



Business model in Middelfart - energy savings with ESCO firm

- And a attempt to evolve a business model for private houses

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Middelfart has made the headlines and is on the podium in Danish energy contexts. This is because they have been the first to try the ESCO-model for all municipal buildings in Denmark.



Landscape in Middelfart municipality, air photo

ESCO (Energy Service Company) is a term for companies engaged in energy-saving measures in buildings and finances them through the achieved economic savings. It is companies or consortia, who in a single package solution offers to be responsible for analysis, project design, financing, execution and start-up, including user training.

An other financial solution is known as EPC Energy Performance Contracting. Here the idea is that the company guarantees a certain energy performance. This could be a contract regarding a certain temperature in buildings.

Many municipalities and major building owners are presently considering whether to enter into ESCO collaborations and which models they should use and are therefore very interested in experiences from Middelfart. The business model within ESCO, does call on customers to consider an number of questions:

- Can ESCOs satisfy expectations when conducting entire renovation processes to user satisfaction?
- Is it economically worthwhile for the municipality, are payback times realistic?
- Are the best energy solutions achieved, is it a good model in relation to renovation of buildings?
- What problems occur in relation to being responsible for the renovation yourself?
- Can the model be extended to private homes, institutions, and housing associations?
- Could small construction enterprises and other actors use a similar model and/or participate as partners in such models?
- Does the model ensure enough savings – why not be really ambitious?
- What is the amount of buildings and can the amount be enlarged during the process?
- Is it possible to conduct further energy-savings in the buildings during an ESCO process? In other words, is it possible to improve the performance with a new ESCO in the process ?
And how is base-line managed?

These questions can only be answered on the basis of experience of some years. Here the “Middelfart model” is presented and it’s background, some points of discussion and further plans for energy development in Middelfart.

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The Middelfart model – background and progress

The merging of municipalities created a new map, where “small municipalities” foolhardy rashness was merged with the county’s expertise”, as head of climate Morten M. Westergaard and director of technique and environment Thorbjørn Sørensen puts it. The three municipalities Middelfart, Ejby and Nørre Aaby and had no particular environmental profile, and there had been no systematic energy management on municipal buildings.

The new Middelfart municipality was interested in creating growth and development. They saw opportunities in environment and energy. A strategy for “Middelfart - the green growth municipality” was adopted by the city council.

In recent years a number of initiatives on environment and climate have been launched:

- Climate Municipality Agreement with the Danish Society for Nature Conservation of 2% CO2 reduction per year
- Requirements for low energy class 1 in local plans comprising larger construction works
- Large nature park project Hindsgavl Deer Park and Nature’s Day
- Energy Renovation of all municipal buildings over 10 years with ESCO
- “My climate plan”: a partnership with packaged solutions for private energy renovation – a concept that continuously is elaborated

Energy renovation almost free of cost ...

The director for technique and environment came from Funen County with many good ideas, among others with knowledge of the ESCO-concept. Some municipalities in Sweden had used an ESCO for energy-renovation and the model was presented to the city council as a model where the energy savings would pay all costs of energy renovation. It was a model which appealed to the politicians and a pilot project was launched.

At the same time the local energy supply company Trefor was invited to participate. They were promised that energy savings in municipal buildings could be included in their statutory annual energy savings and therefore made free energy consultancy available.

In the pilot project a representative sample of 8 municipal buildings (30,000 m²) was reviewed by consultants from Trefor. They found potential savings of 19-24% with a simple payback time of 6-10 years. By comparison with the total building stock (133 190,000 m²) and its energy consumption a savings potential of approx. 20% at a total investment of 33-41 million DKK was made probable.¹⁾

The project was cut short when it's continuation was hindered by the state imposed cap on construction work. A dispensation was to be approved, which the Minister of Climate and Energy had promised, but the Minister of Finance would not approve it. Finally it was given by the Minister of Welfare - as an interesting welfare project, but without a word of it being an interesting energy project.

Energy planning on market terms

The city council decided on a total funding of 44 million DKK which would encompass both energy-saving measures and other wishes for building modifications. They decided to put the project out for procurement. There were 5 companies who made bids on the energy savings they could guarantee. The winning bid secured an overall saving of 20% annually and provided a payback time on energy investment of 10-11 years. After winning the procurement, the company should prepare the actual project design including what type of initiatives would be implemented in which buildings and calculate the amount of savings that could be achieved.

The municipality was assisted by the Swedish municipalities and by consultants in designing the procurement and contracts. Stopping points were deliberately incorporated, so the city council could opt out on several points during the progress of the project and renew their position towards the plan.

With this procurement it was up to companies themselves to find the building improvements that would provide the greatest energy savings. From the beginning the municipality has thus deselected to let other requirements for the renovation and energy solutions affect the project, for example experimental solutions, or renovations with an emphasis on comfort, aesthetics or building improvements.

However, it has been part of the negotiations that other improvements could be added to the defined initiatives, which in turn would cause a longer payback time. The city council has been able to determine how large a sum was to be spent on energy improvements with guaranteed savings and what additional improvements they wished for to be carried out simultaneously.

