

## Refurbishment of municipal schools via Energy Performance Contracting - Paris, France

Population: 2,2 million inhabitants	Project signed on 15 December 2010	Grant from ELENA-EIB: EUR 1,377,000
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In its 2007 Climate Plan, the city of Paris commits to reduce energy consumption and GHG emissions in public buildings by 30% by 2020. Accounting for 20% of the municipal building stock and providing one of the best cost-benefit ratios in terms of energy savings, schools were chosen to benefit from a vast retrofitting programme.

In the framework of this programme, organised in the form of Energy Performance Contracts, 600 kindergartens and elementary schools are to be refurbished in successive lots that allow for learning and iteration. Beyond its climate action goals, the project aims at achieving financial savings, notably thanks to contractual guarantees related to final energy savings. The project benefits from the European ELENA-EIB technical assistance.

### 1. Business model: How the programme is implemented

School retrofitting programme:

- Objectives: **30% of energy savings** and a 30% CO<sub>2</sub>-emission reduction in public buildings by 2020, compared to 2004<sup>1</sup>.
- Schools are the most important category of the municipal building stock with 660 out of 2,500 buildings, representing over 20% of the municipal building stock. They yield one of the best cost-benefit ratios in terms of energy savings. Only some **600 schools** are however included in the retrofitting scheme, the others being either in need of deeper renovations or already show good energy performance.
- The 600 schools are divided in lots and are thus retrofitted in several phases. This allows learning and iteration throughout the process. The overall expected investment to be raised in the context of the technical assistance provided by the EIB (which covers 300 schools) for this project amounts to **EUR 180 million**, which corresponds to a leverage ratio of 131 for the ELENA grant awarded to the city of Paris –much higher than the minimal ratio of 20 required by the EIB.
- The retrofitting programme has been implemented through **Energy Performance Contracting<sup>2</sup> (EPC)**. This type of contract provides a guarantee on the final energy savings achieved and includes actions that vary from one school to another (from installing thermostats to heavy insulation).

Table 1.1: A repartition of Paris' municipal schools per energy performance label (source: Paris City Council)

Etiquette	A	B	C-	C+	D-	D+	E	F	G
Consommation énergétique En kWh <sub>EP</sub> /m <sup>2</sup> /an	< 50	51 – 110	111 – 160	161 – 210	211 – 280	281 – 350	351 – 540	541 – 750	> 751
Proportion d'écoles à Paris	0%	3%	19%	27%	34%	9%	6%	2%	0%

<sup>1</sup> Set by the *Plan Climat de la Ville de Paris*, 2007

<sup>2</sup> Energy Performance Contracting is a financing tool set by the directive CE 2006/32 of the 5 April 2006, which aims at easing energy efficiency actions for local authorities. Under an energy performance contract, "an external organisation (ESCO) implements a project to deliver energy efficiency, or a renewable energy project, and uses the stream of income from the cost savings, or the renewable energy produced, to repay the costs of the project, including the costs of the investment."

Table 1.2: The first two Energy Performance Contracts organised by the city of Paris as of December 2014

