



POLICY MEASURES CATALOGUE

Vietnam Low Carbon Energy Efficiency Project
Danish-Vietnamese Government to Government
Cooperation

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1 Introduction

Energy efficiency (EE) has many benefits; it is the cheapest way to reduce energy related CO2 emissions, it lowers the energy bill, and it reduces dependence of foreign energy sources – just to name a few of the benefits. However, despite these and other obvious benefits, it is still often very difficult to get energy consumers aware of and interested in energy.

Denmark is among countries worldwide with the longest-standing and most comprehensive experiences of policies for promotion of energy efficiency. The sustained focus on energy efficiency has shown remarkable results, and Denmark is one of the most energy efficient economies in the world. In energy intensive industries, EE has been particularly important and they have had a continuous focus on EE and how to optimize or lower energy use. This focus has also spurred the development of more efficient technologies, some of which are now being exported throughout the world, even to Vietnam.

In spite of the obvious differences between the Danish and the Vietnamese economies and regulatory systems, Danish energy efficiency policies could be of some relevance and inspiration to provincial authorities in Vietnam.

Denmark has a long tradition for using different policy measures to attract such awareness and interest. Some of these policy measures are presented in the following to inspire Vietnamese provinces to implement energy efficiency policy measures.

1.1 How to use the catalogue

This catalogue introduces various policy measures and experiences that can serve as inspiration to the development of EE policies and measures in Vietnamese provinces. The target group for using the catalogue is authorities in regional provinces.

The policy measures presented in this catalogue address identified Vietnamese challenges and the measures have already proven successful in gaining energy efficiency in industry and business.

Presentations of the measures are supported by short descriptions of the steps that the public authority will have to take or consider in a development or implementation phase. There will be no introduction of the legal background and documents as these are very extensive and developed for the Danish context. Similarly, funding of EE programs is not included in the catalogue as the funding opportunities widely depend on the local context.

The catalogue shall be seen as an appetizer, not a detailed, step- by-step cookbook. The catalogue is meant to be an inspiration to provinces on which direction they would like evolve and explore and how to get started in these matters. It shall also serve as a presentation of possibilities, some of which might not be relevant at this stage but including them in the catalogue might raise awareness on the possibilities of EE supporting policies for future development.

As such the catalogue should serve as a basis for a dialogue between the provincial authorities, and the staff of the LCEE project dedicated to the promotion of new EE policies in the provinces.

2 Measures

Measures relevant to Vietnam have been identified within the areas of

- Energy taxation
- Incentive schemes for industry
 - Voluntary agreement schemes
 - Energy efficiency obligation schemes
 - Subsidies for energy savings in industry
- Other supportive measures
- Awareness raising

A new Danish measure, with main focus efficient use of renewable energy in production processes has been included for inspiration. There are multiple ways to reach a desired EE goal, and a combination of measures will often be used.

Most measures are developed for a specific and very well defined target group – as it can be very costly and cumbersome to roll out to the entire industry or society.

If a measure is too general it will often also be more expensive, as there are more “free-riders”, who will take advantage of the opportunity without paying the “full cost”. However, examples of a scheme that target entire society, the energy efficiency obligation scheme is also included in the following.

Another important thing to keep in mind when exploring the opportunities for increase the focus on EE in industry and especially smaller companies is the associated costs for both public authorities and the companies.

Some of the most typical costs that will be part of any measure are highlighted in the box.

Typical cost components in presented measures

- Consultancy to perform initial screening
- Consultancy/ public authority to design scheme
- Administration, monitoring and verification. This can be either outsourced (costs can be covered by industry through a fee or by public finances, depending on political desire) or undertaken by a public authority
- Evaluation: this is especially useful if schemes are planned for a longer time period, as it makes it possible to make adjustments long the way.

Every measure has its strengths and weaknesses, the valuation of these against one another have to be seen in conjunction with the aim of a given scheme, for example: Is it a success criteria that as many companies as possible are included it may be more costly in administration but creating much awareness. If the success criterion is to have the highest energy efficiency gains it might be only a few, very large companies who are in the scheme, potentially making the administrative cost lower, but also with little awareness raising in a broader group. These are considerations that the provinces and decision makers have to make.

