

**Further information about why individual metering and billing of heating is neither cost-effective nor results in energy savings in Sweden**

## Summary

The European Commission proposed a revision of Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency on the 30th November 2016.

The Swedish Association of Public Housing Companies (SABO), an industry and interest organisation for Sweden's public housing companies, shares the view of the Commission that energy use needs to decrease to reduce carbon dioxide emissions and make the Union less dependent on imported energy. In order for the implementation in the Member States to be in line with the purpose of the Directive, the wording "technically possible, financially reasonable and proportionate in relation to the potential energy savings" in Article 9 in the current directive must be retained as all Member States have different climates, energy systems, business models and structural engineering preconditions. SABO's position paper includes proposals for concrete wording in relation to the Commission's proposals for revision.

Individual metering and billing of heating is neither cost-effective nor results in energy savings in Sweden. The reason for this is that there are excess temperatures in the Swedish apartment block stock and that the financial incentives for residents to reduce the temperature are too small. A change of temperature of two degrees in a normal apartment of 70 m<sup>2</sup> corresponds to an estimated amount of SEK 24 to 48 (EUR 2.6 to 5.1) per month.

Energy efficiency improvements in respect of heating in the Swedish apartment block stock will cease if individual metering and billing of heating becomes mandatory because the property owners will not be able to share in the savings.

## Successful energy efficiency improvements in municipal housing companies

Swedish municipal housing companies have a long tradition of successful energy efficiency improvements. SABO, together with member companies, launched a joint energy efficiency objective in 2008 in order to boost the rate of efficiency improvement. This objective meant that the companies that affiliated themselves were committed to reducing their energy use by 20 per cent between 2007 and 2016. This campaign currently covers 400,000 apartments, and we have reached more than 17 per cent energy savings up to 2015.

## Concerning structural engineering preconditions in Sweden

The heating of apartments in apartment blocks has for many years been dominated by the use of a joint heating system with water as a medium for the building. Ninety-eight per cent of all apartments are supplied by pipe systems<sup>1</sup> with radiators as heaters. One pipe trunk can supply several apartments with heating and one apartment can be supplied by several pipe trunks. From a European perspective, Sweden has a cold climate with well-

<sup>1</sup> <http://www.boverket.se/sv/om-boverket/publicerat-av-boverket/publikationer/2010/statistiska-urval-och-metoder-i-boverkets-projekt-betsi/>

insulated climate shells that envelope buildings but without insulation between the apartments.

## **Heating included in the rent and national guidelines on indoor temperature**

Heating is included in the rent for apartments in Sweden. The Swedish municipal housing companies endeavour to maintain the same temperature in all apartments in their property stock in order to minimise energy use. The residents do not themselves have the opportunity of adjusting the temperature, but this is instead controlled centrally in the building. A guarantee is normally given of a temperature of 20 to 21 °C in apartments. The fact that heating is included in the rent means that there is no energy poverty in Swedish apartments. The Public Health Agency of Sweden (Folkhälsomyndigheten) stipulates in its General Advice on temperatures indoors<sup>2</sup> a recommended steady temperature of 20 to 23 °C for the general public and 22 to 24 °C for sensitive groups.

## **Experience of increased energy use with individual heat meters**

A precondition for individual metering and billing (IMB) of heating to result in energy savings is that the vast majority of residents would prefer a lower temperature in their apartments. If the residents do not choose to have a lower temperature the installation of meters would be without effect. With a normal temperature of 20 to 21 degrees there is consequently basically no possibility of saving energy through reducing the indoor temperature if the advice of the Public Health Agency of Sweden is to be followed.

The experience gained from properties in Sweden that have introduced individual metering and billing of heating shows that most tenants choose to maintain their temperature at 20 to 21 degrees, some choose a lower temperature and some choose a higher indoor temperature if possible to so, and are prepared to pay for it. The greatest reason for residents in Sweden not choosing to reduce the temperature to a greater extent but in many cases actually increasing it instead is that the financial incentives for such residents to reduce the temperature are too small. An increase of two degrees in a normal apartment of 70 m<sup>2</sup> costs an estimated SEK 24 to 48 (EUR 2.6 to 5.1) per month. A study<sup>3</sup> of 3,675 apartments from the housing company in Helsingborg actually indicates an increase in average temperature to 21.72 °C after introduction of individual metering and billing of heating.

A central heating system must have more energy input to be able to achieve a temperature above 20 to 21 degrees, even if this is only for individual apartments, which increases energy losses and energy use. This suggests that an introduction of individual metering and billing of heating in Sweden would tend to increase energy use rather than reduce it.

<sup>2</sup> <http://www.folkhalsomyndigheten.se/documents/publicerat-material/foreskrifter1/fohmfs-2014-17.pdf>

<sup>3</sup> *Individuell mätning och debitering av komfortvärme och varmvatten* [Individual metering and billing for comfort heating and hot water], Thesis, Lund University

## Retain incentives for future energy efficiency improvements

In Sweden heat is included in the rent, in contrast to many other countries in Europe. This means that the property owner has a strong reason to maintain 20 to 21 degrees indoors with the least possible energy use. No shared incentive exists, but the property owner can take appropriate measures to reduce energy use. This may, for instance, involve supplementary insulation in the attic, insulation of the facade, change of windows, introduction of heat recovery and trimming of the heating system. Such measures do not only improve the building itself but also increase indoor comfort for the tenants. If the cost of the actual use of heating is to be metered and billed to the tenant separately, such investments would hardly be of interest to the property owner. SABO's member companies have made it clear that the energy efficiency improvements to their property stocks will cease if they are compelled to install individual metering and billing of heating, as they will not be able to share in the savings.

Thanks to heating being included in the rent the energy efficiency of the Swedish property stock has been improved continuously, which is clearly shown by the key ratios presented in the ODYSSEE database.<sup>4</sup> Sweden has a significantly lower heating energy use per dwelling than in Germany: 1.38 toe per dwelling in Sweden compared with 1.59 toe per dwelling in Germany. These figures are calculated so that the effect of climate differences between the two countries is eliminated.

## Great deficiencies in metering methods

Individual metering of heating can be effected with different methods. A doctoral dissertation<sup>5</sup> from Lund University contained a research review of the various metering methods in Swedish buildings. Heat transport between adjacent apartments is the most significant deficiency of the method of metering the heat input for individual apartments.

## Individual metering and billing of heating is not cost-effective in Sweden

As empirical experience and research analyses of individual metering and billing of heating under Swedish conditions demonstrates that the installation of individual metering does not reduce energy use, but rather tends to present a risk of it being increased, it is not a cost-effective measure. Moreover, it presents a risk of there being an immediate increase in energy use following installation. This conclusion is confirmed by the National Board of Housing, Building and Planning (Boverket), which has investigated<sup>6</sup> when individual metering and billing is cost-effective in existing buildings. This enquiry demonstrates that it is not generally a cost-effective measure in Sweden.

## Information about SABO and contact person

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<sup>4</sup> <http://www.indicators.odyssee-mure.eu/online-indicators.html>

<sup>5</sup> Individual Metering and Charging of Heat and Hot Water in Multi-Apartment Buildings, Simon Siggele

<sup>6</sup> <http://www.boverket.se/globalassets/publikationer/dokument/2015/individual-metering-and-charging-in-existing-buildings.pdf>

**The Swedish Association of Public Housing Companies (SABO) is in industry and interest organisation for 300 municipal housing companies. Member companies jointly own and manage 800,000 dwellings. The companies are important actors on the Swedish housing market, both locally and nationally.**