



Best Practice: Public-Private Partnership for Building Retrofits

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CITY: BERLIN

**POLICY AREA: BUILDINGS ADMINISTRATION, CLIMATE CHANGE;
PUBLIC-PRIVATE PARTNERSHIPS**

BEST PRACTICE

Through the “**Energy Saving Partnership**” program, the city of Berlin retrofits public buildings in the framework of Energy Performance Contracts. The investment in energy efficiency is refinanced through energy cost savings over a specific period of time. The Berlin Energy Agency (BEA), owned in part by the city of Berlin, advises on project development and manages the bidding process for these retrofits with guaranteed energy and CO₂ reductions.

ISSUE

In the 1990s, the city of Berlin was faced with a tight budgetary situation and looked for ways to reduce spending. At the time, energy costs for the lighting and heating of government buildings totaled approximately €255 million (US\$346 million). Responding to this challenge to come up with a way to improve energy efficiency and reduce energy costs, the Division of Climate Protection of the Berlin Senate together with the BEA developed the Energy Saving Partnership model. The BEA manages the retrofit of public buildings, preparing public retrofit tenders for work that will guarantee a 26% reduction in emissions.

GOALS AND OBJECTIVES

The program aims to increase building energy efficiency by at least 26%, reduce CO₂ emissions and establish energy performance contracts for retrofitting public buildings. The primary focus is on large complexes, such as schools, universities, prisons, recreational facilities, and offices and administration buildings.

IMPLEMENTATION

Energy Performance Contracting

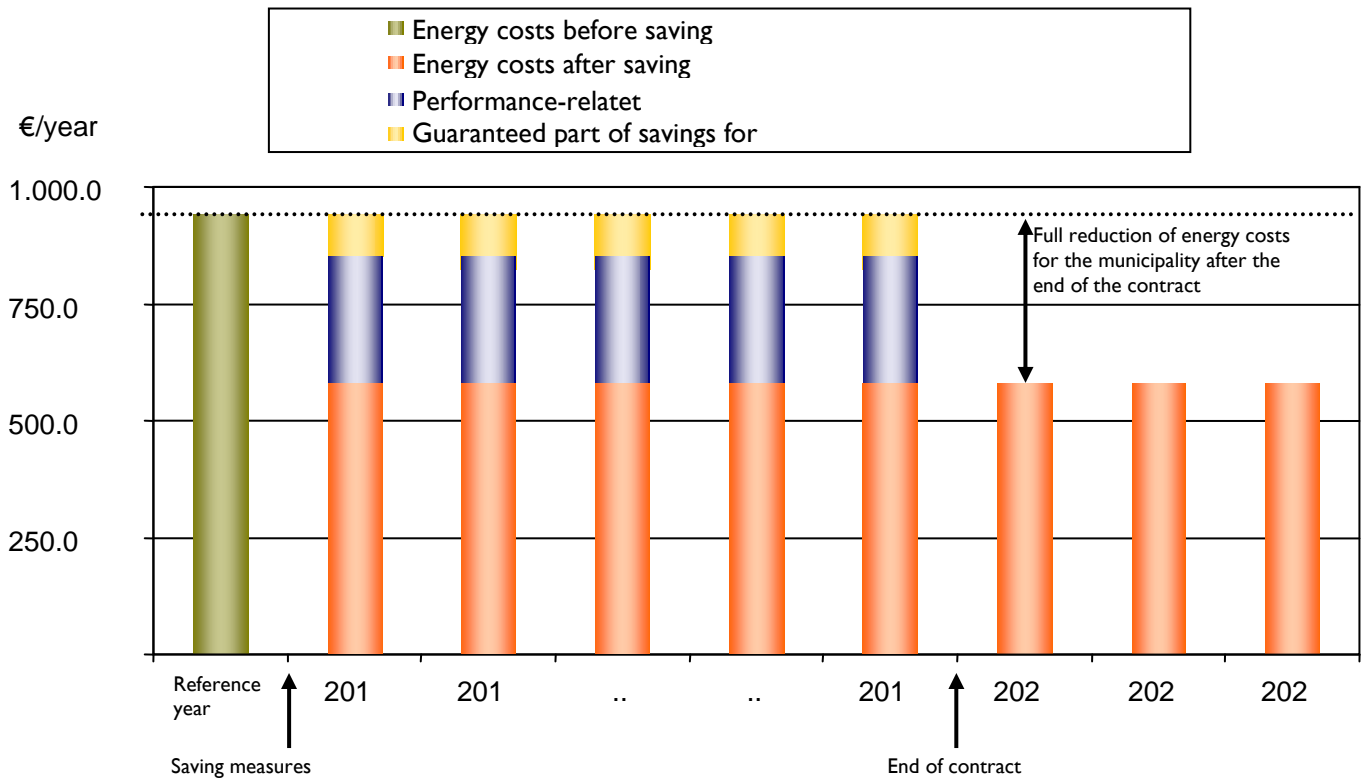
The BEA organizes retrofits for large public and commercial buildings by establishing Energy Performance Contracts (EPC) which are set up between building owners and Energy Systems Companies (ESCOs). ESCOs applying for retrofit tenders agree to achieve annual savings in energy costs averaging 26%. To achieve this target, different hardware components such as automatic control engineering systems, heating control systems, lighting systems, ventilation and air conditioning systems can be installed.