Another point to consider is how to manage measures and initiatives, as well as coordinating the effort among the stakeholders, i.e.: industry, consultants, knowledge centers etc. In Vietnamese provinces, it is relevant also to look at potential management partners – it could be for example

- Neighboring provinces with similar industry structure
- Industrial zones
- Industrial associations
- Universities
- Service providers
- Technology providers

Such cooperation will widen the scope of an initiative and most likely lower the administrative costs, as the functions as negotiation of measures, supervision etc are shared.

2.1 Energy taxation

Provincial authorities do not have a mandate to collect taxes; however, there might be other similar means to collect money, for example as part of the industrial zone financial transactions. Therefore has energy taxation been included.

The use of tax or levy of some sort has the two benefits of increasing the incentive for enterprises to use energy more efficiently while at the same time generating revenue.

If the revenue collected is channeled back to the industry in the form of support to energy efficient initiatives, even more energy efficiency improvements can be obtained.

The experience from Denmark is, that it can be almost cost neutral to industry. However, exact cost of introducing energy taxation in Vietnam depends on many specific circumstances and the financial impact has to be analyzed in the specific context.

The Danish energy tax system consists of several components. The tax is large enough to make especially energy intensive industry very focused on their energy use. It provides a strong incentive to use less energy. The tax

level is differentiated in order to protect energy intensive industries competing on the global market. This is approached by:

- Redirecting the additional tax revenue from the green tax to trade and industry
- Increasing the tax rates gradually, thus giving companies time to improve energy efficiency, switch to fuels with lower emissions, et cetera
- Applying differential tax rates depending on the use of energy, thus lowering rates for energy intensive production methods – the absolute cost of the energy tax is still a substantial part of total cost, compared to industry with lower energy consumption.

Energy taxation will most often be a matter for tax authorities. Provincial authorities might have other means to collect some form of revenue based on the energy consumption of enterprises.

2.2 Voluntary agreements

Voluntary agreements (VA) are an instrument to increase industry awareness and

involvement in EE. Elements in a voluntary agreement are:

- Implementation of Energy Management Systems (EMS) (certified or non-certified)
- An agreements with government/local authority, in which enterprises commits energy reduction targets and being awarded by the authority when achieved.

VAs are often introduced as an alternative to traditional regulation. In the VA scheme, public and private partners will have to work together to reach a common goal: use less energy to reach the same output. However cooperation be encouraged by national/provincial policies or legislation.

In the scheme, the public authorities offer some sort of incentives, such as financial subsidies, administrative benefits, technical expertise or other. In return, the industry commits itself to meet certain EE targets. One of the main benefits of voluntary agreements is that they tend to create a more positive motivation of industries to meet the agreed targets.

2.2.1 Application - example

The use of voluntary agreements in Denmark was initiated along the introduction of a compulsory energy audit scheme in the early 1990's. From 1996 to 2013¹ the Danish Energy Agency (DEA) made numerous voluntary agreements with energy-incentive companies who then implemented EE projects. The principle of the agreements was that the Danish government would reduce energy taxes of energy intensive companies

¹ The tax that was reimbursed was abandoned in 2013, thus the basis for the scheme disappeared. A similar scheme is being set up for another energy related tax.

provided that these would implement a certified energy management system (EMS) and implement all energy saving projects with a payback period of less than 4 years. These projects were identified through detailed studies of specific opportunities for energy efficiency beyond what is identified through a standard energy audit.

Quick steps in the Danish VA scheme

1. The DEA informs trade and industry (the targeted industries) about the VA scheme and the advantages.
2. Companies apply for entering a VA with the DEA by sending a letter of intent. An agreement runs for 3 years.
3. The DEA monitors and approves the applications and then notifies the tax authority.
4. The companies prepare for entering a VA by:
 - implementing EMS,
 - Identifying viable energy efficiency projects
 - Allocate resources internally
5. The companies and the DEA negotiate and sign the VAs.
6. The companies undertake energy efficiency studies, maintain the EMS, implement energy efficiency measures and report to the DEA.
7. CO2 tax rebate is settled with the companies through relevant authority.

During the years of operation, adjustments were introduced along the way following dialogue with industry and evaluations of the scheme.

Voluntary agreements were made both on a bilateral level with individual large energy intensive industries and at a collective level with groups of smaller companies within energy intensive sectors. In such a joint agreement, a number of companies will have to implement an EMS as well as some special projects, identified as relevant to the sector, but without going through the detailed study.

