

Energy-contracting to supply schools with heating

The Georg-Büchner “Highschool” in Kaarst, Germany realised a holistic energy-saving concept through third party financing.



Adding value – buying green

Abstract

The enormous energy and cost saving potential achievable through modernising heating systems and lighting in public buildings, can only be exploited if important amounts of money are invested. Public budgets, however, are often not fitted with sufficient means to realise these renovations. Therefore, ecologically necessary and economically sensible works are often left aside.

The city of Kaarst in North-Rhine Westphalia, Germany solved this problem by outsourcing the energy supply (heating and lighting) to a third party company, which installed a new innovative energy system in a secondary school.

In this way, the city only buys the service (warm rooms, lighting), and leaves the choice of how to achieve the result to the contractor.

Objectives

With the aim of unburdening the budget, the city council of Kaarst decided to implement energy saving measures for municipal buildings. The investment capital should hereby be provided by an external party. The Georg-Büchner Highschool offered a excellent preconditions to make a first step in this direction, as the school building was in good conditions, but the technical systems had to be renewed.

In the course of the project, the contractor, DeTe Immobilien, developed innovative solutions for building services engineering, which was not intend before, but proved to be necessary to fulfil the standards set by the city.

State of the activities

Meanwhile the project is completed and the first contract of a five year period ends in August 2002.

All components are installed and lead to a remarkable decrease of energy consumption.

Background Information

Energy-Performance Contracting is a service concept with the aim to implement improvements in efficiency for energy conversion and energy utilisation systems all different forms of consumption, by third party financing.

The characteristic of such contracting models is that the energy supply systems of a building are not purchased, maintained and prosecuted by the owner of the building, but by an external company. Different actors as contractor are possible. This can be a manufacture of heating systems, a service provider for energy technology or a local energy provider.



The contractor invests in the energy generations and distribution system, maintains and conducts it.

The customers, in this case the local authority, pays only for the energy or the service, e.g. heating and/or lighting.

This system does not only focus on the installation of new modern energy production systems, but also on the development of solutions for further energy reduction.

Two different models of contracting can be distinguished: system contracting and performance contracting. While for system contracting the payment is independent from the energy savings archived, for performance contracting the third party company covers their investment costs by the energy savings.

In 1996, faced with a difficult budget situation, the city council decided to unburden the budget by implementing energy saving measures in urban real estate properties. The unavoidable investments should be taken on by an outstanding investor.

Implementation

In the case of the Georg-Büchner Highschool in Kaarst, the city choose the performance contracting variation. As the contractor's profit augments with the energy savings, he has got an incentive to opt for the most advantageous system in terms of savings.

• Strategy chosen

The preparation can be subdivided into two phases: first a rough-diagnosis of the building has to be done by several firms as a base for the contract, and second a detailed project concept has to be developed by the chosen contractor. Certain performance standards were given by the city

For the rough-diagnosis the city organised a inspection of the building, the appending gym and the heating facilities with all interested supplier. The operational mode of the building was also analysed.

All offers handed in were evaluated by the city together with the energy agency NRW (North Rhine Westphalia). On this basis the DeTe Immobilien (a company of the German Telecom) was chosen as contract partner. DeTe Immobilien prognosticated energy saving of 40 per cent for the school.

To make sure that DeTe Immobilien archived the promised performance they asked to develop a detailed project concept. This lead to a contract with the following characteristics:

- Guarantee of 40% energy saving by the DeTe Immobilien, which must not lead to any loss of comfort
- Contracting-fee, paid monthly by the city which will be oriented on the average energy-costs for the last 5 years
- Commitment by the contractor to accomplish investments in energy saving measures fixed in advanced
- The city of Kaarst will receive a yearly return of costs of DM 10.000 (whereof 50% will go to the Georg-Büchner-Highschool)



- After the contract period the installation plant will be owned by the city without any payment of balance

- *Activities*

DeTe Immobilien built up a concept which did not consider the school as conglomerate of single items, but as one overall system. The concept included all aspects of the school, from the heating system to the user behaviour, and developed a new, innovative approach to tackle the task.

In the course of the project, the air conditioning plant and the heating control devices were optimised, and a lighting system controlled by movements were installed. For the whole building, heat insulation measures were installed. Not only for outer walls, but also for conduits. Each class room got a single room temperature control device, which automatically heats the room according to outside temperature and use. This single room control device was the real innovation by DeTe Immobilien. The developed system is called Building-and-Energy-Service-System.

The whole building service engineering for the Georg-Büchner-Highschool is controlled via a central computer by DeTe Immobilien, with the possibility to control each device in each room separately at any time.

Additionally, the the pupils together with physics teachers and the experts from DeTe Immobilien have installed a solar heating system on the roof of the school's gym, to provide the showers with hot water.

- *Partners*

The project was implemented by three partners: The energy agency NRW acted as a clearinghouse and consultant for the city to plan the project. Involved in the actual implementation were then the city of Kaarst and the German Telecom daughter DeTe Immobilien as direct contract partners.

The Energy Agency NRW is an independent institution of the German Federal State North Rhine Westphalia. Founded to advise municipalities but as well companies in terms of renewable energy sources, energy savings and rational energy using.

Results and Impacts

The concept of energy contracting in general and the project in particular has been advantageous for the city of Kaarst. While the annual cost of energy were around 200.000 DM before the contracting project, the costs decrease to around 120.000 DM afterwards.

By the investments, around 41% natural gas and about 42% of electricity were save yearly. This means that the project saved about 253t CO₂ yearly only one school.

The financial model of the project (outsourcing the investment and financial risk) is an innovative way to unburden city budgets and at the same time modernise real estates.

At least one technical innovation was realised by the contractor, which was the development of the Building-and-Energy-Service-System, allowing to control the energy supplies for each room separately.

- *Transferability*

The described project is a pilot-project for schools in North-Rhine Westphalia and in Germany.



Without doubts, this project could not only be a model for the modernisation of school building , but also for all community estates.

The characteristics of the project are very universal and could be transferred to every municipality in Europe.

Additional information

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References:

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