CDIE
Impact Evaluation
United States Agency for International Development

REDUCING URBAN AND INDUSTRIAL POLLUTION IN THE CZECH REPUBLIC

A USAID project in the Czech Republic confronted air pollution at two levels: nationally, through a state environmental fund, and locally, through direct support to municipalities. The national approach proved to be far more effective. Results in Poland, though, suggest regional funds may be the ideal.

SUMMARY

When it officially formed in 1993, the Czech Republic inherited an environmental legacy of some of the worst polluted air in central Europe. Poor air quality resulted from the widespread burning of low-grade, highly polluting brown coal, often in outdated and inefficient furnaces.

The new Czech government took action to reduce pollution. It curbed highly polluting industries and large power stations. In 1994 it passed the nation's first Clean Air Act. Shortly after, USAID launched its Environmental Action Program Support (EAPS) project. It undertook to improve air quality in the two most polluted regions, northern Bohemia and northern Moravia. EAPS, a $1.4 million project that began in 1995, was part of a larger ($17 million) USAID effort to decrease environmental degradation in seven central and eastern European countries.

EAPS had two goals. The first was to strengthen the environmental fund's institutional capacity by providing a resident adviser. The second was to reduce air pollution through direct technical assistance to 22 high-polluting small municipalities. The assistance consisted mainly of helping the municipalities prepare loan applications to be submitted to the fund. If granted, the loans would enable municipalities to upgrade their heating from high-sulfur coal to cleaner heating fuels.

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In May 2000, USAID's Center for Development Information and Evaluation (CDIE) fielded a four-person team to assess the impact of the Czech project and a more limited assessment of a similar effort in Poland. Over the course of a month, through site visits and numerous interviews, the team found strong evidence that the Czech environmental fund was significantly strengthened. The resident adviser managed the preparation of nearly a dozen studies designed to help the fund move toward major policy and operational improvements. Many of the resulting recommendations were adopted and implemented—allowing the fund to increase its annual environmental loan portfolio by nearly $24 million. The fund was thus able to make additional loans that would further reduce pollution.

The team found a lesser degree of success with the municipalities component of the project. EAPS did help municipalities prepare their loan packages—but many indicated that such assistance was not essential. That is, most municipalities would have been able to obtain environmental fund loans without project assistance. EAPS-assisted municipalities that received fund loans—and upgraded their energy utilities—did reduce pollution, but much less so than what the environmental fund itself accomplished by adopting EAPS policy recommendations and making more loans nationwide.

EAPS assistance to municipalities had only limited success in getting loans approved. That is, there was little difference between the *overall* loan approval rate (41.3 percent) and the rate at which *targeted* EAPS communities loan applications were approved (40.9 percent). Further, there was little evidence of replication by other municipalities beyond EAPS-targeted towns and cities.

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BACKGROUND

The Czech Republic was one of the first former Warsaw Pact states to restructure its economy and adopt political reforms. It moved quickly to privatize state-held industries, liberalize the election process, and delegate responsibility to municipalities for environmental services. The Czech Republic, officially formed after the breakup of Czechoslovakia in 1993, inherited nearly 70 percent of the industrial capacity of the former federation, along with an environmental legacy of some of the worst polluted air in central Europe. Poor air quality resulted from three factors. First, inefficient and essentially unregulated industries customarily burned low-grade, highly polluting brown coal. Second, municipal and district heating plants were using outdated technology and aging equipment. And third, residences and businesses relied heavily on low-grade coal for heating.

Air and water pollution remains one of the Czech Republic's most severe environmental problems. Improving ambient air quality has proved particularly difficult in some regions. Parts of northern Bohemia in the Czech Republic, Silesia in Poland, and Saxony in southeast Germany are still referred to today as the "Black Triangle" because of the air pollution that blackens buildings and corrodes monuments.

Air pollution alerts in northern Bohemia and northern Moravia were common from 1990 through 1996, especially during the winter season. During those months, central Europe comes under the influence of high-pressure atmospheric systems, yielding only light winds. These systems are often accompanied by thermal inversions in which a layer of cool air forms above warmer ground air, trapping suspended particles and other pollutants. Such inversions can produce choking smog that can last several days. The inversions—and the smog and haze they create—are especially damaging to municipalities situated in low-lying valleys.

In 1991 the Czech government drafted air quality standards that were amended in 1994 to become the nation's first Clean Air Act. Shortly thereafter, USAID launched its Environmental Action Program Support (EAPS) project. EAPS aimed to improve air quality in the two most polluted Czech regions—northern Bohemia and northern Moravia. The Czech government had already undertaken to improve air quality by curbing highly polluting industries and large power stations. With these major emitters in check, municipally owned district heating facilities, especially from smaller cities, were the largest remaining source of air pollution.

"Making commercial loans to municipalities was thought to be too high a risk. Something else was needed."

