

# A comparison between what France has done over the past 20 years and what is currently being done in the Czech Republic

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## Synopsis

The authors attempt a comparison between the conditions and achievements of energy efficiency in France and the Czech Republic

## Abstract

France is recognised as a country which at some point in time made great efforts to conserve energy. It has more than twenty years of experience, a developed Western economy and vast resources, both technical and economic. Governmental funding has been considerable.

What was the impact of this on energy use? What success did it have, with which tools? What problems did it encounter?

The Czech Republic is a country in transition. Extensive work in the energy efficiency field started just a few years ago. The Czech government has a lot of problems to solve. Nevertheless the Czech Republic is currently increasing its efforts and budgetary allotments dedicated to energy efficiency.

Can similar results be obtained? What has been the trend over the past years? What questions have been raised? How can such comparisons show the way toward future international co-operation?

## Introduction

The situation between France 20 years ago and the Czech Republic now are of course not similar. On the other hand, studies on energy performances throughout the world show that the level of energy intensity reached by countries for which the energy intensity is still rising tends to be lower over time and that the decrease of energy intensity is more and more rapid. It is also clear that energy performances are greatly influenced by governmental energy - environmental policies. The tools for policy implementation are known and innovations today can be analysed as a sophistication of known mechanisms which are joined to propose a more complete service. Therefore the examination of events in countries which have had energy efficiency policies for some years can serve to design adapted mechanisms in the Czech Republic.

Let us add that comparing energy efficiency policies and attempting to compare their impact is no easy task. This topic should in fact result of an in-depth study of both countries. However, the authors feel that since each of them know the situation in their countries, their collaboration on the particular topic is highly beneficial.

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## 2. Confronted with considerable constraints on the primary energy supply, France implemented a vigorous energy efficiency policy.

### 2.1. Constraints

The oil crisis caught most oil importers unprepared. The deterioration of the national balance in France, like for many others, posed a serious challenge to decision makers from 1974 and during more than ten years. Furthermore, the creation of an oil producers cartel carried high risks in terms of the dependence to those countries.

Therefore, to respond to this new situation, France elaborated a three objectives policy which were :

- The reduction of energy dependence through energy switch namely to the nuclear use
- A further diversification of energy sources and geographical zones for oil imports (namely increasing gas imports and calling Latin American countries for oil) and developing renewable energy sources
- Improving energy efficiency not only on the demand side but also in the energy transformation sector, such as refineries.

### 2.2. Energy policy

Since 1973 one has been able to identify four stages for the energy policy in France:

First stage : 1973-1981 setting up the policy framework for energy management with a number of regulatory and economic tools. The 1974 law on energy saving, the creation of the Agency for Energy saving that same year with the missions of informing, studying and advising to promote rational use of energy. Onwards a number of regulatory measures and incentives are developed through taxation, subsidies to innovation, to demonstration and audits.

Second stage“ 1982 to cope with the second oil crisis. The French parliament adopts the National Plan for Energy Independence and means dedicated to energy efficiency are increased. The French Agency for Energy Management (AFME) is set up and energy efficiency action is decentralised. Research and development (R&D) is promoted and the National Fund for Great Works (FSGT) is providing this field with substantial financial resources.

Third stage : 1986-1987 when a new orientation is given due to the counter oil crisis. Incentives are gradually reduced while simultaneously the effect of energy prices on private investors decisions is diminishing.

Starting from 1990, the energy policy has been coupled with the national environmental policy. The French Agency for Energy Management was hence merged with the Agency for Waste Management and the Air Pollution Agency. Simultaneously, the available budget for energy efficiency tends to be reduced as budgetary equilibrium becomes a priority for the French government aiming to reach targets set within the construction path for a European Monetary Union .

Let us add, the recent orientation towards DSM implementation through a first and then a second protocol between ADEME and EDF, each of the parties contributing in terms of manpower and budget for the realisation of quantified objectives over a multi-year period for an increase of the societal interest (least cost option). This particular topic is completed by a multi-annual envelope of 100 MF reserved within the rural electrification fund for DSM type actions.

