IEA DSM Task X – Performance Contracting

Country Report Norway

NVE, Norwegian Water Resources and Energy Directorate

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1 EXECUTIVE SUMMARY

Energy Performance Contracting is still, in 2002, in a very early and immature phase in the Norwegian energy market. Even though the Norwegian electricity market has been deregulated for ten years, it is evident that the deregulated market in itself is not sufficient to shift the emphasis to energy efficiency. However, more companies are offering Energy Performance Contracting (EPC) services, either as a standalone service or combined with other services. The technical energy-saving potential in office buildings is considered to be quite substantial, especially with a future rise in energy prices and energy taxes.

2 INTRODUCTION, RATIONALE

This report is a part of the International Energy Agency Implementing Agreement on Demand-Side Management, Task X, Energy Performance Contracting. It should be read in conjunction with the introduction and rationale of the common report.

3 ADMINISTRATIVE INFORMATION

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4 METHODOLOGY

This report has been produced by NVE, partly based on existing energy statistics and previous work within the field of Energy Performance Contracting. For some years now, NVE and the Norwegian energy authorities have concentrated on increased use of third-party financing and energy performance contracting. This international collaboration is therefore a suitable continuation of the work in progress in Norway. During 2001 and 2002, NVE has held interviews and discussions with most of the major EPC service providers in order to obtain their views and updated facts and information. This report is a collation of the findings from the interviews.

5 GENERAL ENERGY CONTEXT

5.1 Deregulation - The Norwegian electricity market

The Norwegian electricity market is one of the most open electricity markets in the world:

- All customers have access to a competitive market and open network access has been implemented covering all customer groups, including individual households.

- An entry-exit transmission tariff system based on nodal pricing has been set up. Border tariffs between Norway and Sweden have been abolished. Transmission tariffs are completely independent of trading agreements.

- The Nordic electricity exchange, Nord Pool, organises a spot market and a futures market where it is possible to trade weekly contracts up to three years ahead.

- Dispatching of the system is based on commercial bids from both sellers and buyers of electricity in the market. In short-term operation of the network, the system-operators are also obliged to use market operations as far as possible.

- All providers are free to negotiate bilateral physical contracts. However, trade in the futures market is increasing rapidly. In Norway, an increasing proportion of long-term contracts are now financial, with physical electricity being traded in the spot-market.

- Prices in all markets, including bilateral contracts and the retail market, relate to the spot-market, and to a great extent reflect changes in supply and demand.

The Norwegian electricity market was formally opened for free competition in 1991, but real market entrance for all end-users was not established until 1995. The experience of practical accomplishment and market functionality has been positive. Development in the Norwegian electricity markets is summarized as follows:

1991	• The Norwegian Energy Act came into force • Maximum fee set at 5,000 NOK per year, per connection point for those who have other suppliers than their local supplier
1994	• Maximum fee reduced to 4.000 NOK each year, p.p
1995	• Hourly metering requirement removed • Settlement based on adjusted input-profile for end-users who are not metered by the hour • End-users not hourly metered can change supplier quarterly • Maximum fee set to 246 NOK when changing supplier
1996	• Hourly metering for energy use exceeding 500 MWh/year • Requirements to standard GS2 file format
1997	• All fees are removed
1998	• End-users can change supplier every week • Owners of electricity networks must dispatch settlement-data by using EDIEL
1999	• Hourly metering of all buildings exceeding 400 MWh/year • Reports on change of supplier must be dispatched by using EDIEL
2000	• Running balance settlement required • Settlement of all end-users by every new year
2001	• Ongoing discussion on reducing the requirement for hourly metering to 100 MWh/year

Table 5.1: Yearly changes in regulations of market-entrance to end-users

5.2 Privatisation

Of the 342 utility companies, there are many different types of energy utilities, and the extent of their involvement in electricity generation, trading and transmission varies widely. Important types include production companies, grid companies, vertically-integrated utilities and industrial companies.

In recent years, many energy utilities have changed from municipally owned companies to limited companies. One reason why many companies choose to be organised as limited companies is the possibility for the owner to limit personal financial responsibility. Another reason is to get shared ownership structure.

5.3 Public policies

NVE - Norwegian Water Resources and Energy Directorate - is the electricity regulator. As a regulator NVE has two main objectives:

- to regulate the network as a ”natural monopoly”
- to promote competition in generation and supply.

The starting point of the Nordic electricity market was the Norwegian Energy Act, which came into force in 1991. The main objectives of the Energy Act were:

- Economic efficiency
- Security of supply
- National equalisation of electricity prices.

The basic assumptions underlying the Energy Act are:

Economic efficiency is improved by introducing market prices and competition wherever applicable. However, natural monopolies or dominant providers need regulation to promote and ensure economic efficiency. Deregulation of the electricity sector required an identification of the different functions within the sector and to what extent these functions can be exposed to competition or must be regarded as monopoly functions:

- generation
- trade
- metering and settlement
- system responsibility
- transmission
- distribution
- supply (retail)

Since 1992, NVE has also been in charge of implementation of the public programmes promoting energy efficiency and increased use of renewable energy sources, and more recently also natural gas.

In mid-2001, a new state-owned company, Enova SF, was established in Trondheim, and will consist of 20 to 30 experienced professionals. The company will act as the new national RES and RUE Agency, and will take over NVE's responsibility for the public funds allocated to promote RES and RUE. Enova has been established to strengthen the public efforts to reduce the environmental impact of energy use and production. The Government expects Enova to come up with initiatives to increase the efficiency of energy use and the production of energy from renewable sources. In addition, it should focus on increasing the use of natural gas when beneficial for the environment. Enova's activity will be financed through a state energy fund, providing annual funding of about NOK 500 million, which is equivalent to € 62 million.

Enova will emphasise working in a targeted and result-orientated manner close to the energy market. It will focus on developing incentive schemes and new markets for energy services and products. It will not be operative in the market itself, but will make use of organisations/institutions/enterprises (operating agents) that are willing to compete for assignments and tasks. Enova will also offer a nationwide public information and guidance service. Enova became fully operative on January 1st- 2002.

NVE, which up until now has been responsible for the State-financed energy efficiency and renewable energy activities, will be working closely with Enova to ensure transfer of know-how and the necessary continuity of the existing activities.

Being the national energy regulator responsible for handling applications for concessions under the Energy Act, NVE will continue in future to play an important role with regard to the development of new renewable energy sources and energy efficiency. For example, NVE is responsible for issuing production licenses for all new electricity production plants, including wind power plants, small hydro power plants and so forth. Furthermore, NVE will be responsible for considering normative measures such as

labelling schemes and building codes. Consequently, NVE will work closely with Enova.

5.4 Energy use & energy production

5.4.1 Energy use

Figure 5.1 and Table 5.2 show the country's total annual stationary energy use. The majority of energy use in Norway is based on electricity, and the following part gives a closer description of the electricity production capacity.

