

## **EX-POST-EVALUATION OF ENERGY MEASURES IN SWITZERLAND**

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***Abstract:** In 1990 the national action programme Energy 2000 was started. It comprises the development of state frame conditions, voluntary action and the work of conciliation groups. The programme defines clear quantitative goals to be reached by the year 2000.*

*Voluntary action is implemented in 7 sections. The Swiss Energy Model reunites companies (large energy consumers) in groups, supports them to improve their energy efficiency and thus contribute to the main goal of Energy 2000. The groups are attended and led by moderators.*

*Two evaluations were led through in 1995/96 and 1999. The first was to show the function of the Model and the success factors. The second evaluation should examine if - and if yes how - the Swiss Energy Model could be part of the Swiss energy policy after 2000.*

*The first evaluation based on (i) an assessment of the efficiency of the measures which lead to an improvement of energy efficiency and on (ii) an examination of the functioning of the Model.*

*The second evaluation examined (i) the influence of the membership in the Model on energy efficiency, (ii) what factors influence the expansion of the Model, and (iii) which part could the Model play in the future Swiss energy policy.*

*The results show, that the Swiss Energy Model is a well functioning method to increase the energy efficient behaviour in companies. It is an innovative instrument with good prospects in the context of the future energy efficiency policy.*

*The two evaluations showed some weak points of the Model and proposed a variety of measures to improve the Model.*

*Most of the recommendations have been implemented meanwhile. Thus the evaluations have proven to be a valuable instrument to help to develop and to improve the Model .*

### **The Swiss Energy Policy in the 1990s: the frame conditions**

After a people's vote on three energy relevant projects in 1990 the national action programme Energy 2000 was created and started. Its pillars are:

- voluntary actions
- state frame conditions
- a dialogue consisting mainly of so-called conciliation groups dealing with key problems

### **The goals of Energy 2000 are:**

- Stabilisation of the consumption of fossil fuels and CO<sub>2</sub> emissions at the 1990 level by 2000, thereafter steady reduction
- Reduction of the growth of electricity consumption and stabilisation after 2000
- Increased contribution of renewable energies to energy supply (+3% renewable energies for heat production, +0.5% for electricity production)
- Increase of the electric power of existing nuclear power plants by max. 10%, increase of the production of electric energy from hydropower plants by 5% in the year 2000

In the following the paper focuses on the voluntary measures and actions.

The realisation of the action programme was designed to touch the relevant sectors of the market in specific ways. Therefore, 7 sections were established, each one managed by experts from the private sector:

- public buildings
- residential buildings
- industry
- trade and services
- hospitals
- motor fuels
- renewable energies

Each of these 7 sections first elaborated a strategy for maximising its contribution to the main goal of the action programme. Then the organisation for the realisation phase was created, a plan of operation was worked out and the market partners were defined.

In a later reorganisation the section industry was expanded to take in all large energy consumers and is now responsible for industry, trade, and services. This section offers the "Swiss Energy Model" as the main product to companies willing to participate in the programme.

### **The Swiss Energy Model**

The Swiss Energy Model is a management orientated model designed to improve the energy efficiency. It is basically a learning model for the participating companies, established on the normal principles of enterprise: initiative and economic motive. Thus the model is self financed after a starting period.

The important characteristics of the Swiss Energy Model are:

- A group of companies is formed; size of the groups typically 10 – 15 enterprises
- The process of constitution as well as the work of the groups is moderated by people who are chosen and trained by the section industry. These moderators support the group in manifold ways: administration, energy statistics, evaluation, controlling, supplying

information, methodological advice, introduction of (new) and systematic methods of analysis.

- A goal on the improvement of the energy efficiency is set
- Potentials and possible beneficial measures to improve the energy efficiency are identified
- A plan of action is elaborated
- Measures are realised
- Control of the success is carried out
- The results of the companies and the group are interpreted
- The next cycle is defined and started
- Thus a continuous improvement cycle is kept up

To date more than 20 groups are active in the Swiss Energy Model. Some 250 companies take part.