USAID ENVIRONMENTAL ACTION PROGRAM

USAID designed the Environmental Action Program to decrease environmental degradation in seven central and eastern European countries. In the Czech Republic, the $1.4 million EAPS project had two environmental goals. The first ($750,000) was to work with the Czech State Environmental Fund to facilitate lending, strengthen operations, and improve fund resource allocations. The second goal ($650,000) was to provide technical assistance and training to small municipalities. The aim was to help them obtain necessary investment financing from the environmental fund to upgrade their heating plants.

Czech State Environmental Fund: Filling a Void

When EAPS began in March 1995, most small Czech municipalities were unable to get funding from commercial banks for environmental upgrades. Smaller municipalities whose access to commercial financing was especially limited were hardest hit. The reluctance of Czech commercial banks to fund smaller municipalities rested on a number of standard financial risk factors (liquidity, profitability, repayment potential, degree of solvency, etc.). In the Czech Republic, making commercial loans to municipalities was thought to be too high a risk. Something else was needed.

The Czech State Environmental Fund was established in 1991 to provide financial support for environmental protection. Although available to all municipalities, it targeted smaller ones. As late as 1996 there was still considerable uncertainty on the part of municipalities about how to submit a loan package and secure funding. Most municipalities saw fund application and review procedures as complicated and confusing. They also pointed to a lack of transparency in fund operations. The fund itself was not running as smoothly as originally planned. Initially it was overwhelmed with far too many applications. In 1997 alone, 462 loan applications were submitted, many of poor quality.

Municipal Support: Helping With Studies, Packaging Applications

For most municipalities in 1995, there was little real understanding of how to package an investment loan application that would survive a first-round fund review. EAPS attempted to demystify the process by assisting municipalities with a range of technical assistance, training, and analytical support. EAPS offered two types of municipal assistance—and in many

localities both were coordinated. The first type provided a direct grant to the municipality to undertake an independent feasibility study of the proposed environmental upgrade. The study provided municipalities with an unbiased assessment of the technical, economic, and environmental impacts associated with the upgrade. It covered options such as converting coal-burning boilers to natural gas, constructing gas pipelines for residential and commercial hookups, and rehabilitating aging and inefficient district heating plants. Fund officials viewed the feasibility study as an essential first step in loan application review, but its costs could not be underwritten by the fund. EAPS filled that need and funded the studies.

The second type of EAPS municipal support helped cities package and submit their loan applications. This often meant not gathering any new technical information but packaging the voluminous materials, completing the application form, and assembling annexes. This one-on-one support also meant the EAPS coordinator would often submit the package and then communicate directly with fund officials.

PROGRAM ELEMENTS

Programs to abate and manage environmental pollution typically use one or more of the following program elements: 1) economic policy reform, 2) environmental regulations and standards, 3) education and awareness campaigns, 4) institution building, and 5) technological change. Although EAPS assistance in the Czech Republic directly addressed only two of the five areas (education and institution building), project planners considered all five areas in developing an environmental strategy. The strategy was to be accomplished within the framework of *economic policies* that supported introducing *clean technology* and *appropriate environmental legislation.*

Economic Policies

Economic policy can be an important contributor to sound environmental management. Through incentives and penalties, economic policy can realign decision-making to more properly take into full account all the environmental and social costs. Such policy can also help facilitate the financing needed to implement environmental improvement projects. Although EAPS did not direct its efforts toward changing policies, it is useful to examine the Czech policy context. The project took full advantage of economic tools and conditions in place—namely, natural gas–pricing policies, use of market-based instruments, and the unavailability of commercial municipal loans.

Pricing

In centrally planned economies, input prices (including energy) are often set artificially low, leading to excessive consumption per unit of output. In addition to their economic effect, input prices may result in high levels of waste and pollution. To combat the problems caused by inappropriate energy prices, the Czech government allowed energy prices to rise slowly toward international market levels. Higher prices led to increased energy efficiency. Coupled with a transition to a market-based private enterprise industrial base, it resulted in improved air quality.

Recognizing the reduced environmental damage associated with natural gas relative to coal and the need to encourage greater natural gas use, the government has continued to subsidize natural gas prices. Gradually this has led to a shift from coal to natural gas. EAPS supported this conversion by municipalities in areas with the highest levels of air pollution that need help obtaining financing.

Market-Based Instruments

The Czech government enforces the Clean Air Act through a series of fines and closure orders. Enforcement is sure and harsh. Fines are collected for exceeding emission standards, and a portion of that fee is passed to the environmental fund. The government also levies a user fee or pollution charge. The Czech Environmental Inspectorate sets the charge level. Polluters make fee payments to the tax authority, and a portion of that money is channeled to the fund. Pollution fines are charged for air, wastewater, and solid disposal, and user fees are collected on air, water, and agricultural land conversion. The fund relies heavily on these instruments for its revenue. In 1997, fees and fines accounted for 89 percent of its revenue.

Lack of Financing Options

A major problem facing smaller communities that have decided to carry out projects to improve environmental quality is unavailability of financing. Many municipalities do not generate sufficient funds from their annual budgets to pay directly for such large capital projects. Longer term financing is needed. The municipal bond market is nonexistent, and commercial banks are only now making loans to municipalities, but at interest rates that are somewhat high (about 11 percent) and for terms that are short (five years or less).

