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FROM ENERGY SUPPLY TO ENERGY SERVICES

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Overview

Energy efficiency is gaining attention as the cleanest and cheapest source of energy. The European Commission, as well as most European Member States are implementing schemes to support measures for investments on the demand side, which often prove to be convenient both economically and environmentally. The paper focuses on the perspective change needed to achieve the savings potential estimated with the adoption of the most efficient energy technologies. A major obstacle in fact is the different identity of who building constructors and operators. Giving an incentive to use more efficient technologies in the phase of construction could bring good results for many energy uses. The diffusion of the ESCO (energy service company) approach could help overcoming the paradox of low investment and high operating costs leading to high dividends in economic and environmental terms. The move from selling heaters to selling heating services, in industrial as well as domestic premises, can help investments in energy efficiency, reducing the costs for users and for the society. Energy efficiency is becoming a policy priority: new contractual and cultural approaches are highly needed to achieve the sustainability of the energy sector.

Methods

The paper reports the results of a study aimed at estimating the cost of energy saved by 90 different efficiency measures in the building sector, giving priority criteria for investments. The work was performed for the Provincia di Milano, which is implementing support actions for energy efficiency.

Calculating energy consumption in buildings is rather complicated, as it requires a detailed knowledge of shapes and structures; nevertheless, good approximations can be achieved with proper tools. For all 90 technologies considered, the work is structured as follows:

1. analytical evaluation of energy savings achievable with better technologies,
2. monetization of the lower operational costs, due to lower fuel demand and maintenance and longer life expectation,
3. calculation of the cost of the investments required,
4. calculation of the actualised cost of the conserved energy (CEC),
5. comparison of the CEC with the commercial value of energy.

Results

The study shows that many efficiency measures have true economic value and allow the reduction of the energy cost in buildings. As an example, the table shows part of the results for an apartment in the area of Milan. With a reference value of natural gas for a commercial user of 641 €/tep, it is clear that many of the measures are of interest.

The work also shows that other measures in the fields of lighting and electric motors can have very short pay back in common applications.

APARTMENT IN A BLOCK			
With central heating and independent cooling			
MEASURES	Conserved Energy [tep10⁻³/m²a]	Cost of Conserved Energy 5%discount rate [€/tep]	Pay Back [years]
Substitution of a single glass with a double one	5.8	135	2 and 6 months
Insulation of flat ceiling (low insulation class)	2.5	138	3 and 8 months
External insulation of walls (low insulation class)	6.8	286	7 and 8 months
Condensing heater installation	3.1	305	4 and 9 months
Single glass window substitution with new wood window, double glass	3.5	326	8 and 7 months
External insulation of walls (high insulation class)	8.5	418	11
Solar thermal panel, flat, for sanitary water, natural circulation	1.7	455	9 and 8 months
Thermal regulation and heat measuring system	1.7	560	9
Single glass window substitution with new pvc window, double glass	3.3	806	21 and 6 months
Thermal regulation and heat measuring system with thermostatic valves	1.7	859	13 and 10 months
Venetian blinders on 50% of transparent windows	0.2	1064	20
1 kWp photovoltaic plant with monocristalline silicon	2.2	1792	30 and 10 months

Conclusions

Energy efficiency measures can lead to lower energy costs in many applications whenever investment and operational costs are properly calculated. The work evaluates the cost of the most common interventions, finding good opportunities of savings.

Implementing these measures requires a new approach to energy supply, favouring energy service in place of fuel supply. ESCOs can play a major role in the European energy sector.

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