

Energy Services at Stockholm Energi

**Brita Olerup, Royal Institute of Technology and Anders Lindén,
Birka Teknik & Miljö AB**

1. Synopsis

In a deregulated market a utility has to diversify its products, e.g. offer energy services, so as to win competitive edge and certify sales volumes.

2. Abstract

Stockholm Energi offers, presently, a portfolio of fourteen energy services to professional customers excepting the smallest ones. These energy services are qualitative supplements to the ordinary energy products such as electricity and district heating. Energy services are supplied within a wide range, e.g. energy audits, training programmes, and technical installations.

A contract with a large customer concerning energy deliveries often contains a certain quantity of energy services. Which energy services customers will receive are later settled in discussions with them. Experts at Stockholm Energi usually recommend modified operating procedures since these represent the most cost-effective measure for the customers.

Utilities in a deregulated market tend to offer energy services so as to diversify their supply and win competitive edge. Stockholm Energi, however, also has a history in energy conservation. It was the first Swedish utility to launch campaigns promoting an energy-efficient technology. Energy efficiency had at that time a value of its own but has now turned into an energy sales argument.

3. Introduction

This is a description of which energy services are being offered to whom by a Swedish utility operating in a newly deregulated electricity market as well as how this offer is made and why it is being done. Since the present situation has evolved from an historic context, we briefly touch on the past as well as suggest a possible continuation in the future.

The concept of energy service has been differently interpreted over time. These differences pertain to who is the interpreter and the situation in which this person is operating. Prevailing tendencies point, however, at a possible agreement in the near future. *Scientists* started out by meaning services received from energy such as space conditioning, illumination, and mechanical power. When the concept was transformed into operation, *practitioners* stressed the word service and used it as qualitative supplements to the ordinary energy products such as electricity, district heating, district cooling, and town gas. These supplements could consist of energy audits or maintenance service on a substation.

This divergence in opinion is understandable since there are obvious difficulties when applying the theoretical definition. All energy products comprise several energy services just as one energy service could be supplied from several energy products. So far utilities restrict themselves to delivering the products and bills are made out according to them. Heating supplied from electricity or district heating could, consequently, be priced differently.

In spite of these operational anomalies, practitioners seem to be about to join in the scientific definition. The deregulated electricity market is the reason for this development. Suppliers competing over market shares want to diversify their products so as to avoid price comparisons. Qualitative supplements are then one means to reach this end. Utilities could, however, proceed one step further and certify some of the remaining links up to the actual end use. This would establish a closer relationship with the customers and enhance the competitive strength of that utility.

4. Stockholm Energi

Stockholm Energi AB is a vertically (generation, transmission, distribution, and sales) and horizontally (electricity, district heating, district cooling, and town gas) integrated utility owned by the City of Stockholm. It has a total turn over of 7 GSEK (Stockholm Energi 1996). It is the fourth largest utility in Sweden in terms of electricity sales, but the largest in district heating. Around 450.000 electricity customers consume 13 TWh, 6.000 district heating customers consume 6 TWh (a coverage of 60 percent), and 125.000 town gas customers consume 400 GWh. Prices are regarded as fairly high (households pay around 0,75 SEK/kWh_{el} + 375 SEK/year including taxes) in comparison with other Swedish suppliers, but low in comparison with conditions in other European countries.

4.1. Customer Relations

Before the late 1980s, utilities in general rarely communicated with their customers, who may not even be the end users of their products. Exceptions concerned reading off meters and distributing bills. At that time a political decision to initiate the nuclear power phase out in the mid-1990s led to an assumed shortage in the electricity supply. Stockholm Energi planned an energy conservation programme and formed a marketing department (Olerup 1994a). These activities implied an ambition to get a closer relation with the customers. Energy efficiency had at that time a value of its own. It takes time to build social networks and enough time was not provided within that framework since external conditions changed once more.

In the early 1990s, there were two other political decisions. One was to postpone the initiation of the nuclear power phase out, which meant that the assumed capacity shortage suddenly turned into a likewise assumed surplus. Another decision was to introduce competition in the electricity market. Stockholm Energi interrupted its conservation programme. Some customer connections continued, but now due to a pronounced business interest. Energy conservation became degraded to a side issues used to certify energy sales. Utilities are so far more oriented towards one another and to profile themselves on the market than to learn about their customers' potential problems.

4.2. Organization

Stockholm Energi has grown considerably in recent years, but it aspires an even larger expansion. Since Swedish municipalities are restricted to operate within their borders, this expansion will take place through a special arrangement, where its operation and maintenance staff is employed within a separate company Birka Kraft AB. Stockholm Energi owns together with the Finnish Imatran Voima Oy (IVO) Birka Kraft. Their cooperation came into force in January 1997.

Stockholm Energi continues to own all plants and to administer the entire customer stock. The work force at the plants is contracted through Birka Kraft. In addition to an operation and maintenance company (Birka Service AB), Birka Kraft also comprises a consultancy company (Birka Teknik & Miljö AB). Salespeople at Stockholm Energi negotiate with the customers and settle on some level of energy services. Thereafter, the two parts of Birka Kraft undertakes the actual work. Energy services are sold on a strictly commercial basis, i.e. customers have to finance all costs themselves.