In response, the Czech government in 1991 established the Czech State Fund for the Environment. It was initially capitalized by a transfer from the Czech National Property Fund ($150 million, at current exchange rates) and a $10 million U.S. government grant. Since then, additional funds have been obtained through fines and levies and additional transfers from the property fund. The environmental fund provides grants and subsidized loans to municipalities such that when the grace periods and interest rates are taken into account, the overall subsidy is approximately 40 percent of project cost. During the early years of fund operation the subsidy approached 80 percent.

Environmental Regulations And Standards

Environmental laws, standards, and regulations—and the government's capacity and willingness to enforce them—are key to protecting and improving environmental quality. In the Czech Republic, the government had already passed the Clean Air Act. It has helped reduce air pollution in industrial plants in larger municipalities and electric utility power stations nationwide. In 1994 the Czech Parliament passed legislation establishing the National Air Quality Program to improve air quality from municipal sources such as district heating plants and residential heating. These combustion sources were mainly coal based, with little effective control technology to reduce high levels of particulate matter and sulfur dioxide emissions. Legal and regulatory frameworks in support of environmental management were already in place and being enforced. Therefore, this kind of EAPS project support was not needed. The government's interest in accession to the European Union and the associated requirement of maintaining sound pollution abatement and management further reinforced an effective environmental regulatory framework.

Education and Awareness

Training can be an effective means to broaden the impact of technical assistance. Likewise, public information and outreach programs can involve more people in community-related activities, thus strengthening local government capability. EAPS carried out only limited training. A pilot training course was held in Prague. A session was also held in northern Bohemia and one in northern Moravia. Both were aimed

at informing municipal officials about applying for environmental fund assistance. The regional sessions were also used to present two computer models: a financing model municipalities can use to estimate their borrowing limits, and an economic model for gas pipeline valuation.

Institution Building

Effective environmental management requires the participation of several institutions: local governments to plan and carry out projects; national-level agencies to set policy, establish regulatory frameworks, and ensure compliance; public and private sources such as banks and funds to provide financing; and a vibrant private sector to provide technical assistance and project construction. EAPS directed its efforts at improving fund capabilities and developing municipal capacity to secure needed financing.

"Grant approval was sometimes affected by political and personal factors and had less to do with the merits of the environmental upgrade."

From the outset, environmental fund assistance was geared to improve transparency by recommending operational changes that would enhance communications with grant applicants. Still, some municipalities claimed that grant approval was too often affected by political and personal factors and had less to do with the merits of the environmental upgrade. In response, EAPS put more emphasis on proper fund procedures for project technical and financial analysis. Project personnel also carried out several valuable studies on loan guarantee programs that would strengthen the fund's ties with commercial banks.

Regarding municipalities, EAPS emphasized helping the jurisdictions prepare the entire loan package and then following up with the environmental fund to obtain financing. The project also provided limited environmental strategy assistance and some stand-alone feasibility studies.

Technological Change

New technology and techniques can reduce costs and broaden environmental and economic impacts. Recycling, waste minimization, by-product recovery, and pollution prevention complemented EAPS pollution abatement and treatment efforts. Likewise, improved techniques to package loan applications and analysis of the technical, economic, and financial merits of projects and alternatives result in better environmental priority setting and decision-making. EAPS strengthened the loan package concept and provided analytical support to the environmental fund. It promoted projects that recovered waste heat and converted combustion sources from coal to natural gas. And it developed models for municipal financial analysis and gas pipeline valuation. EAPS did not directly provide engineering or similar assistance.

IMPACTS

Environmental programs, although often designed with very different objectives, have outcomes that fall into four broad categories. *Institutional impact* revolves around the establishment and strengthening of institutions to design, evaluate, undertake, monitor, finance, enforce, and regulate environmental activities. *Environmental impact* helps improve air and water quality and maintain or enhance

biodiversity as well as terrestrial, freshwater, and marine ecosystems, at the national and global level. *Human health impact* is associated with preventing disease and promoting healthful living conditions. *Economic impact* includes all outcomes directly valued in the marketplace and incurred directly by project participants and those borne by additional parties (not captured in the financial analysis), such as social- and health-related costs.

Institutional Impact: A Mixed Bag

Conceptually, there are a number of ways a project can bring about institutional impacts. It can introduce new techniques. It can train people, provide them with skills, and assist them in transferring ideas and technology. And it can help change the way institutional leaders and visionaries view their world.

EAPS attempted to do this at two levels—the environmental fund and the municipality. The result was mixed. The CDIE team found strong evidence that the environmental fund was strengthened as a result of EAPS participation. It found little evidence, though, that municipalities or local consulting companies that performed feasibility studies were strengthened.