One example of a sector with a collective agreement is the Danish brick sector.

To oversee compliance, annual control was conducted. In the Danish case, this was outsourced to external, accredited verification companies within EMS (ISO50001 certified). Verification costs were paid by the companies themselves.

In case a company fails to meet the obligations according to the VA, DEA can cancel the agreement. This is rarely done. Only about 5 companies have faced sanctions as a result of non-compliance, which come in the form of cancellation of the energy tax rebate.

Level of success

To understand the magnitude of the savings realized, it is important to keep in mind that Danish companies have worked with EE since beginning of 1990's.

On this background, it has still been possible to reach energy savings from 2006-11 equal to 5,4 % energy savings for companies with an agreement in place throughout the entire period.

There has been considerable variation in energy savings from company to company especially in the early years. In some companies, the annual energy saving was less than 1%, in others 20% savings were obtained.

The administrative costs of the mechanism were considerable, but they decreased over time. The administrative costs were reduced not only due to experience among personnel but also because the scheme was adjusted along the way. For example by giving preference to collective agreements, which are cheaper to manage.

With the monitoring role sourced to external party the administrative tasks for the public authority was further reduced.

2.2.2 Strengths and weaknesses

Whether a voluntary agreement scheme is a good idea depends on various preconditions.

There should be a tangible incentive offered to the industry, such as a subsidy, a tax rebate, reduced land lease fee or similar. Another possibility is for the public authority to promise to refrain from introducing other/further legislation on the sector /subsector, or access to defined privileges. Such privileges could be in the form of faster application procedures in the public system,

special or preferential access to other relevant schemes or subsidies etc.

A voluntary agreement is attractive in that

- It is flexible: there is a freedom of choice of EE measures for companies
- It is cost effective – and the public spending is limited after the initial phases
- Companies may use the agreement for branding purposes

Other factors pull in another direction – or should be taken into account when the total value of developing and implementing a VA scheme is assessed:

- It can be difficult to assess the true effect
- It is difficult to assess whether the energy efficiency measures would have happened even without the agreement.
- Potentially large administrative cost, especially with small and medium sized industries
- The agreements also involve costs for the companies for audits, verification etc.

When designing a VA scheme, it is necessary to find out which areas are most important to address For example whether competitiveness of companies or the amount of energy saved in the companies is valued the most.

2.2.3 *Actions*

Having the strength and weaknesses in mind, it is necessary to identify the target group, based on the goal that is to be fulfilled.

For example, for industry, it is particularly the issue of the costs to be in the scheme that should be taken into account – it is essential that costs are acceptable if the scheme going to succeed: To fulfil the obligations, internal time and resources must be allocated within companies to manage the scheme, certification costs must be expected, and furthermore, fees for external specialists must be expected. However, from the Danish experience, the costs for the most energy intensive companies are much smaller than the economic benefit.

Why work with energy management systems (EMS)

A well-designed EMS ensures that energy efficiency considerations are taken into account whenever relevant, including in the design and procurement of new process equipment as well as in the daily operation. An EMS scheme for (sub) sectors should build on the following principles:

- A continued and systematic effort is done to improve performance year after year.
- An involvement of key persons inside the companies to address difficult technical areas.
- A clear management buy-in to secure a continued commitment at all levels.
- Budgets and targets should be set every year, and achieved results should be evaluated compared to these.

For the small companies, a certified energy management system will as general rule be too expensive to maintain. Therefore, a “lighter” version of an EMS system has also been developed. This system does not require a certification, and the requirements to documentation are much less comprehensive. (see 6.4).

It is also worth considering the cost efficiency of the nature of the agreement. Experience shows that the cost efficiency is better for the collective agreements, where more companies accept a joint contract, than for the individual agreements. A scheme could be set up that allows for only collective agreements. This will generally require that there is an industry branch organization which is active, and that the individual companies are willing to co-operate.

How to get started

- Consider which industrial sectors would be relevant for VA. The sectors should have considerable energy consumption, and a considerable EE potential. The companies in the sector should be large, or they should be well organised in an industrial association
- Consider what benefits the provincial authorities could offer the companies (possibly in combination with other departments)
- Discuss the idea with the industry in question
- Draft and negotiate a concrete scheme.
- Companies apply to enter the scheme
- Authority to monitor and verify (see also below on *Quick steps*). This could also be sourced to another party

Based on the broad experience in other countries, many of the challenges can be addressed already when setting up the scheme. For example, a new VA scheme should include an effective energy data reporting system. This would provide the public authority with sufficient information to undertake an effective monitoring of the implementation of the individual agreement

as well as the scheme as a whole, and adjust the scheme if needed.

