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FINAL REPORT

Capital Development Initiative Environment Subcomponent

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EXECUTIVE SUMMARY

A. BACKGROUND

The Environment Subcomponent of the Capital Development Initiative (CDI) was an innovative program sponsored by the U.S. Agency for International Development (USAID) to use U.S. environmental expertise and private sector resources to help Central and Eastern European (CEE) countries address their environmental problems. The Environment Subcomponent was one of four parts of the overall CDI Program (the other subcomponents being energy, telecommunications, and finance), which in turn was part of the broader American Business Initiative (ABI) under the Support for Eastern European Democracies (SEED) Act.

The Environment Subcomponent began in April 1992 and was completed in January 1995. The Program's objectives were to:

- promote U.S. private sector investment in locally-identified physical infrastructure projects; and
- build the local environmental technology and service sector (i.e., the related "business infrastructure") by facilitating sustainable relationships between American and local environmental firms.

In mid-1993, USAID directed a "mid-course correction" to shift the program's exclusive focus on promoting specific physical and business infrastructure projects to also include a broader effort to provide environmental business-related policy and planning assistance to all levels of

government in the region. This adjustment was driven by an increasing awareness that deficiencies and institutional blockages in these critical areas were impeding the progress of environmental business development in the region. This objective was factored into all subsequent program activities, although primary emphasis remained on building local environmental infrastructure and business capacity through the formation of sustainable relationships with local counterparts, joint ventures, direct investment, technology licensing and exports.

The Environment Subcomponent contractor established a regional office in Warsaw, Poland and country offices in the Czech Republic, Hungary, and Slovakia. The Program was oriented toward the four countries with local offices although limited activities were also carried out in Bulgaria.

The CDI Program was conceived in a period of dramatic change in CEE, marked by euphoria over the collapse of the communist bloc and the headlong rush by American businesses to the region. The prospect of new, untapped environmental markets fueled this euphoric sense, as did the clear need for rapid solutions to urgent environmental needs. However, as the CDI Program began, the honeymoon period came to an end as businesses ran up against the reality of severely limited and competing financial resources, the lack of infrastructure and the absence of market-oriented business expertise in the region.

In the environmental sector, the CDI Program played an important and timely role in helping to address some of the more critical policy and institutional deficiencies while providing a means for developing specific projects to address priority environmental needs facing the region. In the wake of numerous efforts by bilateral and multilateral aid agencies to assist the transition of CEE nations, CDI offers a model of a results-oriented program that has not only made measurable improvements in environmental quality in the region, but has also helped to strengthen the competitive position of the American environmental protection industry.

By focusing on developing specific physical and business infrastructure projects, the CDI Program helped USAID to identify barriers that were preventing environmental problems from being addressed. As a result, the Program has helped develop a base of understanding which will prove useful in designing future environmental programs in the region. The hands-on knowledge and experience the CDI Program has afforded may be even more important in the long-run than the individual projects which were successfully promoted under the Program, although the project results are impressive, especially given the challenging circumstances.

B. LESSONS LEARNED AND RECOMMENDATIONS

The CDI Environment Subcomponent has paved the way for the U.S. environmental industry to play a major role in both addressing the environmental emergency in the CEE region while also carving out a long-term presence in this growing environmental market. The project has also

yielded valuable lessons which should serve as guides and reference points for future efforts by USAID and other U.S. or multilateral agencies to develop and execute environment-oriented programs in the region. Section V in this report discusses these lessons and recommendations in more detail:

- USAID's strategy of building local environmental business capacity by facilitating sustainable linkages with U.S. firms is appropriate and sound. The absence of a well-developed base of local environmental equipment and service vendors is a major impediment to environmental protection in the region. Much U.S. technology and experience is directly relevant to their needs. Building sustainable relationships between U.S. and local firms is not only a cost-effective way of supporting long-term environmental progress in the region, but also promotes U.S. competitiveness in the environmental goods and services industry by creating a "demand-pull" for ongoing U.S. merchandise and service exports to the region.
- Projects take a long time to develop and "staying power" is critical to their success. The shortest time to develop a project under the CDI Environment Subcomponent was nine months, while several projects which were already being considered at the start of the CDI program still had not been successfully launched at the Program's conclusion despite substantial assistance from CDI staff in Washington D.C. and the field. Most projects take between 18 and 36 months to gestate and the failure rate is high. Thus both U.S. and local

partners need the financial and managerial resources to see these projects through to the end.

- Financing is a key problem in developing almost all environmental projects. Municipal finance markets are only now beginning to emerge, so most public infrastructure investments must be funded through international assistance or with the help of specialized environmental funds (such as The National Fund for Environmental Protection and Water Management in Poland). Privately financed pollution control investments are severely limited by the lack of resources and competing demands facing most enterprises in the region. Financing for project development activities (e.g., preparing feasibility studies and business plans) is also constrained yet vitally important because most foreign investors see better opportunities for using their own time and resources in other parts of the world, especially Asia and Latin America.
- Projects fail for a wide variety of reasons, including inadequate management skills, lack of understanding of U.S. and local business practices, poor fit between U.S. technologies and local needs, political uncertainties, difficulty in getting necessary permits, lack of financing, and the like. Successful business promotion and technology transfer programs need to focus on the full range of problems and have flexible access to resources to help overcome all of the problems in an innovative and pro-active way to help promote the most promising projects. This is especially

true for low-cost, innovative technologies, which are particularly appropriate for Central and Eastern Europe, but face special problems in being accepted, validated, and financed. This raises the further point that such technologies are often the product of small U.S. entrepreneurs. Availability of funds to support visits by U.S. firms to the region or CEE officials to the U.S. would greatly expedite building business relationships and demonstrating innovative technologies.

- Information on specific environmental business opportunities in CEE is still hard for U.S. companies to acquire; similarly, local companies find it difficult to determine the bone fides of U.S. vendors and technologies. A compelling case can be made for providing better information on business opportunities (especially at the provincial and local level) to U.S. firms through a CDI-like program because of the economies of scale in collecting and disseminating such information. Similarly, a strong case can be made for providing relevant information on U.S. vendors and environmental technologies in view of the high transaction costs facing local firms in attempting to gather this information (although it must be recognized that the provision of information on or "certification" of specific firms and technologies raises a number of practical problems which will require innovative approaches and interagency collaboration).
- For all of the above reasons, a strong local presence with knowledgeable U.S. and local staff is essential. The CDI Program found it highly valuable to

combine American expatriate and local staff in each office in order to help U.S. and local firms understand the full range of cultural and business differences from each side. In addition, because of linguistic and nationalistic considerations, a local presence in each target country is critical if the full potential for promoting sustainable business relationships is to be realized.

C. PROJECT ACCOMPLISHMENTS

Project accomplishments can be demonstrated by several different measures:

1. Developing Infrastructure and Environmental Business Projects.

By the end of the CDI Environment Subcomponent Program in January 1995, fifteen "projects" were "operational" or "underway," i.e., had progressed beyond the talking stages and could be characterized by clearly defined implementation activities. In most cases the projects covered a single activity by a single company, but in several cases a company had more than one installation. (One company built nine small wastewater treatment facilities by the end of 1994.) In total, these projects represent **investments of over \$110 million**, will generate **U.S. exports of over \$30 million**, resulting in, among other things, the **ultimate treatment of over 40,000 cubic meters per day of wastewater** and the **reduction or treatment of over 3,000 tons per day of solid and hazardous waste**. (These projects are summarized in Table 1 following.)

At Program termination, including the projects listed in Table 1, **a total of 103 other projects** were at some stage of

"active development". Of those, a number of potential ventures had progressed to the level of a formal letter of intent or a memorandum of understanding. On this basis, the CDI Environment Program will ultimately be responsible for generating additional environmental projects which can be counted in the "operational"/"underway" category. In addition, relationships have been established in both the public and the private sector which will facilitate future transfer of technology, additional physical and business environmental infrastructure, and improved public policies based on more realistic assessments of the potential costs and benefits of various environmental technologies. (All of the projects that reached the "active development" phase throughout the life of the Program are summarized in the project matrices included in the Individual Country Reports in Annex B.)

The types of projects generated by the CDI Environment Subcomponent vary substantially and are difficult to summarize with any single statistic. Some of the more important differences in the projects that were actually "operational" or "underway" in January 1995 include:

- **type of project.** The projects supported range from: (1) traditional infrastructure (e.g., wastewater treatment plants), to (2) ventures to produce pollution control equipment and provide services (e.g., a plant to recycle plastics), to (3) the export of U.S. technologies (e.g., GIS software to support site remediation) to (4) activities which require no investment but have significant environmental benefits (e.g., the use of foundry sand wastes as inputs to cement kilns).

Table 1 - CDI ENVIRONMENT SUBCOMPONENT PROJECTS OPERATIONAL OR UNDERWAY

Project	Description	\$Value	Project Benefits	Status
INFRASTRUCTURE PROJECTS				
Eco-Bud EuroAm	1 transfer station with compactor and refuse derived fuel (RDF) production facility in Poland.	\$15 M	Ultimate capacity of 1200 tpd solid waste disposal plus fuel savings from. U.S. exports of \$13 million.	Land purchased
Future Waters	2 wastewater treatment facilities in Hungary and Poland. CDI funded feasibility studies.	\$17 M	37,000 m ³ /d wastewater treated. Demonstrates feasibility of agricultural re-use technology.	Permits pending
Lemna	9 wastewater treatment plants in Poland using an innovative low-cost technology based on aquatic plants (duckweed).	\$7 M	3,870 m ³ /d wastewater treated. U.S. exports of \$1 million.	Operational
SPEC Industries	1 wastewater treatment plant in Czech Republic utilizing a low cost package plant system. Local distributor signed up.	\$0.1 M	140 m ³ /d wastewater treated. Demonstrates low cost technology for small applications.	Operational
PRODUCTION/MANUFACTURING PROJECTS				
American Battery	Plant in Poland to produce rechargeable batteries followed by a \$50 million second phase expansion to produce chargers.	\$50 M	Rechargeable batteries are less toxic and re-use reduces disposal volume of old batteries.	Conditional funding
CEMG EkoEfekt	Project to reproduce PET bottles in Poland with U.S. partner. Pilot phase collection and sorting already underway.	\$10 M	Plant will recycle 2,000 tpd of PET plastic bottles, saving resources and landfill space.	Initial funding
Clean Air Valves	Facility in Poland to produce clean air valves for autos. National Fund has approved funding if feasibility study is OK.	\$3 M	Replacement/retrofit for PVC valves reduces emissions by 40-50%.	Conditional funding
Exbud-Envira	Project to import one and locally produce two mobile incinerators for use in disposing stored pesticides in Poland.	\$6 M	Each incinerator will treat 5 tph per unit of hazardous waste. Local production base established.	Financing secured
Progres-Carpco	Project to clean coal in Poland. U.S. partner has provided equipment (spirals) for demonstrations.	\$10 M	Project will clean 1,600 tpd of coal and demonstrate feasibility of U.S. low cost technology.	Demo underway
OTHER PROJECTS				
CEVA Tech.	Re-use of Czech foundry sand waste in cement kilns.	n.a.	50 tpd of sand diverted from landfills.	Operational
EZT-Earthshield	Polish joint venture to sell detergents, surfactants, and services.	n.a.	\$600 K sales of product & services.	Operational
SEGI-Mayfair	Polish joint venture to sell GIS software and related services.	n.a.	\$500 K sales of GIS software and remediation services.	Operational
Replast-OMT	Technology to remove odors from recycling plant in Slovakia.	n.a.	Ecosorb selected and shipped for test at the plant.	Testing
Visitor Center	Plan to use buildings at Park Visitor Center in Vitosha, Bulgaria.	\$0.1 M	Building rehabilitated and increased traffic for Center.	Planning

Abbreviations: M = millions, K = thousands, tph = tons per hour, tpd = tons per day, m³/d = cubic meters per day.

- **status of the venture.** Some of the projects in Table 1 are already in operation and generating incomes; others are at a demonstration stage; while others have financing committed but are waiting for the completion of feasibility studies or government permits. Projects have been listed in Table 1 as "operational" or "underway" only if specific actions have been taken (e.g., land acquired, financing arranged) that go beyond a statement of interest or preliminary commitment, as indicated by a memorandum of understanding or letter of intent.
- **environmental benefits.** The various projects have different impacts on the environment. Some can be measured in terms of cubic meters treated (e.g., waste water), others in terms of tons of solid waste safely managed (e.g., through landfills); others are quantifiable in tons of materials reused (e.g., PET bottles recycled); the benefits of others are more difficult to measure (e.g., local production of rechargeable batteries, or licensing of GIS software).
- **CDI's role in promoting the projects.** In some cases, support from the Environment Subcomponent was instrumental in causing a project to happen and the project would clearly not have occurred absent CDI support. In other cases, the CDI Environment Program's on-the-ground presence, local contacts, and expertise played an important role in moving projects more quickly to closure, providing key information, or simply lowering the level of difficulty and frustration encountered by U.S. environmental

firms. The miscommunications and delays that would have occurred absent CDI Environment participation would have killed many of these projects given all the other difficulties being confronted.

2. Stimulating Awareness.

From the beginning, it was clear that the CDI Environment Subcomponent Program would need to cast its net broadly to generate enough interest to produce a body of projects sufficient to justify the Program investment. Washington-based CDI Environment Subcomponent staff contacted over **1200 American environmental firms**, attended and made presentations on environmental needs and business opportunities to over two dozen trade association and industry conferences, and provided in-depth counseling and assistance beyond initial contact to nearly two hundred U.S. companies. Similarly, CDI regional staff contacted over **750 local firms in CEE** to make them aware of the program, and made over twenty presentations at industry meetings and trade shows.

The benefits of these efforts to enhance awareness and improve understanding of opportunities and requirements are hard to quantify, but were clearly useful to many of the U.S. and local firms assisted. In some cases, the primary benefit was to make them aware that the market opportunities were not right for them and to save them from wasting time and money. In many other cases, the Program helped them to explore joint business opportunities with potential for their companies. Over the course of the Project, CDI Environment Subcomponent staff worked closely with U.S. and local companies, as well as local officials, to

identify and evaluate nearly 500 potential projects which eventually produced the 103 specific project opportunities which were actively developed and are listed on the project matrices.

The substantial effort devoted to stimulating awareness proved to be a proper investment, as upon termination of the CDI Environment Subcomponent, we calculated that:

- only about one-quarter of the nearly five hundred infrastructure investment or environmental business opportunities that were identified turned out to be potentially feasible following preliminary investigation;
- of the just over one hundred potentially feasible opportunities, only about one in ten reached the implementation stage because of communications, management, financing, or other problems; so
- about one hundred-fifty leads were required to produce each of the projects that reached the operational stage over the thirty-three month life of the

3. Environmental Improvement in the Region.

Several of the projects which have been completed or are underway demonstrate a direct impact on pollution. For example, wastewater treatment projects will clean over 40,000 cubic meters per day of sewage which would have otherwise been discharged untreated into surface waters. Solid and hazardous waste projects will result in reduction or safe disposal of over 3,000 tons per day, which does not include the volume that expected spin-off, expansion

projects will handle. These are relatively small amounts in the face of overall pollution levels in the region, but are especially significant because of the innovative technologies they demonstrate and the examples set for local officials and environmental businesses. For example:

- The Lemna Corporation's innovative wastewater treatment technology which uses aquatic plants (duckweed) as a key component of the process has now been well-demonstrated in the region. Lemna will continue to expand its investment in facilities without any ongoing U.S. Government support, and the use of its proprietary technology will inevitably stimulate local research into other applications of aquatic plants in pollution control activities;
- Other CDI projects will encourage experimentation with low cost technologies, such as Carpc's simple spiral for coal cleaning which is currently being demonstrated in Poland or the Exbud-Envira project to produce mobile hazardous waste incinerators. These types of projects are likely to have benefits substantially beyond their direct impacts, because they will encourage local environmental groups and industry to experiment with better and cheaper ways of meeting environmental needs; and
- The waste management projects undertaken by the EKO-BUD/EURO-AM joint venture have already had an effect in Warsaw. Their expansion into other cities, which was well underway at the time of CDI termination, will magnify their environmental contribution.

- Additional CDI-supported projects are still at the development stage such as McCormick Resources proposal for coal bed methane production. This project could make a major reduction in emissions of methane (a greenhouse gas) and provide a clean burning fuel. One of the stumbling blocks for this project is the need to dispose of salty waters which are produced along with the gas. CDI staff provided substantial support to McCormick, including efforts to try to arrange funding for the project, and to build regulatory support for deep-injection of the wastewater. Such disposal would greatly benefit coal production, which is one of the primary sources of water pollution in Poland.

4. Policy and Planning Assistance.

The various policy and planning assistance activities range from large, systematic efforts to build capacity, to quick targets of opportunity to provide policy advice to government officials and other decision-makers in the region. Illustrative institution building initiatives undertaken by the CDI Program include:

- **Recycling and Risk Assessment in the Czech Republic.** CDI Environment Prague and Washington staff assisted the National Property Fund in organizing and putting on a two-day risk assessment conference for Czech Government officials concerned with property contamination liability and privatization. U.S. risk assessment approaches were applied to a Czech case study for illustration.

Information on U.S. waste paper recycling regulations and U.S.

Environmental Protection Agency informational materials were provided to the Czech Ministry of Environment. The national energy authority, CEZ, was provided with U.S. technologies for flyash recycling. Washington staff followed up, at the request of CEZ, by canvassing these U.S. vendors to determine their availability for export, and reported to CEZ.

- **A National Park at Vitosha, Bulgaria.** CDI Washington staff worked with the USAID Mission in Bulgaria on a business development plan for developing ecotourism services in the Vitosha National Park near Sofia. Specifically, CDI conducted a market survey to ascertain the types of small park services business expected to be in demand, and completed a business plan, as part of the effort to develop the visitors' center complex.
- **Assistance to the Polish Fund for Environmental Protection.** CDI Environment Subcomponent staff made a short reconnaissance trip to Poland to identify opportunities for collaboration and institutional strengthening for the Polish National Fund for Environmental Protection and Water Management. The staff made a number of recommendations regarding opportunities for supporting the Fund's project management and credit enhancement services. These recommendations are being followed up by the Harvard Institute for International Development (HIID) staff in Warsaw.

**FINAL REPORT
CAPITAL DEVELOPMENT INITIATIVE (CDI)
ENVIRONMENT SUBCOMPONENT**

I. INTRODUCTION

A. Purpose of Report

The primary purpose of this final report for the Capital Development Initiative (CDI) Environment Subcomponent is to summarize the achievements and insights of this \$2.3 million program over its thirty-three month life from April, 1992 to January, 1995. This report highlights the sectors where CDI experience has shown that Central and Eastern European countries could most benefit from American know-how and expertise, and where the environmental needs in these countries suggest continuing market opportunities for U.S. business investment. The report discusses those areas where project development was most successful and most disappointing. In part, our objective is to provide project information so that other sponsors may be able to take over and follow through on the business development projects in progress under the CDI. In addition, we have tried to indicate successful strategies and ideas born in the CDI that could be applied in other programs designed to promote private sector environmental investment and development in the region, to the ends of both building local environmental business capacity and attracting foreign investment in the environmental sector.

B. History and Evolution of the Capital Development Initiative

The assistance activities discussed in this report were provided as part of The Capital

Development Initiative, a program of the U.S. Agency for International Development (USAID). CDI was part of the American Business and Private Sector Development Initiative (ABI) which was authorized by the Support for Eastern European Democracies (SEED) Act of 1989 in response to the needs for reform and assistance in the former east bloc countries of Central Europe. The overall goal of the ABI was to promote privatization, the development of market economies, and the establishment of democracies in Central Europe. Private sector investment was considered a major component of that program.

USAID, through the CDI, sought to promote U.S. and local private sector investment, in particular U.S. investments, in Central and Eastern Europe, as a way to address the region's very serious infrastructure and economic problems. When the CDI began in May of 1992, it had four subcomponents administered by Washington, D.C.- based contractors -- Environment by Sanders International; Telecommunications by Booz, Allen & Hamilton; Energy, by ICF - Clement International; and Financial Support by Coopers & Lybrand. This last was designed to assist in coordinating the three functional areas, as well as to provide assistance to both local companies and American companies in securing financing for promising investments. The financial contractor administered a grant program that

was designed to provide seed money for pre-feasibility studies as an inducement to American firms to evaluate and investigate potential investments in Central and Eastern Europe.

In the first quarter of the project's second year, (mid-1993), the USAID Administration shifted emphasis from promoting U.S. investments to focusing more intensely on building local capacity and developing local projects, and the grant program was terminated. While private sector investment remained an important goal, direct assistance to U.S. business required more explicit linkage to developing specific projects with the potential to achieve identified development goals in Central and Eastern Europe. In addition, the CDI sector programs increased emphasis on policy development assistance and institutional support in cases where the participation of local government entities was necessary to project development and investment success.

C. The "Environment" for Environmental Business Development in Central and Eastern Europe

It is necessary to understand the general environmental and political picture in the region during the life of this project in order to understand its challenges, successes and failures. It is also important to recognize that during the relatively short life of this project, dramatic political, economic and social changes occurred in all four of the countries where the CDI Environment Subcomponent operated. Accordingly, these areas presented enormous opportunities for introduction of environmental technologies and for business development and investment, but

also severe economic constraints to their implementation.

1. The Pollution Picture Confronted by CDI

Serious environmental pollution exists in all the countries of Central and Eastern Europe, and all are experiencing the full range of ecological and human health problems associated with industrial abuse and government inattention. All media - air, surface water, soil, and groundwater - are involved.

Air pollution is the environmental problem most American analysts focus on first, perhaps because pollution levels in the region are similar to those found in certain U.S. cities in the 1950s, posing major human respiratory effects from inhalation of coal dust and other particulate matter. Sulfur dioxide (SO₂) emissions have historically been very high by Western standards, largely because many power plants and industries, as well as many homes, rely on high-sulfur coal, which is locally available and cheap. Nitrogen oxide (NOx) is also an increasing problem related largely to the tremendous increase in the use of private automobiles, fueled largely by leaded gasoline.

From the point of view of most local citizens, industry officials and governmental authorities, water pollution in the region is the most significant environmental priority. There are widespread shortages of potable water, caused in part by leaky, antiquated delivery systems, and in some areas such as Poland and Bulgaria, by drought. In the larger cities, people are forced to drink bottled water almost without exception.

A substantial part of the water supply in the region is too polluted even for industrial use, 40% in Poland alone. Sewage treatment is lacking, especially in rural areas. Agriculture contributes animal waste to surface waters, and pesticide and fertilizer contamination pollute both surface and groundwater. Saline wastewater from coal mines also poses a major threat to groundwater, which feeds the wells so many smaller communities rely on for drinking water.

Systematic waste management is a relatively new concept in the region. Municipal garbage is piling up in landfills that are rapidly reaching capacity. Much waste is disposed without regulation; and, Western-style consumer packaging is an increasing blight on the landscape.

Industrial solid and hazardous waste have historically been "dumped out back," and great mountains of ash, slag, and tailings are common sights, especially in highly industrialized areas especially in Silesia, Poland. Municipal landfills are frequently the repository for industrial hazardous waste; these landfills are not equipped to prevent such wastes from leaching into groundwater.

Almost fifty years of indiscriminate and unrestrained production has left some highly industrialized areas such as Silesia in Poland, and Bohemia in the Czech Republic, so polluted that it is hard to imagine they could ever be successfully cleaned up. But, as privatization proceeds across the CEE region and as Western liability standards are applied, demand for site remediation will grow.

Accordingly, there is a need for a vast array of environmental goods and services designed to reduce pollution from current sources, to remediate past pollution, and to prevent future releases. The potential demand includes pollution control equipment and technologies; pollution prevention engineering consulting and design; recycling technology and economic/market analysis; remediation technology; and the full spectrum of business/finance services.

2. The Political/Regulatory Climate in Which CDI Worked

The initial thinking among donor nations was that environmental improvement would sweep across the Central and Eastern European (CEE) countryside because the environmental or "green" movement was highly visible during the demise of Communist rule throughout the region. Environmental pollution provided a unifying theme where individuals could demonstrate their discontent and desire for change under the old regimes.

Once those old regimes were gone, however, other priorities pressed in upon citizens and new governments, primarily the limited economic circumstances of newly independent countries and the desire for democratization. Global recession beginning in 1989 seriously reduced the flow of investment into the region which, together with Western environmental "know-how," had been expected to provide relatively quick environmental improvement following the fall of Communism. Traditional markets in the former Soviet Union shrank or dried up altogether, creating further difficulties for strapped local economies.

Faced with the hard reality of global recession and competition, many CEE countries, particularly Hungary and the Czech Republic, engaged in what was perceived by many as environmental retrenchment. The kinds of legal and regulatory regimes that drive the environmental technology markets in the West were only beginning to be put into place; their enforcement then and now remains spotty. And even where the regimes and enforcement capacity were more robust, the need to maintain jobs often took precedence among the new governments in the region.

Since demand for environmental services and technology and output of local environmental industries are dependent upon policy development and changes in attitude of operating companies, CEE countries are only beginning to demand environmental technologies and services of the type which are standard in Western Europe and the U.S. Nevertheless, increasingly throughout the region, privatization has brought with it an enhanced awareness of the need to operate in an environmentally sound fashion -- in many instances, that attitude having been instilled by Western partners and investors. The level of sophistication in the environmental arena is growing, particularly with respect to knowledge of the environmental effects and trade-offs produced by various types of industrial activities and public policy choices. So, while any large-scale environmental industry or a comprehensively enforced regulatory regime will take a number of years to mature, the potential for environmental improvement is great.

In part, the increased business receptivity to environmental improvement must be

attributed to improving economic conditions. In some of the CEE countries, notably the Czech Republic and Poland, the GDP has turned upward and output is expanding. Improved economic conditions will enhance the prospect of greater demands for environmental improvement. The programs of donor countries through programs like the USAID-sponsored CDI have also played an important role in assisting the "infant" environmental industry in Central and Eastern Europe toward increased awareness of environmental business opportunity, of U.S. environmental technologies and services that might be appropriate for local application, and of ways to work with local industry and governments that are potential buyers of these goods and services.

Programs like CDI have also enhanced the prospects for U.S. firms to decide to invest in Central and Eastern Europe because they have provided a vehicle for improved American familiarity with the region. This familiarity, along with an increasing external perception of stability in the governments of the more advanced states, such as the Czech Republic and Poland, should result in greater participation by a variety of international firms in developing business in the region overall.

The most salient point to be stressed about making environmental improvements in Central and Eastern Europe, based on the CDI experience, is that environmental progress is made, primarily, one project at a time. Sweeping legislation and reform can be implemented, but environmental pollution sources are altered case-by-case; therefore, donor strategies for development and improving the environment must recognize local concerns and the often halting efforts of newly democratic electorates in these

emerging market economies which will determine how and at what pace these changes are made. Accordingly, the overall infrastructure as well as individual project development process is slow and protracted, and continued successful donor support must be characterized by continuity, long-term commitment, and patience.

In the waning days of the CDI Environment Subcomponent, contractor staffs reported a marked increase in business activities, particularly in Poland and the Czech Republic. Consequently, the program ends on the "up-swing," as evidenced by increased U.S. Government support for CEE business development and steadily growing interest in the region in doing business with Americans.

II. CDI ENVIRONMENT SUBCOMPONENT GOALS, STRUCTURE AND OPERATIONS DEVELOPMENT PROGRAM

A. CDI Environment Subcomponent Goals - Our Mission

From the outset, the primary and enduring goal of the CDI Environment Subcomponent has remained to help CEE countries ameliorate serious environmental problems in priority areas by:

- assisting in developing and financing locally-defined environmental infrastructure projects; and
- facilitating development of an indigenous environmental technology and service sector through formation of sustainable business relationships between American and local environmental firms.

To support this regional environmental business development, the CDI Environment Subcomponent staff has provided logistical and informational assistance to U.S. environmental companies desiring to invest or work in the region. As the program has progressed, finding financing to enable these investments has materialized as a critical need and, therefore, as a priority program objective. This situation was not improved by the discontinuation of the grant program in mid-1993.

Since the redirection of the overall CDI program in mid-1993, providing policy and planning assistance to all levels of government in the region was also identified as a discrete objective. And in the last year of the program, positioning on-going

projects to enhance their chances for continued development after the CDI program is completed was emphasized.

B. CDI Environment Subcomponent Organizational Structure

1. CDI Environment Management Structure

The CDI Environment Subcomponent is unique in its structural organization. From the outset, Sanders' proposal envisioned local offices in addition to the hub in Warsaw, with local offices in Prague, Bratislava and Budapest. Sanders International's proposal included this option, based on our belief that environmental business would be done in Central and Eastern Europe as it is done in the U. S. -- at the local level.

USAID initially planned that all of the CDI program activities for the region would be run out of Warsaw. In addition to the Polish regional office, the CDI Environment Subcomponent management (the Project Officer at USAID and the Project Manager from Sanders International) elected Hungary because it was considered more advanced in business development than most other countries in the region. Czechoslovakia was chosen because already privatization was well along and its economy appeared relatively stable, even though the peaceful severance of Czechoslovakia was at hand. Following the break-up, a local Sanders office was established in Bratislava, in addition to the Prague office established earlier.

The CDI Environment Subcomponent regionally was directed by an American Regional Business Development Officer

(RBDO) located in Warsaw, and staffed in each local office by a combination of local and U.S. Country Business Development Advisors (CBDA). The RBDO and Project Manager selected local staff and established the CDI Environment Subcomponent in-country offices:

- Warsaw - May, 1992
- Prague - November, 1992
- Budapest - March, 1993
- Bratislava - January, 1994

Overall management of the CDI Environment Subcomponent rested in Washington, D.C. with the Project Officer at USAID and the Project Manager at the Sanders International Headquarters office. Over the life of the project, the Project Manager and RBDO travelled regularly to the local offices to provide management advice, business oversight and on-site project analysis. From time to time, the RBDO travelled alone to address a specific need, or to represent the program where there was no CDI office, the case in Slovakia until the beginning of 1994. Over time as the CBDAs were identified and became experienced, this regional function by the RBDO became less important; the RBDO retired on schedule at the end of Year Two. A single project in Bulgaria was staffed from Washington, D.C., CDI/Headquarters staff.

Overall program administration, including the preparation of a variety of regularly-scheduled reports, was done through the CDI/Washington, D.C. Headquarters office of Sanders International, Inc., and the Project Manager worked out of that office. The Headquarters office developed a database of U.S. companies which expressed interest in the program; provided

information in response to inquiries; and maintained project files consisting of reports and information supplied by the local offices.

2. CDI Environment Staff

The CDI Environment Subcomponent local staff were the key to its success. Local offices allowed the CDI Environment Subcomponent to react to national differences in culture, language, and business custom. On the business side, in-country environmental personnel were familiar with area institutions and customs, and were able to network with local firms, agencies, and individuals to identify opportunities with high potential for successful project development. Their American counterparts understood the needs and approaches of U.S. business and the nature of the environmental regulatory and technology milieu in which they operate in the U.S. From the environmental perspective, all had environmental backgrounds and training.

This combination of environmental skills and bi-cultural business awareness allowed the staff to bridge cultural differences and establish the critical relationships with local businesses and agencies, as well as with potential U.S. investors and technology vendors, necessary to developing successful business partnerships. An important legacy of the CDI Environment Subcomponent will be its contribution to enhancing the local capability to evaluate and structure environmental business projects. The CDI Environment Subcomponent local-citizen personnel represent a concrete capacity to establish sustainable business linkages because they can provide a resident ability

to understand and work with future U.S. and other foreign investors after CDI.

C. CDI Environment Subcomponent Activity Elements

Initially, in conjunction with the other CDI subcomponent groups, three activity elements were identified for the operations and reporting of the CDI Environment Subcomponent:

- **stimulating awareness/information dissemination;**
- **developing projects;**
- **coordinating and cooperating with other government programs.**

After the program was redirected in mid-1993, a fourth category was added:

- **providing policy assistance/institutional support to local governments and agencies.**

The CDI Environment Subcomponent activities and accomplishments, discussed in Section III, are organized according to these elements, which are briefly defined below.

Initial emphasis was on **outreach, "getting the word"** out about the program through mailings, referrals, conference participation, and visits to multiplier groups such as trade associations and governmental forums.

The **coordination/cooperation** activity was identified to ensure that CDI would explicitly recognize and afford itself the benefits of the activities of related U.S. and multi-national projects operating simultaneously in the region. The goal was to

obtain the benefit of any additional, available resource for CDI project development, and to make CDI resources available to others where useful and appropriate.