CPPE - “Energy Performance Partnership Contract”	CREM - “Conception, Implementation, Exploitation and Maintenance”
<ul style="list-style-type: none"> <li>- Type of contract: <i>Contrat de Partenariat et de Performance Energétique</i>, Energy Performance Public-Private Partnership contract</li> <li>- Signed in 2011 for a duration of 20 years</li> <li>- 1<sup>st</sup> lot: 100 schools (representative sample of all schools)</li> <li>- Initial refurbishment phase: EUR 34 million</li> <li>- Total cost: EUR 80million over 20 years.</li> </ul>	<ul style="list-style-type: none"> <li>- Type of contract: <i>Marché Public Global</i><sup>3</sup> (global procurement contract)</li> <li>- To be signed at the beginning of 2016</li> <li>- 2<sup>nd</sup> lot: 140 schools</li> <li>- Total investment: <i>not known at the time this document was prepared.</i></li> </ul>
<b>Financing:</b> <ul style="list-style-type: none"> <li>- In this contractual form, the contractor, NOV’ECOLES Paris, pre-finances the retrofitting of the buildings to deliver a minimum 30% reduction in energy savings and emissions.</li> <li>- Services provided by NOV’ECOLES include: <ul style="list-style-type: none"> <li>o Feasibility studies and conception</li> <li>o Improvement of the building envelop</li> <li>o Modernisation of the heating system</li> <li>o Installation of RES production units when suitable</li> </ul> </li> <li>- Upon completion of the initial refurbishment phase, the municipality pays a quarterly license fee, amounting to a yearly EUR 4.15 million payment to NOV’ECOLES Paris.</li> <li>- The penalty in case these savings are not delivered is equal to the additional costs for the city in terms of energy consumption (compared to what they would be if the savings were delivered), and of EUR 15 per tonne of CO<sub>2</sub> emitted beyond the 30% emission reduction threshold.</li> </ul>	<b>Financing:</b> <ul style="list-style-type: none"> <li>- The municipality is to pay upfront the investment needed to undertake the retrofitting work.</li> <li>- The money comes from the global municipal budget. There was no specific borrowing campaign for the CREM contract.</li> <li>- The contractor must get financial guarantees on the behalf of Paris municipality in case of underperformance.</li> </ul>
<b>External resources mobilised:</b> <i>Marchés publics d’assistance à personne publique:</i> legal, financial and technical assistance (during the consultation phase and the first two years).	<b>External resources mobilised:</b> <i>Marché public d’assistance à la maîtrise d’ouvrage:</i> legal and technical assistance (during the consultation phase).

A third EPC will be set up for the remaining 60 schools.

The first Energy Performance Contract, designated as CPPE, was signed in 2011, and takes the form of a Public-Private Partnership. It regards the first lot of 100 schools. The second one (CREM), which should be signed early 2016, takes the form of a global procurement contract, a tool that was not available in the frame of the French legislation back in 2011, when the CPPE was signed.

If for the CPPE the private contractor brought the initial capital, in the case of CREM, it is the city that pays the investment upfront. However, the contracts include the guarantees on delivered energy savings. The reasons behind the switch from one contractual form to another are that the private pre-financing of the actions cannot be presented as an asset in terms of accounting<sup>4</sup>. Besides, financial engineering is more complex for contracts such as CPPE.

For the CPPE contract, which is the only one tested so far, the process goes as follows:

- **Conception phase:** energy audits in schools, identification of the needed measures, etc.

<sup>3</sup> This contractual form allows the public authority to issue a single public procurement contract for all the steps (or less) to implement energy efficiency actions.

<sup>4</sup> Due to the *Arrêté du 16 décembre 2010* which states that the sum owed to the contractor by the public authority must be listed as debt in its books, decreasing the accounting benefit the Partnership Contract previously had in a context of tight public finances.  
<http://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000023274344>

- **Realisation phase:** the first lot finalised in 2012 regarded a representative sample of 45 schools and aimed at increasing their energy efficiency by at least 30%. Their energy consumption was reduced by about 33% for an investment of EUR 14.5 million. There are not definitive results for all the 100 schools yet.
- **Exploitation and Maintenance phase:** the private entity leading the works has a contractual obligation to organise awareness-raising campaigns for employees in every retrofitted school on the issue of energy savings (a measure designed to avoid rebound effect). During this phase, the contractor is entitled to maintain the installed equipment so that energy savings are actually delivered.

For the second contract, it is likely that the implementation process will slightly differ from the first one, notably because of the lessons learnt during the first phase of the programme. In the consultation phase for example, the city is now doing more to take into account the feedback from the school users.

Figure 1.1: Organisational chart of the CPPE contract (Energy Cities)