One important reason why good results can be reached is that in these groups a certain competition between the companies exists. It spurs on the participants to improve the results year after year. It also supports the companies' representatives to work on energy efficiency although the daily business might be a good excuse not to do so.

The control of success in the section industry, trade, and services of Energy 2000 includes only those measures that are realised due to activities in the Swiss Energy Model. Additional measures realised by the companies are not counted in the statistic of Energy 2000.

By end of 1998 the energy consumption of the companies which are engaged in the Swiss Energy Model was equivalent to one third of the overall consumption of the Swiss industrial sector. Thus the Swiss Energy Model has reached importance in the Swiss energy policy in the 1990s.

## **Evaluations: Methodology and Results**

In the action programme Energy 2000 all activities which go beyond a certain financial support by means from Energy 2000 are evaluated. To date more than 30 evaluations are completed.

In 1995/96 and 1999 two different evaluations were carried out on the Swiss Energy Model. In the following chapters these two evaluations are presented.

### ***4.1 First Evaluation***

#### ***4.1.1 Goal of the Evaluation***

The goal of the first evaluation in 1995/96 was to find out and to describe the function of the Model:

- how does the main idea of the Model reach decision makers in the companies from the management of the section industry via the moderators and the representatives of the companies in the group?
- what are the main factors to success of the Swiss Energy Model?
- in which way do these factors have an effect in the companies?

#### **4.1.2 Design of the Evaluation**

The evaluation based on two strategies:

- a) First the efficiency of the measures with regard to reduction of the energy consumption by a summary procedure was assessed. The representatives of the companies and moderators were interviewed
- b) the functioning of the Model was examined by means of process attendance. During this attendance success and problems when implementing measures were tracked down and the reasons were investigated.  
The results and findings were fed back to the persons concerned; thus the project development could be adapted and optimised permanently. Realised changes then got object of the next step in the evaluation.  
The effect of the moderation was evaluated in two ways: with the moderators themselves and with the engaged companies (quarterly).

To get the information the following techniques were used:

- Analysis of documents
- Interviews (semi-structured questionnaires and in-depth-interviews) with:  
the director of the Model  
the moderators  
the representatives of the companies  
associations
- participating observation
- definition of position
- Feedback to the moderators

#### **4.1.3 Results (formulated in 1995)**

##### **General Results**

In all, the Swiss Energy Model is a well functioning method to increase the energy efficient behaviour in the Swiss industry. Therefore, it should be further developed and used.

The evaluation showed the following main results:

- The Swiss Energy Model is a valuable management model that can help companies move towards becoming a learning organisation
- The development and anchoring of the model is good but the initiated processes are more complex and more time consuming than expected.
- The acquisition and constitution of new groups is complex and the search and addressing of the “right” people in the companies is more difficult as expected. It is especially difficult to touch the top management of the companies.

### ***Effect of the General Set-up***

The general set-up strongly determines the Model, because it influences the motivation of the actors. Furthermore, the general framework has turned worse within the last years: low energy prices, lack of an energy law, lack of a CO<sub>2</sub> reduction law. Therefore the binding character of voluntary action was weakened.

Due to the absence of the necessary legislative conditions activity of companies is not oriented to a generally accepted goal. For there is no "legal environment" the companies do not see a big profit by being energy efficient. These are the main reasons why the development of the Model is remarkably slower than expected.

### ***Development of the Model***

The evaluation has shown, that the development of the Swiss Energy Model has made progress on all examined levels. Not only the energy prices influence the development in a negative way, the direction of the Model has also underestimated the complexity of the acquisition on a broad level and overestimated the Model's powers of persuasion at the companies' top management level.

The choice of co-operation with one of the most important industry association has proven to be good, whereas the 'enthusiasm' of the chambers of commerce was very varying.

A further obstacle is the fact that only very few important persons from the economy could be won as 'ambassadors' for the Model. Finally the weak network between the moderators hampers the development of the project.

### ***The Moderators***

The moderators proved to be technical experts. The know how in the field of moderation is not yet developed far enough. Therefore the moderation competence has to be carefully developed and improved. This requires the involvement of the management of the Swiss Energy Model

## ***Groups/Companies***

The examined groups were homogeneous (all companies from the same industrial sector) and heterogeneous groups (the companies are located in the same region, but come from different sectors). Moreover the examined groups were in different stages of their development. At that time it was too early to decide which of the forms should be preferred.