The project provided the fund with policy and operational advice and hands-on guidance in pivotal operating areas. It prepared nearly a dozen targeted studies designed to help fund managers move toward policy and operating improvements. The studies ranged from the basics of loan guarantees to detailed analyses of loan procedures. Overall, the institutional effects on the fund were very positive. The studies and the day-to-day assistance of an onsite adviser led the fund to make many productive changes. For example, the fund

- *Reduced grant subsidies*. The amount of grants given to applicants was reduced from 80 percent of project value to 60 percent, expanding fund financing capacity and reducing risk. With the reduction to 60 percent, the same amount of fund money now generated an additional $24 million in environmental projects.

- *Increased efficiency*. The fund's internal efficiency was increased by making analysis proceed simultaneously in several departments rather than sequentially. In the past, sequential analysis had created bottlenecks and last-minute, ill-conceived decisions.

- *Set more realistic loan terms.* The fund lengthened the loan term from 5 years to a more reasonable 10.

- *Increased revenues.* The fund started charging an interest rate on all noncommercial loans. As a result of charging 3 percent on noncommercial loans beginning in 1998, revenues increased an estimated $739,000, or 0.8 percent of the total.

- *Established sound practices.* The fund was now able to strengthen its loan guarantee programs with commercial banks by establishing clearer lending procedures.

- *Developed improved screening criteria.* The fund was now able to develop and use better criteria for screening applications.

- *Increased transparency*. EAPS helped increase the general openness of the fund. Recommendations of project officers led the fund to publish its procedures, provide applicants more routine access to fund staff, and provide more feedback to pending fund applicants when screening and other criteria changed.

At the municipal level, the impact of EAPS on institutions was less evident. EAPS support was reported to result in loans valued at $8.9 million, but the actual amount that can be attrib-

uted directly to project assistance is unclear. Many municipalities indicated they would have been able to obtain grants from the fund without EAPS assistance. Some were under Clean Air Act regulation and were forced to reduce pollution regardless. Others felt that EAPS assistance was helpful in that it reduced their costs because the project paid for services the city otherwise would have had to incur. Fewer municipalities cited EAPS assistance as the principal reason they eventually received environmental fund loans.

Environmental Impacts: Reducing Air Pollutants

EAPS environmental impacts were mostly positive. To be sure, the project had a direct impact on the physical environment, but that impact was relatively modest at the municipal level compared with what was accomplished at the fund level. At the municipal level the project worked primarily to promote fuel switching, from dirtier lignite to natural gas in district and residential heating systems. In some instances those interventions brought the municipality into compliance with the Clean Air Act. In others, the conversions resulted from citizen pressure for a cleaner environment.

Table 1 presents the estimated emission improvement as a result of the interventions at the local level. Individual reductions are important only insofar as they contribute to improved ambient air quality. EAPS activities had two important environmental impacts. First, they reduced the pollutant load outdoors and thereby improved air quality. Second, when the environmental upgrades addressed residential use, indoor air quality also improved.

The CDIE team encountered problems of quantifying EAPS environmental impacts: shared airsheds, lack of baseline data, no ambient air quality measures. Still, the team's opinion, based on interviews, site visits, and changes in emissions attributable to switching fuels, is that air quality improved in EAPS-assisted municipalities.

Table 1. EAPS Pollution Reductions

Municipality	Pollutant Reductions (tons per year)		
	Particulate Matter	Sulfur Dioxide (SO_2)	Nitrous Oxide (N_2O)
Bilina	12.1	30.2	4.1
Chomutov	15.0	11.1	1.4
Krasna Lipa	51.0	72.8	16.6
Liberec	74.0	116.1	20.5
Ludgerovice	49.0	33.1	11.9
Petrovice U Karvine	23.0	15.5	5.6
Polanka	74.3	32.8	7.2
Svinov	7.6	3.7	0.8
Vratimov	106.0	178.0	48.0
Totals	412.0	493.3	116.1

EAPS municipal interventions may have had an impact locally, but SO_2 and N_2O are widely transported over areas spanning several municipalities and are thus of regional concern as well. It is therefore important to consider the regional effect of EAPS municipal interventions. To address this, the team compared EAPS-assisted reductions with the total that occurred regionally. Data were available only for the Black Triangle part of the Czech Republic, roughly corresponding to northern Bohemia. Table 2 presents reductions in three major air pollutants over the project period for the Black Triangle and for the EAPS-assisted projects in northern Bohemia. As a percent of emissions avoided, the EAPS contribution was small. This probably reflects the fact that EAPS assistance was targeted to small cities and typically involved extending natural gas pipelines (but not building new ones) or converting only a lim-

ited number of residential coal users to natural gas.

There was already a trend during this period of improved air quality throughout the Czech Republic. This resulted from a number of factors: closure of older industrial facilities, cleaner power plant operations, stringent environmental standards and their enforcement, and the availability of capital from the State Fund for the Environment. Since 1989, particulate matter, SO_2, and N_2O have fallen by more than 83 percent, 72 percent, and 74 percent, respectively, in the Black Triangle.