As a result of the formal redirection of CDI during Year Two, providing local assistance for **environmental policy and institutional development** was made an explicit CDI Environment Subcomponent objective. Given that many environmental projects within the purview of the CDI program, including water supply, waste management, and wastewater treatment remain in the public domain in many places in the region, the CDI Environment Subcomponent from the beginning worked in the public sector, where policy concerns and institutional constraints have a very direct bearing on project development success. Following redirection, the CDI Environment staff increasingly offered assistance to national agencies in the form of information about regulatory approaches in the U.S., information on technologies under consideration for funding, and introductions to representatives of external financing groups.

But the vast majority of CDI Environment Subcomponent emphasis and resources were allocated to the **project development** element, the other three being subordinate and contributory to making environmental investments, business ventures and infrastructure projects happen.

D. CDI Project Development

Developing projects was the heart of the CDI Environment Subcomponent charge and mission. It is important therefore to understand what the term "project

development" means in the context of the CDI Environment program. As the program evolved, a wide array of business and policy relationships were exemplified by our projects. These included:

- structuring the conventional business deal - joint venture or investment - between two private partners to collaborate in production or marketing;
- facilitating agreements between a U.S. firm and a local public company or government body (usually a municipal agency) to undertake some type of infrastructure improvement; e.g., build a wastewater treatment plant;
- providing information and experience-based advice to a policy or financial body to make institutional improvements that would contribute to subsequent environmental business development activities; e.g., developing recycling regulations; and
- assisting local firms and agencies in identifying U.S. technologies for export.

1. Development Obstacles

Based on our prior experience in the region, we knew from the outset that, despite widespread interest on the part of U.S. companies, developing environmental projects in the CEE market would be difficult because of economic and political problems there. We predicted that the gestation period for project consummation would be lengthy, i.e., eighteen to twenty-four months; and that many seeds sown by the CDI would not sprout or become full grown during the term of the contract. In reality, the process for finding projects that

were financially viable and partners who could come to accord was even more difficult and attenuated than expected.

Even with willing partners and a good idea, the difficulty of finding project financing (from domestic and external, public and private sources) proved substantially greater than initially anticipated. We attribute this to three factors:

- the special characteristics of environmental projects, many of which by their nature are not revenue-producing;
- the virtual absence of project funding through foreign aid programs (despite widespread representations to the contrary) whose internal guidelines and procedures generally prevented making loans or grants for the smaller projects appropriate to the need and the economies in the region; and
- the inexperience of local entrepreneurs in providing basic business information, such as business plans and budgets. In addition, direction by USAID for the contractor to emphasize infrastructure projects, to assist small to mid-size U.S. firms, and to concentrate on investment (as opposed to export), almost certainly limited the types and numbers of potential project opportunities the CDI Environment Subcomponent was able to consider.

Similarly, the process of CDI environmental project development turned out to be neither as straightforward nor as procedurally predictable as the originating documents for the CDI Environment Subcomponent program would have suggested. Matching

two potential partners or sending in a "short-term technical team" to do technical and financial analysis prior to developing an "engagement action plan" (as outlined in the original proposal), proved to be oversimplified concepts when compared to the reality. Unexpected resistance among the "players" proved to contribute greatly to delay and defeat.

Local officials and entrepreneurs were often skeptical of efforts to introduce U.S. business and technologies. They were especially wary of the innovative and simpler technologies that frequently fit their present needs and pocketbooks, for fear these would not work or would not meet European Union (EU) standards, which are held as the de facto environmental performance goal throughout the region.

On the U.S. side, there was considerable ignorance about the operative business and social cultures and the impressive technical skills available in CEE countries. Business representatives were often naïve about the availability of project funding from the U.S. or other sources. They were in many cases impatient, failing to establish the essential working relationships that are required to do business at home. They did not calculate the importance on the demand side of the absence of robust environmental regulatory and enforcement regimes. And too often, their commitment was too short-term to produce eventual partnerships.

2. Technical Assistance Realities

Accordingly, the transit of a viable project down the development road was neither an efficient nor a linear process, thus creating the lengthy gestation period previously referenced. A great deal of redundancy was

required in the relationship-building part of the process, and certain activities could reappear at any step. Typically, basic communication in the form of meetings, calls and correspondence with potential partners, investors, officials, and other interested parties had to be repeated all along the way.

The nature of the technical assistance the CDI Environment Subcomponent in fact required was considerably different from that originally envisioned. Technical teams were not requested to go to the region on the scale initially projected. The regional staff were able to perform the function of technical project screening completely, routinely and effectively with very little help from U.S. technical experts.

What proved to be more important was having access to the U.S. technical expertise to properly assess and frame an opportunity or potential business arrangement. Subcontractors in the U.S. most often were assigned to do analyses intended to clarify and focus local needs and requests identified by the CBDAs and to provide information on candidate U.S. technologies and vendors.

Project development was supported by research in the U.S. and locally to gather information on global competition, markets, technology and firm reputation. Some of this was "paper" research; other projects required a technical team to go into the region to evaluate the market, the business viability of the local facility or firm, and the appropriateness of proposed technologies, and to meet with regulatory officials and financing sources. As a project matured, CDI Environment staff often participated with project partners in strategic planning to identify and respond to bureaucratic

impediments; to verify technologies in response to the criticisms of competitors or detractors or to reassure regulators; and to make sure that all necessary "bases were touched" to ensure project consummation.

3. Streamlining Project Development

Given the relatively short duration of the CDI program and the multi-year time frames potentially required to conclude most projects, the CDI Environment Subcomponent staff did two things to satisfy the need to quickly identify and separate for action "high-potential" opportunities. First, CDI Headquarters staff developed a six-step "Environmental Project Development Process" for identifying and tracking projects and deciding where to invest resources. This process elucidates and measures program support activities and achievements along a continuum which spans the distance from outreach and initial contact; through project identification and development, including development milestones measured by some type of formal agreement; to actual project operation/implementation, elimination or failure.

The "Environmental Project Development Process" provided a kind of process diagram which allowed for consistency in operations among the regional offices, and served as a teaching guide for new staff. It is outlined and described in Table 1. Its implementation is illustrated in the project case studies in Annex A.

The second major streamlining activity occurred in the first quarter of Year Two, when the first of three regional meetings was held where all CDI regional staff and the Project Manager came together to

discuss their experience and progress to date. In addition to developing synergies and enhanced working relationships, the meeting produced the identification of four "environmental target categories," which were reflective of the collective staff experience. These were:

- innovative wastewater treatment for smaller towns;
- municipal waste management and disposal;
- recycling -- waste-to-energy and waste-to-product;
- surface soil and water remediation.

These categories were utilized for the remainder of the CDI Environment Subcomponent Project to prioritize project opportunities, to enhance regional project coordination, and to organize reporting. A discussion of the overall development of projects in these target categories is provided in Section IV of this report. Each individual country report contains a simplified project identification matrix organized by target category, and a series of representative project summaries illustrative of the kinds of projects developed in these categories in the four countries where CDI had in-country offices.

Table 2

The CDI "Environmental Project Development Process"

Step 1: Outreach and awareness

- Undertake mass mailings to firms, trade groups, government agencies.
- Attend/participate in environmental conferences.
- Publicize/advertise in Government publications.
- Respond to referrals, walk-ins.
- Sponsor business seminars.

Step 2: Profile and screening - Phase I

- Hold initial meetings - introduce CDI services and discuss needs or interests of prospective clients.
- Schedule follow-up meetings - get additional information and an indication of continuing interest from prospective client.
- Undertake base-line due diligence - get information to test firm or opportunity against the initial screening criteria:

CEE firm or opportunity:

- environmental priority locally
- financing/funding availability
- economic and technical viability
- availability/competitiveness of U.S. technology

U.S. firm:

- size and finances for international business
- prior international or regional experience
- genuine interest based on having identified geographic and business targets
- travel or presence in the region
- technologies suitable for region

Step 3: Profile and screening - Phase II

- Develop description of local opportunity or U.S. investment interest.
- Identify and screen potential partners.
- Initiate meetings to describe investment to interested parties.
- Assess potential for getting project financing.

Step 4: Project definition and active development

- Continue follow-up contacts with interested parties.
- Develop detailed descriptive materials about investment opportunity, investment interest, and technology.
- Present materials to potential partners targeted in earlier steps.
- Help U.S. firms tailor technology and business objectives to meet CEE needs.
- Help CEE firms understand potential U.S. partner's objectives and concerns.
- Arrange and oversee preparation of feasibility and marketing studies, business plans, technology needs assessments by U.S. short-term technical and financial experts.

Step 5: Advanced technical assistance

- Facilitate communications between prospective partners.
- Set up interviews and meetings for the principals with necessary third parties such as local and U.S. Government officials, lending or funding institutions.
- Locate local professional services to develop a business plan or market assessment suitable for review by a lender, to do an environmental due diligence audit, or to provide local counsel.
- Facilitate negotiations to achieve letter of intent, memorandum of understanding, joint venture contract, licensing agreement.
- Facilitate loan and local permit applications.

Step 6: Projects underway and operating

- Assist in start-up details as requested.
- Publicize project success.
- Determine project value.

III. PROJECT ACCOMPLISHMENTS

The prior Section provides the context for review of the CDI Environment Subcomponent activities and achievements. This Section provides a summary and compilation of overall efforts and accomplishments of the CDI Environment Subcomponent.

The first two subsections of this Section address the CDI outreach and project development activity elements. Table 3, which follows Section B, provides an aggregate of the quantitative measures developed to reflect the scope and level of accomplishment of our outreach and project development efforts in the four countries with CDI offices. This Table is arranged to reflect the steps in the Project Development Process detailed in Table 2 in the prior Section.

The most quantifiable specific project accomplishments and impacts are summarized in the Project Matrix in the Executive Summary to this Report. Projects are discussed by environmental target category in Section IV following. Project case studies which demonstrate the project development process are provided in Annex A. Selected individual project summaries are provided in the country sections in Annex B.

The success of the coordination/cooperation and policy/institutional support elements must be evaluated on a qualitative basis. These elements are discussed in the last two subsections of this Section. Cooperative efforts and collaborative organizations are enumerated. Policy/institutional support projects are described. In both cases an assessment of their value to specific project development or to projects in the environmental target categories emphasized

by the CDI Environment Subcomponent is offered.

An enumeration of specific firm and agency contacts undertaken by each CDI Environment Subcomponent office is provided in the CDI Environment Subcomponent "Annual Report, April, 1993 - June, 1994," on file at USAID in Washington, D.C. and at the USAID Mission offices in Warsaw, Prague, and Bratislava.

A. Stimulating Awareness/ Information Dissemination

The Environment Subcomponent strategy in Year One was to advertise the CDI program in the U.S. and CEE:

- to build a network of business and institutional (governmental, financial) contacts to establish a "critical mass" of interested parties;
- to identify the players with greatest potential; and
- to provide the daily support services necessary to developing successful environmental business investment projects.

As outlined in **steps one and two** of the Project Development Process, our strategy was to identify and target as quickly as possible those firms locally and in the U.S. with the genuine interest and ability to actually produce a viable business agreement. Initial contact with firms and agencies interested in the CDI Environment Subcomponent was accomplished in several ways: mass mailing announcements; personal contacts with persons and firms sought out by the staff or referred to us; and contacts with relevant agencies and associations, especially at the local level.

The **Washington Headquarters** office initiated the project with a mass mailing to **1000 U.S. environmental technology and service firms** with revenues in excess of \$5 million, drawn from the Corporate Technology Directory ("CorpTech"). Including follow-up with the close to 100 firms which responded favorably to the mass mailing, CDI Environment Headquarters staff worked on a repetitive basis with representatives of about **200 U.S. firms**.

The regional offices followed a mixed strategy for "getting the word out" about CDI. The residence of Country Business Development Advisors (CBDAs) in Poland, Hungary, the Czech Republic, and Slovakia provided greater reach and practical support for interested firms in the region. The **Warsaw** office relied on a substantial network of personal contacts of the RBDO and CBDA and on referrals, which produced initial contacts with some **400 local firms**, and **more than 150 U.S. firms** actively interested in Poland. Also as a result of personal contacts, relationships were established in **31 of 49 Polish voivodeships** (equivalent to states in the U.S.).

In the **Czech Republic**, initial contact was established with over **160 local firms** and **125 local organizations** through mass mailings sent to local and regional boards, and advertisements through the Association of Ecological Producers and the Czech Ecological Management Center. This helped produce long-term relationships with **more than 30 interested local firms** and **some 30 U.S. firms** in the Czech Republic.

In **Slovakia**, program information went to **about 160 district and subdistrict environmental offices** and to **180 private firms and state companies**. In **Hungary** through personal contacts, the CBDAs established working relationships with **more**

than 30 agencies below the national level to generate project leads.

All of the offices took advantage of seminars and conferences, where in many cases they were included in the program, to introduce CDI. The Washington Headquarters staff was represented at **15 major conferences**, including the Water Environment Federation, the Aspen Institute conference on CEE environmental finance in Berlin, and a number of privately sponsored conferences.

In addition, regular announcements of local opportunities were provided to the Department of Commerce, Eastern European Business Information Center (EEBIC), for publication in Eastern Europe Looks for Partners. CDI Headquarters co-sponsored **two briefings for interested business people** in conjunction with the Department of Commerce and USAID. Finally, the Project Manager participated in a State Department-sponsored tour of four U.S. cities to describe the program.

Altogether **regional personnel** attended about **30 formal environmental conferences**. Several CBDAs joined local business organizations, such as the Rotary Club and U.S. Chamber of Commerce.

This combination of efforts produced **contacts with nearly 1200 U.S. firms** at home and working in Central and Eastern Europe, and with **more than 750 CEE public and private companies**. A critical mass of people with continuing interest in the program was identified, which resulted in identification by the **end of the first year of approximately forty extremely promising project leads**.

B. Developing Projects

If priority in Year One was on organizing, advertising and identifying promising projects, in Year Two our strategy was to concentrate on those promising leads identified and developed in Year One and to generate new leads. There was less emphasis overall on outreach, although in Hungary and Slovakia, advertising CDI and making initial contacts continued to be needed to generate project leads.

Early in Year Two, USAID decided to focus entirely on local interests and opportunities to define priorities and direction. As a result of these outreach and coordination efforts and the initial contacts they produced, **more than 130 CEE firms and agencies region-wide and 350 U.S. firms received follow-up** attention and project development assistance as defined by **steps two and three** of the Project Development Process.

We spent greater effort evaluating projects and introducing local firms and agencies to U.S. companies new to and already in the region who had made a commitment to doing business there. In addition, we provided support to U.S. companies offering environmental goods and services as a prelude or investigatory step to ultimately doing an investment deal.

Assistance at this stage was aimed at clarifying whether a project could be defined and productively pursued. As outlined in **step three** of the Project Development Process (Table 2), activities generally included: additional meetings to become more familiar with the client's needs, business or product; identification and introduction of potential partners; and preliminary assessment of the project's financial prospects and ability to conform to

local regulatory requirements and environmental priorities.

By the middle of Year Two, the number of **potential projects that were defined and under active development at any one time grew to between 50 and 60**, where it remained throughout the rest of the program. During the life of the Program, **103 defined projects** moved to **step four**, the major "cut point" of CDI Environment Subcomponent technical assistance, where clients and opportunities were transformed into discrete projects with serious and demonstrable potential for business development. It is at this step that the bulk of activity, particularly in the second half of Year Two and in Year Three of the CDI Environment Subcomponent program, was directed.

CDI projects reaching this stage were regularly tracked and managed using a "Project Development Matrix," which was regularly updated to reflect additions, deletions, and developments. The 103 projects which reached step 4 are summarized in project matrices which appear in each of the Individual Country Reports in Annex B.

Of the clearly defined projects, **about one-third matured** to the point of advanced assistance from the CDI Environment Subcomponent staff in terms of providing special technical assistance, locating funding, doing more in-depth due diligence on partners, i.e., activities outlined in **step 5** of the Project Development Process.

One measure of the effectiveness of the CDI Environment Subcomponent is the number of "deals" or formal transactions it can credit to these development support efforts. To date, more than **twenty projects** have

reached a stage where some type of **legally cognizable agreement** between partners has been achieved. These ranged from relatively simple letters of intent and memoranda of understanding all the way to **four completed joint ventures**.

Fifteen projects (see **Table 1 in the Executive Summary**) reached a level of being **"operational" or "underway."** We fairly narrowly circumscribed this category, requiring that there be activity beyond a commitment or even an agreement to collaborate. These projects reflect a level of development, for example, where construction was begun, products were being actively sold, or pilot/demonstration projects were underway. (Policy and institutional support successes were not counted in this category, which was restricted to commercial projects.)

**Table 3
ACCOMPLISHMENT SUMMARY**

Categories	Poland	CFR	Slovakia	Hungary	US/HQ	Total
A. AWARENESS BUILDING						
Initial Contact (Step 1)*						
- Local Firms	400	160	180	24	1000	> 750
- U.S. Firms	150	40	8	14	1000	> 1200
- National gov't contacts	11	16	12	14	8	61
- Local gov't contacts	31	125	159	30		≈ 350
- Financial Institutions	9	6	4	2		31
Conferences	6	11	7	5	15	39
EELP	22	8				30
B. PROJECT DEVELOPMENT						
Beyond Initial Contact (Steps 2 & 3)						
- Local Firms	80	30	8	18		> 130
- U.S. Firms	110	30	8	2	200	350
Projects Defined & Under Active Development (Steps 4 & 5)	60	17	14	12		103
Projects Operational/Underway (Step 6)	10	2	1	1	1**	15

*See Environmental Project Development Process - Table 2 - for more details about each step.

**Visitor Center in Vitosha, Bulgaria was developed by HQ.

C. Coordinating and Cooperating with Other Government Programs

The CDI Environment Subcomponent staff in the field and at Headquarters took active advantage of the benefits offered by other U.S. Government-sponsored environmental programs, of the potential development support available through local government agencies and of the financing opportunities offered by local, private, bi-lateral and multi-lateral institutions. These resources were tapped and directed toward three basic ends: information exchange, project finance, and future project sponsorship.

1. Information Exchange

The CDI Environment Subcomponent utilized the presence of other U.S. Government-sponsored programs in Central and Eastern Europe both to broaden the information flow about the availability and activities of the program and to provide support for project development. Specific agency contacts are listed in the previously referenced CDI Environment Subcomponent "Annual Report, April, 1993 - June, 1994." The following summarizes those activities.

Several Department of Commerce programs were valuable for disseminating information and obtaining leads to potentially interested U.S. firms. The CDI Environment Headquarters staff utilized the Eastern European Business Information Center (EEBIC) to collect information about U.S. firms. The regional offices regularly submitted announcements about promising companies looking for partners for notice in EEBIC publications. The regional offices also worked with the in-country representatives of the Foreign Commercial Service (FCS).

For information exchange about other U.S. Government-sponsored projects in the region, local CDI Environment staff and the Project Manager early on utilized the Regional Environment Center (REC) in Budapest, and Washington staff regularly communicated with the World Environment Center (WEC) staff in Washington and New York. Following a meeting of all USAID and U.S. Environmental Protection Agency (USEPA) CEE environmental contractors in August, 1992 to improve coordination, the CDI Environment Headquarters staff published four monthly installments of the "CEE Environmental Report," which provided summaries by country of project activities, upcoming events and meetings of general interest, and projected travel schedules for agency officials and contractors. The newsletter was well received, but was discontinued because it was determined to be out of the scope of the contract.

USAID's Environmental Training Program provided a source of information about local entrepreneurs who might benefit from CDI, and also allowed CDI Environment staff to contribute their environmental experience as teachers in several instances. The USAID-sponsored regional advisors, Sandy Hale and Ken Macek, provided valuable leads, project development support and administrative advice. In addition, the REC in Budapest and the multi-lateral Environmental Action Program proved also to be good sources of information and assistance to the CDI Environment Subcomponent.

In the region, local CDI Environment Subcomponent staffs established relationships and met frequently with ministries and agencies at all levels having jurisdiction over environmental matters. Numerous contacts were required since typically multiple

agencies are charged with responsibility for various aspects of environmental protection. This proved to be helpful in disseminating information about the CDI Environment Subcomponent program.

Where such contacts were perhaps most valuable was in providing information about policy trends and decisions that could affect the chances for specific projects. The Warsaw office made impressive strides in establishing working relationships with more than half the voivodeships in Poland, which allowed them to "troubleshoot" on several projects, especially in the Katowice region, where politics posed obstacles. In the Czech Republic, the Czechoslovak Association of Towns and Villages was consistently helpful in directing our efforts to introduce innovative wastewater treatment. Also in the Czech Republic, close staff attention to quickly changing activities of the Czech Property Fund provided a basis for making decisions about the potential for developing successful remediation projects.

2. Financial Support

From the beginning of the CDI program, it was clear that the "deal-breaker" for project development would be finance, especially for the Environment Subcomponent, because many needed projects, such as air pollution control or site remediation, are not income-generating by nature, and infra-structure projects are very costly for new and generally poor governments. The Cost Support Fund, one of the original four subcomponents, was intended to help address financing needs. In addition to working with the Cost Support Fund contractor, the CDI Environment Headquarters staff concentrated on developing relationships with multi-lateral

and bi-lateral financing institutions, particularly the U.S. Trade and Development Agency (TDA), the Overseas Private Investment Corporation (OPIC), the International Finance Corporation (IFC) and the World Bank, in an effort to improve project funding possibilities. In addition, Headquarters staff met with intermediary business groups, including trade associations, law firms, and state development agencies, to develop broader interest in the CDI Environment Subcomponent and as a means to identify potential U.S. technologies and investors.

Regional staff devoted a great deal of effort to establishing relationships with national financing institutions, particularly local environment funds and banks. In Poland, the National Fund of Environmental Protection and Water Management (the "National Fund") has impressive political power and increasing wealth from the collection of environmental fees and fines. Over time, the Fund and its consulting arm, Eko-Efekt, proved instrumental in creating the local cooperation and in locating financing for CDI Environment Subcomponent-sponsored projects involving PET bottles, biobriquettes and waste management.

In the Czech Republic, great attention was paid to the local banks, including the Czech Moravian Guarantee Bank and the Czech State Savings Bank, which emerged during the life of the CDI Environment program as instrumental sources of funding for wastewater treatment projects, the overall priority of the Prague CDI Environment staff. In addition, the Prague CDI Environment staff established an important relationship with the USAID-sponsored Municipal Infrastructure Finance Program, which was working in larger towns and cities and became an ally in offering

financial planning assistance to smaller villages and towns.

Local and international venture promotion groups were also a target for the CDI Environment Subcomponent regional staff. CARESBAC-POLSKA, a Polish venture capital group, was consistently interested in CDI Environment projects. Representatives of U.S. venture capital firms, including Crimson Capital, Fieldstone, and First Analysis of Chicago, met regularly with CDI Environment resident staff to review promising projects identified by the CDI staff and to review financing criteria for project support.

Finally, all resident CDI staffs met with the U.S.- sponsored American Enterprise Funds designated for each of the countries in which they were located. The closest association was with the Slovak-American Enterprise Fund, where two years of effort went into trying to finance a tire recycling project (see Annex A - Tire Recycling Case Study), which eventually failed because the Fund determined it to be too large and too risky. In Poland, the CDI Environment Subcomponent staff worked with the Environmental Enterprise Assistance Fund (EEAF) to evaluate projects for possible finance.

3. Locating Future Sponsors

For the three CDI Environment Subcomponent offices operating at the end of the contract, Poland, Czech Republic and Slovakia, finding future mentors to sponsor projects beyond the termination of the CDI Environment Subcomponent became a priority in the final year of the contract. The Warsaw office spent considerable time working on project development with the Eastern European Environment Program

(E3P) of the Department of Commerce by participating in seminars and cooperating in developing recycling projects with the National Fund of the Environment. The CDI Environment staff in Warsaw also dedicated a significant amount of support to the efforts of the Environmental Action Program (EAP) to identify and evaluate viable projects consistent with EAP priorities.

In Slovakia, the USAID-sponsored MBA Enterprise Corps assisted in preparing business plans for at least two local projects. The Municipal Infrastructure Finance Program in the Czech Republic has been mentioned in conjunction with efforts to find financing sources for wastewater treatment projects, and it is hoped will provide continued support to CDI Environment for these ongoing projects. Work on recycling projects of interest to the Czech Energy Agency (CEZ) and on risk assessment and remediation issues of interest to the Czech National Property Fund was intended in part to ensure a continuing public-sector sponsor for those projects.

D. Providing Policy Assistance/ Institutional Support

Early in the course of the operation of the CDI Environment Subcomponent, it became clear that there remained many institutional and legislative barriers or gaps which retarded the development of certain environmental business sectors. So, policy and institutional support was provided as an integral part of CDI Environment Subcomponent assistance in specific instances, e.g., paper recycling, fly-ash management, hazardous waste incineration in cement kilns, tire recycling.

When the CDI was redirected, offering more explicit institutional assistance where the lack of local experience with environmental regulation was creating a barrier to environmental project development became a priority. The three examples below highlight areas where the most extensive policy and institutional support was provided by the CDI Environment Subcomponent. In addition, CDI Environment staff worked with a large number of local officials on specific transactions, thereby building local understanding of project development needs.

1. Polish National Fund for Environmental Protection and Water Management

The Polish National Fund is very active in funding environmental business development projects. Recognizing their importance, the CDI Environment Warsaw and Headquarters staffs made a point of establishing professional ties with the Fund, and in the course of the program provided two kinds of assistance to the Fund: ongoing, "on-call," advisory support and help to the Fund in building its professional capabilities.

For the first, CDI Environment staff helped the Fund identify high quality projects and introduced local and American companies with viable projects to the Fund on a regular basis. Local CDI Environment Warsaw staff were available to the Fund to serve as project evaluators or to facilitate contacts.

In order to help the Fund build its capability to develop and evaluate projects, CDI Environment Headquarters staff arranged several training opportunities for Fund staff. They helped the Fund establish a relationship with the International Finance

Corporation, which sponsored employee-training programs of interest to the Fund. The CDI Environment Headquarters staff also submitted to the Fund a proposal to work with Eko-Efekt to strengthen Fund capability in preparing business plans and feasibility studies. The Harvard Institute for International Development (HIID) staff in Warsaw is following up.

In addition, Headquarters staff proposed recommendations to develop approaches to provide credit enhancement (collateral) on projects which could not otherwise be financed. Finally, CDI Environment Headquarters staff located and arranged for Fund staff to be received by several major U.S. producers of environmentally responsible food-packaging materials. Unfortunately, Fund personnel were ultimately unable to visit the U.S. for those introductions.

2. The National Property Fund of the Czech Republic

Perhaps the greatest problem and ferment in the environmental legal systems in CEE countries relate to liability for clean-up of past pollution. The Czech Republic has been fairly advanced in responding to this problem in comparison to other CEE countries, primarily due to USAID assistance vis-a-vis a USEPA advisor to the Ministry of Environment, Jim Scherer, who worked with the Czech Ministry of the Environment in establishing a privatization liability program.

As it stands today, the Czech Republic's system calls for a risk-based evaluation of environmental damages. This evaluation is to be used to decide on the reimbursement of money for environmental clean-up at newly privatized facilities. The Czech

Property Fund estimates it will cost more than 30 billion Crowns (in excess of one billion dollars) to clean up properties privatized in the second wave of Czech privatization. The country, quite simply, does not have enough money to cover all of its clean-up costs, and therefore faces difficult choices in allocating scarce resources.

Responding to a request from the National Property Fund of the Czech Republic, the CDI Environment Subcomponent Project Manager conducted a two day seminar on risk assessment by using an actual property transaction risk assessment as a case study. The goal of the assistance was to introduce the fund to a mechanism for evaluating risk, and to raise their awareness about making decisions for allocating scarce resources for clean-up.

3. The Bulgarian Ministry of the Environment

At the request of USAID Bulgaria and the Bulgarian Ministry of the Environment, the CDI Environment Subcomponent created a business development plan to promote ecotourism in the Vitosha National Park near Sofia. The plan addressed long-term development, including building a visitor center and converting existing structures to small tourist-oriented businesses.

The CDI Environment Headquarters staff helped a local consortia of businesses, the park authorities, and the Ministry of Environment to evaluate the following issues:

- Who had land use rights over the property;
- What were legal barriers to development;
- What types of business interested locals; and
- What were the market conditions for developing the property?

CDI Environment staff undertook an informal survey in the U.S. of firms which typically provide tourism-related services in parks and recreation areas to get information and to determine whether some of these might be interested in investment in Bulgaria. Finally, they recruited and sent a business intern to the region for two months to complete a market survey and assist in identifying possible local investors and operators for the facilities.

During the fall of 1994, the CDI Environment Subcomponent Project Manager presented a completed business plan to the Ministry of Environment, potential local investors and officials from Vitosha and Sofia. The plan identified the types of businesses most likely to be viable at this stage of development, and the steps to financing a visitor center. The Peace Corps, Small Business Development program and University of Delaware, operating in Bulgaria, agreed to provide continuing support for the project. When the CDI Environment Subcomponent ended, several local investors were pursuing the project.

IV. OVERVIEW OF PROJECTS BY ENVIRONMENTAL "TARGET CATEGORY"

Early in Year Two, CDI Environment Subcomponent staff identified **four major target** areas where it appeared assistance could contribute the most to successful project development:

- **innovative wastewater treatment for smaller towns;**
- **municipal waste management and disposal;**
- **recycling -- waste-to-energy and waste-to-product;**
- **site remediation.**

These groupings proved important, for management as well as project development, because they allowed greater resource focus, better coordination among staff in different countries, and greater realization of the synergies of the collective experience of program personnel. It was possible, for example, to send technical assistance experts to more than one country where similar projects had been identified with similar development needs.

In several cases, efforts to assist development in a geographic region or within an industry sector generated or are expected to spawn several additional projects. Indeed, as specific projects came to fruition and provided first-hand demonstration of the operational capabilities of technologies, follow-on projects mimicking the first began to spring up. The possibility of a kind of "geometric progression" in project development based on demonstrated success guided project

selection and technical assistance in the final year of the CDI Environment Subcomponent.

The following discussion of project development within each of these target categories describes the overall shape of the CDI Environment Subcomponent technical assistance program. It provides a context in which to consider the "lessons" discussed in Section V, following, and it is hoped reflects experience which may be useful in facilitating similar environmental business development efforts in the future. The project matrices and project technical assistance summaries in Annex B provide additional detail and are organized to correspond to these same four target categories. Table 4 provides a numerical summary of projects by target category and country. It should be explained that the Warsaw office produced the most activity because it was larger, in operation longer, and working with the largest market.

1. Innovative Wastewater Treatment

Background

Water distribution and wastewater treatment are typically being decentralized through local government ownership and management. Some efforts are being made to privatize these systems, but so far limited progress has been made. This is partly due to the limited ability of local governments to manage and finance the large investments required and partly due to the lack of clearly defined rules for how public or private systems will be managed and how revenue streams will be guaranteed. There is also political reluctance to raise user fees to anywhere close to the rate levels necessary to cover even operating costs.

TABLE 4

PROJECTS BY TARGET CATEGORY

	WATER/WASTEWATER TREATMENT	= 26
Czech Republic	6	
Slovakia	6	
Hungary	6	
Poland	8	
	WASTE MANAGEMENT	= 23
Czech Republic	4	
Slovakia	3	
Hungary	-	
Poland	16	
	RECYCLING	= 20
Czech Republic	3	
Slovakia	2	
Hungary	4	
Poland	11	
	SITE REMEDIATION	= 14
Czech Republic	3	
Slovakia	-	
Hungary	2	
Poland	9	
	MISCELLANEOUS	= 16
Czech Republic	-	
Slovakia	3	
Hungary	-	
Poland	13	
	AIR	= 4
Czech Republic	1	
Slovakia	-	
Hungary	-	
Poland	3	

PROJECTS BY COUNTRY

Czech Republic	17
Slovakia	14
Hungary	12
Poland	60
TOTAL	103

Nevertheless, the privatization of water and sewage systems will bring about tremendous changes in the systems for supplying technology and operating sewage and drinking water treatment plants. For the large infrastructure projects needed in urban areas, the CDI Environment Subcomponent program was both too small and too short-lived. In addition in this area, U.S. firms are at a competitive disadvantage in comparison to the large, private British and French water companies, which have well established bases in their home countries and are fierce international competitors. Further, European firms frequently offer the most important ingredient in complex multi-faceted infrastructure projects: creative financing.

