Networking for Energy Efficiency Experiences of the Polish Network "Energie – Cites"

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BACKGROUND

As was the case with all former communist countries, the Polish economy of the four post war decades was characterised by a wasteful use of energy.

Emphasis on the development of energy-intensive industries led to an accellerrated depletion of domestic energy resources, high atmospheric and water pollution, and, last but not least, put a severe strain on the Polish economy as a whole.

In 1989, Poland was the first country in the former Soviet blok to embark on radical political and economic reforms. The economy was in shambles and the first post-communist government had a difficult task curbing rampant inflation, strengthening domestic currency, introducing anti-monopoly controls, and eliminating the most drastic price distortions, especially those of energy. The implementation of the programme brought a substantial initial success: inflation was reduced, the budget was balanced and real interest rates became positive. At the same time, the price Poland had to pay for this success was a GDP decline by 12% in 1990, unemployment, an unknown phenomenon during the previous 45 years and a drastic decrease in real incomes (by 20-30%), to which a sharp increase of energy prices contributed dominantly. Polish people were ready to agree to this painful transformation, which was possible due to the popular support of new political forces derived from the „Solidarity" opposition movement. This patience seems to have paid off. Now the Polish economy, after having recovered from the recession, is growing at ca. 5% per year and inflation has been reduced to 7% or less, as anticipated in 1999. Those trends have a firm basis which is rooted in the well developed and still growing private sector and in the well established democracy, expressed in the increased independence and decision-making role of the democratically elected local authorities.

Presently, Poland is undergoing a fundamental reform of its local administration system. The two-stage territorial division of the country: gmina (municipality), wojewodztwo (region) has, been changed (effective 1 January 1999) by adding an intermediate level, powiat (country). Additionally, last September, the local elections wereheld at all three levels. This led to the emergence of a large number of new officials and councillors, who need to be trained in their new work areas.

An area of particular importance is sustainable energy production and use. The importance stems from Poland's recent Kyoto Protocol commitment to reduce its green house gas emissions by 6% from 1990 levels . Accession to EU , with its 8% committed reduction, will make this target even more stringent.

Unfortunately, this need has not been widely recognized so far in Poland. In fact, the level of awareness of and even of interest in the global implications of atmospheric pollution among local decision-makers and politicians (and among the whole population as well) is far from being satisfactory and is much lower than in the European Union or United States. This is one of the factors to justify the existence and show the vital role of organisations like the Polish Network „Energie Cites" (PNEC), which is presenting in this paper. However, before going to the presentation of PNEC and its activities let us say a few words of background about energy in Poland.

Poland's energy production its dominated by coal. About 80% of energy supply in Poland is based on hard coal and lignite. High energy intensity of the industrial production and lack of practically any environmental protection equipment has led over the past few decades to excessive air pollution with its dramatic consequences for human health and the environment. Energy was needed for this development and had to be

supplied at any price. It was needed the more that industries, mostly heavy and using raw material, were energy intensive by their very nature. To keep them running, the price of energy had to be low and it was maintained artificially low by huge government subsidies that were for both industries and individual consumers. The effect of such policies was a straightforward waste of energy, which did not matter to consumers due to the low prices. Neither the industries nor the individual users were motivated to counteract.

The heritage of this past is that energy intensity of Poland's economy is about 30 MJ/USD which is about 2-3 times higher than in the Western European countries. This puts a heavy burden on the Polish economy, and with the transition to a market economy it also presents very difficult challenges to the country's economy For our industry to be competitive energy efficiency of Poland's economy has to be drastically improved. The need to modernize the industry and economic infrastructure is also creating huge demands for investments in hard currency. As with other industries, the energy sector needs to be modernized and needs large infusions of foreign capital to operate efficiently and in an environmentally acceptable manner. Another circumstance setting the context for the energy sector modernization is the aforementioned enormity and seriousness of the environmental problems caused by energy production. These environmental problems make it necessary for the country to sharply reduce its pollution levels. The financial burden represented by this responsibility is so large that it must be approached wisely, with attention to maximizing the environmental benefits of each dollar invested.

It has been widely recognized that the most effective way of approaching environmental protection is improving energy efficiency and making a wider use of renewable energy sources, notably biomass, which is abundant in Poland. To give an idea about the numbers at stake: the energy saving potential in heating is estimated at about 40%. Out of this amount about 20% can be achieved cost-effectively at the present energy prices, with about seven years pay back or less. Taking into consideration this enormous potential, a special government agency, the Polish Agency for Energy Efficiency (KAPE), has been established in 1995 to co-ordinate the actions at the national level. Even before then, a non-governmental organisation, the Polish Foundation for Energy Efficiency (FEWE), was created due to the initiative of Battelle Pacific Northwest Laboratories, USA, and due to the initial support of USDoE, USAID and USEPA. The Foundation has played an important role in lobbying the MPs and the Polish government to introduce modern policy tools such as Integrated Resource Planning (IRP) and Demand-Side Management (DSM).