Such data is also very useful for other purposes especially when systematic collection of data is not in place.

2.3 Energy efficiency obligation schemes

In 2012, the European Union (EU) included the use of energy efficiency obligations (EEO) in the common energy efficiency policy for EU, the Energy Efficiency Directive. This because it has shown its value in reaching EE goals despite the rather short time frame in which it has been operational in various countries. EEO schemes are seen as an innovative measure with many possible setups making it suitable for many different settings and circumstances.

An EEO introduces an obligation to reduce energy use /gain energy efficiency to for example utility companies. The utility company is then responsible to harvest the energy efficiency gains at the end users, but are also allowed to charge a fee to cover the costs.

This agreement is entered for example between a national or provincial authority and the utility companies.

An EEO has a large degree of freedom in choice of method, simple rules and relies to a large degree on self-regulation. Coupled with the fact that it can be implemented almost without the use of public resources, make this measure very attractive.

2.3.1 Application – example

Denmark has had EEO since 2006, with utility companies as the obliged party (electricity, gas, district heating and oil). The

savings target were applied to the sector as a whole.

The scheme is anchored at the utility companies because these are close to consumers and expected to play a broad and stable role as service providers in the future Danish energy system.

The specific objective of the scheme is that utility companies help to increase the overall savings efforts, focusing on achieving energy savings in final energy consumption, which would not have been realized without the EEO. This means that it becomes easier and/or cheaper for end-use consumers to carry out energy savings. The Danish EEO does not focus on the production side of the energy system.

The EEO is aimed at gaining energy savings for all end use customers, however industry accounts for a large share due high cost effectiveness - energy savings in industry is often cheaper to harvest than in e.g. private households.

The procedure for having savings registered is the same for industry and households, and the involvement of the utility has to be documented before an energy savings project begins in order to prove verify that the project is implemented as a result of the intervention of the utility. All savings in final energy consumption may be included in all sectors except for the transport sector.

Quick steps in the Danish EEO

- An agreement is entered between the public authority and branch organizations of the utility companies within electricity, natural gas, oil and district heating with an annual obligation to implement and report energy savings.
- The utility companies have an energy saving obligation proportional to their annual energy sales that they shall document and guarantee. The utility companies are allowed to finance the costs to implement the savings via an extra cost on the energy prices to all consumers.
- Each utility company can choose a strategy for which measures to apply and report implemented energy savings, for instance:
 - To offer free consultancy to end-users of energy in all sectors in order to identify projects.
 - To enter partnerships with consultants and service companies to deliver projects.
 - To operate a subsidy scheme supporting energy efficiency investment projects.
- Each utility company participates in a benchmarking of costs related to operate the scheme each year.

DEA, as final approver, is indifferent about whether an individual utility company fails to meet the target for the year, as long as the sector as a whole meets its energy savings obligation. Utilities are allowed to buy, sell or share savings certificates with each other when one company exceeds their own obligation for that year.

In the Danish case, the scheme is financed by adding an extra cost to the consumers' energy bill. Other ways are possible, for example through public budgets.

Level of success

The prices of the savings in the Danish EEO are benchmarked across utility companies each year. Comprehensive evaluations are carried out every two or three years.

Analyses of the Danish EEO show that the net effect is 74 % for business i.e. that three fourth of the energy savings reported can be attributed to the obligation scheme, while the remainder would have happened even without the scheme.

Further, it has been assessed that advice and consultancy has a large and long-term effect, whereas subsidies to individual investments has more limited effect in longer term.

One result of this scheme is that a comprehensive and widespread energy saving business has developed in Denmark over the past 7-8 years. In addition, new approaches, partnerships and financing mechanisms are continuously developed solely via the commercial market.

2.3.2 Strengths and weaknesses

To apply an EEO scheme successfully some preconditions should be considered such as

- The presence of sufficient and strong/competent market agents – regulator, obligated parties, and executing parties that are capable of handling the obligation;
- There is transparency of costs,
- There is adequate compliance /performance incentives among obliged parties

- Setting up the scheme can be rather comprehensive, and evaluations has shown that the administration cost have been substantial.