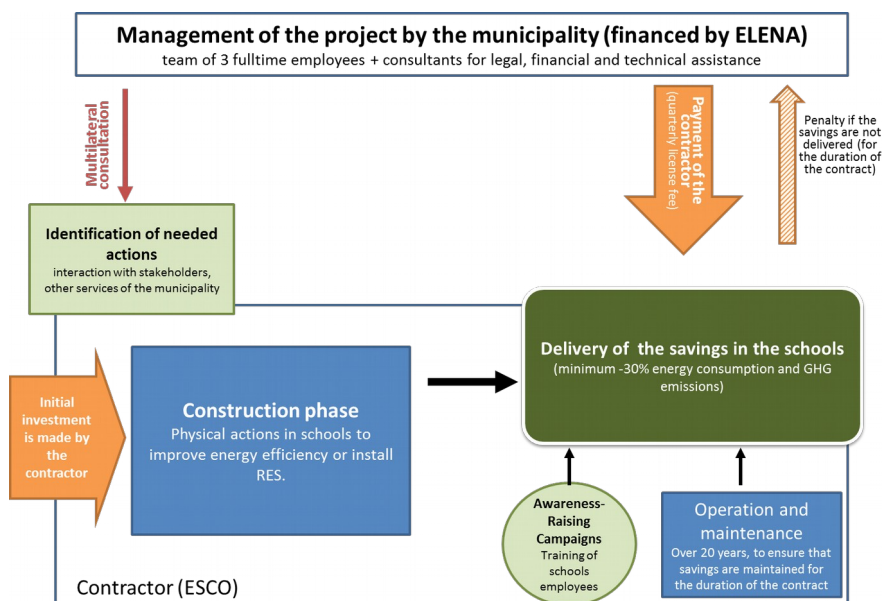
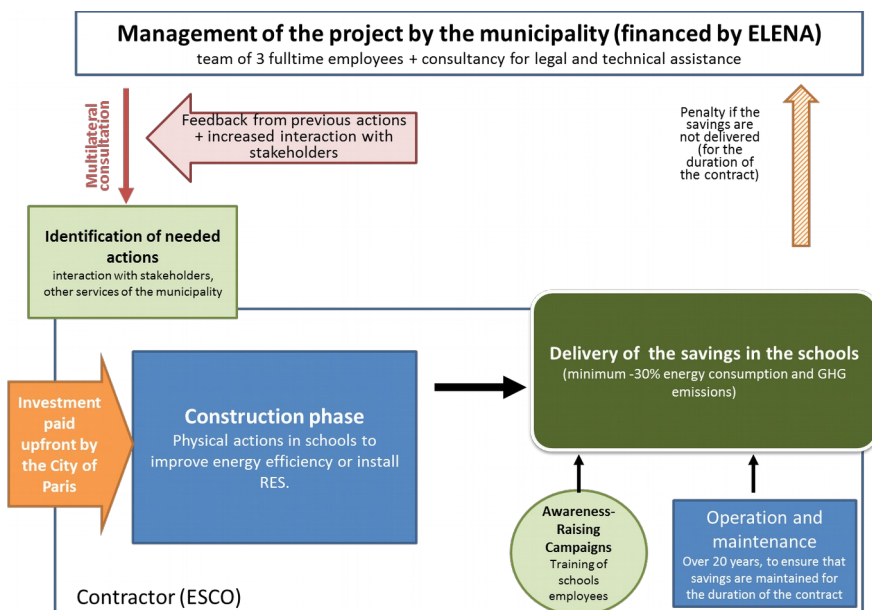


Figure 1.2: Organisational chart of the CREM Contract (Energy Cities)



## 2. Organisation & partnerships

The implementation of the programme is organised around a project management team within Paris municipality (*Mairie de Paris*), composed of three full-time municipal civil servants. This team is in charge of liaising with the city's external partners which include:

- The ESCO that implements the retrofitting programme - NOV'ECOLIS Paris was specifically created to serve the purpose of the project and its shareholders are the *Caisse des Dépôts et Consignations*, EDF Optimal Solution and Atlante Gestion. The conception, implementation and exploitation phases of the retrofitting of the schools is made by EDF Optimal Solution and the local business it is associated with (small and medium local enterprises develop 34% of the actions implemented within this project);
- The European Investment Bank that provides the ELENA technical assistance;
- Schools, to collect their feedback (notably teachers and parents' associations).

Internally, the team also deals with different partners and municipal services such as:

- "*Mairies d'Arrondissement*" (City Boroughs Councils),
- Financial department,
- Education department, usually in charge of school-related matters.