In April 1997, after seven years of debate, the Polish Energy Act was passed by the Parliament, introducing new market-oriented mechanisms in the energy sector step-wise price liberalization, opening ways for privatisation (Third Party Access, power pool). At the same time, the new Act includes provisions that should encourage energy utilities to apply IRP and DSM and more favourably consider the renewable energy options. More recently, in 1998, the Polish Parliament passed another important law in support of energy efficiency: the Thermal Renovation Act, which opens ways to preferential financing of investments leading to heat savings in buildings.

Achieving real improvement will require long-lasting persistent effort.

Most importantly, the success will depend dominantly on the involvement and commitment of local governments because energy efficiency and renewable energy investments take place in municipalities. Undertaking and support of local authorities is crucial in their realization.

ENERGY AT THE MUNICIPAL LEVEL; POLISH NETWOK ENERGIE CITES (PNEC):

The heat saving potential alone is about 40%, and a significant fraction of it can be achieved at relatively low cost. It turns out that about 50% of this huge energy-efficiency potential can be realised in medium-size and small cities (10÷200 thousand inhabitants). As mentioned above, energy efficiency and renewable energy projects, wherever they may be conceived or designed, are ultimately implemented at the grassroots level.

Therefore, the main political actors directly involved in the realisation of such projects are the municipal governments. Unfortunately, the level of awareness and knowledge at this local level is highly insufficient and there is an acute need for education and training in modern energy management methods developed in Western Europe and United States. This need is particularly urgent in small and medium-size municipalities, which lack the opportunity to train their own managers. At the same time, there exists a huge potential for energy-efficiency

and renewable energy projects in such municipalities (heat saving in residential buildings, schools municipal administration buildings, hospitals, conversion from coal to biomass, electricity savings in street lighting, etc.).

To respond to this need in 1993 the Polish Foundation for Energy Efficiency inspired and assisted by the French Agence de l'Environnement et de la Maîtrise de l'Energie (Ademe), and the EU Network „Energie Cites", brought togetherseveral Polish cities, already active in promotion of energy efficiency, in an attempt to create an organisation that would help them co-ordinate their actions and further their goals. The leader city was Bielsko-Bia∏a who already had a well established cooperation with Ademe and the EU „Energie cites" network The process of establishing the Polish equivalent of „Energie Cites" was not easy.

The individual representatives of the cities who participated in the initial meetings showed a high degree of understanding for the need for co-operation and establishing a formal institutional framework for common initiatives. Unfortunately, the attitude of their city boards and their municipal counsellors often did not match their committment. They showed little awareness that there exists anything such as local energy policies. Such awareness still remains low in the majority of small and medium-size cities in Poland.

Despite the disappointing response, Bielsko-Bia_a, Tychy, E_k, Dobczyce and ¯ywiec decided to persist in their efforts. After resolving several legal problems, the new organisation was registered as the ´Polish Network "Energie Cites"ª on 10 June 1994. The EU „Energie Cites" agreed that its Polish counterpart may use their name as part of its own to emphasise the goals and intention to co-operate.

At present, PNEC has 31 member cites throughout Poland and seven supporting members (heat distribution lighting companies etc.).

Municipalities from Lithuania and Ukraine also became interested in close co-operation with PNEC, and a Lithuanian city, Niemenczyn, has became an associate - member of the Network.

To become a member of PNEC, the city council has to make a resolution and the executive city board has to appoint a city representative to the network. Since the registration of the Network coincided with the municipal elections on 19 June 1994, the development of the Network slowed down for some time due to the changes in the local councils and governments. It was only at the end of 1994 that the new local councils started confirming membership.

The first general assembly elected the executive board of PNEC, which was presided by Mr. Adam Antosiewicz, then deputy mayor of Tychy. The present board is chaired by Mr Zbigniew Leraczyk, until recently mayor of Bielsko-Bia∏a, and presently a member of the Polish Parliament.

The activities of the Network focus mainly on:

- education (methods of integrated energy planning, modern technologies, etc.)
- information about domestic and foreign loans and grants for investments reducing energy consumption and improving the environment
- assistance to member cities in preparation of project applications or bank loans
- exchange of information about firms and institutions offering their services in Poland
- organisation of training courses, especially with participation of foreign experts

Below we describe several actions of PNEC and discuss some weaknesses and success stories.