Investment model

On the background of the specific energy conservation projects in municipal buildings the ESCO could develop a comprehensive plan with a total guaranteed energy savings of 20%, shared among

concrete energy savings targets for each building. For these investments there could be a payback time of 10-11 years. In addition to this the municipality had different additional requests to be included. If these additional costs were to be also paid back via energy savings, the payback period for the total investment will be approximately 19 years.

The city council agreed on spending 44 million DKK on the projects. The municipality has loaned the money themselves as they can obtain cheaper loans, and then made them available to the ESCO. The ESCO must in turn perform the specified tasks. If the guaranteed 20% savings each year (compared to the situation prior to the project) in the first 7 years is not achieved, the ESCO must pay the difference. Additional savings up to 3% will accrue to the municipality. Additional savings beyond that are shared between the ESCO and the municipality. After the first 7 years all future savings accrue to the municipality.

The city council decided on that basis to launch the project. At the same time they decided that the possible 3% additional savings should go back to the respective institution to provide an incentive for behavioral change and additional savings.

Operational period and users

After projects are completed in each institution energy consumption must be registered and employees are to be trained to manage systems and installations etc., to ensure correct measurement of savings. However, it may become difficult to prove any discrepancy from the expected savings.

Employees and users have received the project favorably. There have been no objections or additional requests from users. It is already the central administration who is in charge of building maintenance.

It has given some unrest in the city that each school cannot use the craftsmen they are accustomed to, but it is the ESCO that assign contractors and craftsmen to do the work. Problems may also arise if subsequent investments in further energy saving measures are made and alterations implemented. To whom will the possible additional saving accrue?

Advantages and disadvantages for economy and environment?

Could the municipality conduct the work themselves?

Middelfart municipality sees, according to the director of technique and environment, this project as a good solution for their renovation needs. They have not themselves been able to perform the analytical work Trefor has provided and anyhow they would have to sign a contract with a company that could carry out the renovation work. They have also achieved a lot of PR on being pioneers on this field.

The municipality has not built its own expertise to handle energy management and greater energy renovation projects. They have not been accustomed to make larger investments to achieve returns later, such as private companies would do. It would therefore require considerable time and resources to achieve the necessary competence and project management.

The municipality has been able to identify the low-hanging fruits but has not had the resources to pick them themselves. Time will tell whether the project will fulfill expectations or whether the municipality has paid a high price for the accomplished renovations.

Role of the ESCO

The ESCO performing the work, is a large multinational company, Schneider Electric, which has energy services as one of their specialties. They are gaining ground in Denmark and several other municipalities are now cooperation with them, among others Kalundborg, Kerteminde and Gribskov. There are other possible models for ESCO-cooperation; DONG has for example, in collaboration with the Spar Nord bank, announced that they offer energy services as an ESCO, and there could also be local partnerships with financiers, energy supply companies and local contractors.

The task for the ESCO in Middelfart is to specify a number of tasks that can provide at least 20% savings and execute them within the agreed period of time, and to train users to operate the equipment. In an agreed period of 7 years they are required to pay the difference if savings are less than 20%, and in return they receive half of the profits if they manage to save more than 23%. Furthermore, they perform a series of tasks which the municipality wishes carried out simultaneously under normal conditions.

The ESCO has the role of turnkey contractor but they outsource sub-tasks to other companies, among others local craftsmen. The municipality has in this case financed the work themselves through municipal loans, but the ESCO would also have been able to handle the financing.

Role of the energy supply company

Trefor has provided analytical work *for free*, both in the pilot project and the major project. Their interest is to record the expected annual savings as a part of the savings they are required to provide according to an agreement with the national government as part of the Energy Agreement 2005. For them it is a question of what it costs to achieve these savings, for example in comparison with replacing circulation pumps in the industry sector or providing private energy consultancy.

Perhaps a price will be put on these savings in the future. The municipality might have sold their savings too cheap by giving them away in exchange for analytical work.

Trefor has through the project achieved competence in performing these tasks and will in future be able to develop a business concept as an ESCO.

The low hanging fruits

There have not been systematic energy management in the municipality before and because of the cap on construction work and budget cutbacks there have not been many investments in energy improvements for quite some years. Even with the promised projects Middelfart will probably still use more energy than the most energy-conscious municipalities, according to the director of technique and environment.

This means that on the one hand, the ESCO model cannot be used by everyone, as many other municipalities have already completed the most profitable projects, and therefore there is little to achieve for an ESCO.

On the other hand, the solutions offered may simply be to pick the low hanging fruits, such as energy saving light bulbs and replacement of circulation pumps, while the more expensive solutions, such as replacement of windows and improved building envelope will not be conducted. There will in a few years perhaps be a need for a new renovation process in order to replace windows etc.

Maintenance and renewable energy?

Furthermore, the plans aim at economic savings while renewable energy or improvements of buildings and functions are in focus. In this model, the municipality will not continue to build competence for continuing energy improvements and to integrate energy savings in ongoing maintenance. If the municipality accomplished the project themselves they would perhaps achieve much greater savings and gain competence for future energy renovations.

