions for adjusting energy targets

The energy target guaranteed by the ESCO may vary according to two types of adjustment variables.

1. **Independent variables** are intended to evolve over the contract, giving rise to periodic adjustments (annual) of the target. They are:
   - The unified degree days: 3012 (1950a 1981)
   - Indoor temperature: 19 °C
   - The number of occupant: 202
   - The volume of DHW / occupant: 10.44
   - The base temperature: -15 °C
2. **Static factors** are considered stable over the duration of the contract said no periodic adjustment of the target will readjust their value permanently. They are:
   - Gross area
   - DHW temperature: 60 °C

The impact of each variable is defined by formulas.

Measurement and verification

The good implementation of the contract involves the establishment of a system of measurement and verification of energy performance following a MVP (measurement and verification plan) defined in the contract.

SPIE installs measuring devices to monitor energy and DHW consumption. Two electricity sub-meters are installed in the electrical panel of each dwelling in order to record the electricity used for heating. A power meter of the same type is installed in public areas of each building to meter the electricity consumption of ventilation.

A flow meter is installed in each dwelling to record the amount of hot water consumed. It can be used for billing.

A wireless temperature sensor is placed to continuously measure the temperature inside the dwellings. This information is used to assess the level of comfort in which each unit is operated.

The collection, transmission and use of all the above information requires an infrastructure with the following devices:

- a controller hub on each floor of each building
- 3G transmitter to transmit data to a central server
- a secured server
- a database such as Microsoft SQL server.
- Geographical location: a place not accessible to the occupants

Maintenance actions

The EPC is a form of global contract: SPIE must maintain the equipment that enables to meet the performance guarantee; i.e.:

- softeners,
- DHW preparers
- ventilation,
- disconnections,
- metering equipment (sensors, power meters, flow meters, ..)
- transmitters,
- data servers, hubs.

Regulators will be configured initially to 19 °C. Tenants will moderate this temperature if they wish, but may not go beyond 19℃ unless they make a specific demand; in that case, the guarantee energy performance will be adjusted.

Awareness-raising actions

Spie has subcontracted awareness raising actions to a local association called Le Frêne. The planned actions include:

- Sensitization of stakeholders on the site for a speech with just the people
- Organizing a lunch in the garden with workshops
- Writing a guide for the proper functioning of the refurbished dwellings
- Awareness workshops for children
- Awareness workshops for adults

4.3 Contract financing

Breakdown of costs

Total costs	20 years	Per unit	Annual costs
Refurbishment	1,236,750	19,324	/
Energy work	2,378,025	37,157	/
Operation	143,450	/	7,550
Maintenance	179,075	/	9,425
Total	**3,937,300**	**61,520**	**207,226**

Funding for initial investments

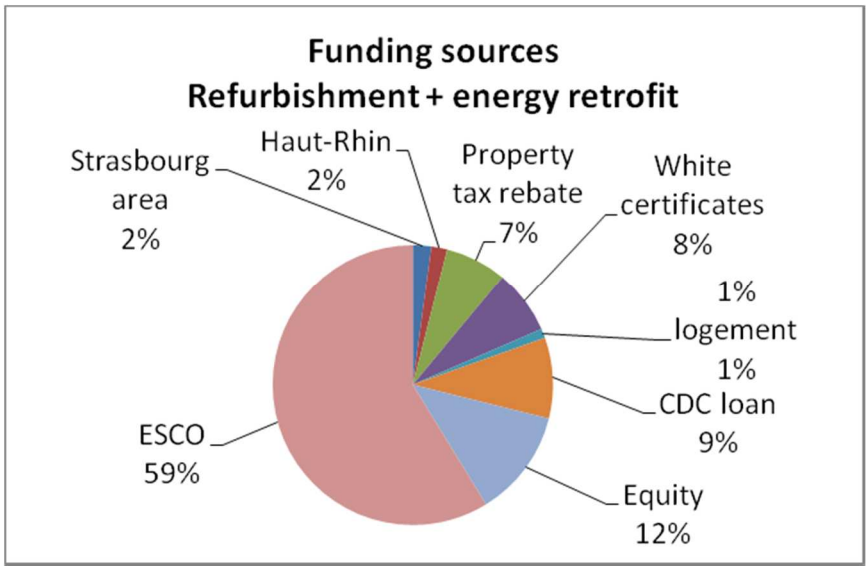
The works are funded by grants (20%), loans (9%), equity (12%), and third investment of up to 59%, i.e. the amount of the energy investments.