Table 2. Tons of Emissions Reduced Annually

	Particulate Matter	SO_2	N_2O
EAPS northern Bohemia	152	230	42
Czech Black Triangle	19,000	283,000	7,000
EAPS % of Czech Black Triangle	0.80	0.08	0.61

As discussed previously, EAPS assistance to the environmental fund increased the overall investment in environmental projects by reducing the grant allocation. This led to an additional $24 million in environmental investments. The precise environmental impact depends clearly on the types of projects financed with the additional funds. Since this information was not available, the team estimated additional pollution reductions per thousand dollars for all environmental fund–supported projects (ratios were determined from data in table 2). These coefficients for particulate matter, SO_2, and N_2O were then multiplied by the additional $24 million credited to EAPS to yield a total additional annual reduction in air pollution of 6,400, 7,900, and 980 tons of particulate matter, SO_2, and N_2O, respectively. Of course, this amount is not fixed but is a function of the total amount the fund provides in grants.

Health Impact: Modest But Immeasurable Gains

There has been a health impact from direct municipal interventions, but owing to a lack of data it is not measurable. Moreover, the effects are small relative to other categories. Human morbidity and mortality are affected by changes in ambient air quality. As a result of EAPS's municipal activities, pollution at the source was reduced. Whether this had any effect on health depends on many factors, including the level of pollution, other sources of pollution, local topography and climate, and the type of pollution. Particulate matter under project conditions can be considered mostly a local pollutant. In many of the EAPS-assisted sites, the team concluded that most sources of particulate matter were reduced. The key to health impacts revolves around how this translates into improvements in ambient environment. These data were simply not available.

Economic Impact: Fund Outpaces EAPS-Assisted Cities

The economic impact of the EAPS project can be measured in two ways: in the marketplace itself and, more broadly, in the general benefits that accrue. The former includes the USAID assistance costs as well as the cost of equipment (for example, the new boiler for using natural gas versus coal, or the cost of the pipeline to bring gas). It also includes the cost of equipment operation and maintenance. The latter occur as individual sources of air pollution are reduced and the ambient environment improves. This improvement then benefits human health, monument preservation, animal and plant productivity and reproductive health, the

Table 3. Cost of Reducing Pollution				
	Project Upgrade Cost			
		Particulate Matter	SO_2	N_2O
EAPS municipal interventions	$845,300	412.1	493.4	116.2
All environmental fund air projects	$566,170	15,056	18,651	2,321
		Tons of Pollution Reduced per $1,000 (estimate)		
EAPS municipal interventions		0.05	0.06	0.01
All environmental fund air projects		0.27	0.33	0.04

ecosystem, and global climate change. These impacts, although often not directly valued in the marketplace, are part of the fuller economic analysis.

Regrettably, the data were not available to conduct such a complete economic cost–benefit analysis. Instead, cost effectiveness was measured. This is justified since emissions reductions were and remain a national objective and would have proceeded regardless of the outcome of a complete cost–benefit analysis. Given that the efforts to reduce emissions were inevitable, the question is, How effective were they relative to the cost incurred?

Table 3 presents the cost of reducing pollution for EAPS-assisted municipal interventions compared with all those approved by the fund. As the data indicate, all environmental fund projects reduced 0.27, 0.33, and 0.04 tons of particulate matter, SO_2, and N_2O, respectively, for every $1,000 of project cost. That compares with only 0.05, 0.06, and 0.01 tons of particulate matter, SO_2, and N_2O, respectively, for EAPS-assisted municipal interventions.

One possible explanation for part of this big difference is that the average environmental fund intervention was larger than the average municipal intervention and that economies of scale come into play. Another possible explanation is that pollution reductions are based on estimates, both at the fund and in municipalities, and that cities overestimated pollution reductions to sweeten the odds for loan approval. As noted earlier, the applications go through a fund technical review. For the most part, the applications cover similar simple technologies that are mostly conversions from coal to gas. A simple comparison of the amount of fuel used (coal displaced) can provide a quick estimate of pollution reduction for major pollutants. The fund review committee is skilled in this basic technique. While the team does not believe this to be a major source of the variation between EAPS and all environmental fund interventions, it can account for some portion of the difference.

If the question is, When faced with limited development assistance, where should USAID provide its help to obtain the greatest impact on air quality? the fund was clearly the better choice. As table 3 shows, EAPS-assisted munici-

pal projects reduced pollution by much less (about one fifth that of all environmental fund projects) for each $1,000 spent.

We now summarize the results of the two project approaches. At the municipal level, EAPS spent $650,000. From that investment it

- Mobilized a one-time $3.2 million investment in new capital for environmental projects
- Reduced annual pollution of particulate matter, SO_2, and N_2O by 412, 493, and 116 tons, respectively
- Trained 22 municipalities in how to complete loan applications for the environmental fund
- Strengthened the professional ties between municipalities, consultants, and the fund
- Strengthened one local nongovernmental organization, the Foundation Project North
- Created the conditions for another consulting company to work with municipalities in project preparation and packaging.

