BUILDING
ENERGY EFFICIENCY

Berlin Energy Saving Partnership for Energy Efficiency in Buildings

GERMANY

BIG BUILDINGS REDUCE ENERGY USE

Public and commercial buildings benefit from energy savings while city achieves carbon emissions reductions

The German capital of Berlin is the European leader in reducing the environmental impact of buildings. Its most successful initiative has been the Energy Saving Partnership (ESP), which it pioneered in 1995 as an energy-saving program for pools of large public and commercial buildings. The City of Berlin and the Berlin Energy Agency, a private-public partnership that facilitates retrofits to schools, day-care centers, universities, administrative buildings, and public swimming pools, created a model program to improve energy efficiency and reduce costs. Acting as the manager of the program, the Berlin Energy Agency facilitates retrofits by arranging partnerships between pools of buildings and energy service companies. In these arrangements, properties are guaranteed to save a certain amount on annual energy costs (generally at least 25 percent), while the partner improves the energy efficiency of properties by contributing financial investments and technical expertise.

From 1990 to 2004, Berlin's annual carbon dioxide emissions declined by 19 percent from 29 million tons to 23.5 million tons. While a small share of this reduction stems from efforts to improve the energy efficiency of the housing stock, most of the improvement can be attributed to the closing of much of East Berlin's industry after the 1989 reunification and shifts from coal to natural gas for electricity generation.[1] After managing to reduce carbon dioxide emissions 25 percent by 2010 (compared to 1990 levels), Berlin is currently pursuing a new goal of a 40 percent reduction by 2020. The city intends to reach this target by increasing energy efficiency, decreasing energy consumption, and using renewable energy rather than fossil fuels.

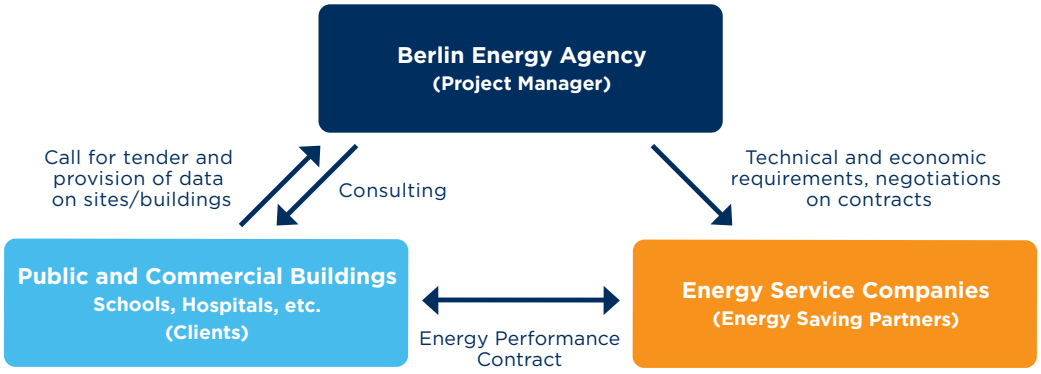
BIG BUILDINGS, BIG IMPACT

The ESP model was developed under the backdrop of tight budgets and high energy costs for public buildings in Berlin during the 1990s. The program aimed to increase building energy efficiency by at least 25 percent, reduce carbon dioxide emissions and establish Energy Performance Contracts for retrofitting pools of public and commercial buildings. It has focused primarily on public buildings such as schools, universities, prisons, offices and administration buildings.[2]

Key participants in the Energy Saving Partnership (ESP) include:

- **Senate Administration of Berlin, Division for Climate Protection:** Coordinates the ESP and provides financial and technical assistance to building owners seeking help in issuing tenders for new efficiency projects.
- **Berlin Energy Agency:** Facilitates retrofits to buildings by setting up Energy Performance Contracts between building owners and accredited energy service companies.
- **Independent Energy Service Companies (determined by tendering):** Implement sustainable measures such as insulation, combined heat and power, lighting systems, and automatic controls to reduce energy consumption in buildings and achieve cost-savings and carbon dioxide reductions.
- **Building Owners (end clients for the Energy Service Companies):** Pay for upgrades through installments over a period of time (8 to 12 years on average) as dictated by expected energy savings.[3]

Figure 1: Role of the Berlin Energy Agency as Project Manager



Source: Berger, Susanne.