Additionality is also one of the large challenges with this measure, but least so for industry projects.

An EEO is attractive for numerous reasons such as

- The energy savings targets create a push in the market, which can have a positive effect on suppliers of material who will then develop more energy efficient solutions.
- The scheme is administered by obliged parties which limits the need for public sector resources.
- The freedom of choice in how to obtain the energy saving makes the measure very cost effective.

2.3.3 Action

How best to design EEOs depends on national (regional) characteristics, e.g., the savings potential, size of market, other measures being in use and the tradition and experience with energy efficiency. This should be assessed as part of the initial investigation on suitability of the measure. The exact way that the scheme should be structured depends on which focus the scheme should have – for example reaching the most energy consumers or the largest energy consumers.

It is also possible to apply different focus and this way influence the type of energy efficiency gains harvested or sectors involved. Focus could of the scheme could be e.g.:

- Cost-effectiveness
- Low administrative cost

- Certain interest to specific sectors - preference can be given to for example energy intensive sectors or certain industrial sectors

No matter the focus, it has shown to be useful to have repeated adjustments and updates based on monitoring and evaluation, and dialogue with obliged parties.

2.4 Subsidies for energy savings in industry

Subsidies are given to stimulate focus on energy and gain energy savings. A subsidy scheme will support a transformation to more EE and at the same time create knowledge and awareness not least among the parties (industry, sectors) eligible for subsidies.

The subsidies can be introduced in form of for example support to:

- Investments in energy efficient equipment
- Investments in heat and electricity production with less CO2 emission
- Energy audits
- Energy management
- Energy efficient design
- Development and demonstration of energy efficient technologies
- Information projects

Subsidies are particularly useful if coupled to a tax, levy or similar, giving extra incentive for companies to use a subsidy scheme. At the same time it could lower the cost of running the scheme if the money collected is returned as subsidy (see also 2.1).

Subsidies will traditionally be used as a temporary measure to transform a sector. However, it is also important that a scheme is in place long enough for the target group to get to know about it.

2.4.1 Application – example

Subsidies for energy savings were used as temporary measure when Denmark first introduced energy taxation on industry. It was financed from parts of the energy tax revenue. The subsidy for energy savings was intended to make it more attractive for companies to invest in cleaner technology and at the same time reduce the burden from energy taxes. It ran for eight years.

The subsidy scheme was not earmarked for specific professions, regions or pre-selected companies, but open for all types of industry.

The large variety of projects eligible for support is both an advantage, as more companies and projects were involved, but at the same time very costly, as so many different applications were to be processed.

Quick steps in Danish subsidy scheme

- Develop framework including application material and guidelines
- Companies apply and get approval from designated authority
- After approval of project, the subsidy is reserved for the company, who will then have a certain timeframe to complete the project and receive the subsidy

All administrative steps could be outsourced to external parties, and only overseen by the authority.

Support was given to individual projects as well as so-called standard solutions.

Individual projects were specific projects, described by the applying company or a consultant hired by the company. The applying company could receive up to 30 % of the cost in subsidies. A set of minimum requirements to the projects were set. For

example, the payback time of the proposed projects should be at least 2 years, since it was assumed that projects with less than 2 years of payback period would not need financial support. Also minimum requirements for the amount of energy/CO2 saved were included.

Standard solutions were standardized description of mostly small scale energy efficiency projects widely applied. A standard solution defines a set of criteria and conditions for support in order to secure that the project would be energy efficient. Standard solutions were introduced to make it easier to apply for and obtain grants, especially for small businesses. About 40 standard solutions were developed in identified areas with identified potential for energy savings through use of uniform technical opportunities across industries, for example within areas such as lighting, cooling, ventilation, compressed air and electric motors.

Level of success of the Danish scheme

Evaluations show that substantial CO2 reductions were gained through the scheme and at low socio-economic costs. Furthermore, the majority of companies (more than 90 %) had a number of positive effects derived from the subsidized investments they made.

Another benefit from the scheme was an increased awareness of energy efficiency in companies also at management level thus creating a continuous focus on energy efficiency.

The subsidy schemes significantly transformed the market for energy consuming technology, and many of the standard solutions became mainstream even after the end of the support scheme.