### 2.3. Programs and tools

France is one of the most interesting examples as far as energy conservation is concerned, because nearly all the tools have been used at some point in time and their effects can be better observed since a number of programs and tools have been abandoned.

### **2.3.1. The industry - ambitious programs, numerous tools**

From 1977, a periodical, thorough examination of major thermal energy consuming installations is compulsory and consultation of the administrative authorities for new installations has been demanded. Also, financial support for investment studies is available and a guaranty on consulting firms and engineers is insured through regular training.

Audits and feasibility studies were financed up to 50% for small and medium size plants - which were not concerned by the above regulation - and it is estimated that 40% of the 1500 studies ended in investments, some of them partly funded by the "FSGT" which was dedicated to the public sector.

Leasing entities with favourable fiscal regimes known as "Sofergies" were established in 1980 and their activity reached a peak in 1984 with a total amount of around 1.4 billion FF dedicated to leasing in industry.

The FOGAME was established in 1982 by the AFME, a subsidiary of the national coal company and Electricity de France to provide loan guarantee to up to 50% of loans (up to 5 million FF) and the fee is 0,8%.

Financial support for demonstration with the aim of validating energy efficiency on the technical and economic aspects and to constitute a reference for other firms. The financial support is provided either by the European Commission or by the French Agency for Energy Conservation (AFME) and can reach 50% of the investment cost. 360 projects were supported from 1975 to 1991.

Purchase subsidies for commercialisation have also been provided for 20% of the cost of energy efficient appliances and increasingly for new type of energy monitoring and test equipment. The annual budget for this measure was between 6 and 10 million FF.

In 1988, a program on energy monitoring was launched to promote complete systems in medium size plants. Around 35 projects were promoted with grants of 20 to 50% of the total cost, which ranges from 2.5 million to 5 million FF.

Also, that same year, a complete by guaranteed turnkey program was launched to promote engineering firms which could become project facilitators. Support concerned studies, engineering works all the ways through to installation, operation and maintenance.

Finally accelerated depreciation of R&D investments is available to concerned firms.

Therefore, until 1990, Investments were financially supported through leasing facilities, accelerated amortisation to reduce taxes and direct subsidies. 400 FF/toe and later the "FSGT" which in total provided 1.4 billion FF of subsidies for a total of 6.8 billion FF of investments and more than 3 900 projects. Originally financed through a levy on gasoline, the "FSGT3 was suppressed in 1987 based on the critics of the principle of non-affectation of national budget income.

Since then, direct subsidies tend to be reduced but a methodological support is still provided, accelerated amortisation still exist, support for R&D is maintained and contracts between the French government and industrial branches are under preparation.

### **2.3.2. Heating in buildings - good results in the residential and tertiary sectors**

Most of the above mentioned measures were applicable to the residential and tertiary sectors. For major thermal consumers. Audits were compulsory and FSGT funding was available for social housing. Loan guarantees were also available and leasing through "Sofergies" were directed at around 25% to the building sector. Leasing reached a peak of 500 million FF around 1984 with grouped projects for social housing promoted by local authorities.

The first specific measures were on building awareness, followed by a regulation on the maximum temperature

in buildings and changes in time to better take into account sunlight.

A tax rebate was put in place from 1983 to 1986 and then from 1989 onwards in order to deduct energy saving investments carried by individuals from revenues or directly from taxes on the revenue. It is estimated that 2% savings were achieved through these measures.

The National Association for Housing also provides grants for certain categories of housing and for families with limited income.

A label for newly built housing was elaborated and linked with low interest loans when buying apartments.

The thermal regulation on construction played a major role with the use of the "G" coefficient from 1982, taking into account the building's envelope performance and solar intakes. This was completed in 1988 by minimum performances of thermal equipment.

The second set of measures were of "technical" type and concern insulation of walls and pipeworks with vast R&D programs

Also, in order to re-equilibrate gas and electricity for heating, the first being more efficient but implying a higher investment cost, the State asked promoters who wished to equip their building with electric heaters to pay a certain amount which would later be reimbursed. This was abolished in 1986.

One interesting aspect was the partnership developed by the Agency with towns in order to implement energy efficiency measures (pilot cities rather than projects) were the result of this partnership. In recent years, the ongoing co-operation is enlarged to include environmental issues.