Grants from the Urban Community of Strasbourg (CUS) and the General Council of Bas-Rhin fund refurbishment operations. 1% Housing is the participation of private companies in social housing. As a counterpart of grants and 1% Housing participation, housing companies yield the right to attribute some of the dwellings.

The valuation of energy saving certificates (white certificates) is increased by the use of standardized operation form BAR-SE-03 (energy performance contracting), which improves by 60% the amount of certificates obtained.

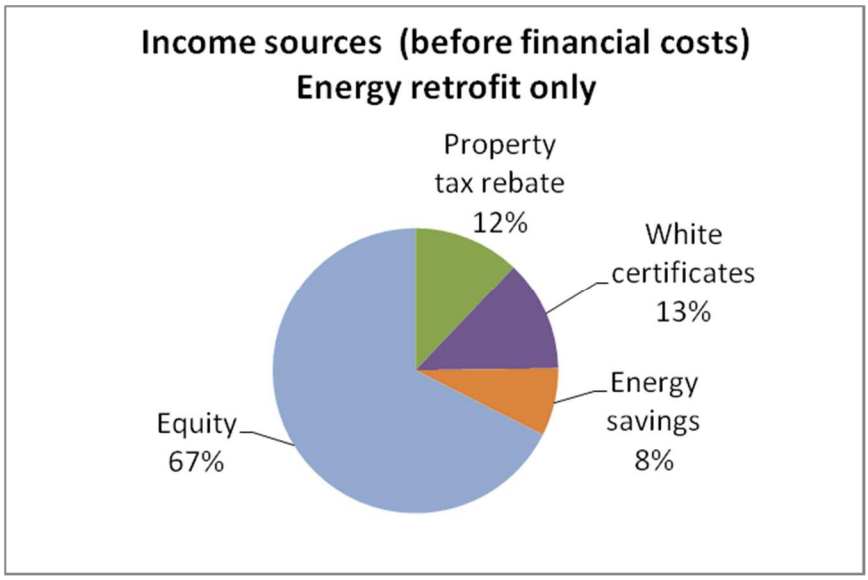
If we add the energy savings certificates and property tax rebates, we see that they cover 14% of total energy investments. These resources are collected by ICF in year N1 to N+3.

Sources	Amount	% of refurbt.	% of total
Grant CUS (7%)	€ 85 995	5%	2%
Grant Bas-Rhin (6%)	€ 73 710	4%	2%
Property tax rebates	€ 287 000	17%	7%
Energy saving certificates	€ 302 095	18%	7%
1% Housing (SNCF)	€ 43 200	3%	1%
Ready CDC 15 years - 3.6%	€ 376 553	23%	9%
Equity	€ 500 808	30%	12%
Amount of refurbishment	**€ 1,669,369**	**100%**	
Third-party financer	€ 2,378,025	/	59%
Total investment	**€ 4,047,394**		**100%**



Repayment of investment

Rents on the Schilitgheim site are all at the legal threshold and cannot be raised. The only direct revenue generated by investment is the “third line of invoice” (50% of energy savings), which in total over 20 years represents € 182 828, or 8% of total investments excluding financial costs.



5 Project Planning

Significant work was conducted early in the project to define the legal conditions for implementation of an EPC. A comprehensive legal diagnosis was made by Azan Avocats.

Once the site of Schiltigheim was selected, an important work of technical and energy diagnosis was performed. The diagnosis phase is particularly important for an EPC with a competitive dialogue, given that:

- The study costs are incurred by all candidates, it is more rational that the owner make available all the candidates as much information
- Due to the cumbersome procedures of dialogue, lack of information may jeopardize the schedule if candidates request it
- Trading on the costs can not be transparent if it is left no uncertainty on the building (strength, asbestos ...)
- Applicants committing to actual performance, they must agree with the diagnosis to reduce their margin of error, so it is essential to have detailed knowledge of the building in particular.