The BEA also assists building owners and ESCOs in determining the terms of repayment. Average payback periods are 8 to 12 years.

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The below table corresponds to energy cost savings as a result of implementation of the Energy Performance Contracts.

Energy Performance Contracting Payment Model

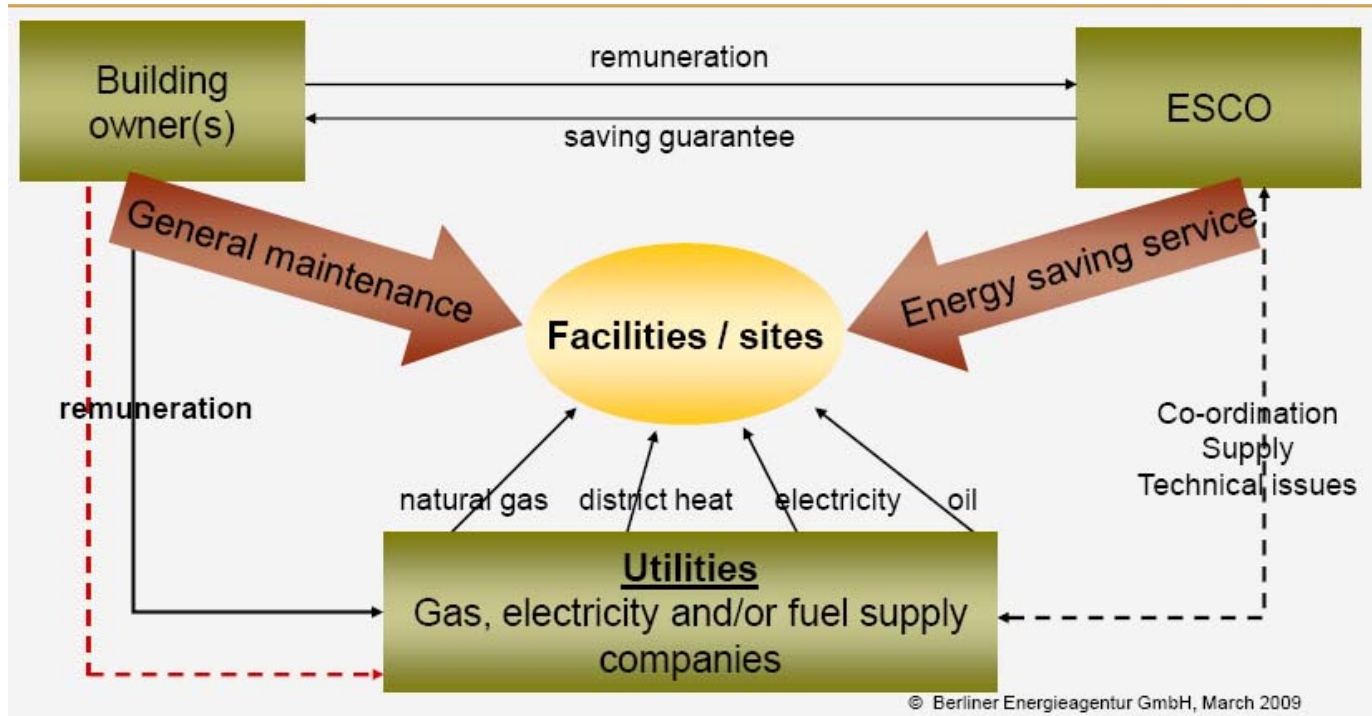


Effective implementation is dependent upon the positive interaction of all key players. The ESP consists of the following components:

- As the central coordination unit, the Division for Climate Protection of the Senate Administration of Berlin offers building owners financial and technical assistance with regard to the tendering procedure of appropriate projects.
- The BEA acts as an independent project manager that moderates and manages the process from baseline to contract negotiation.
- Building owners combine several buildings into building pools, which are grouped for tendering.
- As requirement for participation, pools must have a minimum energy bill of approximately €200,000 (USD\$271,300) annually.
- To reduce energy consumption in buildings, ESCOs offer sustainable technologies and systems (energy management, combined heat and power generation (CHP), lighting systems, automatic control engineering, etc.).
- Due to expanding payback periods, EPCs usually do not include window replacement or wall insulation.
- ESCO finances retrofit investments in advance and depending on the achieved energy savings, building owners repay in annual installments over an agreed period (usually 8 to 12 years).
- Building owners do not pay for retrofit investments and see energy savings immediately.