However, the CDI Environment Subcomponent program found an important niche in outlying areas where, for smaller cities and rural towns and villages, large systems may be not only unaffordable, but unnecessary. This niche would appear to provide a real opportunity for U.S. suppliers, many of them small businesses, which excel in **low-cost, innovative systems**. It is in this area that the CDI Environment Subcomponent developed the greatest number of individual projects, provided superior technical expertise for project development and expects to leave the most solidly developed domain for future project development.

Helping Innovators Get in the Door

Some of the first U.S. firms to request assistance from the CDI Environment Subcomponent were firms specializing in agricultural reuse and constructed wetland technologies. At least two clients were already actively pursuing opportunities in the region and came to the CDI

Environment staff seeking Project Development Support Grant funds and assistance in technology demonstration for projects already on the drawing boards. In addition, several small firms specializing in mechanical systems, whose representatives had already travelled in the region, appeared looking for help in locating local firms appropriate for licensing agreements and for small-volume projects their systems could handle.

Demonstration and verification of the capability of a technology to operate effectively in the region is a major obstacle to the entrance of these low-cost, innovative, U.S. systems. Almost universally, they are not known and do not yet operate in the region; so, there is no local experience to draw on. In the U.S., these systems have not been widely adopted either, in part because here too technology consumers have been convinced that they are at operational and regulatory risk if they rely on innovation as opposed to conventional wastewater treatment. So locals are naturally suspicious that they are being sold a product that is not considered "good enough" for advanced environments like the U.S. In addition they are concerned about whether such systems will eventually meet requirements of the European Union.

In many CEE countries, state funding (grants or loans) is tied to technical approval of the systems by local authorities. If a system is not already in operation, its effluent quality cannot be approved; if there is no approval, money will not be awarded; if money is not awarded, a treatment system cannot be built. The CDI Environment staff helped several American companies work successfully in the region by establishing the efficacy of their technologies or by helping them to find local partners, clients, and

organizations or individuals who could represent them locally.

In one case in Poland, the CDI Environment Headquarters staff with CDI Environment sub-contractors prepared a regulatory authentication report which compared the operational results of a green-plant system with USEPA and European Union standards. This report was favorable and resulted in the acceptance and construction of the system because the report quelled the fears of local authorities that the system would not be able to function properly in winter months. Shortly, another plant using the same technology was approved for demonstration. This same technology was also introduced successfully in Hungary. In the Czech Republic, a guide to small-to-medium-sized local wastewater technologies was prepared for distribution to local and national government bodies.

Providing Technical Assistance in Technology Selection and Finance

An additional obstacle to the introduction of innovative systems is the fact that, after the fall of Communism in the region, many large, over-planned sewage treatment projects remain unfinished due to lack of funds for construction. Many municipalities had elaborate plans for new systems which are totally unaffordable. All four CDI Environment resident country staffs assisted municipalities and innovative wastewater technology suppliers by routinely providing: technical assistance, technology verification, and identifying sources of small project financing. The Prague and Bratislava offices had the greatest success helping some of these municipalities to re-evaluate their needs for such large projects and to structure plans for alternative systems

and financing. In this way they combined institution-building and project development to produce concrete results in the form of licensing and construction agreements that will lead to the realization of new wastewater treatment facilities in three regions in the Czech Republic and Slovakia.

Technology Options

In order to provide practical suggestions to municipalities in need of sewage treatment systems, the Czech and Slovak CDI Environment offices brought a rural wastewater treatment expert affiliated with the USEPA Small Flows Clearinghouse at the University of West Virginia to the region to teach local officials about alternative, low-cost, low-energy systems. This expert worked with five municipalities in three different geographic areas to identify what types of systems were suitable for local conditions. He conducted small seminars on how to select appropriate technologies, and provided the audience with technical data, including videotaped demonstrations of system operations and design. The municipalities were also provided with contacts to American companies who could work with them on developing rural wastewater projects.

Finance

Such wastewater projects cannot be successful without financing, and the CDI Environment Subcomponent both locally and in the U.S. focused a significant effort on developing creative finance mechanisms. At Headquarters, an attempt was made to create a "bundling" mechanism to explore whether like projects sponsored by one manufacturer in a defined region could overcome the size barriers of some of the public financing sources. This possibility was explored with

the IFC, but it was determined to be infeasible because the sponsorship, collateral and credit-worthiness of individual towns could never be consolidated to meet the IFC or any other bank's loan requirements.

Locally, efforts were directed toward helping small communities learn how to structure financible projects. The bulk of this assistance was provided through an American municipal financing expert in cooperation with the regional offices. The expert worked with several local mayors, in the same geographic region the technical expert visited, to structure stand-alone wastewater treatment projects. She provided information and training in how to develop and separate capital and operating budgets. She also worked with local banks and with the State water and wastewater authorities to explain what she and the mayors were attempting to do.

In the process, the finance expert provided her host villages with spreadsheets, pro forma budgets, and instructions on the data they would need to produce to support bank loan applications. The results of this applied municipal financial planning assistance was presented to a larger audience of mayors at two regional seminars, the goal being to leave these smaller municipalities with a practical "how-to" guide to structuring small municipal project financing and resident villages and mayors with some practical experience they could share.

In the Czech Republic and Slovakia, these finance efforts were coordinated with the USAID-sponsored Municipal Infrastructure Finance Program. It is anticipated that program which continues beyond the term of the CDI Environment Subcomponent may provide sponsorship for projects we leave unfinished and a source of information and

assistance for other villages that try to repeat what was done in the ones the CDI Environment Subcomponent served.

Outcome

The outcomes of efforts in this sector range from awareness building to the conclusion of long-term business relationships between American companies and local representatives. Significant progress was made in raising the awareness of local authorities and consultants about the types of alternative, low-energy sewage treatment systems available. Many of the municipalities which received assistance from the CDI Environment Subcomponent are now seriously considering some of these systems, and are working with local inspection authorities to get them approved. Furthermore, the fact that large concrete projects are no longer affordable for many municipalities has been irrevocably established. These towns are now searching for affordable technologies.

Heightened awareness of financial limitations provided by CDI Environment personnel has caused local officials to begin to focus on needed operational changes, including how they structure and organize their budgeting processes and the necessity to consider additional sources for raising revenues. This, in turn, has caused some reconsideration of prior relationships to regional and national groups, such as the Vodovody a Kanalizace (VAK) water authority in the Czech Republic, where some mayors are thinking of reducing their dependence and contributions in order to retain revenues for their own uses. Such independence increases not only responsibility but autonomy to make technical choices.

CDI Environment Subcomponent assistance has contributed materially to the success of four U.S. alternative technology providers in the region.

- The aquatic plant technology was successful in two demonstrations, and is now in place or being constructed in 12 villages in the region.
- The vendor of a simplified mechanical system has concluded individual agreements for representation in specific deals in Hungary and in the Czech Republic; he is actively seeking representation to market his technology nationally in the Czech Republic, Slovakia, and Hungary. The first plant using his technology will begin construction in the first quarter of 1995 in the Palava region of the Czech Republic.
- The CDI Environment Headquarters staff helped the agricultural reuse technology firm, which received the only environmental CDI Project Development Support Grant, participate in seminars and conferences to describe their experiences in Hungary and Poland to other potential U.S. vendors.
- The vendor for a more complex mechanical system, operating in Poland, was introduced into the Czech Republic and Slovakia, where CDI Environment staff investigated the possibility of application of the technology in response to local tenders and identified potential local representatives.

While substantial progress was made in this sector, much remains to be done. Each type of **alternative system** (e.g., agricultural reuse, aquatic plant systems, cluster septic

systems) will either need **technical verification** or funding in advance to pay for it. Once these systems are approved, however, a positive "domino effect" can be expected. Many municipalities are simply waiting for the results of someone else's system, and then they will construct one for themselves.

2. Waste Management

Background

Most CEE countries are only beginning to focus on the enormous problem posed by solid waste. To the extent municipal waste is managed, which is by no means universal, acceptable landfill space is growing scarce. For example in Hungary, only three-quarters of the municipal waste is land-filled or incinerated. Nonetheless, the landfills in Buda are full, requiring transport across the city to Pest for disposal, pending completion of new landfill capacity. Co-mingling and disposing solid and sometimes hazardous wastes in insecure landfills is quickly exacerbating the capacity problem, as well as the problem of developing cost-effective management scenarios.

Industrial waste is also a mammoth problem, although more confined geographically than municipal solid waste. For example, about 70% of Poland's waste is stored in only three provinces (Katowice, Legnica and Walbrzych) in Southern Poland. About one percent of that waste is toxic. Hungary produced 100 million tons of industrial waste, five percent of which is classified as hazardous. In 1992, former Czechoslovakia produced 188 million tons of solid waste of which 38% was considered special waste and 11% hazardous.

Toxics include heavy metals from mine tailings, a variety of organics, hydrocarbons, and solvents from industry and from former Soviet military installations, particularly in the Czech Republic and Hungary. Hazardous wastes include radioactive materials, asbestos from insulation, PCBs from transformers, and some of the more toxic metals, such as mercury in water.

An Innovative Approach to Developing Municipal Waste Projects

Early in the CDI Environment Subcomponent Program, municipal waste management was recognized as an area where enough revenue could be generated to fuel the development of local private businesses. Two sectors were particularly attractive: providing waste management services and supplying waste management equipment. All of the CDI Environmental Subcomponent local offices undertook development of waste management projects. The most successful was Warsaw, and their approach is instructive, particularly as these projects represent the building of local environmental business capacity, one of the CDI Environment Subcomponent priority objectives.

Warsaw consistently did five things when trying to develop municipal solid waste joint ventures that could be replicated to continue the expansion of indigenous business capacity and to broaden the municipal waste management network:

- Since solid waste management is now largely the responsibility of local officials, the Warsaw staff spent time up-front determining **which voivodeships were most likely to finance waste management projects** and most

amenable politically to working with outside investors. They then began to build relationships with the local authorities as well as with local companies interested in such projects. This required a good deal of travel and a lot of repeat visits; but later it enabled the staff to respond when barriers arose and to give the parties a sense that someone was "on top of things." This kind of "hands-on" reassurance saved several projects.

- The Warsaw office also established a **rapport with the American companies** in the waste management business who were exploring the region. Soon after these companies requested CDI Environment Subcomponent help, the Warsaw staff checked their "bona fides" locally and through financial and operational background checks run by Headquarters.
- The CDI Warsaw staff encouraged and helped U.S. firms find **competent local representatives**. This is critical in establishing a U.S. firm's local credibility and capability to react when the deal is imminent and decisions must be made. A major U.S. waste management company lost several large opportunities because its local representatives were inexperienced and its non-resident officials did not take timely actions in response to opportunities.
- One aspect of the Warsaw approach that was "learned in the doing" was the value of a **consortium of partners** to offer the full range of services to local governments. One successful project involved three U.S. partners, combining an engineering, a financial, and a

consulting firm with a local Polish consulting partner.

- The Warsaw office remained **persistent** throughout in actively helping venture partners and their prospective public sector clients to **structure financing** for the work. In one case they worked with municipal authorities to identify ways to offer the services of the landfill and transfer station, to be built by a CDI Environment-sponsored venture, to neighboring towns as a way of making money to pay for the facility in the short run and as a revenue source for schools over the longer term. The CDI Environment Warsaw staff used their long associations with Polish financing officials at the national and voivodeship level to support these local efforts.

Outcome

The most successful project in Poland was the four-way business venture described above, valued at \$12 million and consisting of the construction and operation of a landfill, transfer station and recycling plant near Warsaw. This group has a second project under development in the Lublin area, and toward the end of the CDI Environment Subcomponent tenure made an agreement to pursue joint project development with a Katowice-based company started by an Italian entrepreneur.

With respect to waste equipment, a successful joint marketing effort between an American firm producing waste baling machines for compacting large waste and a Czech manufacturing firm will produce the equipment locally. Efforts to interest U.S. firms which produce landfill liners were not, by the end of the CDI Environment Subcomponent project, so successful,

apparently because the returns on exporting this production capability are not adequate to interest firms with the technologies. Nevertheless this remains an excellent area for exploitation by U.S. investors and local entrepreneurs since such liners will be increasingly required throughout the region to meet regulatory requirements for secured landfills, and the Polish National Fund considers developing local capacity to produce such liners a priority.

Limitations on Developing Industrial Waste Management Projects

The CDI Environment Subcomponent had much less success with projects involving industrial waste reduction, management, and disposal. There are several explanations for this. One is that much industrial waste reduction or minimization is in fact a function of energy efficiency. This area of activity was reserved to the CDI Energy Subcomponent. Pollution prevention, which involves major process change and plant modification, would require projects beyond the economic and time scope of the CDI Environment Subcomponent, and are the purview of the USAID-sponsored Pollution Prevention Program (EP3). Another USAID-sponsored program through the World Environment Center deals globally with waste minimization and is also very active in Central and Eastern Europe.

3. Recycling and Reuse

Background

Many municipalities are experimenting with privatization of waste collection, separation, recycling, and disposal activities. The key issue for most of these activities is whether the underlying economics will support the imposition of user fees which can recover

the costs of providing the services. Where this is the case, there are good opportunities for Western firms to team up with local partners to provide the services.

Many of the companies and municipalities in CEE countries are facing pressures to minimize their waste. These pressures stem both from legislative requirements and from financial constraints. Legislation has been designed to encourage the reuse and minimization of waste vis-a-vis disposal fees and fines. As these fees and fines increase with the transition to full-market economies, the incentives to handle waste more effectively is growing and driving the development of waste recycling and reuse programs.

The amount of industrial wastes re-utilized and re-processed is slowly growing, but recycling is still viewed as insufficient in most regions, most likely because of a combination of poor recycling economics and some growth in industrial output. In Poland, about 57% of industrial waste is re-utilized in earthworks, landfills and road construction, but during 1980-1988 the volume of wastes grew by about 66% anyway. In the Czech Republic, although legislation encourages waste recycling, lack of recycling capacity, for the same reasons, characterizes most of the sectors.

Product recycling of such materials as paper, glass and aluminum is particularly problematical in Central and Eastern Europe. Even in the U.S., these activities typically are highly subsidized. In CEE countries, technology frequently only produces poor quality, lower-end recycled products, e.g., toilet paper and newsprint, and local laws frequently prohibit the import of waste to allow sufficient supplies of waste

inputs, particularly for the smaller countries, to make recycling economically feasible.

The CDI Environment Subcomponent recycling project slate was large, consisting of some 20 separate waste-to-energy and waste-to-product recycling projects. These spanned a fairly broad category of wastes, including paper, glass, used tires, used oil, fly-ash, wood and agriculture waste, and animal and dairy waste. Emphasis on this area reflects the "demand-driven" nature of the project overall. CEE officials and businesses were particularly interested in American recycling technology and experience, based on a widespread impression that the U.S. may have discovered technologies and institutional approaches that work and are cost-effective.

Biobriquettes From Sawmill Waste in Poland

Production of bio-briquettes from wood waste in Poland was among the first projects undertaken by the CDI Environment Subcomponent and illustrates the benefits of successful recycling in that when completed this project would serve several beneficial purposes by solving an existing waste problem and providing a means for preventing its future expansion; offering a more benign energy alternative to soft coal; and establishing a profitable business.

It also demonstrates the **full range of activities provided by the CDI Environment** technical assistance program, specifically:

- **initiating the project at the local level;**
- **providing technical assistance through the Headquarters office and subcontractors;**

- **assisting in writing a business plan;**
- **soliciting American technology suppliers and investors;**
- **identifying local partners;**
- **searching for and securing financing; and**
- **persistence.**

Outcome

This case, perhaps more than any other CDI Environment Subcomponent project, illustrates how the development period is protracted by the difficulties presented in finding viable partners, suitable technologies, and financing. Its development path is traced in a Case Study presented in Annex B. The outcome to date is that more than two years of effort produced a new Polish joint-venture company, formed in September, 1994, operating in Lublin to produce bio-briquettes from wood waste. Sadly, at last report, the project was in jeopardy because of the precarious finances of its local sponsor.

Incineration of Hazardous Waste in Poland

A project to incinerate hazardous waste in cement kilns in Poland illustrates both waste-to-energy and waste-to-product recycling. Environmentally, the process removes a waste and provides an alternative fuel to coal. Economically, it produces a saleable service because the cement works will be paid to take the waste; and it will produce a saleable product in construction aggregate for use in bulkheads and roadbeds.

Programmatically, this project demonstrates the synergistic value of having offices in several countries because the technology supplier was identified by the Prague office which referred him to the CDI Environment Warsaw office, where he was assisted in establishing a relationship with the local cement works at Kielce. The CDI Headquarters office provided local representatives with the latest information on air quality guidelines for such facilities in the U.S., which facilitated acceptance of the process in Poland.

Outcome

The project was not concluded during the term of the CDI Environment Subcomponent tenure. The partners became entangled in a financial dispute, which they were never able to resolve, despite repeated efforts to assist negotiation and reconciliation by the CDI Environment staffs in Warsaw and Prague.

Fuel From Animal and Dairy Waste in Poland and Slovakia

Agricultural run-off from animal farming is a serious water pollution problem through rural areas of CEE countries. There is significant local interest in methane conversion and demand for technologies which would reduce pollution and provide a source of farm-site energy.

A representative of the U.S Department of Agriculture Extension Service for Kentucky and the CDI Environment staff in Warsaw invested considerable effort in trying to develop agricultural recycling projects in Poland. The Headquarters staff, in response to a request in Slovakia, attempted to obtain information on innovative technologies thought to exist at Cornell University.

These efforts were not successful in matching technologies and potential users in Slovakia.

Late in 1992, the International Executive Service Corps (IESC) advised the CDI Environment staff in Poland of a project where a public relations firm representing a consortium of pig farmers was attempting to create a partnership with a small, innovative entrepreneur in California who had developed a methane recovery system, superior to any before seen by consortium members. However, the potential partners had a misunderstanding involving a relatively small sum of money. And despite efforts by the IESC and the CDI Environment staff to assist in reconciliation, both sides remained obdurate, and the project was lost, along with all the "look-alike" opportunities that almost certainly would have followed it for the local consortium and the American entrepreneur.

Outcome

It may be that agricultural waste recycling was a little "ahead of its time." But there is little doubt this remains a fertile area for development, especially in a large agricultural country like Poland. The failed pig farm and hazardous waste incineration projects demonstrate that personalities always matter, and that even the most promising project, given enormous support, can fail if partners disagree over money and are stubborn.

Used Tires in Slovakia

Waste-to-product projects present perhaps the best business possibilities in the region if the economics of raw material supply, transportation and production costs, and

market demand are there and a source of finance can be found.

A Slovak company was interested in investing in and constructing a tire recycling plant to convert used tires into fuel and crumb rubber for paving. The CDI Environment program identified suppliers of tire recycling technology, provided information about waste laws and regulations in the U.S. and former Czechoslovakia, assisted in preparing a business plan, and identified sources of financing. This assistance was provided over an almost two-year period by the RBDO from Warsaw (prior to creation of the Slovakia CDI Environment office), and a U.S. financing expert with experience in tire recycling. Particular emphasis was placed by the CDI Environment staff and contractors on supporting the loan application that the company submitted to the Slovak-American Enterprise Fund (SAEF), in the amount of \$1 - 1.5 million USD.

Working with the SAEF proved to be particularly time consuming. It was not well understood at the outset by the company or the CDI Environment staff how much weight the Fund put on an outside investor. Nor did the Fund make transparent its view that a loan of the size involved was particularly problematical.

Outcome

In the summer of 1994, the Slovak-American Enterprise Fund (SAEF) rejected the application because they were not persuaded there was a substantial enough market in the region to support the company's expansion into recycling. A potential U.S. investor had been found, but was never able to be presented to the Fund.

The CDI Environment team did some preliminary work on locating alternative financing sources. But in the end, the company declined to do the additional market research required by the Fund and presumably any other investor that might have been identified.

This promising project was the victim of number of problems that provide instruction for the future, and is discussed at length in a case study in Appendix A. The most salient lesson is that a project such as this, which involved multiple parties, large scope business in a relatively small and unsophisticated country, a relatively new process and product line, and a company inexperienced both in Western business and recycling should have been approached with much more skepticism at the outset. Both the CDI Environment Subcomponent participants and the SAEF should have agreed early on what the company would have to demonstrate and what the timetable for achievement would be. In this way, a "go/no-go" decision could have been made much earlier.

Paper Recycling in the Czech Republic

Another very promising project, the construction of a proposed paper recycling facility in the Czech Republic, also stalled due to operational and financial uncertainty. A highly respected financial services company, experienced in Central and Eastern Europe, approached the Prague CDI Environment office with a request for help in gathering accurate market information about sources of waste paper, methods of collection, and the privatization of waste collection companies. Based on this data, the financial company secured a letter of intent from a local paper manufacturing facility and was putting together a financial

package for a joint venture when the Czech government enacted legislation prohibiting the import of waste paper.

It is possible, given the project's potential economic and environmental benefits, the Government could have been successfully approached to provide a limited waiver of the regulations to allow the controlled waste paper imports the economics of this project demanded. This is verified by subsequent requests by the Czech Ministry of Environment that the CDI Environment Subcomponent staff provide information about paper recycling programs in the United States. In response to this request, the CDI Environment office in Prague and the Washington office, collected both U.S. federal and state information about paper recycling programs and provided them to the Ministry of the Environment. These materials were obtained from USEPA and the American Forest and Paper Association, the trade association which represents the U.S. paper manufacturing industry.

Outcome

The U.S. financial services firm reluctantly withdrew because, despite its and the CDI staff's encouragement that the regulatory hurdles were not insurmountable, the local paper company became distracted by management and financial problems and became unresponsive. This case, like the tire recycling case, demonstrates that many newly privatized companies remain fragile and often do not have the ability in terms of critical mass and experience to stay the course that complex recycling programs often require.

Industrial Waste Recycling in Poland and the Czech Republic

Three areas of industrial waste recycling and reuse where the CDI Environment Subcomponent succeeded hold positive prospects for additional future development:

- fly-ash produced from electric power generation;
- sands produced by foundry operations; and
- mine tailing from steel production.

Fly-ash production is immense in Poland and the Czech Republic, and has been determined a priority by both the Czech Republic utility company, CEZ, and by the Polish National Fund. Management and disposal are huge problems, but the potential for the manufacture of marketable products suitable for sale in local markets for infrastructure construction, which is a priority in the post-Communist era, is also great. The CDI Environment Subcomponent offices in Warsaw, Prague and at Headquarters conducted a long-term effort to provide fly-ash producers with information about and contacts to the best American producers of fly-ash technology. At least fourteen American companies which work in this sector were identified and expressed interest in CEE business. Local staff worked with fly-ash generators to help them determine what type of technology was suitable for local conditions. Since the time of realization of a project of this scale far exceeded the CDI timetable, the goal of this assistance was to provide local fly-ash generators with enough information and contacts so that these facilities could be developed in the private sector once the CDI

project was finished. This goal was achieved.

The disposal of sand has become an unacceptably expensive activity for some foundries in the Czech Republic. In response to a request for assistance from the environmental department of a large city in the Czech Republic, the CDI local office researched different foundry sand disposal options and conducted a survey of sand disposal needs of seven foundries in the region. The end result of the project was a three-part relationship among a local cementworks, a waste disposal company, and a foundry for hauling sand from the foundry to the cementworks for use in production of new sand. Similar relationships between the cementworks and other foundries in the region are being explored.

Similar to fly-ash, tailings from steel production can be seen for miles around the mills in places like Katowice, Poland. These eyesores can be very valuable, and using modern technology can be about 80% recovered for new or re-use. The Warsaw office introduced a U.S. firm to several mills in Poland, and the U.S. began project partnership negotiations in at least two.

Outcome

These recycling projects are related to large and basic industrial operations. Accordingly the problems will not go away, and their resolution is likely to continue as a priority for environmental officials in the region. Since recycling in these industries produces products that can be income generating and since U.S. technology is competitive in the case of fly-ash and mill tailings, it is hoped the relationships the CDI Environment Subcomponent was able to initiate between

key players in the U.S. and in Poland and the Czech Republic will spawn additional projects there, and provide useful models as more CEE countries address these basic industrial pollution problems.

4. Site Remediation

Background

The area where American firms have the greatest technological advantage is in clean-up of hazardous waste sites, contaminated soils, and similar projects. This is an area which, until relatively recently, has been low on or missing from local priority lists. As privatization efforts move forward, especially in the Czech Republic, Hungary and Poland, and as rules for dealing with contamination liability begin to emerge, property investment and land transfers are increasing.

It is land transfers, not Superfund-type programs, that will drive the local need for the analytical equipment and expertise to do site audits, risk assessments, remedial design and clean-up. According to a survey conducted by the World Bank and the Organization for European Cooperation and Development (OECD) of the 1,000 largest manufacturing, mining, and construction companies based in North America and Western Europe, 66% of respondents said the issue of potential liability arising from past environmental practices was more important in their company's investment decisions for the region than any other environmental issue.

Based on an assessment that remediation issues would eventually drive economic and policy decisions in CEE countries and produce a market niche that Americans might expect to occupy on favorable

competitive terms, the CDI Environment Subcomponent dedicated resources to projects related to site remediation needs. The less than one dozen projects in this area are very diverse, and most hold out more promise for future development post-CDI. Nonetheless, several did result in solid agreements and projects that are being implemented.

Outcome

In Poland two projects resulted in agreement, one a teaming agreement for monitoring and clean-up of oil spills around gas stations, and one a letter of intent for monitoring and clean-up of oil spills and cooperation on remediation. Similarly in the Czech Republic two projects were successful. One was an agreement between a U.S. supplier of surfactants to provide products to a Czech remediation company, resulting in a successful bid to clean up PCB contamination at a Soviet facility at Rozmytal. In the second, a U.S. bio-remediation technology was introduced by its U.S. inventor for use in cleaning up a used oil reclamation facility in Ostrava. This site is the subject of a consent decree specifying clean-up requirements and deadlines between the site owner and the Czech Government; if this project succeeds it would be important for two reasons: it would demonstrate the efficacy of bio-treatment and it would contribute to the amelioration of a serious environmental problem.

V. LESSONS LEARNED AND RECOMMENDATIONS

This section highlights a number of the primary lessons learned in the conduct of the CDI program, with particular emphasis on those lessons that are most likely to be relevant to the design of similar projects in Central Europe or other industrializing regions of the world. Over the almost three year course of this project, substantial change has occurred in the region. Most of the economies have begun to recover, market oriented institutions are emerging, and local business sophistication is increasing rapidly with exposure to the West and growth of local enterprise.

Despite the rapid maturation of many of the countries, the level and pace of change varies substantially throughout Central and Eastern Europe. As a result, the following lessons learned will be of differing applicability by country and great care must be taken not to generalize across the entire region. Special recognition must be paid to the dramatic differences between many of the former Soviet Republics, which are just starting the transition process, and the more advanced Central European countries, which will be striving to meet the environmental standards of the European Union within the next decade.

A. Overall Planning

1. Building Local Business Infrastructure is a Critical Component of Overall Environmental Improvement Programs.

Lesson: There has been some controversy whether USAID should be involved in assisting U.S. business to expand overseas. We believe that this controversy stems from

a possible mis-specification of the objective of "business promotion" programs. In our view, the purpose of programs such as CDI is to help solve priority problems in the recipient countries by helping them to build the business capacity to address those problems using local firms. In the case of the CDI Environment Subcomponent, this meant helping local firms and governmental agencies establish relationships with U.S. environmental technology and service providers.

In CEE countries with respect to the environment, a major constraint on reducing pollution is the lack of a well developed cadre of pollution control equipment manufacturers, environmental testing labs, environmental engineering firms, and the like. This lack of an "environmental business infrastructure" increases the costs and political difficulty of addressing priority problems. As a result, programs which help build this capacity to address environmental problems with local resources should be a key component of overall U.S. environmental assistance programs.

One of the best ways to help recipient countries build this environmental business infrastructure is to assist local companies to form sustainable relationships with U.S. (or other developed country) firms which can license relevant technologies or provide management and technical expertise through joint ventures or direct investments. Initiatives to facilitate the formation of such sustainable relationships have the distinct advantage of enhancing U.S. exports and long term competitiveness, but the primary objective is, and should continue to be, to improve the business infrastructure and environmental conditions in the recipient countries.

Recommendation: Programs to build sustainable relationships between U.S. and local environmental firms should continue to be a major component of overall USAID efforts to improve environmental conditions in developing countries. Future USAID environmental programs should make explicit provision for initiatives to assist U.S. and local firms to form sustainable business relationships in order to build the local environmental business infrastructure, thereby enabling the countries to address priority problems with local resources.

To be effective in facilitating these relationships, contractors should work directly with U.S. companies and actively help them develop projects in priority areas. This type of assistance not only helps the U.S. economy, by opening new markets, it is also frequently a cost-effective way to help recipient countries to solve their problems because business investments in joint ventures will generate income and create jobs, allowing local economies to afford environmental improvements.

2. Projects Fail for a Wide Variety of Reasons.

Lesson: Projects fail for a wide variety of reasons. While any one of the reasons is sufficient to prevent a project from being realized, problems in one area often compound the others, thereby creating a downward cycle. In our experience, probably less than one out of one hundred potential projects actually reach fruition. Among the major causes of project failure are:

Lack of effective market demand. Lack of demand for project outputs is a major problem in the environmental area where "needs" are great, but ability/willingness to

pay is often lacking. As a result, many local promoters believe that there are good opportunities, but fail to undertake the realistic assessment of real ability to sell the products and services.

Lack of strong sponsors. Many projects are inherently attractive, but never are completed because the U.S. or local sponsor does not have the technical, managerial, financial, and business expertise to pull all the elements of the project together.

Lack of financing. As mentioned earlier, the lack of financing is a major stumbling block for most projects and needs to be dealt with in the initial stages of planning for any project.

Difficulties in getting necessary approvals. Frequent changes in governments, lack of established regulatory procedures, and the desire of local officials to avoid making mistakes combine to make it difficult for firms to get the approvals they need for projects.

The various stumbling blocks suggest that all the potential constraints be evaluated at the outset of project planning and explicit strategies be identified for dealing with each. In common sense terms, the chain is only as strong as the weakest link, yet there is often a tendency to pursue projects simply because one or more of the important elements is in place. And far too often the hardest question is deferred: How will it be financed?

Recommendation: Future programs should require that an explicit mechanism be put in place which oversees that all of the potential weak links and strategies for overcoming them are identified before devoting time to particular projects.

3. Successful Projects Require Substantial Time to Gestate and Need Frequent Nurturing.

Lesson: Most projects in Central and Eastern Europe require substantial time for successful consummation (e.g., they probably average 18-36 months between initial contacts and project start-up). This long development time results from a variety of factors such as delays in regulatory approvals, time-consuming visits for the partners to get to know each other, changes in government officials required to approve projects, difficulty in arranging financing, etc.

CDI Environment staff have supported a number of projects over virtually the entire course of the program and many of those are still in process. For example, the first technical assistance team visited Poland in November 1992 to undertake a feasibility study for producing briquettes from wood waste. The initial parties interested in the project from both the United States and Poland have dropped out of the project (changing priorities and bankruptcy respectively), but the project is still alive. (See the detailed case study in Annex A.)

Most environmental projects take a long time to develop and facilitators must be willing to stay engaged for the long haul. In addition, facilitators must develop a wide network of contacts with companies, relevant government officials, and financing sources in order to be of maximum assistance when projects run into snags and workaround arrangements are required.

Recommendation: Future USAID projects to build environmental business infrastructure should be of at least five years' duration or have provisions for extension.

4. Assistance Should be Organized Around Specific Projects.

Lesson: Many officials and business people in Central and Eastern Europe are becoming impatient with the number of government officials, consultants, and business people who visit the region take up valuable time, but do not generate tangible projects in their wake. Insult is added to injury when American "experts" visit only once and then are followed by someone else in a few months who asks essentially the same questions.

At this point there is also little need for generic feasibility studies or free standing policy analyses. What is needed is a systematic focus on getting projects in place which will yield tangible benefits to the local population. This requires concerted follow-up on priority projects, ability to deal with the policy as well as the technical aspects of project development, and most importantly, a focus on getting projects financed.

Given the desirability of generating real on-the-ground projects, it would be desirable to link policy advice and institution building to specific project target areas. This would assure that such technical assistance was relevant to local needs and would encourage the type of on-the-job training that is most likely to be of direct benefit to the recipients.