5. Fourteen Energy Services

Stockholm Energi offers, presently, a portfolio of fourteen energy services. In actual fact, each one of them is more of a broad category encompassing several activities just as there are a few minor ones which are left unspecified. The fourteen services are possible to divide up in three groups. Services in the first group applies to all the energy products, while the other two groups either concern electricity or heating based on water.

A customer's overall need for measures are targeted in *energy and environmental audits*. These may show that the operation and maintenance of the existing equipment could be improved if the staff—in the form of e.g. caretakers, boilermen, and safety representatives—are given appropriate *training*. Customers may also apply for an *electronic data interchange (EDI)* facilitating the payment procedure; especially interesting for those customers who buy several energy products and have many subscriptions.

Services linked exclusively to electricity are, e.g. improving *lighting* conditions indoors as well as outdoors. Other possibilities are analysing the *voltage quality* in the search for disturbing harmonics or reactive power. Customers could also decide on some level of *preparatory examination* arranging for Stockholm Energi to inspect their high voltage installations in order to avoid sudden breakdowns. The entire installation may even be in need of modernizing and old parts successively replaced by new ones. Stockholm Energi undertakes to assist in the *design and purchase* of any aspect of the electrical equipment as well as its *construction, reconstruction, repair, and maintenance*.

Services linked to water based heating are drawn up in a corresponding manner. These could be turn key customer installations, i.e. every task associated with a *district heating* connection. Stockholm Energi offers to *examine* the substations and to suggest how they could be *modernized*. If a certain part of the city is not yet within the range of the existing piping system, but planned to be connected in the near future, Stockholm Energi offers in the meantime to *take over* or merely operate the customers' individual boilers. At times such boilers could even be joined in small heating islands. If a boiler or burner should breakdown, Stockholm Energi could guarantee their *replacement* until the large pipes have reached the area in question.

6. Motives Behind the Offer of Energy Services

Motives are possible to detect through *who* is the subject of the offers, what is involved in them, and the context in which they originated. Stockholm Energi only include large customers, at first they had to be high voltage subscribers, but the limit has gradually lowered to a consumption of at least 150 MWh_{el}/year, which automatically imply that they belong to the industrial & commercial sector. Electricity consumers were the first to be targeted, due to the announced deregulated electricity market, but the other energy products followed shortly afterwards. In other words, profitable customers who may be of interest to other suppliers.

Concerning *what* is involved, the fourteen energy services described above are obviously meant to increase the technical, e.g. safety aspects, and economic performance of the customers' installations as well as improving their working environment and causing less damage to the external environment. Other advantages are that the energy management is made more convenient for the customers. These benefits could reflect back on the utility, e.g. in the case where payments are transferred to electronic systems. Mutual benefits do also seem to be the most fruitful basis for any long-term exchange.

All of the energy services are in actual fact not new ones but has evolved from different *contexts*. Offers to design and facilitate the purchase of electrical installations are as old as the electricity product itself. Smaller heating islands appeared during the 1980s due to the at that time uncertain market for district heating. Some of the services belonged to the early conservation programme. Its financial stress was on lighting campaigns (Olerup 1994b). Energy audits were its next ingredient and their development into environmental audits was a natural step to take. Even training—linked to lighting—began at that time. Since then the content of the courses given has expanded in line with the other energy services provided. The new element in all of this is really the commercial condition.

7. Working Procedure

The approach used by Birka Teknik & Miljö today evolved from one exceptionally thoroughly metered case study, i.e. Stureplan. Findings from that study not only guide the metering that is undertaken today in other cases, but also the cooperation that was found to be necessary between the different people involved so as to achieve a successful outcome.

7.1. The Mother Case: Stureplan

The Stureplan study concerned an electrical substation at a marketplace in the city centre (Tjernberg et al. 1993). The substation was believed to be overloaded in the near future. Building another substation would, in that area, run into space problems and, in addition, be expensive, which made energy conservation the most promising option. The metering that was undertaken—starting in 1991 but most of them in the autumn of 1992 extending into 1993—became exceptionally thorough and the results still guide subsequent energy audits.

The substation in question supplied eight buildings with a heated area of 75.000 m² of which half contained offices. Although each season has its unique claims on energy, the total consumption (14 GWh/year) was fairly constant throughout the year with a small peak in the summer due to the need for air-conditioning. However, there were large variations in specific energy use between the different buildings depending on their occupation; a factor of nearly four for electricity due to restaurants and a factor of over five for district heating due to dwellings.

