

Energy and schools in Modena

Agenzia per l'Energia e lo Sviluppo Sostenibile, Italy

Summary

The involvement of schools in a sustainable energy management was obtained operating jointly on the improvement of the building energy performance, on user behaviour and on the development of didactic projects. The approach was based on performance contracting to an external company the energy rehabilitation and management of all buildings of the local administration, mainly schools. The user behaviour was afforded by a Voluntary Agreement between schools and Administration, where the money saved through energy saving is allocated 50% to the schools itself. The Energy Agency supports didactic projects promoted by the teachers, with financial help from the local administrations.

| End-user area | Target Audience | Technical |
|---|--|---|
| <input type="checkbox"/> New buildings | <input type="checkbox"/> Citizens | <input checked="" type="checkbox"/> Energy efficiency |
| <input checked="" type="checkbox"/> Refurbishment of buildings | <input type="checkbox"/> Households | <input type="checkbox"/> Heating |
| <input type="checkbox"/> Transport and mobility | <input type="checkbox"/> Property owners | <input type="checkbox"/> Cooling |
| <input type="checkbox"/> Financial instruments | <input checked="" type="checkbox"/> Schools and universities | <input type="checkbox"/> Appliances |
| <input type="checkbox"/> Industry | <input type="checkbox"/> Decision makers | <input type="checkbox"/> Lighting |
| <input type="checkbox"/> Legal initiatives (municipal regulations, directives, etc) | <input checked="" type="checkbox"/> Local and regional authorities | <input type="checkbox"/> CHP |
| <input type="checkbox"/> Planning issues | <input type="checkbox"/> Transport companies | <input type="checkbox"/> District Heating |
| <input type="checkbox"/> Sustainable communities | <input type="checkbox"/> Utilities | <input checked="" type="checkbox"/> Solar energy |
| <input checked="" type="checkbox"/> User behaviour | <input checked="" type="checkbox"/> ESCOs | <input type="checkbox"/> Biomass |
| <input checked="" type="checkbox"/> Education | <input type="checkbox"/> Architects and engineers | <input type="checkbox"/> Wind |
| <input type="checkbox"/> Other | <input type="checkbox"/> Financial institutions | <input type="checkbox"/> Geothermal |
| | <input type="checkbox"/> Other | <input type="checkbox"/> Hydro power |
| | | <input type="checkbox"/> Other |

Context

The Local Administrations in Modena have been devoting a constant attention to the schools, as demonstrated by the signature of an "Agreement with schools", covering aspects as environment and energy. Several collaborations with schools are running in the environmental sector, as e.g the annual diffusion of a booklet, produced by the public administrations, reporting the offer of technical visits, didactic material, training for teachers and activities with students proposed by enterprises, NGOs and public bodies to Modena schools.

The Modena Province is in the Emilia-Romagna Region, in a very industrialised and developed area. The Province population is 800,000 and the City of Modena 170,000.

Objectives

The main aim of the project is the joint development of a better energy management and user behaviour in schools with improved didactic approaches to sustainable energy.

Process

The project started in 2001, and is expected to continue for several years. The Province has organised a call for tender for performance contracting with TPF, committing the energy audits and tender specifications to the local Energy Agency AESS. Twenty-three energy audits in schools were performed, an electronic data-base of components created, containing also functional diagrams, certifications, etc... The evaluation of energy conservation opportunities, comparative cost-benefit analyses, definition of the interventions and the drafting of the Terms of Reference were done. The performance contracting will have a time-duration of 7 years, with an amount of about 2.15 million euro/year (net of V.A.T.). A compulsory investment for about 10% of the overall amount is requested, and a guaranteed energy saving of at least 15% is imposed. A remote energy control of all buildings is also required, and a role for AESS identified, as performance and maintenance programme verifier.

Some direct investments have already been activated (under regional funding): two oil to gas conversions of boiler houses, one gas to biomass conversion (pellets) of a 267 kWth boiler house, a solar thermal DHW plant for a school gymnasium. Fifteen PV roofs are in phase of installation in various schools, under the 10,000 PV Roofs governmental/regional programme. A centralised room heat and light control in one school (pilot intelligent school) is one of the compulsory investments foreseen in the performance contract.

Voluntary agreements have been signed between primary schools and Municipality. Already 7 schools have agreed, so that their electricity and gas saving have produced monetary gains, distributed 50% to them. In the first year single schools have gained from 200 to 10,000 euros, according to the obtained results. Children operate very effectively as energy managers, avoiding energy waste.

In the frame of the Local Agenda 21, the Province has approved an Action plan for energy and sustainable development (PAESS). It also includes voluntary agreements with secondary schools (sharing energy savings with schools), didactic projects on sustainable energy (proposed by the schools and supported by the Province), technical assistance by AESS.

In terms of didactic projects, a RES laboratory for primary school pupils, the development of a solar energy outdoor area for a school and a didactic module on energy saving were produced.

Financial resources and partners

The performance contract will have no extra costs for the administration respect to the amount it presently spends for energy. The PAESS budget for schools is of the order of 20,000 euros/y. The money distributed to schools according to the Voluntary Agreement comes from energy savings. The investment for the conversion of the three boiler houses amounts to 166,000 euros and for the PV plants to 310,000 euros.

The main partners are Modena Province, Modena Municipality, the local energy agency AESS and several primary and secondary schools located in the area.

Results

The expected energy saved by the performance contracting is 1.1 millions of cubic meters of methane, corresponding to 30.7 % of the total heat consumption. The energy produced by renewables corresponds to the substitution of 44,000 kWh of electricity and 60,000 m³ of methane per year, passing from 0,00% to %1,4% of the total energy consumption of the Province administration. The main economic benefit for the Province is the improvement of the heating facilities without investment costs.

Environmental benefits are estimated in 2,200 tons of avoided CO₂.

The achieved behavioural changes are evidenced by the pupil's and student's attitude towards energy saving and control.

Lessons learned and repeatability

The main lesson learnt from this project is that a combination of actions is necessary to win the resistance of final users to change their behaviour. The schools managers in fact were very reluctant in adopting energy efficiency engagements if no effort was shown from the administration in building improvements. At the same time the ESCOs need a motivation of the users in energy saving to achieve successful results in performance.

The Voluntary Agreement guarantees economic advantages to schools even when the saving is due not only to behaviour but also to system improvements made by the Administration. Considering the difficulty in dividing effects and the need to motivate the users, the separation was not operated, at the benefit of the schools.

All energy agencies can manage similar experiences, if the local administrations show interest in school energy efficient management.

Contact for more information:

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