The general reasons of the companies to join a group are the following (in this order):

- exchange of experience
- personal concern
- economic motives

A more differentiated analysis shows , that

- motives to influence the energy policy exist within some companies
- the importance of economic reasons rises with the role of energy costs
- economic reasons are stronger weighed by representatives which are not members of the board of directors
- Members of the board of directors tend to be more sceptical about the Model
- When a group has reached an advanced stage the advantages of the membership in the Model are estimated to be significantly more important than in early stages

### ***4.1.4 Recommendations for Improvement***

The following possibilities to improve the Model were identified:

- A strengthening of the voluntary actions should be reached. The context in which absolute voluntary action (in the sense of not being obligating) are framed must be such that they result in a certain commitment
- The opportunities in the companies shall be demonstrated more clearly
- Top management of the companies must be integrated more intensively into the Model
- Representatives of active companies shall be enrolled as “ambassadors” of the Model
- More prestige shall be given to the Swiss Energy Model by appearances e.g. of the Swiss Energy Minister, leading managers from economy
- The co-operation with the relevant associations shall be improved

Most of the recommendations have been worked on since 1996.

## ***4.2 Second Evaluation***

### ***4.2.1 Goal of the Evaluation***

The second evaluation should examine, if - and if yes how – the Swiss Energy Model could be part of the future Swiss energy policy.

The main questions were:

- What is the influence of the membership in the Swiss Energy Model on energy efficiency in the companies? How can this influence be increased? What additional benefits does the Swiss Energy Model launch in the companies?
- What factors influence the expansion of the Model? How can the attractiveness be enlarged?
- Which part can the Swiss Energy Model play in the future Swiss energy policy?

#### **4.2.2 Design of the Evaluation**

The following design was developed to find out the strong and weak points of the Model:

- the implementation process (of energy efficiency measures) was modelled
- the criteria the Model shall be measured with are developed
- the core of the evaluation was formed by 22 interviews with:
  - participating companies
  - no longer participating companies
  - direction of the Model
  - Moderators
- Moreover a fax-questionnaire was sent to 53 companies which participated at an information event, but decided not to participate in the model
- assessment of written documents
- with this information a profile of the Swiss Energy Model was elaborated
- Finally propositions for the further development of the Swiss Energy Model are made and additional supporting measures are sketched

#### **4.2.3 Results (formulated in 1999)**

##### **General Results**

The Swiss Energy Model is an innovative voluntary instrument with good prospects in the context of the energy efficiency policy. Its effect can be improved by continuous development and the combination with other instruments.

##### **Strong and weak points**

- a) The Swiss Energy Model is modelled in six phases:
  - impulse
  - activation
  - planning
  - decision (in the company)
  - implementation (of measures in the company)
  - evaluation, drawing of conclusions
- b) The design of the Model does not satisfy in all these phases. Especially the Model is not designed to tackle with decisions in the companies.

- c) The quantitative and qualitative results are communicated too little
- d) The concept for the acquisition of new groups is too little differentiated
- e) The success of a group strongly depends on the qualification of the moderator
- f) The board of directors in the companies is too little committed

#### **4.2.4 Recommendations for Improvement**

- a) Elaborate a differentiated profile of the Swiss Energy Model. Differentiate the composition of the groups. Offer a benchmark system, document best practices, make use of management reviews
- b) Make success control in the companies. Reinforce the network in and between the groups
- c) The dependency of the Model on the moderators needs to be reflected on. Improve the qualification of the moderators.
- d) Address the board of directors directly. Take more influence on the decision makers
- e) Reinforce communication:  
The management orientated approach has to be communicated better  
Commercialise the results more actively. Success stories and results shall be better used in the marketing of the Model.

The direction of the Swiss Energy Model estimates the recommendations c), d) and e) to be important. Efforts will be taken to remove the respective weak points.

