ABBSTRACT

District heating is well expanded in the residential areas in Sweden, although not in detached house areas, where it is often impaired with problems of low heat density, large heat losses and high construction costs. However, due to the changes on the electricity market, increased environmental concerns and technological improvements, the detached houses’ sector is a potential market for district heating.

The aim of this study was to find out what kind of strategies the Swedish district heating companies have for expansions to low heat density areas; what kind of information the companies gather about their potential customers; what facts they base their decisions on for selection of prospect areas and for marketing purposes; and what sales activities are used to obtain a high rate of connections.

To investigate these questions, a survey was sent to all district heating companies in Sweden. Questionnaires of the companies were followed up by telephone interviews.

The study concludes that the most important factor for choosing a new expansion area is the areas close location to the existing grid. Our analysis of the information collected by the companies about their potential customers proves that the customer basically is seen as a “heat load” in the system rather than an individual with different needs and interests. Promotion campaigns in detached house areas often include the phenomenon of social diffusion where the companies use interested potential customers to promote district heating. Specific sales strategies singled out deals to a large extent with solving timing problems when converting customers’ heating systems. Value added services of district heating are rare.

Keywords: District heating, expansion strategies, sales activities, detached houses, low heat density
1. INTRODUCTION

The market of selling district heating to detached house areas in Sweden has not been considered a very interesting business until recent years, primarily due to low heat density, high heat losses, high construction costs and well developed competitive heating sources, particularly electricity, which is the dominating heat source for detached houses (Swedish Energy Agency, 2002). About 8% of the detached houses in Sweden are connected to district heating today (Swedish Energy Agency, 2003). The line heat density (defined as sold heat divided by the total pipe length in an area) in detached house areas normally varies between 0,5-2 MWh/m. The average value in Swedish district heating networks is about 3,5 MWh/m (Swedish District Heating Association, 2004). When the line heat density is lower than 2 MWh/m an area is denominated a low heat density area (Werner, 2003). In this study detached house areas are considered as low heat density areas.

Due to the latest years of increasing electricity prices, other heating alternatives are becoming more popular, and the possibilities of selling district heating to detached houses are increasing. Other factors, such as environmental concerns and technological improvements (for instance improved insulation and piping technologies) also encourage the expansion. Since district heating in Sweden is already well developed in high heat density areas the companies look for new markets and detached houses is a very significant one. Different companies have different prerequisites for expansion as well as different expansion strategies. The strategies need to consider technical, economic and social factors. It is essential to have high rates of connection in low heat density areas to make the expansion economically feasible.

The competitors to district heating in the detached house sector are not other district heating companies, but rather those companies who sell boilers and heat pumps, electricity and/or natural gas. Investments in district heating grids are just too big to build parallel grids. The product of district heating – to provide the customer with heat and hot water – is compatible, but not the same to the customers as the other alternatives. To differentiate the product from other heat sources the district heating companies should promote the competitive advantages of the district heating system, which would require knowledge about customer preferences and needs. A competitive advantage for retailers of heat pumps and boilers is the fact that they can do sporadic selling’s to geographically spread customers. To get profit or even to reach break-even when building district heating in low heat density areas a high rate of connections to the grid is essential. Hence, the marketing of district heating to detached houses, means selling to a selected group where ideally everybody in the group will buy.

The change of heating system in a house is a matter of timing. The existing equipment should either be old or in a need to be exchanged, or there should be some other beneficial factors in changing the system. From the customer perspective, the change of heating system means a high involvement decision. A new system is costly and the conversion requires many changes in the building.