At the environmental fund level, EAPS spent $750,000. From that investment it

- Increased operating efficiency
- Increased the public stature of the fund
- Increased the viability of the fund and reduced its operational vulnerability
- Mobilized an annual increment of $24 million in environmental projects support by the fund
- Reduced annual pollution of particulate matter, SO_2, and N_2O by 6,400, 7,900, and 980 tons, respectively (figures based on one year's leveraging).

The team's view is that USAID's investment generated larger and longer lasting developmental benefits at the fund level than at the municipal level.

PROGRAM PERFORMANCE

Program performance is assessed as to 1) effectiveness, 2) sustainability, and 3) replicability.

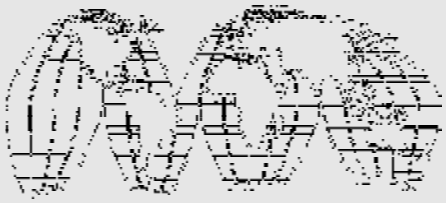
Effectiveness

Effectiveness is a measure of how well the intended development assistance met the stated project objectives. Overall institutional capacity was significantly strengthened at the State Fund for the Environment. The fund reported carrying out most EAPS operational recommendations for financial improvement. This was confirmed by a 1998 external evaluation of the fund by the Organization for Economic Cooperation and Development. Additionally, the fund reported that working closely with the EAPS resident adviser greatly enhanced its overall institutional credibility with a wide range of financial and governmental institutions.

For example, EAPS assistance significantly strengthened application financial reviews and reduced loan processing times. As a result, the fund was able to support more environmental investments. As recommended by EAPS, the fund also decreased the grant portion of total project costs, used the latest cash-flow-management software, lowered interest rate subsidies, and charged interest on municipal loans. Together, these changes further improved the fund's loan-processing and loan-guarantee programs. There is good evidence that EAPS support enhanced the fund's effectiveness, and this allowed the fund to support more projects, thus increasing the potential for environmental benefits.

Municipalities did not always see these institutional improvements translated into significant service upgrades. Most EAPS-assisted municipalities indicated that they had better access to fund officials after EAPS. But difficulties remained when checking on the status of their loan applications. Moreover, municipalities indicated that the period of time between submitting an application and receiving a response had not yet decreased noticeably.

The project's municipal institution capacity building efforts were much less effective. That is, many municipalities reported that EAPS assistance was not critical to their securing environmental fund financing. Financing of feasibility studies and organizing training sessions did not significantly improve their ability to carry out technical, financial, and environmental project evaluations. This observation is supported by the lack of a real difference between loan approval rates. The rate for EAPS-assisted municipalities was 40.9 percent; for non-EAPS-assisted municipalities, 41.3 percent. Municipalities did, however, greatly value EAPS's facilitation role with their application, which provided them with greater access to the fund. EAPS assistance was viewed as useful in only a few cases.



"EAPS support enhanced the fund's effectiveness and this allowed the fund to support more projects."

Sustainability

Sustainability refers to the degree to which a program continues to provide benefits beyond the end of development assistance. By reducing the grant portion of total project costs from 80 to 60 percent, the fund was able to better preserve its financial resources, thus contributing toward its longer term financial sustainability. By helping improve the loan guarantee program, EAPS assistance helped make the fund a more stable financial institution. Charging interest on noncommercial loans also increased the fund's revenue stream, further strengthening its longer term financial capability.

With respect to institutional sustainability, EAPS assistance changed a pivotal fund operational procedure such that the technical evaluation division and credit policy division now work together in a much more efficient manner and are likely to continue to do so. By working closely with the fund, EAPS managers increased fund credibility, critical to ensuring the longer term viability of what was still a relatively new institution.

In contrast to the likelihood of fund operational sustainability, EAPS assistance to municipalities preparing loan applications is likely to have little long-term effect. When EAPS and municipal staff met, the technical assistance could have had a more lasting impact. In only a few cases did EAPS and municipal staff actually work together on the applications. In most cases where EAPS staff helped with the application, they did it independently; thus, municipal staff had less of an opportunity to develop skills for future applications.

Feasibility studies financed by EAPS also did not build substantial municipal capacity in technical, financial, and environmental project evaluation. But such assistance did help some local consultants who carried out the studies. Financing municipal feasibility studies neither enhanced the ability of the municipality to conduct its own studies nor increased the chances that the municipality would be able to obtain financing for future studies.

An alternative strategy might have been to work with the environmental fund and encourage it to provide loans for feasibility studies, with the understanding that the loan could be included in the overall project cost should the project be fund financed. Otherwise, the loan could be paid back at below-market rates of interest. By providing consultants with an opportunity to work with a number of municipalities, EAPS helped them showcase their services. In addition, the consultants themselves recognized the growing need for this sort of consulting.