Because of the need to show benefits to the local population and the fact that most of the financing for projects will likely come from sources within Central Europe, priority must be given to projects which are of high local priority.

Recommendation: AID programs to develop local environmental business infrastructure as well as other technical assistance and institution building programs should be linked and focused on a few priority environmental projects. These projects would provide an "organizing theme" for the programs and be more likely to generate demonstrable progress.

B. Funds for Development and Finance are Key to Program Success.

1. Lack of Project Financing is a Critical Constraint.

Lesson: Despite much talk about numerous programs and substantial amounts of money available, very little financing is effectively available for environmental projects given the requirements imposed by lenders (e.g., collateral, equity, minimum size, etc.). The first question that should always be asked in evaluating potential projects is "how will this project be financed?" If it is a public sector project, are funds actually budgeted? If it is a private project, can the sponsor pay for it?

The multi-lateral development banks have long project development cycles and most environmental projects are below their multi-million dollar project size cut-offs, or are too risky to qualify for their programs. It was also our experience that most CEE country governments are unwilling to provide the sovereign guarantees many programs require.

Private financing requires substantial local equity and collateral (e.g., required collateral is often two to three times the amount to be borrowed). Many gaps in financing remain, especially for projects in the one-half to ten million-dollar range. Simply listing potential sources of finance is misleading; U.S. and local companies need realistic assessments of the funding criteria and lending requirements of the various potential financing sources.

Many planners and business people in both the U.S. and the region fail to distinguish clearly between public sector versus private sector projects and the very different types

of financial arrangements that each requires. Local project sponsors often assume that the foreign party will bring funding for the project. However, if the project is a public sector project, municipalities are often unwilling, unable or too inexperienced to impose user fees or to allocate scarce funds to service the debt. Private sector firms in the region often lack the cash flow to pay for investments in environmental protection and expect the foreign partner to provide all the financing.

Projects that yield a revenue stream (e.g., from recovered product or user fees) are significantly easier to finance because those revenues can be used to help structure special financing packages. Short of a discrete revenue stream, environmental investments which generate cost savings can also be somewhat easier to finance, but these savings are often difficult to capture in terms of arranging financing.

An often overlooked reality is that most environmental finance will be from domestic sources. This is especially true for Poland and the Czech Republic which have large environmental funds from fees and fines. For example, the Polish National Fund for Environmental Protection and Water Management (and the affiliated voivodeship funds) will collect the equivalent of almost one billion U.S. dollars this year, which amounts to about half a percent of the Polish GNP.

Recommendation: Future programs to build local environmental business infrastructure should be linked with programs to provide project development financing and project completion funding. Because of the difficulty in financing projects, it is useful to have financing organically linked to business promotion projects as is the case in the

USAID-sponsored Trade in Environmental Services & Technologies (TEST) project in India. In that case, a \$20 million dollar loan and grant program administered by an Indian bank is available to help finance projects and partnerships in priority environmental areas.

It is not particularly useful to provide simple lists of potential funding sources without indicating their real lending criteria. USAID project design should include specific resources for contractors to work "hands-on" to develop finance for specific projects.

The national environmental funds (primarily in Poland and the Czech Republic) represent important potential resources for future collaboration. Given their substantial role in funding projects, USAID should more systematically support these funds with technical assistance and coordinate programs with them. Contractors should be explicitly tasked to work with and support local environmental funds, either directly or through other AID advisors working with the funds.

2. Project Development Funds are Critical to Making a Project Financible.

Lesson: Getting financing to actually implement a worthwhile project is really the second step. In CEE what is critically needed are relatively small funds to help local entrepreneurs and agencies actually plan and develop discrete pieces of the project, e.g., do market studies, develop a business plan, travel to see a facility in operation, get training from the technology vendor. Also U.S. firms, especially the small to mid-size type targeted by the CDE Environment Subcomponent, can benefit from help with pre-feasibility studies and

some support for repeat travel and like business development costs.

The existence of the CDI Development Cost Support Fund managed by Coopers & Lybrand was a useful concept for interesting U.S. environmental companies in the potential for Central Europe in the early stages of the project. The decision to terminate the Fund almost certainly had an adverse impact on the CDI Environment Sub-component because it took away one "recruiting" tool and because the difficulty in securing feasibility study funding is a constraint on developing projects in the region.

Recommendation: Future business development projects should be structured to include a pool of discretionary money that can be used by USAID staff and contractors to assist in the major effort involved in determining preliminary project viability, and in locating potential long-term funding and sponsorship.

C. Active Efforts to Integrate U.S. and Local Interests are Critical to Project Development.

1. Local Presence and Knowledge Are Critical.

Lesson: Each of the countries of the CEE region is very different from the others. Ability of program staff to understand the indigenous business and social culture, to speak the local language and to know key players is essential. Local staff are also much less costly (both salary and living expenses) and provided a substantial "multiplier" for the expensive RBDO expatriate. It has been observed that the productivity of expatriates was only about half the rate possible under Western business conditions because of poor business

and other support services -- thereby further reinforcing the desirability of working with lower cost local personnel).

The presence of experienced local staff is all the more important for environmental projects because most of the decisions regarding them are made at the provincial or municipal level. The local staff are able to develop relationships with the more forward looking officials at this level and to provide guidance to U.S. businesses about opportunities. This ability to contact officials and stay in touch with them periodically provides significant "economies of scale" to U.S. business through the support of the U.S. Government.

The expertise gained by CDI Environment local staff in facilitating environmental business ventures should be available to provide ongoing business intermediation services in the environmental sector in the future. This is one of the most important legacies of the CDI Environment Subcomponent project.

Recommendation: Future USAID programs should make greater use of local staff and be designed to provide as much training and technology transfer to these staff as possible to position them to provide similar services through other arrangements following completion of the project.

2. Differences in Business Culture and Climate Benefit from Combined U.S. - Local Staff.

Lesson: American impatience and the expectation of quick results often compound the problems of lack of understanding by local firms of markets and Western business decision-making tools (e.g., market research and business plans). These differences in

expectations and approaches frequently lead to miscommunication and "disconnects". In addition, local firms often expect that Western firms will finance product sales and joint ventures, while Western firms often expect local partners to contribute more financing than is realistic.

Most U.S. firms are not prepared to spend the time to build sustainable business relationships in Central and Eastern Europe. Conversely, most local firms do not know how to interact effectively with American firms. Therefore, there is a need to screen potential American firms very carefully before encouraging them to get involved in the region and to be able to provide substantive and on-going business development assistance to local firms in connection with "marriage-brokering" business facilitation activities.

Given the need to communicate effectively with both U.S. and local businesses, the CDI Environment Subcomponent offices which had both American and local staff seemed to work the best. Local staff felt that having U.S. counterparts was essential for them to understand U.S. business thinking and often to communicate; U.S. staff felt a strong need for local staff to communicate and interpret local situations. For example, the Hungarian office probably suffered from lack of a U.S. counterpart. This "twinning" of staff allowed each to understand the other's business culture better and helped train the local staff in U.S. business concepts and expectations.

Recommendation: Future projects should try to augment local staff with Americans (ideally Americans already living in the region to enhance familiarity and lower cost) whenever possible, in order to provide biculturally sensitive business expertise.

3. "Absorptive Capacity" of Local Enterprises Is Also Limited and Needs to be Addressed.

Lesson: Many proposed projects lack competent local management and/or the ability to provide the type of documentation that U.S. firms typically require before entering into a long term relationship. Business people in the region had not been exposed to Western business planning concepts and generally are still not able to provide the type of market research and business plans that Western partners require. This observation applies primarily to private sector business, but many government entities, especially at the local level, also lack the capacity to prepare budgets and financing proposals that meet Western requirements.

Because of this limitation on absorptive capacity, it is important at the outset to assure that all the necessary components are in place (e.g., competent project management, ability to prepare business plans, access to financing). The need is not for more generic feasibility studies, but for "hands-on", project specific development programs which provide technical assistance to the local partners and facilitate access to financing on a project specific basis. This is in addition to development funding. Local project sponsors need the ongoing assistance of mentors who can be available for advice and support through a protracted project gestation period.

It would have been useful, for example, to have had easier access to project-specific sources of technical assistance for local firms and local government entities in preparing business plans, market research, and funding requests. Programs such as the USAID-sponsored MBA Enterprise Corps

should provide a vehicle for this type of assistance. However, in this case, the MBA Corps was not available on short notice and the terms of its support were not sufficiently flexible to assist in developing individual CDI Environment project opportunities.

Recommendation: Future projects designed to create sustainable linkages between U.S. and local environmental firms should be more closely linked to other USAID and other donor programs that provide technical assistance to local businesses and municipal governments on a project specific basis. USAID should develop mechanisms to inform contractors about other programs and should explicitly evaluate the performance of contractors in terms of the degree to which they share information and draw on the resources available under other programs.

4. U.S. Firms Should Be Encouraged to Find Local Representatives.

Lesson: Many U.S. firms are tempted to try to transfer technologies or form sustainable business relationships without making the substantial investment necessary to locate a well-qualified local representative or partner. U.S. firms often underestimate the importance of finding a very good local partner and are unwilling to incur the costs of doing so.

The CDI Environment Subcomponent was much more successful in supporting U.S. firms that had identified good local representatives than for those firms that did not. Services that CDI Environment staff provided were complementary to those of the local representatives, who could directly and personally represent the business interests and strategies of their clients, in effect "selling" them, while CDI

Environment technical assistance reinforced their effectiveness.

While it is difficult for a government contractor to recommend specific partners, programs such as the CDI should systematically encourage and assist U.S. firms entering the local market to actively interview potential local representatives, and if they decide to continue, to engage a local representative. CDI Environment local staff did provide this type of assistance, although it was not a formal part of the contract. In many cases, however, U.S. firms did not believe that they needed this type of representation and many projects failed as a result.

Recommendation: Future programs designed to promote business relationships should include an explicit mandate for the contractor to assist in identifying local representatives and business promotion partners for U.S. firms coming in. Special attention should be paid to identifying local parties at the provincial level and in major municipalities, because many project decisions are made at this level and it is very difficult and expensive for U.S. firms to find the right representatives outside the capital cities.

D. U.S. Technology Can Make a Special Contribution in CEE.

1. Low-Cost Projects Should be Emphasized and Need Extra Support.

Lesson: Low cost, innovative technology projects face major impediments (e.g., uncertainties on performance, fees based on a percent of contract costs, professional conservatism of engineering firms, small

U.S. vendors with little opportunity to amortize high market development costs, etc.). Low cost technologies will be vitally important if countries are to achieve anything like Western standards in the next decade. It is estimated, for example, that Poland will only be able to finance 10-15% of environmental needs if conventional technology is used.

Low-cost innovative technologies are unlikely to be adopted without special support from governments. This type of support (e.g., low-cost wastewater) can be provided but it is labor intensive and will pay off only as examples are replicated.

Recommendation: USAID should continue programs to systematically identify and promote low cost environmental technologies which are suitable for applications in CEE and other lesser developed countries (LDCs).

2. Project Development and Policy Reform Go Hand-in-Hand.

Lesson: There is often a "chicken-and-egg" relationship between technology transfer and policy reform, especially in the diffusion of innovative technologies. Regulators in CEE countries have been understandably reluctant to approve the use of innovative technologies (e.g., deep reinjection of saline mine waste water or incinerating hazardous waste in cement kilns) without reassurances from Western experts. They have also felt little need to set up regulatory regimes to manage the technologies that are actually ready to be implemented in their countries.

Conversely, foreign companies that might provide these technologies are reluctant to invest the time in introducing them unless there is a favorable regulatory climate in

place. As a result, potential innovative and cost-saving technologies are often significantly delayed in introduction in the region.

Because of the potential benefits of solving the regulatory and technology introduction problems at the same time, it would be useful for the U.S. Government to design coordinated programs which identified key opportunities for the introduction of innovative technologies which need to be accompanied with regulatory or policy changes. Assistance could then be provided which dealt with both aspects simultaneously, thereby accomplishing results which would otherwise be significantly delayed in the absence of U.S. Government support.

Future projects which include an objective of facilitating the transfer of environmental technology would probably be more effective if they included mechanisms for providing regulatory assistance through EPA or other relevant sources that would speed the diffusion of those technologies. Such assistance could take advantage of the potential synergies which exist between regulatory technical assistance and business promotion activities designed to facilitate the diffusion of appropriate technologies and building of local environmental business infrastructure.

Recommendation: USAID should develop a mechanism (probably with USEPA) that would permit quick access to USEPA or other independent experts who could advise local governments on the policies and regulatory regimes that allow the safe adoption of new technologies which offered better performance or especially lower cost.

3. Information Costs Are High for Environmental Projects.

Lesson: There is a demand for reliable information on the performance of U.S. technologies. Local firms cannot readily get objective information on costs and performance of U.S. environmental technologies. Similarly U.S. firms find it difficult to differentiate between real potential and hyperbole by local promoters. Most information comes directly from vendors or potential local partners who are unlikely to be objective. At the same time, most of the information provided by governments or trade associations is so general that it is of limited use in evaluating technologies or the suitability of particular companies.

The cost of getting reliable information is especially high for those countries like Poland where much of the decision-making and action has shifted to the local level. In these cases, regionally-based CEE firms do not have the same access to information about foreign technologies and vendors as do firms based in the capital city. Similarly, U.S. firms find it much more difficult and time-consuming to get information on local companies which are located in the provinces rather than the capital city.

In many cases, the best (or only realistic) way to generate reliable information is first-hand observation. The CDI Environment project would have benefited from more formal access to other USAID projects which could have funded targeted travel by interested local partners to the United States or U.S. firms to the region. In addition, it would have been extremely useful to have been able to fund small demonstration projects for innovative technologies which

often face considerable skepticism about their applicability to local circumstances.

USEPA and the State of California are undertaking interesting initiatives to certify environmental technologies. These initiatives are limited primarily to soil and groundwater remediation technologies which are less relevant to current CEE environmental priorities than water, waste and air pollution control technologies. Nonetheless, they may provide potential lessons for joint USAID and USEPA or state programs.

The Authentication Report prepared by the CDI Environment staff and subcontractors for the Lemna Corporation was instrumental in reassuring potential local partners that the technology could be expected to meet EU and local requirements. Because of the skepticism on the part of potential local buyers, there is also a special premium on demonstration projects which provide on-the-ground proof of performance. For example, Lemna was only able to develop additional projects after the successful demonstration at the first two sites.

Recommendation: USAID should evaluate USEPA's and perhaps California's current initiatives to develop, translate and distribute information on comparative performance of U.S. environmental technologies. Based on that evaluation, future USAID programs should work in closer coordination with those programs which can provide official documentation on the performance of U.S. environmental technologies.

ANNEX A

PROJECT CASE STUDIES: INTRODUCTION

The case studies provided in this Annex illustrate how environmental projects were developed under the CDI Environment Subcomponent. They illustrate the implementation of the Environmental Project Development Process illustrated in the Final Report, Section II, Table 1. They also demonstrate the experience upon which many of the "Lessons Learned" in Section V are based.

Overall, these case studies show that environmental project development in Central and Eastern Europe can be expected to be a long and multi-phased process. That process is often characterized by false starts, great complexity, and many hiatuses when projects appear to be dead. Some do "go away," as it would appear the tire recycling project has done. On the other hand, as in the cases of biobriquettes and coal-bed methane, projects which appeared at mid-point in the program to be lost, proved to be merely dormant and were regenerated in the last year. At the end of the CDI Environment Subcomponent program, the viability of both these last was once again in question because new economic obstacles emerged. They should not be counted out, however, given past history and the fact that both have many environmental and market assets remaining to spur renewed efforts in the future.

Other projects -- representing more established lines of business, more apparent income-generating potential, and less need for policy-level interventions -- proved considerably more straightforward. For example, at the end of the CDI Environment Subcomponent program, the EZT/Earthshield cleaning agent venture was

operating profitably, and still holds the record as the "speediest" CDI environment project, requiring only a little over nine months of elapsed time from inception to completion. Similarly, in January, 1995, the EKO-BUD/EURO-AM \$15 million waste management joint venture, which came together relatively quickly, was underway and spawning spin-offs in other areas of Poland.

Wastewater treatment projects provided a policy/infrastructure -- as opposed to business-venture -- emphasis, and represent the environmental sector with the greatest number of CDI Environment Subcomponent projects and activity in all four countries where we operated. These case studies demonstrate the unique requirements of introducing U.S. innovative technology into the CEE public sector. We found that U.S. technology vendors must be intrepid and persistent, and that technical assistance, which provides expertise in municipal finance and technology options, greatly facilitates decisions and actions.

These vignettes are representative and are intended to provide the reader with a "flavor" for the CDI Environment Subcomponent experience in project development. Similar stories could be told for all of the projects on the Executive Summary matrix, as well as for those discussed in the Project Summary sections of the "Individual Country Reports" in Annex B.

CDI ENVIRONMENT CASE STUDY: TIRE RECYCLING (SLOVAKIA)

The Tire Recycling Business Opportunity

EuroSarm, a private Slovak company based in Martin, was established in August 1992 as an outgrowth of Sarm D. Zagyi. In 1991 its primary business was storage and wholesale of durable foodstuffs. In December of 1991, the company purchased an additional property which has an active rail site, expanded its import/export business, and increased its annual EBIT to more than \$800,000 by the end of 1992.

The CDI Environment Subcomponent Project Manager first met one of the owners of EuroSarm in June 1992 and discussed the possibility of a tire recycling project. EuroSarm proposed to set up a rubber tire recycling facility in the Czech Republic as part of its operations. This decision was based on an economically motivated desire to create a profitable business which would provide environmentally beneficial services. To this end, EuroSarm enlisted the assistance of an American businesswoman, to help determine possible markets for end products and to locate sources of financing.

The proposed project envisioned a fully integrated rubber tire collection system in Slovakia, because there was no existing waste tire collection organization in Slovakia, and no organized scrap tire collection system. There was, however, a rapidly growing demand for crumb rubber products on a commercial basis. This project envisioned setting up a national collection system, acquiring technology, know-how, machinery and equipment for the granulation of waste rubber tires, and establishing contractual relationships for sale of the processed product.

EuroSarm did an analysis of the end market for its proposed crumb rubber product. On the basis of these efforts, which yielded several Letters of Intent from potential buyers of the end product, as well as other information obtained from independent sources, there was good evidence to believe that the project was economically viable and would succeed.

Assistance Provided to Encourage the Project

In the early spring of 1993, EuroSarm's resident American advisor contacted the president of the Czech and Slovak American Enterprise Funds, the International Executive Service Corps, the USAID mission in Slovakia, USAID regional advisor, Samuel Hale, as well as CDI Environment offices in Washington, Poland and the Czech Republic to acquaint them with the project. Specifically she was seeking assistance in creating a comprehensive business plan in order to secure funding for the project.

At the outset, EuroSarm was considering construction of its facility at a property it owned in the Czech Republic. The CDI Environment office in Prague investigated the status of waste regulations and export/import requirements, and identified other tire processing facilities in the Czech Republic. Ultimately the company determined that, given the location of its plant in Slovakia and the proximity of Austria as a source of used tires, it would locate the business in Martin, Slovakia.

On April 1, 1993 representatives of CDI Environment Headquarters and Warsaw

offices (the CDI Environment office in Bratislava did not yet exist) visited EuroSarm. It was decided the project would benefit from a short-term technical assistance team which would help create a full-scale business plan. CDI Environment Headquarters staff began looking for potential technology suppliers, investors and a specialist to travel to the region to help with the EuroSarm business plan. In July an expert in finance, with experience in putting tire recycling ventures together, went to Slovakia to begin work on the business plan and developing financing for the project. Over the next several months, he and the Warsaw RBDO, who visited EuroSarm intermittently, worked with the company to perfect the business plan and to prepare an loan application to the Slovak-American Enterprise Fund (SAEF).

In November, the finance expert and the RBDO returned to Slovakia to assist representatives of EuroSarm in presenting their application for financial assistance before the Slovak-American Enterprise Fund. The application was well received; Fund representatives suggested that the identification of an equity partner would improve the likelihood of a favorable disposition of the application. During December of 1993, a representative of the Fund went to the EuroSarm facility in Martin to inspect its capability and to review corporate records.

Upon his return to the U.S. following the Fund meeting, the finance expert approached several U.S. firms with suitable technology. He and the RBDO met with representatives of the Slovak-American Enterprise Fund in Washington in January 1994, and subsequently representatives of the Fund in Bratislava made a second due-diligence visit to EuroSarm. Also during this period a survey of the world market for crumb rubber revealed that the market was growing

and the price of the product was increasing. With aid from the finance expert, a U.S. tire recycling firm obtained approval from its Board of Directors to seek equity investment in EuroSarm; and a meeting was scheduled for April, 1994. In addition, a major U.S. waste management firm with state-of-the-art technology expressed interest and invited representatives of the Fund to see its newest facility for rubber recycling in the United States.

At this point the project stalled. A planned April meeting of the finance expert and the SAEF was cancelled. A visit by the equity partner was deferred. The Fund indicated to EuroSarm that it would be positively disposed toward an additional market study under the auspices of the IESC. The company considered undertaking the study, but did not proceed. In July, the Fund rejected the EuroSarm application.

Lessons Learned

In the beginning and even at the end, significant evidence suggested the EuroSarm project could succeed. There were risks such as possible unforeseen regulatory constraints that would restrict import of used tires; or competition from other firms not yet on the horizon might erode the market; or possibly the management of EuroSarm was not up to the task of following through on such a departure from its core business. But these potential obstacles were evaluated and seemed surmountable.

The CDI Environment team that worked on this project in the U.S. and in Slovakia was especially frustrated. In the course of the project, there always seemed to be an additional hurdle: a market study, a U.S. investor, another market study. Nevertheless, efforts to satisfy were generally well received until the end. It would have been far better had the Fund

been more direct early on, certainly after the due diligence visits, that they simply considered a project like this too risky given their portfolio, and its chances of a loan were slim to none.

For its part, the CDI Environment team may have been overly enthusiastic about the project, and too much influenced by tire recycling market growth potential in the U.S. This project suggests that future projects should begin with clearly agreed guidelines of the criteria for assistance, and that the first determination must be financibility, using the most conservative evaluation criteria. The difficulty in Central and Eastern Europe is that so much up-front work must nonetheless be done to provide a basis for a fair assessment of the financibility of a project. And when that work appears to support a project, it is very difficult to leave any stone unturned to see it through to success.

Points Worth Noting

The EuroSarm project looked highly probable for lucrative, outside investment. EuroSarm was a well-capitalized company, had selected a project in an area where a clear need had been established, enjoyed the support of both the Slovak and American Government programs, and had independently employed an American experienced in business to put the project together. The inexperience of the company and the reluctance of the lender proved fatal as a project attenuated by indecision and misunderstanding among the primary players - despite the good offices of the CDI Environment staff and other helpers - finally failed. This clearly establishes that a much more robustly-managed company and early identification and satisfaction of a potential lender are crucial to project success.

CDI ENVIRONMENT CASE STUDY: BIOBRIQUETTES (POLAND)

The Environmental Opportunity

In June 1992, shortly after the inception of the CDI Environment Subcomponent program, the CDI office in Warsaw identified the need to locate technologies and joint venture partners for production of biobriquettes in Poland. The Warsaw office reached this conclusion because of a large number of requests for this type of assistance from national and local level contacts.

Environmental authorities in Warsaw and in the voivodeships recognized that substantial economic and environmental benefits could be realized if Poland could use the substantial amounts of wood and agricultural wastes to make fuel. Not only would the use of these wastes to make biobriquettes directly eliminate a source of pollution (acid drainage from waste piles and smoke from burning straw in the fields), they would also allow the substitution of a renewable fuel for dirty coal. Moreover, the possibility of co-firing coal with biobriquettes made with a lime additive could eliminate much of the SO₂ emissions and reduce the need for expensive scrubbers, especially at obsolete power plants, whose remaining useful life is short.

Poland had a small number of "cottage" industry level producers of biobriquettes around the country using woodwastes from sawmills and paper plants. The production was of poor quality because of the unreliability of the Polish briquetting machinery and lack of management capacity. At the same time, there were increasing indications of strong demand for high quality briquettes from Scandinavia,

Germany and Austria and a growing awareness of the environmental damage being caused by large piles of woodwaste and the burning of straw in the fields.

As a result of the need to find uses of the wood and agricultural wastes and the opportunity to generate income producing employment, the Warsaw office asked the CDI Headquarters staff to give this area its highest priority attention.

The Project History

In order to respond to the Warsaw office request, Headquarters undertook a brief review of the U.S. biobriquette industry and the potential for assisting potential joint venture partners in Poland. In addition to desk research, one staff member attended a two-day meeting of the Fiber Fuel Institute in August 1992 to better understand the technology and the potential interest of U.S. briquette companies in Poland. Based on the meeting, it appeared that the U.S. had relevant technologies (pellets, briquettes, and cubes) and that several of the leading U.S. manufacturers were interested in looking at the Central European market.

The conference indicated that the primary focus of the U.S. industry was on producing fuel for the up-scale market for pellet stoves. The pellets are of high quality, but are very expensive and were not likely to be suitable for the Polish market. Alternatively, there was a much less well developed market for "cubes" which are of lower quality but much less expensive to produce. As a result, CDI Headquarters staff concluded that the best opportunity for U.S. firms would probably be in introducing

the U.S. briquetting or cubing technology (which is primarily used for agricultural feed production in the United States) as a low cost method of densifying wood and agricultural wastes in Poland.

Technical Assistance Team Visit

In October 1992, Headquarters staff led a three-person team for a ten day visit to Poland. The team included two business planners and a technical expert with over 25,000 hours experience in operating briquetting and cubing machines. The team visited four voivodes and met with over a dozen potential local partners as well as a number of utilities that might be buyers of the briquettes. The team found uniform interest in the concept, but only two candidates who seemed to have the technical and business capacity to serve as partners for U.S. firms. Furthermore, all of the utilities interviewed expressed interest in testing briquettes and two further indicated that they might be willing to invest in such ventures.

Upon returning home, the team prepared a report on the overall situation, the business opportunity, and pro forma financial projections for a prototype production venture. In short, the conclusion was that there was a strong need for better technology for drying, processing and densifying wood and straw wastes and that there were good business opportunities for U.S. firms in Poland.

The Local Entrepreneur

At the same time, the Warsaw office began working with an entrepreneur in Bydgoszcz who appeared to be the best qualified of the potential local partners. He had secured a site and a long-term contract for high-quality wood wastes from an adjacent paper mill. He had identified German briquetting

equipment as his first choice (because of reliability and the fact that it made a large "brick" of a type already in widespread use in Western Europe). He was, however, interested in U.S. dryers and the possibility of adding a cubing machine in the next phase.

The Polish entrepreneur lacked an adequate business plan to attract financing or a foreign investor. The CDI Environment project assisted him by obtaining the services of Ken Macek, a former regional advisor to the CDI project, to help in developing a western-style business plan, but it turned out that this was insufficient to help him overcome the difficulties in securing financing. Specifically, the local banks required him to put up collateral equal to **three times** the value of the guarantee he needed to post in order to qualify for either U.S. or German export credits. As a result, he was unable to proceed with the necessary investments and the opportunity languished.

Locating U.S. Technology

In the meantime, CDI Headquarters staff circulated the report on the biobriquette opportunities in Poland to about a dozen of the best candidates in the United States. Only one, a producer of refuse derived fuel (RDF) in Chicago, was seriously interested, but did not have the cash to invest directly and was unwilling to use his limited credit line for an international investment without supplemental financing. The CDI Environment Headquarters and Warsaw staff approached several potential sources of financing (Environmental Enterprises Assistance Fund, Global Environmental Fund, and the International Finance Corporation) but the project was respectively too large, too poorly secured, or too small for them.

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Sticking with the Opportunity

Both the Washington and Warsaw staffs believed that there was still substantial potential for biobriquette projects in Poland. Therefore, contacts were continued in both countries. In the United States, the CDI contractor began working through a West-coast trading company which had an office in Poland and had become interested in the project. They recontacted several of the U.S. companies and managed to interest one of them sufficiently that they visited Poland in September 1993 to evaluate the potential of the Bydgoszcz project. The U.S. company was interested, but ultimately decided that they were not willing to make the management and financial investment necessary to pursue the project.

On the Polish side, the Warsaw office continued to stay in touch with the original entrepreneur (who was beginning to run out of money) and another businessman whom they had also met in Bydgoszcz on the initial trip in 1992, who was, by this time, building a small briquette manufacturing company, NABRU, using raw material from the same paper mill. NABRU was using all local equipment and demonstrating substantial skill in keeping it running and producing export quality product. The owner/manager of NABRU was interested in expanding his production regionally and requested assistance from the Warsaw office in identifying potential sites and sources of expansion capital.

The Warsaw office had independently been working with the environmental officials in the Lublin voivodship who expressed a strong desire for assistance in biobriquettes. The Warsaw office introduced NABRU to several potential partners in Lublin in the late spring of 1994 and by the end of the summer three Lublin-based companies and formed a new company, ECO-PRODUCT

S.A., in conjunction with NABRU. In the fall of 1994, the Warsaw office also assisted in introducing the new company to CARESBAC-POLSKA which indicated an interest in financing the venture.

Creating a Spin-off

On a separate track, the CDI Environment Headquarters staff stayed in contact with the technical expert, Mr. Tolmie, part of the original technical assistance team. Based in large part on the potential he saw during the trip to Poland in the fall of 1992, he had patented a proprietary process which incorporates injection of ammonia in the cubing process. The ammonia softens the wood fibers and allows faster production of better quality cubes. In the late fall of 1994, with assistance from Headquarters staff, Mr. Tolmie applied (in conjunction with the University of Idaho) for a USEPA grant under its Technology for International Environmental Solutions (U.S. TIES) program, which would allow for full commercial scale demonstration of the process.

As part of the application for the grant, Mr. Tolmie discussed with the CDI Environment Headquarters staff the possibility of demonstrating the process in Poland as well. The Warsaw office approached the Lublin officials and company and they indicated strong support for a demonstration project for producing lime-enhance briquettes from wood waste and from straw. It is not clear what the prospects are for Mr. Tolmie and the University of Idaho to win the grant, but if they do, it includes funds for developing an action plan to demonstrate the technology in Lublin.

Lessons Learned

Two basic lessons can be derived from the biobriquette project in Poland.

The first lesson is that greater care should have been paid to the structure of the industry at the outset. There is no question that the environmental (and economic) benefits accruing to biobriquette production are great. The problem is that the industry in both Poland and the United States is essentially at the "cottage" level. The firms are small and mostly family owned and lack the management and financial depth necessary to easily do international business. In addition, the likely levels of investment in individual facilities typically run in the range of \$1-5 million and this size transaction is especially difficult to finance (i.e., too big for the small environmental funds and too small to be of interest to multi-lateral development banks or international banks).

The second lesson is that it takes persistence and luck to bring this type of project to fruition. The initial project did not materialize because of difficulties in matching U.S. and local firms and in getting financing. Nonetheless, it appears almost certain that the local biobriquette industry will be developed more quickly because of the introductions by the Warsaw Environment Subcomponent office and the visibility given to the potential for production in Poland.

In addition, depending on TIES funding, there is still a chance that a truly innovative project for producing lime-enhanced briquettes from agricultural waste will materialize because of the interest developed by Mr. Tolmie in the potential for this technology in Central Europe and the ongoing assistance of the Warsaw office in stimulating interest in Lublin for a demonstration project there.

CDI ENVIRONMENT CASE STUDY: COAL BED METHANE (POLAND)

The Environmental Opportunity

In the late 1980s, prior to joining the CDI Environment Subcomponent project, members of the CDI Environment staff in Central Europe and at Headquarters had assisted a U.S. company, McCormick Resources, to get a concession for coal bed methane in Poland, we were aware of the tremendous "win-win" nature of coal bed methane projects. These projects, which extract methane through specially-drilled wells in advance of mining operations, capture valuable methane gas which would otherwise be an explosion hazard in the mines and is typically vented. This vented gas is 20-50 times more potent than CO₂ as a greenhouse gas. In addition, the use of recaptured methane can substitute for the use of coal, thereby also reducing emissions of particulates, SO_x and NO_x.

One of the constraints to exploiting the coal bed methane resource is the need to dispose of the water which is produced along with the gas from the wells. The produced water is typically quite salty and Polish officials made it clear from the start that they would not allow production of coal bed methane if any of the produced waters were discharged untreated into waterways. The only ways to treat this water would be with prohibitively expensive desalinization technologies or through deep injection wells.

