

# Capacity building through practical training programmes

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## 1. Synopsis

Capacity building is focused in Norwegian collaboration with central- and eastern Europe and the CIS; Energy Auditing, Business Planning and Management skills. Content and results will be presented.

## 2. Abstract

The demand for increased energy efficiency in central and eastern Europe and the CIS is well known and accepted. The theoretical skill of people being involved in the energy efficiency field are very good, they have a lot of information about technical solutions and possibilities. However, still the visible results are very limited. Why? One very important reason is the lack of practical know-how and experience.

Local capacity building through practical training programmes is an absolute necessity to achieve increased energy efficiency in a big scale. Development of skills how to technical, economic and financial; evaluate, develop and implement real projects is crucial (Energy Audits, Business Plans and Management skills).

Based on more than 20 years of experience, Norway has developed methods for organising and implementing projects in an efficient and profitable way. This knowledge, including practical tools and training material is found very interesting for other countries.

Hence capacity building is focused in the Norwegian collaboration programmes with countries in central and eastern Europe and the CIS.

When organising training programmes, use of interactive training has proven to be a very efficient way of learning (Mixture of lectures, examples, exercises and practical homework to be presented and discussed in the sessions).

To ensure efficient training and proper quality of the work, our practical oriented project tools has also been very popular and useful.

This paper describes the basic content of these Norwegian collaboration programmes, and results from successful implementation of training and education programmes in several countries during the last six years.

## 3. Energy Efficiency from Norway - Transfer of Know-How

### 3.1. Introduction

The energy costs for companies, municipalities and private households are relatively very high in central and eastern European countries due to inefficient energy use, rapidly increasing energy prices, and as a result of low salaries energy costs continue a high percentage of disposable income.

The level of education is high, therefore technical engineering skills are very good, but until now they have had

limited time and possibilities for practical experience from developing and realising energy efficiency projects in a market economy.

Financing has been, and still is, a big problem. However, national and international financial institutions are showing an increasing interest for energy efficiency projects, leading to more and more funds being available for investments. The financial institutions are searching for viable projects which leads to the need of local know-how for development of acceptable Energy Audits, Business Plans and Management skills.

Based on more than 20 years of experience, Norway is one of the leading countries on energy conservation issues and environmental technology. Hence the Norwegian authorities focus on training and education in their national policy. It is considered important to train people "to do the right things at the right time". Thus we have a wide experience in organising and implementing projects in an efficient and profitable way. This knowledge, including practical tools and training material is found very interesting for other countries.

Hence the Norwegian authorities focus on "Capacity building" or "transfer of know-how" in their collaboration programmes with several countries in central and eastern Europe and the CIS. This document describes some of the basic ideas and content of such collaboration programmes.

### 3.2. Organisation of transfer of Know-How

The aim of the collaboration programmes is to contribute to increased energy efficiency in the respective countries; to accelerate the process of implementing energy conservation (ENCON) projects. This can best be realised through support to the further development of a commercial "Energy Efficiency Market".

To achieve this aim in an efficient way, the Norwegian transfer of know-how programmes are implemented in two main steps (Illustrated in figure 3-1.):

In the first phase, a selected group of engineers receive intensive training to become ENCON specialists. The intensive training can take place in Norway or in the related region. The training consists of lectures, building site inspections and practical training two or three times a two week period. In addition they have to do preparations before the first training course, plus homework between and after the training courses.

The trained group forms the basic staff of the Regional Energy Efficiency Centre (REEC), established as a part of this first phase.

The second phase involves dispersion of the know-how through a wide range of local activities, e.g. university education courses, training of energy advisers, demonstration projects, articles in technical magazines, development of financial mechanisms, information, seminars, exhibitions, etc.

The second phase is carried out through close collaboration between the REEC and the Norwegian specialists. Step by step the activities are carried out, more and more by the REEC specialists. After 3 - 5 years they should be able to accomplish the activity totally by themselves, as a self financed organisation.

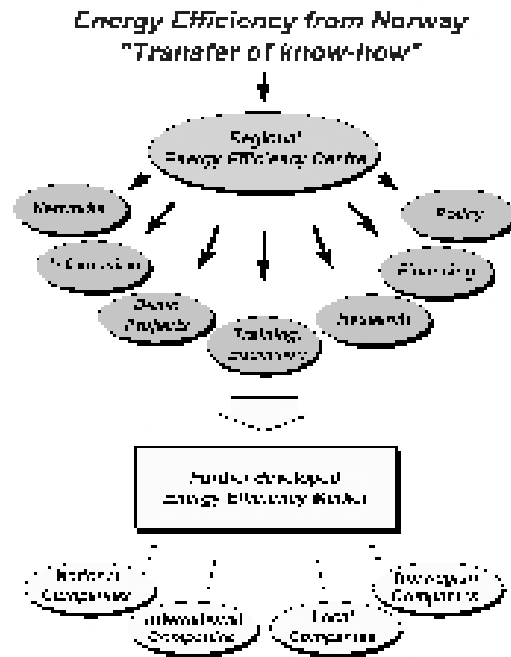


Figure 3-1. Transfer of know-how - Norwegian principle

Through the collaboration programmes, we focus on information activities and practical training, relating to technical, economic and financial issues and how to evaluate, develop and present real ENCON projects (Energy Audit Reports and Business Plans).

