Energy Surveys for Buildings: Problems and Perspectives

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The Background

The international oil crisis in the seventies had a large impact on Denmark. Oil was the predominant energy source and like many other countries the oil crisis was followed by an economic recession. In the building industry unemployment rose faster than in most other industries. In order to improve the situation Parliament passed an act which gave tax benefits to building owners and tenants who initiated maintenance work or carried out renovation of buildings.

The success of this act spurred another government initiative in 1981, which focused on the reduction of energy consumption for space heating. The purpose of the act was primarily energy savings but employment was a secondary objective.

Act on Reduction of Energy Consumption in Buildings

The "Act on Reduction of Energy Consumption in Buildings" specifies the content of a heat survey of a building, the qualifications of the consultants who conduct the heat surveys and defines a system of subsidy. Subsidies were given to tenants and homeowners who had implemented energy saving measures. In order to apply for a subsidy a heat survey must have been made by an authorized consultant. Only measures listed in the consultant's energy survey report were subsidized. The energy survey report contained suggestions for improvement on all components of the building that were below the energy standards of the 1979-building code. Each suggestion was specified and the costs calculated.

The expenses for the consultant's work had an 80% subsidy. The subsidy for energy saving measures was initially 40% and reduced gradually to 20%. The system of subsidies expired by the end of 1984.

The act also specified the replacement for the subsidy scheme. Since 1985 it has been mandatory for the seller of a heated building to inform the buyer about the energy efficiency of the building by presenting a heat survey report. Since the act does not contain penalties for non-compliance, this rule is in practice, voluntary.

Energy Savings Within the Building Sector

The net energy consumption for space heating and the production of hot water (net energy consumption includes only the use of energy at the end-use, i.e. improvement in energy generation and distribution is not included) has fallen from 750 Mega Joule per m^2 per year in 1972 to 490 Mega Joule per m^2 in 1990. The change is shown in Figure 1. Between 1972 and 1980/81 the curve is decreasing, while it shows only minor changes since 1982.

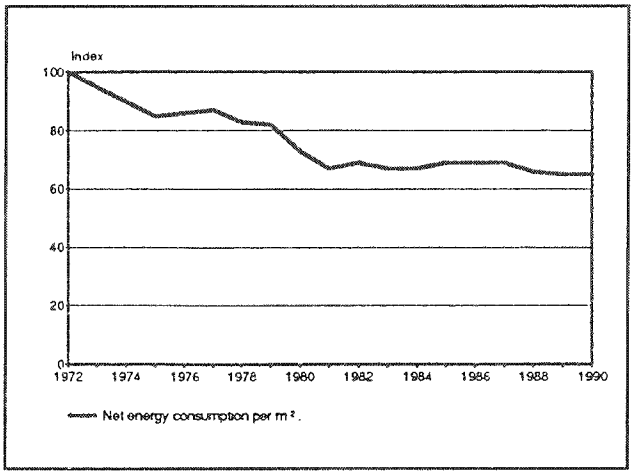

Figure 1. Index of Energy Consumption for Space Heating

The heat surveys have been implemented since the autumn of 1981. However the impact upon the heat consumption in the building sector seems moderate.

The Penetration of Heat Surveys

The annual number of completed heat surveys is shown in Figure 2.

The annual number of heat surveys rose from 10,000 in 1981 to a maximum of 142,000 in 1984 - the last year the surveys were subsidized. They declined to 20,000 in 1985. From 1985 to 1991 the number of annual heat surveys continued to fall with only 5,600 conducted in 1991. During the eleven year period, 1981-1991, 410,590

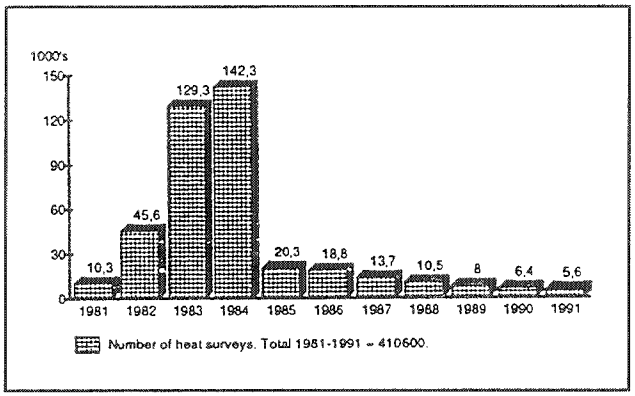

Figure 2. Heat Surveys

heat surveys were performed. The total number of dwellings covered by the "Act on Energy Reduction in Buildings" is approximately 2 million.

As mentioned above since 1985 it has been mandatory for the seller to present a heat survey report to the buyer before the deal is settled. However, in 1985 only roughly half of the buildings sold have had a heat survey. In 1991 it is estimated that the figure has dropped to 30%.

Table 1 shows the percentage of the buildings sold with a heat survey in relation to the total number of buildings sold.

Table 1. Buildings With Heat Surveys Sold in Relation to the Total Number of Buildings Sold

1985	c.54 %
1986	c.50 %
1987	c.47 %
1988	c.40 %
1989	c.35 %
1990	estimated c.35 %
1991	estimated c.30 %

Since 1981 close to 400,000 single-family houses and 470,000 dwellings in apartment buildings have had a heat survey. In relative terms, one-third of the single-family houses and approximately half of the dwellings in apartment buildings have been surveyed by 1991. With the current annual number of heat surveys, it will be 2117 before all residential buildings will have had a heat survey.

Possible Changes in the Heat Survey Programme

It is recognized that there are still a considerable potential for energy savings within the residential building sector in Denmark. However, the present price of energy results in an unattractive consumer pay back period for most of the energy saving measures that could be implemented.

One possible way to enhance the program would be to make the heat survey report fully mandatory when buildings are sold by setting up sanctions for non-compliance, or by reestablishing a subsidy scheme. These solutions would be consistent with an expected proposal for a directive on energy certification of buildings from the Commission of the European Community. However these solutions are not consistent with the policy of the present Danish government and consumers are not interested in the heat survey reports as such but in the energy savings from implemented measures.

As an alternative, the Energy Agency is developing a link between energy surveys and general building inspections. The main objective of this scheme is consumer protection through a voluntary system which will be financially attractive for both the seller and buyer.

The intention is to make energy savings measures a part of the renovation and maintenance work which are expected to be carried out as a consequence of the building inspection. The recommended renovations are very likely to be initiated since non-compliance will negatively impact insurance, the securing of loans and the value of the home or apartment building.

The costs of energy saving measures can be minimal when implemented with remodeling, renovation, etc. From a long term perspective, an improvement in energy efficiency within the existing building stock is expected when implementing a program that is coupled with building inspections.