In addition to the potential problem of disposing of produced water from coal bed methane, Poland faces an urgent challenge in dealing with the disposal of salty water pumped from existing coal mines.

Something on the order of 7000 tons per day of salt is being discharged from the mines

currently and the current efforts to treat the worst of the mine discharges (with desalinization) are expensive and only cover a small percent of the total. As a result, successful deep injection wells for coal bed methane could also be used to help solve the mine wastewater discharge problem.

The Project History

Early in the project in the summer of 1992, CDI Environment Warsaw staff confirmed that the water disposal problem had not been solved, and that it (along with difficulties in negotiating satisfactory fuel pricing contracts) was stalemating any progress in developing coal bed methane resources in the country. On that basis, CDI Environment staff reestablished contact with McCormick.

Shortly after that contact, CDI Environment Headquarters staff were approached by a U.S. firm that was trying to convince the Polish Government of the benefits of deep injection technologies to dispose of the mine waste water discharges. This firm had hired a local representative, but had little luck in moving the Polish bureaucracy toward developing the legal and administrative regime necessary to allow re-injection to be effectively regulated.

The U.S. company was referred to the Warsaw office which helped arrange meetings with relevant local officials. The CDI Environment Headquarters staff approached USEPA to see what type of assistance they might provide, but could not identify any readily available experts or program vehicles which might have allowed EPA or State regulators to serve as advisors to the Polish Government (nor was there any

apparent interest on the part of the Polish Government for such assistance).

In the absence of official programs to assist in breaking the regulatory constraint, the Warsaw office put the U.S. companies in touch with private attorneys who could work with them in trying to move the process along. By the spring of 1994, the Polish Government had approved the drilling of one or more test wells and McCormick approached the Headquarters staff for assistance in finding financing for a possible test well, which would demonstrate the feasibility of deep injection for both coal bed methane and for a group of coal mines which had expressed interest in participating in a commercial venture to dispose of their wastewater.

McCormick was introduced by the Headquarters staff to the International Finance Corporation, which had independently become interested in the problem because they were considering financing AMOCO's venture in coal bed methane (AMOCO had the other primary concession in addition to McCormick.) In addition to potentially solving the coal bed methane problem, IFC staff also became interested in the possibility of the commercial venture to dispose of coal mine wastewater.

CDI Environment Headquarters and Warsaw staff worked closely with IFC, McCormick and AMOCO to help develop the concept and Warsaw staff accompanied the key IFC official on a one-week visit to Silesia to better understand the problems and potential solutions. The Warsaw staff included visits with the Higher Mining Authority and worker representatives, on the theory that any future deal would necessarily require their concurrence.

Following return of the IFC official, a specific funding proposal was developed and coordinated with the Global Environmental Facility (GEF) for potential funding. Unfortunately, in early 1995, the IFC learned that the deep injection project did not fit within the categories of activities eligible for funding in 1995. They will reconsider the project again next year but, given its potential importance, CDI staff believe it should be given priority for funding under the Environmental Action Program (EAP) or any other appropriate vehicle.

Lessons Learned

The primary lesson, as with almost all complex projects, is that the gestation period is much longer than anyone projected at the outset and only those players prepared to stay the course (in this case already over five years) are likely to succeed. And, indeed, it is still not clear whether the project will successfully get off the ground or whether a follow-on more comprehensive deep injection project can be financed to help dispose of coal mine wastewater discharges.

A second lesson is that high risk, innovative projects are very unlikely to be funded without government support. In the case of deep injection, there is a technical risk that the geologic formations may not be able to absorb the volumes of water currently predicted and thereby make deep injection financially inviable. However, once the demonstration wells (about \$5 million) are proven successful, private financing (or traditional public financing for government coal mines) may become feasible. In essence, the first well is a sort of "public good" which requires government support. However, even Polish government sources (e.g., the National Fund for Environmental Protection) were not willing to consider this

type of risky investment. Fortunately the IFC staff (through the GEF) saw the necessity of this type of intervention, with advice and support from CDI staff.

CDI ENVIRONMENT CASE STUDY: ENVIRONMENTALLY SAFE CLEANING PRODUCTS (POLAND)

The Partnership

On November 29, 1993, the Polish company EZT and the American company EarthShield signed a joint-venture for mixing, packaging, marketing, and selling environmentally friendly cleaning products. Sales began in July, 1994.

This new Polish firm, called EarthShield Polska, resulted from CDI Environment identification of EZT as a promising local partner, as well as facilitation of joint-venture negotiations. In addition to demonstrating successful assistance in establishing a joint-venture, this profile highlights three other important aspects of the CDI Environment program: inter-regional coordination, inter-program cooperation, and the potential for associated project spin-offs.

Background

EarthShield International was incorporated in 1991 in North Carolina. It has the exclusive rights to market and distribute patented bio-degradable cleaning products (the Eco-Clean line) outside of the United States. These products are used for commercial, industrial and consumer cleaning applications. Currently, EarthShield has factories in seven countries and distribution in fourteen. EarthShield's European operations are run from their office in the Czech Republic where they already mix, package and sell concentrates in cooperation with a Czech firm.

EZT, a private Polish firm in Sosnowiec, was founded in 1990. Its principal activities include construction and operation of numerous washing and cleaning facilities for railway cars, buses, trucks and streetcars.

EZT employees approximately 200 people, and is managed by a dynamic, aggressive and experienced team. The firm is debt-free, which is unusual among most companies in Poland and elsewhere in the region.

Matchmaking by Three CDI Environment Subcomponent Staff Offices

On March 16, 1993, the CDI Prague office met with EarthShield to discuss possible assistance under the CDI program. At that time, EarthShield was interested in several different possibilities, including a matching grant for development of surfactants for PCB clean-up, regulatory authentication reports about the absence of harmful residues from their cleaning products, and locating potential partners in other areas of Central Europe. As a result of this meeting, the Prague office sent information and material about EarthShield to both the CDI Environment Budapest and Warsaw offices. In May, representatives of CDI Environment from Washington, Poland and the Czech Republic met with EarthShield's president. On May 13, 1993, the Warsaw office informed EarthShield that it had identified a potential joint-venture partner.

The Warsaw office met this potential partner, EZT, through the USAID Environmental Training Project for Central and Eastern Europe (ETP). EZT requested assistance in locating a suitable partner who could improve their competitive stance by injection of new technology and know-how in the form of a joint-venture. The Warsaw office worked with EarthShield Prague to ascertain the criteria for possible partners, and determined that EZT met the requirements. A meeting was arranged

between both companies in Poland, and joint-venture discussions began in earnest.

These discussions culminated in the signing of an EZT-EarthShield joint-venture agreement on November 29, 1993 in Sosnowiec. EarthShield Polska will mix, package and market the Eco-Clean line of environmentally friendly cleaning products for commercial, industrial and consumer cleaning applications throughout Poland. EarthShield's contribution consists primarily of the required dosing, mixing and packaging equipment, technical know-how and the supply of the patented Eco-Clean ingredients for the production of ecologically friendly cleaning products.

EZT holds 60 percent of the shares, with EarthShield's equity representing the balance. The Polish contribution includes the plant site and the required marketing effort, based on an existing sales and service organization, in-country expertise, and an extensive network of contacts throughout the Polish market. Although the basic capital of EarthShield Polska is relatively low, the turnover potential is quite high and can be expected to reach a multi-million dollar level quite soon.

The Spin-offs

In addition to locating a Polish partner for EarthShield, CDI Environment staff also established cooperation between EarthShield in Prague and the Czech office of Comco-Martech environmental services company. Comco-Martech is an American firm working in environmental remediation in the Czech Republic, Slovakia, Hungary, and Austria. During April of 1993, Comco-Martech was in the midst of preparing a proposal for PCB remediation at a site in the Czech Republic. Comco-Martech was in need of an effective surfactant to use in the soil remediation program. The CDI Prague

office established communication between both firms and arranged for the delivery of EarthShield products to the Comco-Martech lab for testing. The tests were successful, and EarthShield products were included in the Comco-Martech proposal. Comco-Martech won the tender and is now in the midst of site remediation. The two firms are exploring cooperation for future projects as well.

At the very end of the CDI Environment program, EZT began negotiation with MCT International for a joint-venture to construct train, bus and truck cleaning facilities. Clearly EZT has become sufficiently robust to expand on its own without further CDI assistance.

Lessons Learned

This successful Polish-American joint-venture demonstrates several positive elements of the CDI program. The selection of potential partners, and the ensuing negotiations involved the CDI Warsaw and Prague offices. Additionally, the Warsaw office was able to identify a suitable Polish candidate through its established contacts with another USAID-supported program in the region, the ETP. Lastly, CDI Environment helped conclude a relationship between an indigenous Polish company and an American firm operating out of the Czech Republic.

Points Worth Noting

EarthShield had failed to establish a joint-venture in Poland in its two previous independent attempts until CDI Environment assistance provided EarthShield with a viable partner. This joint-venture arrangement was concluded only eight months after the initial meeting between CDI and EarthShield. This time period from initial meeting to culmination of a

formal business arrangement is unnaturally brief for business development in the U.S., much less in Central Europe. The timing can be attributed to several factors. First, EarthShield had been active in Central Europe since 1991, and had an existing office in Prague. Second, since EarthShield had been working internationally, it had established clear requirements and procedures for selecting partners, concluding agreements, and getting approval for the cleaning products in foreign countries. Third, both EZT and EarthShield were actively searching for a foreign partner and the ready availability of the CDI Warsaw office, with its combination of U.S. and local staff, was able to promptly and efficiently introduce the parties to each other and assist their discussions. All of these factors contributed to successful, rapid negotiations and the conclusion of an agreement in about half the time normally expected in the region.

The Comco-Martech and EarthShield cooperation demonstrates that successful projects may rely on "being in the right place at the right time," as was the case with the CDI Environment Prague office. In both cases, this type of cooperation would not have been possible without local representatives on the ground.

The EZT expansion into a new joint-venture for fleet cleaning facility construction demonstrates the sustainability that a program, such as CDI, aimed at business development can provide.

CDI ENVIRONMENT CASE STUDY: MODERN LANDFILL CONSTRUCTION AND MANAGEMENT (POLAND)

The EKO-BUD joint venture is a product of cooperation between a group of U.S. firms (EURO-AM Resources Corp., Harris Waste Management Group, Inc. and Lundell Manufacturing Company, Inc.) and EKO-BUD Co., Ltd, a private Polish company located in Warsaw. EKO-BUD was founded over four years ago and is specializing in construction projects for housing development and municipal services, especially landfills. It is managed by a dynamic and experienced team.

EKO-BUD approached the CDI Environment Warsaw office in August 1993 to ask for assistance in identifying a U.S. partner who could improve their competitive standing by injecting new technology, expertise and capital for solid waste management projects in Warsaw.

The EURO-AM group has been active in the Polish market for over three years, especially in the Katowice area where, together with Polish-Italian companies (LANDECO Co., Ltd. and COFINCO-POLAND Co., Ltd), it was involved in construction of two modern landfills. Therefore, the request for USAID-CDI Environment assistance was related to the intent of this group to expand their operations to other regions in Poland.

Following receipt of these requests, the Warsaw office arranged contact for EKO-BUD with several U.S. companies interested in the Polish market; the EURO-AM group was introduced to several Polish firms, relevant environmental authorities and local financing institutions. Direct talks between EKO-BUD and the EURO-AM group were opened in October, 1993. The successful

negotiations resulted in an interim construction agreement between EKO-BUD and Lundell in December 1993.

The agreement talks culminated in an EKO-BUD/EURO-AM group joint venture agreement, signed on February 3, 1994. The new joint venture company is called EKOBUD Waste Management S.A. and is based in Warsaw. This Polish-American joint venture will build and operate a modern landfill, transfer stations and recycling plant in the Warsaw area. This will be the first modern waste recycling plant in Poland.

EKO-BUD holds 51% of the shares, and the EURO-AM group 49%. The preliminary business plans were compiled with the assistance of EKO-EFEKT Co., Ltd., a consulting company of the National Fund of Environmental Protection and Water Management. The Bank of Environmental Protection, brought in by the CDI Environment Warsaw office, expressed an interest in participating in the financing and providing the necessary guarantees for the U.S. Export-Import Bank. The Export-Import Bank is a likely source for project finance, since preliminary plans anticipate a large purchase of American equipment for the project. On March 11, 1994, EKO-BUD signed a \$13 million contract with Lundell Engineering to erect the facility.

Expansion Potential

In addition to locating a Warsaw partner for the EURO-AM group, the CDI Warsaw office also assisted in opening talks between the group and authorities in several major cities in Poland and potential local partners

(Bydgoszcz, Lodz, Tychy and Lublin). This facilitation could lead to early start-ups of several new projects.

The situation seemed most promising in the case of Tychy as ENCOM S.C., a local company responsible for municipal solid waste management. ENCOM S.C. submitted a proposal to EURO-AM group on February 3, 1993. Included in the proposal was a project to complete landfill construction for one site and to build and operate additional transfer stations. The assistance efforts of the Warsaw office for this project included introducing the group to the authorities of the city of Tychy at the suggestion and with the recommendation of the Ministry of Environmental Protection, Natural Resources and Forestry. At the end of the CDI program, this project was stalled because of local politics.

Lessons Learned

This successful Polish-American joint venture demonstrates several positive elements of the CDI program, especially the possibility of presentation of several local partners to a U.S. firm interested in entering or expanding this market, combined with opening contacts with relevant local environmental authorities and financial institutions.

As stated above, the EURO-AM group already had some experience in the Polish market when they approached CDI for assistance in expanding their activities. Nevertheless, it should be noted that the joint venture agreement was signed in less than four months from the time of opening talks between partners, which was due in part to recommendations and additional contacts (especially with local environmental authorities and financing institutions) provided by the CDI Warsaw staff.



CDI ENVIRONMENT CASE STUDY: WASTEWATER TREATMENT USING AQUATIC PLANTS (POLAND)

The Environmental Opportunity

Within a month of starting the CDI Environment Subcomponent program, both Warsaw and Headquarters staff identified the need to help Poland develop low cost wastewater treatment systems. Much of the water in the country is too polluted even for industrial use; virtually everyone has to rely on expensive bottled water for drinking. The largest environmental investment requirements were for water and wastewater treatment and the daily inconvenience of inadequate water made the issue the highest public priority.

Notwithstanding the interest in wastewater treatment, the cost of traditional wastewater treatment is prohibitive for most smaller communities (a problem even in the United States). The CDI Environment Subcomponent staff felt, therefore, that one of its priorities should be in identifying innovative, low-cost treatment technologies. This conclusion was based primarily on the environmental priority of the problem, but also on the reality that most conventional U.S. wastewater treatment firms were not competitive with the large private British and French firms (e.g., Severn Trent, Lyonnaise des Eaux).

The initial focus was on very low cost "constructed wetland" systems which had been under development in the United States (and to a lesser extent in the U.K.) for the last decade. There is currently a lot of interest in these systems and a large number have been put in place or are under development. The Headquarters staff identified and approached several firms which with expertise in constructed wetlands, a few expressed substantial

interest in pursuing opportunities in the region. In addition, the Warsaw office identified several groups, especially the National Fund of Environmental Protection and Water Management, which wanted to take advantage of American expertise in the area.

After a number of leads had been identified and pursued, the CDI team reluctantly concluded that such very low cost technologies were simply too difficult to transfer. In essence the problem is that there is so little opportunity to provide equipment or expatriate consulting services, that there is little chance for a U.S. firm to recoup its market development costs. In addition, most of the small villages that would be appropriate users of these systems did not have the funds (or at least were not willing to pay) for expensive foreign consultants and services.

Based on the experience with constructed wetlands, the CDI Environment Subcomponent staff began looking for other innovative low cost wastewater treatment technologies that might have better business prospects. One of the first to come to our attention was the proprietary technology developed by the Lemna Corporation of Mendota Heights, Minnesota, which uses a patented floating grid system to keep a cover of duckweed plants over a portion of treatment lagoons. These plants provide for advanced treatment (reduction of solids, organic and non-organic material) through anaerobic digestion and nutrient uptake by the plants.

The Project History

Headquarters staff contacted the President of the Lemna Corporation in early summer of 1992 to determine their interest in exploring business opportunities in Central and Eastern Europe, especially Poland where the regional office was functioning. He indicated strong interest and informed staff that the company had already had some marketing success in Poland which was one of their high priority target markets. The company had agreements to develop two prototype demonstration facilities and wanted the regional office's assistance in assuring that the facilities received necessary bureaucratic approvals and publicity as demonstration sites.

Lemna had appointed a local agent and the regional office worked closely with the local agent. The two demonstration facilities were quickly completed and an opening ceremony planned for Kochcice, near Czestochowa, in the fall of 1992. The Warsaw office helped the local agent identify key officials who should attend the opening and made the invitations to many of those whom Warsaw staff knew personally. As a result attendance at the opening was approximately twice what had been originally expected, and Lemna officials were very appreciative of the assistance of the Warsaw office.

Prior to the opening, however, Lemna began to get disturbing reports that rumors were spreading that the Lemna technology would not work, especially in the cold Polish winter. In order to counter this misinformation, Lemna and CDI staff decided that it would be very helpful to prepare an "Authentication Report", which would objectively document the performance of a sample of Lemna facilities operating under different climatic conditions in the United States and to document the specific

treatment levels being achieved by these facilities and compare them with the performance standards required by U.S., European Union, and Polish law.

The Authentication Report was prepared by the CDI subcontractor NETAC (the National Environmental Technology Applications Center) which is a USEPA grantee and brought considerable objectivity and credibility to the report. The report was delivered in September 1992 and proved to be extremely useful to Lemna in countering unfounded allegations against the efficacy of its treatment technology.

CDI Environment staff continued to try to increase awareness of the aquatic plant technology whenever appropriate. For example, the Warsaw staff arranged a meeting in November with visiting CDI Headquarters staff and Dr. Maria Stolzmann, the Advisor to the President for Rural Affairs, who was highly influential on matters concerning small wastewater treatment systems. She was well aware of Lemna through the CDI Environment Warsaw office and indicated interest but wanted to wait to see how the system performed through the winter. She was given additional assurances about the systems performance and sent a copy of the Authentication Report (and subsequently supported additional Lemna facilities).

Based on the performance of the two demonstration projects over the winter (and with the support of the CDI Environment staff and the Authentication Report), Lemna was successful in developing three more sites in 1993. By October of 1994, they had four more sites completed and three more nearing completion, resulting in a total of 12 Lemna facilities in the space of three years. These 12 plants demonstrate the feasibility of introducing innovative wastewater treatment technology with much broader

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applicability throughout the region. If a system will function in Poland's relatively harsh climate, it can be expected to work everywhere.

Lessons Learned

The first lesson is that projects have to have enough "value added" from the United States to make it attractive for the U.S. firm to invest the time and expense in developing the opportunity. In addition, very low cost systems (such as constructed wetlands) are difficult to finance.

A second lesson is that it is often difficult for the potential buyers in the region to get accurate and objective information about the performance potential of U.S. environmental technologies, especially those that are relatively new and innovative. As a result, it is extremely useful to have vehicles, such as the NETAC Authentication Report, which can increase the confidence of the foreign buyers that they are not being sold a "bill-of-goods".

A third lesson is that the local contacts of the local project staff can be an extremely valuable adjunct to the contacts of a local representative. The local Lemna representative had a few relevant contacts outside of Warsaw, and his reach was substantially enhanced by the good working relationships that the Warsaw CBDA had with key environmental and other officials in most of the voivodeships. Because of these contacts, the CDI local staff provided substantial "economies of scale" in enabling the U.S. firms to reach local officials who were making most of the purchase decisions.

CDI ENVIRONMENT CASE STUDY: WASTEWATER TREATMENT

The Environmental Need and Opportunity.

Wastewater treatment was the universal environmental priority of the local government agency officials and organization leaders who made up the primary public sector constituency of the CDI Environment Subcomponent. Many areas, especially rural towns and small villages, may have no wastewater treatment capability at all; even where systems exist, generally in larger cities, they are characterized by antiquated equipment and leaky transport piping. The environmental result is serious surface water pollution; the health result is that people either drink substandard or bottled water.

Accordingly, wastewater treatment in smaller towns emerged as a unique business and environmental opportunity for the CDI Environment Subcomponent because it was a priority among local officials, who were galvanized to find the money and the technologies to install new systems. In addition, wastewater treatment turned out to present a significant policy assistance opportunity for the CDI Environment Program because it was at the heart of enormous and rapid change in local regulatory and financial institutions.

Wastewater treatment provided the CDI Environment Subcomponent a forum for introducing financing mechanisms and treatment technologies where the U.S. is outstanding in its expertise and highly competitive. It also permitted the CDI Program to operate in a niche where entrepreneurial U.S. firms and small, local partners/consumers were eager for assistance

because they have been largely overlooked by other programs. Finally, wastewater treatment presented the opportunity for the CDI Environment Subcomponent to participate in the financial and institutional ferment occurring in all of the countries where we were resident. As a result, the CDI Environment staff and USAID sponsors were able to experiment "hands-on" with how to make business development-based environmental projects work.

The case study on aquatic plants in this Annex and a number of the Project Summaries in the Individual Country Reports in Annex B provide details about the activities of specific technology providers and about the technical assistance field visits. Our objective in this case study is to describe in a general way how a number of different forces interacted through the CDI Environment Subcomponent to leave specific people and organizations in a better position to address their wastewater treatment needs in the future.

Providing Technical Assistance in Municipal Finance and Wastewater Technology.

The circumstances of a consortium of towns in the Orlice Region of the Czech Republic are representative of what the CDI Environment staff found generally. In 1991, forty towns banded together to form an Association of Towns and Municipalities to address overall environmental problems, including wastewater treatment. They commissioned a study of their wastewater treatment needs. Some had no systems extant; some had inadequate systems; and

some had been left by the communists with unfinished conventional systems, which in most cases were well beyond the size system needed and the towns universally could not afford to complete.

In general, the officials in these towns had no idea how to finance new or improved systems. Most started out thinking they would get a central government grant, allowing them to ignore temporarily the need to institute improved user fee structures. Over the course of the CDI Environment Subcomponent involvement, as it became clear that grants were largely a thing of the past, town officials developed a growing interest in taking advantage of donor-backed loan programs and new municipal finance options being developed by local banks.

The CDI Environment staff travelled to the Orlice and Palava regions in the Czech Republic in the winter of 1993 and established an ongoing relationship with a number of these towns. Over the course of a year and after numerous repeat visits to establish credibility and come to a full understanding of the needs, the staff ascertained that the CDI Program could help in three possible areas: financial planning, technical evaluation, and watershed management. By the time this assessment was made, it was determined that similar assistance could also be transported to two areas of Slovakia as well.

Assistance in municipal finance: On two separate occasions in the summer and fall of 1994, a municipal finance expert was sent to provide in-depth assistance to selected towns in the Czech Republic and Slovakia. In Jablonne in the Czech Republic and in Sala in Slovakia, she met with mayors and town officials to do finance planning, including identifying and pricing possible sources of capital; outlining loan repayment terms and

security requirements; and introducing important provisions of service and construction contracts and loan agreements. She also designed specifically tailored financial models for use in calculating user fees under a number of scenarios.

This exercise allowed the local officials to see that in almost every case, they could not afford to finance the wastewater treatment projects that had been left unfinished or in some cases had been proposed by local engineering/design firms. These case studies provided the basis for seminars with a wider audience on the expert's second trip, in which the mayors and officials she had assisted participated.

Helping identify appropriate technology:

In a single trip to the same regions assisted on finance, a U.S. technology expert experienced with U.S. EPA's Small Flows Clearinghouse, was sent to work with local officials to identify the most appropriate low cost or alternative wastewater collection and treatment technologies. He provided criteria to determine the parameters that must be considered in system selection, e.g., density of population, and information regarding construction and operation/maintenance and cost-effectiveness. Upon his return to the U.S., he persuaded several vendors do provide no-cost proposals of how their technologies could be applied.

Helping U.S. Entrepreneurs Get a Foothold.

When the CDI Subcomponent began in April, 1992, several U.S. wastewater treatment vendors with non-conventional, low-cost technologies -- Lemna and Future Waters among them -- were already active in the region. Other vendors with simple mechanical systems -- Spec and Chief are representative -- were just getting underway exploring the market. These alternative

technologies generally fall into three categories: agricultural reuse, constructed wetland and simple mechanical. The CDI Environment Subcomponent Program helped these vendors in several important respects which demonstrate the kind of technical assistance future programs may want to feature.

Technology performance validation: By the time the CDI Environment Subcomponent got to Central and Eastern Europe, many technology vendors from all over the world had already made the rounds. So local officials and potential purchasers were becoming increasingly skittish and skeptical about the value of these "foreign" products, especially these innovative technologies with no local analogue. Since there were few if of these technologies working in the region and since at home in the U.S. these alternative, low-cost wastewater treatment approaches remain outside the "mainstream," it became clear early on that a major stumbling block to local acceptance and funding would be demonstrating performance.

The CDI Environment Subcomponent materially assisted the Lemna Corporation in Poland by preparing a "desk study" demonstrating that the technology met the federal and state standards where it had been implemented in the U.S., and possessed documented specifications that would meet European Union and Polish environmental standards in Europe. This "Authentication Report," prepared with CDI short-term technical assistance was instrumental in convincing local Polish officials to allow the project to proceed and be replicated.

The Spec mechanical system was introduced into the Czech Republic on the basis of technical representations of its efficacy and with guarantees that the vendor would indemnify failure. Once this system is

operational in mid-1995, it will provide a local facility where interested officials from Slovakia, Poland, and Hungary can "kick the tires" before committing to buy.

This experience demonstrates that, notwithstanding their favorable price tags and short-term construction/installation requirements, these technologies meets resistance from an entrenched engineering and regulatory community. The U.S. experience has been similar, which leads to the conclusion that buyers must see the product work; so, programs in the future would greatly assist both the vendor and buyer if there were funds for demonstration projects or for buyers to travel to see the projects operating somewhere else.

Showing U.S. vendors the ropes: Many small U.S. vendors with highly competitive technologies need help making the time, travel and capital commitments necessary to doing business abroad. Each of the four CDI Environment wastewater treatment clients mentioned above demonstrated extraordinary effort to work over a long period, at considerable personal expense to stay with their early established efforts in the region.

They were materially assisted by the CDI Environment staff who were available to help them with logistical arrangements and accompany them, particularly to rural areas where many fewer people speak English than in the cities. The CDI Environment staff were also able to help the U.S. business people understand unique or particularly sensitive aspects of the local business and social culture which might not be obvious to an outsider. Thus, the CDI staff helped U.S. vendors avoid pitfalls that might disrupt or slow a project.

To a greater or lesser extent in all cases, the CDI staff became temporary, surrogate representatives who could talk to the local

buyers and communicate problems and questions to the U.S. vendor. This experience presaged an area of assistance where all four CDI Environment in-country offices eventually spent a good deal of effort helping to locate credible and competent local representatives and licensing partners for U.S. vendors. The experience confirmed for the CDI staff and taught many clients the absolute necessity to project success of having good local representation.

Participating in Change:

The effort to assist wastewater treatment project development allowed the CDI Environment personnel to witness and offer assistance in fundamental institutional changes that are profoundly altering the way business is done throughout CEE. In particular in the Czech Republic and Slovakia, the CDI staff came into contact with the alteration of the institution which historically oversaw water and sewage system management - the Vodovody a Kanalizace (VAK).

Within the space of a year between 1990 and 1991, the nine regional VAKs were subdivided into 38 subdivided units, which began systematically to be privatized, first in the larger cities. By the time the CDI Environment Subcomponent began its work, the smaller villages were beginning to consider subsuming authority for water and sewer, motivated by the potential to generate municipal income from user fees, but tempered by the responsibility for constructing, operating and managing new systems.

It was this type of power shift and the enthusiasm of a generation of new and younger elected officials to learn how to manage their own affairs that created the climate in which the CDI municipal finance expert was successful in providing guidance on how to structure the budget and fee-

generating systems necessary to obtain infrastructure project finance. This power shift was also instrumental in providing the opportunity for the USAID-sponsored Municipal Infrastructure Finance Program (MUFIS) to assist the Czech banking system in reorganizing to provide on-lending services to towns and cities. It was to the MUFIS and these banks that some of the CDI Environment clients were introduced by CDI staff in their efforts to structure the financing for their new wastewater treatment systems.

Outcome:

At the termination of The CDI Environment Subcomponent Program, Lemna had nine wastewater treatment plants in some phase of development in Poland. Spec's first facility in Ivan in the Czech Republic, was under construction under the supervision of Spec's local partner, AMARE. Spec was also in active pursuit of a similar partner in Hungary and in negotiation with an identified partner, Hydrovrt, in Slovakia. Chief's representative in Poland was continuing to locate and underwrite financing for mechanical systems in Poland, and the CDI Environment Prague office was pursuing a public tender, at Chief's request, in Brno.

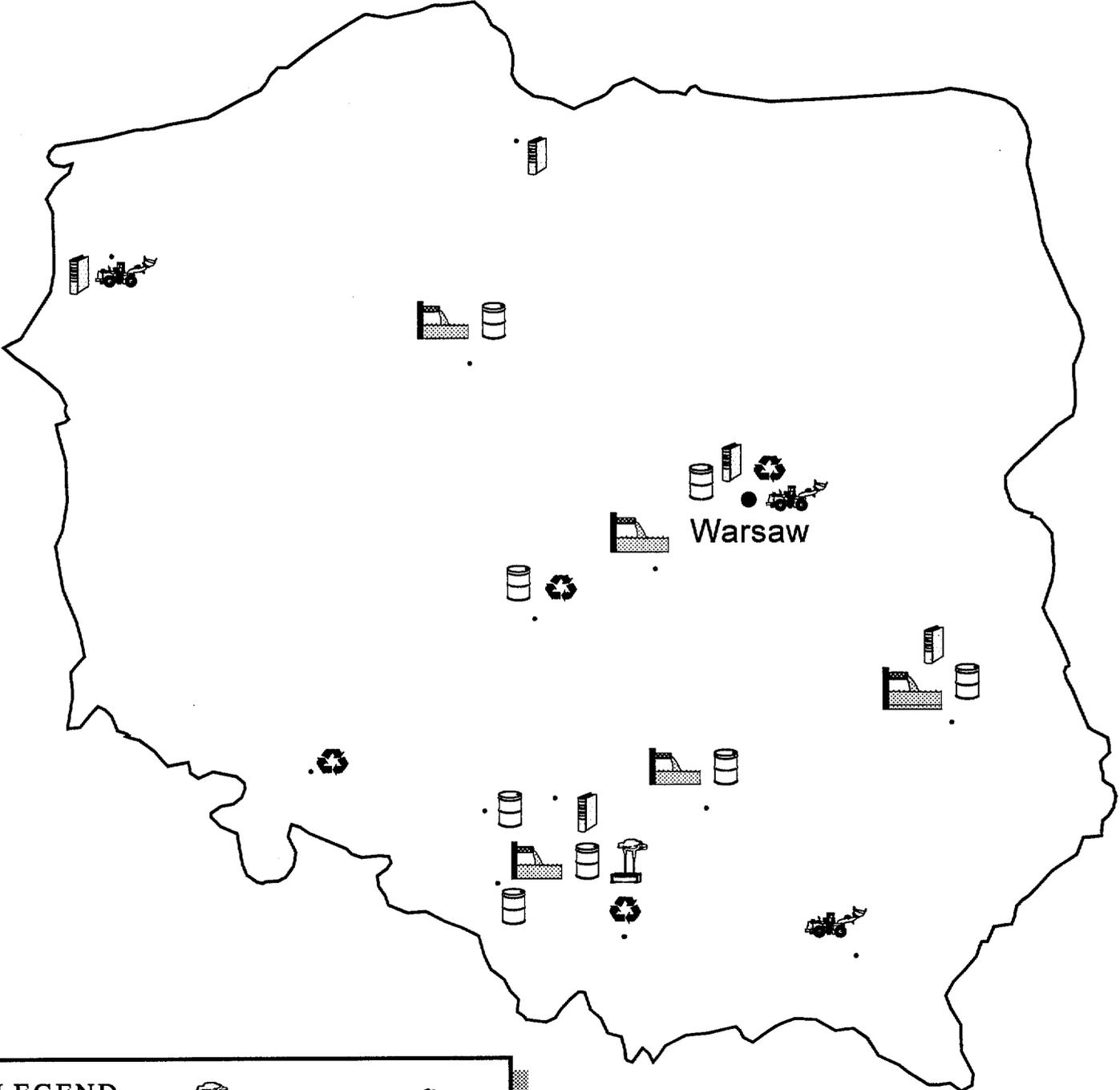
The CDI Environment Subcomponent left a record of solid accomplishment in project development, institutional support, and program coordination. Collectively, the CDI Environment staff provided both their U.S. and local clients, with commitment over the long term and unusual creativity in structuring technical assistance that responded to extant needs and available opportunities. This collection of related projects demonstrates the kind of flexibility, resources and coordination needed for development assistance to pay off through delivering results that make a difference and are sustainable over time.