Stages	**Dates**
Project launch	June 2009
Selection of legal and energy consultants	September 2009
Legal feasibility study	September 2009 to March 2010
Selection of the Schiltigheim site	February 2010
Technical and energy diagnosis	February-May 2010
Invitation to Public Competition	April 2010
Selection of 3 candidates	June 2010
Transmission of tender documents for the competitive dialogue	July 2010
Site Visit for the 3 candidates	August 2010
First round of competitive dialogue	November 2010
Second round of competitive dialogue	March 2011
Receipt of final offers	April 2011
Tendering commission	May 2011
Meeting with tenants	June 2011
Contract signature	July 8, 2011
Achievement of the works (delivery by building)	January to July 2012

6 Legal analysis

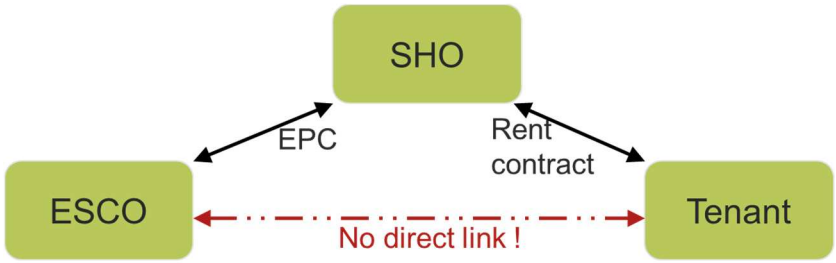
Legal relationship with the tenant

The EPC is not a tripartite contract between the landlord, the tenant and the provider, no direct legal link exists between the provider and the tenant. The EPC is based on two separate contractual commitments:

- The first binding the housing company and the ESCO in an energy performance contract (design, implementation, operation and financing).
- The second binding the tenant with a residential lease HLM classic.

The contractual chain thus formed allows the tenant to benefit from the energy savings. Energy services contracted by the housing company are then invoiced to tenant under the lease according to law, as is the case of all operating contracts.

In return, the housing company pays the provider, regardless of the payment of the tenant, and therefore takes the risk of payment default (as it does on the rental charges in all its buildings). The EPC does not entail any direct payment by the tenant to the ESCO.



A private law contract

ICF Nord-Est is a private social housing company with the statute of limited company (SA HLM). The contract is therefore a private contract awarded under the regulations for public procurement transposed from European rules. In France, the rules are different for public entities (e.g. State or local authorities) and entities acting with a mission of general interest (among which all social housing companies), who have to comply with the ordinance of 6 June 2005 and the decree of 30 December 2005.

The 2005 ordinance and decree do not prohibit deferred payments, unlike regulations for public entities which need to use a partnership contract (“contrat de partenariat”, i.e. the legal form for a public-private partnership).

It is therefore possible to implement an EPC in the frame of the usual procurement rules.

A design-build-operate contract

The EPC is a contract incorporating the whole chain that generates energy performance. Solidarity among the actors in charge of the design, construction and operation of the building is essential to ensure energy performance after renovation, and thus to secure cost savings for tenants and the amount of recouped savings.

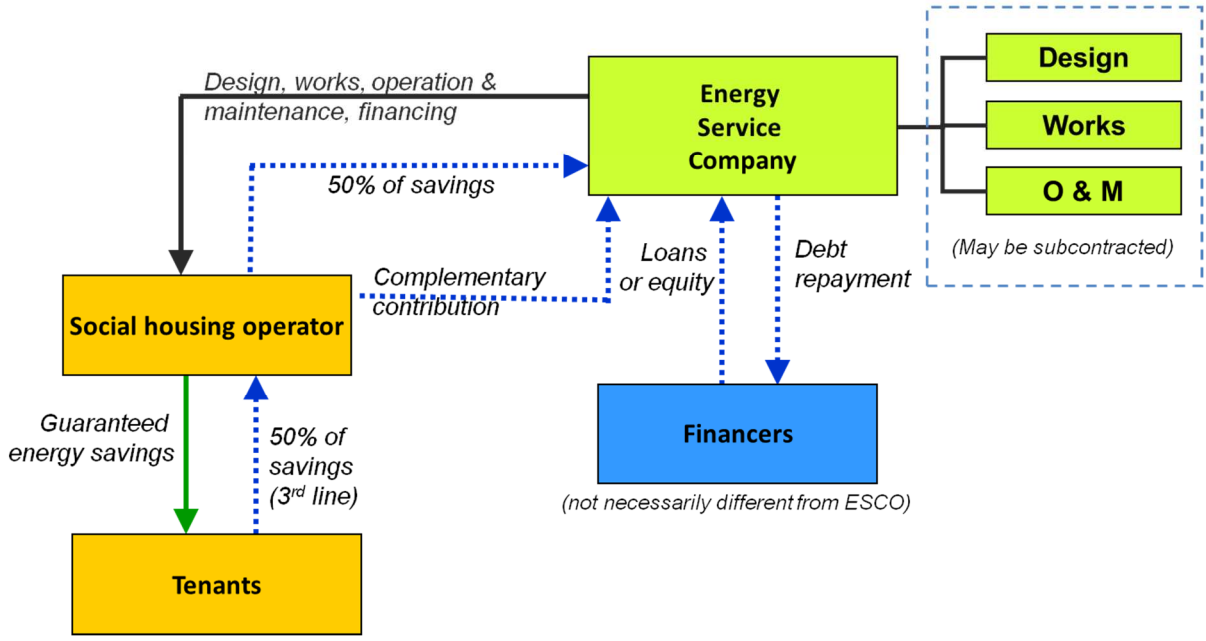
The design-build-operate contract is also a factor to optimize costs and performance constraints as construction and operation are integrated in the design. The competition in the competitive dialogue focuses on the energy performance and cost, but the means remain the choice of the ESCO who has an interest in rationalizing its choices.