Though economic issues are obviously important when choosing heating systems, research has shown that customers should not be seen as economically rational decision makers, as they have a need to simplify their choices and therefore they focus on just a few preferences and consequences and disregards others (March, 1994). For that reason it could be wise to offer a set of different economic propositions in order to adjust to customer needs. Personal situations may occur in the household that makes the household members less apt to do any larger changes in the house, for example if the household members are old, or if they are planning to move in the near future. The main conclusion from this reasoning is that in order to connect as many households as possible within a specific area, the customers should be viewed as a heterogeneous group with different needs, preferences and knowledge.
The aim of this study was to investigate Swedish district heating companies considering:

- How they select prospect expansion areas and what facts they base their choices on
- What information they gather about the customers and how they collect it
- What sales activities they perform to obtain a high connection rate in prospect areas

2. METHODOLOGY

2.1. The survey

This study is based on a survey sent out to all members of the Swedish District Heating Association (SDHA). These companies supply 99% of the total district heating sales in Sweden. The frequency of response was 30% (51 companies out of 150). The survey questions aimed to cover the following information about the companies:

- Background information about the company and its heat production/sales
- Performed expansion to low heat density areas
- The company’s information about customers
- Sales activities

In order to deepen the answers regarding the expansion strategies telephone interviews were carried out with 17 of the respondents.

2.2. Applicability and generalization of the survey results

The study is limited to investigate the sales strategies of Swedish district heating companies and survey data stems from answers of representatives from the SDHA companies. Customer surveys are not carried out. Since essentially all Swedish district heating companies are members of the SDHA one can say that the Swedish district heating companies are well represented in the study. The falling off of respondents might naturally distort the results and a comparison with statistics that include all SDHA members has therefore been performed. The analysis shows no large discrepancies from the sample population in terms of ownership structure, annual heat sales, share of heat sold to detached houses and fuel mix.

3. RESULTS AND DISCUSSION

3.1. Decisive factors for expansion in low heat density areas

Building district heating systems in low heat density areas is economically challenging. Considering this, it is of interest to investigate what factors the district heating companies find essential when they decide whether to expand into a low heat density area or not. The survey results are presented in Figure 1.

![Figure 1: Factors that district heating companies find decisive when expanding in low heat density areas](image-url)
According to Figure 1, approximately half of the respondents find access to cheap heat to be a decisive factor when expanding into low heat density areas. This relatively low value is actually surprising since low production costs can be expected to be an essential factor for expansion. One possible explanation could be that many companies view the heat production as something almost invariable and therefore they have a vague picture of what the situation would be like if they, for instance, had access to cheap waste heat. The most important factor when district heating companies decide whether to expand into an area is its location in relation to the existing grid. Many companies have commented that only detached house areas located close to existing mains are connected to the grid. With “Good geographical location” the distance to the production site, ground conditions etc was intended, however it turned out that many respondents thought that also this alternative was related to the distance to the existing grid. Considering that a majority of the Swedish district heating companies are municipally owned, it is not surprising that one third of the respondents specified that political incentives are important. Commonly specified examples of political incentives were measures to limit local and global environmental pollution. As “Other factors”, for instance over-capacity in the production, grants to the district heating companies for expansion and grants to private persons for converting to district heating were mentioned. However, the opinions differ regarding the importance of grants; some companies find them to be important while others think they are quite insignificant.

### 3.2. Information about customers

To be able to know who your potential customers are within the chosen expansion area, you need to have information about the houses and the people living in the area. This study investigates how the district heating companies gather information, what kind of sources they use and what kind of information they collect. In Figure 2, results from the survey regarding which sources district heating companies use to obtain information about the potential customers are put together.

![Figure 2: Sources of customer information used by district heating companies](image)

As seen in Figure 2, the most common source of information about potential customers is customer surveys. Surveys sometimes are sent out to all households of detached houses in a city but most often only to households within a selected area. Half of the companies’ say that they make personal contact with the potential customers either face to face or via telephone. About one third of the companies state that they use records or directories of different kinds. One example of this is the municipal energy plan, which has to be approved by the municipal council. The energy plans are thus established documents that show the visions and objectives of future energy supply and energy use in the municipality. Property taxation directories are also mentioned as information sources. Here some interesting information can be found about the properties in a selected area. Another useful record stems from the fact that in Sweden, well-boring for installation of energy wells must be reported to the authorities. A few district heating companies mention that they sometimes use this record to map out the presence of heat pumps in an area. Other sources of information can be
local craftsmen, for example plumbers and chimney-sweepers. A big advantage with these professionals is that they not only can tell what kind of equipment the households have, but also what condition these are in.

The next question is: What information about the customers are the companies interested in? Figure 3 displays what information the companies state that they collect about their potential customers based on alternatives given in the questionnaire.