ANNEX B

INDIVIDUAL COUNTRY REPORTS: INTRODUCTION

Annex B provides Individual Country Reports for all five of the CEE countries where the CDI Environment Subcomponent operated. The sections for Poland, the Czech Republic, Slovakia and Hungary each contain a map with project locations; a short profile of the business and environmental context in which the CDI Program operated; and a matrix of projects that reached the stage of definition and active development. The single project developed in Bulgaria is summarized in the last of the Country Reports.

Poland Environmental Projects



LEGEND			
Air		Policy	
Recycling		Waste Management	
Site Remediation		Wastewater Treatment	

Environmental and Business Context

POLAND

Environmental Overview

While Poland is recognized as one of the most environmentally degraded countries in Eastern Europe, it has made great strides in overcoming some of its environmental problems. This is largely due to public concern over environmental health issues which started before the revolution of 1989 and continues to be a major political issue today. Of the three pollution media (water, air and soil), water pollution is of greatest concern to Poles. One third of 830 major cities in Poland do not have wastewater treatment plants, although many have sewage systems. Studies of Poland's rivers show that over one half of these are "beyond any class": they are unusable for drinking, washing and even industrial production. Therefore, the need for wastewater treatment in this country is enormous.

Air pollution is also an important issue, especially among multi-lateral donors. The greatest needs are for: control of sulphur and oxides of nitrogen emissions from power and heating plants; improvement in coal quality; energy saving programs for communities with inefficient distribution systems and waste heat recovery from various industries such as glass production and smelters. In the area of pollution from municipal landfills and industrial waste, there are many issues to consider. Municipal landfills are rapidly becoming full and new sites as well as new landfill technologies are necessary to alleviate waste disposal problems. Industrial solid waste also has its share of challenges; official estimates put industrial hazardous waste production each year at over three million tons. Solutions such as co-generation from incineration of hazardous wastes are needed, as well as alternate uses of industrial wastes, such as fly ash from power plants.

Government/Jurisdiction/Finance

The Government of Poland (GoP) has made the greatest strides of all Eastern European countries in improving the environment. Since 1989, the GoP has been working on a national environmental policy designed to improve environmental conditions throughout the country. As part of this effort, Poland has announced its commitment to achieve standards of the European Community in ten years. This ambitious goal is managed through attempts for self-financing investments and from external international funding from such institutions as the World Bank, the International Finance Corporation and the European Bank for Reconstruction and Development.

Along with the introduction of new environmental legislation and economic incentives for pollution prevention, the power of decision has shifted from the central government to regional authorities (voivodeships) and local councils. These regional authorities have been given authority to establish local environmental standards and penalties within areas of their jurisdiction, and are enforcing the new laws by collecting pollution fees and fines. It is estimated that twenty to forty billion dollars of investment will be necessary to bring Poland up to EC standards by the year 2005. Therefore, the demand for investments in all regions of Poland, in the environmental sector are high. The GoP itself invests up to one billion dollars/year in this sector from a variety of sources, far exceeding the amount other neighboring governments allocate to the environment.

The major source of local financing of environmental projects are ecological fees collected at the voivodeship level and split

between the Polish National Fund of Environmental Protection and the voivodeship funds. These fees and fines are levied upon polluters, depending upon their emissions. They are used for grants for innovative environmental technologies; low-interest bearing loans; equity for commercial projects and bond issues for municipal projects. Other project financing sources include the Polish Debt for Environment Swap (the ECOFUND) and the Band for Environmental Protection (BOS). Compared to the environmental funds listed above, the amount of money from the ECOFUND is low, only 12 million dollars in 1994 out of one billion, or approximately one percent. However, the political significance of this money serves as an example to neighboring countries for financing of environmental programs. BOS is the fourth largest bank in Poland.

The CDI Experience

Of all the countries Sanders International assisted in Eastern Europe through the CDI project, we feel we were most successful in Poland. Here, we were able to bring four deals to closure, with transactions complete by the end of the CDI project in January, 1995. Seven other deals are well on their way, with Letters of Intent signed between U.S. and Polish partners for the establishment of Joint Ventures.

Our success in Poland was due to the political and financial climate, which is supportive of the environmental business sector. The Polish National and local environmental funds have provided much-needed financing for the huge costs of environmental clean-up. For example, the Polish National Fund is spending millions of dollars investigating recycling. The CDI project has worked with the Fund in areas such as commercial use of fly ash, in the production of aggregates for building materials; recycling of packaging materials,

e.g., PET bottles and the introduction of commercial products in biodegradable packaging.

Since the GoP has placed such emphasis on environmental issues, this country is more receptive to new waste treatment systems. For example, CDI was successful in assisting a U.S. firm in introducing an innovative biological waste water treatment system, using duckweed. There was much skepticism that this system would work, especially in harsh Polish winters. However, after the U.S. company and CDI had introduced proof to the local governments that the duckweed treatment could work year-round, local authorities agreed to try the system in two areas. After the completion of two demonstration projects in 1992, ten additional systems have been introduced in the past two years throughout Poland.

Although Poland has some financial and political support for projects, the reader must remember that this country will only generate 20-40% of the funds needed for cleanup over the next ten years. To date only about 5% of environmental investment has come from outside the country. Therefore, U.S. companies with low-cost technologies are desired and will be most successful in entering the Polish environmental market. They may also be required to assist in the search for additional funding or make an equity investment in the project. When the CDI project was initiated in 1992, the United States and other major industrialized nations were in a period of recession. Only in 1994 and 1995 have many U.S. firms had the financial capability to invest in expanding to Eastern Europe. Therefore, we feel that many of the projects initiated through CDI, highlighted in the Matrix are likely to come to fruition in time.

Project Matrix

**POLAND
WATER/WASTEWATER TREATMENT**

Project Name	Description and Objective	Outcome
Sumax (Lublin representative Chief (Lincoln, NB) in - Bydgoszcz region - Lublin region, - Katowice region - Lodz voivodeship and Eastern Poland	- Introduce modern wastewater treatment plants for small cities and rural areas, also for food processing industry. [Aug '93 - Present]	- Plants operating and financed through revolving fund set up by Sumax and Chief.
Lemna Corporation, (Mendota Heights, Minnesota) Hydro Ltd, Poland	- Introduce low-cost wastewater treatment based on aquatic plants (duckweed). [May '92- '94]	- CDI assistance in meeting Polish officials & setting up demonstration projects. - Two demonstration projects completed in '92 in Kochcice and Czestochowa. - CDI authentication report provided in '92 to reinforce technology acceptance pending first winter operation performance. - Five additional systems completed and two under construction at end of '94. - Seven systems in design phase.
Future Waters, (Chicago, IL) and the City of Glogow, Poland	- To build model wastewater reclamation and reuse systems in Glogow, Poland [July '92 - Oct., 93]	- Received CDI support grant for Poland & Hungary.
GEA (Warsaw), ProChem (Warsaw) Pepsi Cola (Warsaw Office)	- Treatment of wastewater at Pepsi plant	- Sanders facilitated two contracts: GEA contract for startup, maintenance and staff training. ProChem contract for construction

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**POLAND
WATER/WASTEWATER TREATMENT**

Project Name	Description and Objective	Outcome
Black & Veatch (CEE Office) Polgeol (Warsaw)	- Teaming agreement to enter Polish market in areas of: portable water supply municipal and industrial wastewater solid and hazardous waste [Nov. '94 - present]	- Sanders facilitated relationship between two parties - MOU forthcoming
Advanced Aquatics (Denver, Colorado)	- To locate JV partner constructed wetland [Aug. '92 - March '93]	- Project dropped because of lack of suitable partner.
PRC (Albuquerque, NM)	- Constructed wetland projects	- No suitable project found.
AE Advantage Engineering (Wakefield, MA)	- Design water supply and wastewater treatment system for Polish branch of Pepsi Cola; [March '93 -]	- Introduction was made, no suitable partner was found

**POLAND
WASTE MANAGEMENT**

Project Name	Description and Objective	Outcome
Euro-Am Resources/Harris Waste Management/Radar Companies (Euro-Am Group) and Eko-Bud Co. Ltd. (Warsaw)	- To establish a JV corporation which will build and operate environmental waste transfer and recycling stations in Warsaw [Aug. '93 - Jan. '95]	- Oct. 93 LOI signed - Dec. '93 Interim Agreement - Feb. '94 JV signed - Dec. '94 Corporate Plan completed - Jan. '95 Land Purchased

**POLAND
WASTE MANAGEMENT**

Project Name	Description and Objective	Outcome
Harris/Landucci (Katowice)	- Landfill & transfer stations in Katowice region [Aug. '93]	- Two landfill completed at Siemianowice and Jastrzebie - Two landfill under construction at Gliwice and City of Katowice
Amoco/GEF/IFC/McCormick and local mines	- Mine brine reinjection from coal mining & coal bed methane production [Aug. '92 - Oct. '94]	- Meetings arranged between all parties - Pilot project scheduled to be funded - In Oct. '94 IFC notified Sanders that project will be postponed for a year
Olivine (Bellingham, WA) and Central European Marketing Group, Thermax.	- Build municipal solid waste incinerators [Oct, 93]	- Talks with several towns initiated - LOI signed - Negotiations suspended as a result of lack of Polish policy on stationary incinerators
Ceva International (Prague) and Nowiny Cement Plant (Kielce)	- To form a JV for waste incineration in cement kilns [Jan. '93 - Present]	- Aug. '93 - LOI signed - Mar. '94 - MOU Signed
Engineering Science (ES, The Parsons Group) (Boston/London) and Prochem/Ecopal (Warsaw)	- To offer environmental consulting/engineering services [Sept. '93 - present]	- Teaming Agreement signed - Project passed to E3P
Chemfix Tech, Inc., (Metarie, LA) and Prochem/Ecopal (Warsaw) and Exbud (Warsaw)	- JV, licensing or other business relationship for its process for the treatment and solidification/stabilization of various hazardous and non hazardous waste	- No deal



**POLAND
WASTE MANAGEMENT**

Project Name	Description and Objective	Outcome
Euro-Am Group and Encom (Tychy)	<ul style="list-style-type: none"> - Urban solid waste management for city of Tychy and adjacent communes <p>[Feb. '94 - present]</p>	<ul style="list-style-type: none"> - Feb. '94 LOI signed - Negotiations broken off. - City will issue tender based on Sanders' solution for compactor system and transfer station
TWO (Texas World Operation), Inc. and AE Engineering, McCormick Resources, Inc, Higher Mining Authority in Upper Silesia, Lublin region and Bydgoszcz voivodeship	<ul style="list-style-type: none"> - Recirculation of salty waters from mines - Deep injection of brines in Upper Silesia - Injection of mining waters from copper mines in the Lublin region - Injection of industrial waste waters from a chemical plant in Bydgoszcz - Clean up of soil polluted with oil products in military camps <p>[Feb.'93 - Fall '93]</p>	<ul style="list-style-type: none"> - Introduced to McCormick Resources - provided advice to GOP reinjection - will probably undertake drilling for McCormick & AMOCO test well when project reinstated
Morrison Knudsen Corporation/ TWO and Prochem S.A./Ecopal Co, Ltd/Exbud 22	<ul style="list-style-type: none"> - To entering Polish market for: - constriction of landfills - waste water treatment plants - investment in biobriquetts projects - production of construction materials from flyash <p>[Feb '93 - Fall '93]</p>	<ul style="list-style-type: none"> - Warsaw office of Morrison Knudsen closed. Project dropped.
Enercom (Broad Brook, CT) represented by Envira Co. Ltd. Exbud-22 (Warsaw)	<ul style="list-style-type: none"> - Construction of three mobile incinerators for use in disposing stored pesticides in Poland. <p>[Oct. '92 - Present]</p>	<ul style="list-style-type: none"> - Feb. '94 - LOI signed by Exbud-22 and Envira - Jan. '95 - EXBUD SA (parent company) will join project as equity partner

**POLAND
WASTE MANAGEMENT**

Project Name	Description and Objective	Outcome
Exbud-22 (Warsaw)	- Construction of mobile plants for treatment of water polluted with chemicals and/or oil. [Nov. '94 - Jan. '95]	- Sanders assisted in finding two equity partners for project: Exbud SA Caresbac-Poleska
IESSCO, N.Y., Marathon, and Ekobud, (Warsaw)/ Budimex-Rzeszow S.A., (Rzeszow)	- Municipal solid waste management for the City of Rzeszow and other towns in the region; to be followed by municipal wastewater treatment projects	- Jan. '95 - LOI signed between IESSCO and Marathon to enter the Polish market for municipal solid waste
Marathon Equipment Co., (Vernon, Alabama), in Lublin, Lodz and Katowice	- Local manufacturing assembly plant of on-site compactors and refuse containers for small towns and villages [June '94 - Present]	- Introduced Marathon and their representative, Creative Corp., to local contacts. - Sanders helping Creative Corp., representative for state of Alabama, to open contacts with Polish Union of Small Towns, City of Pulawy, etc.
Waste Management Int. (London) City of Cracow	- Win tender to build solid waste management systems and landfills. [Aug. '92 - May '94]	- May '94 - lost tender to Empire
Gundle Lining System Inc., (Houston, TX) Polish Nat'l Fund of Environmental Protection and Water Management	- Joint venture in Poland to produce landfill liners in local manufacturing facility	- Gundle decided not to enter market. - Search under way for replacement since National Fund is still interested in project.



**POLAND
RECYCLING**

Project Name	Description and Objective	Outcome
CEMG/Eko-Efekt & City of Lodz International Plastics,	- PET bottles utilization program [Mar. '93 - present]	- Prefeasibility study in Lodz finished and approved - Feasibility study under way - Pilot project established and operational in Lodz. - LOI issued by Int'l Plastics to take bottles for recycling when minimum level of tonnage is collected.
American Battery Int. (Chicago) Town and Gmina of Dzierzgon, Poland	- Rechargeable battery assembly factory in Poland to reduce used batteries in municipal waste	- Polish JV partner, town of Dzierzgon identified - LOI to establish JV (value \$50M) signed 7-3-94 - Preliminary agreement to enter venture as equity partner signed by National Fund
Eco-Product S.A., Poland (Consortia)	- To produce biobriquettes at Bydgoszcz & Lublin [July '92 - Present]	- New company formed in Lublin in Sept. '94. Organization facilitated by Sanders. - Possibility of financing from Caresbac-Poleska and National Fund.
Lubcoal S.A., Lublin, Poland	- Production of construction materials from mining rocks and fly-ash [1992 - Present]	- Announcement in EELP produced 12 responses. No US technology suitable. - Sanders requested to continue assisting in obtaining financing for Lubcoal.
Reserve Iron & Metal (Cleveland, OH & Chicago, IL) Steel mills, Cracow, Poland.	- Utilization of steel mill waste dumps [Jan. '94 -]	- First agreement with Cracow Sendzimir Steel Mill delayed by strikes
Polish National Fund of Environmental Protection and Water Management	- Find U.S. technology for JV to produce biodegradable food packaging	- May '94 - arranged U.S. visit with U.S. packaging vendors. Visit deferred.

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POLAND RECYCLING		
Project Name	Description and Objective	Outcome
EKO-Efekt and BM & MMRI	- Fly-ash and barren mining rocks utilization	- Talks on cooperation in progress - \$700K of financing secured. - Search underway for U.S. partners
USDA Extension Service EKO-Efekt, Poland	- Utilization of dairy waste country-wide and pig manure country-wide	- Talks on cooperation initiated - Some financing secured from Polish side. - Contacted US firm with bio-processing technology. - Project passed to USDA
LB International, Inc. (Denver, CO)	- To enter Polish market with technology to produce Eco-Lena, heating with logs from waste raw materials & solid fuel stoves [Oct. '93]	- Production of fireplace logs introduced to Polish market. - Project dropped because market demands briquettes not logs.

POLAND SITE REMEDIATION		
Project Name	Description and Objective	Outcome
Alpha Bio GEA (Warsaw)	- Provide sludge treatment and disposal technology in the Gdansk refinery oil spill clean up [Dec. '92 - present]	- June '93 - LOI signed. Negotiations bogged down when parties could not agree on nature of involvement.

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**POLAND
SITE REMEDIATION**

Project Name	Description and Objective	Outcome
SEGI (Warsaw) ACS (Texas)	- Form JV's to utilize ACS technology to seal leaks from gas and oil pipelines [Sept. '94 - present]	- Sanders identified SEGI as potential partner. - ACS extended offer to team to SEGI - ACS technology also introduced to Polish Union of Small Towns
Mayfair Environmental Service, (San Fr. CA) Intergeo (Warsaw)	- Form company to monitor & clean up oil spills, conduct site assessments [May '93]	- Oct. '93 - LOI signed - JV talks still in progress
Ecotech, (Houston, TX) Aurex, (Warsaw)	- Monitoring & clean-up of spills (gas stations) ['92 - present]	- Established contact between firms - Teaming agreement reached but JV talks bogged down when parties could not agree on nature of involvement
Ryan-Murphy Inc., (Denver, CO) Mostostal Export Corp. (Warsaw, Poland)	- Airport soil decontamination with mobile incineration.	- U.S. firm visited Poland. No follow-up
PROGRESS, S.A, (Poland) CARPCO Inc. (Jacksonville, FL)	- JV for coal cleaning & reclamation of Grzybow sulphur mine area [Sept '92 -	- U.S. technology supplier, CARPCO, identified. - CARPCO donated coal spiral to Central Mining Institute for research - Negotiations stalled
EN-BO Co. Ltd (Lublin, Poland) CARPCO, Inc. (Jacksonville, FL)	- Reduce organic sulphur content in coal	- Introduced CARPCO technology to EN-BO - Awaiting result of mining report from Central Mining Institute - EN-BO has \$6M earmarked for project

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POLAND SITE REMEDIATION		
Project Name	Description and Objective	Outcome
City of Szczecin EIMCO (U.S.)	- Miedwie Lake clean-up	- Put Szczecin in touch with EIMCO, U.S. supplier of technology - EIMCO's Prague office still attempting to develop project
Pela and Intergeo, (experts)	- Groundwater protection and clean-up of mining waters and reuse in Katowice	- Unable to locate U.S. technology

POLAND MISCELLANEOUS		
Project Name	Description and Objective	Outcome
Earthshield (N.C.) EZT (Warsaw)	- Production & distribution of biodegradable washing media for public transport [Mar. '93 - Apr. '94]	- Sanders identified Polish partner and facilitated JV negotiations - Nov. '93 JV signed - July '94 first produce sales generated
MTC International EZT (Warsaw)	- Joint venture of Cleaning Facilities for train, bus, and truck	- Sanders identified Polish partner and facilitated negotiations. JV expected to be signed March '95.
Mayfair Environmental Service, (San Fr., CA) SEGI-PBG, (Warsaw)	- To market environmental software, a PC based application, for site modelling, assessing, and quantifying extent of pollution - Prepare remediation plans in Poland [May '93 - present]	- Oct '93 LOI signed - May '94 software sold to Exbud - Dec '94 JV negotiations in advanced stage

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**POLAND
MISCELLANEOUS**

Project Name	Description and Objective	Outcome
PRG-W, Sosnowiec	- Use of U.S. software in mining operations, especially reduction of inflow of brines to mines	- Ongoing search for U.S. partners
Calvert Social Venture Partners, L.P., (Bethesda, MD) USAID, Warsaw NFEPWM Bank of Environmental Protection	- Explore the feasibility of creating a Central European Environmental Fund (initially \$30 to \$50 Millions) [July '93	- Decision made to open Warsaw office based on Sanders assistance
USDA Extension Service and -Polish Ministry of Agriculture -Union of Small Polish Towns -Szczecin Voivodeship -Lublin Voivodeship	- Agriculture Technology Transfer [Sept. '93 - Present]	- Project passed to USDA
Higher School of Pedagogics, Kielce	Establish regional environmental laboratory	- Sanders looked for U.S. partners - Passed business plan and master plan of school to E3P. - E3P began talks with school
AGRA (U.S. Canadian)	Establish permanent office to perform environmental services in CEE	- Sanders providing advice and guidance
Foreign Trade Service/Global Ozone Solution, Inc., (Nashua, NH) and MoEP, Dept of Air & Surface/Polar (refrigerator factory, in Warsaw)/Ecofund	- To build CFC recovery and reprocessing (distillation) center; licenses Petrosolv product for neutralization of soil affected by oil spills with bacteria []	- Company chose not to pursue project

**POLAND
MISCELLANEOUS**

Project Name	Description and Objective	Outcome
Southwest Research Institute, (San Antonio, TX)	<ul style="list-style-type: none"> - Identify strategic environmental projects in Poland - identify local leads [July 1993 -]	<ul style="list-style-type: none"> - Company chose not to pursue project
Ogden Corporation in Gdansk	<ul style="list-style-type: none"> - Provide market entry strategy 	<ul style="list-style-type: none"> - Company chose not to pursue project
TenHoeve Bros., Inc., in Gdansk and Elblag	<ul style="list-style-type: none"> - To construct environmentally friendly gas station. 	<ul style="list-style-type: none"> - Company chose not to pursue project
Westinghouse Electric Poland Ltd	<ul style="list-style-type: none"> - Identify heating plants which have to be modernized to meet new environmental requirements in Zakopane and Cracow regions. 	<ul style="list-style-type: none"> - Elblag heat plant, Kielce & Stomil-Olsztyn S.A. heat plant were identified - Sanders arranged meetings for Westinghouse with EXIM Bank to discuss project financing

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POLAND AIR		
Project Name	Description and Objective	Outcome
Pollution Control Systems, Inc. (PCS), (AZ) Eko-Efekt (Warsaw)	- JV to manufacture, assemble, distribute and install clean air valves in CEE countries [Aug. '94 - present]	- Sanders arranged contacts between Eko-Efket (acting for the National Fund) and PCS - MOU signed 12-16-94 - JV and funding secured pending authentication of technology. - EPA Field Demo Grant applied for
Air Products and Chemical, Inc./Pure Air AGOS S.A., Katowice	- To introduce clean coal technology: coal gasification, biogas drainage and cleaning marketing Pure Air advanced flue gas desulfurization technology in Poland [Sept. '92]	- Firms still communicating - AGOS interested in finding another U.S. partner if Air Products withdraws.
Lean Power (Silver Spring, MD)	- Arrange meeting with GoP - introduction of emission reduction technology and market in Poland; establish JV with Pulaski Consortium. [July '93] [Oct. '94]	- Preliminary talks produced no result - New attempts to introduce technology made in Oct. '94.

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Project Summaries
By Environmental Target Category

PROJECT SUMMARY

- Project Name:** American Battery
- Target Category:** Recycling
- Description/Objective:** Construct rechargeable battery assembly factory in Poland to:
(a) reduce disposal volume of old batteries;
(b) produce a battery containing lower toxic levels.
- Participants:** Municipality: Town and Gmina of Dzierzgon, Poland
U.S. Firm: American Battery International (ABI), Chicago, IL
- Location:** Town and Gmina of Dzierzgon, Poland
- Period of Performance:** February 1994 - Present
- Assistance by CDI:**
- CDI Environment office/Warsaw initiated talks between Polish National Fund of Environmental Protection and Water Management (Fund) and ABI regarding ABI's project to construct battery assembly factory in Poland.
 - CDI provided ABI with initial introductions to local financial institutions, local and central authorities to obtain project support.
 - CDI Environment/Headquarters assisted ABI in opening talks with IFC.
 - CDI Environment/Warsaw identified Town and Gmina of Dzierzgon as project site.
- Outcome:**
- Letter of Intent signed July 3, 1994 by ABI and town of Dzierzgon to form a joint venture (value \$50M).
 - Letter of Intent signed on December 7, 1994 by the Fund to join project as an equity partner.
 - Outside evaluator is being retained to provide authorization to the Fund that the batteries are environmentally friendly.
- Lessons Learned:** The market for investment in CEE has shown an upward trend in 1994. New investors are more plentiful and companies who lost interest in the market in 1992 and 1993 are returning. Projects are being developed much more quickly at this point.

PROJECT SUMMARY

Project Name: Biobriquettes

Target Category: Recycling (Wood and Agricultural Waste)

Description/Objective: To locate technologies and joint venture partners for production of biobriquettes.

Participants: Local Firm: Eco-Product SA (Consortia)

Location: Lublin / Bydgoszcz Poland

Period of Performance: June 1992 - Present

Assistance by CDI:

- CDI Environment Headquarters conducted review of biobriquette industry in U.S. to determine suitable technology for project.
- Short-term technical team traveled to Poland in November 1992 to explore the feasibility of U.S. investments to make biobriquettes. An investment action plan with recommendations and information packages for potential U.S. investors was completed.
- Arranged for USAID-sponsored Environmental Business Advisor to develop business plan for prospective Polish local partner, Wimix, to use to attract foreign investor. (Requirements of local banks to post high collateral eventually eliminated this prospect).
- CDI Environment continued to search for local and U.S. joint venture partners and sources of financing.
- CDI Environment office in Warsaw, responding to interest expressed by Lublin officials in biobriquette production, introduced Bydgoszcz entrepreneur, NABRU to three potential partners in Lublin. This contact resulted in the formation of a new company, Eco-Product SA.
- CDI Environment office in Warsaw introduced the new company to Caresbac-Polska and the Polish National Fund for Environmental Protection who have indicated interest in financing a biobriquette venture.

Outcome:

CDI Environment continues to support project in Lublin, Poland and will actively seek U.S. partners for joint venture and sources of financing.

Possibility to erect demonstration project in Lublin under the TIES program for producing lime-enhanced briquettes.

Lessons Learned:

Even though there was substantial potential for biobriquette projects in Poland, the industry in the U.S. and Poland consists of small firms that are not secure enough financially to establish independent joint ventures or easily qualify for existing financial aid.

It requires substantial time to formulate a successful project and frequent nurturing is required to support the venture through all types of setbacks. There is now the possibility to construct a project in the Lublin area due in large measure to ongoing CDI Environment efforts.

PROJECT SUMMARY

- Project Name:** CEVA International/Nowiny Cement Works
- Target Category:** Waste Management - Hazardous Waste Disposal
- Description/Objective:** Formation of a joint venture between a local and a U.S. firm to construct and operate a facility for cement kiln solid waste incineration
- Participants:** Local Firm: Nowiny Cement Works
U.S. Firm: CEVA International
- Location:** Kielce, Poland
- Period of Performance:** February 1993 - Present
- Constraints:** CEVA International had initiated talks with Nowiny Cement Works' officials prior to requesting CDI assistance. These discussions resulted in a serious misunderstanding on the part of the local firm, Nowiny Cement Works, as to CEVA's intentions. CDI personnel had to resolve this situation before there could be any resumption of talks.
- Assistance by CDI:**
- CEVA identified by CDI Environmental office in Prague. Regulatory objections in Czech Republic made project there not feasible. Referred to Poland.
 - Convinced Nowiny Cement Works to reopen talks with CEVA International.
 - Made arrangements and participated in new round of meetings between CEVA and Nowiny.
 - Met with Voivode environmental officials, representatives of MOE and Department of Protection of Air and Water regarding project.
 - CDI Environment Headquarters provided information on regulations governing process in U.S.
 - Outlined Letter of Intent to be submitted by CEVA.

Assistance by CDI:

- Assisted CEVA in demonstrating technology at Nowiny plant.
- Currently assisting in final negotiations for establishing joint venture.

Outcome:

Letter Of Intent to form joint venture signed by Nowiny and CEVA in August 1993.

Interim agreement signed in March 1994.

Final joint venture talks in progress.

Lessons Learned:

This project illustrates the value of the bicultural business expertise that was provided to CEVA International and Nowiny Cement Works by the combined U.S. and local staff in the CDI Warsaw office. This project was almost derailed at the outset by misunderstandings arising from differences in business culture.

PROJECT SUMMARY

- Project Name:** EKO-BUD Co., Ltd. / EURO-AM, Lundell, Harris
- Target Category:** Waste Management - Municipal Solid Waste Management Systems
- Description/Objective:** Establish a joint venture corporation to build and operate a modern landfill, transfer stations and recycling plant.
- Participants:**
- | | |
|-----------------|---------------------------------------------------------------------------------------------|
| Local Firm: | EKO-BUD Co., Ltd. |
| U.S. Consortia: | EURO-AM Resources Corp./Lundell Manufacturing Co., Inc./Harris Waste Management Group, Inc. |
- Location:** Warsaw, Poland
- Period of Performance:** August 1993 - Present
- Assistance by CDI:**
- At EKO-BUD's request, CDI identified potential U.S. partners who could provide new technology, expertise and capital for solid waste management projects.
 - Arranged introductory talks between local firm and above U.S. consortia.
 - Assisted in successful round of business negotiations.
 - Provided necessary contacts with local environmental authorities.
 - Initiated contacts with Bank of Environmental Protection to request their participation in financing and providing guarantees for the U.S. Export-Import Bank which will also be approached as a financing source.
 - Provided contacts at Environmental Division of IFC to develop additional project financing assistance.
- Outcome:**
- Interim agreement signed in December 1993
- Joint Venture Agreement signed in February 1994.
- A \$13 million contract signed in March 1994 to erect the facility.

Spin Offs:

Assisted EURO-AM in locating potential partners in several other major cities in Poland: Tychy
Lublin
Swidnik
Bydgoszcz

Constraints:

Obtaining required approvals from Polish authorities for major project in Warsaw and its prospective spin-offs in other locations in Poland. Securing financing.

Lessons Learned:

Even when a project is fully developed and ready for implementation in a relatively short period of time, the lack of required governmental approvals and sources of financing can impede progress. In almost every case, the estimated time frame to complete a project needs to be expanded to consider these contingencies.

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PROJECT SUMMARY

Project Name: EZT / Earthshield

Target Category: Soil Remediation / Surfactants

Description/Objective: Create a joint venture for the production and distribution of biodegradable washing media for public transport vehicles.

Participants: Local Firm: EZT
U.S. Firm: Earthshield

Location: Sosnowiec, Poland

Period of Performance: March 1993 - November 1993

Assistance by CDI:

- Worked with Earthshield's Prague office to ascertain criteria for joint venture partner.
- Screened and potential joint venture partners for Earthshield.
- Identified potential joint venture partner
- Arranged initial meeting between companies
- Assisted in joint venture negotiations.

Outcome: Joint Venture Agreement signed in November 1993.

First sales of biodegradable washing media generated in July 1994.

Lessons Learned: The value of cooperation and referrals between the CDI environmental offices was first illustrated during this project, since the Czech CBDA referred Earthshield to the CDI Warsaw office after assisting in the development of another clean-up project with this firm in the Czech Republic. The relatively brief time between initial meeting and formal business arrangement highlights optimal conditions that should be encouraged if at all possible. The U.S. firm already had international experience and a European office. They had defined requirements and procedures for selecting

Lessons Learned:

partners, concluding agreements and getting approval for the project from local authorities. In addition, both parties were actively seeking a partner. However, perhaps the most significant factor contributing to this venture's success was the availability of the combination of U.S. and local business expertise provided by CDI Environment. Earthshield had previously made two unsuccessful attempts to establish a joint venture in Poland.

PROJECT SUMMARY

Project Name: Lemna

Target Category: Innovative low-cost waste-water treatment

Description/Objective: Assist in developing demonstration projects and authentication of U.S. technology for innovative low-cost wastewater treatment.

Participants: Municipalities: Kochcice, Czestochowa
U.S. Firm: Lemna Corporation (Minneapolis, MN)

Location: Kochcice / Czestochowa Poland

Period of Performance: August 1992 - Spring 1993

Assistance by CDI:

- CDI Environment office in Warsaw assisted in two technology demonstrations: September 8th in Kochcice and October 30th in Czestochowa.
- CDI Environment/Warsaw arranged attendance by key government officials.
- CDI Environment Headquarters and subcontractor, NETAC, provided an Authentication Report on the capability of the technology to meet U.S., European Union, and Polish water quality standards.
- Representatives from CDI's Washington and Warsaw offices met with Polish National Fund of Environmental Protection to discuss further expansion in Poland.
- Authentication Report expanded to cover Czech Republic and Hungary.
- CDI Environment pursued discussions with the IFC and World Bank relative to bundling the Lemna project with similar efforts to qualify for loans.