Third-party financing

As part of the EPC, the investment is carried by another actor than the owner, SPIE, which acts as third-party financer.

Third-party financing helps businesses focus their investments on their core business and thus reduce their debt ratios. It is therefore a financial strategy that aims to outsource debt. Investment is repaid gradually through both energy savings and a deferred charge of the owner.

Financial flows in an EPC with third-party financing



Ownership of works

ICF Nord-Est is the owner of the works performed (insulation, heating, etc ...), even though payment is deferred in time.

Third-party financing does not result in the housing company paying a "rent" to a third party for using the insulation and the boiler room, but rather in a deferred payment of investments that are full ownership of the housing company. This deferred payment enables the third-party financer to carry the debt instead of the housing company.

Tax system

Social landlords benefit from a reduced VAT rate (5.5%) and a rebate on property tax on buildings equal to 25% of expenditures for energy conservation.

These tax benefits would be lost if the works were undertaken by a private actor and invoiced to ICF as a service; this would undermine the economic balance of the contract.

To maintain the tax benefits, the contract specifies that the third-party financer will not be owner or client of the works. The ESCO therefore carries out the works "in the name and on behalf" of the housing company.

Fiscal aspects have been validated by 2 tax rescript logged by ICF Nord-Est in 2010: one on property tax rebates, and the other on the applicable VAT rate. The positive result of these 2 rescripts is only valid for ICF Nord-Est, any other housing company would have to do the same request.

7 The role of tenants

Tenant participation in energy savings

Energy savings are realized by the tenant of its expenses, funding of the contract, at least in part, by the energy saving means of recouping energy savings to the tenant.

The MOLLE law of 25 March 2009 allows the housing company to recoup from tenants up to 50% energy savings for 15 years, through the payment of a "third line of invoice" (line 1 being the rent and line 2 being the rental charges).

Consultation rental Schiltigheim

The implementation of the third line of invoice has to follow a procedure for rental consultation, as with any project to rehabilitate social housing. Tenants have the opportunity, within a month after the consultation meeting, to vote against the refurbishment work. In the absence of opposition from a majority of tenants, the work is deemed accepted. Theoretically, the tenants can only oppose the works and the raise of the rent, not the establishment of a third of invoice: in reality, this element can influence their global vote on the project.

At the beginning of the project, a tenant survey was conducted to determine residents' interest in energy issues and in the refurbishment project. The social survey has shown a strong desire on the part of tenants to carry out works. It also identified an interest of tenants for saving energy and water.

Once the ESCO was selected through the competitive dialogue, an information meeting was held for tenants to present the overall project. Tenants were then asked to vote on the project, which was accepted.

Taking into account the behaviour of tenants

Energy efficiency of a building depends on the behaviour of tenants. SPIE therefore plans to raise the awareness of tenants on energy savings.

The performance guarantee is based on an assumption of 19℃ in the dwellings, the thermostat of radiators is capped at 19℃. Exceptio ns are possible, but they cause a change in the level of energy performance guaranteed.

The "deviant" behaviour, that is, those that result in excessive consumption are treated in several ways. Temperature sensors can detect too long temperature differences, which often correspond to a systematic opening of windows. In this case, awareness raising actions can be triggered.

Furthermore, when a dwelling has consumes no energy or twice the average, it does not count in assessing the achievement of objectives, so that the provider is not penalized for intentional wasteful behaviour.

Does the performance guarantee encouraged over-consumption?