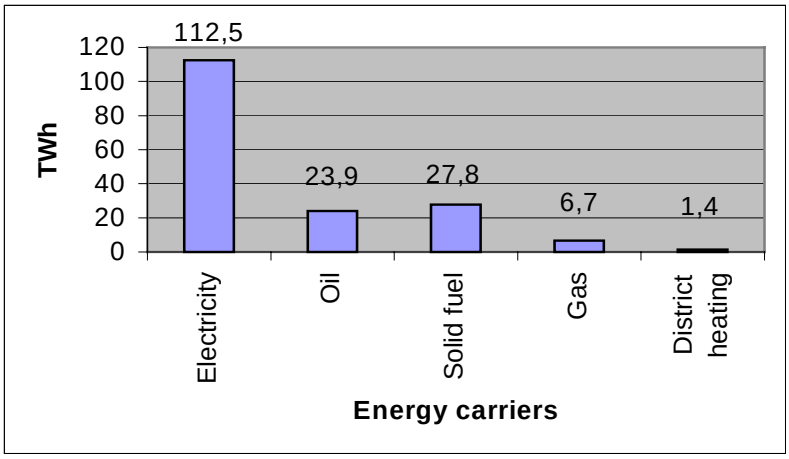

Figure 5.1: Stationary energy use in Norway, specified energy carriers. 2001.

Figure 5.2 shows development in inland energy use, shown by energy carriers. 1976-1996.

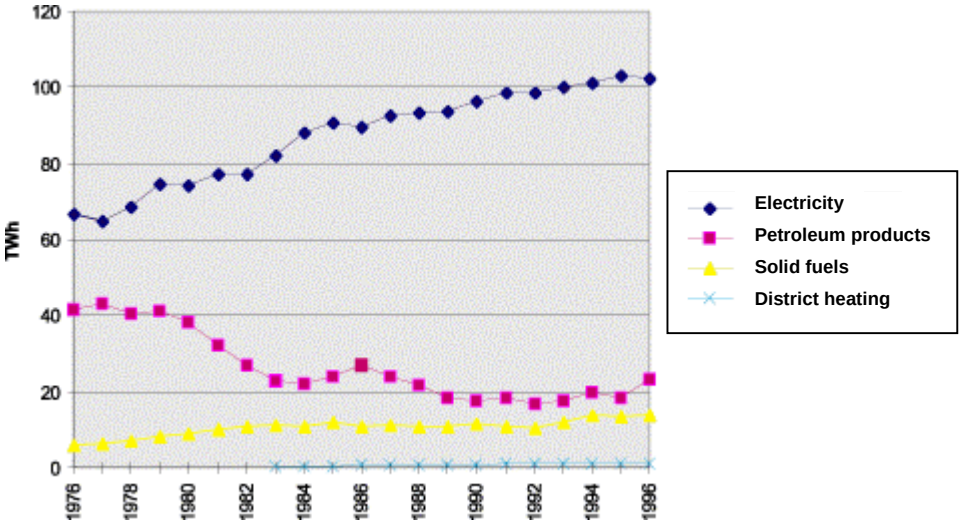

Figure 5.2: Development of inland energy use, by energy carriers. 1976-1996.

5.4.2 Energy production

Key statistics regarding the Norwegian electricity production [2001]:

- Norway has interconnections with power systems in neighbouring countries
- Generation in Norway is 99 % from hydro power
- 600 power stations - total capacity 27 853 MW
- 30 major producers - 200 distribution utilities, 342 companies total
- The State Power Company, (now in charge of 30 % of the national production capacity) was split in two in 1992:
  - Grid Company - Statnett SF
  - Power Company - Statkraft SF
- More than half of the distribution utilities are owned by municipalities.

	Hydro power	Wind power	Thermal power	Total production
2001	120918	30	906	121854
2000	142984	32	729	143745
1999	121 824	25	789	122 638
1998	116 280	11	496	116 787
1997	110 938	11	471	111 420
1996	104 148	9	555	104 712
1995	122 487	9	514	123 011
1994	112 676	10	528	113 214
1993	119 622	9	467	120 096
1992	117 062	7	437	117 506
1991	110 580	-	429	111 011
1990	121 382	-	466	121 848

Table 5.2: Electricity production, GWh

6 DEFINITION OF ESCO / PERFORMANCE CONTRACTING, INCLUDING THIRD PARTY FINANCING

6.1 Services offered

The services offered at present in the Norwegian market differ significantly between the various providers. The following description is based on the Norwegian market.

Services

The majority of the providers offer a service whereby the customer is guaranteed a reduction in energy use. The energy reduction is implemented through modernisation and upgrading of the existing equipment in the buildings. All these efforts are based on energy reductions. Some of the providers offer services centered on a fixed price on the energy deliveries. This solution does not necessarily entail energy reductions, but rather

reduced electricity price, i.e. through trading, or it includes the use of bioenergy, waste or other energy sources. As a consequence of a substantial (by Norwegian standards) support scheme promoting bioenergy and other renewables, to reduce the use of direct electrical heating, several companies now offer turnkey energy plants, with a choice of energy source. Some of these companies also include complementary services, such as facility management and operation and maintenance.

Savings

There is a great potential for energy savings in many buildings which represent the target markets of the ESCOs. The average potential energy saving in the buildings that have been analysed and found interesting exceeds 20 %. However, for several reasons, many buildings are not suitable for Energy Performance Contracting.

Financing

Financing is normally part of the services offered. However, the customer is free to arrange the financing himself, or to take up a credit in his own rights. Financing through the provider has advantages such as not affecting the customer's own credit line, possibly an optimal harmonisation between savings and repayment, and a single partner for the handling of the entire project, including financing.

Other services

As an instrument for creating unique solutions, the providers offer other services combined with EPC. These products can be services such as:
- Operation and maintenance of the installations and equipment at the customer's premises
- Complete facility management.

The following upcoming products are or will be available from some of the providers:
- Checking of the energy bills, changing of tariffs and/or supplier if necessary
- Telephony and internet services
- Alarm services
- Smart building functions

Supply

The supply of energy is the responsibility of the grid owners. They are in turn overseen by the regulating authorities, NVE. Security of supply is generally high in Norway, and those who are not fulfilling their commitments have to pay a penalty: see Table 6.1. Supply of energy is an important issue, but as it is not the ESCO´s responsibility, none of the providers focuses on supply as a realistic or probable problem.

	Alerted	Not alerted
Households/Aggriculture	3	4
Industry	35	50

Table 6.1: Current Penalties due to loss of supply, NOK/kWh not supplied, (1 EURO = 8 NOK)

6.2 Target markets/customers

There are three main market segments, domestic, industry and property, each consisting of several sub-segments.

Most service providers see the **property segment** as the most interesting, since energy costs are considerable and there is some experience in the use of outsourcing other support functions. Furthermore, quite a number of possible projects are much alike, allowing duplication from one project to another. **Industry** also has great potential for energy savings, but is considered a harder market segment to penetrate. This is both due to the traditionally low energy prices in industry, and to the more demanding energy flow of industrial companies, requiring more in-depth analysis and specific process knowledge to provide EPC. Some providers do, however, focus on industry as a niche market. In this market segment in particular, information is not readily available as companies tend to treat their details as commercially confidential.

The **domestic segment** naturally consists of many small and less uniform units, in such a way that there are only modest savings to be made from any single unit. However, apartment buildings are of interest to some of the service providers, and several cases of energy supply arrangements are known.

There are many buildings in the property segment with old technology and discarded equipment with a great potential for energy savings. Many of these buildings are owned by the public sector, especially municipalities.