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Below is an illustration demonstrating the relationships between all contract stakeholders.



Criteria for Qualification

The following criteria must be demonstrable in order to establish an EPC

- ownership for at least 10 years, with the guarantee that the building will not be sold during the time frame of the EPC contract
- savings potential
- steady use of the building and constant energy consumption over the past 3 years
- measurable energy consumption of the buildings that are connected – share a common heating unit - to the building where retrofits will be implemented, so as to establish a baseline
- modernization and changes can be made to the central heating, ventilation and cooling devices (no restrictions on supply contracts or on devices owned by the building owner)
- minimum project size - baseline minimum €200,000 (USD\$271,300)

Building Pools

Another unique component of the ESP program is that similar public buildings owned by the same entity (i.e. State Berlin) and managed by the same administration (i.e. District of Berlin Buildings Management Office) can be pooled in order to reach minimum project size and effectively monitor progress and set common goals. These public buildings include:

- schools and kindergartens
- vocational schools
- city halls, finance authorities, other office and administrative public buildings

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- establishments for youth and seniors, including libraries
- cemeteries and forest administration buildings
- sport facilities and swimming pools
- technical colleges and universities
- prisons
- cultural institutions
- hospitals

Implemented Savings Measures

Heat generation

- replacement/modernization of boilers
- condense boiler technology
- conversion of energy source from oil to gas
- reduction of heat power

Heat distribution

- modernization of pumps, valves, control units
- hydraulic balancing, thermostatic values
- heating optimization (heating curve, heating times)

Hot water generation

- replacement, reduction of storage volumes, decentralization
- optimization through interval timers, waterborne pathogen control

Ventilation systems

- replacement ventilation motors/rotors/automatic control
- operation on demand (CO₂ sensors, frequency converters)
- heat recovery systems

Lighting

- electronic ballasts, energy saving lamps, control systems
- sensor technology: presence detectors/daylight detectors

Energy management

- digital energy management systems/building automation

Others

- individual control (equipment) for rooms, sealing of windows, water savings measures, operation of CHP, modernization of cooling

COST

Only accredited ESCOs are allowed to participate in the bidding process. Already, they have invested nearly €52 million (US\$75.2 million) to retrofit nearly 1,400 buildings. The BEA assists building managers and ESCOs to negotiate the financing terms.

RESULTS AND EVALUATION

Since it was established in 1996, 1,400 buildings have been upgraded through this system, resulting in CO₂ emissions reductions of more than 500,000 tons and a savings of €11.7 million (US\$16.9 million), including €2.7 million (US\$3.6 million) savings on public budgets.

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In Berlin 24 pools are operated by 15 different ESCO contractors. There are approximately 100 subcontractors - mostly regional small, medium enterprises - involved in implementation of the saving measures and maintenance. As a result of the success of initial savings measures, Berlin has found that contractors are gaining expertise and the program's overall effectiveness is increasing.

Berlin has also found that problems regarding contracts or project implementation can be solved and relevant stakeholders have avoided any legal proceedings or bank guarantees.

The goal for 2010 is to establish one or two new building pools. Energy savings up to 35% are now feasible. In 2010, two of the first re-tenders, or contracts with new savings guarantees, have been secured. These two contracts were established in 1998. The BEA is now turning to areas outside of metropolitan Berlin to enter into new EPCs.

TIMELINE

It takes approximately 10 – 12 months for a public agency to

- evaluate the savings potential for the building(s) chosen
- prepare a baseline assessment
- prepare tender documents
- complete the tendering process
- negotiate with the bidders
- prepare the final contract

The installation of savings devices and measures is usually complete within in 1 year after the contract execution date.

LEGISLATION

N/A

LESSONS LEARNED

With regard to EPC project development, it is essential that projects are managed by people who have local knowledge of the current infrastructure and energy system. Owners need assistance during the start-up process, especially in negotiating transaction costs. In Berlin the Senate finances 50% of project development costs to address the lack of initial financing. This is critical component of the program given that most building owners would not be willing to develop an EPC otherwise.

Berlin has also discovered, especially when other states try to implement an ESP program, that problems can arise related to a lack of clarity in the contract approval process. It is important for authorities to thoroughly explain the contract approval process so as not to lose potential EPC customers.

TRANSFERABILITY

Berlin's Energy Saving Partnerships have been replicated successfully with BEA's assistance through its division "International Know-How-Transfer." This section has initiated more than 20 projects in Europe and worldwide (e.g. Bulgaria, Chile, Romania and Slovenia). Program success can be attributed to communication, political will, transparent procedures, support of the Senate Administration of Berlin and enforceable standards.



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The success of the Berlin ESPs can be attributed to

- communication and smooth interaction
- political will
- transparent procedures
- financial and political support of the Senate Administration of Berlin,
- transparent procedures,
- enforceable standards and
- independent experts

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