

Who benefits? Effects and perceptions of residential volumetric water billing

Abstract:

What are the effects and perceptions of increased installation of water metering and volumetric billing in residential areas in Sweden? An interview study was undertaken in a low-income suburb of Göteborg to explore residents' experiences and opinions. Additionally, the interests of water and energy companies, social affairs committee, real estate owner and maintainer were investigated to contrast the added value of reduced water consumption. Stakeholders either benefit or are disadvantaged by the introduced system. Furthermore, the applied tariff structure fails to motivate all segments of the population to reduce water consumption, yet still inequitably burdens the most financially exposed groups.

Keywords:

Water; Volumetric Billing; Resource Consumption; Tariff Structure

Introduction

Sweden has to a large extent adopted a market driven environmentalism as means for eco-innovations and socio-technical transitions. Visions of sustainable development are supported through investments and incentives for clean-tech products and processes. A challenge remains in internalizing externalities, in order to reduce resource consumption. Another important aspect is recognizing the role of households, not just as units or consumers, but also as active subjects or contributors (Strengers, 2011). Associating consumption with a price is one way of recognizing the residents' role, and constitutes an essential part of the ecological modernization paradigm (Spaargaren, 2000). One example is the introduction of water meters and volumetric billing in an increased number of Swedish residential areas. Such measures, aiming at consumption feedback, have proven effective in reducing resource consumption (Darby, 2006). Nevertheless, this idea fails to take into account complex societal consequences and issues of equity for residents. In addition, ecological modernization builds on flexibility and efficiency, while volumetric billing *discourages* rather than *limits* consumption. Therefore, this extended abstract discusses the range in effects following volumetric billing implementation, encompassing residents' perception of this process.

Method

A threefold study was conducted at Bredfjällsgatan in the low-income suburb of Hammarkullen, Göteborg, where volumetric billing was recently instigated. Volumetric consumption data of cold and hot water was collected for all 599 apartments. Stakeholder meetings with water and energy companies, social affairs committee, real estate owner and maintainer were carried out respectively to map interests. To further understand residents' experiences and opinions on volumetric billing, questionnaires and accompanying brief semi-structured interviews were carried out in 85 households. In this extended abstract, reflecting a work-in-progress, the semi-structured interviews and background data compose the bulk of the analysis and conclusions of the study. Future work will include further processing of the data, detailed cost analysis and statistical analysis of the residents' water consumption.

Results

The current linear tariff structure at Bredfjällsgatan was adopted from a structure developed for Gårdstenbostäder in 2001; a fixed price of 13.78 SEK/m³ for cold water and 43 SEK/m³ for hot water. New rental contracts signed by each tenant included the tariff structure and a lowered rent depending on the number of rooms/apartment, as to compensate for the introduced payment of water (see Table 1).

| Apartment | Reduction of monthly rent | Equivalent daily water volume consumption | Equivalent to the estimated consumption of (person not paying volumetric bills) |
|-------------------|---------------------------|---|---|
| 1 room + kitchen | 169 SEK | 205 litres | 1.12 persons |
| 2 rooms + kitchen | 190 SEK | 233 litres | 1.27 persons |
| 3 rooms + kitchen | 291 SEK | 356 litres | 1.94 persons |
| 4 rooms + kitchen | 359 SEK | 438 litres | 2.38 persons |

Table 1. *Description and interpretation of tariff structure used at Bredfjällsgatan, by person equivalent consumption based on a study by Energimyndigheten (2009).*

Some of the residents are social welfare recipients, with the Social Affairs Committee (SAC) paying the monthly costs, including the water consumption. These residents have no apparent financial motivation for reducing the water consumption. Furthermore, they often live in crowded apartments and if unemployed, spend a lot of time at home. Hence this group consumes considerably more water than what was offset by the lowered rent, resulting in an increase in total costs up to 2000 SEK, paid by the SAC. SAC is currently discussing whether this is the preferred solution.

The residents' opinions are polarized into two main categories; one group in favor of volumetric billing, and one opposed. The group in favor refers to arguments of economy, fairness and environment, stating opinions such as: "I earn money"; it is a more just system; or that it is good for the environment. The group **not** in favor of volumetric billing use similar, but oppositional arguments along the lines of "I lose money" or that it is unfair on people that are already struggling. Additionally, they comment on the fact that the apartments are run down, and that they feel other changes should be prioritized. As reflected in the opinions of the respondents interviewed, there is a clear sentiment of benefiting or being disadvantaged by the new system. The system implemented in Bredfjällsgatan has obvious beneficiaries, and show benefits as well as disadvantages for residents and institutions (see Table 2). This adds to the complexity and is relevant to bring up, prone to polarize the discussion on volumetric billing.

| Benefits | Disadvantages |
|--|--|
| Decreased total monthly cost for <i>one-person households</i> | Increased total monthly cost for <i>larger multi-person households</i> |
| <i>Improved flexibility</i> if water or energy costs increase as it would be possible to adjust the unit price | Increased reemployment threshold for the <i>social welfare receivers</i> |
| Reduced strain on the <i>environment</i> by reduced consumption | Increased societal costs paid by the <i>Social Affairs Committee</i> and indirectly by the <i>tax payers</i> |
| Largely decreased monthly expenses for <i>the housing company</i> | Reduced revenues and maintained expenses for <i>the water distributor</i> |
| <i>Future possibility</i> for temporal adjusted water cost to decrease peak hour consumption | |

Table 2. *Benefits and disadvantages of volumetric water billing.*

Discussion

One shortsighted consequence of not recognizing externalities in policy is over-consumption. However, as seen in this study, in the process of internalizing external costs, the savings made and the distribution of these are problematic. Although volumetric billing has clear benefits, such as reduced consumption, it is important to acknowledge under-lying conflicts. There is a difference between equal systems and equitable systems in this respect (García-Valiñas et al., 2010), as reflected in the difference in effects for one-person and multi-person households, and the subsequent polarization of opinions on volumetric billing. Single block tariff models, as applied at Bredfjällsgatan, treat consumers equally, but threaten to create inequities, as the same per unit price does not motivate all segments of the population to reduce consumption (Barberán and Arbués 2009). The low-income households will face a larger burden in the venture to reduce consumption while the more affluent are less affected. At its extreme, this could have health implications (Gascoigne et al., 2010; Rudge and Gilchrist, 2005).

An interesting alternative would be to combine multiple block tariffs with a structure that takes the number of residents into account (Barberán and Arbués 2009). Such a tariff structure could be used in order to increase motivation of different segments of the population, while still providing the financially exposed with a minimal amount needed to sustain livelihood. However, at Bredfjällsgatan, per capita block tariffs alone might not suffice. Some of the most financially exposed groups, such as the unemployed, spend more time at home and consequently need to consume more water in the home. Additionally, a per capita block tariff would be more difficult to manage and require more contact between tenant and housing company, as well as between housing company and SAC. Another issue would be how to accurately account for the number of residents/apartment, including long-term guests or unregistered residents. In conclusion, with an increased implementation of volumetric billing in contexts like Bredfjällsgatan, it is urgent to explore strategies that are both efficient in reducing consumption and equitable for all residents.

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