Some providers will consider performance contracting in buildings with an annual energy bill of at least EURO 250.000, while others set their threshold at at least EURO 6.000.000. One ESCO stated its project investments to be of the order of 40.000 to 225.000 EUROS. Other providers define their requirements in terms of the annual energy use, ranging from 1 GWh up to 40 GWh.

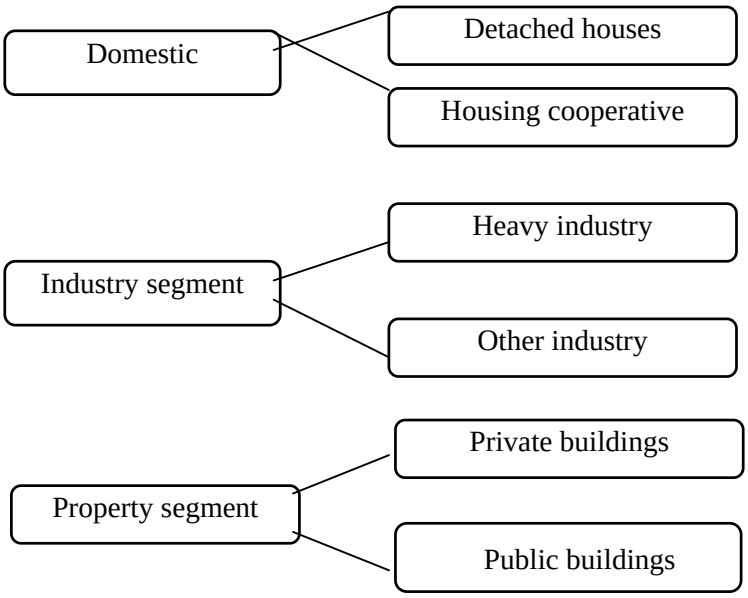

Figure 6.1: Market segments

Based on estimates, it is possible to estimate the percentage value of the energy reduction potential in service industries (property segment) as follows (estimated potentials for TPF and energy services are shown in brackets):

	Potential	Value - Norway mill. NOK
Office- and commercialbuildings	57 %	1192 (285)
School-, sport- and culturebuildings	15 %	313 (75)
Hotel- and healthbuildings	10 %	209 (50)
Industrybuildings and storehouses	18 %	377 (90)
Sum	100 %	2091 (500)

Table 6.2: Energy reduction potential in different services

Table 6.2 shows that the greatest potential is in office and commercial buildings, and especially public buildings.

There is a growing interest in the public sector among service providers, due to the quite large energy saving potentials. In addition, last year's (2001-2002) decline in overall national economic activity has led to a reduction in long-term investments in the private sector. However, the public sector is still quite well concentrated on long term considerations.

6.3 Types of ESCOs

The services provided in the Norwegian market can be divided into three groups, with the providers having the following elements as their core businesses:

- technology
- energy
- advisory services

A closer description of each group is given in Chapter 7.

6.4 Size of ESCOs

The use of performance contracting is in an early market stage in Norway. The providers offering performance contracting are mainly small, because of the immature market, while their mother companies are usually large international enterprises. Companies working with advisory services are mainly small, private independent companies. It is expected that the providers will grow larger with the (presumably) growing market.

The number of man-years in each ESCOs is 20 or less, normally 8-10. The revenue in the ESCOs (or ESCO divisions) is up to EURO 4 million per company, but normally less.

7 HOW ESCOS OPERATE

7.1 Differences between ESCOs

The providers operating in the market have different products, based on what their core business is. These products/services can be divided into three areas:
- Technology
- Energy
- Advisory services

	Technology	Energy	Advisory services

Focus	- Energy reduction through:
	  - Implementation based on a detailed analysis (see Figure 7.2).
	  - Extensive metering of energy use in the buildings, both before and after implementation of the new technology
	  - Normally part of a large enterprise, and offer financing through their financial division
	- Undertakes O&M
		- Pricing of energy and energy services
		- Elements which may be included:
		  - Energy supplies
		  - Power control (shifting/reduced peak loads, reduced grid tariffs for reduced peak demands)
		  - Energy flexibility (bio-energy, waste, oil and gas are the most common alternatives)
		- Not all of them do O&M
		- Normally offers internal financing
			- Knowledge of the market
			- Financing through third parties
			- Analysis & identification of electricity alternatives
			- Some offer implementation.

Table 7.1: Description of different service providers

The types of services provided differ between the participants in the market as shown in Table 7.1. Nevertheless, some elements are characteristic for most of the providers. A detailed analysis shows the potential energy savings, and the provider guarantees cost savings as defined in the contract. Should the contractually guaranteed savings fail to be achieved, the provider will cover the difference between the actual and the guaranteed cost. This performance accounting will be averaged over the full term of the contract. The same procedure applies when there is a guaranteed price for energy.

Financing the investments is also offered by most of the providers. The customer then has a single partner to deal with, covering all the necessary elements in the investment. In this way, the provider develops a unique product which is difficult for competitors to copy. For the customer, the guaranteed savings from the PFC contract make the investment risk-free and predictable. The energy savings cover the investment costs.

There are differences in what kind of guarantees the providers offers, which can be divided into following groups:
- cost reductions due to energy saving
- cost reductions due to guaranteed energy prices
- cost reductions due to the continuous use of the cheapest energy source available, such as bioenergy, waste, gas, oil, electricity etc.

Guarantees normally relate to energy reductions, but guarantees in respect of the cost of energy supplies also exist. Contracts in respect of energy reductions are commonly described as PFC contracts. Guarantees of the energy price do not necessarily entail energy savings.

Generally, all providers initially make a detailed analysis of the potential buildings. The following figure shows an example of the progress:

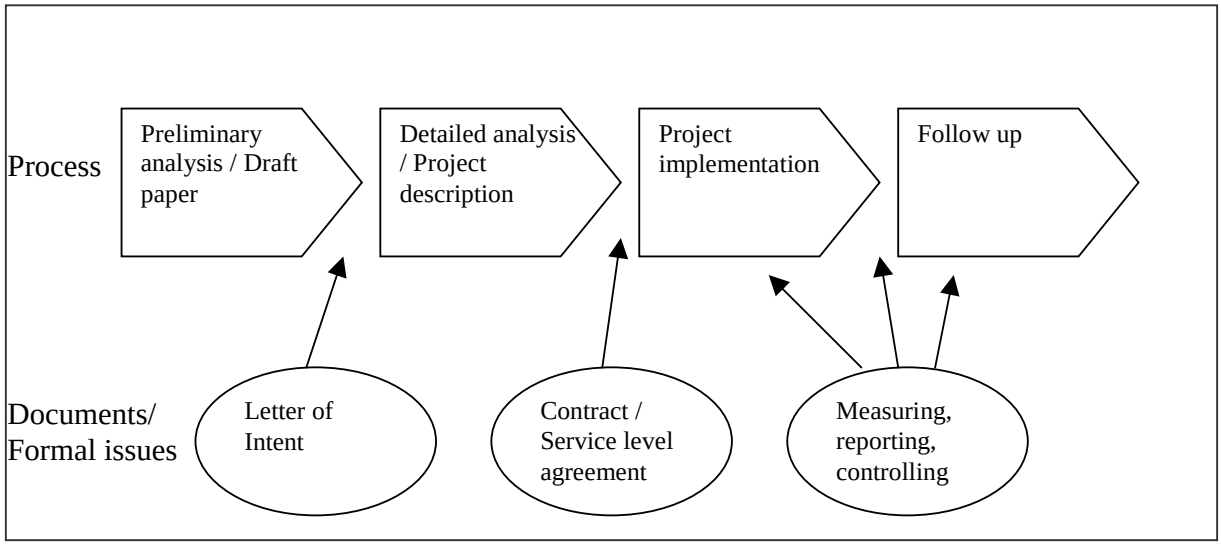

Figure 7.2: Progress

7.2 How the industry is evolving

Energy Performance Contracting is at present a very limited business in Norway, and there are several reasons for this. However, many of the commercial service providers expect that the demand for these services will increase in the future.