### **2.3.3. The transport sector**

The transport sector is very specific because of the contradictory political objectives of decision-makers.

On the one hand, information and awareness raising campaigns coupled with high taxes on gasoline (up to 80% taxes) were implemented.

On the other hand, road transport was promoted, rail and river transportation losing market shares rapidly and the major car firms interests were taken into account.

From 1974 to 1982, awareness raising campaigns were the main governmental action with for instance the inclusion of energy related topics in driving licences exams, etc. Regulatory measures to limit speed and to state unit consumption for car sales have also been introduced.

From 1982, a financial support to car firms for R&D was coupled with an objective of a reduction in consumption of 12% in 5 years. (Consumption have been reduced by 25% between 1975 and 1986).

From 1982 to 1986, specific supports to road transport firms were set up with grants for energy audits, firm contracts and grants for energy efficient materials.

From that date, direct granting has been abolished but combined transport (road and rail), tools for city traffic and development of alternative fuels were promoted.

### 3. Although programs can always be criticised, results obtained are more than honourable and can inspire policy makers in countries undergoing an economic transition

To evaluate energy savings is not an easy task and requires a clear methodology and a fair amount of data. In twenty years, the economic scene has changed, behaviours have evolved and the impact of public action has to be analysed in this context.

Therefore, to evaluate energy savings, only a desegregated approach is valid. Let us take for instance the transport sector. One has to identify the technology factor (a similar car is consuming up to two times less now than in 1974), the behavioural factor (the number of cars per family is increasing and the number of km per year is also changing).

Let us examine the results of public actions per sector, based on the same methodology elaborated throughout the years in France and shared within the SAVE project on energy efficiency performance indicators for E.U. countries, supported by the European Commission and lead by ADEME.

#### 3.1. The industry: a high price-elasticity with time lag and a change in energy use

Cumulated savings on the studied period are evaluated at 6,6 Mtoe. However one can divide the period between high energy prices and lower energy prices. The maximum cumulated savings were attained in 1990 with 12 Mtoe. Within this amount, high energy consuming industries such as cement, chemicals, etc. reached 7,3 Mtoe due to high energy saving investments. Energy substitution was also substantial. While coal and oil products represented 62% of total consumption in 1973, gas and electricity represent 67% of that same total.

The phenomena is in fact more complex since while in times of high economic growth - and high investments- energy saving is rapid. When the economic activity is slowing down, the level of use of existing capacity can imply a reduction of savings. Furthermore, the increasing use of new electrical processes for drying by induction for instance explains part of the bad results in industry in the latest years of the period.

However, despite 20 years of policy implementation, a total of 9 Mtoe of savings still remain due in part to technology improvements.

The following graph illustrates annual and cumulated savings in industry over the past two decades :



Source : ADEME

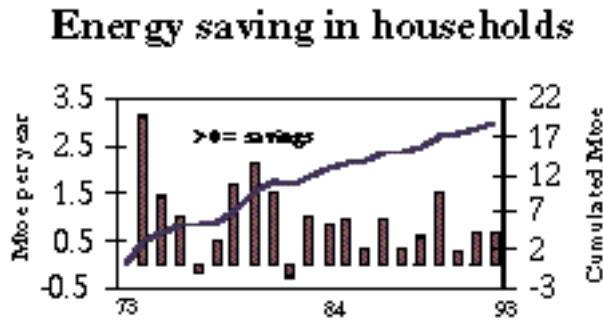
#### 3.2. Building : Heating in the residential sector - a success, The tertiary sector, -mutations

From 1973 to 1991, the total cumulated energy savings is estimated at 17,4 Mtoe for the residential sector while the tertiary sector has "unsaved" 2,2 Mtoe.

For the residential sector, only for heating, the total savings are estimated at 19 Mtoe (around 35%) while decohabitation and comfort requirements are explaining observed “unsavings”). Electricity is also increasingly used (more appliances, etc.)

For the tertiary sector, the total saved was 4,4 Mtoe more than compensated by an increased use of electricity (7,3 Mtoe are consumed in surplus).