The step by step development of projects following the ENCON Process (described in the following) is the governing idea for the activities included in the collaboration programme.

### 3.3. The ENCON process (ENCON = Energy Conservation)

Every project is unique, and must be treated as such in order to find the energy conservation possibilities. The sponsor might also have various plans for renovation and different requirements for the profit. It is necessary to find the possibilities and the economic consequences of the project before expending too much time on investigating all details. Hence the total ENCON process is divided into six main activities as illustrated in the float chart.

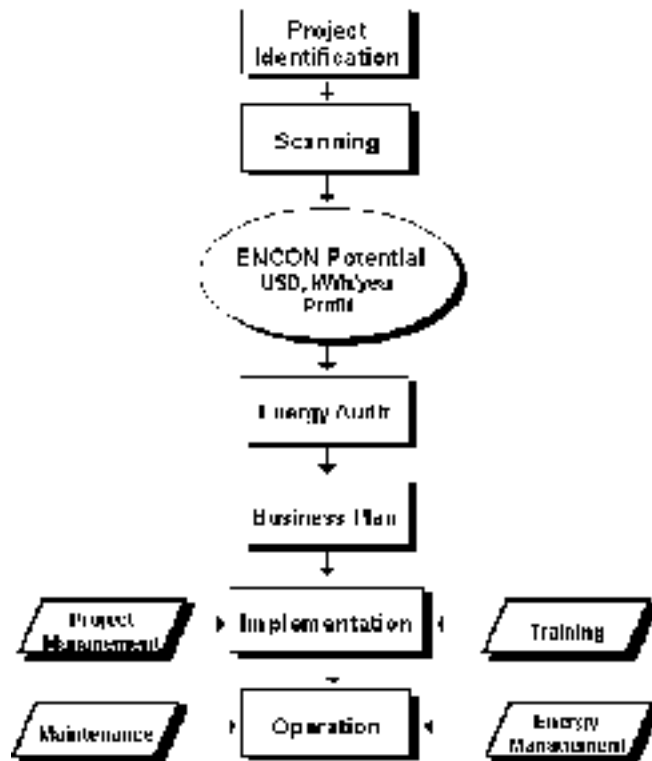


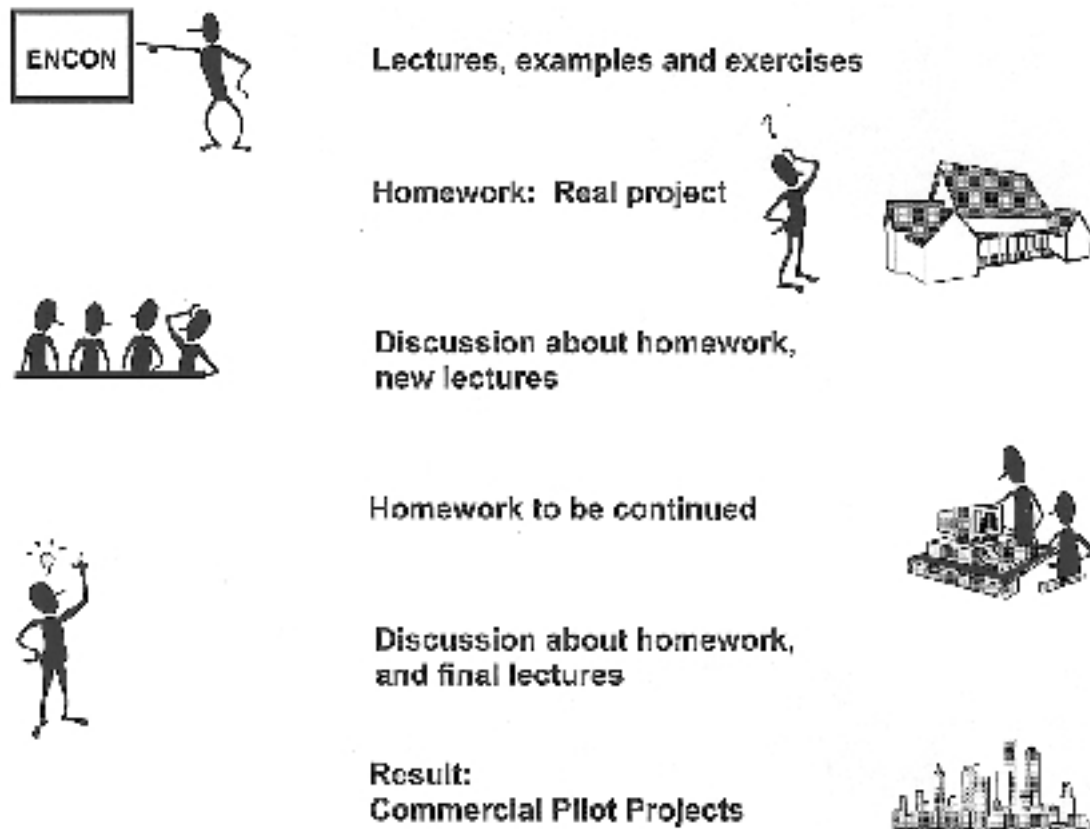
Figure 3-2. The ENCON Process

If the information gathered during the Project Identification phase reveals an interesting project, a Scanning is carried out in order to investigate whether profitable ENCON installations can be made or not (total energy saving potential, total required investments and total profitability).

If the sponsor finds the profitability interesting, the process will continue with a more detailed Energy Audit (Technical and economic evaluation). In order to organise financing, a Business Plan is necessary (Financial evaluation). During the Implementation period, the operation personnel is given thorough training on all systems and equipment. The training ensures an energy efficient Operation of the building and processes. After having implemented the ENCON measures, the installed systems for Maintenance and Energy Management will contribute to ensuring the energy consumption low .