Replication

Replicability refers to whether the assistance provided to targeted municipalities has spread to others. The issue of replicability does not neatly apply at the fund level, because while there are thousands of municipalities in the Czech Republic, there is only one state environmental fund. The team could find no evidence for EAPS replication at other municipalities. This did not appear to be an explicit project strategy. When the team observed replication, it was from municipalities sharing general information and could not be directly linked to any EAPS activity. Notably, cooperation between municipalities was limited in the northern Bohemian sites but common in northern Moravia. Especially notable in this regard is one EAPS-assisted municipality (Ludgerovice) that belongs to an association of towns and villages from former Prussian areas. Through regular meetings, these municipalities exchanged limited information.

POLAND

There was considerable interest in obtaining added field information about EAPS in neighboring Poland, where the project has also closed out. EAPS began somewhat later and lasted somewhat longer in Poland. The budget for EAPS Poland was $2.75 million, twice that spent in the Czech Republic. The overall EAPS approach was similar—namely, to strengthen domestic environmental funds and help municipalities get loans for environmental upgrades. Another reason to obtain additional information from Poland was the report that the Polish State Fund for the Environment and several regional environmental funds (absent in the Czech Republic) were playing a much more catalytic role. With this in mind, the team conducted a limited number of site visits in Poland that looked mainly at the regional funds.

In contrast to the Czech Republic, there are three basic categories of domestic environmental funds, not just a single state fund. At the national level there is the National Fund for Environmental Protection and Water Management. At the provincial and regional level there are 49 voidvodal, or regional, funds. At the municipal level, there are more than 2,000 local environmental funds. Like the Czech fund, the Polish funds typically use grants as a way of financing environmental upgrades. The team visited two of the largest and most active funds: the Krakow and Katowice Voidvodal Funds.

The Krakow Voidvodal Fund, now almost five years old, benefited significantly from EAPS assistance. Before EAPS, the fund had in place application screening procedures that weighed both ecological and financial project merits but relied less on actual (and therefore quantifiable) pollution measures. With project assistance the fund was able to better quantify environmental impacts associated with each proposed upgrade using a computerized model provided by an EAPS implementer. As a result, the fund reported it was much better able to prioritize applications and award grants. This cash-flow model was later adopted by other voidvodal funds and the national fund, with the Krakow fund taking the lead to help introduce and apply the model.

The Krakow fund also reported a significantly better application approval rate from munici-

palities receiving EAPS investment packaging assistance (almost 90 percent), compared with non-EAPS-assisted applications (67 percent). Quantifying environmental impacts had another positive effect on the fund. Before EAPS, there was a tendency for the fund's board to become more involved in grant decision-making. After EAPS support, the board relied much more heavily on the recommendations of fund financial and technical specialists, thus making the final grant decision-making less subject to non-merit-based influences and thereby reinforcing fund transparency.

The Krakow fund clearly benefited from EAPS assistance and was able to transfer what it learned to help other funds. It already had a well-defined set of technical procedures for assessing creditworthiness in place before EAPS assistance and made no mention of using the EAPS cash-flow model. The fund lacked precision in estimating environmental impacts, though. EAPS appeared to fill that need, and it enabled the fund to transfer the acquired skills to other institutions.

The Katowice fund serves an unusual voidvod in that the region is highly urbanized and industrialized. One fifth of national industry is located in the Katowice voidvod. A variety of projects are considered for funding. They include environmental education (notably Earth Day activities), forest protection, flood prevention, environmental monitoring and control systems, residential and industrial waste management, and projects that reduce air, water, and noise pollution. EAPS worked with the fund in a number of ways.

The Katowice fund cooperated with EAPS to develop a computerized cash-flow planning model and another impact model to collect and confirm data on project environmental impacts. The team found no evidence to confirm the usefulness of the cash-flow planning model but did find that the impact model was used consistently. EAPS also helped the Katowice fund showcase its competencies and increase its outreach through central and eastern Europe fund training and workshops for other municipal governments. The fund continues to hold these workshops. In this way, it continues to provide valuable loan application guidance to municipal governments. However, the fund stressed that EAPS assistance really benefited the municipalities more by helping improve the quality of their applications submitted and only indirectly affected fund operations. Several key fund personnel emphasized that the quality of loan applications from EAPS-assisted municipalities was far superior to those before EAPS assistance. That, they said, made their job of evaluating applications much easier.

The investment climate for environmental upgrades in Poland appears to have been much more robust than in the Czech Republic. Thus, quite naturally, the overall success of environmental financing was much higher. The demand for Polish environmental financing has been growing since the 1990s, and the role of domestic environmental funds has increased proportionately. In such a dynamic market, it is hard to say with any precision what role EAPS Poland played in strengthening funds and facilitating investment packaging without a more detailed full-scale study. At the same time, the team came away with the strong impression that EAPS Poland had scored major accomplishments. The voidvodal and other fund managers acknowledged receiving helpful support from EAPS and could cite specific contributions such as training and selected model use. More important, they were able to put that technical assistance to use by helping train other funds.

Compared with the Czech Republic, fund application procedures in Poland appear to be better documented and more widely communicated. Participant outreach is considered routine rather than rare. In short, the funds appear to go out of their way to help applicants pack-

age their investments without actually doing it for them.