As referred to in Chapter 6, there is a great potential for energy savings in many public buildings, and especially those belonging to municipalities. A general problem for municipalities is that their operating budgets and investment budgets are often not well co-ordinated, nor considered in conjunction with each other. This means that municipalities are relying on state-defined investment funding, which is not increased to allow for aspects such as procurement of more energy-efficient (and more expensive up-front) equipment. Municipalities often do not have the necessary funds available, even when the project offers a high level of return. In such cases, the performance contracting companies can help by offering outsourcing of the energy services. The municipalities thus avoid the co-ordinating problems between the budgets, and the performance contracting companies earn money through a share of the saved operating costs. Some of the more successful service providers see the municipalities as the main customer segment, despite obstacles as described in Chapter 9.

The price of energy has been low for many years, thus minimising the profitability of energy-saving investments. In the future, the Norwegians ESCOs believe that the price of energy will rise, which will make these investments more profitable.

7.3 List of ESCOs

The following non-exhaustive list shows the Norwegian ESCOs with EPC/TPF mechanisms.

- Energispar
- Entro
- Oslo Energi
- Siemens
- Statoil
- Johnson Controls
- Shell

8 MAIN ISSUES IN PERFORMANCE CONTRACTING

8.1 Financing

There are three sources of financing used in the Norwegian market:

- Financing provided by the ESCO
- Financing provided by the customer
- Financing provided by a third party

A common feature of the market is the flexibility of choice of financing solutions. Most ESCOs provide solutions according to the specific needs of their customer. If the customer needs financing, the ESCO will provide this, either by its own financing service, or by bringing a third party into the project. For larger investments, the ESCO normally has a separate entity offering financing services.

One of the ESCOs considers tax rules as a problem, as illustrated by the following example:

An ESCO wanted to offer financing to its customers via a bank. The ESCO's parent company would not accept this loan/property to be registered on their balance sheet. A solution could have been to put the bank as the owner of the equipment, but this was not acceptable to the accountant, as the installation was physically situated at a third party (the customer). (The accountant’s objections were probably motivated by taxation rules).

8.2 Contractual / Legal matters

The commercial contracts developed and used so far are most often regarded as confidential information, and NVE has therefore little insight into the detail on the

contracts used. The observations in this chapter are therefore based on market research and dialogue with the market actors.

8.2.1 Standard / Model Contracts

There is no official Standard Performance Contract in Norway. In the cases of public purchases, the buyers of energy services are subject to public procurement legislation. The contracts used differ from one ESCO to another. Legal terms in the contracts used in Norway are subject to Norwegian law.

New legislation that came into force from 1st July 2001 sets a limit for municipal purchases that can be made without a tendering procedure: all purchases above 200.000 NOK (25.000 Euros) are subject to tendering procedures. (See Chapter 9.7.) To avoid the risk of the municipality using the initial ESCO project sketch in the tendering procedure, some ESCOs have developed a model contract that makes them the municipality's main contract partner. The project is then divided into sub projects / contracts, where different sub-contractors can be used for the different implementing projects. The hardware and software is purchased by the ESCO. The ESCO assists the municipality in the procedure and management of the tendering process. This requires the ESCO to operate with 'open books', which means that the cost and hence the ESCO's margins are transparent to the municipality.

Some of the smaller companies, without access to standard contracts from parent companies, operate with modified contracts that are based on US standards/law.

8.2.2 General conditions and legal rules

From our experience with the market, it is apparent that the following subjects are included:

- General contracting conditions and purchasing conditions
- Performance
- Financing
- Variations
- Changes in operating conditions.

'Performance' is related to the performance of installed equipment and the quality of the services or products supplied, such as temperature, lighting or ventilation. However, it is important to note that not all of the ESCOs offer services that include operation and maintenance: their services may be limited to analyses and implementation of equipment. Nevertheless, the term 'performance' is important, related to the guarantee of availability of the equipment.

'Performance' may also be related to price, i.e. some of the ESCOs guarantee a price for the agreed services, including volume, energy price and cost related to operations and maintenance. Performance will therefore be important to the ESCO, as its margins are directly linked to the 'performance' or 'variations'.

And last but not least: ”Performance” is related to energy savings. Most of the ESCOs, but not all, guarantee energy savings.

”Financing” will vary according to:
- who is providing the financing,
- who is the owner of the equipment,
- the length of the contract period
- the payback time of the equipment,
- how savings are shared during the payback time (0-x $, over 0-x years)

”Changes in operating conditions” is an important issue, as this can influence the margin of the ESCO. Many of the ESCOs provide guarantees for the total price, including both the volume of energy and the price per kWh. This parameter is vital, both for ESCOs who guarantee the total cost, and for those that guarantee the volume.

Changes in operating conditions are defined using terms such as changes in the number of employees, changes in the way the building is used, duration of use, rebuilding or new building etc. To be technically fair, a contract value of energy use should also include climate corrections, although (as we know) this has not been done. The contract makes the customer responsible for reporting all kinds of relevant major changes to the ESCO. If changes of this kind occur, the 'performance' part of the contract will be adjusted due to pre-defined criteria. So far, we do not know of any cases of disputes on contracts of this kind, although this cannot be ruled out in the light of the increased use of this concept.

Two contractual aspects are stated as important for the customer (municipality): eliminating the risk of losses, and ensuring savings.

8.2.3 Ownership of installed equipment

The usual arrangement is that the ESCO retains ownership of the equipment throughout the contract period, which is usually for a period of 5 - 15 years. After this, ownership is transferred to the customer. When it comes to this phase, some of the technology-based ESCOs offer to continue operating the equipment and installations.

Normally, the ESCO is responsible for operation and maintenance of the equipment, but other solutions are also implemented. One of the ESCOs puts the focus on the price the customer has to pay for the energy. The guarantees are related to the total price invoiced to the customer. In this case, volume must also be controlled.

The dilemma of ”*building-owner-and-renter-are-different-entity*” enforces the need of having ESCOs as owners of equipment. Neither the owner of the building nor the renter normally has any interest in owning the equipment, but the investment is more likely to be considered if the ESCO is the owner. However, if it is possible to charge more by offering to reduce energy use in the premises, this is an incentive for the owner to focus on energy-efficient installations. Many companies are also concerned about their environmental image, and would like to show customers and the general public a positive attitude.