Critics of this scheme argue that the ESCO can perform a sub-optimal energy planning, where only the offhand economically cost-effective sub-projects are implemented. Perhaps the future will see large supplementary bills for needed renovation. A coherent long term plan for maintenance, energy savings and a focus on renewable energy could provide more optimal solutions in terms of both economy and in terms of CO2 reductions.

Partnerships on energy savings in homes

Employees at the environment and climate area could see that there are large potential for savings in the municipality's housing stock - gold waiting to be dug out. They could see possibilities in transferring the ESCO model to private buildings.

Maybe it was possible to get private owners to carry out energy-renovation, if they were offered a package deal where project design, financing and implementation were carried out by a company or partnership.

Partnership

Middelfart municipality summoned various local actors in order to establish a collaboration, among others:

- Middelfart savings bank
- Energy supply company Trefor
- The district heating company
- The local energy service
- Rockwool
- Region South

The aim was to develop a model to offer energy services to private homeowners. At first they could not agree on a model for financing - several questions aroused on credit assessment, ownership of the installations - what if the house changed hands?

It was agreed to make an effort with an offer of free thermo graphic tests, energy analysis and energy investment plans for 2 neighborhoods. The energy supply companies provide energy advice, banks finances communication and investment advice and the municipality is responsible for the administration.

We have an offer for you ...

Two residential neighborhoods were chosen, a wealthy neighborhood and a residential neighborhood from the 60-70s, from the point of view that these area would hold many savings opportunities. Offerings were sent out to around 60 households – and for the first meeting no one turned up! To the next meeting the aim was to spread the word via more unofficial channels in order to get people to persuade neighbors to go with. It helped! 40 out of 60 accepted the offer of a free thermo graphic test and energy review with suggestions for improvements - a personal climate plan.

The next step was to review the actions, pool them and offer them out to craftsmen. It could be a number of windows in the area which craftsmen could make an offer for. The municipality organized a major conference on May 11th for everyone in the construction and consultancy industry where this project was described. However, it is up to people whether they will take the offer and how they wish to obtain financing.

The municipality's role is to manage the project and to be a kind of guarantor for the seriousness. They have become aware that people want follow-up checks of the construction work and tests of whether the promised savings are achieved. There is great interest in that construction work is coordinated and controlled.

However, it is a source of wonder that only 40 out of 60 have accepted the offer of free visits from an energy consultant with a value of 7-8000 DKK. It would probably help with grants for renovation or financing via the energy bill.

Next step in the model – before the first step is put to ground

Before the project finished a new was elaborated. Called "My Climate Plan 2.0". Here the ambition still is to perform data and experience for private house ESCO. But other business models also were examined. First of all, a new neighborhood was found. This time the neighborhood was selected because *they wanted to participate*. The idea was to give all the houses a free energy analyses of the houses energy performance, and also give the houseowners a offer regarding implementation of the analysis – the idea was to make a model, that provides economy of scale. In this case there also was found possibilities.

Spatial planning as a part of a business model?

The municipality is at the moment combining experiences within its field of spatial planning, and working on a new model regarding energy savings in private houses in combination with core municipality tasks as spatial planning.

Low energy class 1 as requirements for new buildings

There was no energy requirements for construction in the local plans when they started discussing energy issues. When the new energy strategy was decided the city council decided to set out demands for low energy class 2. But they were reluctant to several other requirements. They invited the technology and environment committee to Egedal municipality so they could see how such rules could work and that it did not necessarily lead to houses made of straw bales and cooking over a bonfire. The case was reopened and the city council was so excited about what they had seen in Egedal that they adopted the whole package; both low energy class 1, collection of rainwater, environmentally friendly building materials etc.!

The requirements apply to new constructions in the new local plans but it is also possible to go through the old local plans and change them. Existing buildings are not affected, only when they need to be demolished and new buildings are constructed.

District heating vs. low energy requirements

An ongoing controversy is the issue of district heating. Low energy buildings are exempted from the else mandatory connection to the district heating system, which would increase the costs for district heating for the other users if they do want to lay pipes out to a new-build area. Some believe that

district heating allows for more efficient energy supply and a larger overall CO2 reduction, therefore should district heating be prioritized in areas where pipes are being laid. Others believe that in the long term it is better to construct as many low-energy buildings as possible, and therefore should low energy requirements be supported in the best possible ways.

Middelfart municipality is participating in discussions for an overall energy plan for the entire Triangle area (Middelfart, Fredericia, Kolding, Vejen, Vejle and Billund). 3 scenarios have been prepared for the future energy supply, for example one involving the entire South and Central Jutland. The focus is on developing an overall energy plan for the area with as much supply of renewable energy as possible and with a phasing out of natural gas and instead installation of biogas plants. A CO2 account will also be made for the area.

Networking, competency development – free-municipality?

The municipality is trying to establish cooperation with businesses to prepare them for future energy requirements. Among other things a workshop has been held with 10-12 private companies. It is clear that there are companies south of the border who can meet the new energy requirements.

Middelfart municipality's desire is to achieve status of free-municipality, for example for a period of 2 years so they would be given free hands to work with industry.