The costs of handling the scheme were assessed as acceptable while the scheme was running.

In a single year, 2000, support pledges for a total of 3,387 projects were granted. 2,365 applications were for the standard solutions projects, of which 1,926 were completed.

2.4.2 Strengths and weaknesses

Some specific issues have made the subsidy scheme interesting, including:

- It is open to all private companies (or if it is a more focused approach: open to all companies within a defined sector)
- Small projects and small/medium-sized companies are also targeted

There are also some negative experiences that should be taken into account:

- Individual projects can be costly to manage

- Small projects are costly to manage compared to energy saved
- Application cost in companies can also be of considerable size.
- There is a risk that support is given to projects which would have taken place even without support.

These experiences can all be handled but it will often be a prioritization issue which types of projects are in focus in the specific scheme. This will also depend on the success criterion for the scheme: it could be a priority to have many companies involved as this will spread the knowledge of energy efficiency. A different priority could be to harvest the largest efficiency gains.

2.4.3 Action

Based on Danish experience, there are some issues that could be addressed up front in the design of a similar scheme.

A key part of a subsidy scheme is to have identified and committed a certain amount of money per year for a given timeframe. It has to be large enough to make the subsidy attractive. With the resources identified, it is important that the administrative setup matches the funds allocated.

If the scheme is administered by a public body, a number of people have to be appointed to assess applications. Individual projects are assessed individually which requires a wider range of specific skills (projects are different) and people to handle it. Assessing standard solution projects require fewer skills as it is predefined projects which has form more like a checklist. Thus, individual projects will be more expensive to handle than the standard solutions. However, the amount of energy saved or CO₂ reduced

will often be larger in the individual projects. The initial identification and description of standard solutions will also require resources making it more expensive in the short run.

Standard solutions could be of special interest as it will often be an attractive option for small and middle companies. A consultant could be hired to search the circumstances for the defined target group, to identify where the most common challenges in form of energy use are. Based on this, various solutions should be identified, tested, and if they are found successful, a standard solution description is described.

It is worth to scan the market and identify potential financial mechanism already in place and /or standard solutions already developed. One example of such is the Green Investment Facility in Vietnam, which offers attractive awards to selected energy efficiency projects in sectors such as food processing, ceramics and bricks.

Initiatives could be centered around other schemes already developed to increase attractiveness and awareness in these areas, by coupling more EE measures.

2.5 Supportive measures

Below, a range of smaller, supportive policy measures are presented. These can be used either in combination with more comprehensive support schemes or as stand-alone measures, for example as first steps in the direction of including more energy efficiency focus in regulation and legislation.

As the measures are smaller in size, most of them have not been evaluated in the Danish context thus the real effect of these is not known. However, the measures described here have been chosen based on a dialogue

with DEA representatives with knowledge of measures as well as companies who have expressed content with the measures.

Despite the smaller size of the following measures, it is still a very important first step to identify a specific target group of companies/industry and define specific and understandable criteria for who should be included in this group. Such specific delimitation is important in order for companies to know if they are eligible/required to a certain scheme.

2.5.1 Energy management light

For many smaller companies, certified energy management systems are too expensive and comprehensive to implement. However, introducing some form of energy management will often still be a valuable idea. The concept of energy management light is to focus on the same areas as are included in certified energy management systems, but adjusted to fit smaller companies. For example, instead of having an external expert to do a thorough check of a production facility, the owner or management of the company will go through pre-developed check list to assess the current state of energy consumption and potential for energy efficiency gains. The cost of doing this is limited and possible to carry out also for small companies.

Experience shows that simple energy management in a company can reduce energy consumption by substantial amounts. Energy Management Light aims to address management and energy responsible staff in companies and institutions with an ambition to gain better control of the energy consumption. Specifically, the control will be gained through support from comprehensive check lists of target areas, for example:

Lightning, pumps, cooling, IT and office devices, process equipment, compressed air and vacuum systems, central heating systems, building envelopes and transport. In some areas substantial energy savings can be made only by changing behavior.

The checklists for SME- subsectors also include one introductory checklist focused on a general overview of energy use.