The following graph represents annual and cumulated savings in the residential sector



Source : ADEME

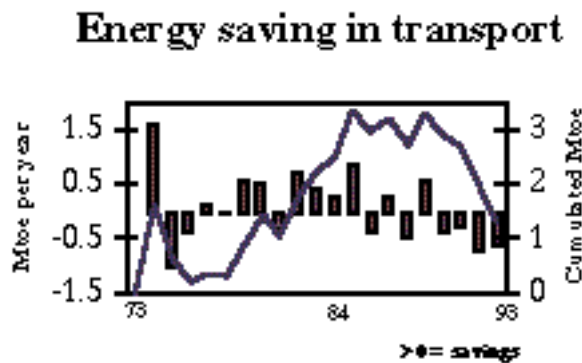
3.3. The transport sector : technological progress - degradation of behaviour - a mitigated balance

Only 1,6 Mtoe were saved in the transport sector while consumption for the sector is rapidly increasing.

Awareness campaigns in 1974 allowed to save 1,6 Mtoe in only one year but this was vanished the next year and on needs to wait 1982 to see a profound change in behaviour with the penetration of smaller cars.

From 1982 to 1986, savings are erratic and around 3 Mtoe. From then on good results are offset and the level of efficiency attained are comparable to those of 1974.

The following graph illustrates annual and cumulated savings in the transport sector :



Source : ADEME

In conclusion, it is essential to notice that the study of results in energy efficiency contradict the “automatic link” between economic growth and energy consumption. There is no correlation and no automatic mechanisms. Energy prices are certainly playing a major role but state action is still necessary to fully realise existing economic saving potentials.

## 4. Energy Efficiency by the Government of the Czech Republic

### 4.1. Constraints

While the economy of France has developed in a manner typical for Western European countries, the situation in the Czech Republic is in many respects different. The centrally planned socialist economy, in place up to 1989, greatly deformed the internal and external workings of the country, and the economy was not an exception. The strong, unswerving dependence on supplies of several energy media (crude oil, natural gas) from the former Soviet Union and the sufficient domestic potential of other sources (coal, uranium) together with distorted prices kept the first oil crisis in the early 1970s from having the same effects as in Western Europe. Its repercussions in the Czech Republic were strongly mitigated, and certainly did not serve as a stimulus to save energy.

So as not to be unjust in wiping away the past - certain efforts were made to save energy even during this period. However, these efforts were centrally directed, more for show than for real technical or economic benefits; therefore they had neither a real impact nor were their results realistically assessed.

This era ended with the „velvet revolution“ of November 1989, when market forces began to be introduced into the economy. The first substantial stimulus for energy efficiency was the privatisation and restructuring of the energy sector hand-in-hand with increases in energy prices.

### 4.2. Energy Policy of the Czech Republic

The state became seriously involved in energy-related issues in 1991, when the government accepted the first Energy Policies of the Czech Republic as an informational document not carrying any legal obligations.

Since that year, this document has undergone a certain development; however, its fundamental shortcomings and mistakes, including a lack of specificity, a non-binding character, and lack of a legislative framework, have not been alleviated. Of course, some successes have been attained, for example, the partial privatisation of energy companies and changes in the legislative framework for the Czech energy sector. Yet the basic problem - an energy intensity level for the Czech Republic that is double that of developed countries - remains unresolved.

A lack of specificity and the non-binding character is also a subject of debate concerning the latest version of the Energy Policies for October 1996, which is now being discussed by specialists. This version primarily deals with the continuing privatisation of the energy sector, the diversification of energy imports such as crude oil and natural gas, ways to further utilise domestic energy resources, and several legislative requirements.

The field of energy efficiency and the interest level of the state in promoting it are small; the most important point is the Energy Management Law which has been under preparation now for several years. Moreover, Energy Policies addresses means and resources only a general level, without specific figures and requirements. There is no statement on the potential for energy savings nor on the goal toward which the Czech government drives, nor is there any mention of obstacles and means to overcome them.

As an example of how the government adopts a position on energy efficiency, it is possible to mention the relation between financing provided as compensation for distorted energy prices for the general population and the resources allotted for the energy efficiency program.