### 3.4. Interactive Training

When organising training programmes, for both Energy Auditing and Financial Engineering, use of interactive training has proven to be a very efficient way of learning. “Interactive” means that the training is divided into sessions. Between these sessions, each participant will carry out a practical homework which will be presented and discussed in the next session. Thus the participants will gain their own experiences while repeating and testing out their new knowledge.



*Figure 3-3. Interactive Training*

Through this interactive training programmes each participant is developing a real project, which can be further developed and implemented as a commercial project.

To ensure efficient training and proper quality of the work, we provide the participants with practical Project Tools and Education Material. The material contains all the following documentation necessary to evaluate and implement energy efficiency projects:

- Descriptions and guidelines
- Examples
- Tools and forms
- Check lists
- Standard reports

The material, in English, Russian and Slovakian languages, has been adjusted to central and eastern European conditions, based on the experience from these regions the last 6 years.

### 3.5. Practical Training

It is very important that the training programmes are practically orientated. Based on the knowledge gained at the training, the participants must be able to continue the development and realisation of energy efficiency projects by themselves.

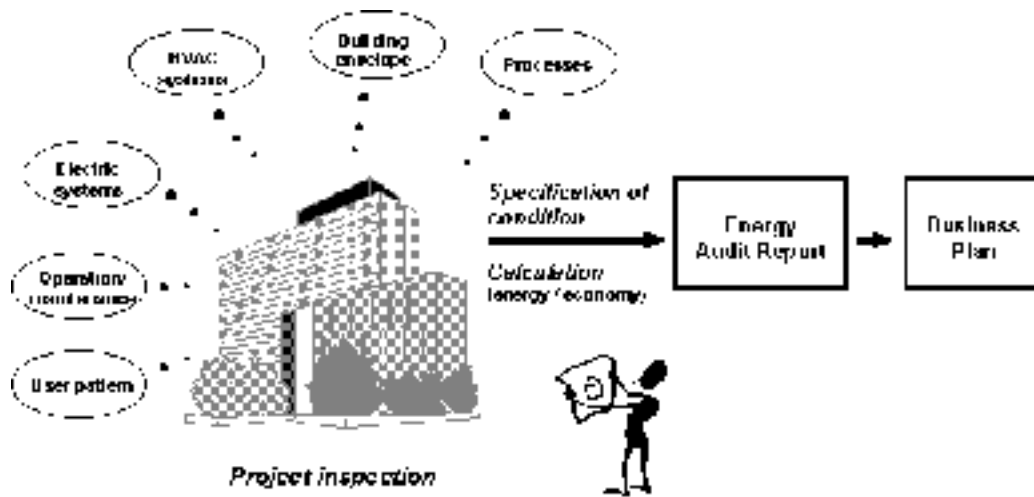


Figure 3-4. Practical Training

## 4. Results

Norway has supported Transfer of Energy Efficiency know-how to the Russian Federation, Latvia, Lithuania, Hungary, Poland, Slovakia and the Czech Republic, including the activities:

- Establishment of Regional Energy Efficiency Centres
- Education of students
- Training of engineers (Energy Advisers)
- Information schemes
- Demonstration projects (Buildings and Industry)
- Support to development of Energy Efficiency Policy

Some of the projects are further described in the following chapters.