Some companies regard real estate property simply as a means of investment. Their horizon might be quite short, e.g. selling the building after a couple of years, or even as

soon as it has been built. They therefore have no interest in entering into a long-term contract. This phenomenon also exists among tenants: They rent for a shorter period of time, and although buying energy services could reduce their operating costs, they do not find this sufficiently attractive to sign a contract that ties them up for a longer period.

The previously mentioned lack of connection between investment budget and operating budget among municipalities enforces the need for ESCOs as the owner of the equipment. Municipalities concentrate mainly on the investment costs. They do not have sufficient investment budgets, and although an investment can contribute to reducing operating costs, they will have problems in getting the necessary funding from the municipality budget.

Ownership of the investment can be an issue that makes municipalities hesitate. As they do not own the installations until the payback period has ended, they need to make sure that if the ESCO or leasing company goes bankrupt, the municipality will have the legal right to buy the equipment.

8.3 Guarantees and enforcement

Guarantees given to customers depend on the type of ESCO. Some ESCOs guarantee 20-30 % energy savings. A common feature is a guarantee of cost savings, but guarantees do not necessarily include energy savings. This is probably due to the historically low energy prices in Norway.

The technology-based ESCOs concentrate on performance, technical performance, quality of deliveries, service to be done on the equipment, temperature, quality of the ventilation air, etc. These parameters are adjusted during operation, in order to reduce the energy cost as well as the overall running costs. If the agreed performance is not achieved, the ESCO will cover the loss, although there is not much practical experience of this point yet. The guarantee is also adjusted for factors that are out of the ESCO's control.

8.4 Measurement and verification

The level of measurement and verification is closely linked to the type of ESCO. The technology-based ESCOs have established routines for measurement, where measuring can be done on an aggregated level, as well as for each single installation. For those ESCOs, metering is very important.

The energy-based ESCOs also emphasise the importance of measurement, and use mainly two approaches. Those focusing on energy efficiency, energy mix or energy sources are interested in both measuring the changes in the amount invoiced to the customer, and are the changes in energy use. On the other hand, those ESCOs that are focused on energy supply and the trading of energy concentrate mainly on the energy bill, and attach less importance to changes in energy use.

The importance attached to measurement and verification ranges from that applied by energy efficiency consultants, to more complex solutions where parameters are continuously measured, and made available online, e.g. on the internet.

8.5 Different type of services today and in the future

Development seems to be towards more complex solutions, where the ESCO offers a broader range of services (e.g. Facility Management). There seems to be increased contractual focus on the service and quality delivered. Outsourcing of energy services also seems to be an upcoming issue but, as discussed in Chapter 9, many obstacles still remain.

8.6 Other added values: environment, indoor climate, labour safety

As the ESCO market is still quite immature in Norway, there is still little focus on other added values. However, some market actors see this as a possibility for creating a new niche market, by combining various services. For some the customers, and especially municipalities, giving a private company the entire responsibility for operations and maintenance is quite a new way of thinking.

Some subjects came up under added values: the ESCOs ecological profile, hedging of energy price, improved indoor air quality and customer (building user) satisfaction.

9 OBSTACLES AND OPPORTUNITIES

Energy Performance contracting has many obstacles in the Norwegian market. Below are discussed both technical and economical obstacles, as well as sociological ones.

9.1 Lack of performance contracting in general

Traditionally, there has been little use of performance contracting agreements in the Norwegian building sector. In the 1950s, larger office buildings were generally cared for by a janitor, who did all the repairs and maintenance. In the 1970s, the steadily increasing use of direct electric heating virtually eliminated the boiler room, and thus much of the need for on-site technical expertise. In the 1980s, HVAC systems started to become more complex and demanding, and it was during this period that the use of external technical services increased, i.e. service contracts between the building owner and the service provider. However, each service agreement tended to concentrate mainly on one aspect, such as HVAC, security, cleaning etc.

Generally a strong focus on low costs might also be a contributing factor opposite buying wider turn-key-services. One might not be happy with the provided cost-benefit-ratio of a certain service, if there is at the same time a suspicion of the supplier/service provider making a (more than usual) significant income of the project. Companies also present in the US market confirm that the business culture in Norway in itself is a barrier against performance contracting.

9.2 Hidden costs (hassle)

Compared to doing nothing, every measure implying even the slightest degree of involvement might be considered a hassle. Where performance contracting includes, for example, replacement of technical equipment, there is often a conservatism in respect of the change, and a belief that the new technology will be more demanding to use, might be of poorer quality or requires some staff training to install, use, maintain, etc. Generally, the focus on energy efficiency has been very modest. With (too) many challenges in everyday life every customer, decision-maker etc. all too easily avoids (whether deliberately or not) getting involved in new actions.

9.3 Uncertainty

Uncertainty might be related to future energy prices, future company energy use, investment costs or other market parameters, which might change enough to reduce the savings. In cases of leasing, the remaining (short) time of the lease for the premises might be a substantial hurdle against actions involving investments. There is therefore a tendency to use well-known technologies for the security that they imply. Furthermore, the strong tendency of renting properties in the service sector has become an obstacle to sound investment policy, i.e. building owners concentrate on low investment costs, as the tenant pays the running costs. However, the slight increase in total energy prices occurring lately has somewhat increased interest in energy costs. As customers/tenants become more demanding and energy-conscious, building owners will be forced to change their investment policy described above. However, with the strong seasonal changes in energy prices, it takes a long time before the average (increasing) price is apparent to the general public.

9.4 Lack of information

There is a significant lack of information on the various energy efficiency possibilities, with the result that, in many cases, possible savings are not even considered. However, low energy prices and other obstacles are more often the main hurdles in the way of use of more energy-efficient equipment. This is one of the main reasons behind the long-term public programmes focusing on energy efficiency information.

There is also a lack of knowledge in many municipalities about how purchasing of energy service can be organised with regard to contractual arrangements, and/or uncertainty related to the interpretation of the rules and regulations, as described in