The Czech Republic and Slovak Republic are alone among the countries in transition in Central Europe in their high subsidisation of energy prices for the general population. The precise structure of these subsidies, ranging from cross-subsidies for gas prices and electricity to direct subsidies for district heating, is outside of the scope of this lecture. However, it can be noted that, on the basis of analyses by SEVEN, these energy subsidies totalled about CZK 34 billion in 1995. In contrast, there is the budget of the Czech Energy Agency, which, as the only institution at the government level responsible for energy efficiency in the Czech Republic. In 1995 and 1996, the annual budget was CZK 200 million. (In 1997 it was raised to CZK 350 million.) It can thus be said that for

energy efficiency the Czech Republic gives about 1% of the amount it gives for supplying energy. Quite a disparity, isn't it.

#### 4.3. Programs and tools

As has already been mentioned, the Czech Energy Agency is responsible for energy efficiency at the government level. Since 1991, this subject has existed under various names and statutes. A group of measures entitled „State energy-saving programs in buildings and apartments“ dates from the same year. The majority of its content is direct financial support (subsidies) for energy-saving projects in the residential sector, schools, and hospitals. This support can be as much as 40% of the investment costs for a project. Projects included in this group range from the large-scale installation of metering and regulation (1991-1995) to demonstration projects in 1996 and 1997. This group of measures substantially differs from the generally used term „energy efficiency programs“ primarily in that it does not have previously set and quantified goals, such as the amount of energy savings, and does not have a wider spectrum of means, but only gives financial support. Moreover, as a result of the lack of experience in past years, the precise benefits of this program from 1991 to 1995 cannot be precisely determined. However, we should not just criticise; many improvements have been made in the past several years, and the current activities of the CEA hold promise for the future.

Other measures supporting energy efficiency range from tax breaks (for example, for alternative sources of energy) to reductions in the VAT for components for alternative energy sources to state support for regional energy planning. However, because of the absence of baseline data this support cannot be precisely quantified. Its impact is not decisive in reducing the energy intensity of the Czech economy.

#### 4.4. Encouraging results

##### **4.4.1. Energy efficiency in buildings**

The most evident effects of the „program of state support for energy efficiency“ can be found in the residential, school, and health-care sectors. The latest analyses of the Czech Energy Agency showed that during the lifetime of the „programs“ cumulative savings for 1991 to 1995 were 10,900 TJ of energy, that is, 0.26 Mtoe.

Annual average savings are 0.052 Mtoe, which is one-twentieth of the amount of France. This corresponds to the low level of interest of the Czech Republic in saving energy. The fact that the French economy is twice as efficient as the Czech economy gives an even clearer comparison of efficiency levels.

##### **4.4.2. Energy efficiency in the other sectors**

Unfortunately, the figures that can be given for energy savings in buildings cannot be found in any other sectors.

In particular, from the beginning the industrial sector was not taken into consideration by state administration; and the idea existed (and still does) that industry does not need any state intervention in (or even any information on) matters related to energy efficiency, and that on the basis of market forces it can react on its own to situations related to supplying energy. However, in the absence of clear guidelines and future plans it does not contribute very much to proliferation of energy efficiency activities. Fortunately, there are also examples of rational behaviour in the Czech Republic: EPC methods are starting to be implemented for projects in the industrial sector; and the state is slowly beginning to realise that it must somehow engage itself in this sector, and, albeit for now to a minimal extent, it is starting to support, for example, audits in industrial enterprises.

In other sectors, such as transportation and agriculture, we unfortunately cannot yet talk about any systematic efforts to support energy efficiency.



## 5. Still a major economic potential

While the energy efficiency market is still very broad, the potential to implement energy-saving measures will only increase with the development of prices and introduction of new technologies. This can be seen particularly in regard to the question of economic potential, which is of course dependent upon the movement of energy prices.

Despite all of these disadvantages, I still believe that a wide field of activity is opening up for energy efficiency in the Czech Republic, and that we can go down the same path as France in a relatively shorter period of time. However, among other things it will be necessary to make use of experiences with similar undertakings abroad and thereby take advantage of the clear disadvantage of a late start in the long race for energy efficiency.

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