According to Figure 3, the district heating companies have a clear insight in most of the physical factors that can be of interest when estimating the heat demand in an area. They also have pretty much information of the customers’ present need to shift heating systems and if the internal heating system has to be rebuilt in order to connect to district heating. Social factors like age of household members, income, profession and education, are hardly examined at all. One exception is the composition of the household, where 18 % of the companies state that they gather this kind of information. However, this can be due to the fact that the number of household members could be one of the factors for estimating domestic hot water load.

The chart in Figure 3 gives a clear picture that the Swedish district heating companies to some extent still view their customers mainly as subscribers for heat rather than customers with different preferences and needs.

3.3. The sales process

In Figure 4 the typical course of action that district heating companies use when expanding into detached house areas is shown. The summary is based on the survey and the interviews.
It is often the case that customers initiate the contact with the company wondering when they will be able to connect to the district heating system. Often these interested customers act as the company’s “ambassadors” and play an important role in the selling process by investigating interest and promoting district heating in the specific area. In other cases the company, based on available information or due to shown customer interest, selects an area they believe have a potential. Once an interesting area is found, interest inquiries are sent out and/or information meetings are arranged. The purpose of these activities is both to provide the potential customers with information and to gather information about them. If the interest in the area is high enough the next step is contract signing. The contract is typically a unilateral agreement where the customers commit to connect to the district heating system if the company decides to go through with the project. The company on the other hand normally makes no commitment to the customer at this stage. During or even after the construction process, efforts are sometimes made to get more customers to connect to the grid. The fact is that some customers tend to decide to go for district heating only after the construction has started. A possible explanation to this can be that the customers are uncertain whether there will be an expansion or not and that they want to see if the expansion plans really are to be realized. Another explanation can be that in the course of construction, the customers have the possibility to meet and talk to representatives from the district heating companies.

### 3.4. Strategies for dealing with timing problems

When a new district heating grid is being built some customers might not have the interest or means of getting connected. For example, they might have just invested in a new heating system or they don’t have the money to put in to the investment at the present time. Some of the district heating companies in the study came up with strategies to deal with timing problems when converting the customer heating systems:

- **Customer compensation for current heating device**: Some companies pay for the customer’s old equipment in order to attract those customers who recently invested in a new heating system. The compensation is often restricted to an age limit of the equipment.

- **“Heat emergency”**: Sometimes customers have problems with their old boiler before the district heating grid has been fully constructed and they can connect to it. To help the customer – who has already signed the contract with the district heating company and therefore is not interested in another new system – the company can offer to install a heating system to operate until the connection can be made. Some companies use old boilers they have bought from other new customers. A few companies have come up with the solution to install the district heating substation that will be used, but to use it temporarily with an immersion heater. The cost for the heat during this temporary solution sometimes is adjusted to district heating prices.
• **Mediation of boilers:** Another example to facilitate customer change of heating system is to help mediate old boilers to other buyers.

• **“Resting connection”:** If the customer for some reason don’t want to connect to the district heating grid immediately, some companies offer a “resting connection”. This means that the pipes are drawn to the customer facility, even if the customer does not buy heat. Different companies have different agreements on time limitations and connection fees. In some interviews there has been companies that strongly oppose the use of resting connections due to problems that occur when the customers choose never to connect to the grid.

• **Repurchase of oil:** Some examples exist of companies that offer to purchase the remaining oil in the customer boiler tank. This offer could of course be extended to include other types of fuel.

• **Competitive pricing:** Some companies choose to subsidize the connection fee in order to make the financial part easier for the customers. In this way, customers with small possibilities to take out mortgages on the house or that suffer from a temporarily bad economy, still can afford to make the connection to the district heating grid. If the energy price for district heating is considered to be substantially lower than for other alternatives, this also can have an impact on the household’s immediate living expenses.