Outcome: Demonstration projects were successful. Authentication Report satisfied local skepticism as to technology's effectiveness. CDI Environment assistance was in part responsible for Lemna

Outcome:

able to undertake additional projects in the region. The firm completed the two projects in 1992, three more in 1993, and have four more in operation and three under development this year.

Lessons Learned:

Local officials favor high end, state-of-the-art approaches because they fear anything less may affect their ability to meet EU standards. Although innovative and less complex technologies may be more suitable to local needs and finances, skepticism exists because these technologies are not widely used and perceived as substandard. Local officials must be persuaded that low-cost technologies are more appropriate in many situations.

PROJECT SUMMARY

- Project Name:** Clean Air Valves
- Target Category:** Air Pollution
- Description/Objective:** Create a joint venture for the manufacture, assemble, distribute and install clean air valves in CEE.
- Participants:** Local Firm: Eko-Efekt (subsidiary of National Fund)
U.S. Firm: Pollution Control Systems, Inc. (PCS), AZ
- Location:** Warsaw, Poland
- Period of Performance:** August 1994 - Present
- Assistance by CDI:**
- CDI Environment office/Warsaw initiated talks between Eko-Efekt and PCS.
 - CDI Environment/Warsaw facilitated ongoing negotiation between the the two parties.
- Outcome:**
- Memo of Understanding signed on December 16, 1994 between Eko-Efekt and PCS to do bench-scale pilot test of the valves and then install in 6600 cars.
 - Joint Venture and funding secured pending authentication of technology by either a demonstration project or controlled testing.
- Lessons Learned:** The market for investment in CEE has shown an upward trend in 1994. New investors are more plentiful and companies who lost interest in the market in 1992 and 1993 are returning. Projects are being developed much more quickly.

PROJECT SUMMARY

- Project Name:** PET Bottles
- Target Category:** Recycling
- Description/Objective:** Establish a program for collecting, washing and processing PET plastic bottles. Construction of processing plants in Poland or option for export to U.S. firm's Netherland's subsidiary. Possible first program for export of Polish waste.
- Participants:**
- Local Firm: Central European Marketing Group (CEMG)
Eko-Efekt
City of Lodz
- U.S. Firm: Wellman, Inc. (represented by CEMG)
- Location:** Lodz, Poland
- Period of Performance:** March 1993 - Present
- Assistance by CDI:**
- Introduced CEMG to Polish firms that could be potential project partners.
 - Arranged meeting for CEMG with Polish Presidential Advisor on the Environment and Chairman of the President's Ecological Council to present the project in order to gain official support.
 - Participated in meetings between CEMG and the National Fund of Environmental Protection and Water Management which resulted in funding for project feasibility study.
 - Assisted in further negotiations between CEMG and the Fund which resulted in the National Fund's acceptance of project as a pilot project for the City of Lodz.
 - At the National Fund's request, CDI Environment Staff met with Lodz officials and successfully clarified issues which had been delaying signing of agreement to launch program.
 - CDI Environment Staff continues talks with potential U.S. partners.

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Outcome:

Agreement by National Fund in October 1993 to authorize their consulting company, Eko-Efekt, to conduct a project feasibility study.

Formal agreement signed by National Fund on January 10, 1994 to accept the PET Bottle Collection Program as pilot project.

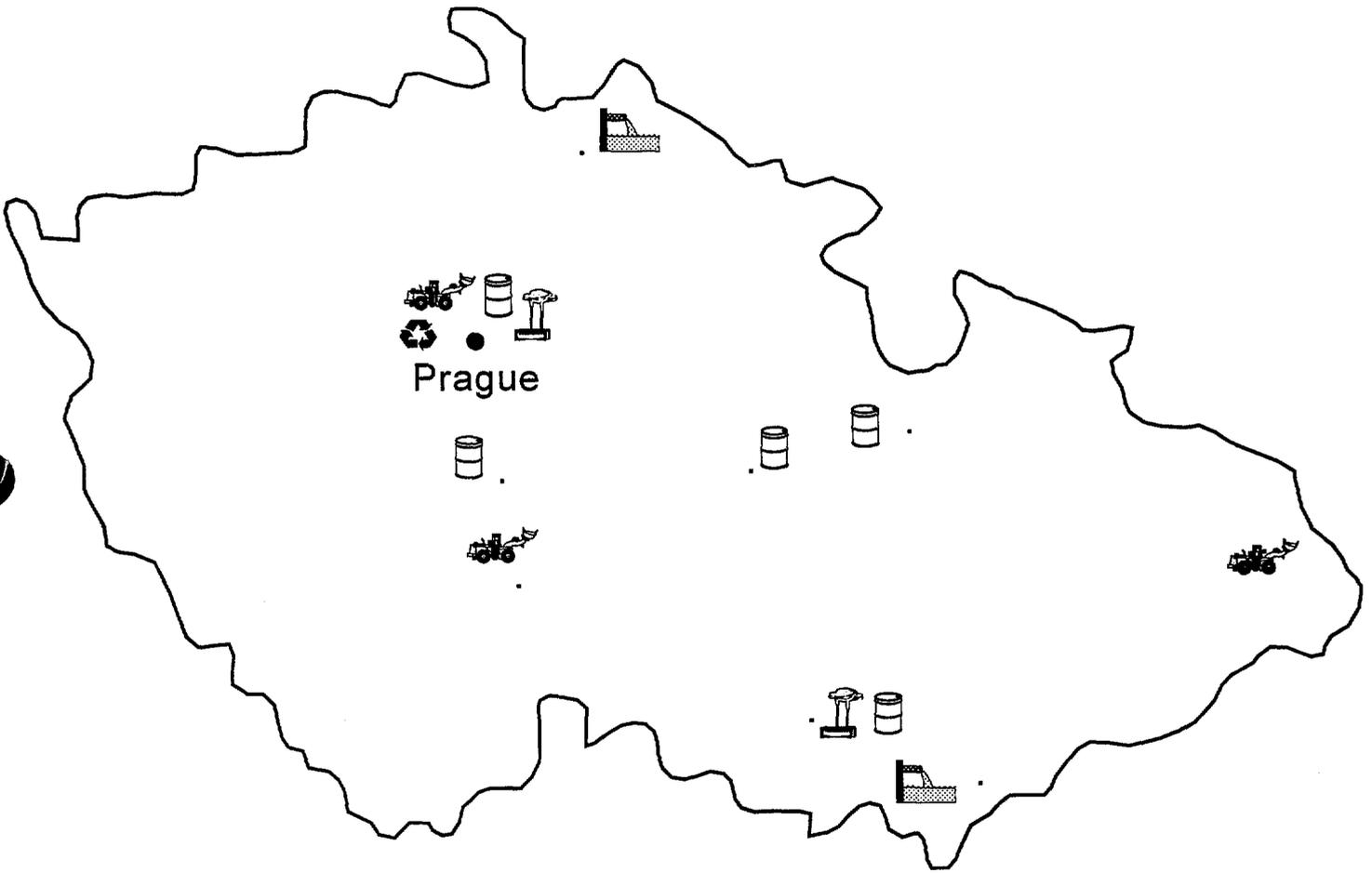
LOI signed by President of City of Lodz on February 4, 1994 to participate in program.

As of July 1994, feasibility study completed, site for waste processing plant has been selected and collection of PET bottles has started.

Lessons Learned:

Project illustrates value of foreign company having local representation as illustrated by CEMG's representation of Wellman, Inc. This representation combined with the expertise and contacts provided by the combined U.S./local CDI Environment personnel resulted in the structuring of a project eligible for support and funding by a large Polish environmental organization. This enabled the project to be implemented in a relatively short period of time.

Czech Republic Environmental Projects



LEGEND

Air		Policy	
Recycling		Waste Management	
Site Remediation		Wastewater Treatment	

Environmental and Business Context

CZECH REPUBLIC

Environmental Overview

Initial predictions concerning the actions requisite to correct environmental degradation in the Czech Republic have proven somewhat optimistic. While substantial attention has been focused on some of the more serious environmental problems such as the hazardous waste landfill at Chabarovice, much remains to be done. Equally severe, yet less dramatic everyday environmental concerns such as wastewater treatment, solid waste disposal, and air pollution persist and concerted efforts are required to alleviate these problems. It is now evident that there will be no quick fixes to correct the problems created over the past four and a half decades. Rather, these problems can only be tackled by steadily improving the domestic environmental service industry as well as increasing the awareness of the average citizen.

The Czech Republic is fortunate to be well-equipped with qualified personnel in the technical cornerstones of the environmental service and consulting industry -- geohydrology and water quality engineering. The industry itself, however, is still in its infant stage of development. Local companies can continue to benefit from foreign technology and collaboration in areas such as low-cost wastewater treatment, sludge management and small source air pollution control. Although there are several large and small foreign firms and over a hundred Czech firms in this sector, the fledgling industry could greatly benefit from increased investment, be it domestic or foreign.

Government/Jurisdiction/Finance

In contrast to Poland's decentralization of decision-making on environmental issues, the role of the Czech government with regard to environmental legislation, implementation, and resource allocation is central. Many laws have been passed, but enforcement is weak and the impact minimal. Notwithstanding this general condition, the waste management and water treatment fields have introduced fines and fees for polluters, which provide incentives to improve environmental controls.

Under the Law on Waste, rules and guidelines for municipal waste disposal have been established. All major waste producers must create and follow a waste management plan. The administrative structure for waste management is in place; wastes have been catalogued and disposal fees outlined. There is virtually no legislation requiring recycling or waste minimization. But the tendency towards recycling will increase as solid waste disposal become more regulated and expensive.

Legislation for special and hazardous waste is not as developed. While some of these wastes have been catalogued, methods for differentiating classes of hazardous waste and its storage, shipping, and disposal requirements are still being worked out. Liability for past damage to state sites is currently being negotiated and the outcomes of these proceedings will eventually lead to remediation and an expanded market for hazardous waste disposal.

Wastewater treatment guidelines have been in effect for more than twenty years, but are now in the process of being rewritten. The responsibility for infrastructure operations

and maintenance has devolved to the municipal level. Fines for industrial wastewater are increasingly being raised and enforced. Both of these developments are enhancing the market for the private participation in this sector.

Environmental protection is not a priority in the Czech Republic. As such, financing for projects can be quite difficult. While the Czech State Fund for the Environment is one potential source of funds, the fund is small relative to the demand. About 75% of the fund's 3,675 million crowns (a little over \$1 million) was awarded as grants in 1993, while the remaining quarter was dispersed as loans. The Czech State Savings Bank has a municipal lending program offering terms slightly better than commercial banks. The municipal bond market is developing, though still in the early stages of development. Foreign sources of funding such as the International Finance Corporation, The European Bank for Reconstruction and Development, The Czech American Enterprise Fund, and the Municipal Urban Finance Insurance Program represent other means of financing projects.

The CDI Experience

Sanders International's experience with the CDI project in the Czech Republic has created optimism for future environmental improvements and for expansion of the environmental business sector. Success in the Czech Republic was not as dramatic as in Poland, but U.S.-Czech joint-ventures were formed over the course of the contract, mostly due to policy changes during the course of the contract. There is promise in this business sector, particularly in management and disposal of solid and hazardous waste and in low-cost waste water treatment systems.

The Czech economy continues to improve and politically is much more stable than many of its neighbors, with both inflation and unemployment in the single digits. Over the past three years, we have encountered a centralized government unwilling to place a high budgetary importance on the environment. This is changing with the creation of the Czech State Fund for the Environment, which should continue to grow as new legislation is enacted and implemented. Another positive note is the fact that Czechs are making great strides in entrepreneurship and business management. Three years ago, many Czechs thought that all they needed was a business idea and that money would flow from Western countries to support these initiatives, without having well developed marketing or business plans. Now, Czechs are aware that this is simply not the case; while they wish their Western neighbors could assist them more financially, they realize that they need to make contributions with market information and some form of capital for a new business venture.

The Czech Republic represents the most vigorous economy in Central Europe, although a small market relative to countries like Poland. The momentum of economic growth and a desire to become more closely allied with Western Europe will pull environmental improvement and, therefore, business loans with general economic development.

Project Matrix

**CZECH REPUBLIC
WATER/WASTEWATER TREATMENT**

Project Name	Description and Objective	Outcome
Orlice Regional Development	<p>- Assist selected towns and villages in the region in developing financial plans and selecting technology. Chose Jablonne as recipient of assistance by municipal financing expert.</p> <p>[Fall '93 -]</p>	<p>- Collected financial and technical data for use in offering short-term technical and financial assistance. - Produced Statement of Work for the short-term municipal finance expert's travel to the Czech Republic. - Sent financial expert to Jablonne in June & Sept. '94 to teach finance and do budgets. - Translated forms and other material to be used by financial institutions when considering loans. - Presented regional finance seminar in September '94. - Sent technical expert to Pastviny Dam in Oct. '94.</p>
Chief Industries (Lincoln, Nebraska) and town of Jablonne	<p>To do JV using mechanical treatment technology</p> <p>[Fall '93 -]</p>	<p>- Identification of potential partner and tender opportunities. Chief is still considering its commitment in the Czech Republic.</p>
Palava Regional Development	<p>- Traveled to region to meet with officials to get clarification on type of assistance desired and make final selection of towns which would benefit most from short-term technical and financial assistance. - Assist selected villages in regional association to develop plan for sewage treatment. Selected town of Hlohovec as recipient of municipal financing assistance.</p> <p>[Fall '93]</p>	<p>- Selected 1 village to receive technical assistance - Send technical assistant to village, Milovice, to assess the wastewater treatment needs there.</p>

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**CZECH REPUBLIC
WATER/WASTEWATER TREATMENT**

Project Name	Description and Objective	Outcome
SPEC Industries (Seattle, WA) and Amare	- Joint-venture to install \$120,000 wastewater treatment system in Ivan Paleva, with cooperation with other villages likely. [June '93 - Jan. '95]	-Sept. '94 agreement signed; - Oct. '94 final design; - Oct. '94 out to bid; - Nov. '94 contract between Ivan and constructor; - Jan '95 money from Czech Fund ; - March. '95 construction starts
SPEC Industries (Seattle, WA) and Town of Dolni Cermna	- Introduction of alternative low-cost wastewater treatment system.	- Spec decision to work in Ivan.
Utility Services Inc. (Seattle, WA)	- Locate partner for USA (leak detection in water supply systems) in the Czech Republic. [Jan. '93 - Dec. '93]	- Identification of water authorities interested in cooperation. USA made the decision not to come to the Czech Republic.

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**CZECH REPUBLIC
WASTE MANAGEMENT**

Project Name	Description and Objective	Outcome
Proekos	- Foundry sand disposal for Brno region [Fall '93 -]	- May '94 agreement signed between Proekos and cement works for cooperative waste management. - Agreement signed with one foundry for sand disposal -Two contracts under negotiation
Waste Technology Corporation, and Transporta Chrudim (Czech Republic)	- To produce American waste baling machines. [April/May '93 - Spring '94]	- Oct. 1993 joint exhibition at Brno Engineering Fair - Undertook joint marketing, efforts continue.
EMSEKO (Czech Republic)	- Find a U.S. technology supplier and investor for a hazardous waste incinerator	- Identified 7 potential U.S. cooperators. None interested in project. Project closed.
3R Technologies (Columbus, Ohio)	- Search for potential partners for Joint-venture or cooperation on project [Oct. '93 -]	- Negotiations continue.

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**CZECH REPUBLIC
RECYCLING**

Project Name	Description and Objective	Outcome
CEZ, State Energy Company (Czech Republic) Fly-Ash disposal	<ul style="list-style-type: none"> - Provide U.S. technology to CEZ for recycling and selling fly-ash. <p>[Spring '94 -]</p>	<ul style="list-style-type: none"> - Prepared report on fly-ash problem and approaches to treatment. - Located U.S. firms and determined their interest in business with CEZ.
Fieldstone Private Capital Group (N.Y.) and Paper Mill (Confidential)	<ul style="list-style-type: none"> - To finance joint-venture with a paper mill for construction of state-of-the-art wastepaper de-inking and pulp production facility. <p>[Spring '93 - Dec. '93]</p>	<ul style="list-style-type: none"> - Three reports on state of wastepaper collection & recycling prepared. - July '93 - MOU signed - JV failed because paper mill reluctant
Policy Czech Ministry of Environment	<ul style="list-style-type: none"> - Provide information on paper recycling in U.S. <p>[June '94]</p>	<ul style="list-style-type: none"> - Prepare report on U.S. paper recycling regulation and economics.

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CZECH REPUBLIC SITE REMEDIATION		
Project Name	Description and Objective	Outcome
EarthShield (North Carolina) and Comco-Martech (Prague)	- Cooperation on remediation project [April '93 - June '93]	- Use of surfactants for test clean-up; won contract for PCB remediation project at Rozmytal [May '93]
Bio Team (New Jersey) and Ostramo (Ostrava)	- To help BioTeam present biological technology option to Ostramo. [Nov. '93 -]	- BioTeam, introduced to Ostramo. Continued negotiations.
National Property Fund (NPF) of the Czech Republic	- Policy assistance in risk assessment for the NPF.	- Conducted roundtable discussion on risk assessment and provided fund with requested materials from U.S.

CZECH REPUBLIC AIR		
Project Name	Description and Objective	Outcome
Brno - and K3 (Virginia)	- Help City of Brno develop air quality monitoring firm and select continuous monitoring technology. [Fall '93 - Spring '94]	- Established contacts between Brno and K ³ . Financing unavailable so cooperation could not proceed.

Project Summaries
By Environmental Target Category

PROJECT SUMMARY

Project Name: Spec/AMARE Municipal Sewage Treatment

Target Category: Innovative Wastewater Treatment

Description/Objective: The signing of a territory licensing agreement and formation of a joint venture between a Czech and a U.S. company, for the purpose of marketing and implementing the US firm's patented sewage treatment system to municipalities in the Czech Republic. This system is especially tailored for small capacity demand.

Participants: Local Firm: AMARE
U.S. Firm: SPEC, Industries

Location: Palava Region, Czech Republic

Period of Performance: October 1993 - Present

Assistance by CDI:

- Identified SPEC, Industries as supplier of appropriate low-cost technology for towns in Orlice and Palava regions.
- Mapped out itinerary and accompanied SPEC representatives on travel to region in November 1993 to demonstrate their technology.
- Aided SPEC, Industries in their efforts to select a Czech firm to participate in a joint venture/licensing agreement and to get a demonstration project up and running in Palava or Orlice regions.
- Facilitated negotiations between SPEC and prospective local candidate for licensing agreement, AMARE.
- Assisting SPEC in presenting licensing agreement to other qualified firms in the Czech Republic.

Outcome: SPEC is cooperating with AMARE and the city of IVAN in the Palava Region to construct a sewage treatment plant using SPEC technology. Construction slated to begin in February of 1995.

SPEC has designed a project for Klasterec and hopes to implement that as well.

Lessons Learned:

The structuring of this project utilized the opportunities offered under the CDI Environmental Subcomponent that have also contributed to the success of many other ventures. It was the unique combination of U.S. and local expertise in the CDI/Prague office that made it possible to identify the regional need for alternative low-cost wastewater systems and to research objective information on costs and performance of appropriate technologies. The additional benefit of having an in-country office made it possible to provide a consistent presence to serve as a facilitator for two prospective partners whose companies are located many thousands of miles apart.

PROJECT SUMMARY

Project Name: Foundry Sand Disposal

Target Category: Recycling

Description/Objective: Research options and develop and implement environmentally sound, cost-effective alternatives to methods of disposal of foundry sand currently practiced by City of Brno.

Participants: Local Government: City of Brno, Czech Republic
Local Firm: Proekos
U.S/Czech Firm: CEVA Tech

Location: Brno, Czech Republic

Period of Performance: August 1993 -

Assistance by CDI:

- Interviewed seven foundries in area to determine their level of interest in such a project and discuss their waste disposal needs.
- Circulated detailed survey to foundries to further refine project. Compiled results and translated to English.
- Identified firm, CEVA Tech, which could provide solution for disposal of sand via their contracts to supply sand to cement kilns for use in production.
- Supplied prospective disposal partner with price survey for disposal of sand from foundries and assessed transportation costs.
- Facilitated negotiations between CEVA Tech and foundries in Brno region for the disposal of sand.

Outcome: In April 1994, CEVA Tech signed a contract with a local waste management firm, Proekos, for the rights to the sand from foundries in Moravia.

In April 1994, CEVA Tech signed agreement with cement works, Mokra, for disposal of sand from foundries in Moravia.

Outcome:

In May 1994, CEVA Tech signed agreement with cement works, Prachovice for disposal of foundry sand in Moravia.

Prospect for additional disposal contracts with Proekos and other foundries.

Lessons Learned:

Industrial waste recycling can be a cost-effective solution to waste disposal needs. It requires integration by advisors like CDI Environment who "put all the pieces together."

PROJECT SUMMARY

Project Name: Municipal Finance Planning

Target Category: Innovative Wastewater Treatment

Description/Objective: To assist local municipalities structure financeable wastewater treatment plants.

Participants: Municipalities: Jablonne, Hlohovec
U.S. Municipal Finance Expert: Stephanie Lewis

Location: Czech Republic

Period of Performance: March 1994 - September 1994

- Assistance by CDI Staff/
Expert:**
- Selection of appropriate recipient based on receptivity to training and ability to secure financing.
 - CDI Environment Headquarters executed advanced planning with USAID sponsored Municipal Infrastructure Finance Program. CDI took advantage of existing training programs and obtained introductions to potential sources of funding.
 - Before travel to region, expert prepared basic municipal financing document containing sources of capital for construction and a stream of revenues for self-sufficient operation with emphasis on needs for sewage treatment plants.
 - Local CDI Environment office translated document and provided to municipalities.
 - Expert traveled to region to meet with municipal officials to establish the concept of self-sufficient, self-financing municipal projects.
 - Met with local water and sewage company to explore possible structures of new relationship with municipalities.
 - Worked with local officials to separate capital and operating budgets and establish appropriate sewage fees.

- Constructed rough budget, pro forma income statement and balance sheet for new sewage treatment plant for the current year.
- Designed financial models for the wastewater treatment projects to calculate user fees.
- Returned to region to explain the results of the financial assessments to local officials.

Assistance by CDI:

- Expert gave presentation to Orlice regional group as whole on important aspects of creating self-supporting municipal wastewater treatment projects.

Outcome:

Municipalities were provided with a "how-to" guide to structure small municipal projects and establish relationships with local water authorities.

Lessons Learned:

This project addressed weak areas that have been critical factors in prior project failures:

- No project can be successful without financing and CDI Environment focused significant effort on helping local communities learn how to structure financeable projects.
- Low-cost projects should be emphasized and need extra support.

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PROJECT SUMMARY

- Project Name:** Fieldstone
- Target Category:** Recycling
- Description/Objective:** The formation of a joint venture to construct a state-of-the-art environmentally sound wastepaper de-inking and pulp production facility.
- Participants:** Local Firm: Czech paper mill (not identified by U.S. firm)
U.S. Firm: Fieldstone Private Capital Group
- Location:** Czech Republic
- Period of Performance:** May 1993 - December 1993
- Assistance by CDI:**
- Prepared three in-depth reports on domestic conditions in waste paper collection and recycling.
 - Efforts made to locate potential U.S. partners.
- Outcome:**
- Based on CDI efforts, Memorandum of Understanding signed between Czech paper mill and Fieldstone in July 1993.
 - Project failed as a result of local partners ensuing financial difficulties and revised import restrictions on wastepaper. U.S. firm redirected efforts to Hungary and Poland.
- Lessons Learned:** This project was derailed by two elements: lack of local partner's long-term stability and the fluctuating regulatory climate. This illustrates that a variety of circumstances can contribute to a project's failure and careful analysis and planning should precede any project development.
- Spin-Off:** Assisted Czech Ministry of the Environment (MOE) and Ministry of Industry in study of paper recycling situation in the Czech Republic. CDI Environment Prague office supplied U.S. regulations and studies on paper recycling. A possibility exists to provide further assistance to the MOE in their attempt to establish an incentive program for recycled paper. Outcome could be a more flexible approach to waste import restrictions where a cost-effective/environmentally sound business would ensue.

PROJECT SUMMARY

Project Name: Comco-Martech / Earthshield

Target Category: Soil Remediation / Surfactants

Description/Objective: Create a joint venture between a local company in need of an effective surfactant to use in its soil remediation program and a company to supply that need.

Participants: Local Firm: Comco-Martech
U.S. Firm: Earthshield

Location: Prague, Czech Republic

Period of Performance: March 1993 - June 1993

Assistance by CDI:

- Established communication between the firms.
- Arranged for delivery of Earthshield's product to Comco-Martech's lab for testing.
- Facilitated joint venture negotiations between companies.

Outcome:

Testing of product was successful.

Joint venture established between two companies to include Earthshield's products in Comco-Martech proposal for PCB remediation

Comco-Martech won tender for Rozmytal site remediation.

Lessons Learned: This project illustrated the importance of local staff in facilitating the U.S. and local environmental business linkages that made this project a success.

PROJECT SUMMARY
Interregional

Project Name: Wastewater Technology Selection Assistance - Interregional

Target Category: Alternative low-cost waste-water treatment

Description/Objective: To assist local municipalities assess potential for introduction of alternative low-cost wastewater treatment technologies.

Participants:

Orlice Region:	Klasterec, Pasviny, Nekor
Palava Region:	Milovice
Slovakia:	Hajnacka
CDI Short-term Expert:	Frank Schutz

Location: Czech Republic/Slovak Republic

Period of Performance: April 1994 - November 1994

**Assistance by CDI Staff/
Expert:**

- CDI Environment office in Prague evaluated regional needs and generalized the technical assistance required.
- CDI Environment office in Slovakia customized work statement to address specific needs of the candidate region for assistance in the Slovak Republic.
- CDI Headquarters selected qualified U.S. technical expert, Frank Schutz, Adjunct Assistant Professor of Public Administration, Water and Wastewater Extension Specialist, West Virginia University (WVU). Mr. Schutz has directed numerous rural wastewater demonstration projects and has served as Assistant Director of the WVU EPA Small Flows Clearinghouse.
- Expert provided information and explanation on the operation and cost-effectiveness of representative alternative technologies to municipal officials.
- Expert developed summary descriptions of the physical/technical parameters of the subject villages for use in evaluating the appropriateness of alternative treatment technologies.
- Expert presented preliminary system recommendations, highlighting both advantages and drawbacks of each proposed system.

Assistance by CDI:

- Expert prepared "final" recommendations on appropriate systems including a process summary for future use as a guide to villages for taking the next steps in collecting and developing the information necessary to evaluate the suitability of alternative technologies.
- Expert provided a list of contacts of American individuals or companies who are specialists in designing and implementing these alternative systems.

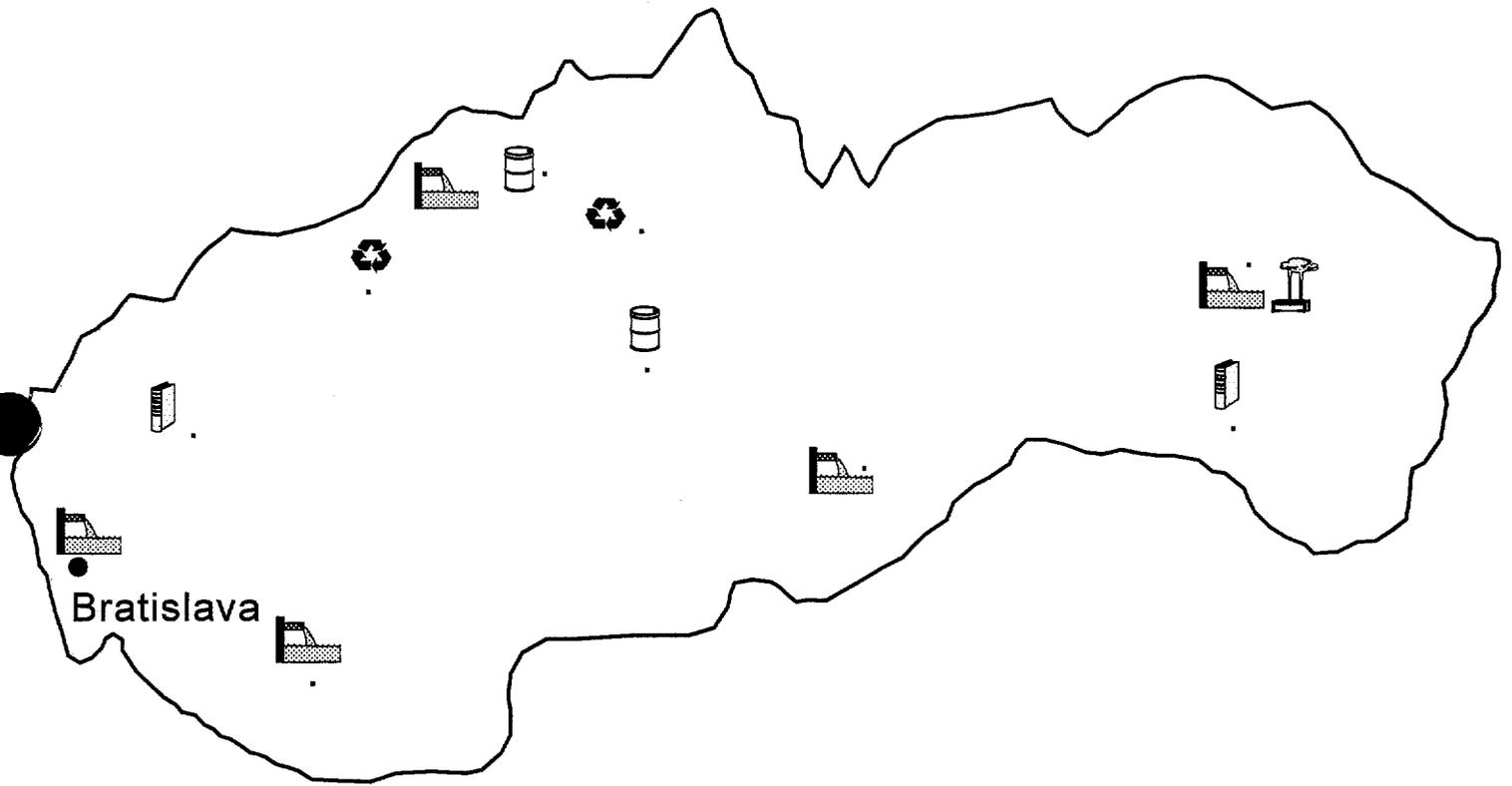
Outcome:

Villages in Slovakia and the Czech Republic sent follow-up questions. Mr. Schutz arranged for several U.S. suppliers to provide no-cost proposals tailored to town needs.

Lessons Learned:

Hands-on site visits by experts greatly facilitate the technology selection process and increase potential that U.S. suppliers will be selected.

Slovakia Environmental Projects



LEGEND			
Air		Policy	
Recycling		Waste Management	
Site Remediation		Wastewater Treatment	

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Environmental and Business Context

SLOVAKIA

Environmental Overview

Slovakia, or the Slovak Republic, was recently divorced from its neighboring country, the Czech Republic, in the beginning of 1993. Prior to that period, the two countries, or what was then Czechoslovakia, faced grave environmental challenges resulting from over four decades of industrial and municipal pollution. Newly created Slovakia has focused more attention on environmental issues, yet lacks the financial resources of the neighboring Czech Republic to enforce new legislation. This country does, however, possess extremely well-educated environmental engineers and scientists who understand the complex pollution problems the country must solve.

Of greatest concern in Slovakia are the areas of environmental remediation, wastewater treatment and solid waste management. In the past, great emphasis was placed on the metallurgical and chemical industries, without efficient waste minimization practices. This has led to severely concentrated soil and groundwater contamination. The Slovak Republic lacks the technologies for clean-up of those contaminated sites. These are becoming of particular importance during the current period of privatization and repatriation of state property. Waste management needs are in the area of both municipal and industrial landfilling, with high growth expected in this area through the year 2000.