Steps to include in an EMS light guide

1. Setting energy efficiency targets – based on an assessment of the potential as well as the level of ambition
2. Organizing efforts: establish an energy management organization within the company
3. Mapping energy consumption
4. Prepare action plan – based on previous steps identify where and how you can save energy
5. Continuously monitor energy consumption, develop and assess key indicators
6. Evaluation of efforts
7. Simple routines: the best way to get energy management to function in daily life

It is important for the success of this kind of measure that it is well communicated that it does not require much from the companies. A very important part is simply to get an overview of energy consumption in the company, and then include energy as a natural part of managing the facility.

Even though it is smaller than the certified, EMS (ISO 50001), it still require substantial efforts from the SME. And also of importance, it requires an initial interest

unless there is benefit or cost connected to EMS light.

By being smaller in nature and therefore less expensive to implement, it could be worth exploring how a EMS light scheme could be included in a voluntary agreement scheme in a Vietnamese context.

2.5.2 *Competent and certified auditors and consultants*

One area that is often critical is the availability and quality of consultants, who are to support industry in energy efficiency gains. Even a few bad experiences with consultants can harm the entire EE consultancy sector. Training and certification of experts with the right knowledge is one way to overcome such problems.

To set up a scheme with certified consultants, the DEA teamed up with technology experts with the purpose of making a scheme for quality experts. This scheme would make trusted competences available for industries within specific EE technologies, to help with EE assessments and projects.

Interested consultants can then apply for certification with proof of their skills. The registration system for energy consultants is targeting the demands from industrial companies. It is a combined registration and quality assurance scheme for energy audit consultants on a general level - the A level – as well as on a specialized B level of technical experts and verifiers.

The administration of the registration system has been sourced to the Danish Technical Institute, an independent and not-for-profit institution. It is financed by the fee consultants have to pay to be in the scheme, thus it is important that the incentives to enter

the scheme are sufficient. Financial incentive schemes require the use of certified auditors.

Guidelines to structure and ensure quality of energy audits could also be part of the work of the secretariat.

How to manage a certification setup

- Management outsourced and financed by the certified members
- Public authority can create demand by requiring the use of certified consultant/ auditors for obliged controls
- To ensure the scheme develops according to demand, and the right qualifications are present, consider appointing a secretariat with attendance from relevant stakeholders, public and private, consultants and industry. This will ensure a continuous development that take into account the demand from public authority and industry as well as the associated requirements with consultants and auditors.

2.5.3 *List of efficient technologies*

Only few energy consuming, industrial equipment are subject to energy efficiency standardization. As a less costly alternative, lists of most efficient technology within a product type, e.g. heat pumps have been developed. A list can serve as “insurance” to buyers that the product meets some predefined requirements on energy efficiency.

In Denmark, this is based on a voluntary system authentication scheme. The authentication schemes provide a series of rigorous technical requirements for the company that manufacture or import a product. Industry participates in the ongoing

dialogue on the development of the criteria that the list is built upon making industry aware of best practice and potential. There is also collaboration with the technology providers who know the products, potential and development.

A list will have to be dynamic and undergo continuous testing, which in Denmark is paid for by the companies themselves. Thus there will be costs imposed to companies who want their product to be included on the list. It is however expected that the extra costs will be covered by increase in sales.

A list of most efficient technologies can be supported by for example a support scheme that requires companies to use a product/technology on the official list, it could spur both dissemination of more energy efficient technologies and search for /developing of more efficient technologies and products. Also, it can be seen as a competitive advantage of the companies with products on the list.

Quick steps in developing list of efficient technologies

- Screening of technologies in collaboration with the sector and technological institutions
- Develop an application format including all the requirements for the technology
- Manufacturer /importer to sign an agreement with the authority to add their product to the list of most energy efficient products. This is free of charge to get on the list but it requires that the efficiency has been estimated by the company
- Authority receives the documentation. The company will have to pay documentation costs.
- Acceptance of the technology
- Authority or third party perform random checks to ensure quality

As there are potentially large cost for industry associated with the approval to be on the list. Another setup could be that authorities support the tests and thus there will be no cost for companies to have their products on the list.

2.6 Awareness raising and information

Awareness raising and information is an essential part of success with energy efficiency schemes because of the initial low level of focus and interest from both individuals and companies. It is also closely related to capacity building and training as it is often the lack of knowledge and capabilities that will often hamper the diffusion of energy efficiency.