### 4.1. Slovakia

The Norwegian-Slovakian collaboration started in 1992. The main collaboration partner at the Slovakian side is the Technical University of Bratislava, Department of Building Services (Ass. prof. Dušan Petrák).

Major activities implemented in Slovakia:

- Education; After three years as a voluntary education programme (60 students educated), the one semester programme “Energy Audit of Buildings” has become an obligatory subject from 1997.
- Training of 120 Energy Advisers, authorised by the Slovakian State Energy Inspection.
- Development of Slovakian textbook “Energy Audit of Buildings”, for students and engineers.
- Publishing of approximately 30 articles in the main HVAC-Magazine
- Approximately 20 presentations at national and international conferences, seminars and exhibitions in Slovakia.
- Five demonstration projects, in the industrial and building sector have been developed, and energy conservation measures implemented and considerable energy savings achieved.
- Support to development of Slovakian policy, regulations, standards and norms in the field of energy efficiency.

For the time being, approximately 15 persons at the Technical University of Bratislava are involved in various commercial Energy Efficiency activities as a result of the Norwegian-Slovakian collaboration. Some of the educated students have also been employed in companies working in the energy efficiency field, implementing energy

conservation projects. They were very satisfied with the training program, and with the tools and forms they were given that could be used in their daily work with energy efficiency. A major part of the Energy Advisors are still working in this field, implementing energy conservation projects. They were very satisfied with the practical approach

#### 4.2. The Russian Federation

A Collaboration Arrangement on Energy Efficiency between Norway and the Russian Federation was signed 30 April 1996.

In accordance with the arrangement, the parties have agreed to cooperate in various fields:

- Development of Energy Efficiency Demonstration Zones in the north-western part of the Russian Federation.
- Development of Energy Efficiency information, training and education schemes and other Energy Efficiency demonstration projects.
- Development of Energy Efficiency demonstration Projects.
- Establish cooperation between Russian and Norwegian Energy Efficiency companies and other companies interested in the subject.

Energy Efficiency Centres have been established in the Energy Efficiency Demonstration Zones Kirovsk (5 employees) and Petrozavodsk (6 employees), and Demonstration Projects have been developed and implemented in the same zones (Industry and buildings).

The main figures for one of the demonstration projects, Kirovsk Kindergarten no 12, is given in table 4-1.

*Table 4-1. Energy Conservation potential in Kirovsk Kindergarten*

Energy conservation measure	Investment (NOK)	(kWh/yr)	Savings (NOK/yr)	Pay Back (Years)
1 Water saving shower heads	9.000	26.000	6.500	1,4
2 O&M and Energy Control System	31.000	65.000	16.300	1,9
3 Sealing of windows	36.000	58.000	14.500	2,5
4 Heat recovery, ventilation	130.000	155.000	38.800	3,4
5 Insulation of tubes in basement	31.000	34.000	8.500	3,6
6 Pool water treatment system	45.000	44.000	10.000	4,5
7 Thermostatic radiator valves	52.000	44.000	11.000	4,7
8 New heating subcentral	310.000	85.000	21.300	14,8
<b>TOTAL (Measure 1-8)</b>	<b>644.000</b>	<b>511.000</b>	<b>126.900</b>	<b>5,1</b>
<b>BUILDING RENOVATION MEASURES :</b>				
9 Insulation of roof	215.000	104.000	26.000	8
10 Insulation of external walls	1.750.000	249.000	62.000	28
11 New windows	960.000	105.000	26.000	37

#### 4.3. Financial Engineering

Together with the United Nations ECE, the Energy Efficiency 2000 Project, Norway developed and implemented a Training Programme on Financial Engineering in 1996.

Project managers/developers for Energy Efficiency Demonstration Zones from Bulgaria, Hungary, Poland, Slovenia and the Czech Republic were trained in how to create a Business Plan for Energy Efficiency projects, and how to present it for international financial institutions.

Through the interactive training programme consisting of three Training Courses and a homework, the six project teams developed individual Business Plans for their own energy efficiency project. Also at this training Programme the participants were very satisfied with the practical approach of the training and the tools given them. As a result of the Business Plans developed at the Training Programme, capital investments have been made for 4 of 6 projects.

The same Training Programme has now started in the Russian Federation, for project managers/developers from various Russian Energy Efficiency Demonstration Zones.

## 5. Conclusions

The education and training activities described in this document will both give short term and long term results.

It is difficult to measure the long term results of these specific training programmes separated from other training and information activities.

The short term results is easier to measure. As described in chapter 4, the training activity has resulted in a lot of engineers and economists using our methods and material in their energy efficiency work, leading to implementation of real projects.

The participants have highly appreciated the practical approach in the training programmes, and the tool and forms they could use in their daily work with energy efficiency.

Practical training in Energy Auditing, Financial Engineering and management results in increased implementation of real energy efficiency projects.