Four of the eight buildings were included in the study since they represented 80% of the electricity consumption. Lighting, ventilation, and air-conditioning covered 80% of this sample's total energy use and 60% of its total power use (see Figure 7-1). Lighting then represented as much as ventilation and air-conditioning together for both energy (38%) and power (35%), whereas ventilation had more of an energy profile (29% versus 18%) and air-condition-

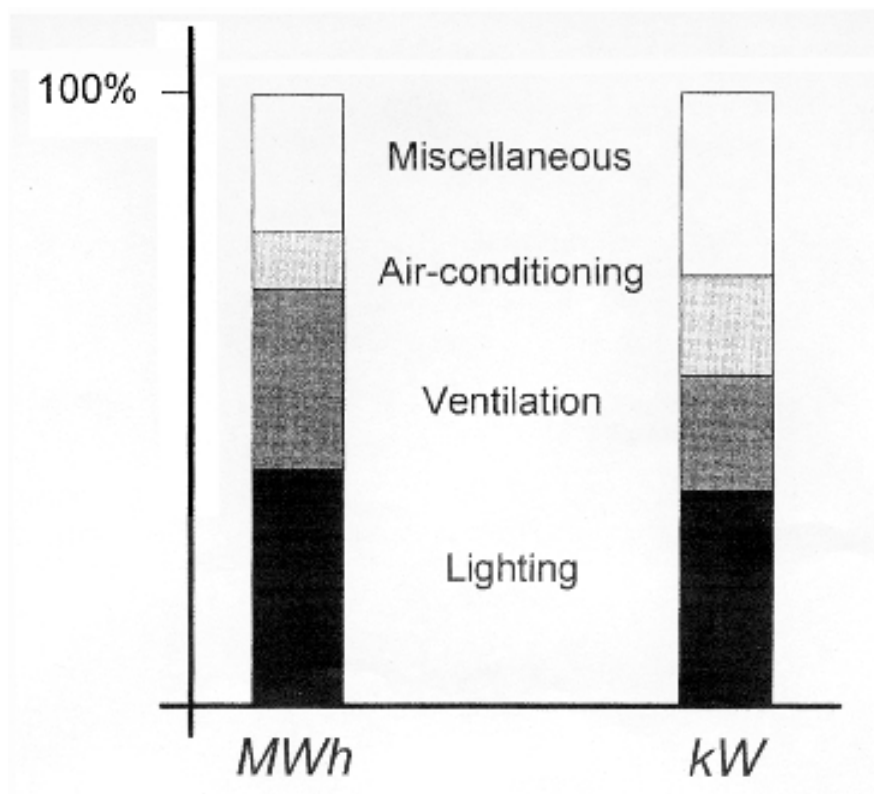


Figure 7-1. Energy and Power Needs for Three Different Energy Services in Four Buildings at Stureplan.

ing that of power (10% versus 17%).

Shops had more energy wasting lighting conditions than the offices. Since lighting here stands for a means to make the merchandise look attractive and increase sales, a potential waste of energy was not an important issue for the present owners. Suggestions for improvements are thus more likely to be favourably received when there is a shift in owner and the whole lighting system is adapted to the new occupant. Concerning ventilation, automatic control systems was in need of adjustments. One barrier was then a limited space that is expensive to rent in such an exclusive area. The same need for changes applied to the air-conditioning systems, but here, it was also a question of the entire system's scale and especially its coordination with the heating system.

Measures suggested implied a four-fold economizing: reductions in the need for electric energy (12%), electric power (6%), district heating energy (7%), and money (750 kSEK/year). Ventilation represented nearly 85% of the energy conservation achievements, whereas lighting in the long term would add another 20%. In spite of the initial problem behind the study, there being a possible shortage of power capacity (kW), measures aimed for energy conservation (MWh). This anomaly did not matter since, when consumption trends were extrapolated into the future, the feared problem of overload was in actual fact no danger. The substation would suffice even without undertaking any of the suggested measures.

7.2. Contracts, Metering, and Cooperation

The contracts that Stockholm Energi have with large customers concerning energy deliveries often contains a certain quantity of energy services. These amount to around two percent of the generating cost excluding taxes, i.e. more than 20 kSEK and most often in the interval of 20-30 kSEK. Customers could either choose to be charged for running expenses or a fixed amount. Which energy services customers will receive are usually settled later in discussions with them. Combinations are made depending on their specific situation. Energy audits are then used as screening instruments.

Following the results from the Stureplan study, the metering is focused on five points:

- Power needs at the substation
- Power needs in the buildings
- Ocular inspection of the lighting systems
- Momentary power needs for ventilation and pumps
- term energy and power needs of the air-conditioning equipment and its dimensions coordinated with electricity based heating systems.

Although Birka Teknik & Miljö often contracts sub-consultants with the appropriate equipment to undertake the field work, one person at Birka Teknik & Miljö always coordinates and participates in the analysis and the presentation of the results to the customers. The field work has to be done in cooperation with the owners and their operation & maintenance staff. This latter group is especially important to involve in the negotiations, since the experts at Birka Teknik & Miljö have discovered that modified operating procedures are usually the most cost-effective change a customer can undertake. The whole process is usually completed within two months.

8. Possible Future Development

It is often said that industrialized countries need to develop their manufacturing industries into service companies. This is a difficult transition, but probably a direction that is necessary to take even for utilities. It would imply a product development based on the customers' problems. Utilities would then have to enlarge their responsibility one step beyond the energy products so as to be able to enter the customers' premises. In Sweden, no utility has yet reached that far, but there are signs and efforts undertaken in that direction. Such a task does also demand building networks with the customers, which takes time and ability in order to accomplish.

9. Acknowledgements

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10. References

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