EXAMPLES OF PROJECTS

3.1. Training Seminars on Energy Efficiency for Local Decision Makers; TEMPUS-CME 1040/95

In 1995, the Network undertook a massive training and awareness raising effort. Seventeen seminars were organised within a TEMPUS-CME project in co-operation with Ademe, „Energie Cites", Centro de Estudos em Economia da Energia dos Transportes a do Ambiente (CEEETA) Portugal, University of Mining and Metallurgy (UMM) in Kraków, and FEWE. The seminars covered four topics:

- Strategic energy planning at the municipal level
- Financing energy efficiency
- Heat saving measures and technologies
- Energy efficient lighting

The seminars were repeated in different parts of the country to facilitate participation and minimize travel costs.

The project was a great success. The total number of participants exceeded 900, representing 216 municipalities from throughout Poland.

Additionally, the membership of PNEC nearly tripled during that time; many fruitful contacts have been established among local government officers, and the cities have undertaken a number of energy efficiency initiatives. At this point, it is worth mentioning that this success was largely due to a previous TEMPUS - JEP project „ Postgraduate Course on Energy and Environment" organised at UMM with Ademe, CEEETA, and FEWE in 1992-95. The graduates of that two semester-course constituted the core team of organisers and lecturers of the TEMPUS-CME project. Moreover, the experience and people trained in the TEMPUS CME project are now used in another training effort sponsored by USAID, aimed at creating small - and medium-sized enterprises offering services in energy efficiency.

Recently, this training effort has had another follow-up, this time reaching outside Poland.

In May 1998, PNEC organized a seminar based on the TEMPUS-CME content for thirty-two mayors from western Ukraine. Presently, the network is organizing another course for sixteen engineers form the City of Lviv who will trained in energy auditing techniques by their Polish colleagues from FEWE and PNEC.

In June 1998, PNEC was long training of Ukrainian city and business managers „Private Sector Involvement in Energy Efficiency Project Development". The training was sponsored by USAID.

We have mentioned this sequence to emphasize that projects in this part of Europe usually produce „delayed" effects that cannot be immediately reported in the *routine final reports*.

The beginning of this ongoing training effort can be traced back to the TEMPUS projects and, before then to the initiative of Ademe to help PNEC come to existence.

This observation should perhaps be taken into account by the grant donors in their assessment procedures.

3.2. Polish Efficient Lighting Project:

The new role of the municipal government in energy efficiency programs is well illustrated by the Polish Efficient Lighting Project (PELP). In 1995, Poland received a $5 million grant from the Global Environment Facility (GEF) for the promotion of compact fluorescent lamps (CFL). The project provided subsidies over a two year period to Polish domestic manufacturers of CFLs and luminaries that are ballasted to accept CFLs. About 1.2 million CFLs were subsidised through the program for Polish residential customers and a strong market education program was designed and implmented.

The main difference from the traditional programs promoting energy efficient electrical equipment was that the subsidy was applied to the product at the manufacturers level. Shops typically calculate retail prices by multiplying the wholesale price, or the preceding wholesale price, by a mark-up percentage. Therefore, as opposed to subsiding the consumer, the PELP subsidy had a multiplicative effect, by which the price was reduced at each stage of the sales chain .

The project contained a separate DSM-part, the aim of which was to demonstrate to a utility the benefits of avoiding costs of upgrading the power supply system by a DSM action leading to reduction of the power peak load. In the project preparation phase, several utilities were considered as candidates. However, it turned out that the readiness of the power utilities to get involved in a program that would reduce the demand for electricity was very limited. In fact, Poland had a significant overcapacity reaching ca.30 %, which mostly resulted from the drastic price increases since 1989. In this situation, any action aimed at further reduction of demand for power or energy was considered by the utilities as suicidal. In the absence of legal regulations that would encourage the utilities to take the path of IRP, this was the only rational attitude.

It has been decided therefore to find allies among municipal governments who are more concerned with electricity savings, due to the high energy bills paid by their voters and by the city administrations themselves (for schools, hospitals and the governments' own office buildings). The role of PNEC was to identify the best candidates. The selection procedure focused on:

- electrical power supply difficulties in the town or its selected areas, resulting from limited transmission capacity (long supply lines, insufficient cable sections, overloaded transformer units, etc.), in order to demonstrate the DSM (avoided capacity costs) option.

- involvement of the municipal authorities in the implementation of the programme.
- readiness of the local power utilities and power distribution companies to co-operate, which was *„conditio sine qua non"* for the success of the project.

Upon careful consideration, three cities, all members of PNEC, were chosen for the experiment; Che_mno (2200 inhabitants), E_k (54000) and _ywiec (32000).

The project had two distinct, though interlinked, components: marketing and technical.

The marketing component was aimed at promotion of CFLs by a wide education and information campaign, supported by a subsidy scheme to lower the price. The ultimate goal of the marketing effort, however, was to provide an experimental ground for the technical component, which included measurements, before and after CFL installation, of energy consumption levels, peak loads on power supply substations, and current characteristics such as harmonic distortion, neutral current, etc. For this purpose one had to achieve high saturation of the DSM target areas with CFLs in a possibly short time (still relying only on the willingness of the residents to buy the lamps).