One of the dangers of guaranteed energy performance is that tenants could feel they can consume as much energy as they want, because the extra consumption is paid by the ESCO.

In fact, the system is virtuous because billing is individual: electric heating, individual billing of hot water. Tenants pay their actual consumption, even in case of over-consumption. Penalties for the ESCO are triggered only if the total consumption of the 64 dwellings is above the target, so that over-consumption can be offset by under-consumption of certain tenants.

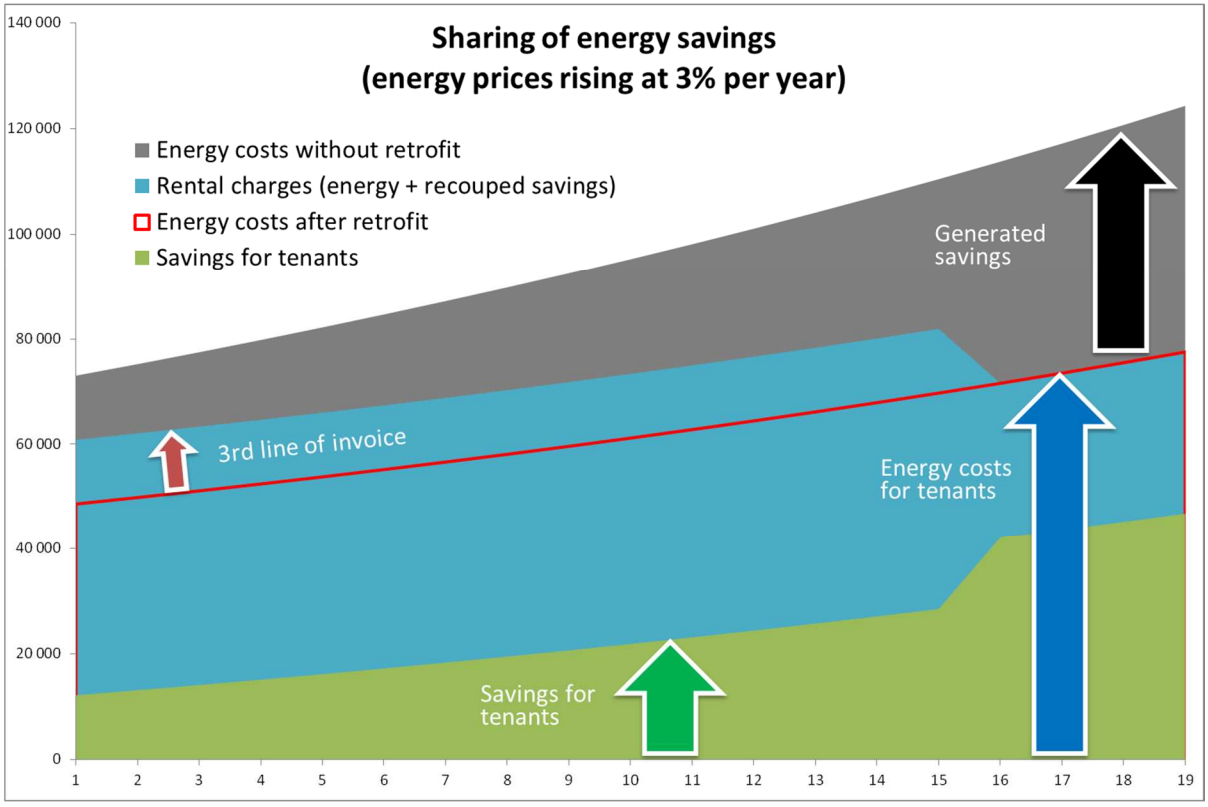
Penalties paid by the provider to the housing company in case of over-consumption are redistributed to all tenants. The system is virtuous because a tenant who over-consumes will receive only a small fraction (1 / 64th) of his extra consumption through the redistribution of penalties. There is therefore no incentive to over-consume.

The sharing of energy savings

The energy performance contract is expected to generate €24,377 savings per year for tenants, including operation costs which are recouped from tenants. Assuming an annual increase of 3% per year for energy prices (gas and electricity combined), and no inflation on operation costs, the investment generates a cumulative total of €658,456 savings over 19 years (i.e. 27% of investment costs).

From the generated savings, ICF Nord-Est will recoup under the "third line of invoice" €12,189 per year for 15 years, i.e. €182 828. The recouped savings correspond to 27% of the savings generated, and 8% of the amount of energy investments excluding financial costs.