The area of wastewater treatment poses one of the greatest challenges to Slovakia. Only 10% of over 2800 Slovak towns and villages are currently provided with sewage handling services. There are many Slovak firms that have the capability to build wastewater treatment systems, but their experience has

been in the construction of large systems, often over-built for local capacity and too costly to be financed. There are currently several unfinished wastewater treatment systems in the Slovak Republic that will not be completed in the near future due to the lack of public funds for these plants. Therefore, there is a need for low-cost, highly efficient systems for small cities and communities, as well as a need for training on the design of efficient systems for local engineers who are knowledgeable in these technologies.

Government/Jurisdiction/Finance

As stated above, the Slovak Republic is a very young country, whose progress is hindered by constant political struggles and pressing budgetary and economic constraints. In the course of the past two years, the Prime Minister, Mr. Meciar, has been forced to resign and has been reinstated three times. New environmental legislation has been passed, such as a wastewater law prohibiting any new construction which will degrade the current water situation; and air pollution restrictions on hydrocarbons, carbon dioxide, and other greenhouse gases have been determined for drastic reductions by 1996. Nevertheless, by the end of 1994, Slovakia had not yet passed formal legislation concerning environmental liability. Public services, such as water and electricity are still heavily subsidized by the government. This is expected to change in 1995, but since these services are presently undercharged, there is little incentive to save energy or water resources.

Unlike Poland and the Czech Republic, Slovakia does not yet have a National Environmental Fund. This lack of funding severely hampers the Slovaks from improving the environment. Therefore, the

ability to find very low-cost or self-financing (co-generation) systems for Slovakia is of greatest importance in this country.

The CDI Experience

The CDI Environment Subcomponent opened its branch office in Bratislava, the capital of Slovakia in January of 1994. Some of the projects worked on were initiated from the Prague office before the country split, such as the tire recycling project described in the project summaries. Over the course of CDI involvement, one joint-venture was completed for the delivery of low-cost, energy-efficient municipal water treatment systems and several other business propositions are still in discussion in the Slovak Republic.

Some important things to consider in working in Slovakia are the lack of optimism and financing to get projects off the ground. Slovaks have seen many foreign experts come and go from the time Czechoslovakia gained independence. They now have a healthy skepticism that new foreign visitors are interested in helping to solve their problems. While many reports have been written, few (if any) foreign firms are interested in investing in the Slovak Republic. On the other hand, one can understand the trepidation American firms have in working in Slovakia. Most Slovaks are not educated in business/financing and business management practices. They need training in writing of business plans and understanding how to analyze the market for new Slovak environmental business ventures. Without this, it is natural for Americans to hesitate in investing in this country.

On the positive side, local labor and materials are inexpensive compared to U.S. standards. If U.S. firms have low-cost technologies which can use local materials and a highly-educated labor force, there is

great potential for this country. An example of this is the joint-venture between the Seattle-based firm in Slovakia for water treatment. This company has proven that, with patience and understanding of the local market, a U.S. firm can succeed in developing environmental business in the Slovak Republic.

Project Matrix

**SLOVAKIA
WATER/WASTEWATER TREATMENT**

Project Name	Description and Objective	Outcome
SPEC Industries (Seattle, WA) and HydroVrt (Bratislava, Slovakia)	- Licensing agreement with local firms to represent Spec AIR technology [April '94 -]	- Sept. '94 Confidentiality Agreement signed. - Spec is intent on forming JV.
SPEC Industries (Seattle, WA) and BB Aqex (Bystrica, Slovakia)	- Coordination of meetings between two parties Possible licensing partner talks. [April '94 -]	- Successful completion of business plan & application; introduction of Aqex to SAEF;
Duha Engineering (Presov, Slovakia)	- To supply wastewater treatment engineering and finance services. [May '94]	- No further talks, Duha has yet to forward requested material
Hydro-power	- Investigation of low-head hydro power opportunities in Slovakia. [May '94]	- Meetings held with two companies, contact made with six companies; meetings with State Electricity Company, Ministry of Economy, Association of Low-Head Hydros
Sala, Slovakia	- Assist Sala in structuring financeable wastewater treatment plant. [May '94 -]	- June '94 short-term finance expert visited region to gather data and work with local officials to establish concept of self-financing municipal project. - Sept '94 Expert returned to region to explain results of financial assessments. Municipality provided with "How-to" guide to structure small municipal projects.

**SLOVAKIA
WATER/WASTEWATER TREATMENT**

Project Name	Description and Objective	Outcome
Hajnacka, Slovakia	- Identify appropriate low-cost wastewater treatment technologies. [May '94 -]	- Short-term technical expert sent to Slovakia from Oct 8-11, '94. Expert recommended best options, provided technical specifications, contacted U.S. providers of technology. - Peace Corps volunteer is cooperating in seeking local financing. Attempts made to locate suitable organization for pass-off of this project.

**SLOVAKIA
WASTE MANAGEMENT**

Project Name	Description and Objective	Outcome
KRR Group (Knoxville, TN) and DeTox (Banska Bystrica, Slovakia)	- Assist in locating local partner for projects in site remediation and hazardous/nuclear waste processing. [May '94 -]	- Introduced KRR to several Slovak environmental companies; DeTox selected as viable candidate. The two parties met in Sept '94; further discussions scheduled.
INGEO (Slovakia) and Acker Drill Co. (Scranton, PA)	- Acquire technology for Hollow Stem Auger system to monitor wells near landfills, and for soil evaluation. [June '94 -]	- Technology provider, Acker Drill, contacted and information supplied.
Alpha Bio	Bioremediation [Sept. '94]	- Introduced to U.S. company KRR Group

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**SLOVAKIA
RECYCLING**

Project Name	Description and Objective	Outcome
EuroSarm (Martin, Slovakia)	Tire-Recycling to produce crumb rubber for use in paving [Jan. '93 - Aug. '94]	- Financial Advisor provided at 3 critical stages. - U.S. partner/investor identified. - Assistance in developing business plan and application to SAEF. - SAEF decision not to fund based on lack of investor (investor withdrew) and cofinance.
Replast Co. (Puchov, Slovakia) and Odor Management, Inc. (New Hope, MN)	- Search U.S. technologies that will remove noxious odors from plastics recycling process. - Assist Replast in selecting the most appropriate technology; contact supplier. [June, '93]	- U.S. technology provider, Odor Management Inc., shipped their product to Slovakia to be tested in Jan '95. Test results successful.

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**SLOVAKIA
MISCELLANEOUS**

Project Name	Description and Objective	Outcome
East Slovak Ironworks (VSZ-Kosice)	Assist development of regional analytical laboratory [Begun by K. Macek for PRIDE in June '92]	Privatization slowed; local momentum and interest diminished by other priorities. Introduced to USAID as possible candidate for EAP project.
Chemolak (Smolenice)	- Identify U.S. company with technology and willing to license to Chemolak, a large producer of resin, glues, and paints for ships.	- U.S. companies researched and list of identified companies provided to Chemolak on Oct 6, '94. Potential U.S. partner expected.
Presov	- Assist Presov branch of National Agency for the Environment in preparation of regional environmental policy [Spring '94 -]	Critique and response to regional environmental policy provided.

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Project Summaries
By Environmental Target Category

PROJECT SUMMARY

- Project Name:** Spec/HydroVrt Municipal Sewage Treatment
- Target Category:** Innovative Wastewater Treatment
- Description/Objective:** The signing of a territory licensing agreement and formation of a joint venture between a Slovak and a U.S. company, for the purpose of marketing and implementing the US firm's patented sewage treatment system to municipalities in the Slovak Republic. This system is especially tailored for small capacity demand.
- Participants:** Local Firm: HydroVrt
U.S. Firm: SPEC, Industries
- Location:** Kuchyna, Slovak Republic
- Period of Performance:** May 1994 - Present
- Assistance by CDI:**
- Arranged and conducted six detailed meetings between U.S. supplier of low-cost wastewater treatment technology, SPEC Industries, and interested Slovak engineering, manufacturing and consulting companies.
 - Worked with SPEC to identify local firm, HydroVrt, as a prospective joint venture/licensing partner. Provided information on local firm's background and conducted limited due diligence as preparation for the two companies to enter into negotiation.
 - Facilitated negotiations between SPEC and HydroVrt.
- Outcome:** HydroVrt and SPEC, Industries signed two agreements in September 1994: 1) a Letter of Agreement to sign a licensing agreement for Slovakia; 2) a Letter of Intent to create a Slovak company or a division of SPEC.
- Lessons Learned:** Successful project coordination between regional offices can serve to significantly decrease the amount of time invested in a second or third related project before tangible results are produced. The prior work done by the Budapest and Czech offices to research the need and verify the appropriate technology in this environmental sector, enabled the Slovak office to structure this venture in much less time than would have been otherwise required.

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PROJECT SUMMARY

Project Name: Euro•Sarm

Target Category: Recycling

Description/Objective: Provide the Slovak company, Euro•Sarm, with investment and technology suppliers for a tire processing and recycling facility they wished to construct in either the Czech or Slovak Republic.

Participants: Local Firm: Euro•Sarm

Location: Slovak Republic

Period of Performance: April 1993 - July 1994

Assistance by CDI:

- CDI Environment office in Prague supplied Euro•Sarm with information regarding waste regulations, import/export requirements, existing tire processing facilities in Czech Republic.
- CDI/Headquarters developed SOW and selected short-term technical expert to travel to region to survey investment opportunities for U.S. companies in tire recycling programs in Czech and Slovak Republic and to work with Euro•Sarm to develop full scale business plan for proposed facility.
- Short-term expert and CDI Environment RBDO assisted Euro•Sarm in perfecting market analyses.
- Short-term expert and CDI Environment RBDO assisted Euro•Sarm in developing an application for financial assistance to the Slovak American Enterprise Fund (SAEF).
- Short-term expert and CDI Environment RBDO assisted Euro•Sarm in presenting its application to SAEF.
- Short-term expert met with U.S. firms with suitable technology and identified prospective equity investor.
- Short-term expert met with SAEF investment officer to discuss status of Euro•Sarm's application. Expert supplied additional information needed to conduct due diligence.

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Assistance by CDI:

- Short-term expert, RBDO and CBDA-Slovakia held additional meetings with SAEF to ascertain Fund's position concerning Euro•Sarm's application.

Outcome:

In June 1994 the project stalled for several reasons: Euro•Sarm elected not to produce a market study with International Executive Service Corps that SAEF was now requiring; previously identified U.S. investor elected not to expand his base to include CEE at this time.

In July 1994 Euro•Sarm's application was rejected by SAEF citing absence of U.S. partner for investment and co-finance.

Euro•Sarm has decided not to go forward with the project at this time.

Spin-Off:

Polish firm, Mostostal-Export is considering waste tire recycling project but could not locate suitable technology for project requirements. Drawing on information compiled for Euro•Sarm project, CDI introduced Mostostal to a U.S. supplier of viable technology. Study will be conducted to determine suitability of technology.

Lessons Learned:

Projects fail for a wide variety of reasons. In this case, the prospective local financing institution (SAEF) could not be satisfied that the market demand and the addition of an equity partner were enough for the project to succeed. SAEF also feared that regulatory issues might interfere with the source of tires needed to sustain a recycling operation.

Euro•Sarm

PROJECT SUMMARY

Project Name: Municipal Finance Planning

Target Category: Innovative low-cost waste-water treatment

Description/Objective: To assist local municipality structure financeable wastewater treatment plant.

Participants: Municipality: Sala
U.S. Municipal Finance Expert: Stephanie Lewis

Location: Slovak Republic

Period of Performance: March 1994 - September 1994

**Assistance by CDI Staff/
Expert:**

- Selection of appropriate recipient based on receptivity to training and ability to secure financing.
- CDI Environment Headquarters executed advanced planning with USAID sponsored Municipal Infrastructure Finance Program. CDI took advantage of existing training programs and obtained introductions to potential sources of funding.
- Before travel to region, expert prepared basic municipal financing document containing sources of capital for construction and a stream of revenues for self-sufficient operation with emphasis on needs for sewage treatment plants.
- Local CDI Environment office translated document and provided to municipal officials.
- Expert traveled to region to meet with municipal officials to establish the concept of self-sufficient, self-financing municipal projects:
- Expert worked with local officials to separate capital and operating budgets vis-a-vis the existing and the new proposed sewage treatment plant.
- Expert provided a list of information to be developed by the town. Developed a rough budget outline to guide the information development.

Assistance by CDI:

- Expert recommended "ideal" sewage charges and draft budget, proforma income statement and balance sheet, using information developed by municipality.
- Expert returned to region to explain the results of the financial assessments to local officials.
- Presentation to Orlice regional group on important aspects of creating self-supporting municipal wastewater treatment projects was distributed to Sala officials.

Outcome:

Municipality was provided with a "how-to" guide to structure small municipal projects and establish relationships with local water authorities.

Lessons Learned:

This project addressed weak areas that have been critical factors in prior project failures:

No project can be successful without financing and CDI Environment focused significant effort on helping the local community learn how to structure financeable projects.

Low-cost projects should be emphasized and need extra support.

PROJECT SUMMARY
Interregional

Project Name: Wastewater Technology Selection Assistance - Interregional

Target Category: Alternative low-cost waste-water treatment

Description/Objective: To assist local municipalities assess potential for introduction of alternative low-cost wastewater treatment technologies.

Participants:

Orlice Region:	Klasterec, Pasviny, Nekor
Palava Region:	Milovice
Slovakia:	Hajnacka
CDI Short-term Expert:	Frank Schutz

Location: Czech Republic/Slovak Republic

Period of Performance: April 1994 - November 1994

**Assistance by CDI Staff/
Expert:**

- CDI Environment office in Prague evaluated regional needs and generalized the technical assistance required.
- CDI Environment office in Slovakia customized work statement to address specific needs of the candidate region for assistance in the Slovak Republic.
- CDI Headquarters selected qualified U.S. technical expert, Frank Schutz, Adjunct Assistant Professor of Public Administration, Water and Wastewater Extension Specialist, West Virginia University (WVU). Mr. Schutz has directed numerous rural wastewater demonstration projects and has served as Assistant Director of the WVU EPA Small Flows Clearinghouse.
- Expert provided information and explanation on the operation and cost-effectiveness of representative alternative technologies to municipal officials.
- Expert developed summary descriptions of the physical/technical parameters of the subject villages for use in evaluating the appropriateness of alternative treatment technologies.
- Expert presented preliminary system recommendations, highlighting both advantages and drawbacks of each proposed system.

Assistance by CDI:

- Expert prepared "final" recommendations on appropriate systems including a process summary for future use as a guide to villages for taking the next steps in collecting and developing the information necessary to evaluate the suitability of alternative technologies.
- Expert provided a list of contacts of American individuals or companies who are specialists in designing and implementing these alternative systems.

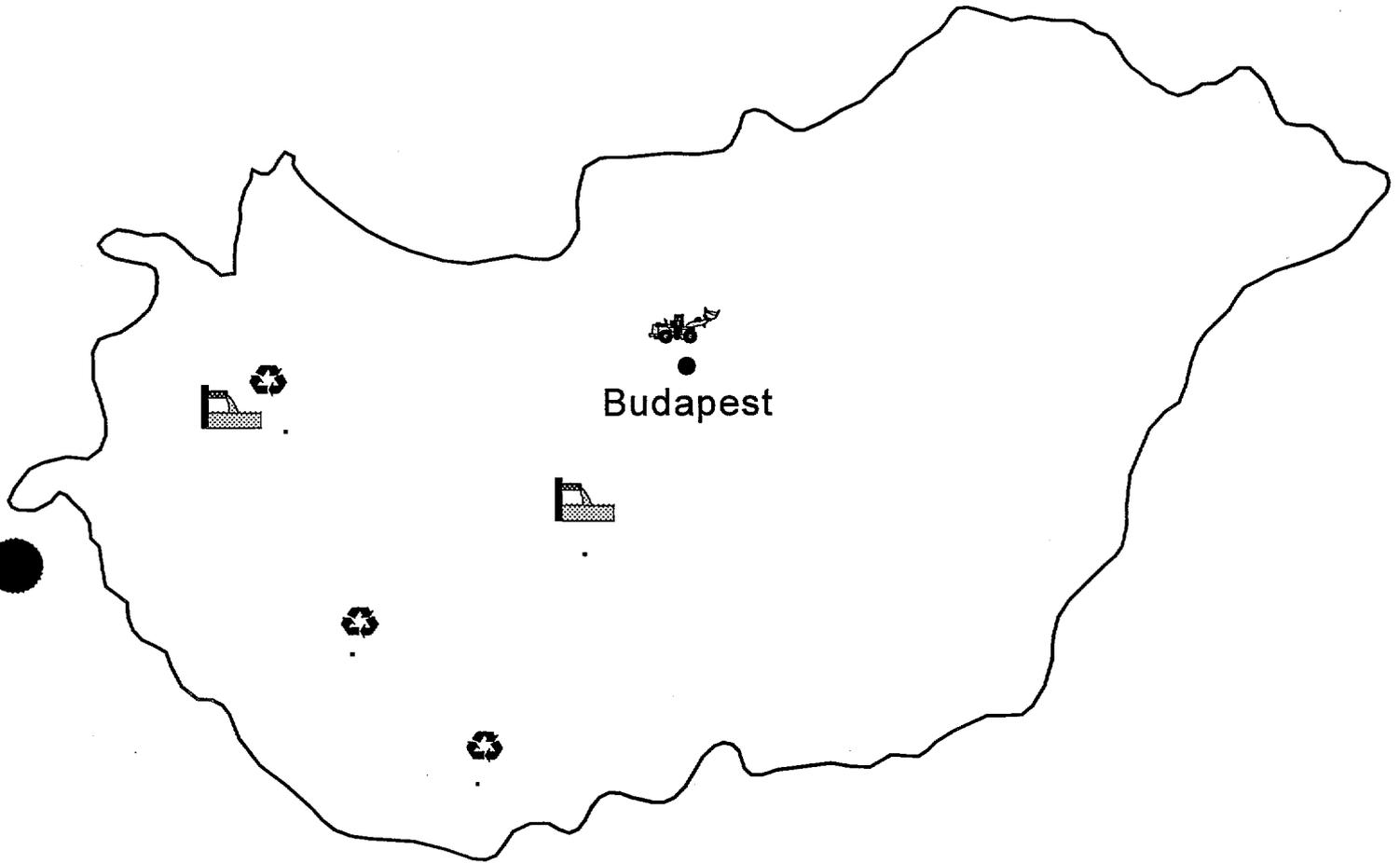
Outcome:

Villages in Slovakia and the Czech Republic sent follow-up questions. Mr. Schutz arranged for several U.S. suppliers to provide no-cost proposals tailored to town needs.

Lessons Learned:

Hands-on site visits by experts greatly facilitate the technology selection process and increase potential that U.S. suppliers will be selected.

Hungary Environmental Projects



LEGEND

Air		Policy	
Recycling		Waste Management	
Site Remediation		Wastewater Treatment	

Environmental and Business Context

HUNGARY

Environmental Overview

Hungary, like its neighbors, suffers environmental damages as a result of industrial pollution and lack of enforcement of environmental policy and laws. The areas of greatest concern in this country are in the water sector. Implementation of sewage treatment systems recently received national policy priority. Other areas of importance are in waste management, especially municipal solid waste.

Government/Jurisdiction/Finance

The Hungarian government has given national priority to wastewater treatment while enforcement of other environmental legislation is sadly lacking. As is so often the case, financing is the biggest obstacle to environmental projects; many international companies, whose intent it is to work here, are expected to bring financing with them.

The CDI Experience

Sanders International opened its Budapest office in March of 1993. By the end of that year, on December 31, USAID determined that this office would be closed. The office closed because the Hungarian market was not ready for environmental projects. There were other more urgent sectoral problems in the country. The government did not have the budget to make environmental improvements a high priority at that time. Therefore, Sanders' involvement in this country lasted only nine months out of the three year contract.

Despite our limited time in-country, we learned a number of valuable lessons. Many Western European companies had already made great inroads in this country,

particularly in the area of water treatment in large cities. Therefore, U.S. firms did not have the competitive advantage in this area, but could compete in water treatment services for smaller municipalities, offering low-cost, efficient smaller systems. One U.S. firm was successful in signing a partnership with a local firm for licensing the U.S. technology. However, after the CDI office closed, the Hungarian partner pulled out of the deal, deciding to focus on other priorities instead of low-cost waste water treatment.

There were also a number of opportunities for partnerships for applying for tenders to bid on large environmental projects. American partners had an opportunity to better understand the local conditions, and to decide at a later time whether to develop a permanent business relationship. We learned that local activities of the American companies seeking large tenders are less likely to succeed without the assistance of an intermediary, such as the regional CDI office, which can provide information on the potential for local partnerships.

While there are many well-educated scientists and engineers available to work on environmental problems, there are few business people trained in how to write business plans or to prepare market surveys for new technologies. U.S. firms must recognize this fact and be prepared to spend a significant amount of time with the local partner developing a business plan, or work with local business training programs to advance their initiatives.

Project Matrix

HUNGARY WATER/WASTEWATER TREATMENT		
Project Name	Description and Objective	Outcome
SPEC Industries (Seattle, WA) and Hydroferr Industrial Ltd. (Szentcsanak, Csongrad)	- To locate JV partner to license and sell system. Small capacity sewage treatment and recycling systems country wide . [May '93 - Present]	-Dec. '93 non-disclosure and letter of authority signed. Deal ultimately failed because local partner had other priorities.
Ionel Ltd.	- JV to trades or produces fittings, automation units, pressure vessels and other components for water treatment equipment.	Discontinued when CDI was terminated in Hungary, (hereafter "Discontinued")
Town of Celldomok and Future Waters	- Help obtain subsidy from the Government to build a sewage treatment plant for the town and its surrounding area; the town to issue a tender. [July '93]	Discontinued
Hajduvid Chicken Farm	- Low-cost technology for the treatment of produced wastewater with high organic load.	Discontinued
Hydroferr Industrial Ltd. and Black & Veatch, Bienstock, Lucchesi, Culligan, America Engineering Services	- Find technology for removal of arsenic and ammonia from drinking water. [Nov. '93]	Discontinued
Future Waters, (New York) and Dunaujvaros, Hungary	- Assist in the implementation of model waste water reclamation and reuse systems in Dunaujvaros [July '92 - Oct. '93]	- Future waters received only environmental. CDI support grant. - Plant under construction.

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**HUNGARY
RECYCLING**

Project Name	Description and Objective	Outcome
Town of Pecs and Neuenschwander & Ass.	- To introduce appropriate technology for selectively collected waste reprocessing. - Town to operate plant to produce biobriquettes. [Sept. '93]	- Data on marketability of technology collected and presented to Co. No local partner found yet.
Town of Celldomok	[Same as Pecs]	Discontinued
Town of Fonyod	- The sanitation company has implemented selective waste collection; they now seek technology for the reprocessing of stored wastes.	Discontinued
Agro-Fern Ltd.	- To obtain Technology for recycling agriculture and animal wastes [July '93]	Contacted 3 U.S. firms without result

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HUNGARY
SITE REMEDIATION

Project Name	Description and Objective	Outcome
Viktoria, Ltd.	- Seek U.S. JV partner with technology for high efficiency microbial oil resolution [May '93 -]	- Verbal agreements about cooperation; however Co. not forthcoming with requested business plan and information.
Earth Consultant	- To get ETP grant to do training program of environmental hazards of asbestos [June '93]	Discontinued

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Project Summaries
By Environmental Target Category

PROJECT SUMMARY

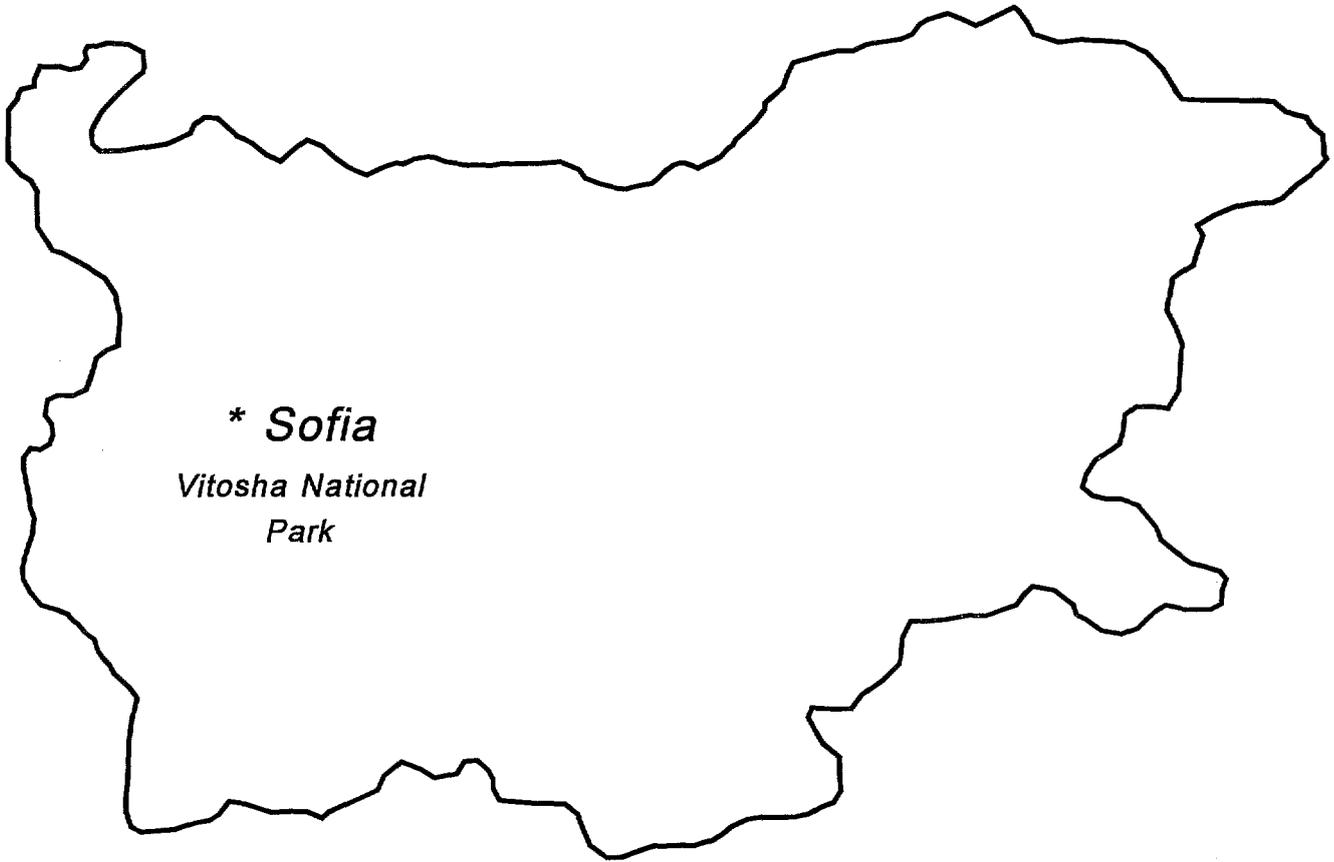
- Project Name:** Spec/Hydroferr Municipal Sewage Treatment
- Target Category:** Innovative Wastewater Treatment
- Description/Objective:** The signing of a territory licensing agreement and formation of a joint venture between a Hungarian and a U.S. company, for the purpose of marketing and implementing the US firm's patented sewage treatment system to Hungarian municipalities. This system is especially tailored for small capacity demand.
- Participants:** Local Firm: Hydroferr Industrial Ltd.
U.S. Firm: SPEC, Industries
- Location:** Hungary
- Period of Performance:** May 1993 - December 1993
- Assistance by CDI:**
- Identified a prospective local partner for SPEC, Industries
 - Facilitated negotiations between the two firms.
 - Translated technical documents and documents for joint cooperation into Hungarian.
 - Arranged visits for SPEC representatives to municipalities that might serve as possible sites for this technology. Meetings were arranged with local water and environmental authorities.
- Outcome:**
- As a result of CDI efforts, a Non-Disclosure and Confidentiality Agreement was signed between Hydorferr and SPEC, Industries in December 1993.
 - Hydroferr experienced a change in management in 1994, and at that time, the company chose not to pursue the venture any further.
 - SPEC Industries is still interested in establishing a business venture in Hungary. They have obtained letters of intent from three municipalities interested in implementing SPEC's technology and are continuing the search for a local licensing partner.

Lessons Learned:

It takes a substantial amount of time to structure a business venture. A change in the management philosophy of either firm during this period can derail a project, as it did in this case. This is not limited to CEE business ventures, but could happen anywhere. However, had local representation still been available to encourage and support this venture, the new management of the Hungarian firm might have decided in favor of pursuing the project.

Hydroferr/SPEC

Bulgaria



Environmental and Business Context

BULGARIA

Environmental Overview

Bulgaria has all the environmental problems of its neighboring countries, yet the magnitude of these problems are less due to less industrial development in this country, in comparison to its neighbors. The area of greatest concern is in water. Bulgaria has been suffering from a drought for the past few years and water supplies are dangerously low. Sofia, for example, often has water cut-offs, with running water only available every second or third day to city dwellers. Waste management and disposal is also of great concern and technologies for waste incineration, or co-generation incineration are being explored.

Government/Jurisdiction/Finance

Of the five countries CDI was involved in, Bulgaria has been the most unstable politically and financially. The government has made great progress in writing environmental legislation, yet has made practically no progress in its implementation. The Ministry of Environment is one of the few ministries which has undergone fewer changes in key positions. However, with the elections of the Socialists in power, in December 1994, (and the replacement of the "Democratic Party"), there will certainly be changes in the government. Privatization is making little, if any, progress and it is not easy for foreign investors to enter this market.

A national Environmental Fund of sorts has been established in Bulgaria, however, the Bulgarian government often takes resources from this Fund and allocates them to other areas where there are budgetary shortfalls. The World Bank and the EBRD are international financing institutions interested in investing more money in the environment, whereas local banks are almost

unapproachable for loans. Interest rates on loans were 90% in the fall of 1994, with a payback period of only one to three years. This means that any environmental projects must be almost entirely self-financed, or supported by a large international financial institution.

The CDI Experience

As mentioned earlier, the CDI Environmental Subcomponent did not establish a local office during the course of this contract. The CDI experience was limited to one project for the development of ecotourism business opportunities for Vitosha National Park. However, during our one year of involvement in this project over 1994, a great deal was learned about the climate for environmental business in this country. As mentioned earlier, the instability of the government and difficulty in obtaining financing makes this country a difficult one to work in. We also became aware of the issues involved in trying to establish new businesses in Bulgaria.

Land and land-use issues are very complicated and will not be sorted out in the very near future, until privatization of land and businesses progresses. While working in Bulgaria, we met several business people and bankers who told us of the frustrations foreign investors have when trying to do business in Bulgaria. It seems they are unwilling to give up control of land to international business people. Therefore, our success was in locating local entrepreneurs to invest in ecotourism at Vitosha. We do not think the time is ripe yet in Bulgaria for foreign investment, yet we believe that this country will be ripe for some investment in the next two to three years once the government and economy stabilize.

PROJECT SUMMARY

- Project Name:** Vitosha National Park
- Target Category:** Ecotourism Business Development
- Description/Objective:** Overall project goal is to develop the first Visitors' Center for a national park in Bulgaria. CDI Environmental Subcomponent's role was to assist in development of eco-tourist business in buildings near the proposed Visitors' Center.
- Participants:**
- Local: Bulgarian Ministry of the Environment (MOE)
Town of Dragelevtsi, Bulgaria
 - U.S.: U.S. National Park Service
CDI Environmental Subcomponent
- Location:** Dragelevtsi, Bulgaria
- Period of Performance:** December 1993 - September 1994
- Constraints:** Only two of ten buildings that surround the park had land use and construction rights that were easily transferable for project use. Obtaining rights for other buildings will require at least one year, because the process for determining these rights is complicated and requires legal counsel.
- Assistance by CDI:**
- Conducted surveys at Vitosha National Park to determine market demand for various businesses, estimates for annual number of tourists, typical spending patterns, mode of transportation to park, patron preferences, and visitor demographics.
 - Developed Business Plan for a food facility and garden center for the two buildings with clear title.
 - Identified several potential investors for business development.
 - Presented Business Plan to MOE, local investors and government officials for the purpose of establishing a framework for its implementation through groups such as the Peace Corps, Small Business Development program and the University of Delaware.

Outcome:

As a result of the Business Plan Presentation, the first two of ten buildings were transferred from the city of Sofia to the MoE. These buildings are now ready for local investor development.

Lessons Learned:

The process of determining land ownership in Bulgaria is lengthy and requires the assistance of a lawyer. The time estimated to complete this process was underestimated and has contributed to delays in project implementation.