The team left with the strong impression that regional funds in Poland have definite advantages over a national fund. The regional funds appear more flexible, are closer to the environmental stresses, and can more easily provide technical support. In short, regional funds are closer to their customer base and may provide better service. The international donor community and many partner organizations have long advocated a more decentralized approach to government services. Polish regional environmental funds would seem to fit that model well.

LESSONS LEARNED

The EAPS project in the Czech Republic and in Poland yielded a number of lessons for the CDIE evaluation team. They are

1. Environmental regulations and meaningful enforcement are necessary first steps for improving air quality. Often, one of the first questions faced by program designers is whether a regulatory framework already exists. When EAPS began in the Czech Republic in March 1995, the Clean Air Act had been in existence for several years. The act required industries and municipalities generating more than 5 megawatts of electricity to reduce emissions according to a well-defined compliance schedule. Failure to comply meant swift and harsh penalties, fees, and ultimately cease-and-desist orders. Many polluting industries were shut down, and larger polluting municipalities began to take action. Smaller municipalities were less well equipped financially and technically to respond.

When asked why they undertook environmental upgrades, the overwhelming number of city managers pointed to the Clean Air Act. (Also cited were citizen complaints about poor air quality and high costs associated with inefficient, outdated heating operations.) For municipalities regulated by the Clean Air Act, compliance was key. Progress switching from coal to gas and the pace of district heating improvements would have been much slower, if they occurred at all, without the act. EAPS implementation was well timed. Its effectiveness would have been seriously compromised had it preceded enactment and enforcement of the Clean Air Act.

2. Domestic environmental funds can be vital finance sources for municipal projects in transition countries. The greatest impact of the EAPS project was at the State Environmental Fund, through the work of a resident adviser and related technical assistance studies. These led to improved procedures and the adoption of policies to reduce subsidies and improve loan guarantees. Notwithstanding the increased participation of other sources of project financing through loan guarantees and interest rate subsidies to commercial banks, environmental funds are still needed. They play the additional role of being a policy instrument to implement projects that take into account environmental and social priorities. Even with improved technical and financial analytical procedures, the fund will be handicapped if its approval of financing is affected by political factors, if it is perceived as not transparent and open, or if its communication with municipalities is inadequate. These problems tend to be more manageable for regional funds than for national-level funds.

3. The right kind of environmental investment evaluation and packaging can be effective. One of the major impediments to increased environmental management—especially for municipalities—has been the unavailability or high cost of funds for environmental upgrades. On the other side of the issue, the capability of municipal project sponsors to provide investment information in a form that banks or environmental funds can use to make lending decisions is also important. According to EAPS project personnel, and to city leaders interviewed, munici-

pal technical assistance was of little interest or use, for three reasons: 1) Larger municipalities claimed they already had the expertise. 2) Most municipalities believed the fund's approval process was arbitrary and political, so education or better packaging did not necessarily improve rates of success. And 3) smaller municipalities were not given sufficient hands-on experience to learn the process.

Thus, EAPS's training in project packaging was undermined by both its targeting strategy and its hands-off nature. City officials in the Czech Republic and Poland made a strong case that environmental investment packaging was indeed needed. They pointed out that such assistance was best utilized when the fund offered the training as part of an overall outreach effort—not just a stand-alone component.

4. To be effective, replication requires an explicit, upfront strategy. Replication of technical assistance at the municipal level can be accomplished in one of two ways. The first is to develop high-quality assistance products (such as manuals) on how to prepare loan applications, examples of successful applications, and specific templates for different kinds of projects, such as coal-to-gas conversion of boilers, district heating, and wastewater. The distribution of these products beyond the target municipalities can lead to more replication. The other way to increase replication is to target groups of municipalities (such as municipal associations) so members can spread the word. Combining these two approaches is also possible—for example, developing high-quality assistance products and disseminating them through municipal associations. Unless an explicit replication strategy is planned and implemented, the likelihood of spreading know-how to other entities will be low.

5. The dual purpose of environmental funds must be emphasized. Technical assistance often dwells on the financing aspects of a fund by addressing credit policies, risk diversification, financial analysis, and operating procedures. These are indeed worthy areas to target. But environmental funds are also a means of subsidizing socially desirable environmental investments. Many of the benefits of mitigating environmental damage or managing resources properly do not accrue to those that incur the costs. Therefore, rate of return on these activities is often below that which is needed in a market economy, and less investment is undertaken than is socially desirable. In-depth interviews with a broad range of participants confirmed that government intervention is necessary to increase societal welfare. This aspect of a fund's role is often overlooked and should be considered and strengthened in fund policy and operations. Both project screening and the allocation of subsidies offer a perfect venue for strengthening societal welfare as an aspect of a fund's purpose.

For example, at the Czech Fund the cost per unit of pollution abated is one screening technique. A problem arises because the fund uses the *subsidized* price of natural gas rather than the cost to the economy. This could result in the exclusion of some projects, such as waste heat to energy, where the cost per unit of pollution reduced may be higher than the subsidized cost of natural gas.

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