This programme contributed to the **development of a cross-sectorial vision of energy efficiency actions within the municipality**. The experience acquired during the first phase of the programme allowed for overcoming the strict division of tasks and the silo mentality that prevailed in the internal organisation of the city.

Improved knowledge on energy efficiency issues determines the actions to be initiated under the following Energy Performance Contracts, especially better consideration of the input from the schools (e.g. accounting winter and summer comfort will lead to improving insulation).

As regards replicability, the city now has the technical knowledge to independently develop its own energy efficiency projects and assist other cities in doing so.

## 3. Beneficiaries

Table 3.1: Beneficiaries of the CPPE contract

Players	Impact of the programme
Municipality	Financial savings in the form of reduced operational costs related to lower energy bills for municipal school buildings.
Schools	Schools benefit from improved infrastructure and better heating systems but not financial savings, as they do not have their own budget.
School employees	Experience disruptions during the construction phase. They may also have to change their behaviour once the actions are implemented (for instance monitoring thermostats). In a few schools, the users complained about some measures (notably when reducing inefficiencies such as excessive heating of the premises during winter time).
Pupils	They may experience improved school infrastructure. The works are carried out during the holiday period, which limits the negative consequences for the pupils (and employees).

## 4. Results

- The initial phase of energy retrofitting actions involving 45 schools in 2012 resulted in average in **33% of energy savings**.
- There is not definitive result yet as regards the savings obtained for the 100 schools under the CPPE contract but they are expected to be of about **10,000 MWh and 2,300 tCO<sub>2</sub>**.
- Very few complaints were expressed by the first 45 schools, which can be seen as a sign of success.
- Within the CPPE, the city expects to save **EUR 750,000/year** (after the payment of the contractor) which means an expected profit of **EUR 15 million** over 20 years.

## 5. Promotion

- Promotional notably activities included a introducing the programme during conferences or seminars and inviting journalists to schools during the early stages of the first Energy Performance Contract.
- 250 awareness-raising sessions targeting school children are to be carried out every year in order to make them more receptive to energy-saving issues.

## 6. ELENA-EIB technical assistance

The city has been benefitting from an ELENA-EIB technical assistance – a grant of EUR 1.37 million - covering 90% of the operational costs which include:

- Internal team - three full-time municipal agents in newly-created jobs<sup>5</sup>;
- External consultancy:
  - CPPE - public procurement for legal, financial and technical assistance (consultation phase and first two years);
  - CREM - legal and technical assistance in the CREM (consultation phase).

For a EUR 180 million project, this subsidy only represents a small share of total costs (the municipality expects a leverage factor of 131 from the ELENA grant). The City of Paris would therefore most likely have conducted the retrofitting programme without the ELENA support. However, in a context of tight public finances, the funding provided by the EIB proved helpful.

The process of applying for the subsidy was not so easy, notably because Paris was among the first cities to apply to ELENA. Some difficulties arose during the translation of legal documents and led to different interpretations by the city and the EIB (for instance regarding eligible expenditures). The relative novelty of the ELENA tool for both parties – the city and the EIB – caused some misunderstandings which progressively disappeared as the learning process went on.

Overall, the experience of the Paris with ELENA and the EIB is positive. Indeed, the management of the technical assistance (monitoring reports, interaction with the EIB) does not consume much the city's resources. Besides, the EIB proposed two *addenda* that allowed Paris to get an extension of the grant contract, showing flexibility and a will to actively assist municipalities.

## 7. Key takeaways for other public authorities

- It is important to develop a **transversal approach** to energy-saving action. Cooperation between municipal services is crucial.
- **Involving all players** having a stake in the programme facilitates its implementation and makes actions more in line with the respective priorities of the different parties.
- Municipalities should identify which forms of financing **best suit their purpose** and favour actions that will **strengthen learning**.

This case study has been published by Energy Cities with the support of Caisse des Dépôts in June 2015 in *Unlocking investment in cities : ELENA-EIB technical assistance facility*.  
[http://energy-cities.eu/IMG/pdf/reviewelena-eib\\_projects\\_june2015.pdf](http://energy-cities.eu/IMG/pdf/reviewelena-eib_projects_june2015.pdf)

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<sup>5</sup> These are the conditions for a cost to be eligible for funding from ELENA.