2.6.1 Energy consumption in industry

To be able to direct policies, campaigns etc. towards areas of industry where the potential

is most promising, analyses of energy use in companies is useful. DEA undertake such analyses regularly, every 7-8 year. The continuous update of the analyses are necessary because use patterns are likely to have changed along with structural and industry developments in business and in line with current technological development.

The latest analysis of the Danish industries maps the energy use in 57 industry sectors, where energy use is divided on 20 energy forms and 24 technologies/end uses.

The report describes the energy consumption by industry sectors and end uses and reviews the technical and behavioral savings potential. The analysis shows that there is a considerable savings potential also with large economic gains for companies. The assessment concludes that industry can realize energy savings of 10, 16 and 33 % of energy consumption with payback times of respectively 2, 4 and 10 years is accepted.

This type of analysis forms the basis for various other analyses, for example on potentials in specific sectors or of technologies.

2.6.2 Technology catalogue

A prerequisite for making informed decisions is to have sufficient knowledge of potential and expected development within energy use as well as for specific technologies. The technology catalogues that DEA produce are used as basis for assessments and scenarios. The catalogues provide technical economic and environmental information for a number of energy installations. An example is a catalogue for production of electricity and district heating, energy storage and energy production and conversion.

DEA has substantial successful experiences in developing technical guidelines, fact sheets and case-stories that promotes the desired measure or the awareness of energy efficiency at a broader level, based on technology catalogues.

2.6.3 Awareness

Awareness and communication is necessary for all measures for people and the target group to know about it. One particularly successful way of communication has been show-cases and demonstration projects. This can be applied to every scheme introduced.

Another way to raise awareness has been though a “toolbox” development, were industry people demonstrates tools and methods within energy management and energy performance indicators. Especially performance indicators and benchmarks – even just rough indications of average use – has been a successful way to get smaller companies interested in energy efficiency. However, this will often be within areas of low technical complexity.

Also a range of surveys and assessments have been carried out to establish a database for industrial energy use. For example surveys of energy saving potentials, review of experiences from special investigations, and analysis of potentials for use of renewable energy. This is very useful for industry when they are making investment decisions as it shows the potential and benefits.

Analyses and assessments are also useful to inspire energy consultants and utility companies to find new ways of developing their business and support industry, to the benefit of both.

Concrete issues to consider

- Develop show cases: show how measures work and the associated benefits. This could also be in a format that is more like a EE show room where more challenges and solutions can be on display.
- Raise awareness and interest through pilots and demonstration projects within subsectors – at a level where other companies in the same subsector can identify itself, has shown fruitful. When a pilot or demonstration has taken place there has to be a plan for how this information is disseminated.
- Assessment of energy use and/or energy savings potential in specific subsectors or geographical areas
- Benchmark tools
- Information that promotes behavioral changes could be beneficial. Behavioral change typically provides “free” savings, but it can be difficult to change deep-rooted habits. It can be a support for companies to help mapping the behavior of the employees. This can lead to better control over the operation.

2.7 Renewable energy for production processes

The industrial energy analysis mentioned above has proven a large and economically viable potential for substitution of fossil fuels by renewable energy for industrial processes.

2.7.1 Application

Such scheme has been introduced in Denmark recently, and it is expected that by 2020, the scheme has converted 25 per cent of the Danish manufacturing and food industries from fossil fuel to renewables.

Support is given in the form of investment aid. The grants will support all forms of

renewable energy, but most of the projects are expected to convert to biomass.

The investment scheme bridges the price gap between renewable and fossil fuels. The scheme supports industries to convert to renewable energy sources or district heating such as surplus heat from neighbouring industries. The scheme also supports investment in measures to increase the efficiency of the use of renewable energy or district heating.

The support also means that projects achieve a reasonable repayment time for businesses.

Also the scheme supports the R&D of new renewable technologies by creating a substantial home market, which forms the base for expansions on export markets.

There are substantial technical requirements to apply for support. For example, subsidies cannot exceed a certain share of investment costs depending on company size. There are also requirements related to payback time that has to be at least 2 years including grant A very comprehensive manual to the application has been developed comprising with step by step guidance to companies.

To consider before introduction

A scheme like this requires a substantial amount of (public) funding, but it also has the potential to change a large share of the industry energy input from fossil to renewable.

It could also be developed for a sector/ sub-sector or identified companies only.

The substitution of fossil fuels by renewable energy could have several co-benefits to the province including the creation of jobs and profit from the local supply of renewable energy.