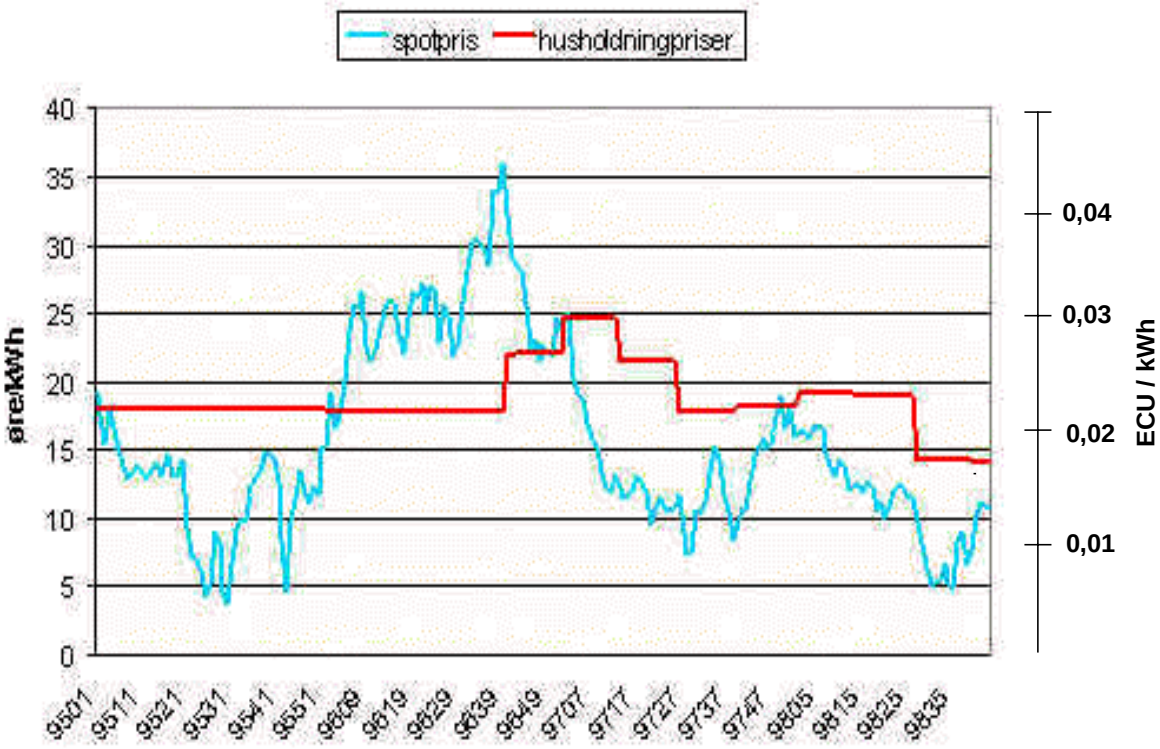

Figure 9.1: Spot market price and household energy prices

Chapter 9.7. This project has revealed that there often is an uncertainty within the municipality administration and the municipal council and local politicians about how these kinds of arrangements could be handled. This often leads to long discussions within the municipality, so that projects tend to circulate within the organisation for a long period.

9.5 Low energy prices

Historically, Norwegian energy (and especially electricity) prices have been very low, both to the end-users and particularly to industry. Low energy prices, in combination with demanding requirements for low payback (pay-off) times for investments, have been the major obstacles in the way of energy efficiency.

Culturally, during the rebuilding of Norway after the second world war, low electricity prices, partly sponsored directly or indirectly by public subsidies, have been used as a political means of establishing industry throughout the country, and generally to spur activity. The public responsibility to 'take care of' private households in a social sense has also been an issue. Many people therefore still regard low electricity prices as a right of the citizens, representing each individual's part of the overwhelming resources of the country. It has therefore been very difficult politically to make major changes in policy towards somewhat higher energy taxes etc. However, the energy tax on supplied

electricity has doubled during the period 1997-2001. The issue of favourable electricity contracts to industry is especially challenging in the cases where the large industrial units etc. form the very cornerstone of a village, small town etc. Prior to deregulation in 1991, electricity prices were decided annually by Parliament (the Storting), to ensure stable and acceptably low energy prices. Production capacity was still quite high relative to demand during the first years after deregulation, and more efficient operation of the utilities resulted in even lower energy prices for several years. However, consumption in all sectors has been steadily rising (more or less constantly) since 1991. Since about 1996, average production capacity has been about equal to or less than the total energy demand, resulting in higher prices and the need for import of electricity. Although Norway has several links with neighbouring countries (and is planning more), import capacity is limited. Prices therefore fluctuate considerably, from quite low throughout much of the year (summer and autumn) to the occasional peak (extremely high prices for a few weeks) in the winter.

9.6 Investments vs. operation costs

Particularly in the public sector (state, county and municipality), there has been a strong division between investment funds and maintenance budgets. There has therefore been a traditional focus on minimising investment costs, regardless of the subsequent O&M costs. Several attempts have been made to give local incentives to reduce running costs, but so far the rules have been too rigid for major changes.

9.7 Contracting rules

Strict rules apply in the public sector (The Public Procurement Act[1]) when buying goods and/or services in excess of certain (quite low) values, i.e. NOK 1.600.000 / 1.300.000 (EURO 213.000 / 173.000). There have been several cases of service providers submitting complete tenders for their services. After receiving the tender, the building owner/requestor of the offer sends out the offer, or a slightly revised version of it, as the enquiry basis for other companies to compete with the initially quoted price. A solution to this challenge is to introduce a pre-study with a clause to use the work of the consultant, or otherwise to pay an agreed modest fee to cover the work of the pre-study. However, the EPC-market is still so small in Norway, that competition is virtually non-existent.

The Public Procurement Act applies to procurement by municipalities of goods, services and building and construction work. If the investments are regarded as long-term financial investments, the process related to approval of the budget may be quite complicated and there may be some confusion about how the rules should be interpreted. One of the principles of this regulation is that the accounting balance should reflect the real economic and financial situation. This will not be the case when

[1] [1] English version of the Public Procurement act; http://www.odin.dep.no/nhd/norsk/p10002767/p10002770/024081-990048/index-dok000-b-n-a.html,
Latest additional regulation; http://www.lovdata.no/for/sf/nh/nh-20010615-0616.html,
Threshold-values;
http://www.odin.dep.no/nhd/norsk/p10002767/p10002770/024081-990072/index-dok000-b-n-a.html)

using, say, outsourcing and leasing to a large extent. The common practice related to the duration of the investments/leasing agreements seems to be that larger 'consumables', copying machines etc. could be leased or rented, i.e. short-term contracts of about three years. Other municipalities also accept contracts of up to five years duration, but more than that is seldom accepted. Given the relatively low Norwegian energy prices , with the consequently long payback periods, this is one of the main obstacles against municipalities considering leasing contracts for energy investments.

There also used to be local rules prohibiting long-term supply agreements for goods and services, representing a substantial barrier against heavy investments with quite long pay-back time. There has also been some confusion related to the interpretation of certain EU regulations applying to the counties. However, even when these rules no longer exist, the perception and anticipation of possible conflicting rules sometimes in itself contributes to the hesitation to choose new ways of working, including new ways of supplying energy.

It has generally been claimed that the municipal councils are too focused on investments in new buildings rather than investments in maintenance of existing buildings.

Insufficient definitions in the public sector purchase manuals pose problems. Municipalities and their technical consultants use purchase manuals based on EU purchasing rules. The manuals indicate that all buildings should have BAS (Building Automation Systems), without giving exact specifications. This gives room for systems that are not necessarily focused on energy efficiency.

10 GOVERNMENT POLICIES

10.1 Tax incentives

As partly explained above in Chapters 5 and 9, the political setting for increasing taxes has been very difficult. Nevertheless, energy taxes have been about doubled from 1997 till 2001, from 5,62 øre/kWh to 11,3 øre/kWh, and the general awareness of the 'energy bill' has increased somewhat due to this. However, 2001 saw a tremendous public (and political) awareness of the energy tax, which has again forced a reduction 2 øre/kWh in the energy tax, down to 9.3 øre/kWh in 2002. A new way of applying energy taxation has also been proposed, by changing the energy tax according to, and in the opposite direction to, changes in the energy market price, to compensate fluctuations in the market price, and to produce a more stable total price for the customers.

Traditionally, since the early 1980s, the use of direct economic subsidies has been the main means of encouraging energy efficiency and greater use of new renewable energy sources. In addition to direct investment subsidies, a production subsidy for electricity from wind energy was introduced in 1999.