#### Results and Impact of the Swiss Energy Model

### **5.1 Recent Results**

In 1998 the companies engaged in the Swiss Energy Model reduced their energy consumption through improvement of energy efficiency by:

- 2'540 TJ/a fossil energies (according to 60'000 tons of oil per year)
- 630 TJ/a of electricity (This corresponds to the consumption of the city of Schaffhausen, the twelfth largest city in Switzerland)

Through these measures the engaged companies reduced their energy costs by more than 40 million CHF in 1998 (corresponding to some 25 million USD) which means a net savings of approx. 30 million CHF (18 million USD).

The measures also led to a reduction of the CO<sub>2</sub> emission of 230'000 t/a (CO<sub>2</sub> emissions in Switzerland in 1990: 43,6 Mt. Switzerland has committed itself in the Kyoto Protocol to reduce greenhouse gases by 8% in the first commitment period).

Some further, non quantified results are:

- The results show, that the engaged companies can improve not only energy efficiency but also get advantages in procurement, operation, maintenance, and spin-offs in improved organisational and managerial efficiency
- The common procurement can also be interesting with buying electricity in the market, soon to be liberalised in Switzerland
- New elements in the contracts with planners and engineers to get better results in energy efficiency were jointly elaborated

## **5.2 Impact of the Swiss Energy Model**

The Model was initiated in 1987 in the town of Zurich by the eight largest energy consumers in the private sector. In 1989 implementation of the Model started. After the first measures were successfully realised the group was enlarged to some 14 members. At that time representatives of the canton of Zurich participated in a meeting of these companies and learnt that the Model and its implementation were no "paper tigers".

A consequence was that the philosophy of the Energy Model was integrated in the revised energy law in 1995. The respective paragraph gives large energy consumers the opportunity to form groups and to sign an agreement with the canton. In this agreement a group of companies commits itself to an energy efficiency goal. The government of the canton has defined as a general line an improvement of the energy efficiency by 2% p.a. As an incentive the companies who sign an agreement get the benefit of a certain degree of deregulation of the energy legislation (simplified approval procedures, repealing of detail regulations etc.).

In 1993 11 cantons founded a group which functions analogous to the Energy Model.

In their relation to the action programme Energy 2000 the Energy Model became the focal activity for big energy consumers. In the new CO<sub>2</sub> reduction law, agreements between large consumer groups and the confederation are foreseen as well. They also refer to the Energy Model.

Finally in the energy policy after 2000 energy agencies are foreseen to execute the national energy law. The agency of the private sector intends to go on working with the Swiss Energy Model, building on its philosophy, experience, and the existing framework of groups. The intention is to extend the activities into measures to reduce the CO<sub>2</sub> emissions. This way the energy law and the CO<sub>2</sub> reduction laws will be fulfilled by the companies engaged with the programme.

So the Swiss Energy Model has caused a broad variety of consequences on the realisation level as well as on the legislative level.

### **Lessons Learnt**

Every company has a certain potential to improve its energy efficiency with profitable measures. Often they are not realised because of the existence of several barriers. One of the barriers is the lack of knowledge of these potentials. Voluntary action like the Swiss Energy Model enables the companies to exhaust these potentials to a large extent.

The two evaluations contributed a lot to make the Swiss Energy Model a better instrument. The state can profit from the evaluations as well: valuable hints on how to shape the future legal framework in order to improve the energy efficiency and climate policies are given.

Experience shows: the stronger the regulatory framework the better the effect of voluntary action. Voluntary action must lead to a binding commitment which is covered by formal arrangements as e.g. voluntary agreements. In the agreements some cornerstones must be fixed as e.g. a concrete and controllable goal of the improvement of energy efficiency, a precise definition of energy efficiency, the method of reporting, the consequences when goals are not fulfilled. Companies must be assured that their sensitive data are confidential. All the same the state must have the opportunity to demand a detailed report if the results seem not to be plausible.

Voluntary agreements develop a maximum of positive impact on energy efficiency and therefore a contribution to mitigate the climate change when the legislation in which they are embedded is clear and strict. Precise quantified goals and a clear allocation of duties leaving the private sector enough flexibility to fulfil the commitment (partial deregulation of laws and regulations) lead to satisfying and fast reachable results.