The ESP targets at least a 25 percent reduction in the energy costs of client buildings. In public buildings, at least 6 percent of these cost savings reach the city budget, as dictated by the particular Energy Performance Contract, while the remainder is used to finance the modernization and optimization of the buildings. The participating energy service companies receive any savings achieved beyond the amount guaranteed to the city until the period of the contract is complete, while the city retains ownership of any newly installed equipment.[4]

Energy Performance Contracts are comprehensive energy service contracts that cover the planning, implementation, operation, and optimization of energy-saving improvements. Upfront energy efficiency investments are financed by the resulting energy cost savings, which are guaranteed by the energy service companies over the contract period.[5] To establish an Energy Performance Contract under the Berlin ESP, several criteria for participating buildings must be met:

- Guaranteed ownership of the building for at least 10 years
- The building cannot be sold during the timeframe of the Energy Performance Contract
- An assessment must show minimum levels of energy-savings potential as evaluated by a public agency
- Steady use of the building and constant energy consumption over the past 3 years
- Measurable energy consumption of any buildings that share a common heating unit with the building to be retrofitted
- No restrictions to perform modernization of the central heating, ventilation and cooling systems

- Buildings must have a minimum energy bill of around USD 307,000 annually. If needed, several buildings can participate together in order to reach the minimum project size if they have the same owner and are managed by the same administrator. Such groups of buildings must monitor progress together and set common goals.[6]

COMMUNICATION, TRANSPARENCY, POLICY SUPPORT KEY TO SUCCESS

The main clients for Energy Performance Contracting in Berlin have been public authorities (75 percent of total), hospitals (20 percent), and trade, commerce and housing associations (5 percent).[7] As of 2012, nearly 1,500 buildings have been retrofitted, leading to carbon dioxide reductions of nearly 70,000 metric tons per year under the Berlin ESP.[8] The project has led to some USD 74 million in private investments, and the building refurbishments have led to yearly financial savings of approximately USD 14.3 million, or an average of 26 percent of energy bills.[9,10]

The ESP owes its success to several factors:[11,12]

- Under ESP contracts, clients are guaranteed savings, which are in turn used to finance the investments
- Allowing buildings to participate as groups encourages energy efficiency investments in large building complexes
- Implementation is supported by a strong and reliable legal framework for tenders and Energy Performance Contracts, and through transparent procedures
- Political will, enforceable standards and independent experts provide a broad base of support for the initiative

ENERGY SAVING PARTNERSHIP BEST PRACTICE: DISTRICT STEGLITZ-ZEHLENDORF

With 69 public buildings, including schools, kindergartens and libraries, the Steglitz-Zehlendorf District of Berlin is one of the largest participating groups in the Energy Saving Partnership. In June 2005, their Energy Performance Contract began with an investment of USD 3.2 million and a term of 14 years. Upgrades have included lighting modernization, installation of new boilers, substitution from oil to gas, and installation of solar thermal systems. The Energy Performance Contract has achieved annual energy cost savings of about USD 665,000, representing a savings of 29.4 percent as compared to baseline energy costs of USD 2.26 million. The energy service company receives most of the savings (USD 603,000) while the remainder reduces energy costs to the government facilities. The carbon dioxide reductions amount to 3,973 metric tons per year.[13,14]

Despite its success, the ESP still faces challenges that have possibly prevented it from reaching its full potential. For instance, potential clients unfamiliar with the advantages of Energy Performance Contracts may mistrust the approach. Mistrust can emerge from clients having difficulty understanding Energy Performance Contracts, including what efforts would be needed on their end and the transaction costs that may arise during project preparation and implementation. Additionally, building owners and managers tend to oppose contracts of more than five years and may prefer other, more profitable, investments over those in energy savings. The long project durations (sometimes over 10 years) of Energy Performance Contracts can detract from their appeal.[15]

Overall, an ESP is a low risk and cost effective way to optimize energy systems in buildings, leading to reduced energy costs and lower greenhouse gas emissions. It can help the public sector promote efficient energy use in support of climate protection targets. Berlin's ESP has inspired similar action in other countries; more than 20 similar initiatives have been implemented internationally in countries including Bulgaria, Romania, Slovenia, Brazil, Chile, India, and Mexico through the Berlin Energy Agency's "International Know-How-Transfer" division.[16]

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ENDNOTES

Note: all currency conversions to US dollars were calculated using the exchange rate on July 9, 2012 (1 USD = 0.81391 EUR).

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3 C40 Cities. "Energy Saving Partnership Berlin (ESP) — An Effective and Innovative Model to Reduce CO2 and Energy Costs without Expenses for Building Owners." C40 Cities, Climate Leadership Group. Web. July 2012. <http://www.c40cities.org/c40cities/berlin/case_studies>

4 Economist Intelligence Unit, 2009, *op cit*.

5 Berger, Susanne. 2012. "Energy Saving Partnership Berlin. Good practice examples for EPC in public buildings." Energy Saving Partnership Berlin presentation at CLUES Workshop, Nottingham, UK, January 27, 2012. Web. July 2012. <http://homepages.lboro.ac.uk/~cvkc2/CLUES%20BESP%20workshop_Presentation_SusanneBerger.pdf>

6 NYC Global Partners, 2011, *op cit*.

7 Berger, 2012, *op cit*.

8 Economist Intelligence Unit, 2009, *op cit*.

9 NYC Global Partners, 2011, *op cit*.

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11 C40 Cities, *op cit*.

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16 Berger, 2012, *op cit*.

Figure References

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