10.2 Other initiatives

As described in Chapter 5.3, 'Public policies', the Norwegian Government has recently reorganised work aimed at promoting efficient use of energy and greater use of renewable energy sources. Enova SF will be handling a common energy fund promoting energy efficiency and renewable energy sources. NVE will still act as the Energy Directorate, collaborating with Enova and other public offices.

The Government has published two quantified national Norwegian targets related to these issues:

- Production of 3 TWh/year from wind energy by 2010
- The (increased) use of 4 TWh/year of heat from renewable energy sources (reducing direct electric heating).

The proposed EU Directive of May 5th 2001, COM(2001) 226 , *'Proposal for a Directive of the European Parliament and of the Council on the Energy Performance of Buildings'*, has several interesting suggestions. The main features are a common European methodology for the measurement of energy use, minimum standards of energy performance in buildings, energy certificates for buildings and greater use of inspection of boilers and HVAC equipment in buildings. Compared to the current situation in Norway, this Directive, if implemented as proposed, will increase awareness of energy efficiency even more.

In the late 1990s, a plan to remove the investment tax was put forward, mainly reducing it on investments related to the use of renewable energy sources. (However, investment tax in its entirety will probably be removed in 2002, thus resetting the competition base line for renewable versus conventional fuels.)

Another obstacle in the way of renewables and energy efficiency is the very high emphasis on R&D concerning CO2-neutral natural gas fired power plants. There is a strong multi-party political willingness to promote these R&D activities by substantial funding. These are power plants where CO2 is extracted and treated and/or used for other means. (One option considered is to use the excess CO2 as injection gas into oil fields to increase extraction of oil from a given field.)

11 LESSONS LEARNED

11.1 Possible areas of initiatives

Competence / Expertise
Lack of competence among customers, consulting engineers, architects and other professionals is regarded as an obstacle to greater use of performance contracting. It is difficult to get building developers to realise that they should pay somewhat more to acquire the interdisciplinary qualifications that are needed in the planning of complex projects. Conservatism in the building sector, and strong pressure to build quickly, too often result in the use of conservative solutions.

Making projects more multidisciplinary is a long process that demands active involvement from the different actors. In addition, developers and building owners must realise that planning is an important issue, for which they must also pay more than at present for the planning.

Information
Courses and education have been, and still are, a possible initiative, including both information in professional education, as well as post-qualification education. Information about the advantages, possible savings, purchasing process, tendering rules, purchasing rules and so on is important for increasing awareness of Performance Contracting.

Public authorities and external conditions
An active and visible attitude from the authorities towards energy savings and Performance Contracting can give a positive stimulation to activities in this field. The external conditions given by the authorities are important, such as purchasing rules, taxes, grid tariffs, etc. The Government could, in the public sector in particular, increase emphasis on energy awareness more than at present. However, many political concerns exist, especially related to employment rates throughout the country. If EPC is combined with outsourcing of energy services, it will be a possible source of conflict in rural areas, against the existing conditions at the site. Generally, politicians tend to delegate the responsibility downwards, i.e. with decisions being taken locally in more cases, but this leads to a fragmented or weak policy, such as municipalities actually competing to attract companies, building developers etc. to establish themselves in **that** municipality. Under such conditions, it is not possible to imagine a municipality choosing to apply stricter rules for such applications as energy efficiency, type of heating systems, mandatory district heating etc. than the neighbouring municipality.

Progress towards greater sustainability is therefore slow, despite the general positive attitude from the Government.

More emphasis from company managers on environment and energy will give a positive contribution to action in this field. Energy reporting as a mandatory part of annual reports, for instance, can assist this effect. This would require changes in the rules relating to company annual reports.

Some companies have established a model form of contract for Performance Contracting. It would, however, be useful for both larger and smaller ESCOs to have a framework as a basis of their contracting work. In addition, and perhaps more importantly, a standard contract could also give customers indications of what should be included in a Performance Contract, whether they use the standard contract or a contract developed by the ESCO. However, at present, most ESCOs work independently, and keep their work mainly to themselves, and the (interested) customers.

Legislation

Purchasing rules must be verified in order to determine to what extent they might adversely influence Performance Contracting. Initiatives of improvement must be designed and proposed. The rules must also be made transparent, easily accessible, and be clearly communicated.

To encourage greater use of non-electric heating, the Building Regulations could be changed such as to prohibit the use of electric heating in, for example, any building with a floor area greater than, say, 500 m². This would increase focus on energy flexibility, and on the chosen energy solutions. There is a specific reference to this point in the proposed EC Directive, as mentioned in Chapter 10.2.

Attitude, culture and process

Norway does not have a strong culture of outsourcing, say, operation and maintenance. The labour union has traditionally had a strong position, and is opposed to changes that could remove the responsibilities of employers, or weaken the rights of employees.

Another obstacle is the slow decision-making process in the Boards of Norwegian companies. This is partly rooted in the Norwegian culture and is quite difficult to change rapidly, although in the long run information can contribute to improving the general understanding of what Performance Contracting is. Spurred by increased international and national competition in all sectors, the general trend seems to be towards a greater emphasis on the core business of each company. This trend is a strong driving force towards increased use of performance contracting and energy outsourcing.

Performance contracting might be a way of overcoming several of the existing barriers, especially in respect of hassle, uncertainty and predictability. However, given the low long-term energy prices, the market is still quite immature and small.

11.2 Summary of possible initiatives

Summary of initiatives that could be taken by authorities or other involved parties:

- Courses and education
- Information on Performance Contracting
- Predictable external conditions
- Energy reporting as a mandatory part of companies' annual reports
- Development of a model form of contract (at least for customer guidance) for Performance Contracting
- Overhaul of purchasing rules.

11.3 Recommendations

As the public sector is considered to be the most interesting market segment, there is a specific need to remove obstacles related to public procurement.

The following initiatives should be considered for Norway:

1. Clarification of how public procurement rules apply to various types of projects and to long term investments.
   - Possible changes to rules to make definitions and rules clear and applicable to long-term public investments

2. Development of 'concept information packages' aimed at municipalities:
   - Explanation of energy services, performance contracting and other relevant concepts.
   - Information about how the municipality could benefit from energy performance contracts.
   - Presentation of how the public procurement rules should be understood and applied.
   - Model forms of contract and examples.

3. Implementation of concept packages
   - Identify targets in organisations / municipalities.
   - Implementation plan.
   - Improve awareness among decision-makers and purchasing agents.

4. Identification and implementation of pilot projects.
   - Governmental project defining a relatively large agglomeration of buildings that will act as a pilot project, where requirements for energy savings are defined, and the project is subject to a tendering procedure. The contract can be awarded to one or more market actors (ESCOs)

5. Establish contact points for building owners and ESCOs.
   - Organised by a third, neutral party.
   - Verification and control of quality of providers' (ESCO) services by a third (neutral) party.

12 CASE STUDIES

12.1 Case Study - Rakkestad municipality

1. General information

- Name of case:
  Rakkestad municipality, Nord Trøndelag County Council district.

- Person to contact for further information:
  Project Engineer Torleif Sommerseth, EnergiSpar AS, http://www.energispar.no

- Type of project:
  Energy optimisation in three buildings; two with water-borne heating and the third with electric heating.