In other words, only 27% of the monetary savings generated in the PEC can be mobilized by the housing company, which enables to pay 8% of energy investments, while the rest has to be financed through subsidies and the housing company's own funds.



8 The result of an innovation project

The Schiltigheim EPC is a prototype the aim of which is to demonstrate the feasibility of a new financing scheme. Like any prototype, it needs to be improved, which can be done only through the multiplication of EPC projects.

The diffusion of EPC's in social housing faces two major obstacles:

- The lack of interest of social housing operators for such contracts, related on the one hand to the absence of concrete examples, on the other hand to the complexity of EPC's for the building owner who wants to launch one
- The EPC in social housing is not organised by regulations, which poses legal and economic problems that are a barrier to diffusion.

In the frame of an European funding (Intelligent Energy Europe Programme) and national funding (ADEME), ICF has published two documents designed to facilitate the dissemination of EPC in social housing:

- a handbook for the implementation of the EPC in social housing
- proposals to the government to facilitate the implementation of EPC's in social housing in France

A project on a European scale

The Schiltigheim EPC was established in the European Project FRESH, which aims to test energy performance contracting with third-party financing in social housing in Italy, UK, Bulgaria and France.

Apart from ICF, the European partners are:

- International Energy Council (France), consultancy, project coordinator
- Places for People (UK), social landlord managing 58,000 homes
- Font Energy (UK), energy service company (ESCO)
- ACER Reggio Emilia (Italy), social landlord managing 5000 homes
- Bulgarian Housing Association (Bulgaria), engineering

The FRESH project is funded by Intelligent Energy Europe from June 2009 to May 2012. The exchange between European partners has helped to enrich the thinking and improve the content of contracts in each country, which are currently contracting in Italy and the UK. In Bulgaria, it was not possible to sign contracts an EPC as housing is composed condominiums and decision-making mechanisms are a major obstacle to the implementation of energy renovation projects.

Handbook for EPC's in social housing

The guide provides housing companies and energy service companies with the tools and methods to implement an EPC with third-party financing in social housing.

It is a 108-page document, published on the internet and available on the link www.fresh-project.eu/media/documents/files/Guide_EPC_en_logement_social.pdf.

The handbook is divided into five parts:

- The first part presents the energy consumption of the housing stock, its management and the challenges of energy renovation. It also identifies the main obstacles to improving the energy efficiency of buildings.
- The second part presents EPC's and how they can be implemented in social housing.
- The third section details the process of implementing an EPC. It explains concretely for the project manager what to do at each step.
- The fourth part presents the documents to be produced. It identifies and explains the difficulties to take into account when preparing these documents.

- Appendices provide example documents that can be used by all housing companies working on an EPC project:
    - Checklist for the client
    - Rules of Consultations for competitive dialogue
    - Model contract
    - Functional Program
    - Measurement and verification Plan (MVP)

19 propositions for the development of EPC in social housing

The Schiltigheim EPC identified a series of obstacles to implement EPC's in social housing. The 19 propositions list the obstacles and propose evolutions in the regulations for public authorities, who will judge their appropriateness. Some of these proposals were included in the report official report on EPC's commissioned by the Ministry of Ecology, Sustainable Development, Transportation and Housing to Olivier Ortega (March 2011). They are available online on www.fresh-project.eu/media/documents/files/Propositions_EPC_en_logement_social.pdf.

The proposals are organized into two parts. The first part proposes regulatory changes in response to obstacles met directly by ICF in the pilot project.

This includes putting in place the legal conditions in which energy savings can be mobilized to repay a significant part of energy investments, which is not currently the case. This could involve the creation of a status of "energy-saving service" for the EPC, or an increase in the third line of invoice through which the housing company could recoup a higher share of the energy savings. This would enable a more replicable financial model, funded mainly by energy savings and supplemented by government support (tax rebates, energy saving certificates) and the owner's investment for improving the market value of the building (based on a "green value" analysis).

In addition, the EPC will be attractive to social housing companies only if they can keep the tax benefits (property tax rebate and reduced VAT rate) and financial benefits (low-interest loans by the Caisse des Dépôts et Consignations).

The second part proposes measures to structure an EPC offer contributing significantly to the government's objectives as defined by the "Grenelle de l'Environment" laws. These would include the creation of public third party financers which can implement a large-scale financial engineering (in progress for the Ile de France and Rhône-Alpes regions), as well as the creation of a legal framework to manage the risks associated with EPC.

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