The sales were based on discount coupons issued only to households in the areas of the study. Each coupon entitled the customer-resident of the target city to purchase up to 10 subsidized CFLs.

An additional goal of the coupons issued in the areas where physical measurements were planned was to prompt the customers to purchase the lamps in a short time interval (two weeks) to make the expected effects measurable. Therefore, a high price reduction was offered to residents of those areas which was applicable only during the first two weeks of the promotion sales. All the coupon system and information campaign, including door-to-door visit in selected areas, were largely the responsibility of the local government.

The sales achieved a huge success. A striking feature was that the sales grew until the abrupt end of the promotion, i.e. until the limit of the project CFLs had been exhausted. It is remarkable to notice that the **daily sales** exceeded by far the **yearly sales** in E∏k and Che∏mno. On the technical side, a significant reduction (ca.15%) of the evening peak was achieved at the 380 V substations. Even more pronounced is the effect in the individual households.

It should be emphasised again that the success of the PELP-DSM Pilot is largely due to the involvement of the participating cities governments.

3.3. The USAID project of promotion of SMEs offering services in low-cost thermal renovation of buildings.

PNEC is presently participating through its member cities in a project sponsored by USAID whose goals are to:

- demonstrate technical feasibility and cost-effectiveness of low-cost heat saving investments, like window carpentry repairs, weather stripping, attic insulation etc.
- create small and medium-size enertprises (SMEs) offering such services (create jobs in areas with high unemployment)
- create city-wide plans prioritizing heat saving investments on the demand-side. The plans will provide guidelines for the local governments how to optimally allocate scarce resources to achieve maximum environmental and economic impact.

The project will encompass six cities of different size and character. Four of the main candidates (Nowy S_cz, Trzcianka, Luban and Bielsko-Bia_a) are members of PNEC. In each city the project will consist of the following stages:

i. the city will appoint a local project coordinator (LPC) and assistant who will be trained managing energy efficiency projects run by local government. The intention is that after the project has terminated, the city will have its own capacity to continue the heat saving work.
ii. general description of the existing buildings will be done (residential and public buildings only), including age structure, main types of construction, heating systems and main sources of heat losses.
iii. Five of the most typical buildings will be selected for detailed energy audits performed by FEWE experts with involvement of LPC and/or local people indicated by them.
iv. six to twelve local technicians (possibly unemployed people) will be selected for on job-training by FEWE technicians.
v. the on-job training will be done in the course of actually implementing the recommended measures in two of the five audited buildings: one residential and one public (preferably a school or health centre). The ultimate goal is that after the training, a local company is created that will continue providing the low-cost thermal renovation services in the city.

i based on the data collected in stage ii and the measurements performed in selected buildings, the city-wide plan for energy efficiency investments will be made.

At present the project phases i-v have been finished in the first two cities, Krapkowice and Olsztynek.

The measurements still continue (the heating season is still underway). The work in the next two cities has been started.

3.4. The GEF project „Integrated Approach to Wood-Waste Combustion for Heat Production"

In 1994/95, FEWE conducted a study with CEEETA from Portugal which estimated the wood waste potential for heat production in Poland. One of the findings of this study was that many timber mills or other wood-processing factories produce process heat (e.g. timber drying or space heat using their wood residues). However very often the real goal of burning wood is not production of heat but rather disposal of waste. Therefore, little or no attention is paid to the efficiency of energy use. The idea of the project (which has been just approved by GEF) is to improve the energy efficiency of the space heating or technological processes at the factory and link the wood-waste producer with a client who would convert its heating system from coal to wood residues. At the same time the project will assist the receiver to make its building(s) more efficient so that possibly more coal-to-wood conversion becomes possible in the area. Although the project is only in its initial phase, several interesting candidates have been identified.
PNEC, having good connections with municipalities, is actively involved in selecting the best locations for the demonstration.

3.5. Post-Kyoto education campaign

As mentioned in the beginning, the level of knowledge about the global implications of atmospheric pollution among the local decision makers is far from satisfactory. Soon after Kyoto, which was hardly prevelent in Polish media, PNEC adopted a resolution to lead action to inform the Polish local administration officials and local politicians about the reasons behind the Kyoto Protocol and its implications for Poland (see the Annex).
In March 1998, the resolution was presented at the annual General Assembly of the European Union's „Energie Cites".

At the end of 1998, PNEC published its first materials for municipal decision makers entitled „Energy Economics and Policies vs. Polish Commitments following the Kyoto Protocol". The project was sponsored by the Cooperation Fund.

At present, funds are being raised to publish the materials in the form of a book and organize a series of seminars, similar to those the TEMPUS-CME project.