3.5. Experiences and advices

Both in the survey and in the interviews, recommendations and ideas came up regarding sales in detached house areas. A common idea is that interested customers should be used to investigate the interest in their neighbourhood. Often one or a few “ambassadors” for district heating will appear and these can carry out the initial work in the sales process. In this way the company can avoid putting sales effort into areas where the general interest in district heating is low. One interviewee expressed that “the best salespersons of district heating are the house-owners themselves”. It is apparent that the influence of social diffusion is important. For instance, one interviewee had the opinion that May to August are the best months to sell district heating. During this period most Swedish house-owners spend lots of time in their garden and thus there will be many occasions to discuss for instance district heating with the neighbours. However, it should be remembered that the competitors to district heating also have “ambassadors” and they can in a similar fashion ruin the market for the district heating company.

Some interviewees had thoughts regarding how to act during and after the interest in an area have been investigated. One thought was that if the number of customers is not great but at least sufficient, the expansion plans should be realised. The idea of “the excavator as entrepreneur” was introduced meaning that once the building process starts there will often be more customers who decide to join. Apart from this, some condensation of the system will hopefully occur even after the initial expansion. If the interest is so low that the company, despite great sales efforts, cannot go through with its expansion plans, the specific area should be considered as “lost” for a considerable time. The reason for this is that the need to replace the current heat source is a real need for many of the house-owners. If they were not aware of this need earlier they certainly will be after the marketing from the district heating company. Hence, if the new heat source cannot be district heating, then the house-owners will look for alternatives making it even harder for the district heating company to attract more customers in the specific area at a later stage.

Different customers have different economic situations. One company that has taken this into account is Göteborg Energi AB. They offer their customers three different types of contracts of district heating with alternative investment cost for the customer, yearly price and energy price, see Fel! Hittar inte referenskälla..
Table 1: Contract alternatives for detached house owners Göteborg Energi AB, (Magnusson, 2004)

<table>
<thead>
<tr>
<th>Contract name</th>
<th>FV 1*</th>
<th>FV 2*</th>
<th>FV 3*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Investment by customer [SEK**]</td>
<td>0</td>
<td>31000</td>
<td>82000</td>
</tr>
<tr>
<td>Yearly price [SEK]</td>
<td>3900</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Energy price [SEK/kWh]</td>
<td>0.748</td>
<td>0.748</td>
<td>0.50</td>
</tr>
</tbody>
</table>

*Vat is included in the prices
**1 SEK ≈ 0.11 EURO

The company expected alternative FV 1 to be the least economically beneficial choice for the customers. 70% of the customers, however, choose this alternative, 20% choose alternative FV 2 and 10% FV 3 (Magnusson, 2004). Even if the company didn’t know their customer preferences very well, the variance in customer choices shows that the different alternatives appeal to different customers. By offering alternatives, the company better adjust to customer preferences.

Based on the surveys it is apparent that most selling strategies used by the district heating companies today disregards factors besides the core product “to sell heat to detached house customers”. To be able to differentiate the product from what the competitors offer, district heating companies could offer value added services. The customer might not just need a new heating system; to have a snow free garage drive or to get a landscape gardener to help organize the garden when the pipes have been installed are examples of customer focused services which you rarely see in the marketing strategies of the Swedish district heating companies. Even if there is a rather big interest amongst house-owners in detached house areas to connect to the district heating grid, there is still the matter of getting a high rate of connections. The information that the companies have stated that they collect about their potential customers is not of the kind from which you can develop specific solutions for specific customers.

4. CONCLUSIONS

- A high rate of connections is essential in selling district heating in low heat density areas. Many companies state that they experience a great customer interest in district heating and that they often get phone calls from customers who want to connect to district heating. Thus the problem is not to get interested customers but to get as many customers as possible to connect within a prospect area.
- Closeness to existing district heating grid is the most important factor when choosing expansion area according to the companies.
- The fact that the kind of information companies collect about potential customers mainly refers to technical factors and not to social, implies a somewhat rigid view to the customers. Without social information about the target group it is very hard to offer tailor-made solutions to the customers.
- Some companies have come up with sales strategies that incorporate strategies of timing problems. These strategies may facilitate the customer situation when changing heating system.
- Many companies are aware of the importance of social diffusion and use it to different degrees in the marketing process.
- Most selling strategies used by the district heating companies today disregards factors besides the core product “to sell heat to detached house customers”. Solutions to other customer needs could give value-added service to the customers. More creativity is desired.

5. ACKNOWLEDGEMENT

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