- Type of customers:
  Public sector / Municipality

- Main services included:
  Project design, financing, installation, commissioning, operation and management, energy management via web solution, verifying results, reporting on results, economic values and benchmark values.

2. Process

- Procedure used:
  Seller takes initiative with the customer's energy provider, then standard sales procedure.

- Time schedule:
  Project started in January 2000 and installation was completed in June 2001. Monitoring started in June 2001.

3. Financing

All financing was provided by the ESCO, via third-party financing institution, for the entire contract duration of ten years.

4. Contractual/legal matters

   - Type of contract:
     Result-agreement, modified in accordance with Norwegian laws and regulations.

   - Tendering procedure:
     Municipalities generally invite providers during a tendering procedure when the amount of the investment exceeds a fixed limit, (NOK 1,6 / 1,3 million or Euro 213.000 / 173.000). These limits are set by the Public Procurement Act[2].
     The ESCO issues enquiries for financing and installation to different sub suppliers.

   - Evaluation of tenders/proposals:
     This is performed by the customer. The ESCO evaluates its sub suppliers.

   - Guarantee and warranty:
     The guarantee period runs for the duration of the contract (ten years). The ESCO guarantees 20 % energy reduction relative to consumption before the contract started.

   - Special security for the fulfilling of warranties:
     It is possible to make further improvements if the ESCO does not fulfil its promised guarantee. All expenses due to improvements within the contract are covered by the ESCO.

5. Role of different actors, including ESCO and Energy Agency.

6. Energy savings and other added values:
   - Energy saving:
     Calculated energy savings are 0,42 GWh/year . These savings are based on the actual consumption over a three-year period before the contract started. The average annual consumption during this period was 2,1 GWh.

   - Other services:
     Operative service agreement based on verification and use of EOS reports every quarter.

   - Other savings (financial):
     Reduced service costs and lower janitorial costs.

   - Other added values:
     These values are:

[2] English version of the Public Procurement act; http://www.odin.dep.no/nhd/norsk/p10002767/p10002770/024081-990048/index-dok000-b-n-a.html,
Latest additional regulation; http://www.lovdata.no/for/sf/nh/nh-20010615-0616.html,
Threshold-values;
http://www.odin.dep.no/nhd/norsk/p10002767/p10002770/024081-990072/index-dok000-b-n-a.html)

- Upgrading electric installations, included new panel heaters for the entire building.
- Upgrading of boiler room with automatic choice of energy carrier.
- Integration of several buildings to one Building Management System (BMS) installation
- Possibility of outsourcing administration.

- New and/or greater efficiency compared to the base level
  The ESCO has developed an ”Integrated Energy Control” energy optimisation system, which controls energy production based on real requirements.

- Comparison with traditional or other forms of action
- Traditional is defined as no integration between buildings, with conservative solutions such as night setback.

- Benchmarking/measuring/verification:
  Verification occurs through automatic collection of data from all metered zones to a central server. All information from the server goes through an EOS program for calculations and thereafter for reporting to the administration of the municipality. This procedure is run every quarter during the ten-year long contract period. The ESCO has guaranteed a fixed operating budget to the customer for the entire contract period.

7. Lessons learned

   The project has been delayed relative to the original progress plan, due to a long administrative process in the municipality-sector.

8. References to existing brochures/reports:

http://www.energispar.no/news/pdf/Overhalla.pdf
http://www.netedit.no/kunder/energispar/upload/husbanken.pdf, page 17 and 18

12.2 Case Study - Mosvik municipality

1. General information

   - Name of case:
     Mosvik municipality, Nord Trøndelag County council district.

   - Person to contact for further information:
     Øyvind Ludvigsen, EnergiSpar AS, http://www.energispar.no

   - Type of project:
     Energy optimisation in five buildings: The council offices, one nursing home, two schools and a sports hall. The project also included a ventilation system, to fulfil the needs of the municipality, although this has no energy-saving effects.

   - Type of customer:
     Public sector/Municipality

   - Main services included:
     Project design, financing, installation, commissioning, operation and management, energy management via web-solution, verifying and reporting on results, economic values and benchmark values.

2. Process

   - Procedure used:
     Seller takes initiative, then standard sales procedure.
     Tendering procedure performed by municipality. Invitation to tender for three sub-projects. Projecting, implementation and co-ordination of sub-contractors performed by ESCO.

   - Organisation:
     See previous point.

   - Time schedule:
     Project started in 2002, and installations were completed in October 2002. Monitoring starts in November 2002.

3. Financing

All financing provided by the ESCO, via third-party financing institution, through the entire period of contract, 7,2 years (payback period)

4. Contractual/legal matters

- Type of contract:
  Result agreement, modified in accordance with Norwegian laws and rules.

- Tendering procedure:
  Municipalities generally invite providers during a tendering procedure when the amount of the investment exceeds a fixed limit, (NOK 1,6 / 1,3 million or Euro 213.000 / 173.000). These limits are set by the Public Procurement Act[3].
  The ESCO issues enquiries for financing and installation to different sub suppliers.

- Evaluation of tenders/proposals:
  This is performed by the customer. The ESCO evaluates its sub suppliers.

- Guarantee and warranty:
  The guarantee period runs for the duration of the contract (7,2 years). The ESCO guarantees 27 % energy reduction on an average for the five buildings, compared with consumption before the contract started (3 years' consumption as reference).
  Guarantee on equipment is one to three years.

- Special security for the fulfilling of warranties:
  It is possible to make further improvements if the ESCO does not fulfil its promised guarantee. If contracted savings are not achieved, the ESCO will pay the customer the difference between actual and guaranteed savings.

5. Role of different actors, including ESCO and Energy Agency

6. Energy savings and other added values
   - Energy saving:
     Calculated energy savings are 27 %, or 1 GWh per year. The value of the saved energy is approximately Euro 61.000/year. These savings are based on the actual annual consumption over the three-year period before the contract started.

   - Other services:
     Operative service agreement based on verification and use of EOS reports every quarter.

   - Other savings (financial):
     Lower service costs and lower janitorial costs.

   - Other added values:

[3] English version of the Public Procurement act; http://www.odin.dep.no/nhd/norsk/p10002767/p10002770/024081-990048/index-dok000-b-n-a.html,
Latest additional regulation; http://www.lovdata.no/for/sf/nh/nh-20010615-0616.html,
Threshold-values;
http://www.odin.dep.no/nhd/norsk/p10002767/p10002770/024081-990072/index-dok000-b-n-a.html)

These values are:
- Upgrading electric systems, included new panel heaters for the entire building.
- New ventilation system.

- New and/or more efficient compared to base level:
  The ESCO has developed an 'Integrated Energy Control' energy optimisation system, which controls energy production based on real requirements.
-
- Benchmarking/measuring/verification
  Verification occurs through automatic collection of data from all metered zones to a central server. All information from the server goes through an EOS program for calculations and thereafter for reporting to the administration of the municipality. This procedure is run every quarter during the 7,2-year long contract period. The ESCO has guaranteed a fixed operating budget to the customer for the entire contract period.

7. Lessons learned

   Sales processes involving municipalities can be quite time-consuming.

8. References to existing brochures/reports

http://www.energispar.no/news/pdf/Overhalla.pdf
http://www.netedit.no/kunder/energispar/upload/husbanken.pdf, page 17 and 18